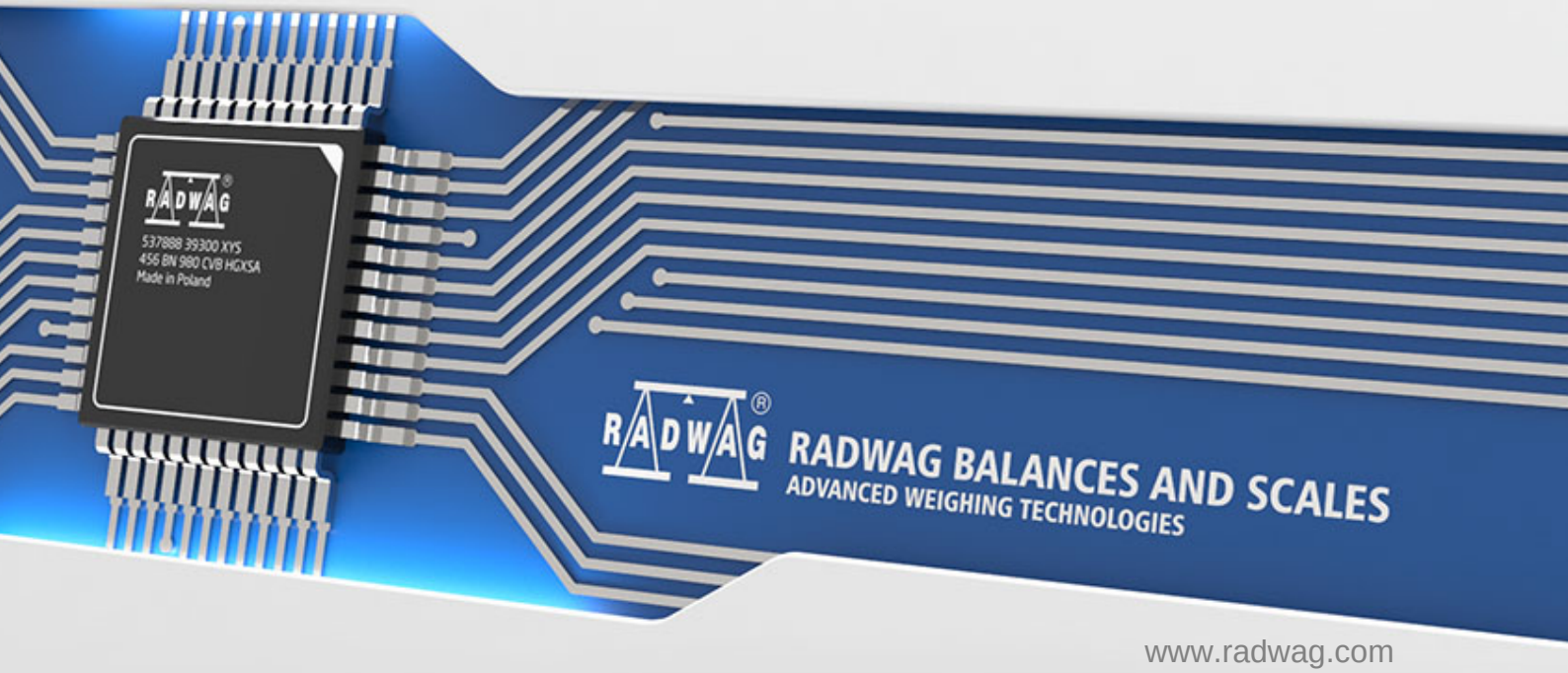
X2 Synergy

SERIES
AS X2.PLUS Analytical Balances
PS X2 Precision Balances
WLC X2 Precision Balances

BRIEF USER MANUAL

IMMU-16-S-03-03-21-EN



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CAUTION:
This is only a brief version of the user manual, it does not provide all product-related information. Prior to moisture analyzer operation it is recommended to read the full user manual version that is to be found on a CD delivered along with the device. The full user manual version describes data crucial for settings and device operation.

If you are reading this, it means that you are bound to achieve success. You have purchased a device that has been designed and manufactured to give you years of service.
Congratulations and thank you for selecting RADWAG product.

MARCH 2021

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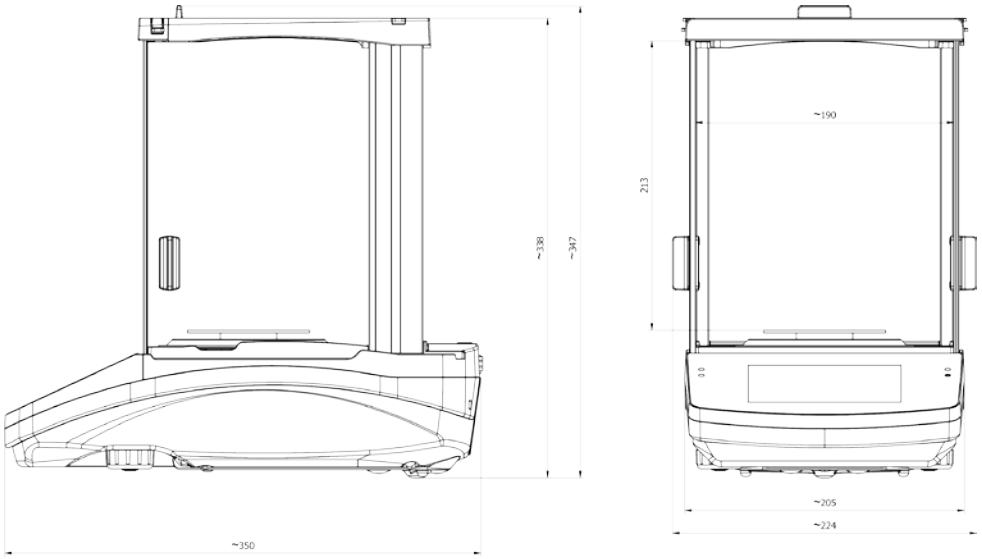
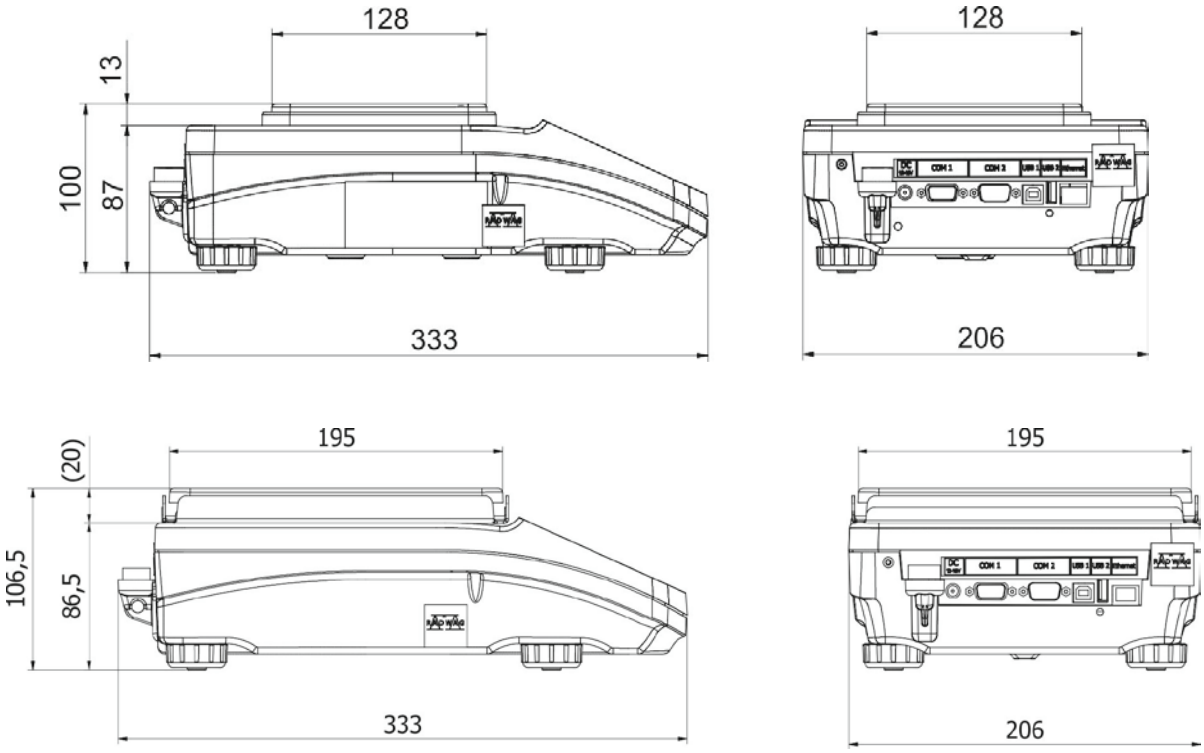
1. GENERAL INFORMATION

