Operating Instructions

VA-6 kg, VA-12 kg, VA-30 kg

Electronic Precision Scales

98648-011-15

Intended Use

Acculab offers precision scales for weighing, with capacities ranging from 0.1 g to 30 kg.
The 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
- Excellent readability under any lighting conditions
- Rugged, durable weighing system
- Type of scale housing protection
  – The weighing platforms are IP65-protected
  – The display and control units are IP40-protected

The scales save work and speed up simple routine applications through:

- Ultrafast response times
- Easy operation
- Computer connectivity through a built-in RS-232 interface
- Two lines in the printout are configurable to show, e.g., your company name

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

- Counting
- Toggling between weight units (second weight unit)
- Net-total formulation (tare memory)
- Second tare memory (incl. automatic container taring function)
- Weighing in percent (incl. display of the difference between current weight and stored reference weight)
- Averaging
- Calculation by a factor
- Number Totaling
- Gross / net toggling

Contents

Warnings and Safety Precautions

This scale has been constructed in accordance with the European Directives as well as international regulations and standards for operation of electrical equipment, electromagnetic compatibility, and stipulated safety requirements. Improper use or handling, however, can result in damage and/or injury.

Read these operating instructions thoroughly before using your 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 scale:

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

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

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

– The weighing platform is IP65-protected against dust deposits and water splashes

– The display and control unit is IP40-protected against penetration of solid foreign objects

– Connect only Acculab accessories and options, as these are optimally designed for use with your scale

– Protect the AC adapter and the display and control unit from contact with liquids

When cleaning your scale, make sure that no liquids enters the scale housing; use only a slightly moistened cloth to clean the scale.

Do not open the scale housing. If the seal is broken, this will result in forfeiture of all claims under the manufacturer's warranty.

In case you have any problems with your scale:
○ Contact your local Acculab office, dealer or service center

Operating Design

The scales consist of a weighing cell and a display and control unit. In addition to the choice of power supply (via AC adapter or external rechargeable battery pack), your scale also has an interface port for connecting peripheral devices, such as a printer, computer, universal remote control switch, etc.

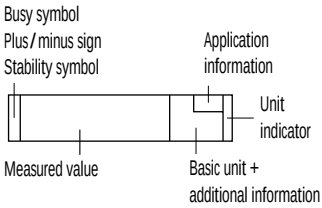
The display and control unit is affixed to the weighing platform. Operation of the scales is simple and uniform.

Keys

The scales can be operated using either the keys on the display and control unit or a connected computer (PC). Some of the keys activate different functions, depending on how long they are pressed ("press briefly" = < 2 sec.; "press and hold" = ≥ 2 sec.).

Display

The display is divided into 5 sections:



Busy Symbol, Plus / Minus Sign, Stability Symbol

If the symbol displayed here is

- a triangle ▲, this indicates that the scale is performing a function (busy symbol)
- a plus or minus sign (+ or –), this applies to the value displayed

Measured Value

When the scale is in the weighing mode, the weight is displayed here.
In the setup mode, the menu code numbers are shown here.

Basic Unit and Additional Information
When the scale has stabilized, the weight unit is displayed here (g or kg). The calculated values (e.g., % or pcs) are also displayed.

Application Information
This section shows information concerning the current application program; e.g., the reference quantity for counting.

Input Functions
When the scale is in the setup mode, you can select parameters from lists. The lists are contained in a menu, which is divided into 3 levels.

To set parameters: Turn the scale off and back on again. While all segments are displayed, press [TARE] briefly.

To navigate within a menu level: Press [TARE] briefly; when you reach the last menu item, the first is shown again.

To change menu levels: Press [PRINT] briefly.

To confirm the selected parameters on all 3 levels:
Press and hold the [PRINT] key. "o" indicates the selected parameter option.

All parameter options are listed in detail under "Configuring the Scale."

To store parameter settings and exit the menu:
Press and hold the [TARE] key. Parameter settings are stored in the non-volatile memory. When you turn on the scale, the last parameters used are active.

To exit the menu without storing any new settings:
Press [ON/OFF]

Output Functions
Your scale is equipped with a data interface for connecting your choice of the following:

- Printer
- PC
- Universal remote control switch

Printer

You can configure a variety of options for data output to a printer.

You can have a printout generated automatically or only when the [PRINT] key is pressed. You can make the print function dependent on or independent of stability parameters, and define whether data ID codes will be included in the printout or not.

The print functions are described in detail under "Data Output Functions" in the chapter entitled "Operating the Scale."

Data Interface

Instead of a printer, you can connect a different peripheral device, such as a computer, to the data interface.

You can use a connected computer to control the scale. Communication between the scale's data interface and a PC is in the form of request and response messages. Not all request messages will activate response messages.

See "Data Output Functions" in the chapter entitled "Operating the Scale" for a detailed description.

Error Messages

Error messages are displayed for 2 seconds. The format is as follows:

- Sequence error: "E" + 2 digits
- Hardware error: "E" + 3 digits

The section entitled "Error Messages" contains detailed information.

Getting Started

Storage and Shipping Conditions
Do not expose the scale to shocks, vibrations, moisture or extreme temperatures.

Unpacking the Scale

● After unpacking the scale, check it immediately for any visible damage as a result of rough handling during shipment.

○ Note:
The display and control unit is attached to the weighing platform via a cable.

○ 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 scale. Only the original packaging provides the best protection for shipment. Before packing your scale, unplug all connected cables to prevent damage.

Equipment Supplied
The equipment supplied includes the components listed below:

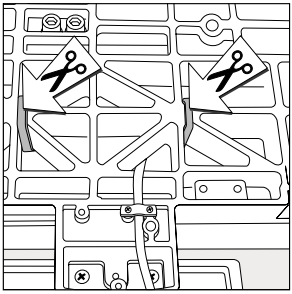
– Scale with attached display and control unit
– Post
– Load pan
– AC adapter
– Installation and operating instructions

Installation Instructions
The Acculab scales are designed to provide reliable weighing results under normal ambient conditions. When choosing a location to set up your scale, observe the following so that you will be able to work with added speed and accuracy:

– Set up the scale on a stable, even surface
– Avoid placing the scale in close proximity to a heater or otherwise exposing the scale to heat or direct sunlight
– Protect the scale from drafts that come from open windows or doors
– Avoid exposing the scale to extreme vibrations during weighing
– Protect the scale from aggressive chemical vapors
– Do not expose the scale to extreme moisture over long periods

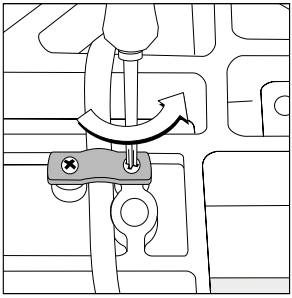
Installing the Post

- Remove the load plate.
- Gently turn the scale over so that the pan support is on the bottom; place it on a soft surface.

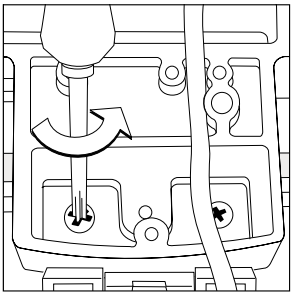


- Use an appropriate tool, such as a pair of side nippers, to sever the cable retainers.

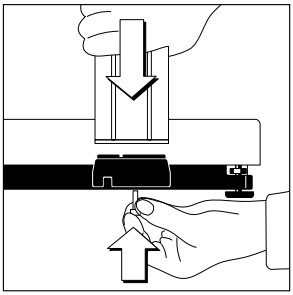
Note:
Make sure you do not damage the cable when you cut the cable retainers.



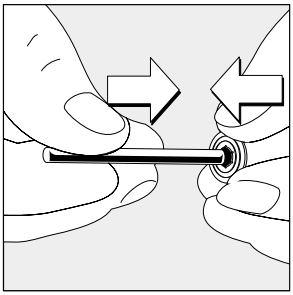
- Remove the strain relief clamp from the display flange.



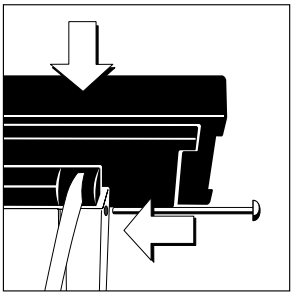
- Remove the fastening screws from the display and control unit, and remove this unit.
- Draw the full length of the display cable out of the scale and then secure it again with the strain relief clamp.
- Gently turn the scale right side up and position it so that the display flange can be accessed from the bottom (for instance, at the edge of the table top).



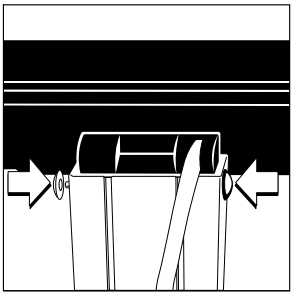
- Gently turn the scale right side up. Use the Phillips screw supplied (4x20 mm) to attach the post to the flange on the base plate.



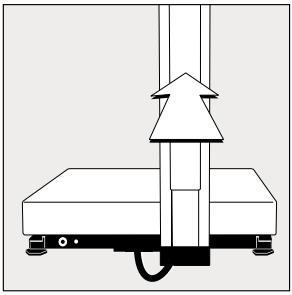
- Attach one of the two cap-shaped lock washers supplied to the bolt provided.



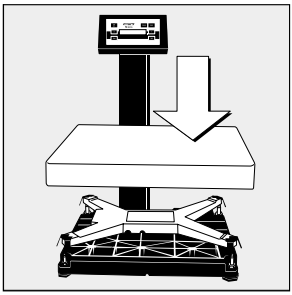
- Insert the fastener located on the rear panel of the display and control unit into the upper end of the post. The spring inside the column housing must lock into place within the cylindrical notch. Align the 4 bore holes of the display and control unit with the 3 column bore holes so you can insert the bolt.



- Cap the free end of the bolt with the second lock washer.

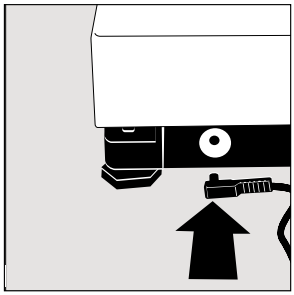


- Press the covering plate into the channel on the back of the column to form a protected raceway for the cable.
- Loop the surplus cable length and press it into the raceway between covering plate and post.
- ○ A connection to the data port can also be secured in this raceway, if desired.
- Place the load plate on the scale.
- ○ The display unit can be tilted and locked into your choice of three different viewing angles.



