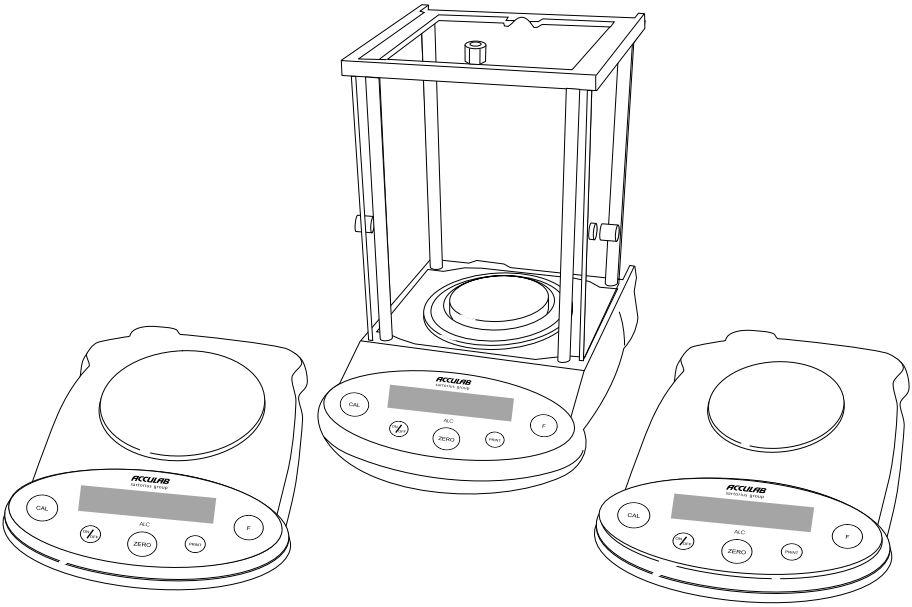
ACCULAB
sartorius group

Operating Instructions | Betriebsanleitung | Mode d'emploi | Istruzioni per l'uso | Manual de instrucciones

ALC Models | ALC-Modelle | Modèles ALC | Modelli ALC | Serie ALC

Electronic Analytical Balances and Precision Scales | Elektronische Analysen- und Präzisionswaagen | Balances électroniques d'analyse et de précision | Bilance elettroniche analitiche e di precisione | Balanzas electrónicas analíticas y de precisión



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Languages

Practical Use

The Acculab ALC Series offers precision balances/scales with capacities ranging from 0.1 mg to 6 kg.

These balances/scales meet the highest requirements on the accuracy and reliability of weighing results through the following features:

- Efficient filtering-out of unfavorable ambient conditions such as vibrations, drafts, etc.
- Stable and reproducible results
- Rugged, durable weighing system

ALC balances and ALC scales save work and speed up simple routine applications through:

- Ultrafast response times
- Easy operation

You can also choose from the following extra functions for simple applications:

- Toggling between weight units
- Net-total formulation (tare memory)
- Counting
- Weighing in percent
- Averaging

Contents

Warning and Safety Information

Read these operating instructions thoroughly before using your balance/scale to prevent damage to the equipment. Keep these instructions in a safe place.

Follow the instructions below to ensure safe and trouble-free operation of your balance/scale:

⚠ Make sure that the voltage rating printed on the AC adapter is identical to your local line voltage

⚠ Use only a commercially available 9-volt battery or rechargeable battery

⚠ Do not use this balance/scale in a hazardous area/location

- The only way to turn the power off completely is to disconnect the AC adapter

- Connect only Sartorius accessories and options, as these are optimally designed for use with your balance/scale.

- Protect the AC adapter from contact with liquid.

Do not open the balance/scale 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/scale to shocks, vibration, moisture or extreme temperatures.

Unpacking the Balance/Scale
- ● After unpacking the balance/scale, check it immediately for any visible damage as a result of rough handling during shipment.
- ○ 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/scale. Only the original packaging provides the best protection for shipment. Before packing your balance/scale, unplug all connected cables to prevent damage.