1.1. DIMENSIONS

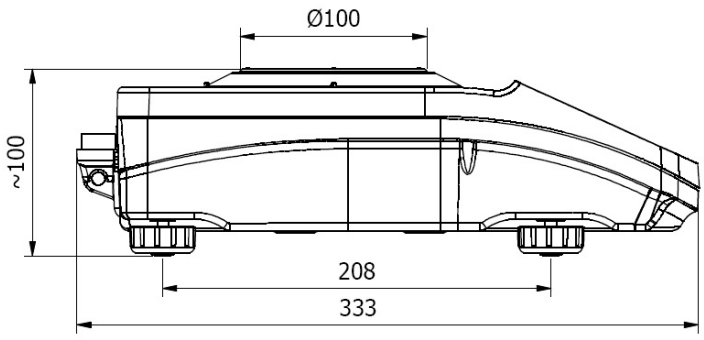
AS X2 PLUS series

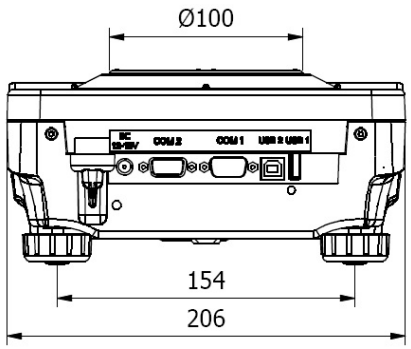


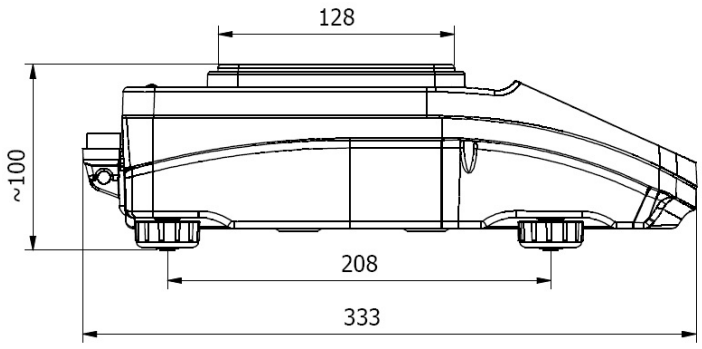
PS X2 series

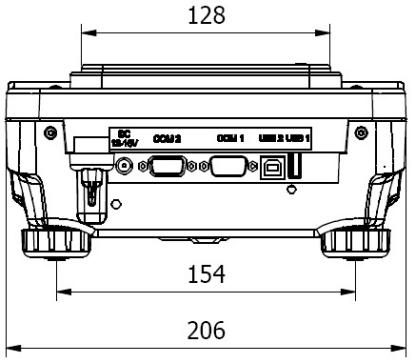


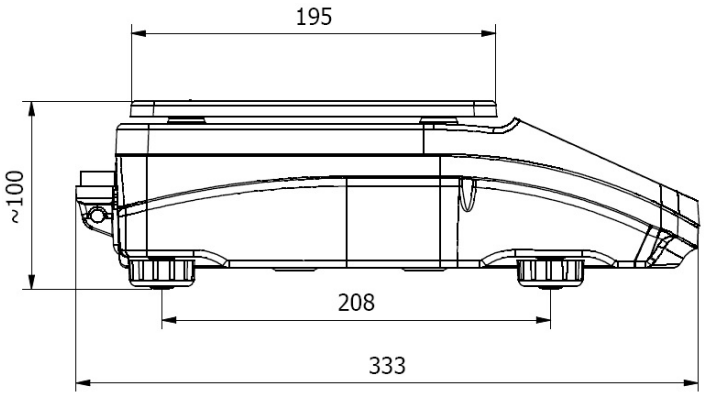
WLC X2 series

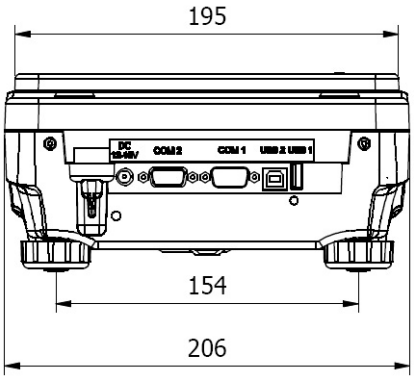




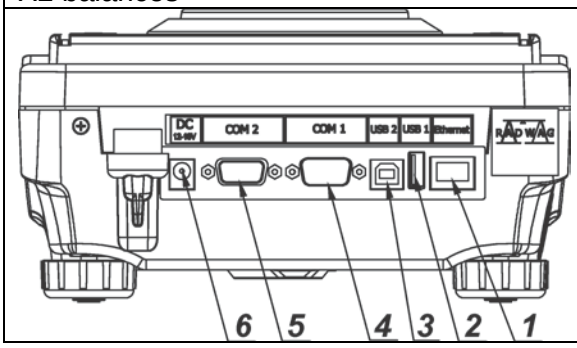


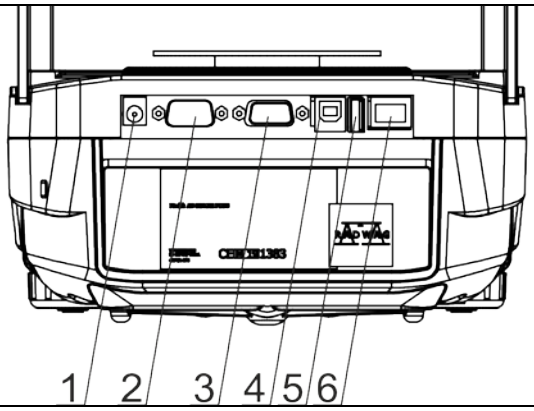






1.2. CONNECTORS

X2 balances	
	1. Ethernet RJ45 connector 2. USB 1, Type A connector 3. USB 2, Type B connector 4. COM 1 connector 5. COM 2 connector 6. Power supply socket

AS X2.PLUS balances	
	1. power supply seat 2. DB9/M connector (external buttons) 3. COM 1 connector (e.g. printer) 4. USB 2 type B connector (e.g. computer) 5. USB 1 type A connector (e.g. computer keyboard) 6. RJ45 Ethernet connector

1.3. INTENDED USE

X2 series balances are designed to provide accurate measurement of weighed loads, performed under laboratory conditions.

