

# User manual

## Computer Software - PIPETTES

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ITKU-07-08-11-12-A

**Version - 3.0.X**



**MANUFACTURER OF ELECTRONIC  
WEIGHING INSTRUMENTS**

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# 1. INTENDED USE

Computer software **PIPETTES** is intended to determine the measurement errors of a pipette (batcher) volume according to the standard ISO 8655. The software enables simultaneous cooperation with two balances connected to a computer with installed computer software **PIPETTES**.

## Main software functions:

- Calculations made on the basis of measurement records:
  - Average pipette volume,
  - Systematic error  $e_s$  (accuracy error A),
  - Random error CV (repeatability error P).
  - Uncertainty of measurement ( $u$ )
- Calibration of pipettes:
  - Fixed volume – single channel pipettes,
  - Adjustable volume – 1-, 8- or 12-channel pipettes.
- Automatic measuring procedures related to a type of tested pipette,
- Pipette characteristics stored in a database:
  - Databases comprise specification of pipettes manufactured by RADWAG,
  - Defining custom pipette models.
- Calibration results stored in databases (MS Access),
- Creating backups of databases with calibration results
- Printout of reports from pipettes calibration process,
- Export of reports from pipette tests to a file in format: PDF, MS Word, Excel and other,
- Preparing calibration schedules,
- Filtering calibration schedules: weekly or monthly,
- Simultaneous cooperation with 2 balances connected to a computer via RS-232 ports:
  - All types of RADWAG balances supporting a uncoded communication frame,
  - Possibility of connecting a weighing instrument operating in other communication protocol,

- Intuitive parameter configuration,
- "hot key" to acquire data on currently weighed mass,
- "hot key" to tare a balance,
- Manual entering value of a weighing record,
- Cooperation with a temperature-humidity-pressure recorder (THB module) connected via RS-232 port of a computer.

**Caution:**

1. *Due to continuous modifications made to the software, there may occur minor discrepancies between the content of this user manual and the software version.*
2. *RADWAG does not take responsibility for the effects of software operation or possible errors occurring as a result of inappropriate software operational use.*

## **2. INSTALLATION**

### **2.1. System requirements**

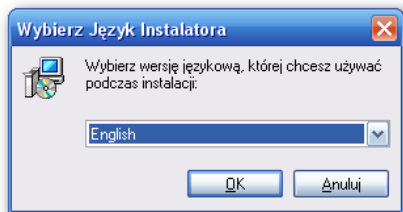
Minimum hardware requirements:

- Processor INTEL or AMD  $\geq 2000$ MHz,
- RAM min. 500 MB,
- Video card SVGA (min. resolution 1024x768 with 24-bit palette of colours),
- 2 ports RS-232 (balance and temperature-humidity-pressure recorder (THB module)),
- HDD  $\geq 50$  GB,
- Mouse,
- Keyboard,
- Colourful monitor with resolution 1024x768,
- System Windows XP/2000/Vista or newer,
- Microsoft ® .NET Framework 2.0 Environment,
- Printer (format A4),
- Basic knowledge of computer (MS Windows)

## 2.2. Installation process

In order to install the software **PIPETTES** on your computer insert the installation CD into the computer's CD-ROM drive. The installation program should start automatically. For custom installation run **<Install\_1.4.X.exe>** file located in the main folder of the of the instillation CD.

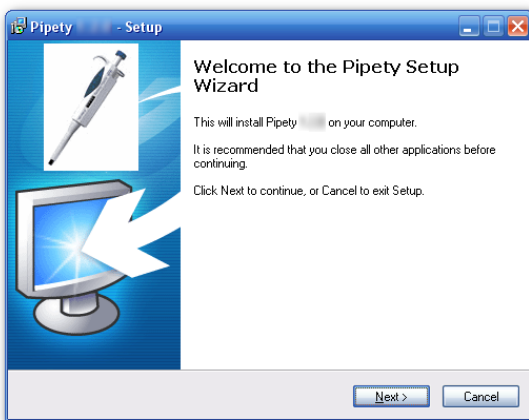
After the start-up the a message box is opened for selecting language version of the installation wizard:



Select language version and press “**OK**” button.

Next, follow the guidelines displayed by the installation wizard on the subsequently appearing windows.

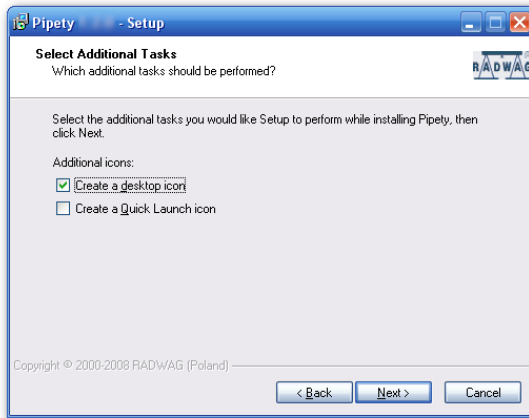
**Installation wizard welcome window:**



Press “**Next >**” button to continue.

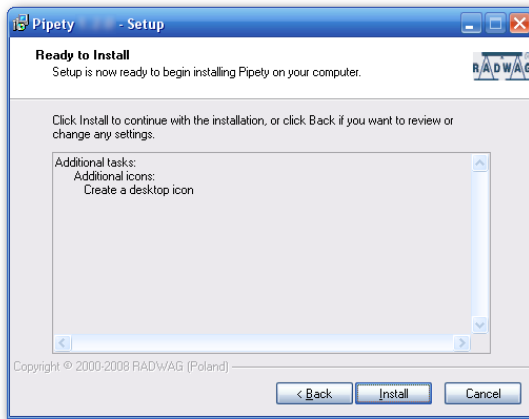
Options: select options according to your requirements.

### Window for creating shortcuts to run the application:



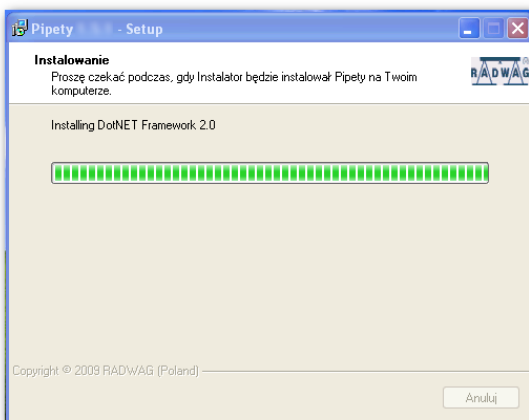
Press “Next >” button to continue.

### Window for initiating application installation:



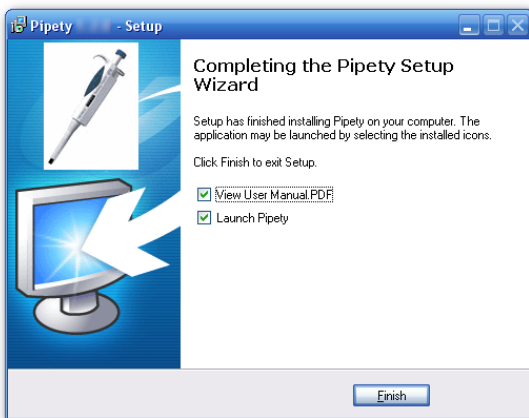
Press “Install >” button to continue.

## Window for installing DotNET Framework 2.0 application component:



If the system does not have the **DotNET Framework 2.0** component installed, then the wizard initiates its automatic installation.

## Window of completed installation process:

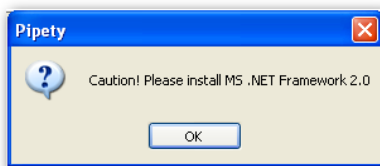


Optionally, tick field **“Launch PIPETTETS”** which opens the application PIPETTETS after pressing **“Finish”** button in the installation wizard window.

### **Caution:**

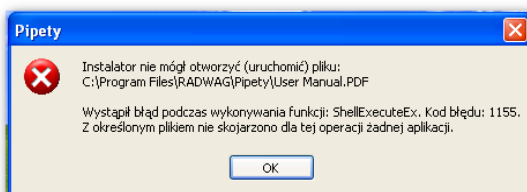
*If the following message box is displayed during installation process:*





*It means that the components required for proper software operation are not detected on the computer. Follow the activities specified in chapter 2.2.1.*

*If in the window finishing the installation process the option to open a user manual in PDF format is ticked, then the following message box is displayed:*

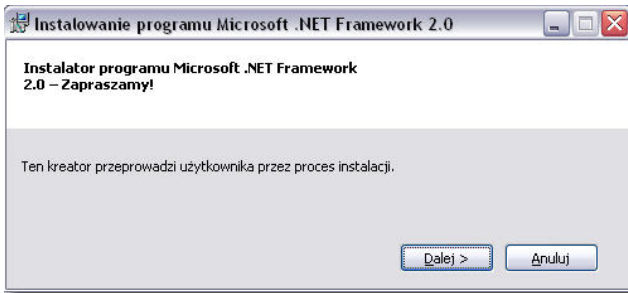


which means that the **Adobe® Reader** application is not installed on the computer. Please download and install the newest software version from: <http://www.adobe.com/pl/downloads/> or use an application available on the CD and located in folder *UserManuals*.

