RADWAG BALANCES AND SCALES
ADVANCED WEIGHING TECHNOLOGIES

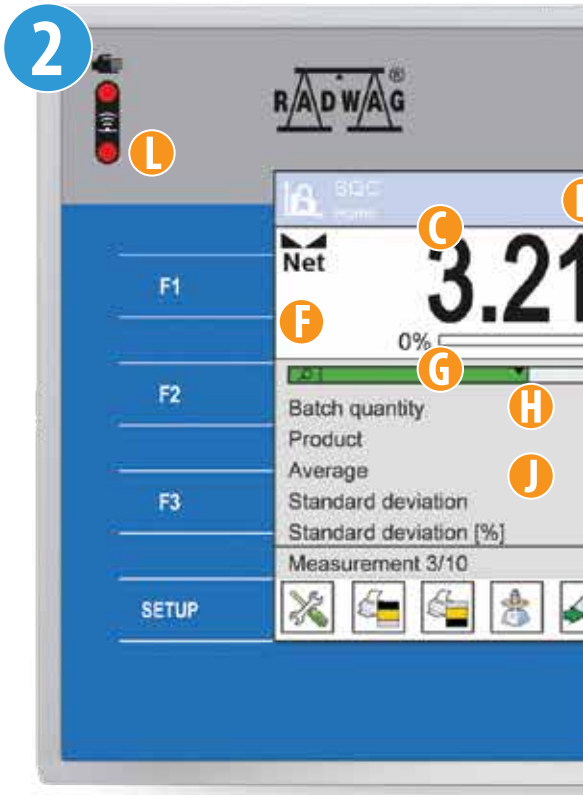
Ultra-microbalances and microbalances

MICRO SCALE MEASUREMENT - LABORATORY APPLICATIONS

3Y series microbalances

Extraordinary precision and comfort of operation for small mass measurement performed with the highest accuracy.

- 5,7” touch screen
- Interactive menu
- Wireless connection
- Conformity with regulations (GLP, GMP System)
- Database (weighing records, samples, operators, reports)
- Dynamic control sample weight (bargraph)
- Statistics, SQC
- Printouts, reports (standard PCL)
- Multilingual menu
- Interfaces: Ethernet (network applications), USB, RS 232
- Wide spectrum of use (industry, laboratories, universities, research and development centres)



1 Weighing module

A Automatically opened draft shield

B Weighing pan

2 Terminal

C Information on a selected working mode and on an adoped profile

D Information on a logged in operator

E Area for date, time, connection type information, battery state, etc.

F Measurement indication area

G Load bargraph

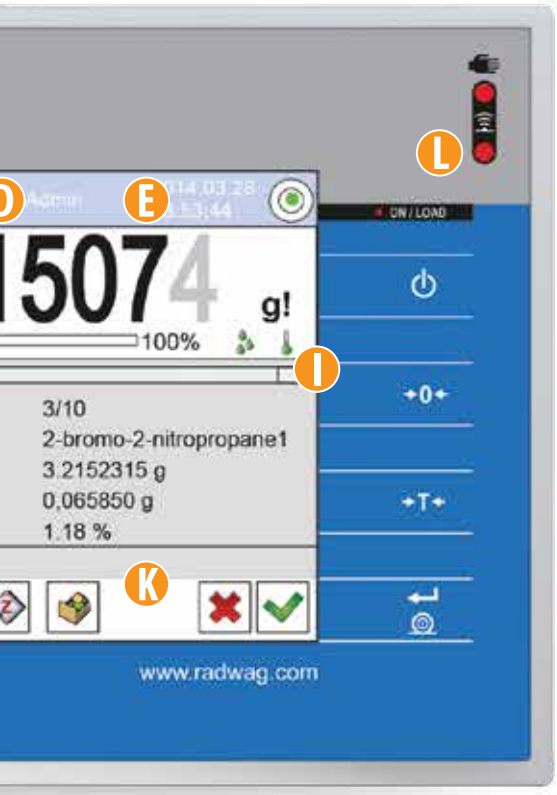
H Checkweighing function bargraph (thresholds)

I Pictograms for ambient conditions monitoring

J Configurable area for extra information

K Quick access bar

L Proximity sensors (optimization of operation)



Standard design of UYA 3Y Ultra-microbalance and MYA 3Y Microbalance

MYA 3Y.P Microbalance for pipettes calibration

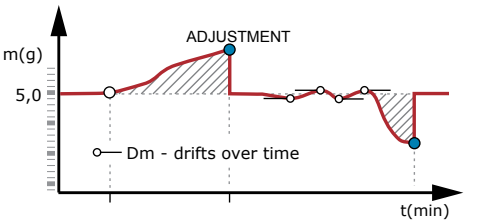
MYA 3Y.F Microbalance for filters weighing