1.4. PRECAUTIONS

- Prior to first use, it is highly recommended to carefully read this User Manual, and operate the balance as intended.
- Do not operate the touch panel using sharp-edged tools (knife, screwdriver, etc.).
- While loading the balance make sure that loads are placed in the very centre of the weighing pan.
- Load the weighing pan with loads, gross weight of which does not exceed instrument's measuring range (maximum capacity).
- Do not leave heavy loads on the weighing pan for a longer period of time.
- In case of failure, immediately unplug the instrument from the mains.
- Balances to be decommissioned, should be decommissioned in accordance with valid legal regulations.
- Do not use the balance is areas endangered with explosion. The X2 series is not designed to operate in EX zones.

NOTE:
This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
-Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
-Consult the dealer or an experienced radio/TV technician for help.

NOTE:
This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions:

(1)this device may not cause harmful interference, and
(2) this device must accept any interference received, including interference that may cause undesired operation.

NOTE:
The grantee is not responsible for any changes or modifications not expressly approved by the party responsible for compliance. Such modifications could void the user's authority to operate the equipment.

1.5. WARRANTY CONDITIONS

A. RADWAG feels obliged to repair or exchange all elements that appear to be faulty by production or by construction,
B. Defining defects of unclear origin defects and means of their elimination can only be realized with assistance of manufacturer and user representatives,
C. RADWAG does not bear any responsibility for defects or losses resulting from unauthorized or inadequate performing of production or service processes,
D. Warranty does not cover:
   - mechanical defects caused by product exploitation other than intended, defects of thermal and chemical origin, defects caused by lightning, overvoltage in the power network or other random event,
   - balance defects if it is utilized contrary to its intended use,
   - balance defects, if service claims removing or destroying protective stickers which secure the balance's housing against unauthorized access,
   - mechanical defects or defects caused by liquids and natural wear,
   - balance defects caused by inappropriate setting or by electrical wiring failures,
   - defects caused by overloading the mechanical measuring system,
   - maintenance activities (cleaning).
E. Loss of warranty takes place if:
   - a repair is carried out outside RADWAG sales office or authorized service point,
   - service claims intrusion into mechanical or electronic construction by unauthorized people,
   - other version of the operating system is installed in a balance,
   - the balance does not bear company protective stickers.
F. Detailed warranty conditions are listed on a service card.

1.6. SUPERVISION OVER METROLOGICAL PARAMETERS

Metrological parameters of a balance need to be checked by a user in determined time intervals. Inspection frequency is conditioned by ambient conditions in which a balance is used, kind of carried out processes and adopted quality management system.

1.7. USER MANUAL SIGNIFICANCE

It is very important to read the user manual carefully before switching on and starting up balance operation, even if you are experienced and have worked with this type of balance before.

1.8. BALANCE USER TRAINING

The balance should be utilized and supervised only by users who are trained and experienced in such type of weighing instruments.

2. TRANSPORT AND STORAGE

2.1. DELIVERY CHECKLIST

Upon delivery it is necessary to check the package, make sure that your package bears no signs of damage.

2.2. PACKAGE

Keep all package elements should your device be transported in the future. Remember that only original packaging can be used for shipping purposes. Prior packing uncouple any cables, remove any separable components (weighing pan, shields, inserts). Pack the device components into an original packaging. The original packaging protects the equipment against potential damage during transportation.

3. UNPACKING AND INSTALLATION

Cut the adhesive tape. Take the device out of the packaging. Open the accessory box, take the device components out of it.

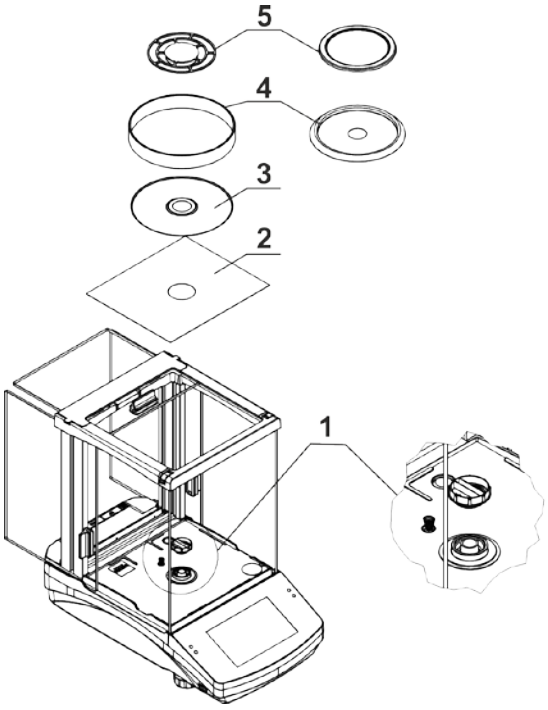
3.1. PLACE OF USE AND ASSEMBLING

- The balance should be stored and used in locations free of vibrations and shakes, free of air movement and dust.
- Ambient air temperature should not exceed the range of: +10 °C ÷ +40 °C.
- Ambient relative humidity should not exceed 80%.
- During balance operation, ambient temperature in the weighing room should not change rapidly.
- The balance should be located on a stable wall console desk or a stable working table which is not affected by vibrations and distant from heat sources.
- Take special precaution when weighing magnetic objects, as part of the balance is a strong magnet. Should such loads be weighed, use under-pan weighing option, which removes the weighed load from area influenced by the balance's magnet. The hook for under-pan weighing is installed in balance's base.

3.2. STANDARD DELIVERY COMPONENTS LIST

- balance
- bottom insert (*AS balance exclusively*)
- centring ring (*AS balance exclusively*)
- weighing pan, open-work pan for AS with d=0,01/0,1mg exclusively
- draft shield (AS and PS balances, d=0.001g, exclusively).
- power supplier
- user Manual – CD version

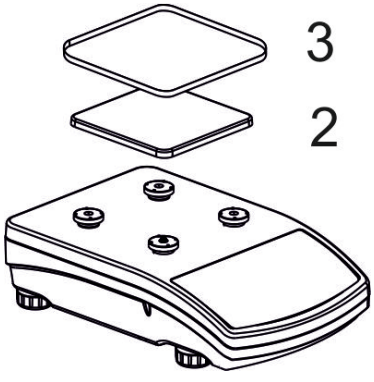
AS X2.PLUS



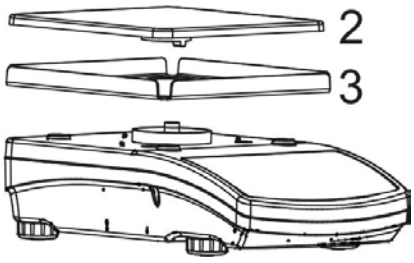
- remove a transport lock (1) – gently press the transport lock and turn it accordingly to <OPEN> instruction, keep the transport lock should your balance be transported in the future.
- Install components following the above diagram:
  - bottom insert (2),
  - centring ring [embossment side up] (3),
  - weighing pan (4),
  - draft shield (5).

CAUTION! AS balance with d=0,01/01mg is equipped with 2 weighing pans (standard and open-work). Remember to calibrate the balance upon changing the pan.