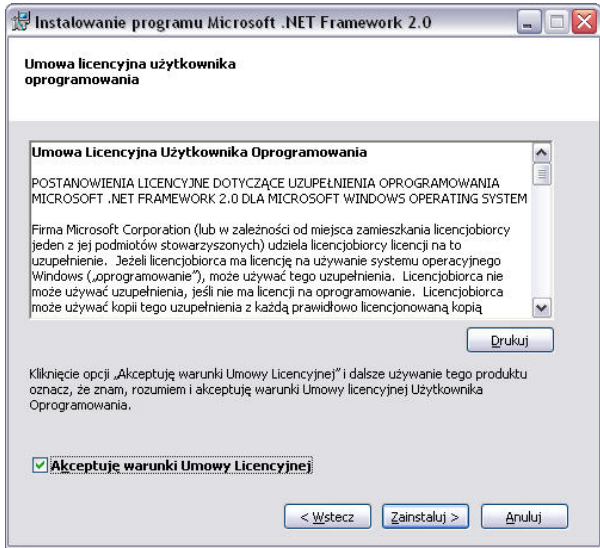
### 2.2.1. MS .NET Framework installation

In order to manually install **Microsoft® .NET Framework 2.0** environment on the computer run program `<dotnetfx2.0.exe>` located in a subfolder `<dotnet>` on the installation CD, which opens an installation wizard:

## Welcome window of .NET Framework installation wizard:



## The window on licence agreement:



Tick: **"I accept..."** and press **"Install"** button.

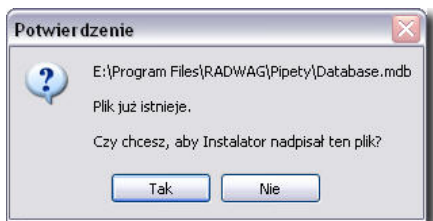
### Caution:

The user of Polish version of *Windows*<sup>®</sup> OS should install an additional language package, available on the CD and located in folder `<dotnet>`. In order to install the language package run application `<langpack.exe>` and follow guidelines displayed by the install wizard.

## 2.2.2. Software updating

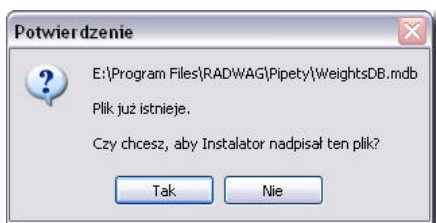
In case the software **PIPETTES** has already been installed on the computer and a user starts installation of a newer software version, then on installation process additional warning message boxes are displayed determining user decisions:

### Window on overwriting Database.mdb:



**Database.mdb** comprises: pipettes' characteristics, operators and company data. Press “**No**” to keep the current database version, otherwise the software overwrites it with a new database version comprising default settings (the process may result in losing important data).

### A window for confirming overwriting of the database WeightsDB.mdb:



Database WeightsDB.mdb comprises data on measurements of calibrated pipettes. Press “No” to keep records of the current database, otherwise the software installs a new empty database.

### **Caution!**

*Before running the installation wizard it is recommended to create a backup of the existing folder with software and databases. Default location:*

**<C:\Program Files\RADWAG\Pipety\>**

### 3. SOFTWARE START UP

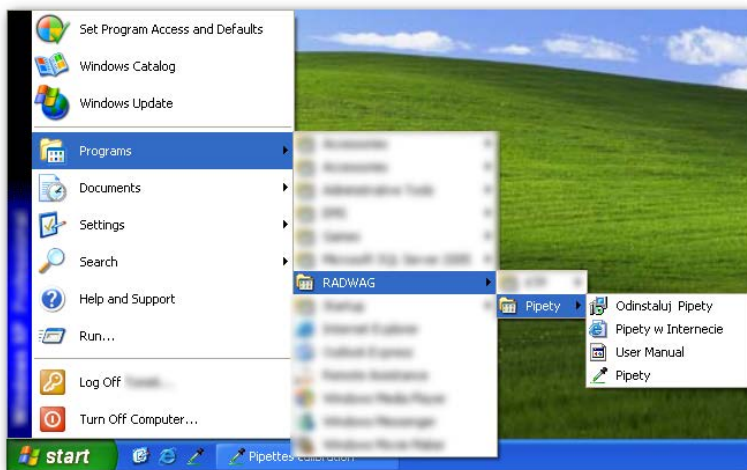
The software can be run using a shortcut on the desktop provided the shortcut has been created during the installation process.



Another means of running the software is clicking a shortcut on the task bar (option to choose during software installation process).

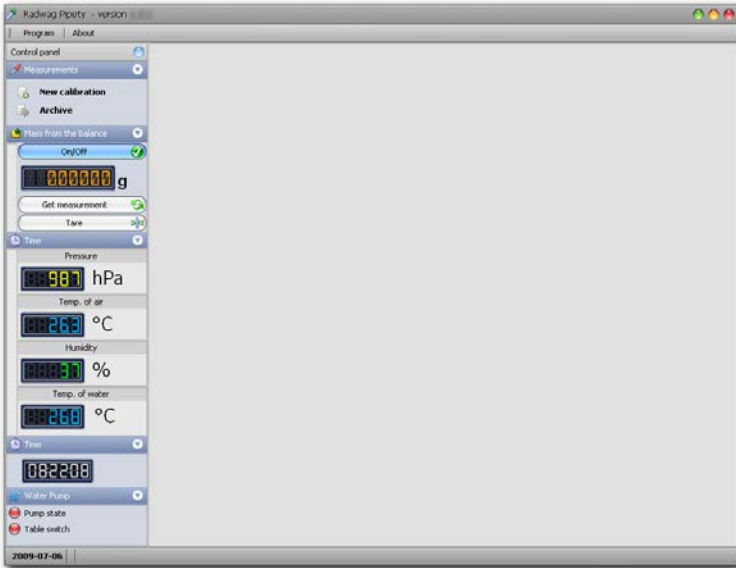


As standard the software is run from menu **START** of Windows OS: **START/Programs/RADWAG/Pipety/Pipety**.



### 3.1. Software main window

After software start the main window is displayed:



#### 3.1.1. Description of sections

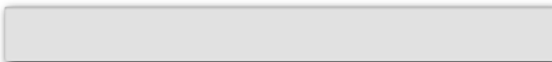
**Title bar** – includes the name and version of the software. Buttons enable minimizing and maximizing the window or closing the software.



**Main menu** – navigating menu with access to all software functions:



**Working window** – an area previewing the windows of the software:



**Control panel** – displays information on current measurements, ambient conditions, time, a button for initiating “New Calibration” process and “Archive” menu.

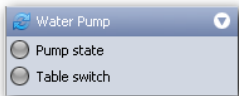


where:

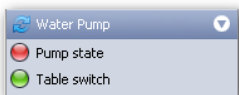
<b>“New calibration” button</b>	Beginning of calibration process of a pipette
<b>“Archive” button</b>	Reading records of saved testing procedures
<b>“Select active balance” bar</b>	Drop down menu for selecting an active balance for acquiring measurements during calibration of a pipette
<b>“On/Off” button</b>	Connecting / disconnecting a serial port. The button pictogram shows current connection status
<b>“Get measurement” button</b>	Reading mass value from a balance connected to a computer. Additionally the mass reading can be carried out using a “hot key” (F3 by default). The last acquired mass value is displayed.
<b>“Tare” button</b>	Tarring a balance. Mass indication returns to zero, and on placing a load on balance’s weighing pan the value of net mass is displayed.

<b>“Ambient conditions” tab</b>	Displays current data monitored by the temperature-humidity-pressure recorder connected to a COM port of a computer.
<b>“Time” tab</b>	Displays current time
<b>“Water pump” tab</b>	Displays current pump status and table switch status
<b>Status bar</b>	Displays current date.

Displaying status in “Water pump” tab:



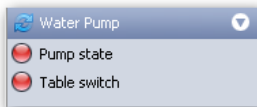
If the temperature-humidity-pressure recorder does not communicate with the computer, the signal lamps are grey.



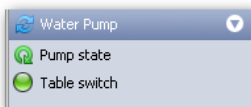
If the operation time of water pumps is exceeded according to the options set in the adjustment menu, then the light of pump status is red, and the of the table switch is green.



The bottom status bar of the software displays a message “Put pipette’s pump to its storage place”

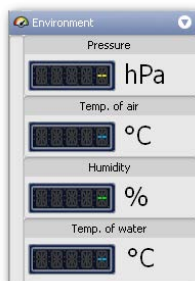


When the pump’s pipette is in its storage place, the table switch is not pressed, then the water pump is disabled. Both lights are red.