Equipment Supplied
The equipment supplied includes the components listed below:
ALC-80.4, ALC-110.4, ALC-210.4, ALC-210.3
- Balance/scale
- Weighing pan
- Pan support
- Shield ring
- Shield plate
- AC adapter

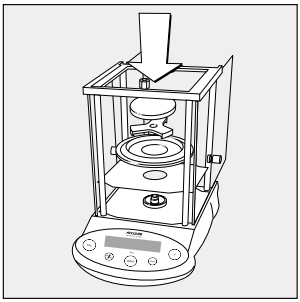
ALC-150.3, ALC-320.3
- Balance/scale
- Weighing pan
- Pan support
- Shield ring
- Shield plate
- AC adapter
- Glass cylinder

ALC-810.2, ALC-1100.2, ALC-2100.2, ALC-3100.2, ALC-2100.1, ALC-4100.1, ALC-6100.1
- Balance/scale
- Weighing pan
- Pan support
- AC adapter

Installation Instructions
Your balance/scale is designed to provide reliable weighing results under normal ambient conditions. When choosing a location to set up your balance/scale, observe the following so that you will be able to work with added speed and accuracy:
- Set up the balance/scale on a stable, even surface
- Avoid placing the balance/scale in close proximity to a heater or otherwise exposing the balance/scale to heat or direct sunlight
- Protect the balance/scale from drafts that come from open windows or doors
- Avoid exposing the balance/scale to extreme vibrations during weighing
- Protect the balance/scale from aggressive chemical vapors
- Do not expose the balance/scale to extreme moisture over long periods

Conditioning the Balance/Scale:
Moisture in the air can condense on the surfaces of a cold balance/scale whenever it is brought into a substantially warmer place. If you transfer the balance/scale to a warmer area, make sure to condition it for about 2 hours at room temperature, leaving it unplugged from AC power.

Information on Radio Frequency Interference Warning!
This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference, when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user, at his own expense, will be required to take whatever measures may be required to correct the interference.

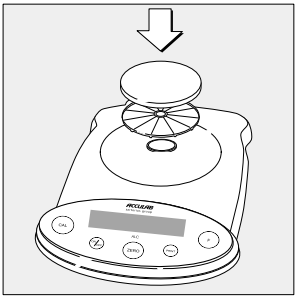


Setting up the Balance/Scale

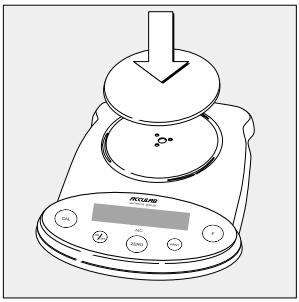
Balances/Scales with an Analytical Draft Shield Chamber:

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

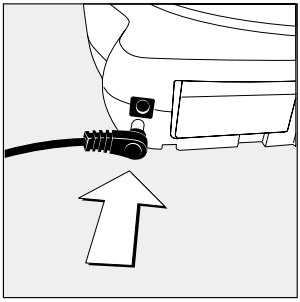
Balances/Scales with a Round Weighing Pan:



- Place the components listed below on the balance/scale in the order given:
  - Pan support
  - Weighing pan



- Place the components listed below on the balance/scale in the order given:
  - Pan support
  - Weighing pan



Connecting the Balance/Scale to AC Power/Safety Precautions

Use only original Acculab AC adapters:

- for Europe: 6971948
- for the U.S.: 6971947
- for the RSA: 6971949
- for Australia: 6971950

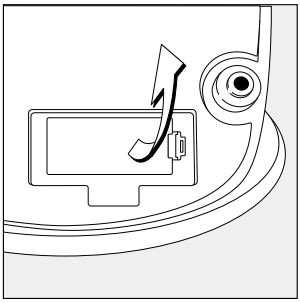
● Insert the right-angle plug into the jack

● The AC adapter rated to Class 2 can be plugged into any wall outlet without requiring any additional safety precautions

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

Using a Non-Rechargeable/Rechargeable Battery

(for models ALC-810.2, ALC-2100.1, ALC-4100.1 and ALC-6100.1)



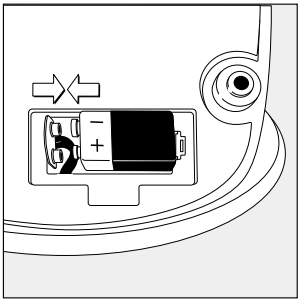
○ A non-rechargeable or rechargeable battery is not included with the equipment supplied

⚠ Use only a commercially available non-rechargeable or rechargeable 9-volt battery

⚠ When using a rechargeable battery, always use an external charger to recharge the battery

● Lay the balance/scale on its side

● Open the battery compartment: Lift the compartment cover

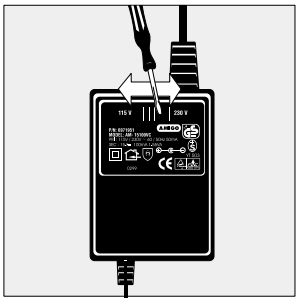


● Insert the 9-volt (rechargeable) battery in the compartment

○ Make sure to connect the positive and negative poles correctly

⚠ All used batteries are classified as waste that requires special handling (not “household” waste). Dispose of rechargeable batteries in accordance with the applicable special waste disposal regulations.