PS 200/2000.X2-PS 1000.X2

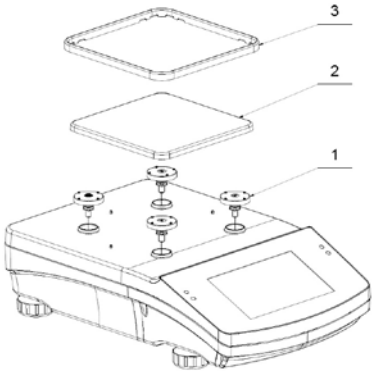


PS 2100.X2-PS 10100.X2

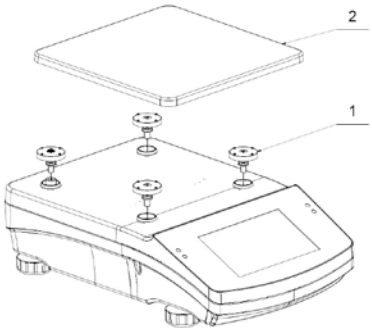


- remove tape protecting the grounding spring, located on one of the rubber mandrels
- install components following the above diagram:
  - weighing pan (2),
  - draft shield (3).

WLC X2, 128x128 mm

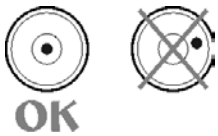


WLC X2, 195x195 mm



- remove tape protecting the grounding spring, located on one of the rubber mandrels (1)
- install components following the above diagram:
  - weighing pan (2),
  - glass draft shield (3).

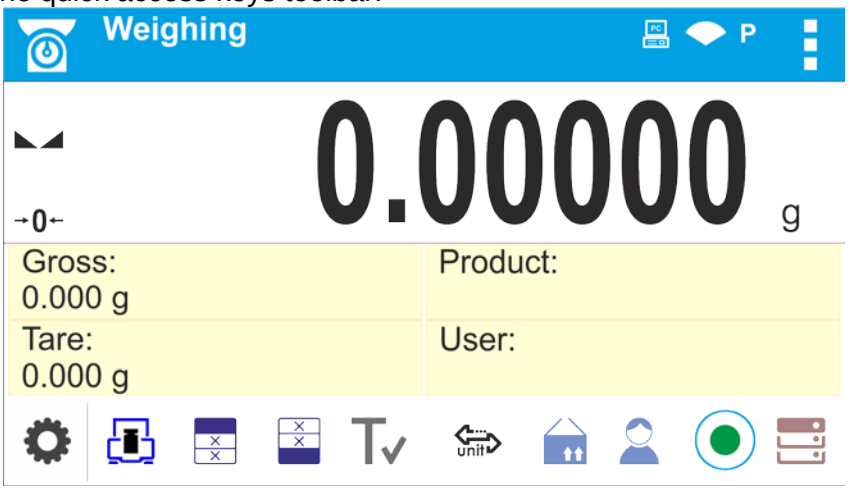
3.3. SETTINGS



It is necessary to level the balance prior connecting it to the mains. To level the balance turn its feet until an air bubble takes central position.

The balance shall firmly rest on a surface, each of the feet must be supported.

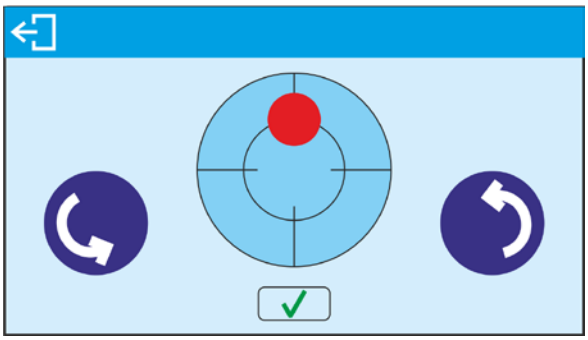
X2.PLUS series balances are equipped with AutoLEVEL System which allows monitoring of the balance level. Level monitoring is performed uninterruptedly in the course of balance operation. Level status is signalled with a respective pictogram, displayed in the lower right corner of the operation panel screen, on the quick access keys toolbar.



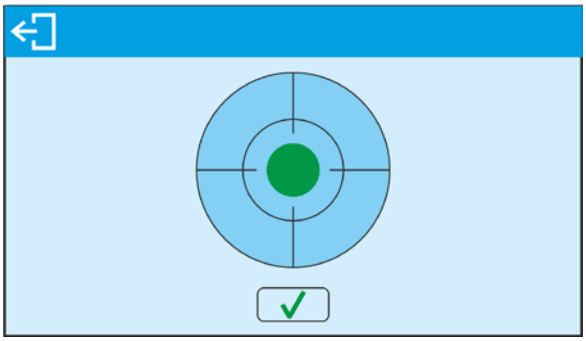
The system monitors balance level state. In case of level deviation, position of level marker is displayed on the screen (correct levelling, incorrect levelling) and/or respective alarm is activated. Balance level setting proceeds.

Levelling procedure:

- Press < > level status button located on the top of the display.
- Control panel of level function is displayed. Next to the level indicator, pictograms of balance's feet are displayed with the suggested direction of their rotation.



- Level the balance by turning its feet left/right, follow the pictograms, level marker moves towards the centre of the circle.
- When the marker takes central position, its colour turns from red to green – the balance is correctly levelled.



Go to the home screen.

3.4. MAINTENANCE ACTIVITIES

1. Disassembly a weighing pan and other detachable components (the components differ depending on a balance type – see *Unpacking and Installation* section). Be careful while detaching the components so as not to cause any damages to the balance mechanism.
2. Using handheld vacuum cleaner remove dust from the weighing chamber.
3. Using a dry flannel cloth clean glass parts (mild cleanser may be applied if it does not contain any abrasive substances) – for draft shield disassembly instruction go to the next section of this manual.
4. Using a dry flannel cloth clean disassembled components (mild cleanser may be applied if it does not contain any abrasive substances).

CAUTION!
Cleaning draft shield while still installed may cause damage of the measuring system.

In order to ease cleaning of glass draft shield panes, it is permissible to remove them following the below instruction.

<u>Cleaning ABS components:</u>

To clean dry surfaces and avoid smutching use clean non-colouring cloths made of cellulose or cotton. You can use a solution of water and detergent (soap, dishwashing detergent, glass cleaner). Gently rub the cleaned surface and let it dry. Repeat cleaning process if needed.

In the case when contamination is hard to remove, e.g. adhesive, rubber, resin, polyurethane foam residues etc., you can use a special cleaning agents based on a mixture of aliphatic hydrocarbons that do not dissolve plastics. Before using the cleanser for all surfaces we recommend carrying out tests. Do not use products containing abrasive substances.

Cleaning draft shield panes:

Select dissolvent depending on a dirt. Never soak the glass panes in alkaline solutions since they interact with glass and may cause damage. Do not use abrasive substances.

For organic dirt use acetone first, next use water or detergent. For other than organic dirt use diluted acid solutions (soluble salts of hydrochloric or nitric acid) or base solutions (ammonium or sodium base).

To remove ACIDS use protofilic solvent (sodium carbonate), to remove BASE use protogenic solvent (mineral acid of various concentration).

In case of heavy contamination use brush or detergent nevertheless avoid detergents containing large and hard molecules which could potentially scratch glass panes.

Use soft brush with wooden or plastic handle exclusively to avaoid risk of scratches. Do not use wire brush.

At the end of the cleaning process rinse the pane using running water first, distilled next.