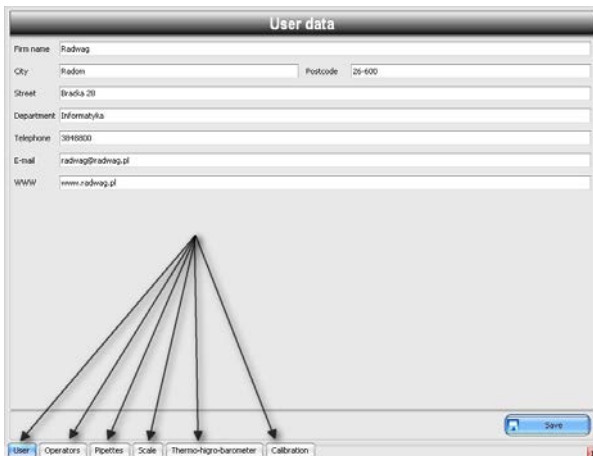
At the moment of picking up a pump’s pipette the table switch is enabled, and the water pump is activated. The table switch lamp changes colour to green, and the arrow on pump status moves clockwise.


No communication between the computer and the temperature-humidity-pressure recorder is signalled by sign “-“ in the “Ambient conditions” tab.

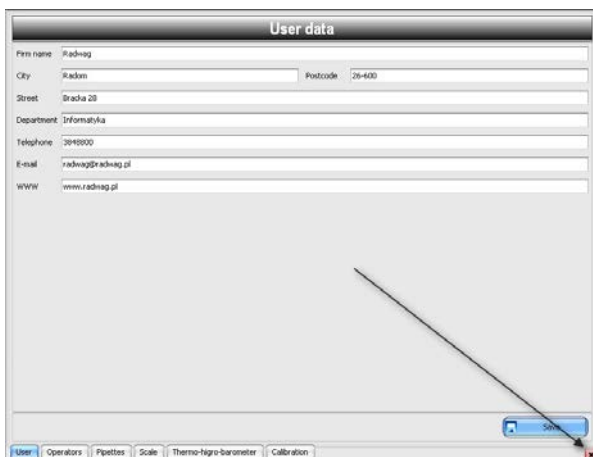


### 3.1.2. Operation on windows

The workspace area of the main window displays a number of the subsequent sub-windows. Below example presents displaying of three windows. Each window is previewed by a tab located on the bottom bar of the main window. Pressing a tab denoting a window causes immediate switching to this window and displaying its content (here: user data).

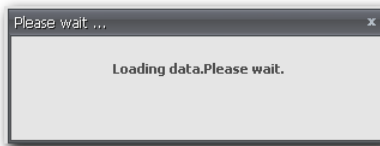


Press  button to close the currently displayed window.



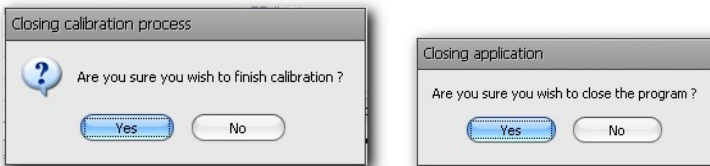


Before displaying some of the windows a message box is indicated with a request to wait until the window is opened. The message box disappears automatically as the data is ready to be displayed



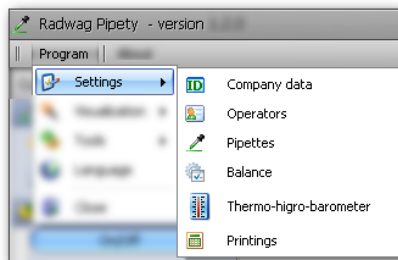
### Close windows / application:

Closing the application and some of the windows is preceded by a message box requesting confirming the process:



## 4. MENU SETTINGS

In order to enter the “**Settings**” menu press tab:  
**Program->Settings:**



### 4.1. Company (User) data

Data contained in this form (section) is printed in a header of a report from pipette testing process.

The screenshot shows a window titled "User data" with the following fields:

- Personal name: Radwag
- City: Radom
- Postcode: 26-600
- Street: Bracka 2B
- Department: Informatyka
- Telephone: 2049800
- E-mail: radwag@radwag.pl
- WWW: www.radwag.pl

Buttons for "Save" and "User" are visible at the bottom.

All fields need to be filled in accordance with their description. All changes are effective on pressing **“Save”** button located in the bottom right corner of the **“User data”** window.

## 4.2. Operators

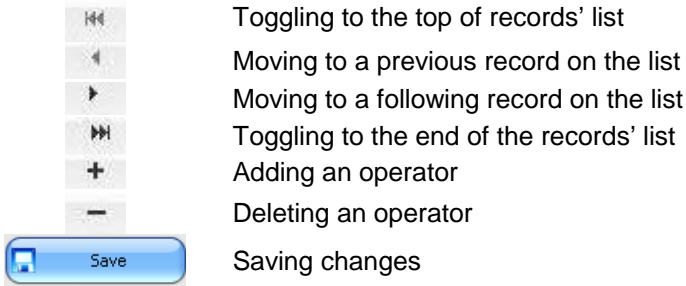
Database of operators is used for pipette testing process, and it contains records on personnel carrying out the testing procedure. Column **“Operators”** is filled in with random data (first name, second name, nick name etc.) but the filled in data has to be unique for a single record.

The screenshot shows a window titled "Operators definition" with a table containing one record:

Operators	Operators post.	Range of duty	Calibration count.
> Administrator			

Navigation buttons and "Record 1 of 1" are visible at the bottom, along with a "Save" button.

## Where Buttons:



Fields “**Workstation**” and “**Scope of duties**” needs to be filled in. Field “**Completed calibrations**” outlines the number of calibration procedures completed by an operator, and it is automatically calculated by the software.

### 4.3. Clients

Tab “**Database of Clients**” provides access to records on clients that optionally can be assigned to completed calibration procedures. Data on a Client entered in this database is included in a report from pipette calibration.



## Where Buttons:



Toggling to the top of clients' list

Moving to a previous record on the list

Moving to a following record on the list

Toggling to the end of the clients' list

Adding a client record

Deleting a client record

Editing data on an client record existing in the database

### CAUTION!

Field **"ID, Company, Address"** are obligatorily filled in, and field **"ID"** cannot repeat in the database (must be unique).

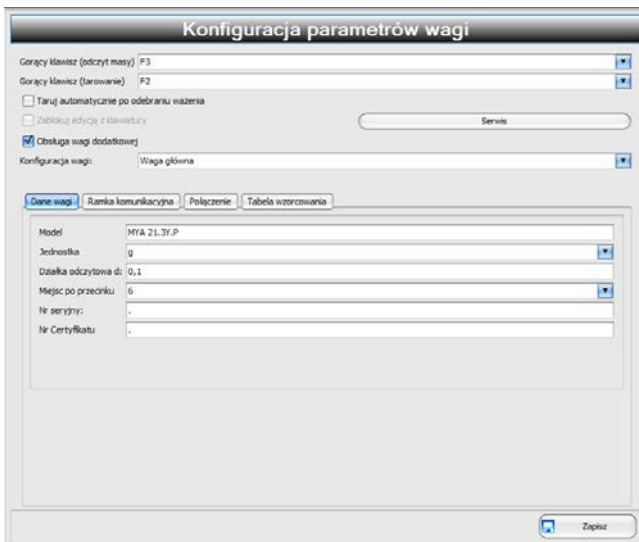
After filling in all required data on a client save changes by pressing **"Save"** button located in the bottom section of the window.

## 4.4. Balance

The option for configuring balances used during the pipette testing procedures. The scope of configuration is matched in a way that the software can cooperate with balances of various manufacturers. Changes in configuration tab of a balance are effective on saving them by pressing **"Save"** button located in the bottom section of the window.

### 4.4.1. Balance parameters

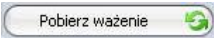
Window containing basic parameters of a balance:



The top section of the window contains main parameters on cooperation with balances.

### Hot Key (mass reading)


Sending a command to a connected balance on mass reading is operated by two means:

1. By pressing  (acquire a weighing record) button in the control panel of the main software window,
2. By pressing the hot key.

In order to use option no. 2 a user should select a key that is comfortable to use. Available options are function keys from **F1** to **F12**.

### Hot Key (tarring)

Sending a command to tare a connected balance is operated by two means:

1. By pressing  (tare) button in the control panel of the main software window,
2. By pressing the hot key.

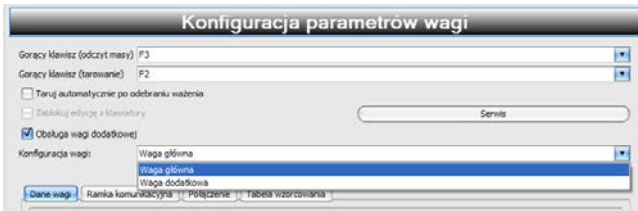
In order to use option no. 2 a user should select a key that is comfortable to use. Available options are function keys from **F1** to **F12**.

Field "Lock editing from keyboard" enables blocking editing option of measurements, the option is disabled by default. Enabling this option is available only on entering a service password.