- Place the load plate on the scale

Connecting the Scale to AC Power



- Check the voltage rating and the plug design
  - If they do not match the rating or standard you use, contact your Acculab office or dealer

  Use only
  - Original Acculab AC adapters
  - AC adapters with a registered approval rating from a national testing laboratory

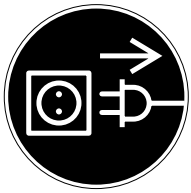
- See the chapter entitled "Accessories" for information on using an external rechargeable battery pack with your scale

- Insert the right-angle plug into the jack and then tighten the screws

- Then insert the plug of the AC adapter into a wall outlet (mains)

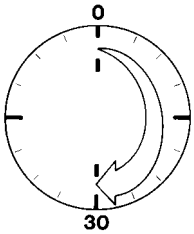
Information on Radio Frequency Interference

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense. Changes or modifications not expressly approved by Acculab could void the user's authority to operate the equipment.



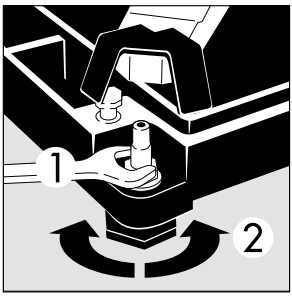
Connecting Electronic Peripheral Devices

- Make absolutely sure to unplug the scale from AC power before you connect or disconnect a peripheral device (printer or PC) to or from the interface port.



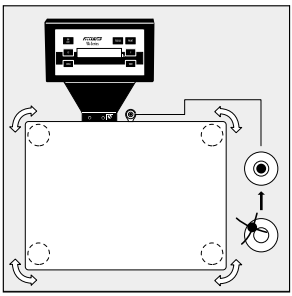
Warmup Time

To deliver exact results, the scale must warm up for at least 30 minutes after initial connection to AC power. Only after this time will the scale have reached the required operating temperature.



Leveling the Scale

- Remove the load plate
- Loosen the locking nuts (1) on all leveling feet (2) (if necessary, use a 13 mm open-end wrench)



- Turn the leveling feet until the scale is level
- To prevent inadvertent changes to this adjustment, tighten the locking nuts with a 13 mm open-end wrench before placing the load plate back on the scale.

Configuring the Scale

Setting the Parameters (Menu)

Purpose

You can configure your scale to meet individual requirements by selecting from the parameters available in the menu. Parameters that are not permitted in legal metrology are not shown in the menu on verified scales.

Features

The parameters are divided into the following groups (1st menu level):

1 Scale functions
2 Application programs
3 Application parameters
5 Data interface
6 Print for weighing
7 Print for application
8 Extra functions
9 Reset menu to factory-set parameters

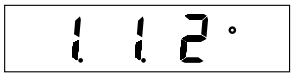
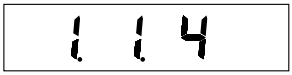
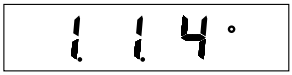
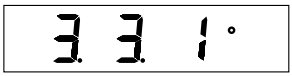
Factory-Set Parameters

The factory-set parameters are marked by an "o" in the list starting on page 16.

Preparation

● Turn off the scale: Press [ON/OFF]
● Turn on the scale: Press [ON/OFF]; while all segments are displayed, press [TARE] briefly
> Measured value line: ⸗ (1st menu level)
○ To navigate within a menu level: Press [TARE]; when you reach the last menu item, the first is shown again
○ To select the next sublevel within a group: Press [PRINT] briefly.
○ To return to the higher menu level: Press [PRINT]
● To confirm selected parameters: Press and hold [PRINT] for more than two seconds
> "o" indicates the selected menu code
● To store parameter settings and exit the menu: Press and hold the [TARE] key
● To exit the menu without storing any new settings: Press [ON/OFF]
> Restart the application

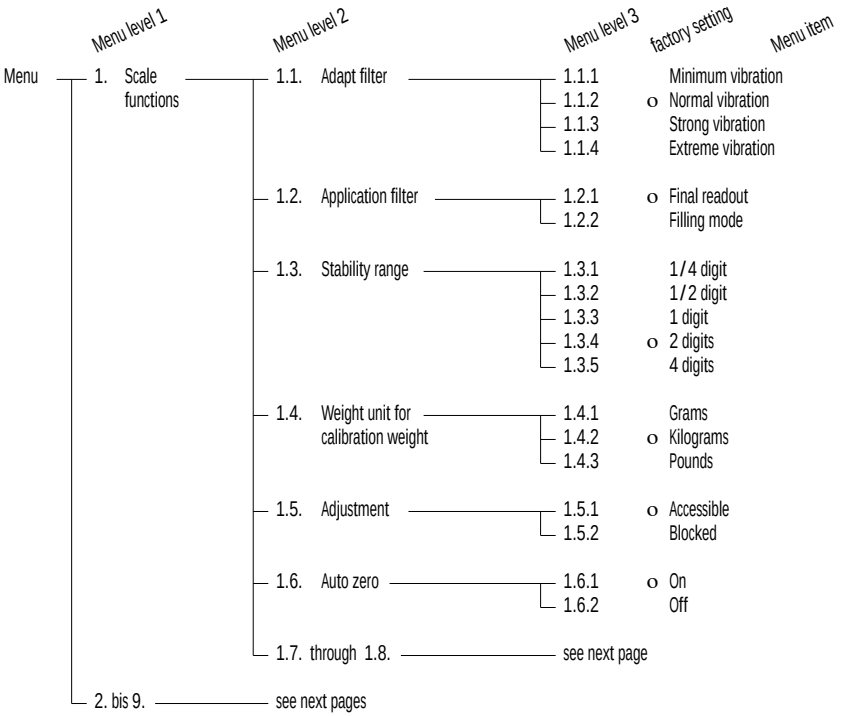
Example
Adapt the scale to unstable ambient conditions: Menu Code 1. 1. 4

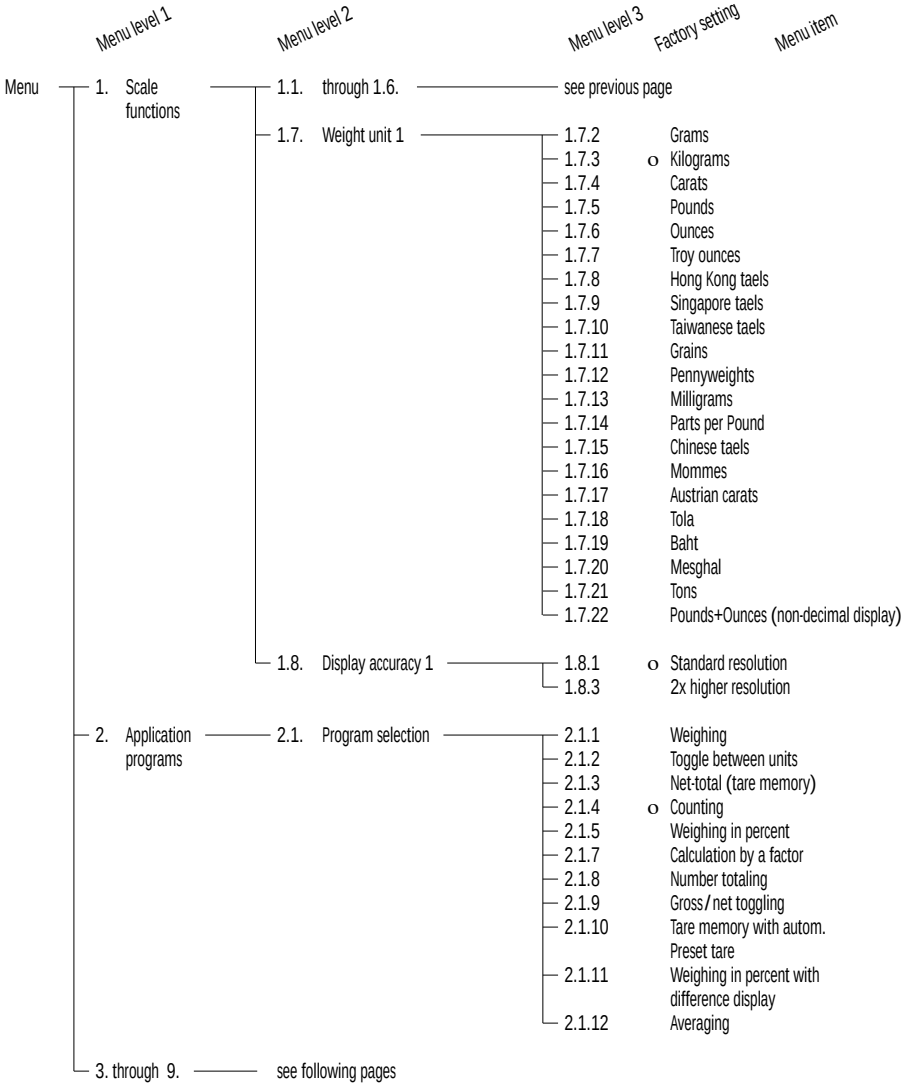
Step		Key	Display
1.	Turn the scale off	[ON/OFF]	
2.	Turn the scale back on;	[ON/OFF]	
	while all segments are displayed	[TARE] briefly	
3.	Confirm 1st menu level (scale functions)	[PRINT]	
4.	Confirm "Adapt filter" group (2nd menu level)	[PRINT]	
5.	Menu level 3: Select the desired menu item	[TARE] repeatedly	
6.	Confirm selected item	[PRINT] for 2 seconds	
7.	Set other parameters, if desired	[PRINT], [TARE]	
8.	Saves changes and exit menu	[TARE] for 2 seconds	

