User manual

ITKU-06-10-06-19-EN

PIPETTES

Computer Software

radwag.com

Scan the QR code to view additional scientific material that may be of interest to you.
There you will find more useful information in an accessible format!

CONTENTS

1. INTENDED USE 4
2. INSTALLATION 5
2.1. System Requirements 5
2.2. Windows 10 5
2.3. Installation Procedure 6
3. RUNNING THE SOFTWARE 8
3.1. Running the Program for the First Time 9
3.2. Home Screen 10
3.2.1. Sections Descriptions 10
3.2.2. Operation 13
4. SETTINGS 14
4.1. Settings 15
4.1.1. Address Data 15
4.1.2. Company Logo 15
4.1.3. Options 16
4.1.4. CMC 16
4.1.5. Password Settings 17
4.2. Operators 17
4.3. Customers 18
4.4. Balance 20
4.4.1. Balance Data 22
4.4.2. Communication Frame 23
4.4.3. Connection 25
4.4.4. Corrections Table 26
4.5. Pipettes 26
4.5.1. RADWAG Pipettes 27
4.5.2. Defining Pipettes 29
4.6. Thermo-Hygro-Barometer 31
4.6.1. TECHNICAL SPECIFICATIONS 34
5. VISUALIZATION MENU 34
6. TOOLS MENU 35
7. LANGUAGE MENU 35
8. AUDIT TRAIL 36
9. NEW CALIBRATION 37
9.1. Specification 39
9.2. Calibration - Weighing 40
9.2.1. Entering Mass Value 41
9.2.2. Results/Report 41
9.2.3. Calibration Report Printout 43
10. ARCHIVE 45
10.1. Scheduled Adjustments 45
10.2. Calibration Start 46
10.3. Deleting Selected Calibrations 46
10.4. Filtering 47
10.5. Printing 49
11. REVIEW ARCHIVE 49
12. RECALCULATION COEFFICIENT 50

1. INTENDED USE

PIPETY (PIPETTES) software is intended for determining measurement errors of pipettes volume (volumetric instruments) in accordance with ISO 8655 standard.

Main functions:

- Calculating results basing on the measurements:
  - Pipette average volume (channel)
  - e_s systematic error (A accuracy error)
  - CV random error (P repeatability error)
  - Measurement uncertainty (*u*)
- Calibrating pipettes of:
  - fixed volume – single-channel
  - variable volume – 1, 8 and 12 channels
- Automatic measurement procedures depending on the type of tested pipette,
- Information on pipettes stored in the database:
  - By default, the database includes information on RADWAG-manufactured pipettes
  - Defining pipettes of other manufacturers.
- Storing calibration results in databases (MS Access),
- Creating backup of databases with calibration results,
- Printing pipettes calibration protocols,
- Exporting measurement reports as PDF, MS Word, Excel and other files,
- Determining date of the next calibration,
- Filtering scheduled pipettes calibrations: current week or month,
- Cooperation with balance connected to computer using RS-232 connector:
  - All RADWAG models are based on non-coded communication frame,
  - Possibility to connect balances of other manufacturers,
  - Easy parameters configuration,
  - Hot key for acquiring currently measured mass,
  - Hot key for balance taring.

- Possibility to manually enter measurements values,
- Cooperation with ambient conditions module (thermo-hygro-barometer) connected to RS-232 computer port.

Caution:

1. *Due to the program update, some discrepancies may occur between this user manual's content and the actual state.*
2. *RADWAG does not bear responsibility for the consequences of program operation and any errors resulting from its inappropriate use.*

2. INSTALLATION

2.1. System Requirements

Minimum requirements:

- INTEL or AMD processor ≥ 2000 MHz,
- 500 MB of RAM minimum,
- SVGA video card (resolution 1024x768 or more with 24 bits colour depth),
- 2 RS-232 connectors (balance and thermo-hygro-barometer operation),
- Hard drive ≥ 50 GB,
- Mouse,
- Keyboard,
- Colour monitor with 1024x768 resolution,
- Windows XP/2000/Vista or later versions,
- Microsoft® .NET Framework 4.0,
- Printer (A4 format),

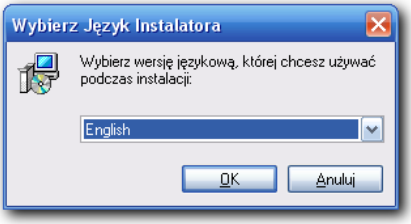
2.2. Windows 10

Caution:
PIPETTES software is not intended to be used properly on an unconfigured version of ***WINDOWS 10.***

2.3. Installation Procedure

In order to install the software, insert the installation CD into the CD-ROM. **PIPETY (PIPETTES)** installer is launched automatically. You can perform the installation manually. To do that, run **<Install_Pipety_X.X.X.exe>** program located in CD main catalogue.

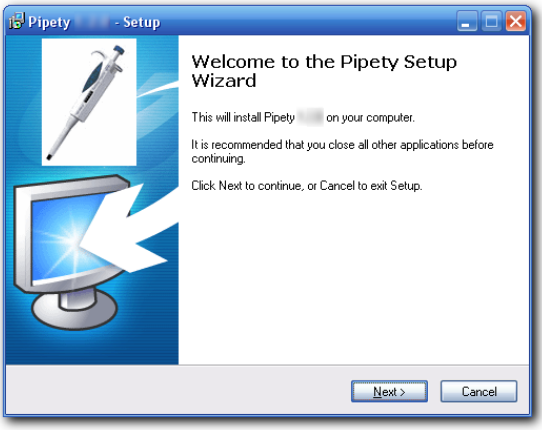
On running, a message box for selecting installation language is displayed:



Press **„OK”** button.

Follow the instructions displayed in next windows.

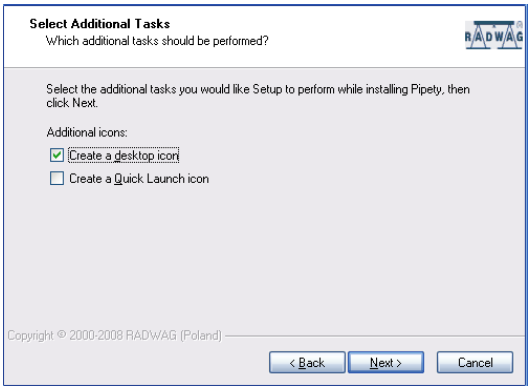
Start-up dialog window:



In order to continue press **„Next”** button.

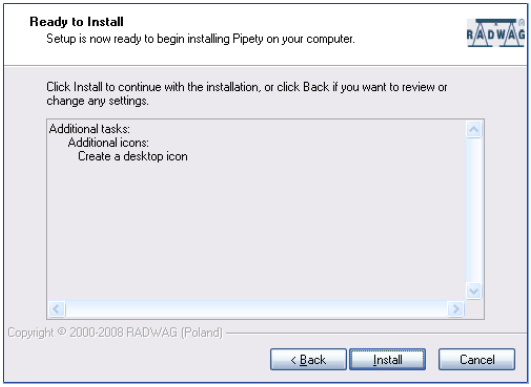
Options: Select check boxes in accordance with your preferences.

Shortcuts Window:



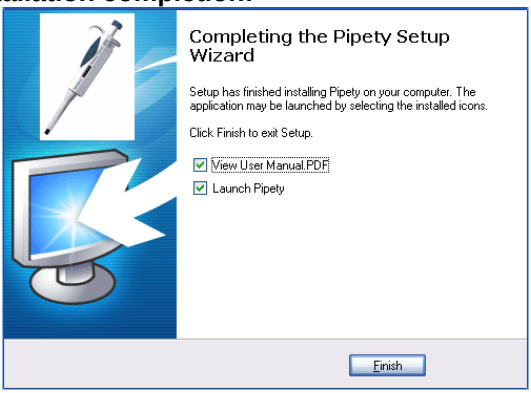
In order to continue press **„Next”** button.

'Ready to Install' window:



Press **„Install”** button to continue.

Window for installation completion:



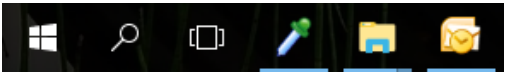
When **„Launch..."** check box is selected, on pressing ***Finish*** button, **PIPETY (PIPETTES)** program runs automatically.

3. RUNNING THE SOFTWARE

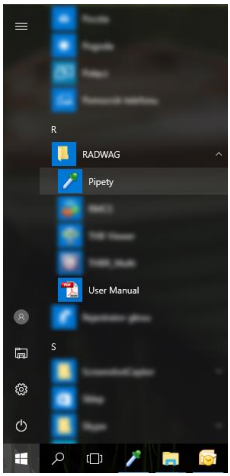
You can run the program using shortcut created on the desktop, if you selected such option during installation.



You can also use a shortcut located on the **„Taskbar"** (option depends on the choice during installation).