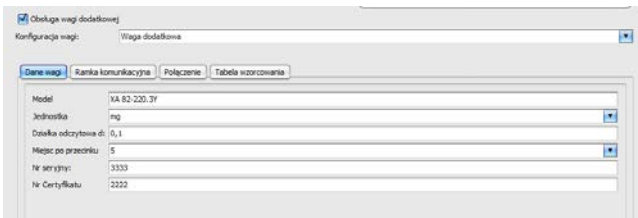
Field “Operation of a supplementary balance” :

The software is designed to cooperate with two balances connected to a computer via the RS 232 ports.

If a workstation features two balances, then before configuring them, enable option: “**Operation of a supplementary balance**” in the balance parameters window. If enabled, the user can configure parameters for two balances, i.e. the main balance and a supplementary one.



The window on balance parameters previews data on a balance enabled in option “**Balance configuration**”.



Field “**Type**” (MANUFACTURER-BALANCE NAME) is used in reports from pipette testing procedure.

Field “**Unit**” is used to select one of available measuring units of a balance:



**Caution:**

When reading a mass value the software uses a measuring unit determined in this setting. It is conditioned by a criterion that different manufacturers of weighing instruments use different formats to send data on a measuring unit. A measuring unit is selected automatically in the process of testing a pipette.

Field “**Reading unit**” has to be filled in with data on balance sensitivity, i.e. its parameter “d”. This field is used for information purpose only and it is not used in printouts.

Field “**Decimal places**” is used for selecting number of decimal places for measurements carried out on a balance.

Field “**Serial no.**” is used for determining a serial number of a balance. In most cases the serial number (factory no.) is located on balance’s data plate.

Field “**Certificate no.**” is intended to enter a number of a type approval certificate of a balance. In most cases the data on type approval is located on balance’s data plate.


#### 4.4.2. Communication frame

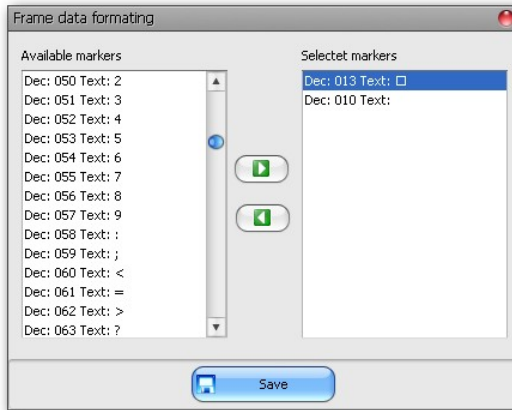
Determining the means of communicating a balance. In case of connecting two balances, the communication data need to be determined for both balances: the main and supplementary one.



#### “End of frame” marker

When acquiring data from a balance the software has to detect which has completed sending a response (data pack – frame). Therefore, this value

has to be determined in the software using  button which displays an editing window:



Data format **Dec: <number> Text: <character>** means:

**<number>** - decimal value of a character (byte),

**<character>** - ASCII text character equivalent.


Example for RADWAG balances:


**Char(13) + Char(10) i.e.: [CR] Carriage Return + [LF] Line Feed**

Which stands for: **Dec: 013 Text: <none>**

**Dec: 010 Text: <none>**

The list on the right side (**selected markers**) includes characters recognized as the end of response (end of frame). The sequence of characters is crucial.

In order to **add** a subsequent character as the last one in the list, mark an entry in the right column of the table and press  button.

In order to **delete** a selected character highlight it in the list (**selected markers**) and press  button.

All changes are effective after pressing **“Save”** button.



## Command requesting mass reading

A balance sends data to the software in two ways:

1. If balance's user forces sending a mass value by pressing a key on balance's keyboard (e.g.: Print, Enter) or if balance configuration enables automatic sending of mass data on stabilization of weighing result,
2. If a balance receives a command sent from a computer.

This configuration refers to **point 4.3.2.** the same format refers to definition of „**Frame end marker**” – with prior determining character(s) that should be sent to a balance as a command requesting a response with currently weighed mass.

In case of RADWAG balances it is:

An example for a balance by RADWAG: **Char(83)** i.e.: **S**

Which in configuration stands for: **Dec: 083 Text: S**

Data sent to a balance: **Char(83) + Char(13) + Char(10)**

Where **Char(13) + Char(10)** stands for frame end definition.

## Command on tarring a balance:

A balance is tarred in two ways:

1. If balance user carries out tarring process by pressing tare button, or balance configuration enables automatic tarring on completing a weighing process,
2. If a balance receives a command sent from a computer.

This configuration refers to **point 4.3.2.** the same format refers to definition of „**Frame end marker**” – with prior determining character(s) that should be sent to a balance as a command requesting tarring a balance.

In case of RADWAG balances it is:

An example for a balance by RADWAG: **Char(84)** i.e.: **T**

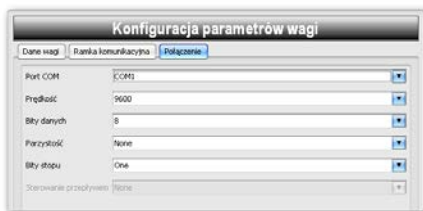
Which in configuration stands for: **Dec: 084 Text: T**

Data sent to a balance: **Char(84) + Char(13) + Char(10)**

Where **Char(13) + Char(10)** stands for frame end definition.

### 4.4.3. Connection

Defining communication parameters for connecting with a balance. Connect a balance to a serial port COM of a computer and carry out parameter configuration, in accordance with below description.



#### **COM (serial) port**

Displays a list of available serial port numbers. Select a port used by a connected balance.

#### **Baud rate**

Displays list of available baud rates. Select a value which complies with the baud rate set in a connected balance.

#### **Databits, parity, stop bits, handshake**

Displays a list of available values for the above parameters. The values need to comply with those set in a connected balance. The last parameter is disabled.

Changes in configuration of the connection are effective on pressing “**Save**” button.

### 4.5. Pipettes

Carrying out a pipette testing procedure requires determining a pipette characteristics, its permissible errors, volume and number of control measurements. In order to improve the testing process, the software stores all acquired data on pipettes in corresponding database.

**Baza pipet**

Pipety    Modele

Przebiegi to wykazywanie aktywności

Producent	Model	Typ	Symbol	Zakres	Jednostka	Pomiarowy kanał	Dotyka	Stożkowość	Dozwolak
Radwag	RP-AV	Zmienna 1-kanał	10	0,5-10	µl		10	0,1	10
Radwag	RP-AV	Zmienna 2-kanał	20	2-20	µl		10	0,1	10
Radwag	RP-AV	Zmienna 2-kanał	50	5-50	µl		10	0,5	300
Radwag	RP-AV	Zmienna 1-kanał	100	10-100	µl		10	0,5	300
Radwag	RP-AV	Zmienna 1-kanał	200	20-200	µl		10	1	300
Radwag	RP-AV	Zmienna 1-kanał	1000	100-1000	µl		10	5	1000
Radwag	RP-AV	Zmienna 1-kanał	5000	500-5000	µl		10	50	5000
Radwag	RP-PV	Zmienna 1-kanał	2,5	0,2-2,5	µl		10	0,01	10
Radwag	RP-PV	Zmienna 2-kanał	10	0,5-10	µl		10	0,1	10
Radwag	RP-PV	Zmienna 2-kanał	20	2-20	µl		10	0,1	10
Radwag	RP-PV	Zmienna 1-kanał	50	5-50	µl		10	0,5	300
Radwag	RP-PV	Zmienna 1-kanał	100	10-100	µl		10	0,5	300
Radwag	RP-PV	Zmienna 1-kanał	200	20-200	µl		10	1	300
Radwag	RP-PV	Zmienna 1-kanał	1000	100-1000	µl		10	5	1000
Radwag	RP-PV	Zmienna 1-kanał	5000	500-5000	µl		10	50	5000
Radwag	RP-AF	Stała objętość	5	5	µl		10	0	300
Radwag	RP-AF	Stała objętość	10	10	µl		10	0	300

Edytuj     Dodaj     Usuwaj

**Badane objętości**

Objętość badana	Dispensowany błędnie dokładności [%]	Dispensowany błędnie powtarzalności [%]
10	1	1,0
100	0,8	0,15

#### 4.5.1. RADWAG pipettes

The software comprises a pre-defined database of RADWAG pipettes.