MYA 3Y.F1 Microbalance for weighing filters of large-diameter

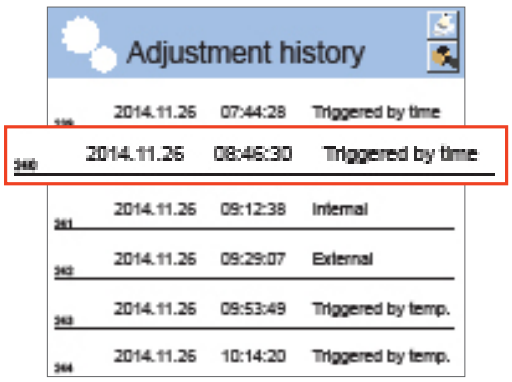
Quality built into the product

Adjustment
and an automatic cycle

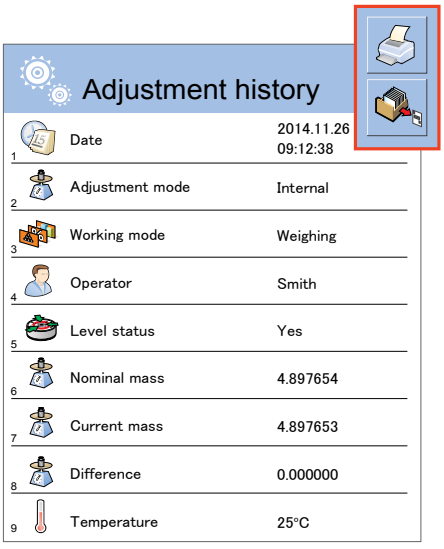
Accuracy of indication for MYA 3Y microbalances is guaranteed owing to automatic adjustment process. This process takes into account the dynamics of temperature variation and time flow. It is possible to generate a report upon each completed adjustment.



Principle of operation for an automatic adjustment



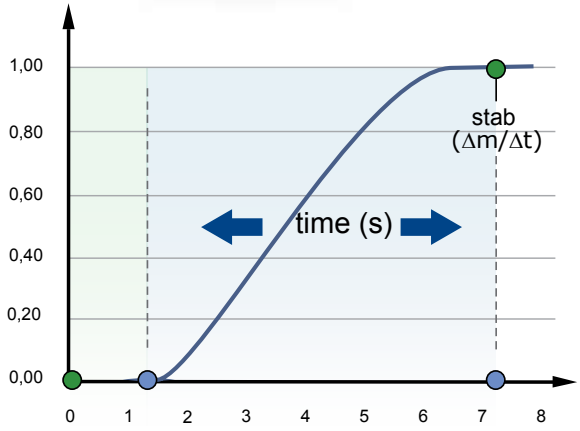
Result of each adjustment is recorded in microbalance memory, it can be previewed.



Printout or export of a report on adjustment

Fast measurement
for any sample

System designed to control process of opening the draft shield provides instant access to the weighing pan. Determining weight of a particular sample takes just a few seconds.

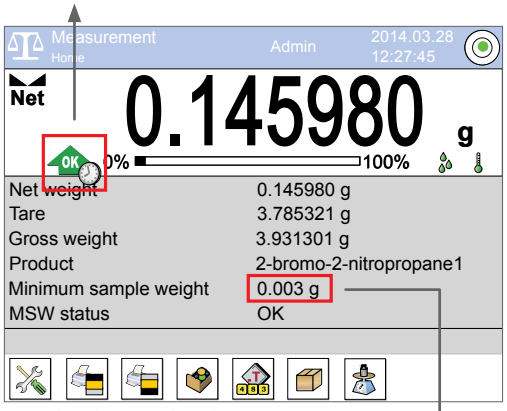


Conformity
with USP Conventions

General Chapters, Apparatus for Tests and Assays <41„BALANCES"> General Information, <1251„WEIGHING ON AN ANALYTICAL BALANCE">

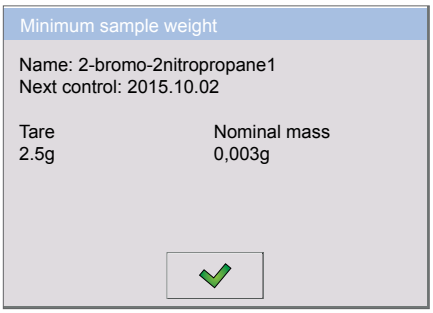
Applied design solutions provide the best possible micro scale measurement accuracy. MSW-dedicated software features programmable thresholds for low limit of a weighing range wherein variable tare loads can be used.

Minimum sample weight pictograms



Weight of a sample is heavier than MSW limit value.

MSW status.



Microbalance software is used to specify and control MSW certificate validity.

Auto-Level
semi-automatic levelling system

A brand new system has been designed to provide continuous control of balance level status. Any level deviation is recorded and reported by means of a respective message displayed on a screen. Using on-screen prompts, the operator may carry out levelling procedure.

Universal and specific solutions

Micro and ultra-micro scale measurement

When it comes to standard solutions, RADWAG offers series of microbalances (MYA 3Y) and ultra-microbalances (UYA 3Y) comprising devices varying in terms of max. capacity, readability and weighing pan size. Each balance features glass draft shield comprising automatically opened door.

Using MYA 3Y microbalance for liquid weight measurement.

Filters weight measurement differential weighing

Owing to special design of a weighing chamber, precise absorption level may be determined by means of filter weight measurement. F series balances intended to weigh filters comprise specific weighing chamber characterized by airtightness and featuring an open work weighing pan.