Rinsing is a necessary cleaning process stage allowing to remove remaining soap, detergents and other cleansers from the panes prior their reinstallation.

Avoid drying the panes either using paper towel or forced air circulation since some fibres, grains or contamination of other type could permeate into the panes thus causing weighing errors.

One shall not use driers when drying measuring glass tools.

It is a frequent treatment to leave glass components on a rack to dry.
Cleaning stainless steel components:

Avoid using cleansers containing any corrosive chemicals, e.g. bleach (containing chlorine). Do not use abrasive substances. Always remove the dirt using microfiber cloth to avoid damage of protective coating.

In case of a daily maintenance:
1. *Remove the dirt using cloth dipped in warm water.*
2. *For best results, add a little dishwashing detergent.*

Cleaning powder-coated components:

For preliminary cleaning stage you need running water or wet sponge featuring large holes, this will help you to remove loose, heavy dirt.

Do not use cleansers containing abrasive substances.

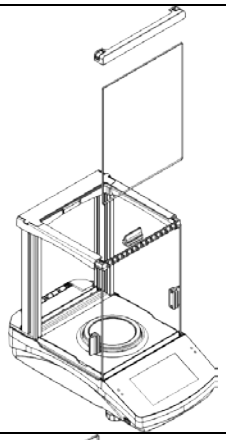
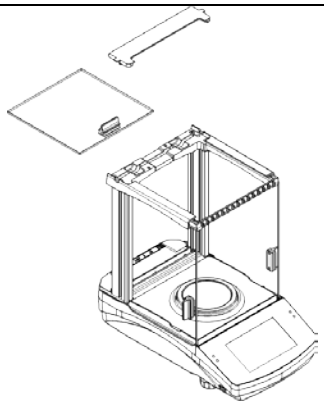
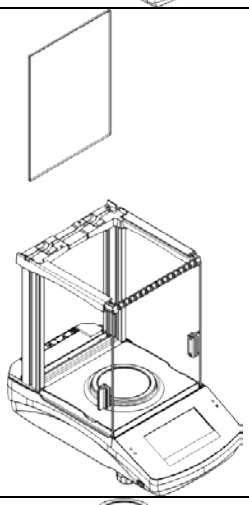
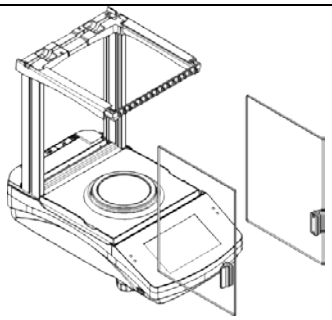
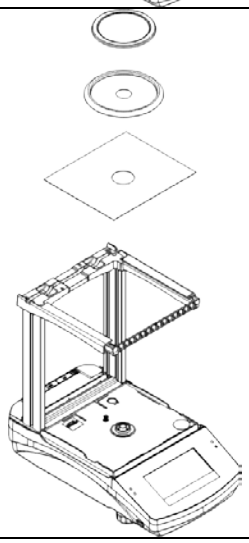
Next using cloth and cleanser-water solution (soap, dishwashing liquid) gently rub the cleaned surface.

Avoid using cleanser without water since it may result with damage of the cleaned surface, please mind that large amount of water mixed with cleanser is a must.

Cleaning aluminium components:
While cleaning aluminium components use products acid by nature, e.g. spirit vinegar, lemon. Do not use abrasive substances. Avoid using hard brush, this may cause scratches. It is recommended to use □illigram□ cloth.

While polishing the surface use circular movements. Use clean, dry cloth

AS X2.PLUS series balances; disassembly steps:

	Detach the front part of the frame and take out the front pane.		Detach the back part of the frame and take out the top pane.
	Remove the back pane of the chamber.		Remove the left and the right side pane.
	Carefully disassemble the weighing pan, the draft shield and the bottom insert.		

Clean the weighing chamber and the panes. All the operations have to be done carefully. Pay special attention to the spot where the weighing pan is installed; dirt and other small elements might enter the balance construction through this opening. This may cause incorrect operation of the instrument.
Upon maintenance is completed carry out the same set of actions in a reverse order. Pay a special attention to the left and the right side panes, assembly them on the correct side of the balance.

3.5. POWERING THE DEVICE

Balance can be connected to the mains only with a power adapter that comes standard with the particular model. Nominal power supply of the power adapter (specified on the power adapter data plate) should be compatible to the power from the mains.
Plug the balance to the mains – connect the power adapter to the socket, next connect its connector to port located at the back of the balance housing.
Test of the display unit takes place right after connecting the balance to the power, all the elements and pictograms are backlit for a short time. Next, the name and the program number appears, the indication gets to ZERO (displayed reading unit depends on the balance). During the balance start, the test of an internal mass adjustment mechanism occurs (single location and elevation of the internal mass adjustment).

If the indication is different than zero, please press →0← button.

CAUTION! If the balance is "verified", automatic adjustment occurs right after switching the balance on.

3.6. TEMPERATURE STABILISATION TIME.

Before start of measuring processes, it is necessary to wait until the balance reaches thermal stabilisation.
For balances that were stored in much lower temperatures before plugging to mains (e.g. during winter period), thermal stabilisation period shall take at least 4 hours for PS and WLC balances, and 8 hours for AS balances. During the thermal stabilization, the indications on a display panel can change. It is recommended that ambient temperature changes at place of use were insignificant (slow to change).

Thermal stabilization also applies to the level monitoring system of AS X2.PLUS balances.

3.7. CONNECTING ADDITIONAL HARDWARE

Use only accessories and peripheral equipment recommended by the manufacturer. The balance must be disconnected from the mains before connecting or disconnecting any peripherals (printer, PC computer, computer keyboard). On connecting the peripherals, plug the balance to the mains.

4. START-UP

- Plug the power adapter to a socket, next connect the connector to port located at the back of the housing.
- Press ⏻ button located in the top right hand corner of the terminal.
- Wait until start-up procedure is completed, the home screen of balance software is displayed automatically.
- The balance runs with no user logged in. In order to start operation it is necessary to carry out the logging procedure (for detailed logging procedure read later sections of this user manual).

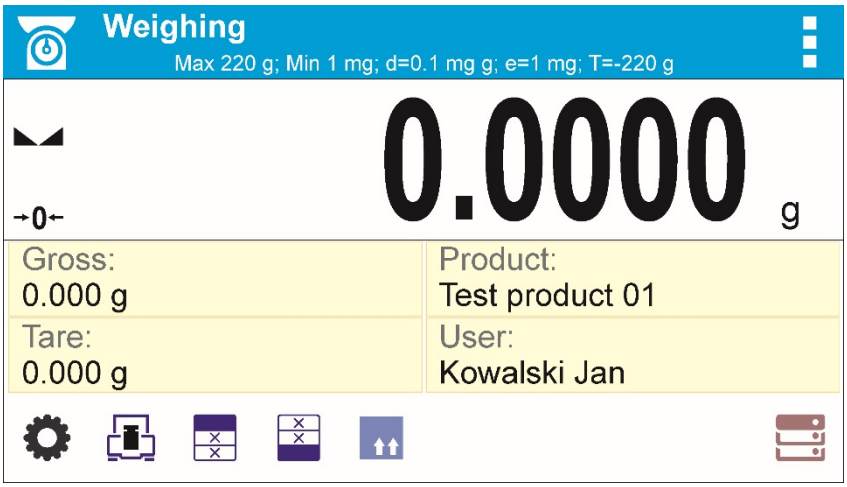
CAUTION!
Remember to start the balance with no load on the weighing pan.
In accordance with the EN 45515 standard verified balances cannot display mass value below -20e. If the indication value is below -20e, <Lo mass> information is displayed.