- **Pipettes with adjustable volume MODEL RP-AV**

Range	Accuracy	Tested volume	Accuracy error	Repeatability error	Tips
[ $\mu$ l]	[ $\mu$ l]	[ $\mu$ l]	[%]	[%]	
0,5-10	0,1	1	2.50	1.50	<b>10</b>
		10	1.00	0.80	
2-20	0,1	2	2.00	0.80	<b>10</b>
		20	1.80	0.60	
5-50	0,5	5	2.00	2.00	<b>300</b>
		50	0.60	0.30	
10-100	0,5	10	3.00	1.50	<b>300</b>
		100	0.80	0.15	
20-200	1	20	0.60	0.60	<b>300</b>
		200	0.50	0.15	
100-1000	5	100	2.00	0.70	<b>1000</b>
		1000	0.60	0.20	
500-5000	50	500	0.70	0.30	<b>5000</b>
		5000	0.50	0.15	

- Pipettes with adjustable volume MODEL RP-PV

Range	Accuracy	Tested volume	Accuracy error	Repeatability error	Tips
[ $\mu$ l]	[ $\mu$ l]	[ $\mu$ l]	[%]	[%]	
0,2-2,5	0,01	0,25	2.50	1.50	<b>10</b>
		2,5	1.00	0.80	
0,5-10	0,1	1	2.50	1.50	<b>10</b>
		10	1.00	0.80	
2-20	0,1	2	2.00	0,80	<b>10</b>
		20	1.80	0.60	
5-50	0,5	5	2.00	2.00	<b>300</b>
		50	0.60	0.30	
10-100	0,5	10	3.00	1.50	<b>300</b>
		100	0.80	0.15	
20-200	1	20	0.60	0.60	<b>300</b>
		200	0.50	0.15	
100-1000	5	100	2.00	0.70	<b>1000</b>
		1000	0.60	0.20	
500-5000	50	500	0.70	0.30	<b>5000</b>
		5000	0.50	0.15	

- Pipettes with fixed volume MODEL RP-AF

Volume	Accuracy error	Repeatability error	Tips
[ $\mu$ l]	[%]	[%]	
<b>5</b>	1.30	1.20	300
<b>10</b>	0.80	0.80	300
<b>25</b>	0.50	0.30	300
<b>50</b>	0.50	0.30	300
<b>100</b>	0.50	0.30	300
<b>200</b>	0.40	0.20	300
<b>250</b>	0.40	0.20	1000
<b>500</b>	0.30	0.20	1000
<b>1000</b>	0.30	0.20	1000
<b>2000</b>	0.30	0.20	5000
<b>5000</b>	0.30	0.20	5000

- **Pipettes with fixed volume MODEL RP-PF**

Volume	Accuracy error	Repeatability error	Tips
[ $\mu$ l]	[%]	[%]	
5	<b>1.30</b>	1.20	300
10	<b>0.80</b>	0.80	300
25	<b>0.50</b>	0.30	300
50	<b>0.50</b>	0.30	300
100	<b>0.50</b>	0.30	300
200	<b>0.40</b>	0.20	300
250	<b>0.40</b>	0.20	1000
500	<b>0.30</b>	0.20	1000
1000	<b>0.30</b>	0.20	1000
2000	<b>0.30</b>	0.20	5000
5000	<b>0.30</b>	0.20	5000

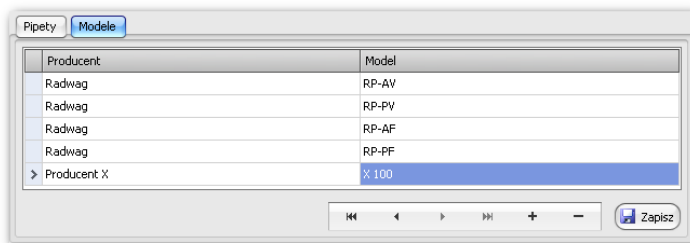
#### 4.5.2. Defining a pipette

The software enables:

- Defining manufacturers and models of pipettes,
- Defining new pipettes, independently on a manufacturer,
- Deleting records of pipettes present in the database,
- Editing records of pipettes present in the database.

#### Manufacturers

Press tab „**Models**” to modify the data on pipette manufacturers



A record in the database comprises two fields (Manufacturer and Model) that are editable directly in the table.

In order to add or delete a record use corresponding buttons:



. Changes are effective on pressing “**Save**” button.

## Pipettes

Press tab “**Pipettes**”. Data in this tab is modifiable in two tables:

- basic data:

Przeciągnij tu kolumnę aby zgrupować

Produc...	Mo...	Typ	Sym...	Zak...	Jednos...	Pomiarów/k...	Dzia...	Końcówki	
> Radwag	RP-AV	Zmienna 1-k...	10	0,5-10	µl		10	0,1	10
Radwag	RP-AV	Zmienna 1-k...	20	2-20	µl		10	0,1	10
Radwag	RP-AV	Zmienna 1-k...	50	5-50	µl		10	0,5	300
Radwag	RP-AV	Zmienna 1-k...	100	10-100	µl		10	0,5	300
Radwag	RP-AV	Zmienna 1-k...	200	20-200	µl		10	1	300
Radwag	RP-AV	Zmienna 1-k...	1000	100-1...	µl		10	5	1000
Radwag	RP-AV	Zmienna 1-k...	5000	500-5...	µl		10	50	5000
Radwag	RP-PV	Zmienna 1-k...	2,5	0,2-2,5	µl		10	0,01	10
Radwag	RP-PV	Zmienna 1-k...	10	0,5-10	µl		10	0,1	10
Radwag	RP-PV	Zmienna 1-k...	20	2-20	µl		10	0,1	10
Radwag	RP-PV	Zmienna 1-k...	50	5-50	µl		10	0,5	300
Radwag	RP-PV	Zmienna 1-k...	100	10-100	µl		10	0,5	300

Edytuj Dodaj Usuń

- data on tested volumes:

Badane objętości

Objętość ba...	Dopuszczalny błąd dokładności [%]	Dopuszczalny błąd powtarzalności [%]
> 1	2,5	1,5
10	1	0,8

Pressing pictogram disables from previewing the window on tested volumes.

### Adding a pipette

In order to add a new pipette to the database press „**Add**” button and fill in required fields in both columns.

### Deleting a pipette

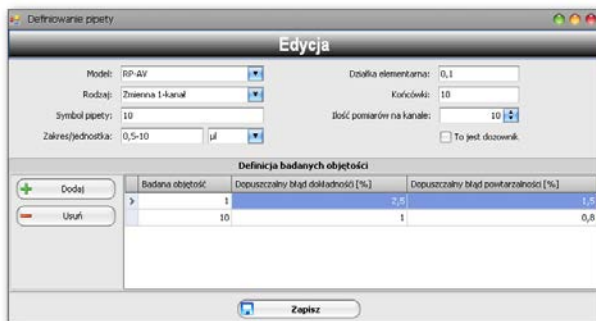
In order to delete a pipette from the database highlight (mark) its record in the main table and press „**Delete**” button.

Changes are effective on pressing “**Save**” button.

## Editing pipette records

Highlight (mark) a selected pipette record in the main table, and fill in all of the fields:

- **Model** – select a model from the list or create a new model (tab *Models*),
- **Type** – select pipette type (the definitions are non-editable),
- **Symbol, Range, Unit, Reading unit, Tips**,
- **Number of measurements per channel** – enter a value from 3 to 15. The value determines the quantity of mass measurements carried out on for each tested tip.
- **It is Batcher** – mark this field if a pipette functions as a batcher.
- Changing this parameter causes modification of the report header name.



After entering basic data on a pipette go to table “**Tested volume**” and determine quantity and parameters of the volume to be tested. The number of entered data refers to a type of tested pipette – see below table.

No.	Type	Number of volumes
1	Adjustable 1-channel	2-3
2	Adjustable 8- channels	2-3
3	Adjustable 12- channels	2-3
4	Fixed volume	1

Next, specify “**Permissible accuracy error**” and “**Permissible repeatability error**” for each volume to be tested.

Changes are effective on pressing “**Save**” button.



#### 4.6. Temperature – humidity – pressure recorder (THB module)

The software cooperate with an ambient conditions module by RADWAG. It is a device intended for measuring data on temperature, humidity and barometric pressure at a workstation.

Go to tab „**Device data**” and set the manufacturer, device name and serial no. as indicated on device’s data plate.

The screenshot shows the 'Konfiguracja parametrów Termo-Higro-Barometru' window with the 'Dane urządzenia' tab selected. The window contains the following fields:

- Włącz obsługę urządzenia
- Producent: Radwag (dropdown menu)
- Nazwa urządzenia: Thermo-Higro-Barometer
- Nr seryjny: SN 000000
- Zapisać (button)

Use tab „**Sensors**” to set enabled/disabled sensors and a button for refreshing an indication of each.

Separately set the sensors which read data on ambient conditions:

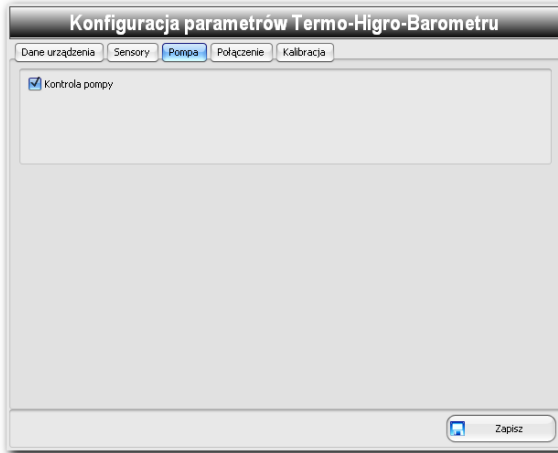
- atmospheric pressure,
- humidity,
- air temperature,
- water temperature.