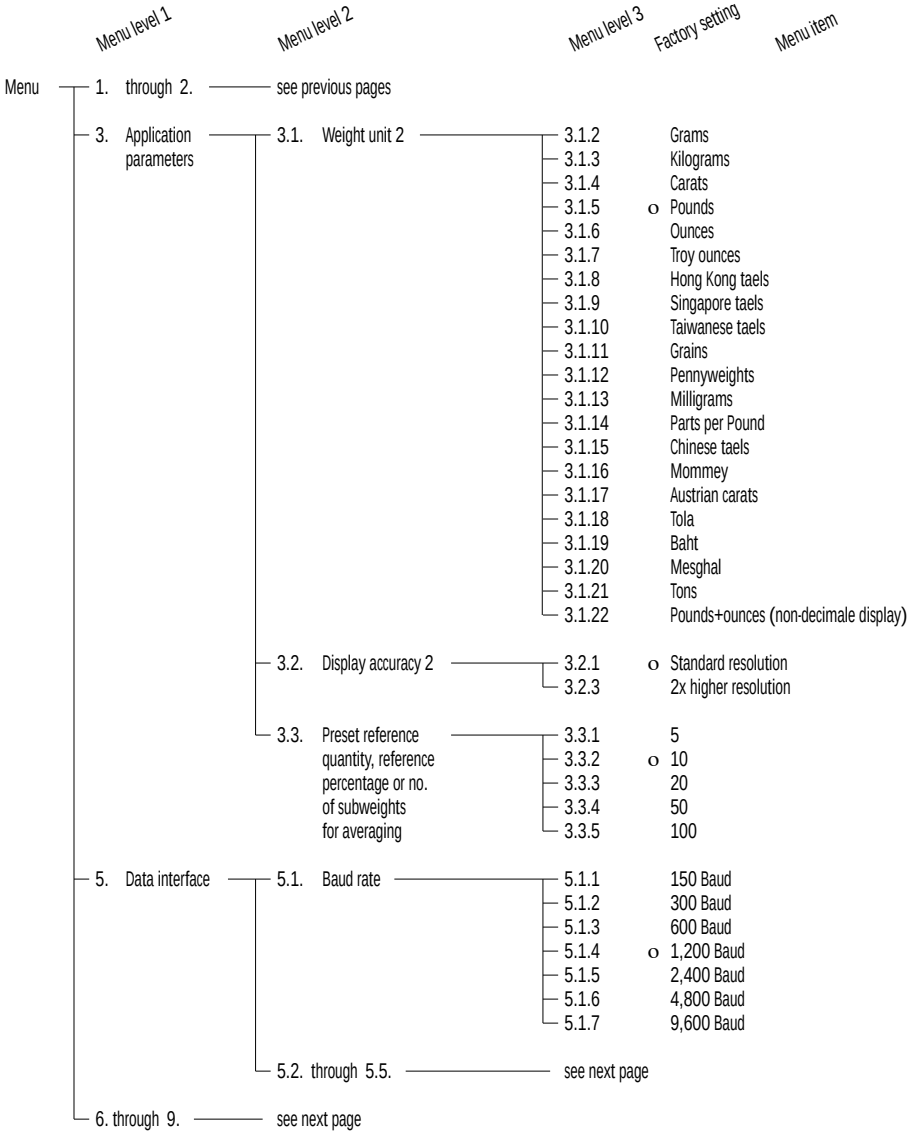
Scale Operating Menu (Overview)

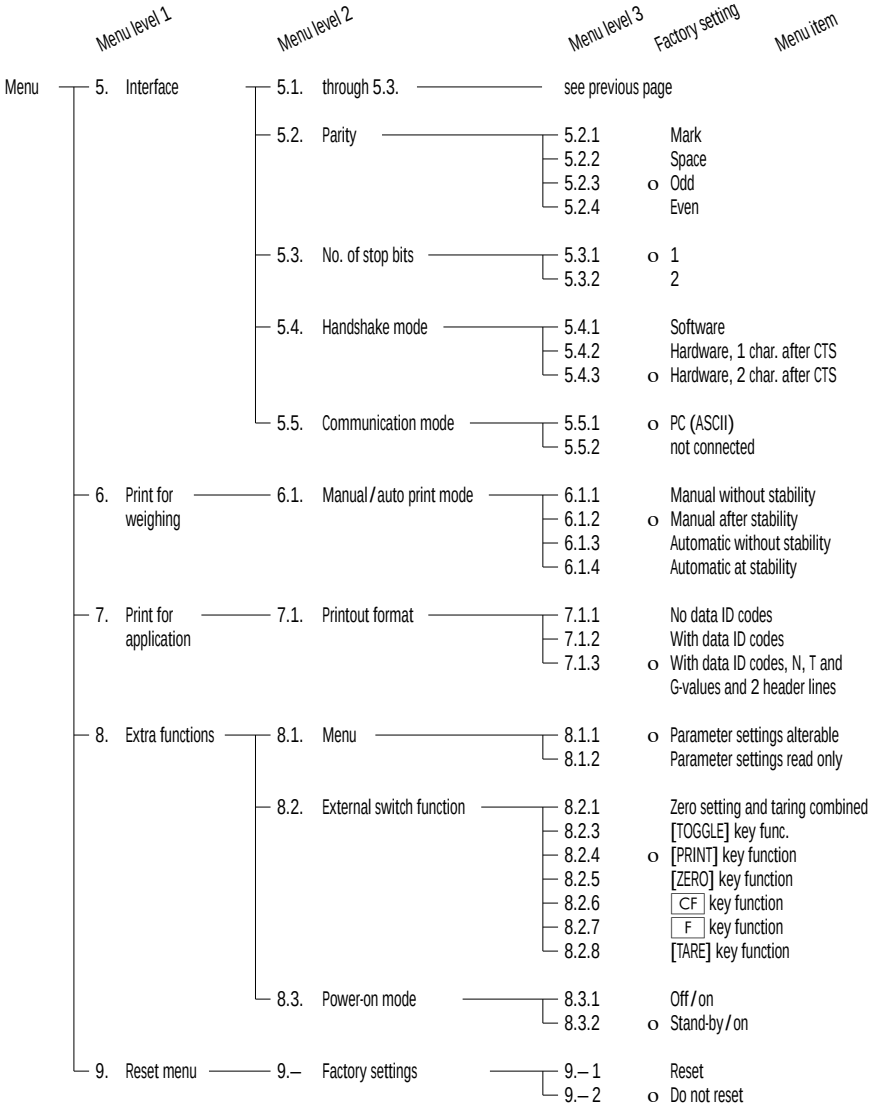
o Factory setting

√ User setting




Menu level 1
Menu level 2
Menu level 3
Factory setting
Menu item
Menu
1. Scale functions
1.1. through 1.6.
see previous page
1.7. Weight unit 1
1.7.2 Grams
1.7.3 o Kilograms
1.7.4 Carats
1.7.5 Pounds
1.7.6 Ounces
1.7.7 Troy ounces
1.7.8 Hong Kong taels
1.7.9 Singapore taels
1.7.10 Taiwanese taels
1.7.11 Grains
1.7.12 Pennyweights
1.7.13 Milligrams
1.7.14 Parts per Pound
1.7.15 Chinese taels
1.7.16 Mommes
1.7.17 Austrian carats
1.7.18 Tola
1.7.19 Baht
1.7.20 Mesghal
1.7.21 Tons
1.7.22 Pounds+Ounces (non-decimal display)
1.8. Display accuracy 1
1.8.1 o Standard resolution
1.8.3 2x higher resolution
2. Application programs
2.1. Program selection
2.1.1 Weighing
2.1.2 Toggle between units
2.1.3 Net-total (tare memory)
2.1.4 o Counting
2.1.5 Weighing in percent
2.1.7 Calculation by a factor
2.1.8 Number totaling
2.1.9 Gross / net toggling
2.1.10 Tare memory with autom. Preset tare
2.1.11 Weighing in percent with difference display
2.1.12 Averaging
3. through 9.
see following pages


Menu level 1
Menu level 2
Menu level 3
Factory setting
Menu item
Menu
1. through 2.
see previous pages
3. Application parameters
3.1. Weight unit 2
3.1.2 Grams
3.1.3 Kilograms
3.1.4 Carats
3.1.5 o Pounds
3.1.6 Ounces
3.1.7 Troy ounces
3.1.8 Hong Kong taels
3.1.9 Singapore taels
3.1.10 Taiwanese taels
3.1.11 Grains
3.1.12 Pennyweights
3.1.13 Milligrams
3.1.14 Parts per Pound
3.1.15 Chinese taels
3.1.16 Mommey
3.1.17 Austrian carats
3.1.18 Tola
3.1.19 Baht
3.1.20 Mesghal
3.1.21 Tons
3.1.22 Pounds+ounces (non-decimale display)
3.2. Display accuracy 2
3.2.1 o Standard resolution
3.2.3 2x higher resolution
3.3. Preset reference quantity, reference percentage or no. of subweights for averaging
3.3.1 5
3.3.2 o 10
3.3.3 20
3.3.4 50
3.3.5 100
5. Data interface
5.1. Baud rate
5.1.1 150 Baud
5.1.2 300 Baud
5.1.3 600 Baud
5.1.4 o 1,200 Baud
5.1.5 2,400 Baud
5.1.6 4,800 Baud
5.1.7 9,600 Baud
5.2. through 5.5.
see next page
6. through 9.
see next page


Menu level 1
Menu level 2
Menu level 3
Factory setting
Menu item
Menu
5. Interface
5.1. through 5.3.
see previous page
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
5.3.2 2
5.4. Handshake mode
5.4.1 Software
5.4.2 Hardware, 1 char. after CTS
5.4.3 o Hardware, 2 char. after CTS
5.5. Communication mode
5.5.1 o PC (ASCII)
5.5.2 not connected
6. Print for weighing
6.1. Manual / auto print mode
6.1.1 Manual without stability
6.1.2 o Manual after stability
6.1.3 Automatic without stability
6.1.4 Automatic at stability
7. Print for application
7.1. Printout format
7.1.1 No data ID codes
7.1.2 With data ID codes
7.1.3 o With data ID codes, N, T and G-values and 2 header lines
8. Extra functions
8.1. Menu
8.1.1 o Parameter settings alterable
8.1.2 Parameter settings read only
8.2. External switch function
8.2.1 Zero setting and taring combined
8.2.3 [TOGGLE] key func.
8.2.4 o [PRINT] key function
8.2.5 [ZERO] key function
8.2.6 CF key function
8.2.7 F key function
8.2.8 [TARE] key function
8.3. Power-on mode
8.3.1 Off / on
8.3.2 o Stand-by / on
9. Reset menu
9.– Factory settings
9.– 1 Reset
9.– 2 o Do not reset

Operating the Scale

Basic Weighing Function

Purpose

The basic weighing function can be used alone or in combination with an application program (Toggle between Weight Units, Counting, Weighing in Percent, etc.).