Press →0← *key to zero the balance.*

5.KEYBOARD – BUTTONS FUNCTIONS

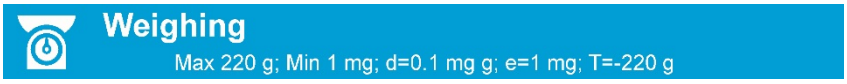
Button	Overview
	Press to switch the balance ON/OFF
→0←	Press to Zero the balance
→T←	Press to Tare the balance
	Press to send measurement to a printer or a computer
	Function key <Esc>, press to abandon parameter changes or exit to previous menu level
	Function key <Home>, press to exit to home screen
	Programmable proximity sensors, press to enable operation of freely selected functions

6.WEIGHING MODE HOME SCREEN



The home screen of balance software can be divided into 4 sections:

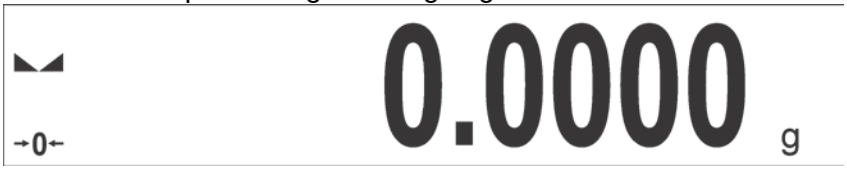
- Top section displaying data on active working mode (pictogram and name), metrologically important data and button enabling selection of functions available for a particular working mode.



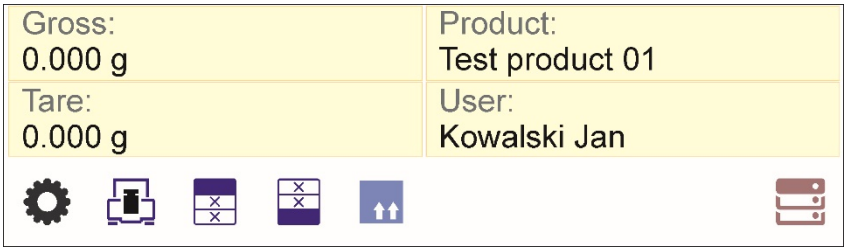
The top bar displays the following information:

Ważenie	Working mode name and symbol.
	Symbol informing that wireless communication is on.
	Symbol informing that communication with a USB flash drive is on.
	Symbol informing that PC keyboard is connected.
	Symbol informing that printer is connected via USB.
	Symbol informing that communication with a PC computer is on.
	Symbol informing that data is saved to moisture illigra memory.
	Symbol informing that ACAI function in Parts Counting mode is active.
E2R	Symbol informing that the moisture illigra connects with E2R system.
F	Symbol informing that the weighing profile is active.

- Section presenting the weighing result.



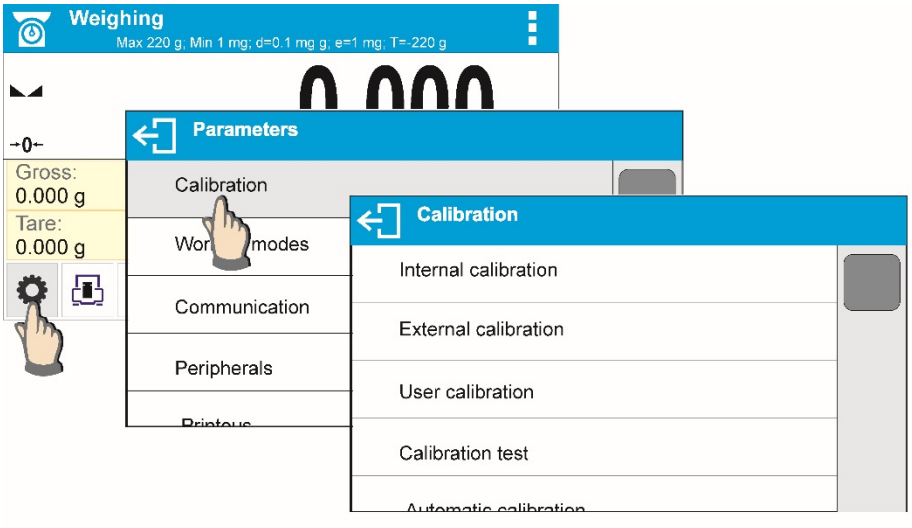
- Section comprising supplementary information on currently performed operations, and function buttons.



7. OPERATING BALANCE MENU

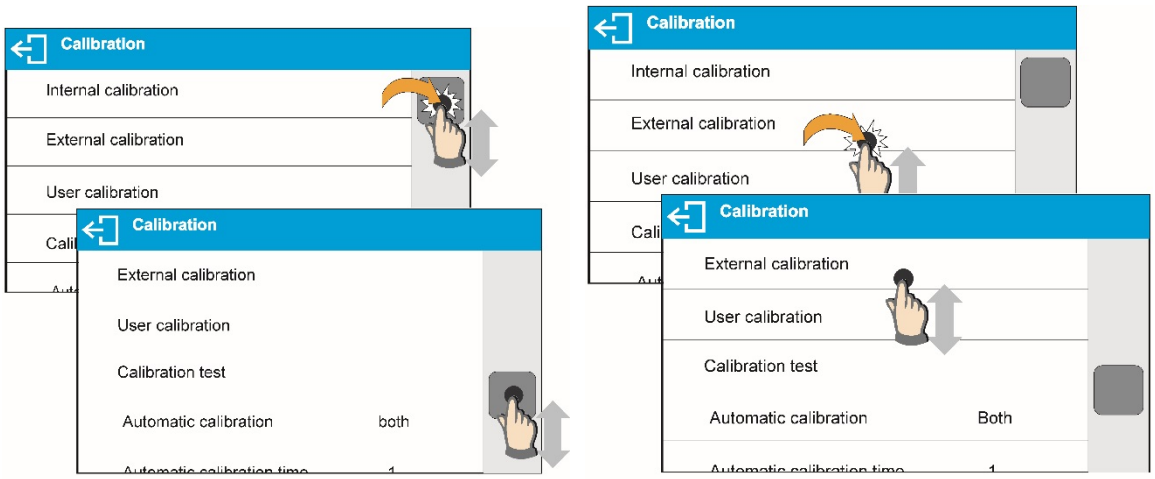
Operation of balance software menu is intuitive and uncomplicated. The touch panel makes the software operation easy. Pressing a function key, a soft key or an area on the display initiates an assigned function or process
Touch screen operation is also possible while wearing gloves.

7.1. ENTERING BALANCE MENU



In order to enter balance menu, press  <PARAMETERS> button. Clicking any button comprised within information section, or clicking any button with particular parameter name, results with change of colour. This is for signalling purposes. If a given area has any function or action assigned, then it is performed automatically upon clicking (e.g. adjustment procedure), respectively a particular window with parameters or list of appropriate settings is displayed.

7.2. SCREEN SCROLLING



There are two methods for scrolling the screen of parameters window. The first one requires pressing, holding down and scrolling up or down the scrollbar located on the left. The second one requires pressing, holding down and scrolling up or down any point of the displayed window.