The screenshot shows the 'Konfiguracja parametrów Termo-Higro-Barometru' window with the 'Sensory' tab selected. The window contains the following fields:

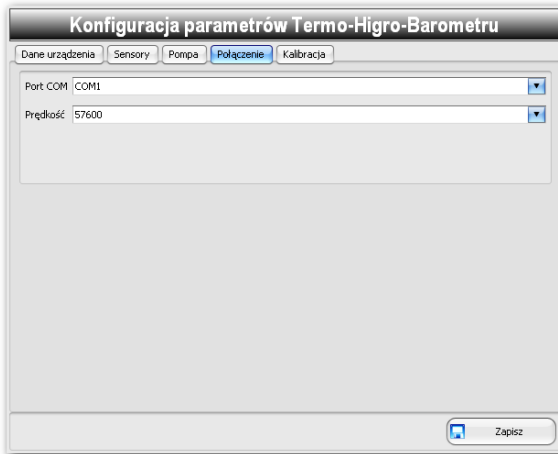
Nazwa	Poprawka	Rozdzielczość	Niepewność
<input checked="" type="checkbox"/> Ciśnienie [hPa]	0	0	0
<input checked="" type="checkbox"/> Wilgotność [%]	0	0	0
<input checked="" type="checkbox"/> Temperatura powietrza [°C]	0	0	0
<input checked="" type="checkbox"/> Temperatura wody [°C]	0	0	0

Gończy klawisz (odświeżanie wskazań) FS (dropdown menu)

Use tab “**Pump**” to set operation criteria of the pump and accessibility of “**Water pump**” tab visible in the main window of the software.



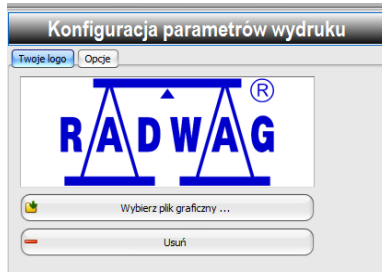
Use tab “**Connection**” to set RS 232 port to which the THB module is connected, and baud rate value – set it by default to 57600.



Tab “**Calibration**” enables calibrating the **THB module** and it is accessible only for an authorized personnel (RADWAG service) on entering an appropriate code.

## 4.6.1. Printouts

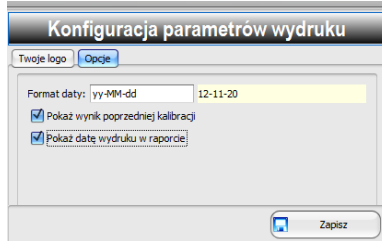
Option **“Your Logo”** enables setting a company logo to be printed in generated reports.



Pressing **“Select image file”** button enables selecting a graphic image that will be visible in the upper left corner of each printed report.

Button **“Delete”** deletes the present logo and substitutes it with RADWAG logo.

Tab **“Options”** enables a user to set date format and select data to be included in a report.



## 5. MENU VISUALIZATION

Access to menu “**Visualization**” is enabled by entering a menu option:  
**Software →Visualization:**



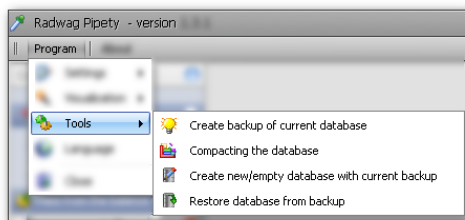
**The menu comprises two options:**

- Frames – changes frame format of software windows
- Skin – enables selecting graphic style of software windows, in accordance with user preferences.

New settings are saved automatically.

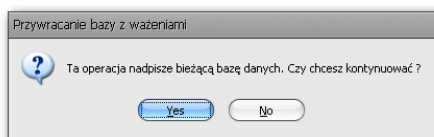
## 6. MENU TOOLS

Access to menu “**Tools**” ” is enabled by entering a menu option:  
**Software → Tools:**



**The menu contains four functions:**

- **Backup the current database** – creating a backup copy of the current database including test records of pipettes,
- **Optimize database** – compacting the content of the database including test records of pipettes
- **Use new/empty database ...** – removes all records of tested pipettes with prior creating backup copy of the database
- **Restoring database** – enables restoring the database from a backup and using it. This process is preceded by a message box:

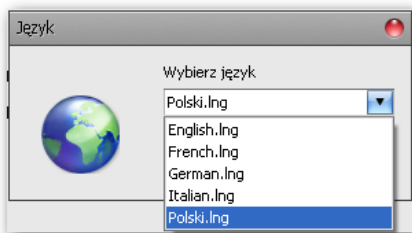


### **Caution:**

*Before accepting the message box make sure, that the enabled database is empty. The records comprised in the database will be irreversibly lost. Before accepting the message box it is recommended to use function: “**Backup the current database**” or “**Use new/empty database...**”.*

## 7. MENU LANGUAGE

Menu “**Language**” enables selecting the language version of the software interface. After selecting an interface language version press “**Save**” button and restart the software.



List of available language versions:

- English
- French
- German
- Italian
- Polish
- Russian

## 8. NEW CALIBRATION

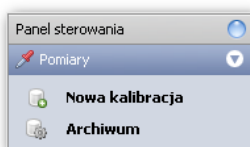
This is the basic function of the software PIPETTES, and it enables carrying out a calibration process of a pipette.

A process initiated on a connected balance has to be carried out till its end. It is not possible to enter changes during process progress (i.e.: changing a balance or a pipette used for the testing procedure).

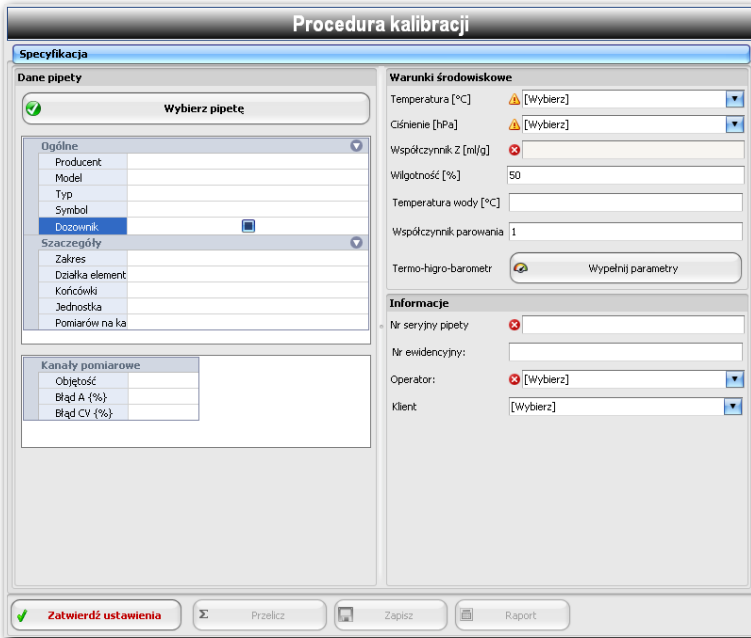


After selecting a balance, the system is ready to start the testing / calibration procedure.

Access to the function is enabled by pressing menu “**New Calibration**” in the Control Panel:



Which displays a window with a tab on “**Specification**”:



**Where Fields:**

**Pipette’s serial no. \***

Unique number of a pipette assigned by its manufacturer

**Registration no.**

Internal no. of a pipette assigned by an organization

**Operator \***

Data on operator carrying out the calibration process

**Client**

A client for which the procedure is carried out

**Temperature [°C] \***

Ambient temperature

**Pressure [hPa] \***

Atmospheric pressure

**Z coefficient [ml/g]**

Z coefficient is calculated automatically (table with coefficient values can be found further in this document)

**Humidity [%]**

Ambient humidity – default value: 50%

**Temp. of water [°C]**

Water temperate in the ambient conditions

**Evaporation factor [K]**

Default value 1

## Fill in parameters

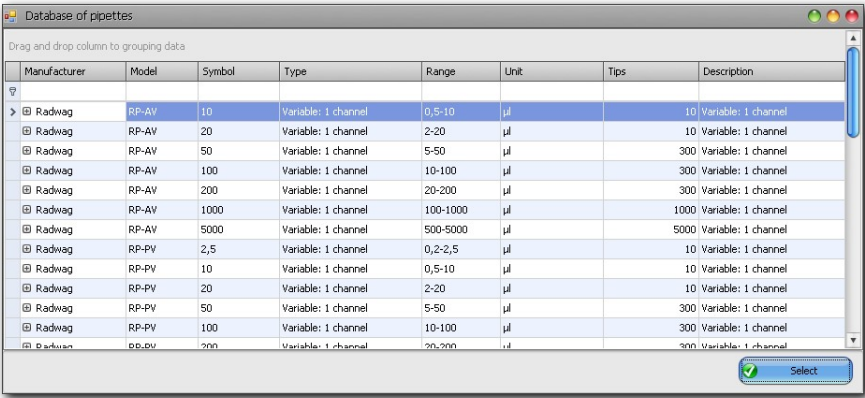
A button for automatic filling in data on ambient conditions acquired from the connected THB module (ambient conditions module).