Features

– Zeroing the scale
  Depending on prevailing ambient conditions, the display may not show a zero readout even though there is no load on the scale. If the weight shown is less than 2% of the scale's maximum weighing capacity, you can zero the scale.
– Taring the scale
  Tare the scale with an empty container on the weighing pan to obtain a readout of the net weight after the container is filled.
– Printing weights

Factory Settings

Weight unit 1: Kilogram (1 73)
Manual / automatic printing: Manual after stability (6 12)
Print format: Gross, tare and net values with data ID codes (7 13)

Preparation

● Turn on the scale: Press [ON / OFF]

> All segments light up briefly

○ To change configurations: See the chapter entitled "Configuring the Scale"

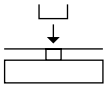
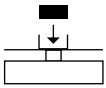
○ To load factory-set configurations: See "Configuring the Scale," parameter 9 – 1

– Start an application

– Toggle the display between weight and calculated value

– Delete an application

Practical Examples
Simple weighing
Menu code settings: Factory-set codes

Step	Key (or instruction)	Display / Output
1. Turn the scale	[ON/OFF]	0.000 kg
2. If necessary, zero the scale	[ZERO]	0.000 kg
3. Place the container on the scale (here: 0.015 kg)		+ 0.015 kg
4. Tare the scale	[TARE]	0.000 kg
5. Place a sample in the container on the scale (here: 0.125 kg)		+ 0.125 kg
6. Print weight	[PRINT]	N + 0.125 kg T + 0.015 kg G# + 0.140 kg

Calibration / Adjustment

Purpose

Calibration is the determination of the difference between the weight readout and the true weight (mass) of a sample. Calibration does not entail making any changes within the scale. Adjustment is the correction of this difference between the measured value displayed and the true weight (mass) of the sample, or the reduction of the difference to an allowable level within the maximum permissible error limits.

Features

External adjustment can only be performed when

- there is no load on the scale,
- the scale is set to zero, and
- the internal signal is stable.

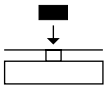
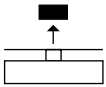
If these conditions are not met, an error message is displayed.

The weight on the scale must not differ from the nominal weight by more than 2%.
You can use g, kg or lb as the weight unit for calibration (14)
You can block calibration of the scale (15)

Factory Settings

Weight unit for calibration: kg (142)
Calibration function: accessible (151)

Example
Calibrate the scale
Menu code settings: Factory-set codes

Step		Key (or instruction)	Display / Output
1.	Turn on the scale	[ON / OFF]	0.000 kg
2.	If necessary, zero the scale	[ZERO]	0.000 kg
3.	Begin calibration Calibration weight is displayed without wt. unit	[TARE] > 2 sec.	+ 5.000
4.	Place the indicated calibration weight on the scale (here: 5,000 g)		5.000
	After calibration, the calibration weight is displayed with wt. unit		+ 5.000 kg
5.	Remove the calibration weight		0.000 kg

Application Programs

Counting

Purpose

With the Counting program you can determine the number of parts that have approximately the same average piece weight.

Available Features

– The reference sample quantity can be changed either in the operating menu or during weighing
– Store the current weight value to have it loaded as the preset reference sample quantity the next time you initialize the Counting application
– Re-initialize without quitting the program
– The average piece weight is automatically output via the data interface port after initialization, if the menu code for "Printout with data ID codes" is set
– Press [TOGGLE] to toggle the display between piece count and weight

Preparation

Configure the Counting application in the operating menu:

○ If the scale is on, turn it off: Press [ON/OFF]

● Turn on the scale: Press [ON/OFF]; while all segments are lit, press [TARE]

● Select the "Counting" menu item:
Press [TARE], [PRINT], and [PRINT]; press [TARE] repeatedly, if necessary
214 Counting

● Confirm the selection of Counting: Press [PRINT] for > 2 sec.
> o indicates that this is the current menu code setting

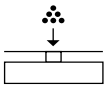
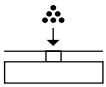
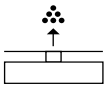
● Set the next parameters: Press [PRINT]

● Select and confirm:
– Reference sample quantity:
331 5 pcs
332 10 pcs
333 20 pcs
334 50 pcs
335 100 pcs
see also the "Scale Operating Menu (Overview)" in the chapter entitled "Configuring the Scale"

● Save settings and exit the Setup menu: Press [TARE] for at least 2 sec.

Example
Determine on unknown piece count; store the weight on the scale as a reference sample quantity

Settings (changes in the factory settings required for this example:
Menu: Application program: Counting (2 14)

Step	Key (or instruction)	Display / Output
1. Turn on the scale	[ON/OFF]	
2. If necessary, zero the scale	[ZERO]	0.000 kg ^{i0}
3. Select the reference sample quantity (here 50 pcs)	[TOGGLE] [TOGGLE]	rEF 20 (briefly) rEF 50 (briefly)
4. place the reference sample quantity (50 pcs) on the scale (here: 0.930 kg)		+ 0.930 kg ^{50}
5. Start the application if the print format is set to include data ID codes, the following is printed	F	+ 50 pcs ^{50} wRef + 0.186 kg
6. Display weight	[TOGGLE]	+ 0.930 kg ^{50}
7. Display quantity	[TOGGLE]	+ 50 pcs ^{50}
8. Weigh uncounted parts (here: 174 pcs)		+ 174 pcs ^{50}
9. Print total piece count	[PRINT]	JOE SMITH EDGEWOOD Qnt + 174 pcs
10. Unload the scale		0 pcs ^{50}
11. Repeat the procedure starting from Step 8. if desired.		

Toggle between Weight Units

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

Available Features
– Toggling the displayed weight
– Other features as for the basic weighing function

Factory Settings
Weight unit 1: kg (1 7 3)
Weight unit 2: kg (3 1 3)

Preparation
Configure the Toggle weight units application in the operating menu:

○ If the scale is on, turn it off: Press [ON/OFF]

● Turn on the scale: Press [ON/OFF]; while all segments are lit, press [TARE]

● Select the "Toggle weight units" menu item: Press [TARE], [PRINT], and [PRINT]; press [TARE] repeatedly, if necessary
2 1 2 Toggle weight units

● Confirm selection: Press [PRINT] for at least 2 sec.
> o indicates that this is the current menu code setting

● Set the next parameters: Press [PRINT]

● Select and confirm:
– Weight unit 1: see next page (1 7 x)
– Display resolution 1:
1 8 1 Standard resolution
1 8 3 2x higher resolution
– Weight unit 2: see next page (3 1 x)
– Display resolution 2:
3 2 1 Standard resolution
3 2 3 2x higher resolution

see also the "Scale Operating Menu (Overview)" in the chapter entitled "Configuring the Scale"

● Save settings and exit the Setup menu: Press [TARE] for at least 2 sec.

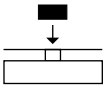
You can affix one of several adhesive overlays to the right of this section.
These overlays show the optional weight units selected in the scale Setup menu. The arrows indicate the selected units.

Menu code		Unit Conversion factor	Printout	
(17 2)	(3 12)	Gramm	1.00000000000	g
(17 3)	(3 13)	Kilogramm	0.00100000000	kg
(17 4)	(3 14)	Carat	5.00000000000	ct
(17 5)	(3 15)	Pound	0.00220462260	lb
(17 6)	(3 16)	Ounce	0.03527396200	oz
(17 7)	(3 17)	Troy ounce	0.03215074700	ozt
(17 8)	(3 18)	Tael Hongkong	0.02671725000	tlh
(17 9)	(3 19)	Tael Singapur	0.02645544638	tls
(17 10)	(3 1 10)	Tael Taiwan	0.02666666000	tlt
(17 11)	(3 1 11)	Grain	15.43235835000	GN
(17 12)	(3 1 12)	Pennyweight	0.64301493100	dwt
(17 13)	(3 1 13)	Milligramm	1000.00000000000	mg
(17 14)	(3 1 14)	Parts per Pound	1.12876677120	/lb
(17 15)	(3 1 15)	Tael China	0.02645547175	tlc
(17 16)	(3 1 16)	Momme	0.26670000000	mom
(17 17)	(3 1 17)	Karat	5.00000000000	K
(17 18)	(3 1 18)	Tola	0.08573333810	tol
(17 19)	(3 1 19)	Baht	0.06578947437	bat
(17 20)	(3 120)	Mesghal	0.21700000000	MS
(17 21)	(3 121)	Tonne	0.00000100000	T
(17 22)	(3 122)	lb / oz	0.03527396200	o

If you select menu code 17 22 or 3 1 22, you can affix the label with the “lb” weight unit under the left number, and the label with the “oz” weight unit under the number on the right.

Example
Toggle the display from kilograms [kg] (1st unit) to pounds [lb] (2nd unit)

Settings (changes in the factory settings required for this example):
Menu: Application program: Toggle between weight units (2 12)
Menu: Weight unit 2: pounds (3 15)

Step	Key (or instruction)	Display / Output
1. Turn on the scale	[ON/OFF]	0.0 kg
2. Place weight on scale (here: 2.295 kg)		+ 2.295 kg kg
3. Toggle to weight unit 2: pounds [lb]	[TOGGLE]	+ 5.060 lb
4. Print weight	[PRINT]	JOE SMITH EDGEWOOD G + 5.060 lb
5. Toggle to weight unit 1: kilograms [kg]	[TOGGLE]	+ 2.295 kg kg

Second Tare Memory

Purpose

With this application program you can store the weight on the scale as a tare compensation weight.

Available Features

– Press [F] to store the weight on the scale in the second tare memory
– *NET* is displayed next to the net weight readout if the scale has been tared or if a tare value is stored in the second tare memory (**N** in the printout indicates that the scale was tared by pressing the [TARE] key; **N 1** indicates that there is data in the second tare memory)
– You can have a series of containers tared in sequence, if the scale is unloaded to under 30% of the previous weight after measurement and then loaded with 70% – 130% of the previous weight (i.e., the next container)
– Press [CF] to delete the value from the second tare memory
– Press [TOGGLE] to toggle between weight unit 1 and weight unit 2

Preparation

Configure the Second tare memory application in the operating menu:

○ If the scale is on, turn it off: Press [ON/OFF]

● Turn on the scale: Press [ON/OFF]; while all segments are lit, press [TARE]

● Select the "Second tare memory" menu item:
Press [TARE], [PRINT], and [PRINT]; press [TARE] repeatedly, if necessary
2 13 Second tare memory
2 1 10 Second tare memory with automatic container taring

● Confirm selection of Second tare memory: Press [PRINT] for at least 2 sec.
> o indicates that this is the current menu code setting

● Set the next parameters: Press [PRINT]

● Select and confirm:

– Weight unit 1: (see also "Toggle between Weight Units")

172	Grams
...	...
1722	lb/oz

– Weight unit 2: (see also "Toggle between Weight Units")

312	Grams
...	...
3122	lb/oz

see also the "Scale Operating Menu (Overview)" in the chapter entitled "Configuring the Scale"

● Save settings and exit the Setup menu: Press [TARE] for at least 2 sec.