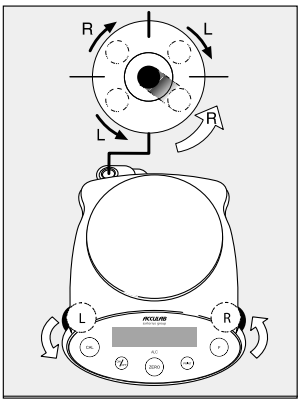
● Close the battery compartment: Press down on the cover until it clicks into place



Selecting the Line Voltage (Mains Voltage)
Use the following original AC adapters for selecting the line voltage:

– AC adapter TNG8, order no. 6971951 (universal)
  or
– AC adapter TNG8, order no. 6971952 (for the U.K.)

● Use the switch to toggle between 230 V and 115 V

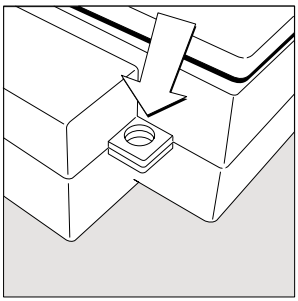


Leveling the Balance/Scale
Level the balance/scale any time you set it up in a new location.
Use only the 2 front feet of the balance/scale for leveling.

● Turn the 2 rear feet until they are in position

● Turn the 2 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/scale.

● Secure the balance/scale at the place of installation, for example with a chain or a lock

Operating the Balance/Scale

Basic Weighing Function

Available Features

– Taring the balance/scale

You can tare the balance/scale within the entire weighing range.

Preparation

● Turn on the balance/scale: Press [ON/OFF]

● To change configurations: See the chapter entitled "Configuring the Balance/Scale"

● To load factory-set configurations: See "Configuring the Balance/Scale," parameter 9 – 1

○ To tare the balance/scale: Press [ZERO]

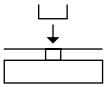
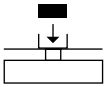
Additional Functions

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

Example

Basic weighing

Menu code settings: Factory-set codes

Step	Key (or instruction)	Display/Printout
1. Turn on the balance/scale	[ON/OFF]	
Self-test is performed		8.8.8.8.8.8.8.8 kg NET
2. Place container on balance/ scale (here: 52 g)		+ 52.0 g
3. Tare the balance/scale	[ZERO]	+ 0.0 g
4. Place sample in container on balance/scale (in this example, 150.2 g)		+ 150.2 g

Calibration/Adjustment*

Always calibrate/adjust the balance/scale after setting it up in a new location.

Available Features
Calibration/adjustment can only be performed when

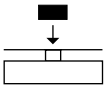
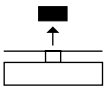
- there is no load on the balance/scale,
- the balance/scale is tared,
- the internal signal is stable.

If these conditions are not met, an error message is displayed.
The weight required for calibration/adjustment is displayed (see "Accessories" for calibration weights).

On ALC balances, calibration/adjustment can be performed with any of three weight units: g, kg**, or lb (menu code 1. 4. x)
Factory setting: Grams (menu code 1. 4. 1)

Example
Calibrate the balance/scale

Menu code settings: Factory-set codes

Step	Key (or instruction)	Display/Printout
1. Turn on the balance/scale	[ON/OFF]	8.8.8.8.8.8.8.8
2. Tare the balance/scale	[ZERO]	0.0 g
3. Begin calibration Calibration weight is displayed without weight unit (here: 1000 g)	[CAL]	+ 1000.0
4. Place the indicated calibration weight on the balance/scale		1000.0
After calibration, the calibration weight is displayed with wt. unit		+ 1000.0 g
5. Remove the calibration weight		0.0 g

* = "Calibration" technically means to determine the difference between the balance/scale readout and the actual weight on the pan to determine the accuracy. Adjustment means to bring a balance/scale into the state of accuracy required for its use. Therefore, "calibration," as used in this manual, actually means "adjustment."
** = not on models with a readability of 0.1 mg or 1 mg

Application Programs

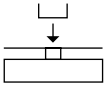
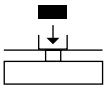
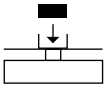
Net-Total Formulation/Second Tare Memory