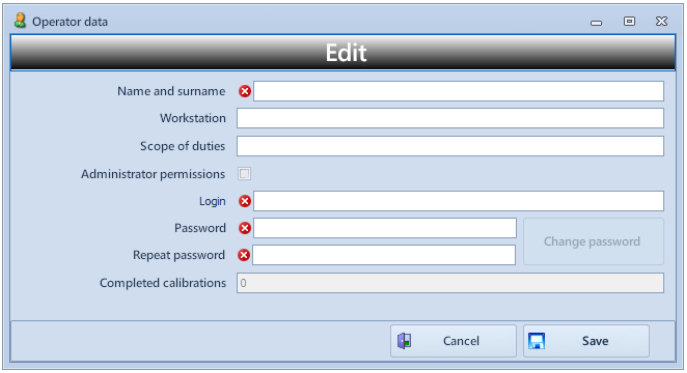


By default, the program can be run using the following menu: **START/Programs/RADWAG/Pipettes**.

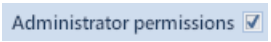


3.1. Running the Program for the First Time

When running the software for the first time, **„User data”** window is displayed. Define the first user of the program.

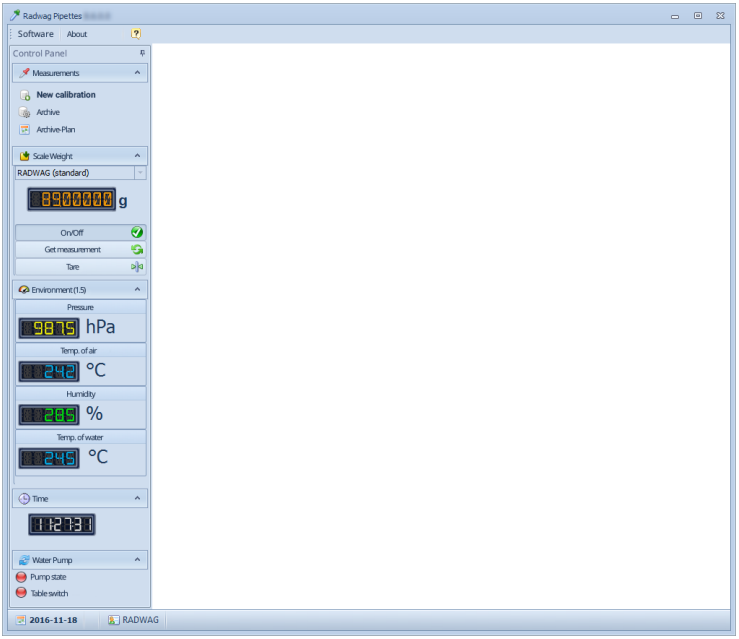


Give the personal data (name, surname, position). The first operator has to have an administrator permissions level that enables modifying program settings, using its extended functions and adding other operators.



3.2. Home Screen

On running the software, its home screen is displayed:



3.2.1. Sections Descriptions

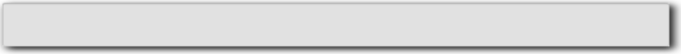
Title bar – displays name and version of the software. The buttons enable minimizing, maximizing and closing the software:



Home screen – navigation menu with access to all software functions:



Viewport – an area in which software windows are displayed:



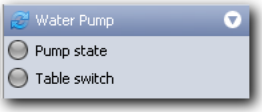
Control panel – includes information on current measurements, ambient conditions, time, new calibration button and measurements archive.



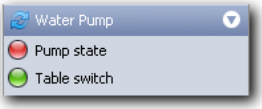
Where:

New calibration	Press to initiate new calibration process,
Archive	Press to read saved measurements,
On/Off	Press to connect/disconnect serial port. The pictogram shows current state of the connection,
Get measurement	Press to read indication of connected balance. Additionally, you can use a hot key (F3 by default). The last measurement value is displayed,
Tare	Press to tare the balance. The indication zeroes. On loading the weighing pan, net mass is displayed,
Environment	Area in which all information measured using Thermo-Hygro-Barometer, connected to COM connector of the computer, are displayed,
Time	Area in which the current time is displayed,
Water Pump	Area in which current state of the pump and the table switch is displayed,
Status bar	Area in which current date is displayed.

Displaying status in ***Water Pump*** bookmark:

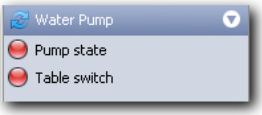


If thermo-hygro-barometer does not communicate with the computer, the warning lights are grey.

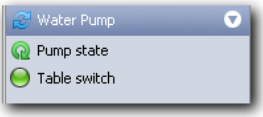




If you exceeded pump operation time set in calibration options, the warning light goes red and the table switch light goes green. The following message is displayed in the status bar: 'Put Pomp Pipette on the spot!'.



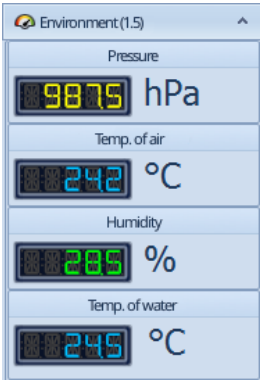
When the pipette is in its place, table switch is not pressed and the water pump is disabled. Both warning lights are red.



When you pick up the pipette, table switch is pressed and the water pump is enabled. Warning light of table switch is green and the needle that indicates pump state moves clockwise.

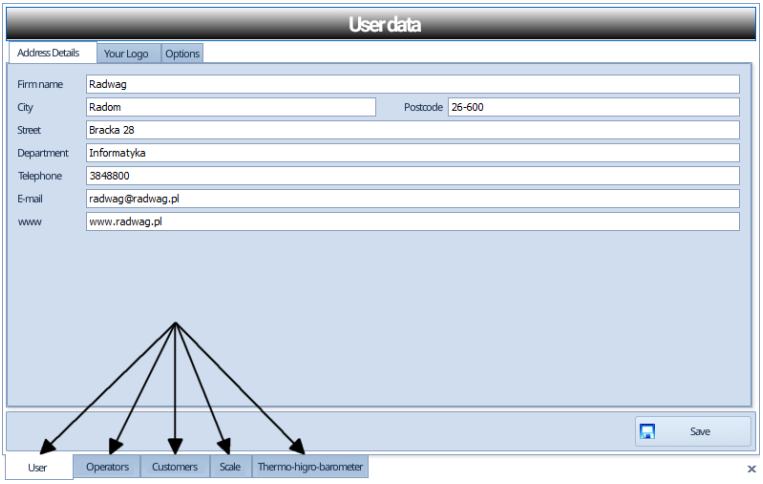
Caution:
*Displaying **Water pump** status is disabled for pipettes calibration workstations based on THBR System 2.0.*

No communication between computer and thermo-hygro-barometer is signalled in ***Environment*** bookmark with „**-**” sign.

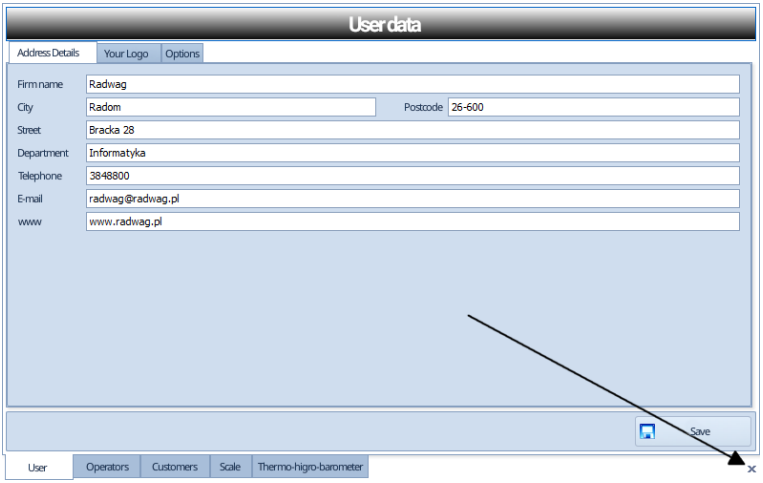


3.2.2. Operation

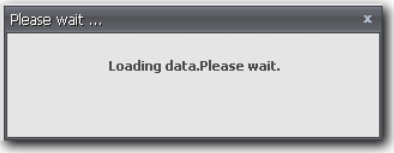
Various child windows can be displayed in the home screen. There are three windows displayed on the example below. Each window is represented by buttons located in the bottom part of the home screen. By pressing the buttons you switch the windows and the title bar is displayed (example: User data).



Press  button to close the window.

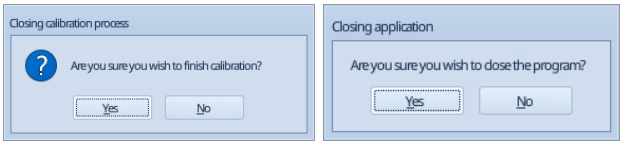


A message asking you to wait is displayed before opening some of the windows. Such window is automatically closed when the data is ready to be displayed.