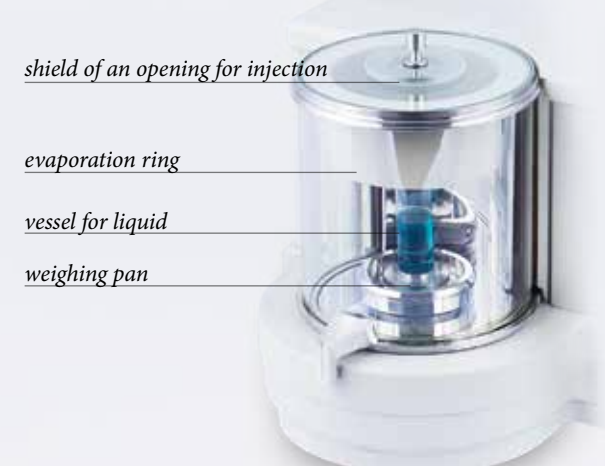
Using MYA 3Y.F microbalance for filters weight measurement

Pipettes calibration gravimetric method for control of volume

Dedicated set, installed inside the weighing chamber, allows a microbalance operator to check piston pipettes volume. The procedure is performed in accordance with the respective standard, ISO 8655.

Used evaporation ring limits the effect of particular liquid evaporation, this considerably improves measurement accuracy.

MYA 3Y.P series microbalances provide functionality also when it comes to mass measurement.



MYA 3Y.P microbalance for pipettes calibration

Automatic cycle optimization

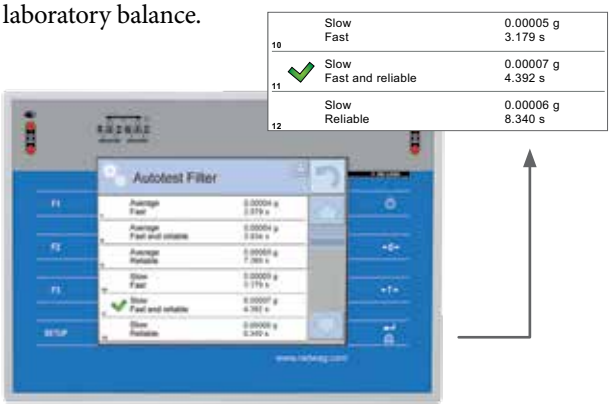
Autotest GLP
automatic control of accuracy

Auto-test function provides the user with possibility of manual confirmation of the performed measurements quality (record, export). Autotest GLP is a perfect solution used in quality management systems (ISO, GMP, GLP, USP, ICH Q10, SOP).

Autotest GLP: Report	
Balance type	MYA 3Y
Balance ID	544121
User	Admin
Software revision	L1.4.15 K
Date	2014.09.30
Time	13:42:13
Number of measurements	10
Reading unit	0.000001 g
Internal weight mass	17.673852 g
Filter	Slow
Value release	Reliable
Temperature: Start	23.99 °C
Temperature: Stop	23.96 °C
Humidity: Start	58 %
Humidity: Stop	58 %
Deviation for Max.	0.000004 g
Repeatability	0.0000017 g
Signature	

Autotest Filter
automatically performed selection of working parameters

Some weighing operations need accuracy, other require speed. An indispensable help for both features, speed and accuracy, is Autotest FILTER application. The Autotest FILTER is offered by every single Radwag-manufactured laboratory balance.



Autotest Filter operation consists in determining standard deviation value and weighing time needed for all possible combinations of settings for Filter/Value release parameter. Upon Autotest Filter procedure completion, the balance presents its results, allowing the user to select the most optimal options, i.e. such that provide the shortest time of weighing or the best repeatability.

On-line monitoring
of ambient conditions

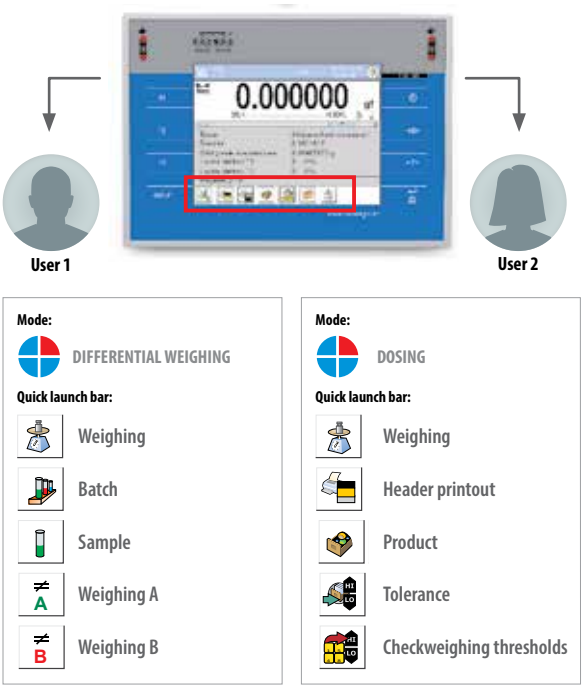
Mechanisms implemented in a microbalance are used to facilitate automatic monitoring of elementary ambient conditions (temperature, humidity). Specifying limit values and dynamicity of changes for these values, combined with visualization, provide ergonomic and efficient means of operation.

Ambient conditions			
IS T1:	24.26 °C	THB H:	59%
IS T2:	24.26 °C	THB T:	24.26 °C
IS H:	59%	THB P:	994 hPa
ISP:	994 hPa	P:	1.161 kg/m³
THB T:	23.9 °C		

Ergonomics and comfort of operation

Customization
of balance settings and access level

Unique user profiles with modifiable settings and access permissions provide flexibility of balance customization. Each profile comprises information, pre-set settings and a quick access shortcut dedicated for a particular operation. Number of operators and profiles is not limited.