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/Scale" Menu code 2. 1.3

Example

Step	Key (or instruction)	Display/Printout
1. Turn on the balance/scale	[ON/OFF]	8.8.8.8.8.8.8.8. kg/t NET
2. Place an empty container on the balance/scale		+ 65.0 g
3. Tare the balance/scale	[ZERO]	
4. Add the first component		+ 120.5 g
5. Store the first component weight	[F]	0.0 g_{NET}
If the print format is set to include data ID codes, the following is printed:		N1 + 120.5 g
6. Add the next component		+ 70.5 g
7. Store the 2nd component weight	[F]	0.0 g_{NET}
8. Add further components, if desired	As described for steps 5 and 6	
9. Display total weight	[CAL] <2 sec and fill to desired final weight	+ 191.0 g

Counting

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

Available Features
- Store the current weight value to have it loaded as the preset reference sample quantity next time you initialize the Counting application
- The reference sample quantity can be changed in the operating menu:
  See "Configuring the Balance/Scale"
- The average piece weight is automatically output via the optional data interface port after initialization, if the menu code for "Printout with data ID codes" is set
- Press [F] to toggle the display between piece count and weight

Factory Settings
Reference sample quantity: 10 (menu code 3. 3. 2)

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

- Reference sample quantity:
  Menu code 3. 3. 1 5 pcs
  Menu code 3. 3. 2 10 pcs
  Menu code 3. 3. 3 20 pcs
  Menu code 3. 3. 4 50 pcs
  Menu code 3. 3. 5 100 pcs

  See also "Configuring the Balance/Scale"

Example

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

Settings (changes in the factory settings required for this example):

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. Turn on the balance/scale	[ON/OFF]	8.8.8.8.8.8.8.8 kg/tl GN/ct/wt pcs % NET
2. Tare the balance/scale	[ZERO]	0.0 g
3. Display the reference sample quantity (here: 20 pcs)	[F] >2 sec.	rEF 20 (briefly)
4. Place the reference sample quantity (20 pcs) on the balance/scale (here: 66 g)		+ 66.0 g
5. Start the application; if the print format is set to include data ID codes, the following is printed:	[F]	+ 20 pcs wRef + 3.300 g
6. Weigh uncounted parts (here: 174 pcs)		+ 174 pcs
7. Display weight	[F]	+ 574.2 g
8. Display quantity	[F]	+ 174 pcs
9. Unload the balance/scale		0 pcs
10. Delete the reference value	[CAL] > 2 sec.	

11. Repeat the procedure starting from step 6, 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.

Available Features
- Store the current weight value to have it loaded as the preset reference percentage next time you initialize the Weighing in Percent application
- The reference percentage can be changed in the operating menu:
  See "Configuring the Balance/Scale"
- The reference percentage is automatically output via the optional data interface port after initialization, if the menu code for "Printout with data ID codes" is set
- Press [F] to toggle the display between percentage and weight

Factory Settings
Reference percentage: 10 (menu code 3. 3. 2)

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

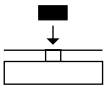
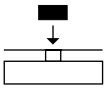
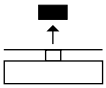
- Reference percentage:
  Menu code 3. 3. 1 5 %
  Menu code 3. 3. 2 10 %
  Menu code 3. 3. 3 20 %
  Menu code 3. 3. 4 50 %
  Menu code 3. 3. 5 100 %

  See also "Configuring the Balance/Scale"

Example

Determine an unknown percentage; store the weight on the balance/scale as a reference percentage

Settings (changes in the factory settings required for this example):
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. Turn on the balance/scale	[ON/OFF]	8.8.8.8.8.8.8.8 kgtl GNd/wt pcs % NET
2. Tare the balance/scale	[ZERO]	0.0 g
3. Display the reference percentage	[F] > 2 sec.	rEF 100
4. Place the reference weight for 100% on the balance/scale (here: 222.5 g)		+ 222.5 g
5. Start application; if the print format is set to include data ID codes, the following is printed:	[F]	+ 100.00 % Wxx% + 222.500 g
6. Place an unknown weight on the balance/scale (here: 322.5 g)		+ 144.94 %
7. Display weight	[F]	+ 322.5 g
8. Display percentage	[F]	+ 144.94 %
9. Unload the balance/scale		0.00 %
10. Delete the reference percentage	[CAL] > 2 sec.	

11. Repeat the procedure starting from step 6, if desired.

Weigh Averaging

Purpose
Use this program to determine weights under unstable ambient conditions. In this program, the balance/scale 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."