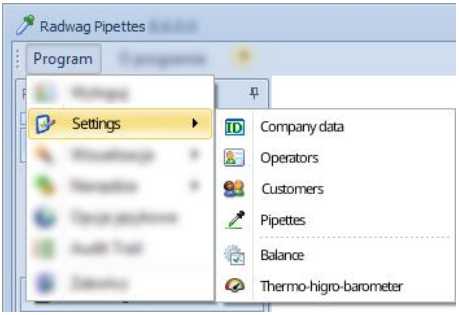
Windows Closing/Shutting Down the Software:

Shutting down the program and closing some windows is preceded by the following message:



4. SETTINGS

To open **„Settings"** menu, press: ***Program → Settings***:



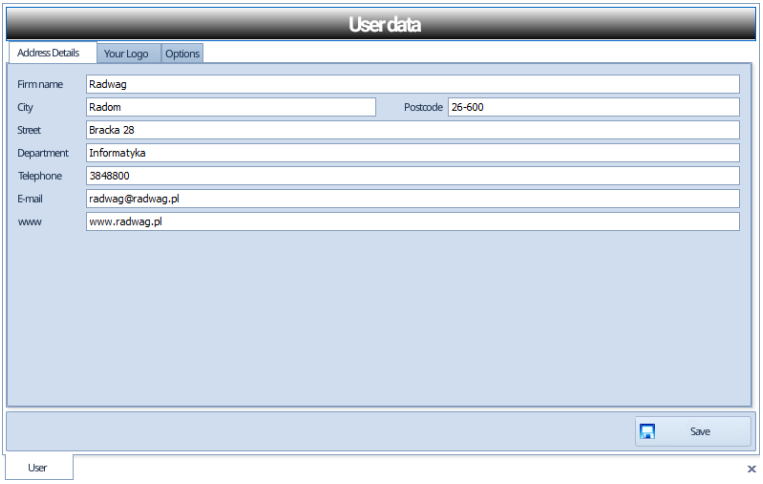
Caution:
*All functions of **„Settings"** menu are available only for users with administrator permissions level.*

4.1. Settings

Configuration of user - company - settings. The settings concern data displayed on reports generated by the program.

4.1.1. Address Data

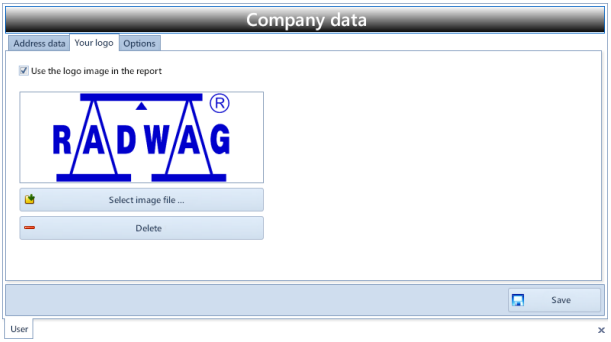
Data from this form is used as a header for pipettes testing report printout.



Fill in all the fields in accordance with the descriptions.
The changes are confirmed and implemented on pressing **„Save”** button.

4.1.2. Company Logo

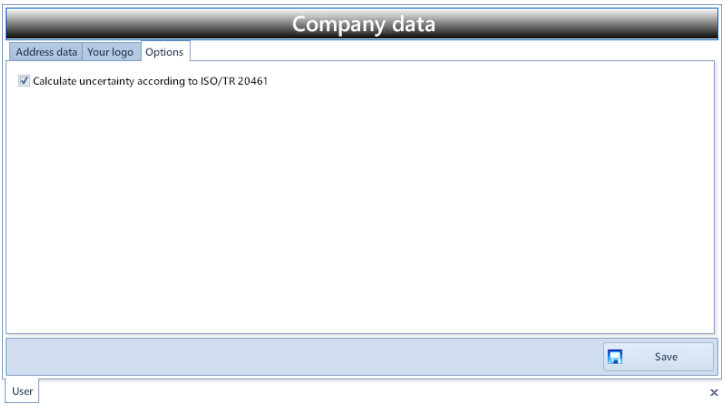
The option enables setting company logo on printed reports.



On pressing **„Select image file”** button, select graphic file that is to be displayed in the left upper corner of each report.

Press **„Delete”** button to set RADWAG logo.

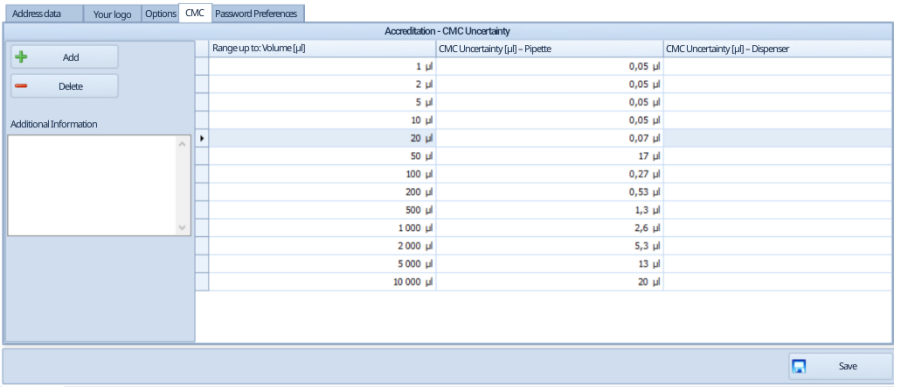
4.1.3. Options



There is one option available. While selected, it runs automatic uncertainty calculation in accordance with the ISO/TR 20461 standard.

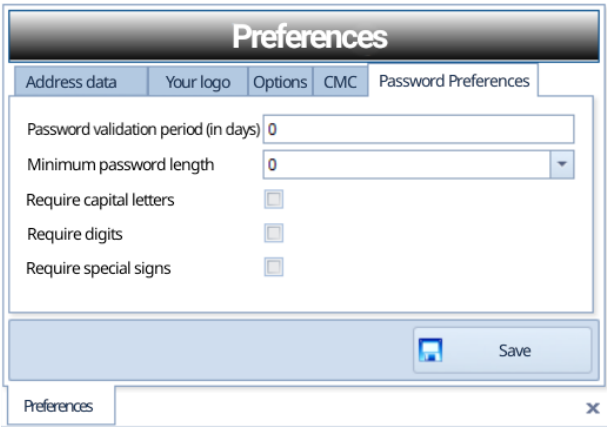
4.1.4. CMC

The CMC uncertainty table enables entering uncertainties for individual volumes to the software in accordance with the accreditation obtained by the laboratory.



4.1.5. Password Settings

Pipettes software enables precise determination of requirements for setting the password.



Password validation period (in days) – after specified time determined in days user password is no longer valid;

Minimum password length – minimum quantity of characters required for a password to be accepted

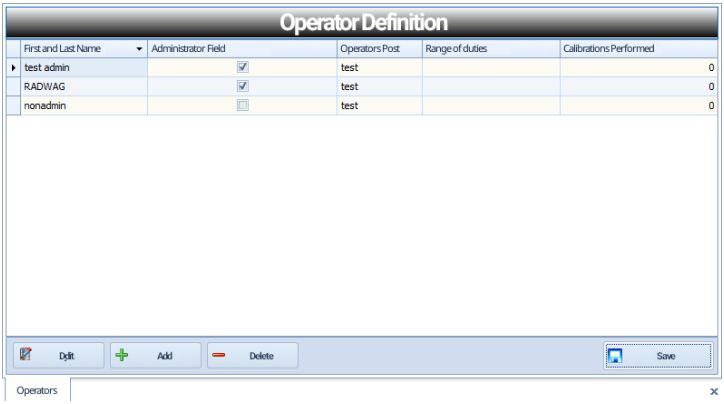
Require capital letters – the password has to contain both uppercase and lowercase letters to be accepted

Require digits – the password has to contain digits to be accepted

Require special signs – the password has to contain special characters (e.g. dash, exclamation mark) to be accepted

4.2. Operators

Operators are people carrying out pipettes calibrations. In **„Operators”** column you can enter unique names (name, surname, aliases, etc.).



Where:



Press to go to the top of the records list

Press to go to the previous record

Press to go to the next record

Press to go to the bottom of the records list

Press to add operator

Press to delete operator



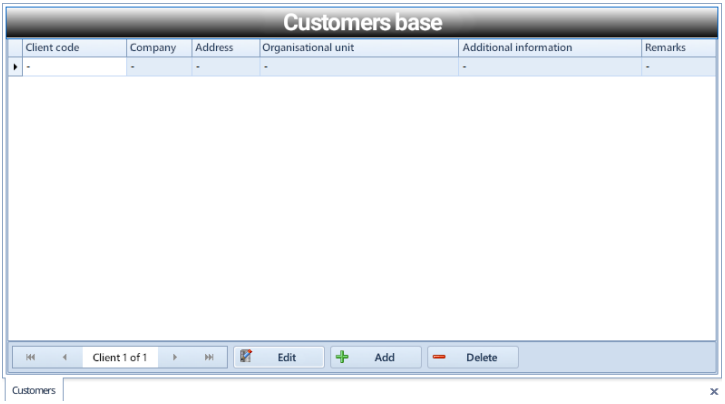
Press to save changes

Fill in **„Operators Post”** and **„Range of duties”** fields. **„Calibrations performed”** field specifies number of calibrations carried out by an operator and is automatically calculated by the program.

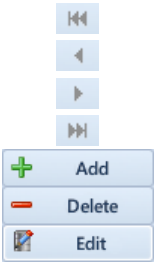
While adding or editing an operator you can grant him administrator permissions level that enables the following actions: adding new operators, changing software settings, connecting with devices, changing language, previewing audit trial, base optimizing and others.