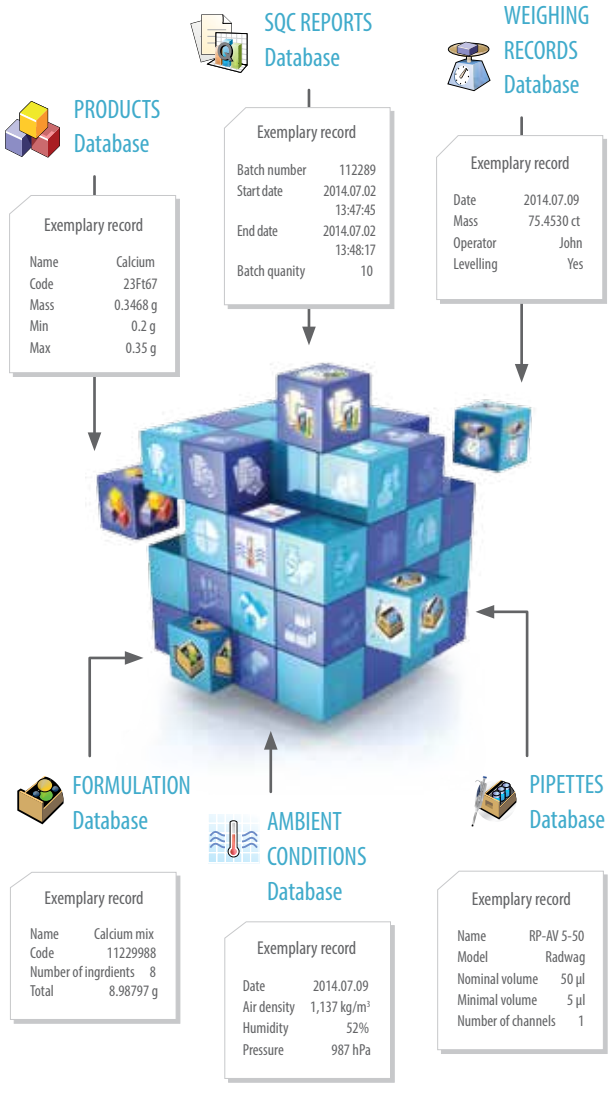


MEDIA module
support within a reach

Media module is an absolute novelty of 3Y microbalances. The module provides video materials supplying users with information on mass measurement, guides etc. (recommendations, SOP, reminders, individual testing procedures). Possibility of adding any personal materials is also a useful feature of the module.

Information system
complex databases

3Y series microbalance is characteristic for the fact that it features 18 complex databases. Their size is dynamically shared within 1 GB memory flash. Option of databases import and export enables easy databases management as well as their copying and archiving.



Programmable
proximity sensors

Manual abilities of an operator may be limited by characteristics of a workplace or by a required testing methodology (suit, gloves etc.). Owing to proximity sensors, microbalances and ultra-microbalances may be operated hands-free regardless of the said limitations.

It is possible to assign one of many various operations to a given proximity sensor, e.g. draft shield door opening or closing.

RadConnect
cooperation with portable devices

RadConnect software enables communication between any 3Y series balance and a portable user-owned device. The software allows online transfer of various information, recorded by a balance, to any device featuring iOS or Android system.

The communication is established via Wi-Fi or Ethernet interface.

Portability
balance - terminal wireless communication

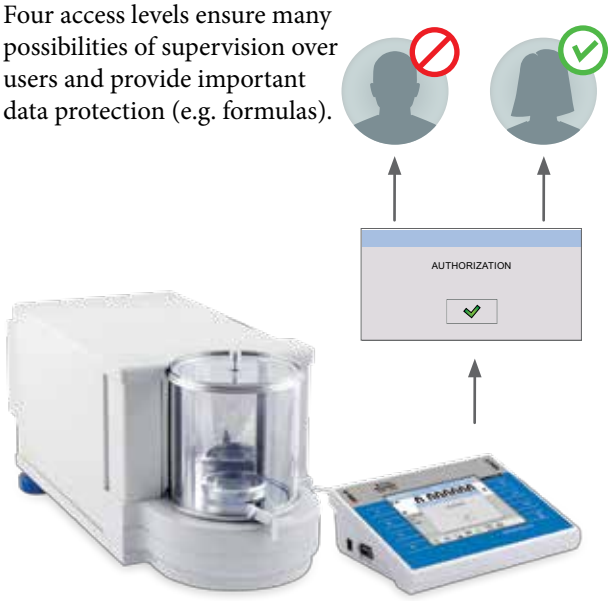
Wireless communication provides possibility of placing the terminal in the vicinity of up to 10 meters distant from a balance. Battery-powered terminal allows 8-hour-long, continuous operation. This is especially convenient solution when placing a balance inside fume cupboard or Glove Box type of chamber.

Standard cable connection is an optional solution allowing for balance-terminal communication.