Available Features
- The measured result displayed is the arithmetic mean shown in the selected weight unit; a triangle indicates that this is a calculated value
- You can set the number of subweighing operations performed in the operating menu: See "Configuring the Balance/Scale"
- Press [F] for at least 2 sec. to display the preset number of subweighing operations
- Press [F] to toggle the display between the calculated result and the weight

Factory Settings
Number of subweighs for averaging: 10 (3. 3. 2)

Preparation
- Configure the Weigh Averaging application in the operating menu:
  See "Configuring the Balance/Scale"
  Menu code 2. 1. 12 Averaging

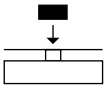
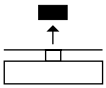
- Number of subweighs for weigh averaging:
  3. 3. 1 5 subweighs
  3. 3. 2 10 subweighs
  3. 3. 3 20 subweighs
  3. 3. 4 50 subweighs
  3. 3. 5 100 subweighs

  See also "Configuring the Balance/Scale"

Example

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

Settings (changes in the factory settings required for this example):
Menu: Application program: Weigh Averaging (menu code 2. 1. 12)

Step	Key (or instruction)	Display/Printout
1. Turn on the balance/scale	[ON/OFF]	8.8.8.8.8.8.8.8 kg/t GN/ct/wt pcs % NET
2. Tare the balance/scale	[ZERO]	0.0 g
3. Display the number of subweighs (here: 10)	[F] >2 sec.	rEF 10 (briefly)
4. Place sample on the balance/ scale (weight readout fluctuates; here: about 275 g)		+ 8888
5. Start measurement	[F]	+ 8888 10 9 8 ... 1
After 10 subweighs		+ 275.5 g ⚠
If the print format is set to include data ID codes, the following is printed:		RES + 275.5 g
6. Unload the balance/scale		+ 275.5 g ⚠ (stable display)
7. Delete the result	[CAL] > 2 sec.	
8. Repeat the procedure starting from step 4, 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/Scale," menu code 2. 1. 2 Toggle weight units (factory setting on ALC models)

Menu code		Unit	Conversion factor	Abbr. on printout
1. 7. 2 o	3. 1. 2 o	Grams	1.00000000000	g
1. 7. 3 [1])	3. 1. 3 [1])	Kilograms	0.00100000000	kg
1. 7. 4	3. 1. 4	Carats	5.00000000000	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	Hong Kong taels	0.02671725000	tlh
1. 7. 9	3. 1. 9	Singapore taels	0.02645544638	tls
1. 7. 10	3. 1. 10	Taiwanese taels	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	1000.00000000000	mg
1. 7. 14	3. 1. 14	Parts per pound	1.12876677120	/lb
1. 7. 15	3. 1. 15	Chinese taels	0.02645547175	tlc
1. 7. 16	3. 1. 16	Mommes	0.26670000000	mom
1. 7. 17	3. 1. 17	Austrian carats	5.00000000000	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
1. 7. 22	3. 1. 22	lb/oz	0.03527396200	o

o = Factory setting
[1]) = not for models with a readability of ≤ 1 mg

Function

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

Configuring the Balance/Scale

Setting the Parameters (Menu Codes)

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

Example: Adapt the balance/scale to unstable ambient conditions:
Menu code 1 1 4

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

Balance/Scale Operating Menu (Overview)

o Factory setting
√ User setting

Menu	Menu level 1	Menu level 2	Menu level 3	Factory setting	Menu level 4
Menu	1. Balance/ scale functions	1.1. Adapt filter	1.1.1		Minimum vibration
			1.1.2	o	Normal vibration
			1.1.3		Strong vibration
			1.1.4		Extreme vibration
		1.3. Stability range	1.3.1		1/4 digit
			1.3.2		1/2 digit
			1.3.3		1 digit
			1.3.4	o	2 digits
			1.3.5		4 digits
		1.4. Weight unit for calibration weight	1.4.1	o	Grams
			1.4.2		Kilograms[1])
			1.4.3		Pounds
		1.6. Auto zero	1.6.1	o	On
			1.6.2		Off
		1.7. Weight unit 1	See "Toggle between Weight Units"		
	2. Application programs	2.1. Program selection	see the desired application program description		
	3. Application parameters	3.1. Weight unit 2	see "Toggle between Weight Units"		
		3.3. Reference qty or %	see the desired application program description		
	5. Data Interface	5.2 Parity	5.2.1		Mark
			5.2.2		Space
			5.2.3	o	Odd
			5.2.4		Even
		5.3 No. of stop bits	5.3.1	o	1 stop bit
			5.3.2		2 stop bits
		5.4 Handshake mode	5.4.1		Software
			5.4.2		Hardware, 2 char. after CTS
			5.4.3	o	Software, 1 char. after CTS

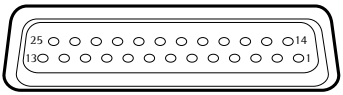
[1]) = not for models with a readability of 0.1 mg or 1 mg