4.3. Customers

In *customers base* window you get access to customers database. The customers can be assigned to carried out testing procedures.
Entered information on a customer is placed on the report.

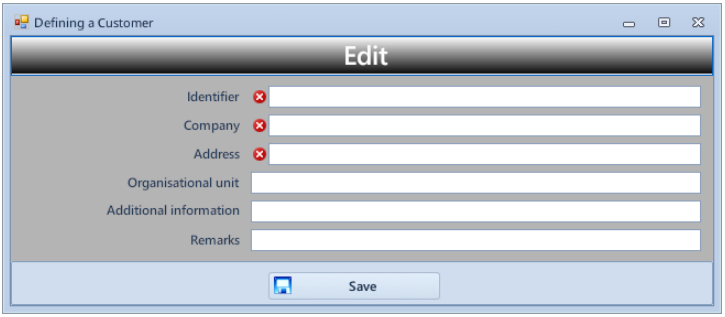


Where:



Press to go to the top of the customers list
Press to go to the previous customer
Press to go to the next customer
Press to go to the bottom of the customers list
Press to add customer
Press to delete customer
Press to change information on customer

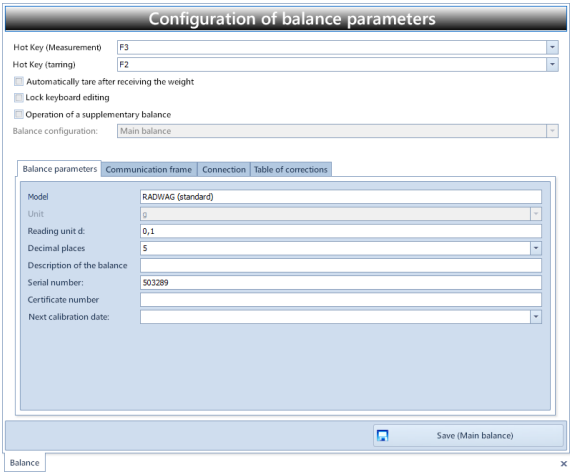
CAUTION!
„**ID, Company, Address”** fields have to be filled in. “**ID”** field is unique.



On filling in all crucial information on customers, press **„Save”** button to confirm the changes.

4.4. Balance

Parameters configuration of balance used for pipettes testing procedure. The range of configuration enables cooperation with balances of other manufacturers. Changes in configuration are to be implemented on pressing **„Save”** button.



Hot Key (Measurement)
To send command for mass readout, press:

1. 

button located in the home screen of the control panel,
2. a hot key.

In order to use option 2, select a hot key. The program enables ascribing function keys from **F1** up to **F12**.

Tare Command
There are two methods of taring the balance:

1. By pressing tare button or by configuring the balance (the balance is tared automatically after the measurement),
2. By sending tare command from a computer.

This configuration refers to **point 4.3.2** of this user manual. Analogously, as for **„End of Frame ident.”**, define the character (characters) that are to be send to the balance as a taring command.

For RADWAG-manufacture balances it is as follows:

Example for RADWAG balances: **Char(84)** it is: **T**

Which in configuration is: **Dec: 084 Text: T**
The following options are send to the balance: **Char(84) + Char(13) + Char(10)**
Where **Char(13) + Char(10)** is a definition of frame end.

Hot key (Taring)
There are two methods of sending a taring command:

1. 

button located in the home screen of the control panel,
2. a hot key.

In order to use option 2, select a hot key. The program enables ascribing function keys from **F1** up to **F12**.



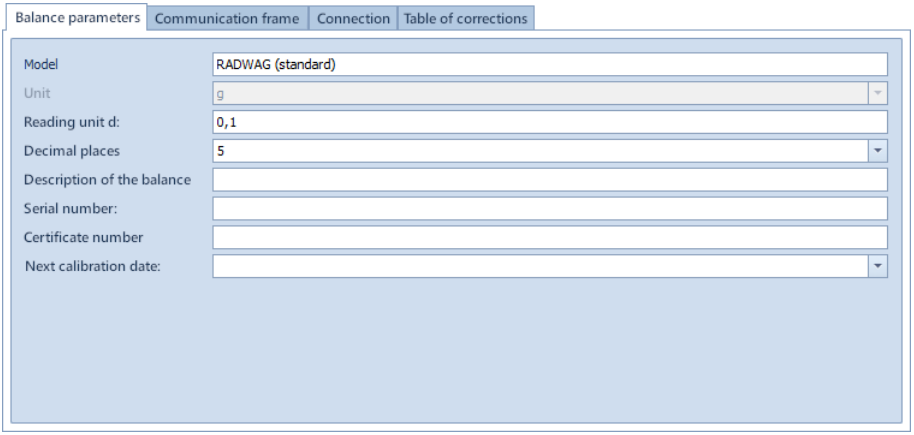
Enable Additional Scales
Field **Enable additional scales** enables using additional balance.

Field **Scales config** enables selecting the balance (main or additional) to which parameters changes of the following bookmarks refer to: **Balance data**, **Communication frame**, **Connection** and **Correction table**.



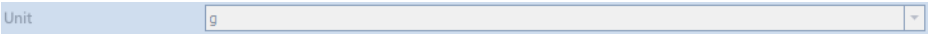
4.4.1. Balance Data

Window with basic information on the balance:



Field **„Model”** (MANUFACTURER-BALANCE NAME) used on printouts of pipettes testing reports.

In **„Unit”** field, a constant measurement unit - gram - is displayed:



***Caution*:**
The software uses mass unit defined in this field to read mass value. It results from the fact that different manufacturers send information on mass unit in different ways. Mass unit during pipettes testing procedure is selected automatically.

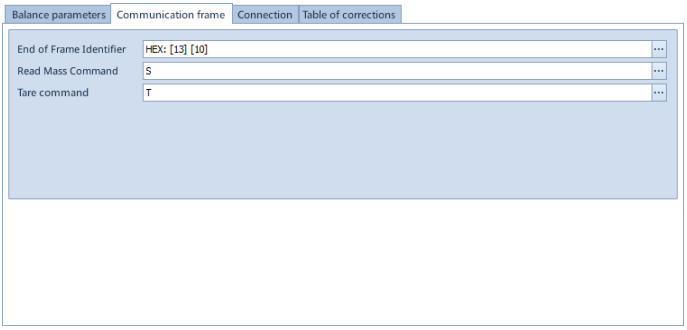
In **„Reading unit”** field enter balance sensitivity - „d” parameter (verification unit). This field serves information purposes exclusively and it is not used on printouts.

In **„Decimal places”** field select number of decimal places for measurements carried out on the balance.

In **„Lock editing manually”** field lock measurements editing option. The option is disabled by default. To deselect an option, enter service password.

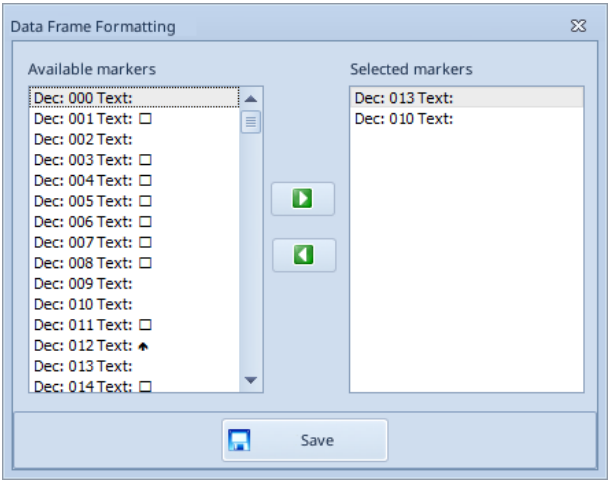
4.4.2. Communication Frame

Defining method of communication with the balance.



End of Frame Identifier

While collecting data, the program has to recognise when the balance finishes sending the response (data packet - frame). Define the value using ... button. Press it to display editor window:



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

<number> - decimal value of a character (byte),
<character> - ANSI string (byte).

Example for RADWAG balances:

Char(13) + Char(10) that is: [CR] Carriage Return + [LF] Line Feed

Which in configuration is: **Dec: 013 Text: <none>**
Dec: 010 Text: <none>

(**Selected markers**) list located on the right contains characters interpreted as the end of the frame. The order of characters is crucial.

In order **to add** another character as the last one on the list, select item from the list on the right and press:  (add) button.

In order **to delete** selected character, select item from the (**Selected markers**) list and press:  (delete) button.

Changes in configuration are implemented on pressing **„Save"** button.

Read Mass Command
There are two methods of sending data to the software:

1. When you manually press the button (e.g. Print, Enter) or when balance configuration enables sending the mass automatically on measurement stabilization,
2. By sending tare command from a computer.