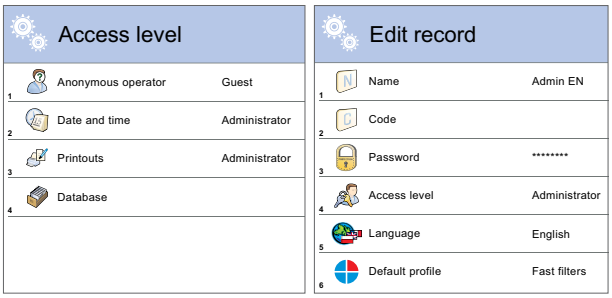
Data monitoring and safety

Protecting data
user authorization levels

When there is a need for one balance to be operated by several users, the option of customizing access rights for particular functions may turn out to be indispensable. Four access levels ensure many possibilities of supervision over users and provide important data protection (e.g. formulas).

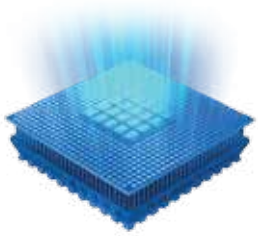


Numerous operations such as defining language of the menu, selecting a desired working mode or personalizing main screen layout may be limited according to the access level, with respective password protection.



Possibility of associating a given profile with a particular user allows such balance personalization, that upon log in, a given working mode and filters are automatically selected.

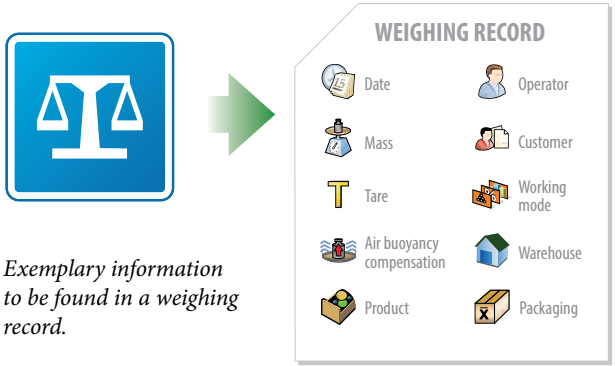
Alibi
secure data storage partition



3Y series balances feature secure partition for data storing where all weighment data, reports, ambient conditions measurements are recorded and secured for a specified amount of time. All these can be easily restored in case there was such a need.

Data archiving
and exchange

The 3Y series offers complex archiving of databases, user profiles and data stored in the memory. All the data can be exported, imported, copied and transferred between balances.



Exemplary information to be found in a weighing record.

Exchange of databases between balances via USB port by means of standard storage devices.

Reports and printouts

Reports
reports database

Upon completion of each process, a respective report is generated and recorded in a proper report database. The users have possibility to preview, print, export or archive reports but not only. They can also freely configure them.

Weighing	
Date	2014.08.19
Time	14:48:50
Balance type	XA 3Y
Balance ID	392543
Level status	Yes
Product	Calcium
Net weight	0.7502 g
Tare	24.23788 g
Gross weight	24.9881 g
Signature	

Printouts
flexibility of configuration

There are two printout types for 3Y series balances: standard (generated according to a fixed template) and non-standard, customized ones.

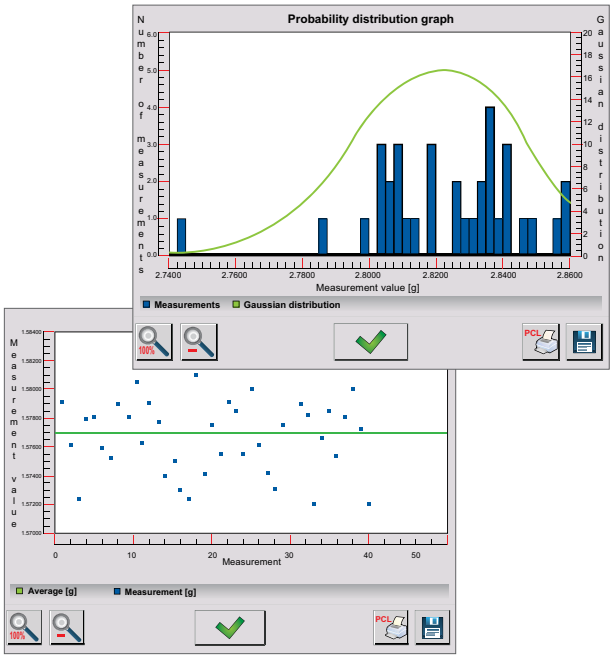
Standard printout comprises three sections: header [A], weighment data [B] and footer [C].

Each section can be freely adjusted by a user, it can also be extended with a non-standard printout.

	Weighing	
A	Date	2014.04.02
	Time	14:07:43
	Balance ID	419036
	Operator	Admin
	Level status	Yes
	Product	Calcium
	Packaging	Blister
B	Temperature during mesaurements:	26.79 °C
	Humidity during measurements:	24 %
	Pressure during measurements:	994 hPa
	Net weight	0.1118376 g
	Tare	0.5000000 g
	Gross weight	0.6118376 g
	Supplementary unit	0.5591880 ct
	Minimum sample status	OK
	Net weight	0.1118071 g
	Tare	0.5000000 g
	Gross weight	0.6118071 g
	Supplementary unit	0.5590355 ct
	Minimum sample status	OK
	Net weight	0.1118071 g
	Tare	0.5000000 g
	Gross weight	0.6118071 g
	Supplementary unit	0.5590355 ct
	Minimum sample status	OK
C	Signature	

Charts
measurements visualization and statistics

Selected working modes (Statistics, SQC) apart from generating report offer possibility of creating a chart for a particular completed weighment. The balance allows to generate weighments charts (with mean value calculated) and probability distribution chart out of series of measurements. Each chart can be freely scaled, printed or saved to BMP file.