Menu level 1	Menu level 2	Menu level 3	Factory setting	Menu level
6. Print for Weighing	6.1 Manual/auto print mode	6.1.1		Manual without stability
		6.1.2	o	Manual at stability
		6.1.3		Automatic without stability
		6.1.4		Automatic at stability
7. Print with applications	7.1 Line format of Printout	7.1.1		Without data ID Codes
		7.1.2	o	With data ID Codes
8. Extra functions	8.1. Menu	8.1.1	o	Parameter settings can be changed
		8.1.2		Parameters "read only"
	8.2. External switch function	8.2.1		[CAL] key
		8.2.4		[ZERO] key
		8.2.5	o	[PRINT] key
		8.2.6		[F] key
		8.2.8		[ZERO] key
	8.3. Power-on mode for balance/scale	8.3.1		Off/on (battery shuts off automatically after 3 min)
		8.3.2	o	Stand-by/on
9. Reset menu	9.– Factory settings	9.– 1		Reset
		9.– 2	o	Not reset

Data Interface

Purpose
Your balance/scale 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/scale 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 (RxD)
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

For remote switch

*) = Hardware restart

Preparation
You can set these parameters for other devices in the Setup menu (see the chapter entitled "Configuring the Balance/Scale"). You will also find a detailed description of the available data interface commands in the file "Data Interface Descriptions for ALC Models", which you can download from the Internet (www.acculab.com, or www.acculab-europe.com).

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/scale to a Sartorius data printer. The recording capability for printouts makes it easy for you to work in compliance with ISO/GLP.

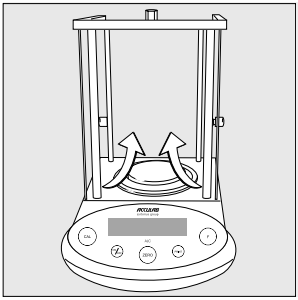
Error Codes

Error codes are shown on the main display for approx. 2 seconds, after which the program automatically returns to the weighing mode.

Display	Cause	Solution
No segments appear on the display	No AC power is available The AC adapter is not plugged in Battery is dead	Check the AC power supply Plug in the AC adapter Replace the battery Recharge the battery using an external charger
H	The load exceeds the balance/scale capacity	Unload the balance/scale
L	The weighing pan is not in place Something is touching the weighing pan	Place the weighing pan on the balance/scale Move the object that is touching the weighing pan
E 0 1	Display capacity exceeded: Value to be output cannot be shown on the display	Decrease the weight on the balance/scale
E 02	Calibration parameter requirement not met; e.g.: – balance/scale not zeroed – balance/scale is loaded	Calibrate only when zero is displayed Press [ZERO] to zero the balance/scale Unload the balance/scale
E 09	When gross value ≤ zero, no tare	Tare the balance/scale
E 10	The [ZERO] 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 [CAL] to clear the tare memory and release the tare key
E 11	Value input is not allowed for second tare memory	Press [ZERO]
E 22	Weight is too light or there is no sample on the balance/scale	Increase the reference quantity or sample amount
E 30	Interface port for printer output is blocked	Contact your local Acculab Service Center
Max. weighing capacity is less than indicated under “Specifications”	The balance/scale was turned on without the weighing pan in place	Place the weighing pan on the balance/scale and press [ON/OFF] to turn the balance/scale back on
The weight readout is obviously wrong	The balance/scale has not been calibrated/adjusted The balance/scale was not tared before weighing	Calibrate/adjust the balance/scale Tare before weighing

If any other errors occur, please contact your local Acculab Service Center.

Care and Maintenance



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

⚠ Disconnect the balance/scale from the AC adapter and unplug any interface cables that are connected to the balance/scale

⚠ Make sure that no liquid enters the balance/scale housing

⚠ Do not use any aggressive cleaning agents (solvents or similar agents)

- Clean the balance/scale using a piece of cloth which has been wet with a mild detergent (soap)
- After cleaning, wipe down the balance/scale 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.

Cleaning Stainless Steel Surfaces
Clean all stainless steel parts regularly. Remove the stainless steel weighing pan/load plate and thoroughly clean it separately. Use a damp cloth or sponge to clean any stainless steel parts on the balance/scale. You can use any commercially available household cleaning agent that is suitable for use on stainless steel. Clean stainless steel surfaces by wiping them down. Then clean the weighing pan/load plate thoroughly, making sure to remove all residues. Use a damp cloth or sponge to wipe down any stainless steel parts on the balance/scale again. Afterwards, allow the balance/scale to dry. If desired, you can apply oil to the cleaned surfaces as additional protection.