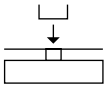
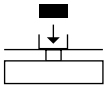
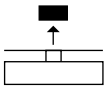
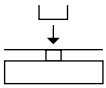
Additional Functions

In addition to the basic functions (power off, zeroing, taring and printing), you can also access the following functions from this application:

– Store weight in second tare memory (F key)
– Delete tare memory (CF key)
– Toggle weight unit ([TOGGLE] key)

Example
Fill containers with nearly identical weights (± 30 %)

Settings (changes in the factory settings required for this example):
Menu: Application program: Second tare memory with automatic container taring (2 1 10)
Menu: Weight unit 2: Grams (3 1 2)

Step	key (or instruction)	Display / Output
1. Turn on the scale	[ON/OFF]	
2. If necessary, zero the scale	[ZERO]	0.000 kg
3. Place an empty container on the scale (here: 65 g)		+ 0.065 kg
4. Store the container weight in the second tare memory. If the print format is set to include data ID codes, the following is printed	F	0.000 kg_{NET} N1 + 0.065 kg
5. Fill the container (here: to 500 g)		+ 0.500 kg_{NET}
6. Display weight unit 2	[TOGGLE]	+ 500 g_{NET}
7. Display weight unit 1	[TOGGLE]	+ 0.500 kg_{NET}
8. Remove the filled container from the scale		– 0.065 kg_{NET}
9. Place the next empty container on the scale (here: 75 g)		0.000 kg_{NET} (automatic containertaring is performed)

10. Repeat the procedure starting from Step 5.

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

– Reference percentage can be changed either in the operating menu or during weighing
– Store the current weight value to have it loaded as the preset reference percentage the next time you initialize the Weighing in Percent application
– Optional auto-zero function
– The reference sample weight is automatically output via the data interface port after initialization, if the menu code for "Printout with data ID codes" is set
– Press [TOGGLE] to toggle the display between percentage and weight

Preparation

Configure the Weighing in Percent application in the operating menu:

○ If the scale is on, turn it off: Press [ON/OFF]

● Turn on the scale: Press [ON/OFF]; while all segments are lit, press [TARE]

● Select the "Weighing in Percent" menu item:
Press [TARE], [PRINT], and [PRINT]; press [TARE] repeatedly, if necessary
215 Weighing in percent – without taring
211 Weighing in percent – with taring

● Confirm selection of Weighing in Percent: Press [PRINT] for at least 2 sec.
> o indicates that this is the current menu code setting

● Set the next parameters: Press [PRINT]

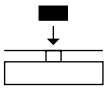
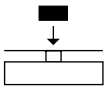
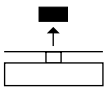
● Select and confirm:
– Reference percentage at power-on:
331 5 %
332 10 %
333 20 %
334 50 %
335 100 %

see also the "Scale Operating Menu (Overview)" in the chapter entitled "Configuring the Scale"

● Save settings and exit the Setup menu: Press [TARE] for at least 2 sec.

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

Settings (changes in the factory settings required for this example):
Menu: Application program: Weighing in percent (215)
Menu: Reference percentage 100 % (335)

Step		Key (or instruction)	Display / Output
1.	Turn on the scale	[ON/OFF]	
2.	If necessary, zero the scale	[ZERO]	0.000 kg
3.	Place the reference weight on the scale (here: 2.295 kg = 100%)		+ 2.295 kg
4.	Start the application; if the print format is set to include data ID codes, the following is printed	F	+ 100.00 % Wxx% + 2.295 kg
5.	Display weight	[TOGGLE]	+ 2.295 kg
6.	Display percentage	[TOGGLE]	+ 100.00 %
7.	Display the reference percentage	F (at least 2 sec.)	rEF 100
8.	Place an unknown weight on the scale (here: 3.225 kg)		+ 140.41 %
9.	Print percentage	[PRINT]	Prc + 140.41 %
10.	Unload the scale		0.00 %
11.	Repeat the procedure starting with Step 8, if desired.		

Calculation by a Factor

Purpose

With this application program you can calculate the weight of a sample by a given factor.

Available Features

– Calculate a weight value using one of the following factors:
0.25; 0.50. 0.75; 1.0; 1.5; 2.0; 2.5; 3.0; 3.5; 4.0; 4.5; 5.0
– A flashing triangle in the display indicates a calculated value
– Press [CF] to delete the calculation factor
– Press [TOGGLE] to toggle between weight unit 1 and weight unit 2

Preparation

Configure the Calculation application in the operating menu:

○ If the scale is on, turn it off: Press [ON/OFF]

● Turn on the scale: Press [ON/OFF]; while all segments are lit, press [TARE]

● Select the "Calculation" menu item:
Press [TARE], [PRINT], and [PRINT]; press [TARE] repeatedly, if necessary
217 Calculation by a factor

● Confirm selection of Calculation: Press [PRINT] for at least 2 sec.
> o indicates that this is the current menu code setting

● Set the next parameters: Press [PRINT]

● Select and confirm:
– Weight unit 1: (see also "Toggle between Weight Units")
172 Grams
... ...
1722 lb/oz

– Weight unit 2: (see also "Toggle between Weight Units")
312 Grams
... ...
3122 lb/oz

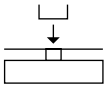
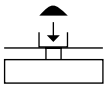
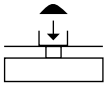
see also the "Scale Operating Menu (Overview)" in the chapter entitled "Configuring the Scale"

● Save settings and exit the Setup menu: Press [TARE] for at least 2 sec.

Example

You have a formula requiring several different components for a total amount of 1,000 g. You want to use this recipe to make a 500 g batch (factor: 0.5). The scale shows the amounts called for in the formula, although only half the amounts are placed on the scale. This saves you having to recalculate the amount of each component.

Settings (changes in the factory settings required for this example):
Menu: Application program: Calculation (2 1 7)

Step	key (or instruction)	Display / Output
1. Turn on the scale	[ON/OFF]	
2. If necessary, zero the scale	[ZERO]	0.000 kg
3. Place an empty container on the scale (here: 65 g)		+ 0.065 kg
4. Tare the scale	[TARE]	0.000 kg_{NET}
5. Start calculation	F	▽ 0.000 kg_{NET} .25
6. Select the calculation factor	F	▽ 0.000 kg_{NET} .50
7. Add first component (amount called for in the formula: 240 g; actual amount. 120 g		+ ▽ 0.240 kg_{NET} .50
8. Add other components (until the display indicates 1,000 g)		+ ▽ 1.000 kg_{NET} .50
9. Print weight of components	[PRINT]	Res + 1.000 kg

Number Totaling

Purpose
This application program acts as a cumulative memory function.

Available Features
- The current weight is stored as a net value when the scale stabilizes
- A value indicated as negative (–) in the display is stored as a positive (+) value in the totaling memory
- The data stored in the totaling memory is automatically output via the data interface port after initialization, if the menu code for "Printout with data ID codes" is set
- The number of values in the totaling memory is displayed (transaction counter)
- Press [F] for > 2 sec. to display the contents of the totaling memory
- Press [CF] to clear the totaling memory. The total is displayed for 1.5 seconds and printed
- You cannot toggle between weight units when there is data in the totaling memory

Preparation
Configure the Totaling application in the operating menu:

○ If the scale is on, turn it off: Press [ON/OFF]

● Turn on the scale: Press [ON/OFF]; while all segments are lit, press [TARE]

● Select the "Number Totaling" menu item:
Press [TARE], [PRINT], and [PRINT]; press [TARE] repeatedly, if necessary
218 Number Totaling

● Confirm selection of Number Totaling: Press [PRINT] for at least 2 sec.
> o indicates that this is the current menu code setting

● Set the next parameters: Press [PRINT]

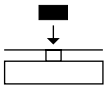
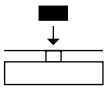
● Select and confirm:
– Weight unit 1: (see also "Toggle between Weight Units")
172 Grams
... ...
1722 lb/oz

see also the "Scale Operating Menu (Overview)" in the chapter entitled "Configuring the Scale"

● Save settings and exit the Setup menu: Press [TARE] for at least 2 sec.

Example
Totale weight values

Settings (changes in the factory settings required for this example):
Menu: Application program: Number Totaling (2 18)

Step	Key (or instruction)	Display / Output	
1.	Turn on the scale	[ON/OFF]	
2.	If necessary, zero the scale	[ZERO]	0.000 kg
3.	Place sample on the scale (here: 380 g)		+ 0.380 kg
4.	Store value in memory; if the print format is set to include data ID codes, the following is printed	F	+ 0.380 kg [1] G + 0.380 kg
5.	Place the next sample on the scale (here: 575 g)		+ 0.575 kg [1]
6.	Store value in memory	F	+ 0.575 kg [2]
7.	Display the total in memory (total is also printed)	F for at least 2 sec.	± 0.955 kg [2] (briefly) Sum + 0.955 kg
8.	Clear totaling memory and print total	CF	Sum + 0.955 kg
9.	Repeat the procedure starting from Step 4, if desired.		

Gross / Net Toggling

Purpose
With this application program you can toggle between net and gross values.
Available Features
– Toggle the display between gross and net weights when there is data in the tare memory
– Press [TOGGLE] to toggle between weight unit 1 and weight unit 2

Factory Settings
Weight unit 1: kg (173)
Weight unit 2: kg (313)
Display accuracy 2: Standard resolution (321)

Preparation
Configure the Gross / net toggling application in the operating menu:

○ If the scale is on, turn it off: Press [ON / OFF]

● Turn on the scale: Press [ON / OFF]; while all segments are lit, press [TARE] briefly

● Select the "Gross / net toggling" menu item:
Press [TARE], [PRINT], and [PRINT]; press [TARE] repeatedly, if necessary
219 Gross / net toggling

● Confirm selection of Gross / net toggling: Press [PRINT] for at least 2 sec.
> o indicates that this is the current menu code setting

● Set the next parameters: Press [PRINT]

● Select and confirm:

– Weight unit 1: (see also “Toggle between Weight Units”)

172	Grams
...	...
1722	lb/oz

– Weight unit 2: (see also “Toggle between Weight Units”)

312	Grams
...	...
3122	lb/oz

– Display accuracy 2:

321	Standard resolution
323	2x higher resolution

see also the “Scale Operating Menu (Overview)” in the chapter entitled “Configuring the Scale”

● Save settings and exit the Setup menu: Press [TARE] for at least 2 sec.