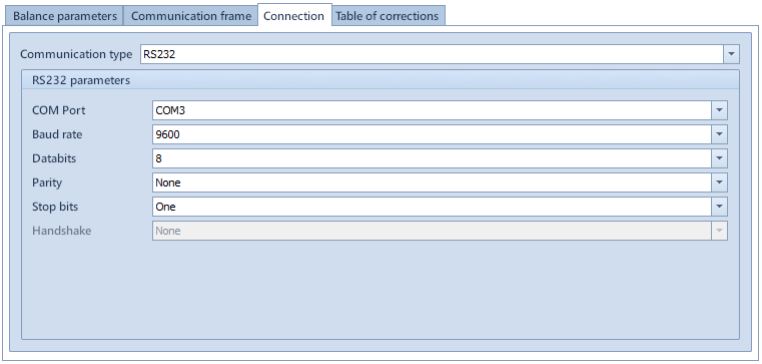
This configuration refers to **point 4.3.2** of this user manual. Analogously as for **„End of Frame ident."**, define the character (characters) that are to be send to the balance as a command for sending currently measured mass.

For RADWAG-manufacture balances it is as follows:

Example for RADWAG balances: **Char(83)** is: **S**
Which in configuration is: **Dec: 083 Text: S**
The following options are send to the balance: **Char(83) + Char(13) + Char(10)**
Where **Char(13) + Char(10)** is a definition of frame end.

4.4.3. Connection

Defining communication parameters for the balance. Connect the balance to COM serial port. Configure the parameters in accordance with the description.



COM Serial Port
List of available serial ports numbers is displayed. Select port used by the balance.

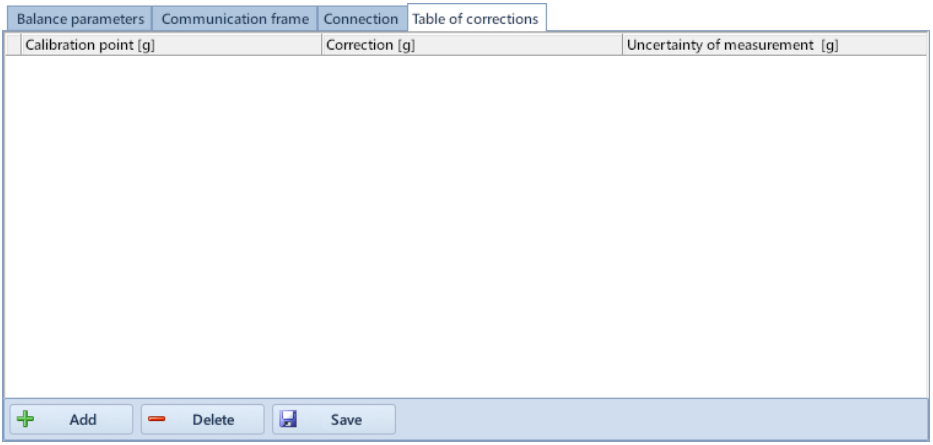
Baud Rate
List of available baud rates is displayed. Selected value has to be the same as the one set in the balance.

Data Bits, Parity, Stop Bits, Handshaking
List of available parameters values is displayed. Selected values have to be the same as the ones set in the balance. Last parameter is disabled.

Changes in configuration are implemented on pressing **„Save”** button.

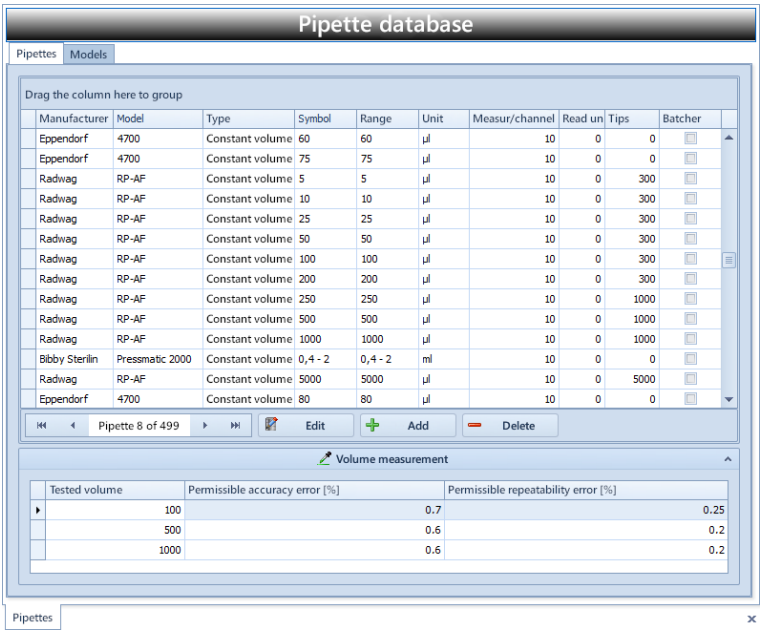
4.4.4. Corrections Table

The table enables defining corrections for measurement results.



4.5. Pipettes

Carrying out calibration requires defining a pipette, determining its limiting errors, volume and quantity of test measurements. Information on pipettes is saved to the database in order to improve testing procedure.



4.5.1. RADWAG Pipettes

There is a predefined base of RADWAG - manufactured pipettes in the software.

- **RP-AV Variable-volume pipettes**

Range	Increment	Tested volume	Accuracy error	Repeatability error	Tips
[µl]	[µl]	[µl]	[%]	[%]	
0.5-10	0.1	1	2.50	1.50	**10**
		10	1.00	0.80	
2-20	0.1	2	2.00	0.80	**10**
		20	1.80	0.60	
5-50	0.5	5	2.00	2.00	**300**
		50	0.60	0.30	
10-100	0.5	10	3.00	1.50	**300**
		100	0.80	0.15	
20-200	1	20	0. 60	0.60	**300**
		200	0.50	0.15	
100-1000	5	100	2.00	0.70	**1000**
		1000	0.60	0.20	
500-5000	50	500	0.70	0.30	**5000**
		5000	0.50	0.15	

- **RP-PV Variable-volume pipettes**

Range	Increment	Tested volume	Accuracy error	Repeatability error	Tips
[µl]	[µl]	[µl]	[%]	[%]	
0.2-2,5	0.01	0.25	2.50	1.50	**10**
		2.5	1.00	0.80	
0.5-10	0.1	1	2.50	1.50	**10**
		10	1.00	0.80	
2-20	0.1	2	2.00	0.80	**10**
		20	1.80	0.60	
5-50	0.5	5	2.00	2.00	**300**
		50	0.60	0.30	
10-100	0.5	10	3.00	1.50	**300**
		100	0.80	0.15	

20-200	1	20	0.60	0.60	**300**
		200	0.50	0.15	
100-1000	5	100	2.00	0.70	**1000**
		1000	0.60	0.20	
500-5000	50	500	0.70	0.30	**5000**
		5000	0.50	0.15	

- **RP-AF Fixed-volume pipettes**

Volume	Accuracy error	Repeatability error	Tips
[µl]	**[%]**	**[%]**	
5	1.30	1.20	300
10	0.80	0.80	300
25	0.50	0.30	300
50	0.50	0.30	300
100	0.50	0.30	300
200	0.40	0.20	300
250	0.40	0.20	1000
500	0.30	0.20	1000
1000	0.30	0.20	1000
2000	0.30	0.20	5000
5000	0.30	0.20	5000

- **RP-PF Fixed-volume pipettes**

Volume	Accuracy error	Repeatability error	Tips
[µl]	**[%]**	**[%]**	
5	**1.30**	1.20	300
10	**0.80**	0.80	300
25	**0.50**	0.30	300
50	**0.50**	0.30	300
100	**0.50**	0.30	300
200	**0.40**	0.20	300
250	**0.40**	0.20	1000
500	**0.30**	0.20	1000
1000	**0.30**	0.20	1000
2000	**0.30**	0.20	5000
5000	**0.30**	0.20	5000

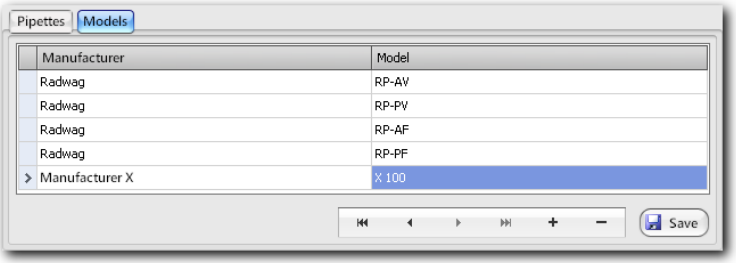
4.5.2. Defining Pipettes

The program enables:

- defining manufacturers of pipettes and its models,
- defining new pipettes of different manufacturers,
- deleting existing pipettes in pipettes base,
- editing existing pipettes in pipettes base.

Manufacturers

Press **„Models”** bookmark to modify information on manufacturers.



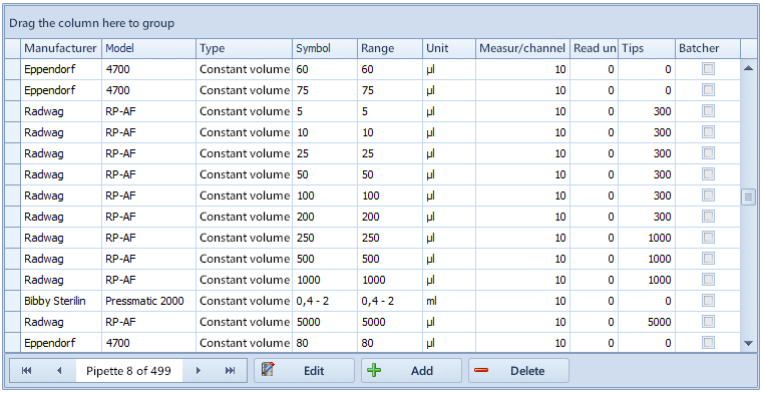
The record consists of two fields (Manufacturer and Model) that are to be edited directly in the table.