⚠ Do not use stainless steel cleaning agents that contain soda lye (caustic), acetic acid, hydrochloric acid, sulfuric acid or citric acid.
The use of scrubbing sponges made of steel wool is not permitted.
Solvents are permitted for use only on stainless steel parts.

Safety Inspection
If there is any indication that safe operation of the balance/scale 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

Safe operation of the balance/scale with the AC adapter is no longer ensured when:

– there is visible damage to the AC adapter

– the AC adapter no longer functions properly

– the AC adapter has been stored for a relatively long period under unfavorable conditions

In this case, notify your nearest Acculab Service Center or the International Technical Support Unit based in Goettingen, Germany. Maintenance and repair work may only be performed by service technicians who are authorized by Acculab and who

– have access to the required maintenance manuals

– have attended the relevant service training courses

Instructions for Recycling the Packaging

To ensure adequate protection for safe shipment, your balance/scale has been packaged to the extent necessary using environmentally friendly materials. After successful installation of the balance/scale, 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		ALC-80.4	ALC-110.4	ALC-210.4
Weighing capacity	g	80	110	210
Readability	mg	0.1	0.1	0.1
Tare range (subtractive)	g	80	110	210
Repeatability	≤± mg	0.1	0.1	0.1
Linearity	≤± mg	0.3	0.3	0.3
Operating temperature range		+10…+30 °C (50 to 86°F)		
Allowable ambient operating temperature		+5…+40 °C (41 to 104°F)		
Sensitivity drift within +10…+30°C	≤±/K	$3 \cdot 10^{-6}$	$3 \cdot 10^{-6}$	$3 \cdot 10^{-4}$
Response time (average)	s	3	3	3
Adaptation to ambient conditions		By selection of 1 of 4 optimized filter levels		
Display update (depends on the filter level selected)	s	0.2–0.4	0.2–0.4	0.2–0.4
External calibration weight (of at least accuracy class…)	g	100 (E2)	100 (E2)	200 (E2)
Net weight, approx.	kg/lb	3.0/6.6	3.0/6.6	3.0/6.6
Pan size	mm inches	80 Ø 3.3 Ø	80 Ø 3.3 Ø	80 Ø 3.3 Ø
Weighing chamber height	mm inches	200 7.9	200 7.9	200 7.9
Dimensions (W x D x H)	mm	200 x 270 x 300		
AC power source/power requirements		AC adapter, 230 V or 115 V, +15%…– 20%		
Frequency		48–60 Hz		
Power requirements, direct current	V	10 to 20		
Power consumption (average)	W	1	1	1

Model		ALC-150.3	ALC-210.3	ALC-320.3
Weighing capacity	g	150	210	320
Readability	mg	0.001	1	1
Tare range (subtractive)	g	150	210	320
Repeatability	<±mg	0.0015	1	1
Linearity	<±mg	0.003	3	3
Operating temperature range		+10…+30 °C (50 to 86°F)		
Allowable ambient operating temperature		+5…+40 °C (41 to 104°F)		
Sensitivity drift within +10…+30°C	≤±/K	$3.3 \cdot 10^{-6}$	$5 \cdot 10^{-4}$	$5 \cdot 10^{-6}$
Response time (average)	s	≤ 2.5	≤ 3	≤ 3
Adaptation to ambient conditions		By selection of 1 of 4 optimized filter levels		
Display update (depends on the filter level selected)	s	0.2–0.4	0.2–0.4	00.2–0.4
External calibration weight (of at least accuracy class…)	g	100 (F1)	200 (F1)	200 (F1)
Net weight, approx.	kg/lb	1.6/6.6	3.0/6.6	3.0/6.6
Pan size	mm inches	100 Ø 4 Ø	80 Ø 3.3 Ø	80 Ø 3.3 Ø
Dimensions (W x D x H)	mm	–	200 x270 x 75	200 x 270 x 300
AC power source/ power requirements		AC adapter, 230 V or 115 V, +15%…–20%		
Frequency		48–60 Hz		
Power requirements, direct current	V	10 to 20		
Power consumption (average)	W	1	1	1