Additional Functions

In addition to the basic functions (power off, zeroing, taring and printing), you can also access the following functions from this application:

– Toggle display between gross and net values (F key)

– Toggle weight unit ([TOGGLE] key)

Example of Printout

Net display ([PRINT] key):

```
N     +    0.125 kg
T     +    0.015 kg
G#    +    0.140 kg
```

Gross display ([PRINT] key):

```
G     +    0.140 kg
```

Averaging

Purpose

Use this program to determine the weights of unstable samples (e.g., live animals) or to determine weights under unstable ambient conditions. In this program, the 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

– You can set the number of subweighing operations performed in the operating menu, or before starting the Averaging application (press [TOGGLE])
– The number of subweighs remaining to be performed is indicated in the display during weighing
– The measured result displayed is the arithmetic mean shown in the selected weight unit; a triangle under the plus or minus sign indicates that this is a calculated value
– Press [F] for at least 2 sec. to display the pre-set number of subweighing operations
– Press [TOGGLE] to toggle the display between the measured result and the weight
– The measurement result is automatically output via the data interface port after initialization, if the menu code for "Printout with data ID codes" is set

Preparation

Configure the Averaging application in the operating menu:

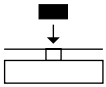
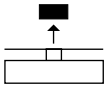
○ If the scale is on, turn it off: Press [ON/OFF]
● Turn on the scale: Press [ON/OFF]; while all segments are lit, press [TARE]

● Select the "Averaging" menu item:
Press [TARE], [PRINT], and [PRINT]; press [TARE] repeatedly, if necessary
212 Averaging
● Confirm selection of Averaging: Press [PRINT] for at least 2 sec.
> o indicates that this is the current menu code setting
● Set the next parameters: Press [PRINT]
● Select and confirm:
– Number of subweighs for averaging:
331 5 subweighs
332 10 subweighs
333 20 subweighs
334 50 subweighs
335 100 subweighs
see also the "Scale Operating Menu (Overview)" in the chapter entitled "Configuring the Scale"

● Save settings and exit the Setup menu: Press [TARE] for at least 2 sec.

Example
Determine the weight of a sample in extremely unstable ambient conditions.
Enter the number of subweighs while in the weighing mode.

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

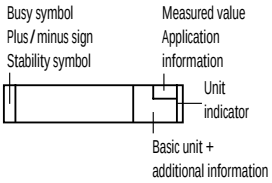
Step	key (or instruction)	Display / Output
1. Turn on the scale	[ON/OFF]	
2. If necessary, zero the scale	[ZERO]	0.000 kg 10
3. Set the number of subweighs for averaging (here: 5 subweighs)	[TOGGLE] [TOGGLE] [TOGGLE] [TOGGLE] [TOGGLE] [TOGGLE]	rEF 20 (briefly) rEF 50 (briefly) rEF 100 (briefly) rEF 1 (briefly) rEF 2 (briefly) rEF 5 (briefly) 0.000 kg 5
4. Place sample on the scale (weight readout fluctuates; here: around 275 g)		+ 8888 5
5. Start measurement; if the print format is set to include data ID codes, the following is printed	F	+ 8888 5-1 + 0.275 kg 5 Res + 0.275 kg
6. Unload the scale		+ 0.275 kg 5 (stable display)

7. Repeat the procedure starting from Step 4.

Data Output Functions

There are 3 options for data output:

- Output to the display and control unit
- Output to a printer (generate a printout)
- Output to a peripheral device (e.g., computer) via the interface port



Output to the Display and Control Unit

The display is divided into 5 sections. Information about the scale, the application being used and the sample weighed is output in the following sections:

- Busy symbol, plus/minus sign, stability symbol
- Measured value line
- Basic units and additional identifiers
- Application parameter
- Weight unit indicator

Busy Symbol, Plus/Minus Sign, Stability Symbol

This section contains:

▲ – Busy symbol

± – Plus/minus sign

▼ – Calculated value indicator (flashing triangle; in the examples shown in this manual, it appears as a white triangle with a black border)

Measured Value Line

This section shows:

125.09 – Current weight

35 – Calculated values (e.g., piece counts)

rEF 100 – Application parameters during configuration (e.g., reference sample quantity, etc.)

r 19.01 – Software version (r = release; in this example: 19 = scale program; 01 = software version)

Weight Units, Additional Identifiers

This section shows:

kg – The current weight unit (e.g., kg)

pcs – Other unit of measurement (e.g., piece count)

NET – Indicates that there is data in the tare memory

Application Parameter

50 This section shows application parameters (e.g., reference sample quantity, no. of subweighs for averaging, etc.).

Weight Unit Indicator

▶ The arrows in this section indicate the configured weight units

▶ (upper arrow: weight unit 1; lower arrow: weight unit 2)

▶

▶

Printing a Data Record

Purpose

You can generate a printout of weights as well as other measured values and identifiers for documentation purposes. You can format the printout to meet individual requirements.

Print an individual weight, or net, gross and tare weights.

Line format: You can configure a data ID code of up to 6 characters for each of the values printed; this data ID code is printed at the beginning of the line

Printouts generated automatically or by pressing the [PRINT] key, dependent on or independent of scale stability

You can have the following values output automatically when using the application programs if menu code 712 or 713 is configured (printout with data ID codes):

- Second tare memory: last net value
- Counting: Reference weight for one piece (average piece weight)
- Weighing in percent: Reference weight for the percentage selected
- Number Totaling: Current weight, total weight (net)
- Averaging: Result of measurement

Factory Settings
Header:
The default header lines do not contain any text

Print manual / automatic:
Individual printout or automatic printout dependent on scale stability:
Manual after stability (6 i2)

Line format:
Up to 6 characters at the beginning of each line to identify the weight or calculated value:
Print net, tare, gross value with data ID (7 i3)

- See the chapter entitled "Configuring the Scale" for instructions on setting parameters

Headers:

Printout without Data ID Codes:
The value currently displayed is printed (weight or calculated value with unit)

Examples

+ 1530.0 g	Weight in grams
+ 58.562 ozt	Weight in Troy ounces
+ 253 pcs	Piece count
+ 88.2 %	Percentage
+ 105.8 o	Calculated value

Printout with Data ID Codes:

The current value displayed can be printed with a data ID code of up to 6 characters at the beginning of the line. You can use this data ID code, e.g., to designate a weight readout as a net weight (N) or a calculated value as a piece count (QNT).

N	+	1.530 kg	Current net weight
N1	+	1.530 kg	Current net weight
T	+	0.234 kg	Value in tare memory
T1	+	0.102 kg	Value in 2nd tare memory
G	+	1.553 kg	Current gross weight
G#	+	1.630 kg	Calculated gross weight
Qnt	+	253 pcs	Calculated quantity
Prc	+	88.2 %	Calculated percentage
Sum	+	1.279 kg	Total value (net)
Res	+	1.530 kg	Calculated result

Print Application Parameters:

You can generate a printout of one or more of the values configured for initialization of an application as soon as you initialize the scale.

wRef	+	0.014 kg	Counting: Average piece weight
Wxx%	+	1.200 kg	Weighing in percent: reference weight for the selected percentage

Auto Print:

You can have the weight readout printed automatically. The display update interval depends on the operating status of the scale and on the scale model.

N	+	1.530 kg	Net weight
Stat			Display blank
Stat		L	Display underload
Stat		H	Display overload

Interface Description

Purpose

Your 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 scale and the application programs.

Available Features	
Type of interface:	Serial interface
Operating mode:	Full duplex
Standard:	RS-232
Transmission rates:	150; 300; 600; 1,200; 2,400; 4,800; 9,600 baud
Parity:	Mark, space, odd, even
Character format:	1 start bit, 7-bit ASCII, parity, 1 or 2 stop bits
Handshake:	2-wire interface: via software (XON/XOFF) 4-wire interface: via hardware handshake lines (CTS/DTR)
Operating mode:	SBI
Data output format of the scale:	16 or 22 characters

Factory Settings:	
Transmission rate:	1,200 baud (514)
Parity:	Odd (523)
Stop bits:	1 stop bit (531)
Handshake:	Hardware, 1 character after CTS (543) Operating mode: Standard SBI (551)
Print manually/automatically:	Manual after stability (612)

Preparation

- See the chapter entitled “Overview” for the pin assignment chart

Line Format (Data Output Format)
You can output the values displayed in the measured value line and the weight unit with or without a data ID code.

Example: Without data ID code

```
+      253 pcs
```

Example: With data ID code

```
Qnt    +      253 pcs
```

Configure this parameter in the Setup menu
(Menu: Printout format 711 or 712 or 713).

The output without data ID code has 16 characters; with data ID code, 22 characters.

Output Format With 16 Characters

Display segments that are not activated are output as spaces. Characters without a decimal point are output without a decimal point. The following characters can be output, depending on the characters displayed on the scale:

Normal Operation

Position	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	+				D	D	D	D	D	D	*	U	U	U	CR	LF
or	–		.	.	.	.	.	.	.	.		*	*	*		
or	*		*	*	*	*	*	*	*	*						
or					0	0	0	0	0	0						

*: Space
D: Digit or letter
U: Unit symbol
CR: Carriage Return
LF: Line Feed

Special Codes

Position	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
					*	*	–	–	*	*	*	*	*	*	CR	LF
or							H	*								
or							L	*								
or							C	*								

*: Space
– –: Weight
H: Overload
L: Underload
C: Calibration / adjustement

Error Codes

Position	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
				*	*	E	*	#	#	#	*	*	*	*	CR	LF

*: Space
#: Error code number

Example: Data output example: + 1255.7 g

Position	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	+	*	*	*	1	2	5	5	.	7	*	g	*	*	CR	LF

Position 1: Plus or minus sign or space
Position 2: Space
Position 3–10: Weight with a decimal point; leading zeros = space
Position 11: Space
Position 12–14: Unit symbol or space
Position 15: Carriage Return
Position 16: Line Feed

Output Format with 22 Characters

When data with an ID code is output, the ID code consisting of 6 characters precedes the data with the 16-character format. These 6 characters identify the following value.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
I	I	I	I	I	I	+	*	D	D	D	D	D	D	D	D	*	U	U	U	CR	LF
	*	*	*	*	*	–		.	.	.	.	.	.	.	.		*	*	*		
						*		*	*	*	*	*	*	*	*						
										0	0	0	0	0	0						

I: ID code character[1)]
*: Space
D: Digit or letter
U: Unit symbol[1)]
CR: Carriage Return
LF: Line Feed

[1)] depends on scale type; e.g., not all units and characters are available on scales (see also next page)

Special codes

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
S	t	a	t	*	*	*	*	*	*	*	*	–	–	*	*	*	*	*	*	CR	LF
												H	*								
												L	*								

*: Space
– –: Weight
H: Overload
L: Underload

Error codes

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
S	t	a	t	*	*	*	*	*	E	r	r	*	#	#	#	*	*	*	*	CR	LF

*: Space
###: Error code number

ID code characters I	Meaning
Stat	Status
G	Gross
G#	Gross – calculated value
T	Tare T
T1	Tare T1
N	Net N
N1	Net N1
Qnt	Counting: quantity
Prc	Weighing in percent: percentage
Res	Calculation, averaging: result
Sum	Number Totaling: net total
wRef	Automatic Printout: average piece weight
Wxx%	Automatic Printout: reference percentage weight

Data Input Format

You can connect a computer to your scale to send commands via the scale interface port to control scale functions and applications.