Press + − buttons to add or delete a recordPress **„Save”** button to implement changes.

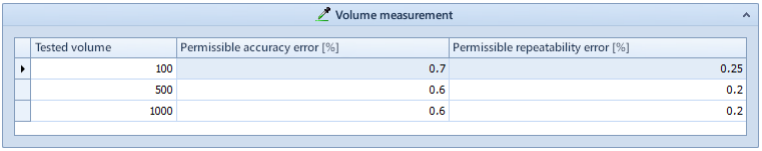
PIPETTES

Press **„Pipettes”** bookmark. Entered records are modified in two tables:

- Basic data:



- Tested volumes data:



On pressing button, window with tested volumes is closed.

Adding Pipettes

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

Deleting Pipettes

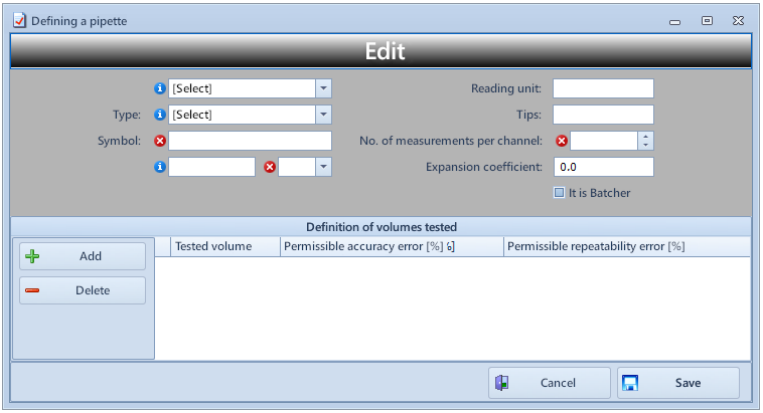
In order to delete a pipette, press **„Delete”** button.

The changes are confirmed and implemented on pressing **„Save”** button.

Editing Pipettes

Select a pipette from the main table and fill in all fields:

- **Model** – select model from the list or create a new one (*Models* bookmark),
- **Type** – select pipette type (definitions are not to be edited),
- **Symbol**, **Range**, **Unit**, **Reading unit**, **Tips**,
- **Measurements per canal** – enter value from 3 to 15. The value determines quantity of carried out mass measurements for each tested tip.
- **This is feeder** – select the field if a pipette is a dispenser.
  Changing the parameter causes changing the name of report header.



On entering basic data about a pipette, go to **„Tested volumes”** and determine the quantity and parameters of the volumes that are to be tested. The quantity of volume records depends on pipette type - see the table below.

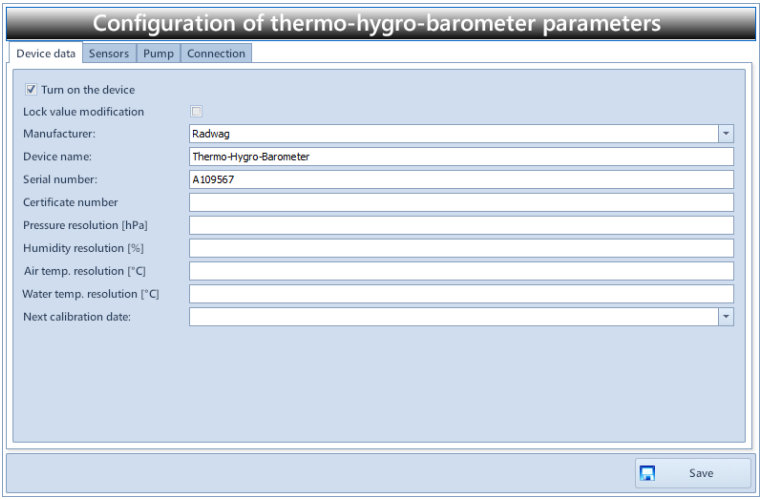
No.	Type	Volumes quantity
1	Variable 1 channel	2-3
2	Variable 8 channels	2-3
3	Variable 12 channels	2-3
4	Fixed volume	1

Enter **„Permissible systematic error”**
and **„Permissible random error”**.

The changes are confirmed and implemented on pressing **„Save”** button.

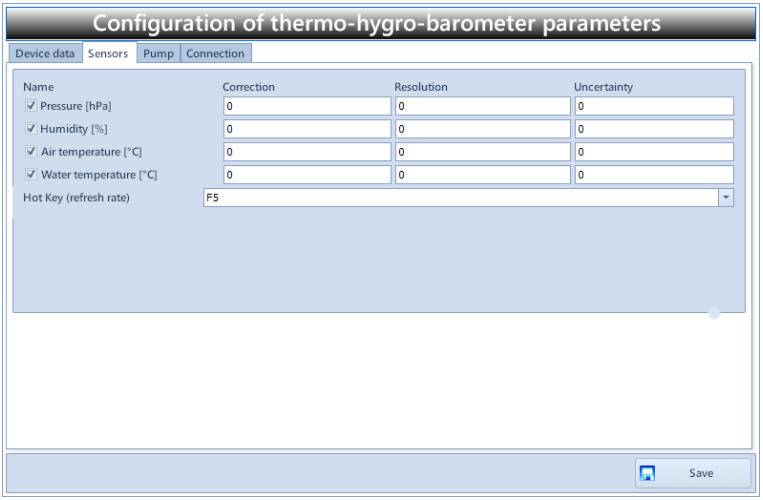
4.6. Thermo-Hygro-Barometer

The software can be integrated with RADWAG ambient conditions module. It is a device intended for temperature, humidity and atmospheric pressure measurement.
In **„Device data”** bookmark set manufacturer, name of a device and its serial number taken from the data plate.

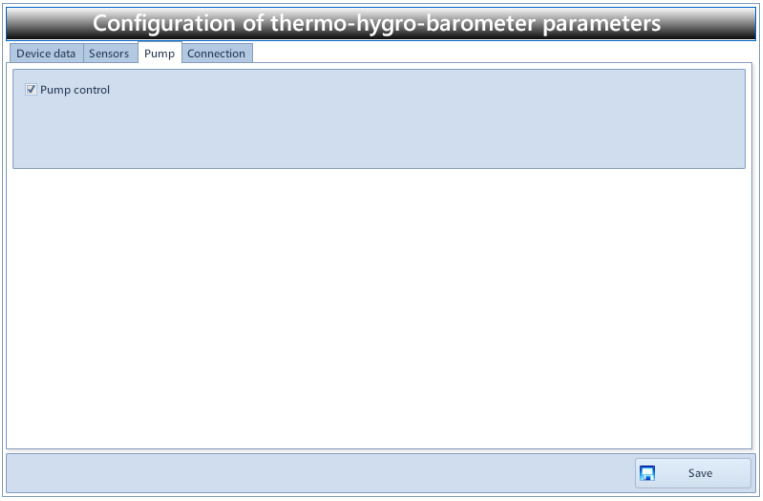


In **„Sensors”** bookmark set active sensors and a button for refreshing indications of each parameter.
Individually set sensors for:

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

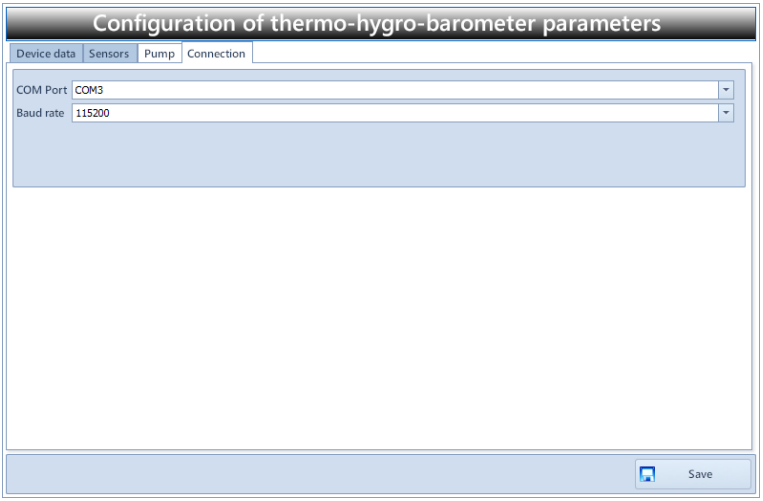


In **„Pump”** bookmark set pump control and accessibility of ***Water pump*** bookmark located in the home screen.



Caution:
Setting pump control does not apply to pipettes calibration workstation based on THBR System 2.0.

In **„Connection”** bookmark set RS232 port, to which the balance is connected, and the baud rate for 57600 value (by default).