\*) – fields marked with asterisk must be filled in

### 8.1. Specification

Before starting calibration process the following fields have to be filled in:

1. Press  button to select a pipette that has already been defined in the database of pipettes:



Database of pipettes

Drag and drop column to grouping data

Manufacturer	Model	Symbol	Type	Range	Unit	Tips	Description
Radwag	RP-AV	10	Variable: 1 channel	0,5-10	µl	10	Variable: 1 channel
Radwag	RP-AV	20	Variable: 1 channel	2-20	µl	10	Variable: 1 channel
Radwag	RP-AV	50	Variable: 1 channel	5-50	µl	300	Variable: 1 channel
Radwag	RP-AV	100	Variable: 1 channel	10-100	µl	300	Variable: 1 channel
Radwag	RP-AV	200	Variable: 1 channel	20-200	µl	300	Variable: 1 channel
Radwag	RP-AV	1000	Variable: 1 channel	100-1000	µl	1000	Variable: 1 channel
Radwag	RP-AV	5000	Variable: 1 channel	500-5000	µl	5000	Variable: 1 channel
Radwag	RP-PV	2,5	Variable: 1 channel	0,2-2,5	µl	10	Variable: 1 channel
Radwag	RP-PV	10	Variable: 1 channel	0,5-10	µl	10	Variable: 1 channel
Radwag	RP-PV	20	Variable: 1 channel	2-20	µl	10	Variable: 1 channel
Radwag	RP-PV	50	Variable: 1 channel	5-50	µl	300	Variable: 1 channel
Radwag	RP-PV	100	Variable: 1 channel	10-100	µl	300	Variable: 1 channel
Radwag	RP-PV	200	Variable: 1 channel	20-200	µl	300	Variable: 1 channel

Select

Highlight (select) a pipette from the database and press “**Select**” button.

When searching for a pipette the software enables grouping option aiding the searching process. For instance, the pipettes can be grouped by their “**Type**” – drag and drop header “**Model**” to a field described as “**Drag and drop here a column to group**”. Drag a column to group records by a needed criterion:



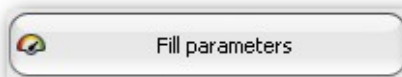
Database of pipettes

Model ▲

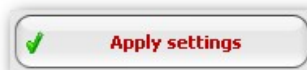
Manufacturer	Symbol	Type	Range	Unit	Tips	Description
Model: RP-AF						
Model: RP-AV						
Radwag	10	Variable: 1 channel	0,5-10	µl	10	Variable: 1 channel
Radwag	20	Variable: 1 channel	2-20	µl	10	Variable: 1 channel
Radwag	50	Variable: 1 channel	5-50	µl	300	Variable: 1 channel
Radwag	100	Variable: 1 channel	10-100	µl	300	Variable: 1 channel
Radwag	200	Variable: 1 channel	20-200	µl	300	Variable: 1 channel
Radwag	1000	Variable: 1 channel	100-1000	µl	1000	Variable: 1 channel
Radwag	5000	Variable: 1 channel	500-5000	µl	5000	Variable: 1 channel
Model: RP-PF						
Model: RP-PV						

Select

- Fill in all necessary data marked by warning signs. If the software cooperates with the temperature-humidity-pressure recorder simply press **“Fill in parameters...”** to acquire data from the THB module to the corresponding fields of the software. The reading from the THB module are easily updated by pressing F5 button or another ‘hot key’ configured in the software options.



- Make sure that all data are correct. In order to go to next step: **„CALIBRATION – weighing”**, press:



At this moment the software automatically assigns a unique number to the created document, e.g.:

**Calibration: 09-03-13/00001**

## 8.2. Calibration – weighing

After accepting the settings of “**Specification**” tab, the software automatically displays another two tabs: “**Weighing**” and “**Results/report**”:

Calibration: 09-03-13/00001

Specification    **Weighing**    Results/report

**Select volume to checking**

Volume research [µl]	Weight [mg]	Acceptable error A [%]	Acceptable error CV [%]
1	0,9980	2,5	1,5
10	9,9800	1	0,8

**Weighing on selected volume**

Volume [µl]	Canal No.	Measures No (on canal)	Weight measured [mg]	Volume count [µl]
1 µl	1	1	0	0,0000
1 µl	1	2	0	0,0000
1 µl	1	3	0	0,0000
1 µl	1	4	0	0,0000
1 µl	1	5	0	0,0000
1 µl	1	6	0	0,0000
1 µl	1	7	0	0,0000
1 µl	1	8	0	0,0000
1 µl	1	9	0	0,0000
1 µl	1	10	0	0,0000

Σ Recalculate    Save    Report

Calibration

The displayed window contains two tables:

- “**Select volume to checking**” – the table contains quantity and parameters on volume to be tested,
- “**Weighing records of tested volume**” – this tab contains data on measurements carried out on all channels of a selected volume.

The calibration process is initiated by selecting the volume to be tested. By default the software selects the first value on the table.

### 8.2.1. Entering mass value

In table “**Weighing records of tested volume**” highlight the item for which the mass value should be entered. The values are entered in two ways:

1. Manually, after unlocking this option in the balance settings,

2. Using a connection with the balance – see chapter “**Communication protocol**”, points: „**Request mass reading**” and “**Hot Key**”.

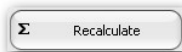
In case of manual entering of the acquired mass value the user enters data into column “**Weight measured**” and manually goes to subsequent weighing records for next tested volumes.

In case of using **communication with a balance**, the value of mass reading is entered automatically into the highlighted record of the table „**Weighing record for tested volume**”.

After filing in a weighing record the software automatically goes to another weighing record, and the filled in record was the last one for the tested volume, then the software selects another volume to be tested and the first record assigned to this volume. This process is repeated until entering data for the last weighing record of the last tested volume. Then the software displays a message box on completing the process of entering the measuring data.



After completing calibration process or within its progress there is access to a button intended for calculating current status of mass value entered to the database:



### 8.2.2. Results/report

Before enabling tab “**Results/report**” it is **obligatory** to press “**Recalculate**” button. The window with results is divided into two sections:

1. **Intermediate results** – results for each tested channel,
2. **Summary** – contains a balance (summary) for all acquired measuring records in a form of a single parameter: Status = **ACCEPTED** or **REJECTED (discarded)** .

**Calibration: 09-03-13/00001**

Specification		Weighting	Results/report
<b>Tested item</b>			
Volume	1 µl	10 µl	
Canal	1	1	
<b>Countings</b>			
Average volume	1,0000	10,0000	
Precision error A [%]	0,00	0,00	
Precision error A	0,0000	0,0000	
Repeating error CV [%]	0,00	0,00	
Repeating error CV	0,0000	0,0000	
<b>Intermediate results</b>			
Range A	✓ OK	✓ OK	
Range CV	✓ OK	✓ OK	

**Summary**

Calibration result		Next calibration date
Status	✓ ACCEPTED	2009-04-13
<b>Information</b>		Calibration date: 2009-03-13 13:05:35
Document No.	09-03-13/00001	Remarks
Pipettes serial no.	SN123456	
Norm	ISO 8655	
Performer	Administrator	
Calibration date	2009-03-13	

Use field **“Next calibration date”** to enter the date of the subsequent test of a pipette. This date is used for filtering scheduled calibration processes. By default the software enters one month period for the subsequent calibration of a pipette.

Field **“Remarks”** is intended to enter user comments, which are particularly useful if a calibration result is rejected.

The below example demonstrates a instance of a rejected calibration due to exceeding the range of permissible value of repeatability error **CV** for volume 20µl in channel 1.

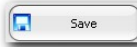
Tested item		
Volume	1 µl	10 µl
Canal	1	1
<b>Countings</b>		
Average volume	1,0000	10,0561
Precision error A [%]	-0,0004	0,5607
Precision error A	0,0000	0,0561
Repeating error CV [%]	0,0000	1,6266
Repeating error CV	0,0000	0,1636
<b>Intermediate results</b>		
Range A	✓ OK	✓ OK
Range CV	✓ OK	✗ Error

**Summary**

Calibration result		Next calibration date
Status	✗ DISCARD	200
<b>Information</b>		Ca
Document No.	09-03-13/00001	13

## Saving calibration results

In order to save the data on testing process in the database press:



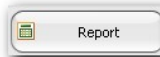
### **Caution:**

*Until the moment of pressing this button all results are not saved. The button can be pressed for multiple times during calibration process in order to make sure, that an unexpected computer malfunction will cause losing some important data.*

Saving data is confirmed by displaying a message box:



After saving the results, a new button in the menu is accessible for previewing a document on calibration report:



## 8.2.3. Printing of calibration report

Below presented window presents a example of a report and a tool bar.