Graph of probability distribution (Gaussian distribution)

Operating the printouts
import, export and printing

Technology used for 3Y series enables free exchange of printouts and labels (TXT or LB file format) between balances. The balances are compatible with vast range of PCL printers and label printers, wherein connection between printers and balances is established by RS 232, USB, Ethernet.

SQC
statistics on a micro scale

SQC
automatic data analysis

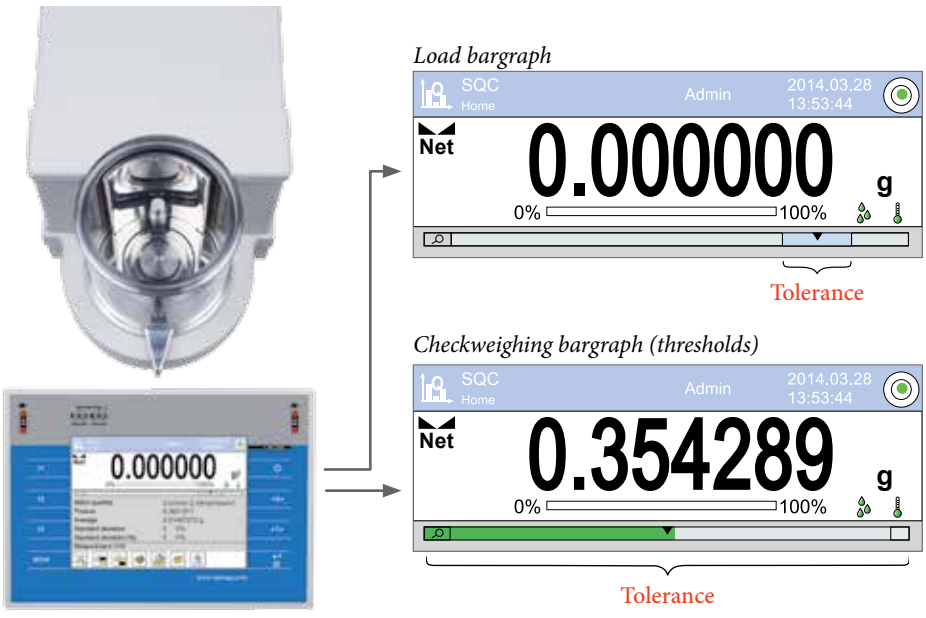
SQC statistics module is an excellent operating mode for complete control over measurement series of a particular sample. The control may be carried out in course of a manufacturing process (warning and critical limits) and during other tests.

SQC Reports
homogeneous and clear information

SQC Reports is a modern tool for collecting information on carried out measurements, measurement numbers, names, statistic data, information data etc. The collected data is recorded in a database.

Viewer graph
automatic tolerance scaling

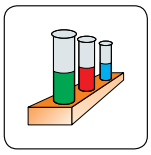
Viewer graph facilitates automatic scaling of checkweighing thresholds online, thus providing possibility of comparing current sample weight to a reference value. This tool permits safe and quick sampling wherein optimal accuracy is maintained.



SQC	
User	Lab
Product	caps
Start date	2014.12.02 10:10:18
End date	2014.12.02 10:14:41
Batch number	1\a
Batch quantity	10
Mominal mass	0.361 g
Limit T2-	0.0361 g 10 %
Limit T1-	0.01805 g 5 %
Limit T1+	0.01805 g 5 %
Limit T2+	0.0361 g 10 %
Measurement 1	
Net	0.366185 g
Measurement 2	
Net	0.369271 g
Measurement 3	
Net	0.385184 g
Measurement 4	
Net	0.324771 g
Measurement 5	
Net	0.356942 g
Measurement 6	
Net	0.368712 g
Measurement 7	
Net	0.355558 g
Measurement 8	
Net	0.368694 g
Measurement 9	
Net	0.368100 g
Measurement 10	
Net	0.368100 g
Number of T2- errors	1 10 %
Number of T1- errors	1 10 %
Number of T1+ errors	1 10 %
Number of T2+ errors	0 0 %
Average	0.3631517 g
Standard deviation	0.01487272 g
Signature	

Differential weighing

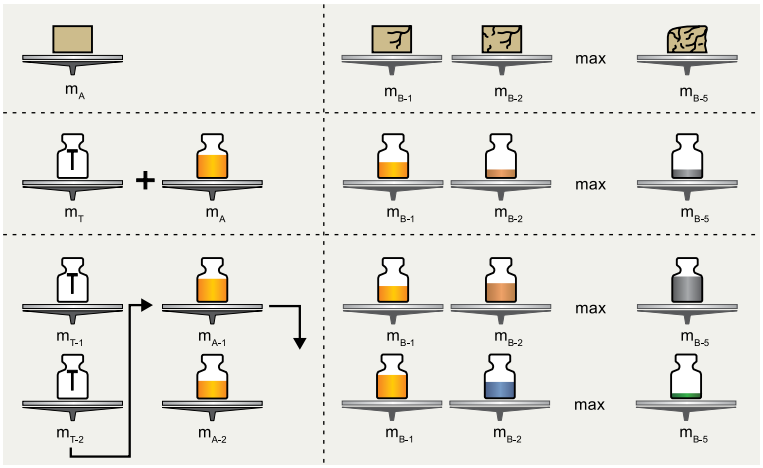
Analysis
of sample weight variation



"Differential Weighing" module facilitates analysis of weight changes of a particular sample subjected to various processes. Two key components are of significant importance for the module operation, these are databases and methods.