„Calibration” bookmark enables calibration of ambient conditions module and is available for RADWAG employee exclusively on entering a password.

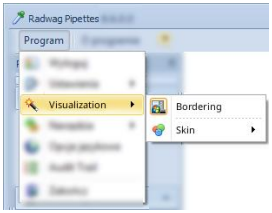
4.6.1. TECHNICAL SPECIFICATIONS

Technical specifications of ambient conditions module:

Measured temperature range	-10 °C ÷ 85 °C
Temperature measurement accuracy	d=0.1 °C error ≤ ±0.4 °C (15 °C ÷ 30 °C)
Measured pressure range	850 ÷ 1050 hPa
Pressure measurement accuracy	D=1hPa error ≤ 5 hPa
Measured humidity range	0 ÷ 100%
Humidity measurement accuracy	d=1% error ≤ 10%
TH-W Water temperature sensor	measurement of liquid temperature (3 m long cable)
TH-AH Air temperature and humidity sensor	measurement of air temperature and humidity (3 m long cable)
Operating temperature	-10 °C ÷ 40 °C
Housing	Plastic
Power supply	230 V AC / 11 V AC, 50 Hz
Communication interfaces	RS232
Dimensions (in mm) without handle	131×68×34
Mass	0.75 kg

5. VISUALIZATION MENU

In order to access **„Visualization”** menu press: ***Program → Visualization***:



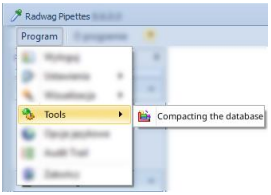
There are two available functions:

- Bordering – changes the style of windows bordering
- Skin – enables selecting graphic style of the windows.

New settings are saved automatically.

6. TOOLS MENU

In order to access **„Tools”** menu press: ***Program → Tools***:



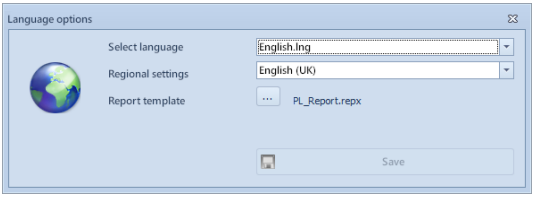
There is one option available:

- **Compacting the database** – compacting database containing pipettes tests,

Caution:
*All functions of **„Tools”** menu are available only for users with administrator permissions level.*

7. LANGUAGE MENU

In **„Language”** menu set the language of the software. On selecting a language, press **„Save”** button and restart the software.

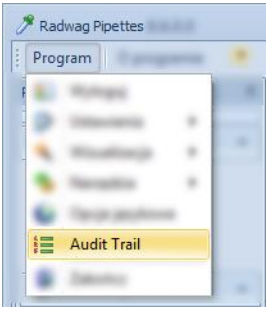


List of languages:

- English
- French
- German
- Italian
- Polish

Caution:
You can change the language only when you have administrator permissions level.

8. AUDIT TRAIL



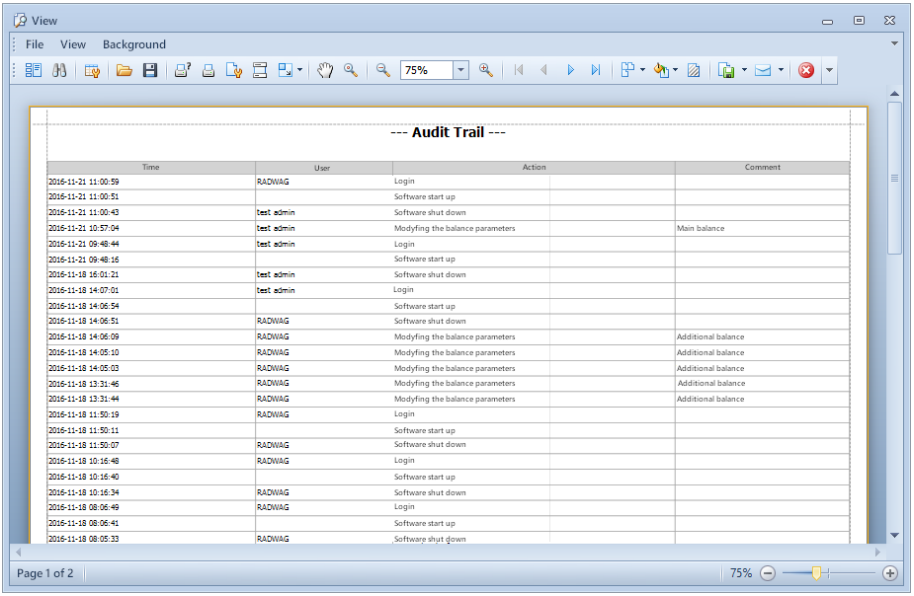
Located in **Program** menu **Audit trail** registers all operations carried out in the software. User with administrator permissions can review and search displayed information.

Audit Trail

Print

Time	User	Action	Comment
2016-11-21 11:00:59	RADWAG	Login	
2016-11-21 11:00:51		Software start up	
2016-11-21 11:00:43	test admin	Software shut down	
2016-11-21 10:57:04	test admin	Modifying the balance parameters	Main balance
2016-11-21 09:48:44	test admin	Login	
2016-11-21 09:48:16		Software start up	
2016-11-18 16:01:21	test admin	Software shut down	
2016-11-18 14:07:01	test admin	Login	
2016-11-18 14:06:54		Software start up	
2016-11-18 14:06:51	RADWAG	Software shut down	
2016-11-18 14:06:09	RADWAG	Modifying the balance parameters	Additional balance
2016-11-18 14:05:10	RADWAG	Modifying the balance parameters	Additional balance
2016-11-18 14:05:03	RADWAG	Modifying the balance parameters	Additional balance
2016-11-18 13:31:46	RADWAG	Modifying the balance parameters	Additional balance
2016-11-18 13:31:44	RADWAG	Modifying the balance parameters	Additional balance
2016-11-18 11:50:19	RADWAG	Login	
2016-11-18 11:50:11		Software start up	
2016-11-18 11:50:07	RADWAG	Software shut down	

Press **Print** Print to preview and print.



Time	User	Action	Comment
2016-11-21 11:00:59	RADWAG	Login	
2016-11-21 11:00:51		Software start up	
2016-11-21 11:00:43	test admin	Software shut down	
2016-11-21 10:57:04	test admin	Modyfing the balance parameters	Main balance
2016-11-21 09:48:44	test admin	Login	
2016-11-21 09:48:16		Software start up	
2016-11-18 16:01:21	test admin	Software shut down	
2016-11-18 14:07:01	test admin	Login	
2016-11-18 14:06:54		Software start up	
2016-11-18 14:06:51	RADWAG	Software shut down	
2016-11-18 14:06:09	RADWAG	Modyfing the balance parameters	Additional balance
2016-11-18 14:05:10	RADWAG	Modyfing the balance parameters	Additional balance
2016-11-18 14:05:03	RADWAG	Modyfing the balance parameters	Additional balance
2016-11-18 13:31:46	RADWAG	Modyfing the balance parameters	Additional balance
2016-11-18 13:31:44	RADWAG	Modyfing the balance parameters	Additional balance
2016-11-18 11:50:19	RADWAG	Login	
2016-11-18 11:50:11		Software start up	
2016-11-18 11:50:07	RADWAG	Software shut down	
2016-11-18 10:16:48	RADWAG	Login	
2016-11-18 10:16:40		Software start up	
2016-11-18 10:16:34	RADWAG	Software shut down	
2016-11-18 08:06:49	RADWAG	Login	
2016-11-18 08:06:41		Software start up	
2016-11-18 08:05:33	RADWAG	Software shut down	

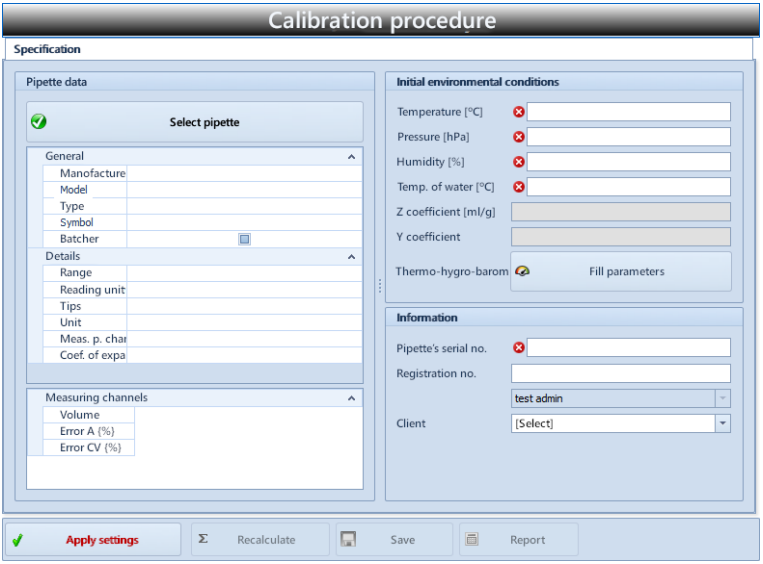
Caution:
The function is available when you have administrator permissions level.