Model		ALC-810.2	ALC-1100.2	ALC-2100.2	ALC-3100.2
Weighing capacity	g	810	1100	2100	3100
Readability	g	0.01	0.01	10	10
Tare range (subtractive)	g	810	1100	2100	3100
Repeatability	<±g	0.01	0.03	10	10
Linearity	<±g	0.02	0.03	30	30
Operating temperature range		+10…+30 °C (50 to 86°F)			
Allowable ambient operating temperature		+5…+40 °C (41 to 104°F)			
Sensitivity drift within +10…+30°C	<±/K	$0.5 \cdot 10^{-5}$	$5 \cdot 10^{-6}$	$3 \cdot 10^{-6}$	$3 \cdot 10^{-6}$
Response time (average)	s	2	2.5	≤ 2.5	≤ 3
Adaptation to ambient conditions		By selection of 1 of 4 optimized filter levels			
Display update (depends on the filter level selected)	s	–	0.2–0.8	0.2–0.4	0.2–0.4
External calibration weight (of at least accuracy class…)	g	1000 (F1)	1000 (F1)	2000 (F1)	2000 (F1)
Net weight, approx.	kg/lb	1.4/3.0			
Pan size	mm inches	116 Ø 4.6 Ø	150 Ø 6 Ø	150 Ø 6 Ø	150 Ø 6 Ø
Dimensions (W x D x H)	mm inches	– –	200x270x75 7.9x10.6x3	200x270x75 7.9x10.6x3	200x270x75 7.9x10.6x3
AC power source/ power requirements		AC adapter, 230 V or 115 V, +15%…–20%			
Frequency		48–60 Hz			
Power requirements, direct current	V	10 to 20			
Power consumption (average)	W	–	0.75	1	1

Model		ALC-2100.1	ALC-4100.1	ALC-6100.1
Weighing capacity	g	2100	4100	6100
Readability	g	0.1	0.1	0.1
Tare range (subtractive)	g	2100	4100	6100
Repeatability	<±g	0.2	0.2	0.2
Linearity	<±g	0.2	0.2	0.2
Operating temperature range		+10…+30 °C (50 to 86°F)		
Allowable ambient operating temperature		+5…+40 °C (41 to 104°F)		
Sensitivity drift within +10…+30°C	<±/K	$2 \cdot 10^{-5}$	$1 \cdot 10^{-5}$	$0.5 \cdot 10^{-5}$
Response time (average)	s	2	2	2
Adaptation to ambient conditions		By selection of 1 of 4 optimized filter levels		
Display update (depends on the filter level selected)	s	0.2–0.8	0.2–0.8	0.2–0.8
External calibration weight (of at least accuracy class…)	g	1000 (F2)	2000 (F2)	5000 (F2)
Net weight, approx.	kg/lb	1.4/3.0		
Pan size	mm inches	150 Ø 6 Ø	150 Ø 6 Ø	150 Ø 6 Ø
Dimensions (W x D x H)	mm inches	200 x 270 x 75 7.9x10.6x3		
AC power source/ power requirements		AC adapter, 230 V or 115 V, +15%…– 20%		
Frequency		48–60 Hz		
Power requirements, direct current	V	10 to 20		
Power consumption (average)	W	0.75	0.75	0.75
Hours of operation with 9-volt battery:				
– Battery, approx.	h	11	11	11
– Rechargeable battery when fully charged, approx.	h	2.5	2.5	2.5

Accessories (Options)

Product	Order No.
Interface cable for connecting a PC; 25-pin	**7357314**
Calibration weights	
– for ALC-80.4 (50 g, E2)	**YCW4528-00**
– for ALC-110.4 (100 g; E2)	**YCW5128-00**
– for ALC-210.4 (200 g; E2)	**YCW5228-00**
– for ALC-150.3 (100 g, E2)	**YCW5128-00**
– for ALC-210.3 (200 g; F1)	**YCW5238-00**

Product	Order No.
– for ALC-320.3 (200 g; F1)	**YCW5238-00**
– for ALC-810.2 (500 g, F1)	**YCW5538-00**
– for ALC-1100.2 (1 kg; F1)	**YCW6138-00**
– for ALC-2100.2 (2 kg; F1)	**YCW6238-00**
– for ALC-3100.2 (2 kg; F1)	**YCW6238-00**
– for ALC-2100.1 (1 kg; F2)	**YCW6148-00**
– for ALC-4100.1 (2 kg; F2)	**YCW6248-00**
– for ALC-6100.1 (5 kg; F2)	**YCW6548-00**

CE Marking

The CE marking affixed to the equipment indicates that the equipment meets the requirements of the following Directive(s) issued by the Council of the European Union:

Directive 89/336/EEC
"Electromagnetic compatibility (EMC)"

Limitation of Emmissioins:
According to Product Standard EN 61326-1 Cl.B
(Residential environment)

Defined immunity to interference:
According to Peroduct Standard EN 61326-1
(Industrial environment)

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

Council Directive 73/23/EU
"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

When 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.