8. WEIGHING OPERATION

Load a weighed object on a balance weighing pan. On stabilization of weighing result, indicated by stability marker ◣◢ visible on the left side of balance display, read the measurement result.
Record / printout of the measurement result is available on pressing <PRINT> key:

- for verified balances – only stable measurement result can be saved or printed (stability marker ◣◢ visible on balance's display),
- for non-verified balances – stable or unstable measurement result can be saved or printed (regardless of stability marker ◣◢ absence). If unstable measurement result is printed then it is accompanied by question mark <**?**> in front of printed mass value.

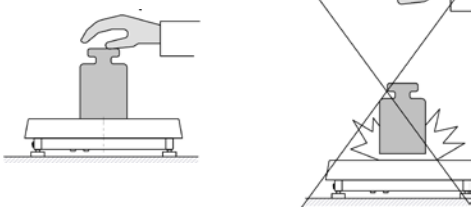
8.1. GOOD WEIGHING PRACTICE

In order to ensure long lasting use of a balance plus correct and reliable measurement of weighed loads, follow below procedures:

- Start the balance with no load on the weighing pan (permissible value of load on the weighing pan on balance start is ±10% of its maximum capacity).

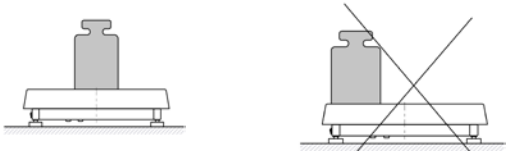
- Load the weighing pan steadily avoiding shocks:

YES NO



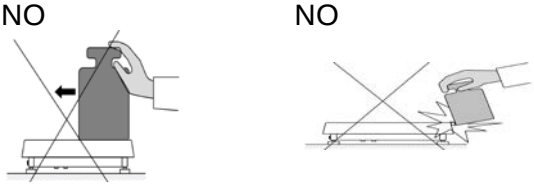
- Place weighed loads centrally on the weighing pan:

YES NO



- Avoid side loading, in particular side shocks:

NO NO



8.2. LOGGING

Full access to user parameters and to editing databases requires logging as an operator with **<Administrator>** permissions level. The logging procedure should be carried out on each switching on of the balance.

First Log In operation – procedure:

- Run home screen and press <  > button, operators database window opens with list of available users,
- Select <Admin> option, the software activates an on-screen keyboard, use it to enter operator's password: „1111",
- Press  button to confirm,
- Home screen of the software is displayed again automatically,
- When logged, add users and set the permissions levels.

On future Logging In, select a user from the list and enter the password, the software initiates operation with permissions level set for the selected user.

Log out operation – procedure:

- Run home screen and press **<**  **>** button, operators database window opens,
- Press **<Log out>** soft key (located as position no. 1 in the list of operators),
- Home screen of the software is displayed again automatically.

Permissions levels
Balance software comprises three permissions levels: administrator, advanced operator, user.

Permissions level dependent access to edition of user parameters, databases and software functions.

Permissions levels	*Enabled operations*
User	Free editing of parameters of <Readout> submenu. Modification of settings for <Misc.> parameter group, except for settings for <Date and Time>. The operator can start and carry out all weighing processes. The operator can preview information recorded in <Databases>, (s)he can define universal variables.
Advanced User	Free editing of parameters of the following submenus: <Readout>; <Working modes>; <Communication>; <Peripherals>; <Misc.>. Access to <Date and Time> submenu denied. The advanced operator can start and carry out all weighing processes.
Administrator	Access to all user parameters and functions, editing databases enabled.

8.3. UNITS

UNITS parameter group enables you to change availability of mass units (the change can be performed in-course of balance operation), and to define two custom units, thus positively effecting comfort and speed of operation. It is possible to change unit to other than unit [g] during weighing process or during operation of other modes. Working modes *Parts Counting* and *Percent Weighing* are exceptions.

8.4. WEIGHING UNIT SELECTION

Change of weighing unit is carried out by pressing the weighing unit icon visible next to the value of measurement result, or by clicking key (if displayed in an information section). Clicking the unit triggers its replacement, the clicked unit is replaced with the unit that is next on the list of available units.
Another option for unit replacement is selecting a particular unit out of the units list, to view the list click key (if displayed in an information section).

Units list:

Unit	Denotation	Verified balance	Unit	Denotation	Verified balance
gram	[g]	yes	Taele Singapore	[tls]	no
milligram	[mg]	yes *	Taele Taiwan	[tlt]	no
kilogram	[kg]	yes *	Taele China	[tlc]	no
carat	[ct]	yes *	Momme	[mom]	no
pound	[lb]	no	Grain	[gr]	no
ounce	[oz]	no	Newton	[N]	no
ounce Troy	[ozt]	no	Tical	[ti]	no
pennyweight	[dwt]	no	baht	[baht]	no
Taele Hongkong	[tlh]	no	tola	[tola]	no
			mesghal	[msg]	no

** - Accessibility of measuring units is conditioned by balance type.*

8.5. BALANCE ZEROING

Zeroing is a function allowing to zero mass indication. In order to zero mass indication, press →0← button. Mass indication of zero value shall be displayed together with precise zero →0← and stability ◣◢ markers.
Zeroing process is an equivalent for determining new zero point, recognized by the balance as precise zero. Zeroing is possible only for stable status of display indication.

CAUTION!
Zeroing the display indication is possible only within ±2% range of instrument's maximum capacity. If the zeroed value is above ±2% of the maximumcapacity, then the software indicates a respective error message.

8.6. BALANCE TARING

Taring is a function allowing to determine net weight of a measured object. In order to determine net weight of the object, place object's container (packaging) on the weighing pan, and on stabilization of measurement result press →T← key. The display indicates mass equal zero and symbols: Net and ◣◢. On taking off the weighed load and its packaging from the weighing pan, the display indicates sum of total tared mass with minus sign.

The software enables assigning tare value to a database-stored product. Using this option, the software automatically uploads data on tare value for a particular product upon its selection from the database.

CAUTION!
Taring negative values is impossible. On taring negative values the balance responds with an error message. In such case, zero balance indication and repeat taring procedure.

8. ADJUSTMENT

In order to ensure the highest weighing accuracy, it is recommended to periodically introduce a corrective factor of indications to balance memory, the said factor must be referred to a mass standard. In other words, balance adjustment shall be performed from time to time.

Adjustment should be carried out:

- Before the beginning of weighing procedure,
- If long breaks between following measuring series occur,

Types of adjustment:

- Internal automatic adjustment
- Manual internal adjustment
- Adjustment with an external weight of declared mass which cannot be modified or of any mass, but not lower than 30% of maximum range.

CAUTION!
In case of verified balances (with an internal automatic adjustment system) only automatic internal adjustment and manual internal adjustment are available. Remember to carry out the adjustment process when there is no load on the pan! When the weighing pan is loaded, command ***<RANGE EXCEEDED>*** *is displayed. In such a case remove the load and restart the the adjustment process. Adjustment process can be aborted if necessary by pressing button at any time during the process.*

8.7. INTERNAL ADJUSTMENT

Internal adjustment is carried out by means of an internal adjustment weight. button, when pressed, automatically triggers adjustment process. Upon adjustment process completion respective message, informing about process end and about its status, is displayed.

CAUTION! Adjustment procedure requires stable environmental conditions (no air drafts or ground vibrations). The process must be carried out with an empty weighing pan.

8.8. EXTERNAL ADJUSTMENT

External adjustment is carried out by means of an external mass standard of specified accuracy class and weight. Both, accuracy class and mass standard weight depend on balance type and max capacity. The process takes semi-automatic form, successive stages are signalled with prompts.