Measuring
methods

Diversity of measuring methods requires maximum flexibility of differential weighing function. The said function has to do with measuring methods used for weighing samples, even those that are grouped within one batch.



Methods are understood as sequence of steps. Any batches and samples may be selected and measured using any weighing cycle, e.g. mixed system.

Measurement
specification

Ambient conditions prevailing in the course of a particular measurement are recorded automatically. Comparison of respective data registered for various cycles lets the user prove conformity with standard guidelines.

Conformity with regulations

OIML
legal metrological control

Legal metrology requirements concern verification scale interval (e), the lowest value of which is 0,001 g. For declared deviation value of +/- 0,000003 g, resolution of microbalances is 0,000001 g. This allows to affirm that legal requirements are met.

WELMEC 2.3
software reliability

Program responsible for managing microbalance applications has been designed in a way providing that any reliability and data safety requirements are met (e.g. ALIBI memory). The program is protected against unwanted intrusion. Its structure may be restored when it comes to usage and metrology aspects (RADWAG Quality Management System).

USP, CFR 21
weight measurement accuracy

Data Sheet

	UYA 2.3Y	MYA 0,8/3.3Y	MYA 2.3Y	MYA 5.3Y	MYA 11.3Y	MYA 11/52.3Y
Metrologically important parameters						
OIML accuracy class	I	I	I	I	I	I
Max capacity [Max]	2,1 g	0,8 g / 3 g	2,1 g	5,1 g	11 g	11 g / 52 g
Readability [d]	0,1 µg	1 µg / 10 µg	1 µg	1 µg	1 µg	1 µg / 10 µg
Verification scale interval [e]	1 mg	1 mg	1 mg	1 mg	1 mg	1 mg
Tare range	-2,1 g	-3 g	-2,1 g	-5,1 g	-11 g	-52 g
Repeatability *	0,4 µg	1 µg	1 µg	1 µg	1,5 µg	1,5 µg
Linearity	±1,5 µg	±3 µg / ±4 µg	±3 µg	±5 µg	±6 µg	±10 µg / ±30 µg
Eccentricity	1,5 µg	3 µg / 4 µg	3 µg	5 µg	6 µg	6 µg / 10 µg
Sensitivity drift	1ppm / °C (temperature range +15 ÷ +35 °C)					
Sensitivity stability	1×10^{-6} / Year × Rt	1×10^{-6} / Year × Rt	1×10^{-6} / Year × Rt	1×10^{-6} / Year × Rt	1×10^{-6} / Year × Rt	1×10^{-6} / Year × Rt
Sensitivity offset	$1{,}5 \times 10^{-6} \times$ Rt	$1{,}5 \times 10^{-6} \times$ Rt	$1{,}5 \times 10^{-6} \times$ Rt	$1{,}5 \times 10^{-6} \times$ Rt	$3 \times 10^{-6} \times$ Rt	$3 \times 10^{-6} \times$ Rt
Sensitivity temperature drift	1×10^{-6} / °C × Rt	1×10^{-6} / °C × Rt	1×10^{-6} / °C × Rt	1×10^{-6} / °C × Rt	1×10^{-6} / °C × Rt	1×10^{-6} / °C × Rt
Minimum weight	0,08 mg	0,2 mg	0,2 mg	0,2 mg	0,3 mg	0,3 mg
Minimum weight USP	0,9 mg	2 mg	2 mg	2 mg	3,0 mg	3,0 mg
Stabilization time	10-20 s	5 s	5 s	5 s	5 s	5 s
Adjustment	automatic (internal)					
Structure						
Display	colour 5,7" resistive touch panel (640x480)					
Keyboard	8 keys					
Features						
Databases	1 GB (samples and programs database)					
Touch-free operation	programmable sensors					
Communication interface						
USB	2 × USB host					
RS 232	2 × RS 232					
Wi-Fi	802.11 b,g,n					
Ethernet	10/100 Mbit					
Inputs / Outputs	4 inputs / 4 outputs (digital)					
Electrical characteristics						
Power supply	13,5 ÷ 16 V DC / 2,1 A					
Power cosumption	700mA (wireless terminal - 1A)					
Battery	5200 mAh					
Battery operating time	to 8 hours					
Ambient conditions						
Working temperature	+18 ÷ +30 °C	+10 ÷ +40 °C	+10 ÷ +40 °C	+10 ÷ +40 °C	+10 ÷ +40 °C	+10 ÷ +40 °C
Atmospheric humidity **	40% ÷ 80%	40% ÷ 80%	40% ÷ 80%	40% ÷ 80%	40% ÷ 80%	40% ÷ 80%
Physical characteristics						
Weighing pan size	ø 16 mm	ø 16 + 60 mm (for filters)	ø 16 mm	ø 26 mm	ø 26 mm	ø 26 mm / ø 26 mm
Weighing chamber dimesions	ø 90 × 90 mm	ø 90 × 90 mm	ø 90 × 90 mm	ø 90 × 90 mm	ø 90 × 90 mm	ø 90 × 90 mm
Overall dimensions	163 × 183 × 411 mm	163 × 183 × 411 mm	163 × 183 × 411 mm	163 × 183 × 411 mm	163 × 183 × 411 mm	163 × 183 × 411 mm
Net weight	10,2 kg	10,2 kg	10,2 kg	10,2 kg	10,2 kg	10,2 kg
Packaging size	565 × 565 × 355 mm	565 × 565 × 355 mm	565 × 565 × 355 mm	565 × 565 × 355 mm	565 × 565 × 355 mm	565 × 565 × 355 mm
Gross weight	14,7 kg	14,7 kg	14,7 kg	14,7 kg	14,7 kg	14,7 kg