The commands sent are control commands and may have different formats; e.g., control commands can have up to 26 characters. Each character must be transmitted according to the settings configured in the Setup menu for data transmission.

Format for Control Commands

Format :	Esc	!	CR	LF

Esc: Escape
!: Command character
CR: Carriage Return (optional)
LF: Line Feed (optional)

Command character !	Meaning
K	Weighing mode 1
L	Weighing mode 2
M	Weighing mode 3
N	Weighing mode 4
O	Block keys
P	Print
R	Release keys
S	Restart
T	Tare and zero (combined)
U	Tare (“Tare only”)
V	Zero
W	External calibration / adjustment

Synchronization
During data communication between the scale and an on-line device (computer), messages consisting of ASCII characters are transmitted via the interface. For error-free data communication, the parameters for baud rate, parity, handshake mode and character format must be the same for both units.

You can set these parameters in the Setup menu so that they match those of the on-line device. You can also define parameters in the scale to make data output dependent on various conditions. The conditions that can be configured are described under each of the application program descriptions.

If you do not plug a peripheral device into the scale interface port, this will not generate an error message.

Handshake
The scale interface has transmit and receive buffers.
You can define the handshake parameter in the Setup menu:

- Hardware handshake (CTS / DTR)
- Software handshake (XON, XOFF)

Hardware Handshake
With a 4-wire interface, 1 more character can be transmitted after CTS (Clear to Send).

Software Handshake
The software handshake is controlled via XON and XOFF. When a device is switched on, XON must be transmitted to enable any connected device to communicate.

Activating Data Output
You can define the data output parameter so that output is activated either when a print command is received or automatically and synchronous with the scale display or at defined intervals (see application program descriptions and auto-print setting).

Data Output by Print Command
The print command can be transmitted by pressing [PRINT] or by a software command (Esc P).

Automatic Data Output
In the "auto print" operating mode, data are output to the interface port without a print command. You can choose to have data output automatically at defined print intervals with or without the stability parameter. Whichever parameter you select, the data will be output as the readouts appear on the scale display.
The display update frequency depends on the setting for "Adapting the Filter" (1.1.x.).

If you select the auto print setting, data will be transmitted immediately the moment you turn on the scale.

Pin Assignment Chart

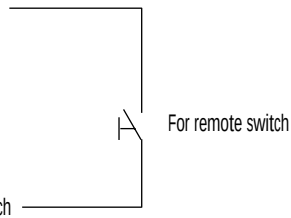
Female Interface Connector:
25-position D-Submini, DB25S, with screw lock hardware for cable gland

Male Connector Used: (please use connectors with the same specifications):
25-pin D-Submini, DB25S, with integrated shielded cable clamp assembly
(Amp type 826 985-1C) and fastening screws (Amp type 164 868-1)

⚠ **Warning When Using Pre-wired RS-232 Connecting Cables!**
RS-232 cables purchased from other manufacturers often have incorrect pin assignments for use with Acculab scales. Be sure to check the pin assignment against the chart below before connecting the cable, and disconnect any lines marked "Internally Connected" (e.g., pin 6). Failure to do so may damage or even completely ruin your scale and/or peripheral device.

Pin Assignment Chart:

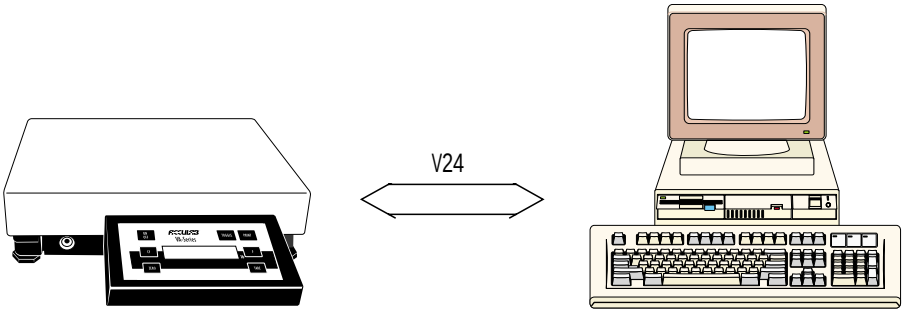
Pin 1: Signal ground
Pin 2: Data Output (TxD)
Pin 3: Data Input (RxD)
Pin 4: Internal Ground (GND)
Pin 5: Clear to Send (CTS)
Pin 6: Internally Connected
Pin 7: Internal Ground (GND)
Pin 8: Internal Ground (GND)
Pin 9: Internally Connected
Pin 10: Not Connected
Pin 11: Not Connected
Pin 12: Reset _ Out *)
Pin 13: Internally Connected
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: Ground input for external power supply (GND _ V in)
Pin 22: Internally Connected
Pin 23: Internally Connected
Pin 24: Power supply input +12 ... 30 V
Pin 25: Not Connected



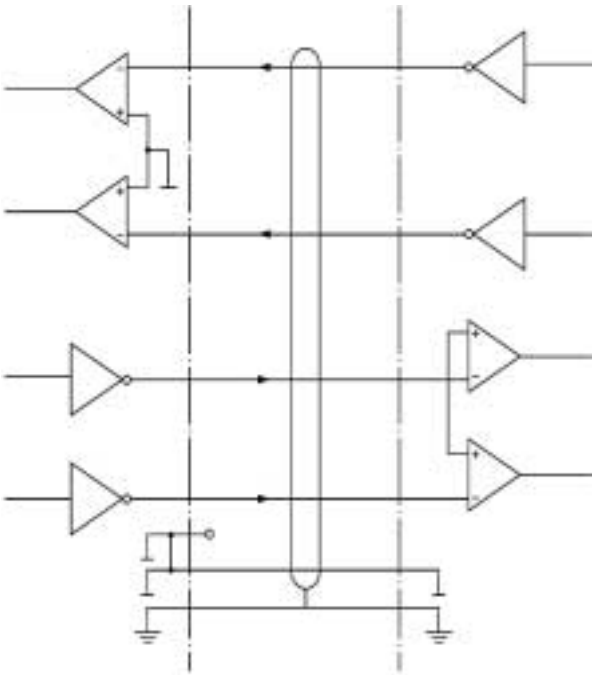
*) = Hardware restart

Cabling Diagram

– Diagram for interfacing a computer or different peripheral device to the scale using the RS-232 / V24 standard and cables up to 15 m (50 ft.) long



Scale **Peripheral Device**



25 pin	PC or	9 pin
2		3
20		4
3		2
5		8
6		6
7		5

Type of cable: AWG 24 specification

Error Codes

Error codes are shown in 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 Automatic shutoff is configured Rechargeable battery has run down	Check the AC power supply Plug in the AC adapter Turn on the scale Recharge battery (see battery instructions)
H	The load exceeds the scale capacity	Unload the scale
L	The load plate is not in place Something is touching the load plate	Place the load plate on the scale Move the object that is touching the load place
E 01	Data output not compatible with input format	Change the configuration in the Setup menu
E 02	Calibration parameter not met; e.g.: – scale not zeroed – scale is loaded	Calibrate only when zero is displayed Press [ZERO] to zero the scale Unload the scale
E 08	The scale was zeroed outside the zero range	Only zero the scale when in the zero range; i.e.: 2% of the maximum capacity
E 09	Taring is not possible when the gross weight is ≤ zero	Press [ZERO] to zero the scale
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

Display	Cause	Solution
E 11	Tare memory not accessible	Press [ZERO]
E 22	Weight is too light or there is no sample on the scale	Increase the reference quantity
E 30	Interface port for printer output is blocked	Perform “Reset menu” or Contact your local Acculab Service Center
The maximum weighing capacity is less than is indicated in “Specifications”	The scale was turned on without the load plate in place	Press the [ON/OFF] key to turn the scale off and back on again
The weight readout changes constantly	Unstable ambient conditions Too much vibration, or the scale is exposed to a draft A foreign object is caught between the load plate and the scale frame	Set up the scale in another area Change setup configuration to adapt the scale to the ambient conditions Remove the foreign object
The weight readout is obviously wrong	The scale has not been calibrated/adjusted The scale was not tared before weighing	Calibrate/adjust the scale Tare before weighing

If any other errors occur, 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 scale from the AC adapter and unplug any data cables that are connected to the scale

⚠ Make sure that no liquids enter the scale housing

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

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

Cleaning Stainless Steel Surfaces

Clean all stainless steel parts regulary. Remove the stainless steel weighing pan and thoroughly clean it separately outside the hazardous area/location. Use a damp cloth or sponge to clean any stainless steel parts on the 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 thoroughly, making sure to remove all residues. Use a damp cloth or sponge to wipe down any stainless steel parts on the scale again. Afterwards, allow the 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 with steel wool is not permitted. Solvents are permitted only for cleaning stainless steel parts.

Safety Inspection

If there is any indication that safe operation of the 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 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. 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

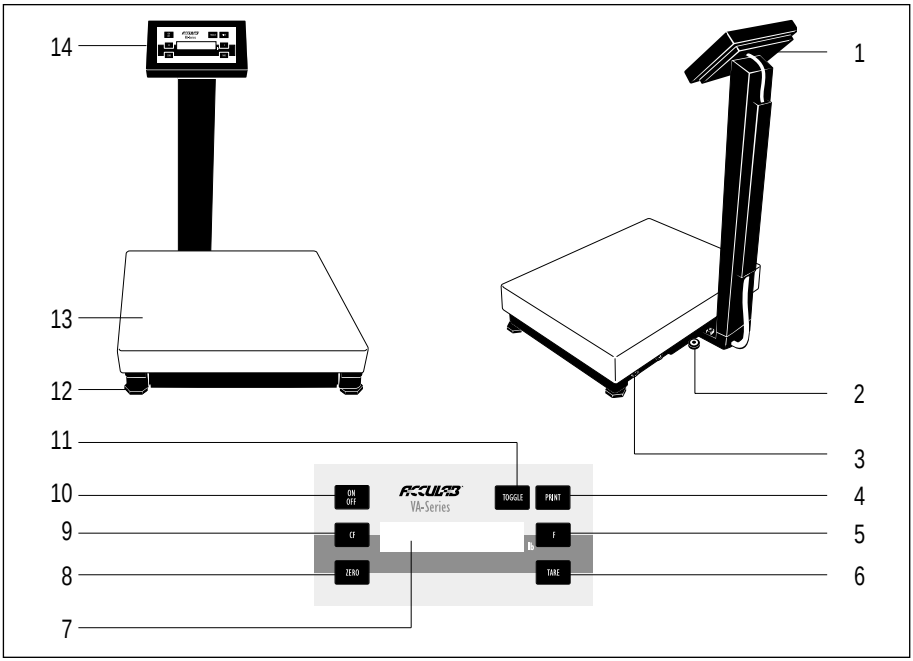
Instructions for Recycling the Packaging

To ensure safe shipment, your scale has been packaged using environmentally friendly materials. After successful installation of the scale, you should return this packaging for recycling.