Toolbar description:



Immediate printout on the default printer



Saving and reopening a printout template in the format dedicated for this type of reports



Exporting a report to different file types: PDF, HTML, Excel, CSV, Text, Image

An example of a report from pipette/batcher testing procedure:

Preview

File View Background

100%

**RADWAG**

Printing: 13-03-2009

Firm: Radwag  
 Department: Informatyka  
 Street: Bracka 28  
 Postcode / City: 26-600 Radom  
 Telephone: 3848800  
 E-mail: radwag@radwagpl  
 WWW: www.radwagpl

### PIPETTE CALIBRATION REPORT

Current calibration	Document No.	Operator	Calibration date	CALIBRATION RESULT
	09.03.13/00001	Administrator	2009-03-13 13:05:35	DISCARD

**PIPETTES DATA**

Manufacturer: Radwag  
 Model/symbol: RP-AV / 10  
 Range/scale/tips: 0,5-10 / 0,1 / 10  
 Type: Variable: 1 channel  
 Unit: µl  
 Serial No: SH123456

**ENVIRONMENT CONDITIONS**

Air temperature [°C]: 15  
 Pressure [hPa]: 1000  
 Humidity [%]: 0  
 Z factor [ml/g]: 1,002  
 Evaporation factor K: 1  
 Temp. of water [°C]: 0

**INTERMEDIATE RESULTS**

Volume [µl]	Weight [mg]	Norm. precision error [%]	Norm. repeating error [%]
1,00	0,9980	2,5	1,5

Canal No / measure	Average volume [µl]	Prec. err. [%]	Repeat. err. [%]	Result A	Result CV
Canal 1	1,0000	-0,0004	0,0000	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
1,00	1,00	1,00	1,00	1,00	1,00

Volume [µl]	Weight [mg]	Norm. precision error [%]	Norm. repeating error [%]
10,00	9,9800	1	0,8

Canal No / measure	Average volume [µl]	Prec. err. [%]	Repeat. err. [%]	Result A	Result CV
Canal 1	10,0561	0,5607	1,6266	<input checked="" type="checkbox"/>	<input type="checkbox"/>
9,98	9,98	9,98	9,98	10,50	10,00

**SUMMARY**

<b>Calibration</b>	<b>Scale</b>	<b>Thermo-higro-barometer</b>
Ground of calibration: Ex	Name/model: RADWAG (standard)	Manufacturer: Radwag
Weights per canal: 10	Unit: g	Name/type: Thermo-Higro-Barometer
Weights unit: mg		Serial No: 000000
Next calibration: 2009-04-13 13:05:35		

Remarks: Calibration date: 2009-03-13 13:05:35

Operator: Administrator

-----  
 Operators signature

Page 1 of 1 | Zoom Factor: 100%

## 9. ARCHIVES

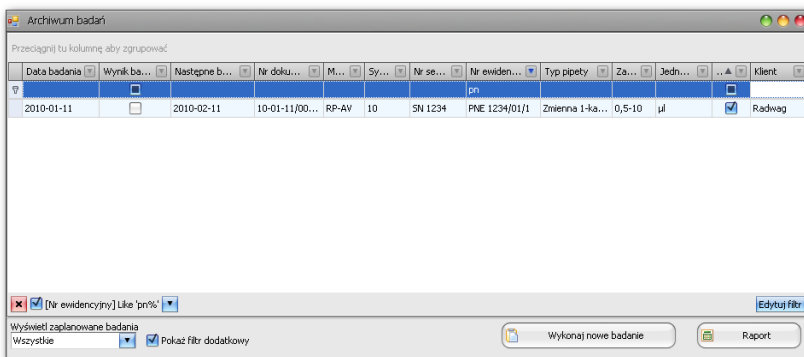
Go to **Control panel** and press “**Archive**” to enter the archives (databases) menu content.



A window displayed on pressing the key has a tabular format presenting a; completed calibration processes.

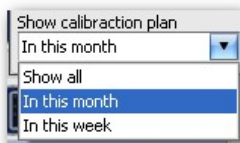
**The following functions are available :**

- Browsing and filtering (searching) of completed calibration processes,
- Printing reports from completed calibration processes,
- Browsing scheduled and pending calibration processes.
- Making new tests on the basis of already existing records.



### 9.1. Scheduled calibrations

On previewing a form, the software automatically displays records with calibration processes scheduled for the current month. An operator can filter calibrations by three criteria available in the drop down menu:

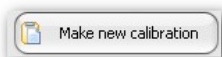


Where:

- Show all** - Displays all scheduled calibrations independently on date
- In this month** - (default) displays calibrations scheduled for the current month
- In this week** - displays calibrations scheduled for the current week

## 9.2. Starting calibration

The level of the form enables starting a new calibration process. In order to start a new calibration select from the table a record containing a specific pipette and press:



This option is particularly useful for scheduled calibrations. Having a scheduled calibration date of a pipette and pressing “**Make new calibration**” button causes automatic filling in of a form with pipette parameters together with its serial number.

### **Caution:**

*This option is available only if no calibration process is in progress.*

## 9.3. Filtering

The table comprising calibrations features a function enabling filtering of the records. The first record in the table (marked with the red rim in the below image) includes filtered fields. By default the filtering fields are empty, i.e. all available records are displayed.

In order to use filtering option mark a field  Show advanced filter and then enter desired values into the selected columns and choose the type of displaying test results.



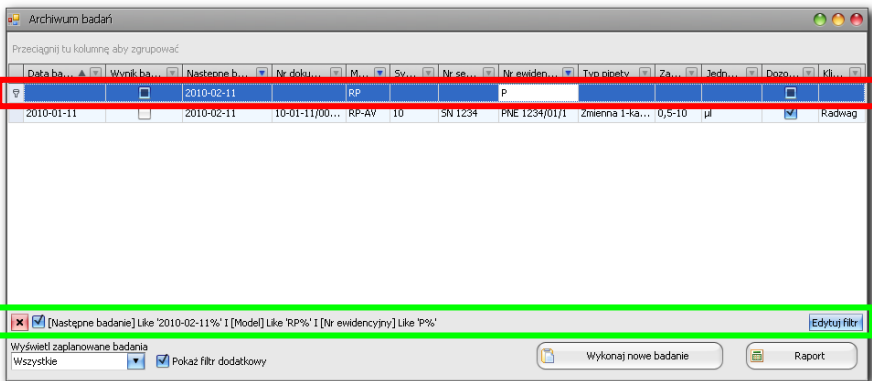
## Displaying test results:

- All tests
- Rejected tests
- Accepted tests

## Displaying type of tested device:

- All
- Pipette
- Batcher

While using filtering a bar, the bottom bar of the table automatically previews currently applied filtering criteria (green rim below).



## This example should be interpreted as below:

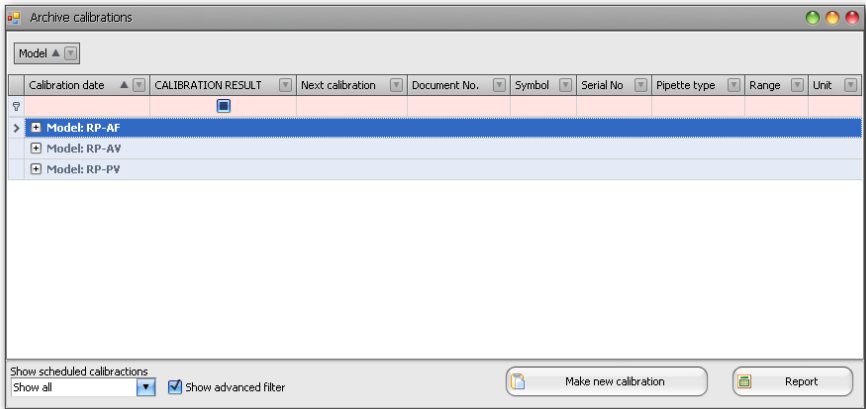
Display records, where the criterion for **“Next calibration”** = **2009-04-13** and **“Type”** name starts with **rp**,

Filtering options:

- Test date
- Test result
- Scheduled test date
- Document no.
- Pipette type
- Pipette symbol
- Serial no. of a pipette
- Registration no. of a pipette
- Range
- Unit


- Batcher
- Client

When searching for a pipette the software enables grouping option aiding the searching process. For instance, the pipettes can be grouped by their “**Type**” – drag and drop header “**Model**” to a field described as “**Drag and drop here a column to group**”.



## 9.4. Printouts

In the table of calibration reports highlight a calibration record to be printed.

Press  **Report** button which previews a report from calibration to be printed.

More information about report option can be found in:  
**Calibration – weighing > Calibration report printout**

## 10. CALCULATION COEFFICIENT

The value of calculation coefficient Z used by the software is determined from an equation:

$$Z = \frac{1}{\rho_b} \cdot \frac{\rho_b - \rho_a}{\rho_w - \rho_a}$$

$\rho_b$  - density of standard liquid (constant 8000 kg/m<sup>3</sup>)

$\rho_a$  - density of air

$\rho_w$  - density of water

**MANUFACTURER**  
OF ELECTRONIC WEIGHING INSTRUMENTS



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