CAUTION! External adjustment is possible for balances that are not a subject to conformity assessment (verification).

Process stages:

- Enter <Adjustment> submenu, next select “External adjustment” option,
- “Remove weight” prompt is displayed.
- Take the weight off the weighing pan and press button. Whereas balance determines start mass, “Adjustment; Please wait…” prompt is displayed,
- Upon completed start mass determination procedure “Put weight …” prompt is displayed along with particular mass standard value.
- Put the required weigh on a pan and press button,
- Upon completed procedure “Remove weight” prompt is displayed.
- Take the weight off the weighing pan, wait for <Adjustment> window to be displayed again.

8.9. USER ADJUSTMENT

User adjustment is carried out with an optional standard of mass ranging between 0,3 Max and Max. User adjustment and external adjustment procedures are likewise with one exception, before user adjustment start, a message box for entering mass of a standard used for user adjustment is opened.

CAUTION!
User adjustment is possible for balances that are not a subject to conformity assessment (verification).

In order to start user adjustment, enter <Adjustment> submenu and select 'User adjustment' option. Then follow the commands displayed on a screen.

9. WORKING MODES – GENERAL INFORMATION

Standard version of X2 series balances features the following working modes:

	**Weighing** Means of operation: weight of a load is determined through an indirect measurement. A balance measures gravitational force which attracts the load. An obtained result is processed to a digital format and displayed in a form of measurement result.
	**Parts Counting** Means of operation: based on a determined mass of a single part it is possible to count another parts, assuming that mass of a single part is determined with sufficient accuracy, and that the following parts are equal in mass.
	**Checkweighing** Means of operation: control of sample mass with applied thresholds. A user should specify the value of min threshold <LO> and max threshold <HI>.
	**Dosing** Means of operation: a user should specify sample's target mass to be obtained by pouring.
	**Percent Weighing** Means of operation: control of percent ratio of a sample in relation to a standard (reference). Obtained data provides percent ratio on how test sample differs from the accepted standard (reference).
	**Density of solids** Means of operation: based on Archimedes principle, a balance determines density of solids. The mode requires an optional density determination kit.
	**Density of liquids** Means of operation: based on Archimedes principle, a balance determines density of liquids. The mode requires an optional density determination kit.
	**Animal Weighing** Means of operation: mass measurement takes place with application of filters dampening animal moves on a weighing pan, thus enabling obtaining a correct measurement result.
	**Statistics** Means of operation: carried out measurements are used to calculate statistical data, such as Min, Max, deviation, etc.

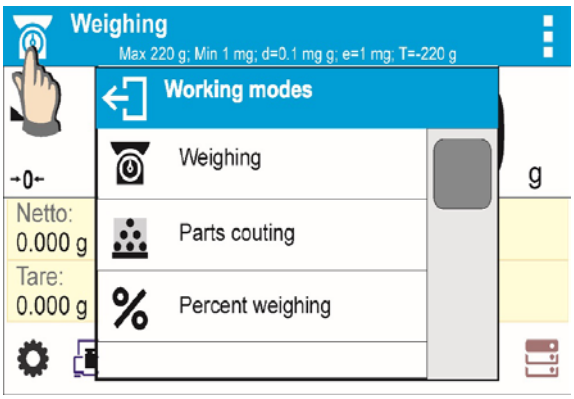
	Peak Hold Means of operation: max temporary indication occurring in course of the weighing process is hold on a display.
	Formulations Means of operation: by mixing specified ingredients you can obtain particular mixture, in order to program given formulation you have to specify weight of particular ingredients.

Particular working modes settings feature specific functions. The functions enable adapting mode operation to your individual needs. The special settings are activated on selecting a respective profile. A detailed description of specific functions is provided within description of working modes.

9.1. RUNNING WORKING MODE

To run working mode other than currently operated one:

- press pictogram of currently used working mode, the pictogram is located in the top left hand corner,



- wait for the available working modes list to be displayed,
- select the working mode you need to operate.

10. DATABASES

Balance software features the following databases <  >:

Products (5 000 products)

Users (100 users)

Packaging (100 packaging types)

Customers (1 000 customers)

Formulations (100 formulations consisting of 25 ingredients maximally)

Formulations reports (500 reports)

Ambient Conditions (10 000 records)

Weighings (50 000 records)

Alibi (512 000 records)

CAUTION! It is not possible to edit some of the databases for a balance cooperating with E2R software. Shall you introduce any modifications on databases, use the PC software.

11. COMMUNICATION

COMMUNICATION menu is comprised within Parameters menu. It is accessed by pressing key. The balance can communicate with a peripheral device, wherein the communication is established via the following ports:

- COM 1 (RS232),
- COM 2 (RS232) (not in AS X2.PLUS balances),
- USB 1, type A
- USB 2, type B
- Ethernet,
- Wi-Fi.

The ports can be configured using <Communication> parameter group. To enter this submenu, press key, next press “Communication” key.

12. PERIPHERAL DEVICES

PERIPHERAL DEVICES menu is comprised within Parameters menu. It is accessed by pressing key. The menu features list of devices that can cooperate with the balance.

- Computer
- Printer
- Additional Display
- Barcode Reader
- External Buttons
- Ambient Conditions Module

13. COMMUNICATION PROTOCOL

General information

A. A character based communication protocol balance-terminal is designed for establishing communication between a RADWAG balance and a peripheral device via RS-232C serial interface.
B. It consists of commands sent from a peripheral device to the balance and responses from the balance.
C. Responses are sent from the balance on each receipt of a command as a reaction to a specific command.
D. Commands, forming the communication protocol, enable both, obtaining data on balance status and influencing balance operation, e.g.: acquiring measurement results from the balance, zeroing, etc.

13.1. MANUAL PRINTOUT / AUTOMATIC PRINTOUT

X2 series balance enables generating manual or automatic printouts.

- Manual printout: on stabilization of indication (measurement result) press  key.
- Automatic printout is generated automatically in accordance with the settings for automatic printout.

The content of a printout depends on setting in menu <Standard printout> - <Weighing printout template>.

Mass printout format:

1	2	3	4 -12	13	14	15	16	17	18
Stability marker	space	character	mass	space	unit			CR	LF

Stability marker	[space] if stable [?] if unstable [^] if high limit is out of range [v] if low limit is out of range
Character	[space] for positive values [-] for negative values
Mass	9 characters with decimal point and right justification
Unit	3 characters with left justification

An example:

_ _ _ _ _ _ **1 8 3 2 . 0** _ **g** _ _ **CR LF** - printout generated using balance upon pressing  key, the printout is generated with reference to settings for <GLP printout>:

Date	**NO**	Universal variable 3	**NO**
Time	**NO**	Net	**NO**
User	**NO**	Tare	**NO**
Product	**NO**	Gross	**NO**
Customer	**NO**	Current result	**YES**
Packaging	**NO**	Adjustment report	**NO**
Universal variable 1	**NO**	Non-standard printout	**NONE**
Universal variable 2	**NO**		

14. ERROR MESSAGES

Max weighing threshold exceeded
Unload the weighing pan

Min weighing threshold exceeded
Install weighing pan

Zeroing out of range
Press tarring button or restart the balance

Display capacity out of range
Unload the weighing pan

Tarring out of range
Press zeroing button or restart the balance

Start mass out of range
Install weighing pan

Zeroing/tarring time out of range
Weighing indication unstable

RADWAG BALANCES AND SCALES
ADVANCED WEIGHING TECHNOLOGIES