MYA 21.3Y	MYA 21.3Y.P	MYA 5.3Y.F	MYA 5.3Y.F1
I	I	I	I
21 g	21 g	5 g	5 g
1 µg	1 µg	1 µg	1 µg
1 mg	1 mg	1 mg	1 mg
-21 g	-21 g	-5 g	-5 g
1,5 µg	1,5 µg	1,6 µg	1,6 µg
±7 µg	±7 µg	±5 µg	±5 µg
7 µg	7 µg	5 µg	5 µg
1ppm / °C (temperature range +15 ÷ +35 °C)			
1×10^{-6} / Year × Rt	1×10^{-6} / Year × Rt	1×10^{-6} / Year × Rt	1×10^{-6} / Year × Rt
$4 \times 10^{-6} \times$ Rt	$4 \times 10^{-6} \times$ Rt	$1,5 \times 10^{-6} \times$ Rt	$1,5 \times 10^{-6} \times$ Rt
1×10^{-6} / °C × Rt	1×10^{-6} / °C × Rt	1×10^{-6} / °C × Rt	1×10^{-6} / °C × Rt
0,3 mg	0,3 mg	0,32 mg	0,32 mg
3,0 mg	3,0 mg	3,2 mg	3,2 mg
5 s	5 s	5 s	5 s
automatic (internal)			
colour 5,7" resistive touch panel (640x480)			
8 keys			
1 GB (samples and programs database)			
programmable sensors			
2 × USB host			
2 × RS 232			
802.11 b,g,n			
10/100 Mbit			
4 inputs / 4 outputs (digital)			
13,5 ÷ 16 V DC / 2,1 A			
700mA (wireless terminal - 1A)			
5200 mAh			
to 8 hours			
+10 ÷ +40 °C	+10 ÷ +40 °C	+10 ÷ +40 °C	+10 ÷ +40 °C
40% ÷ 80%	40% ÷ 80%	40% ÷ 80%	40% ÷ 80%
ø 26 mm	ø 26 mm	ø 100 mm + ø 26 mm	ø 160 mm + ø 26 mm
ø 90 × 90 mm	ø 90 × 90 mm	ø 118 × 35 mm	ø 168 × 35 mm
163 × 183 × 411 mm	163 × 183 × 411 mm	160 × 168 × 400 mm	180 × 168 × 450 mm
10,2 kg	10,2 kg	10,2 kg	10,2 kg
565 × 565 × 355 mm	565 × 565 × 355 mm	565 × 565 × 355 mm	565 × 565 × 355 mm
14,7 kg	14,7 kg	14,7 kg	14,7 kg

PC
software

Radwag-designed PC software is a considerable support for microbalances, enhancing the device capability and functionality.

PW Win
Balance and computer cooperation, display of measurements and statistics.

Database Editor
Databases support for 3Y balances and PUE HY terminals.

RAD Key
Readout of balance data by means of defined Hot Key.

E2R Weighing Records
E2R Weighing Records – Recording measurements performed by means of balances cooperating in a network.

Additional
equipment

- Anti-vibration weighing tables,
- Pipettes calibration workstation,
- Thermal and dot matrix printers,
- Barcode scanners,
- RS 232 cables.

Complete offer is to be found on www.radwag.com website.

Rt - net weight,
* repeatability is expressed as a standard deviation from 10 weighing cycles of a particular load,
** non-condensing conditions.

Features:

Touchscreen display

Databases

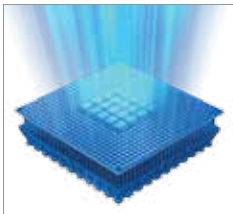
Portable terminal

Automatic on-line monitoring of level

Proximity sensors

Interfaces: USB, Wi-Fi, Ethernet, IN/OUT and RS 232

Profiles



Alibi Memory

Ambient conditions monitoring

Multimedia

Functions:

- Checkweighing
- Filling
- Percent setup
- Infrared sensors
- Formulation
- Statistics
- Pipette calibration
- Differential weighing
- Statistical Quality Control
- GLP procedures
- Air density compensation
- Ambient conditions monitoring
- Autotest (GLP, Filter)

RADWAG BALANCES AND SCALES
ADVANCED WEIGHING TECHNOLOGIES

www.radwag.com