For information on recycling options, including recycling of old weighing equipment, contact your municipal waste disposal center or local recycling depot.

Overview

General View of the Scale



No.	Designation
1	Interface port
2	Level indicator
3	DC jack
4	Print key
5	Function key
6	Tare key
7	Display

No.	Designation
8	Zero key
9	Clear function key
10	On / off / standby key
11	Toggle key
12	Leveling foot
13	Load plate
14	Display and control unit

Description of the Keys

[ON/OFF] key: On/off switch
Switches the display on/off. The scale remains in the standby mode.

[ZERO] key: Zero
Sets the readout to zero. The scale can only be zeroed if the load is ± 2% of the maximum capacity.

CF key: Clear Function
This key is generally used to interrupt/cancel functions:
- Clear memory and delete application data
- Interrupt calibration/ adjustment routines

[TOGGLE] key: Toggle
For toggling the display between weighed and calculated values (counting result, percentage, calculated result)

For changing the reference quantity/percentage or numbers of subweighs for averaging

F key: Start Application Program
The procedure that follows after this key is pressed depends on the application program selected; for a complete description, see the chapter entitled "Operating the Scale" in the corresponding section.

[TARE] key: Tare
For taring the weight of containers so that the scale readout shows the net weight of samples.

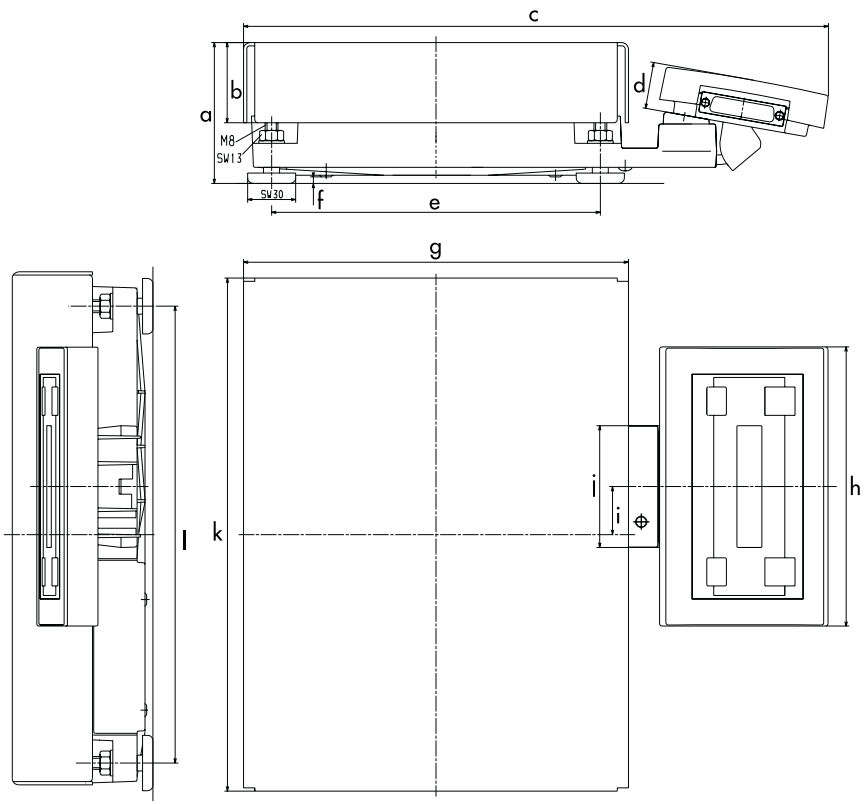
[PRINT] key: Data Output
Press this key to output the displayed values to via the built-in interface to a Data Printer or a computer.

Specifications

Model		VA-6 kg	VA-12 kg	VA-30 kg
Weighing capacity	kg lb	6 13.2	12 26.4	30 66.1
Readability	g	0.1	0.2	0.5
Maximum load	kg	12	30	70
Tare range (by subtraction)	kg	6	12	30
Repeatability	≤±g	0.4	1	2
Linearity	≤±g	0.4	1	2
Sensitivity drift within +5…+35°C	ppm/K	10	10	10
External calibration weight (of at least accuracy class...)	kg lb	2 (F2) 5 (F2)	5 (F2) 10 (F2)	10 (F2) 20 (F2)
Net weight, approx.	kg	5	5	8
Dust and water protection rating for the weighing platform according to EN 60529		IP65		
Dust protection rating for the display and control unit according to EN 60529		IP40		
AC power source / power requirements		AC adapter, 230 or 115 V, +15% ... – 20%		
Frequency		48 – 60 Hz		
Power consumption		maximum 16 VA; average 8 VA		
Operating temperature range		–10 ... +40°C (263 ... 313 K, 14°F ... 104°F)		
Adaptation to ambient conditions		by selection of 1 of 4 optimized filter levels		
Display update (depends on the filter level selected)		0.1 – 0.4		
Hours of operation with fully charged external battery pack, approx.		48 h		
Selectable weight units		grams, kilograms, carats, pounds, ounces, Troy ounces, Hong Kong taels, Singapore taels, Taiwanese taels, grains, pennyweights, milligrams, parts per pound, Chinese taels, mommes, Austrian carats, tola, baht, mesghal and tons		
Built-in interface Format: Parity: Transmission rates: Handshake mode:		RS-232 7-bit ASCII, 1 start bit, 1 or 2 stop bits mark, odd, even or space 150 to 9,600 baud software or hardware		

Dimensions

With front-mounted display and control unit

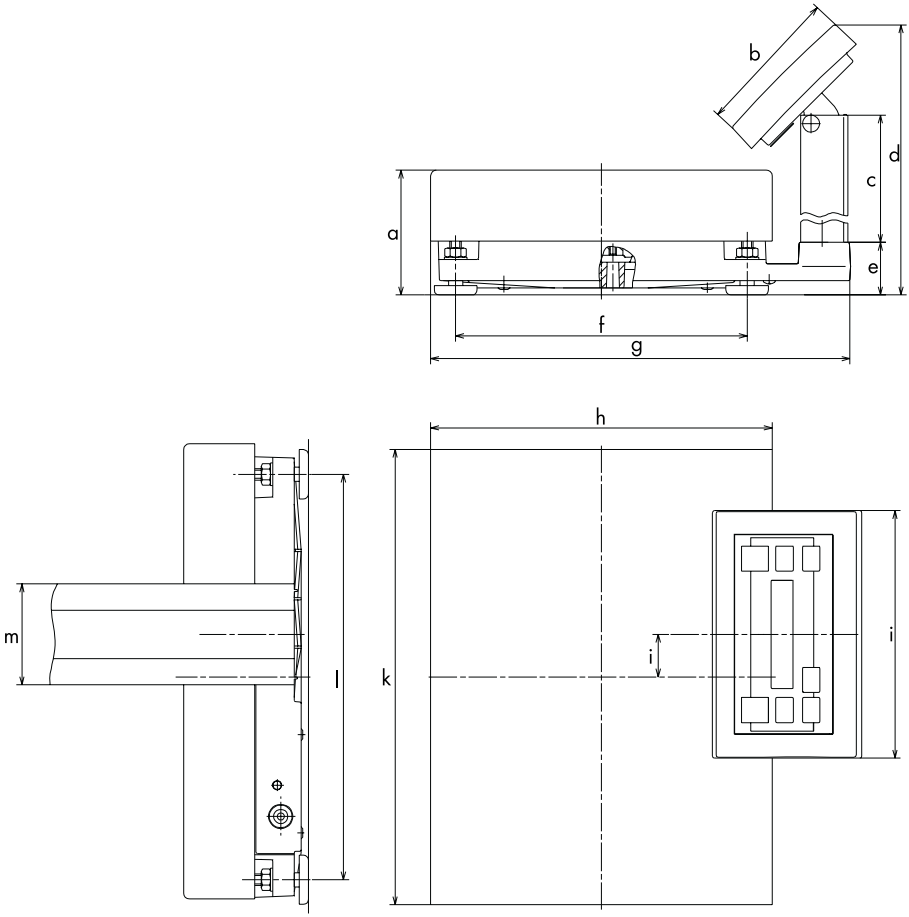


Dimensions (in millimeters / inches)

Model		a	b	c	d	e	f	g	h	i	j	k	l
VA-6 kg,	mm	min.87	50	365	29	205	min.4	240	174	30	76	320	285
VA-12 kg	in	3.43	1.97	14.38	1.14	8.07	0.16	9.45	6.85	1.18	2.99	12.60	11.22
VA-30 kg	mm	min.90	53	425	29	265	min.4	300	174	60	76	400	365
	in	3.54	2.09	16.73	1.14	10.43	0.16	11.81	6.85	2.36	2.99	15.75	14.37

Dimensions

With display and control unit mounted on the post



Dimensions (in millimeters)

Model	a	b	c	d	e	f	g	h	i	j	k	l	m
VA-6 kg, VA-12 kg	min.88	103	325	425	37	205	295	240	174	30	320	285	71
in	min.3.46	4.06	12.80	16.73	1.46	8.07	11.61	9.45	6.85	1.18	12.60	11.22	2.80
VA-30 kg	min.90	103	500	600	37	265	355	300	174	60	400	365	71
in	min.3.54	4.06	19.69	23.62	1.46	10.43	13.98	11.81	6.85	2.36	1.57	14.37	2.80

Accessories (Options)

Product	Order No.
External rechargeable battery pack has a battery-level indicator (LED); can be recharged using the AC adapter (time it takes to charge the discharged battery pack: 15 hours); see "Specifications" for hours of operation can be used in legal metrology	**VA-BAT**
Data printer "PRI-01"	**DOTPRINT**
Data cable for connecting a PC; 9-25-pin	**VA-CAB**
Dust cover for display and control unit	**VA-DUST**

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:

Council Directive 89 / 336 / EU "Electromagnetic compatibility (EMC)"

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).

73 / 23 / EU "Electrical equipment designed for use within certain voltage limits"
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 installations in your country.

For information on the current legal requirements of your country, please contact your local Acculab customer service office.

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The status of the information, specifications and illustrations in this manual is indicated by the date given below.
Acculab reserves the right to make changes to the technology, features, specifications and design of the equipment without notice.

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