9. NEW CALIBRATION

Testing pipettes calibration is a basic function of the software. Press **„New calibration”** button located in the Control panel to access the function:



Window with **„Specification”** bookmark is displayed:



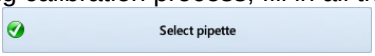
Where:

Pipette serial no.*	Unique serial number of pipette manufacturer,
Identification no.	Identification number of a pipette (within the company)
Operator *	Data of an operator carrying out calibration process,
Client	Customer for whom the calibration is carried out,
Temperature [ºC] *	Ambient temperature,
Pressure [hPa] *	Atmospheric pressure,
Z factor [ml/g]	Z factor is calculated automatically (table with factors is to be found further down this user manual),
Humidity [%]	Ambient humidity, 50% by default,
Temp. of water [ºC]	Temperature of the water,
Evaporation factor [K]	Default value 1.
Fill in parameters	Press to fill the fields with ambient conditions taken from the ambient conditions module.

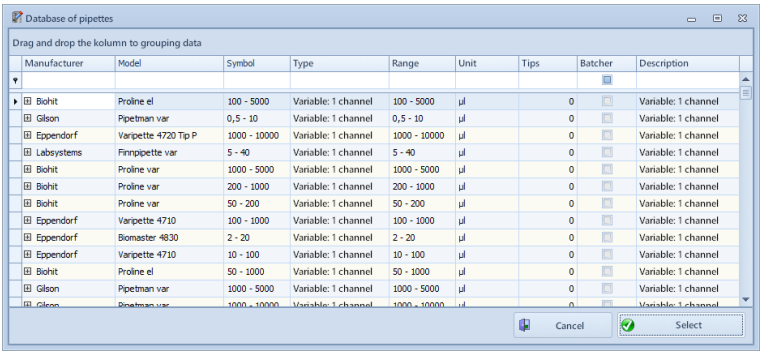
***)** - Obligatory to be filled in

9.1. Specification

Prior starting calibration process, fill in all the required fields:

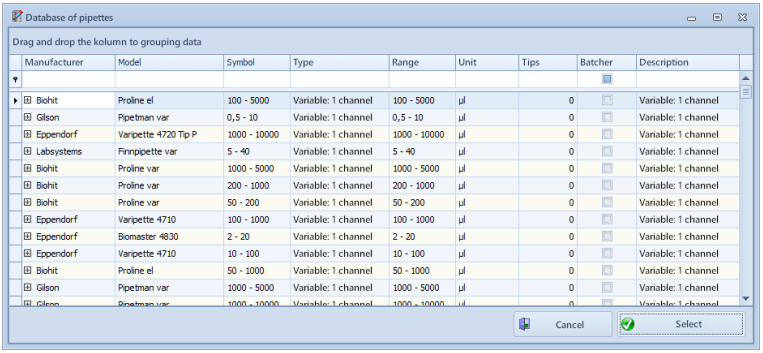
1. Press 

button to select pipette defined in the database:



Select a pipette and press **„Select”** button to confirm.

While searching for a pipette you can use grouping option. You can group the pipettes by Models. To do that, press and drag Model's column header to “Drag and drop column to group data” area:



2. Fill in all necessary data (marked with an asterisk). If the software cooperates with thermo-hygro-barometer, press **„Fill in parameters”** button to load the parameters from the device to the fields in program. Readout update is possible on pressing F5 button or any other button configured in program functions.



3. Make sure the data is correct. In order to go to the next step: **„CALIBRATION - weighing”**, press the following button:

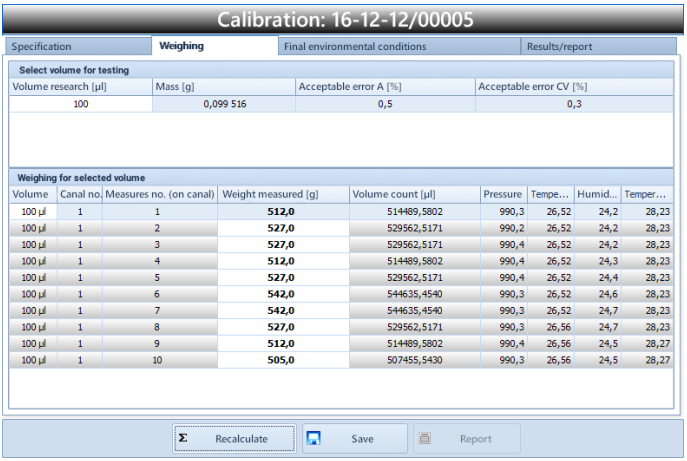


The program automatically gives a unique calibration number, e.g.



9.2. Calibration - Weighing

On confirming the settings in **„Specification”** bookmark the three following bookmarks are displayed: **„Weighings”, „Final ambient conditions”** and **„Results/report”**:



There are two tables in the window:

- **„Select volume for testing”** - the table contains volume quantity and parameters to be tested,
- **„Weighing for selected volume”** - contains measurement data of all channels for selected volume.

Start the calibration process by selecting the volume that is to be tested. By default the program selects the first volume in the table.

9.2.1. Entering Mass Value

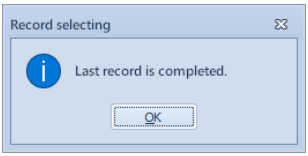
In **„Weighings for selected volume”** table select the record for which mass value is to be entered. There are two methods of entering the values:

1. Manually, on unlocking this option in balance settings,
2. Using connection with the balance - read **„Communication frame”** chapter, sections: **„Weighing request command”** and **„Hot key”**.

In case of **manual entering of the values** of read masses, you enter the data in **„Mass measurement”** column and go to next measurement records for all volumes.

In case of **connection with the balance** the value of read mass is automatically entered into selected weighing record in **„Weighings for selected volume”** table.

On filling in the weighing, the software automatically selects next record. If the record is the last in the tested volume column, the first record of the next volume is ascribed to it. This cycle is repeated until reaching the last weighing in the last tested volume. The following message is displayed:



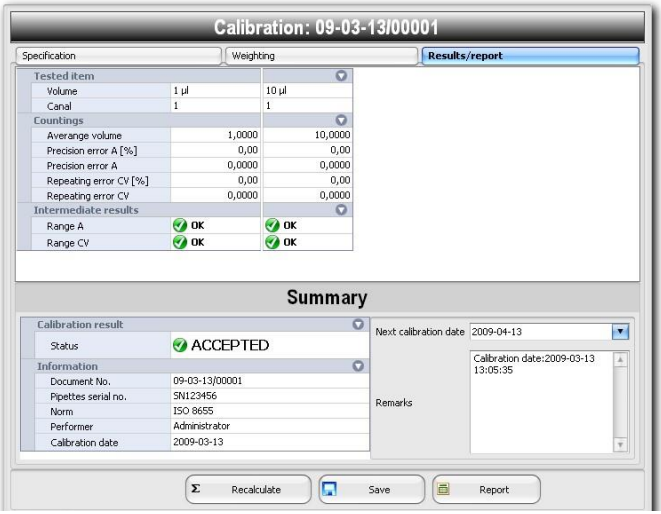
On calibration completion or during the process, the following button for recalculating current state of entered masses values is available:



9.2.2. Results/Report

Prior activation of „**Results/report”** bookmark, it is **obligatory** to press **„Recalculate”** button. The window with results is divided into two sections:

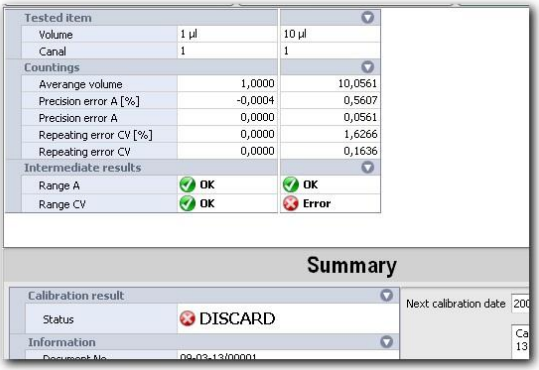
1. **The intermediate results** – presenting records for each tested channel,
2. **Summary** – presenting summary of all measurements as one parameter: Status = **ACCEPTED** or **DISCARD**.



In **„Next calibration date"** you can enter the date of next calibration. This date is used for filtering scheduled calibrations. By default, next calibration is scheduled to be carried out in a month.

„Comments" field contains comments useful when the calibration is rejected.

The example below presents calibration rejected because of exceeding **CV** limiting error (repeatability error) for 20ul volume in channel 1.



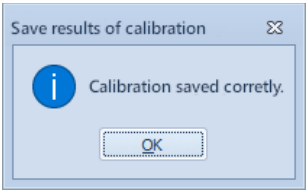
Saving Calibration Results

In order to save the calibration to database press the following button:



Caution:
The results are not saved until you press the button. You can press the button repeatedly to make sure that there would be no data loss caused by any unpredicted computer malfunction.

The following message is displayed on saving the data:



On saving the results, the button for previewing calibration document is displayed:



9.2.3. Calibration Report Printout

The window presented below displays an exemplary report and a toolbar. Toolbar description:



press to activate quick printout on a default printer

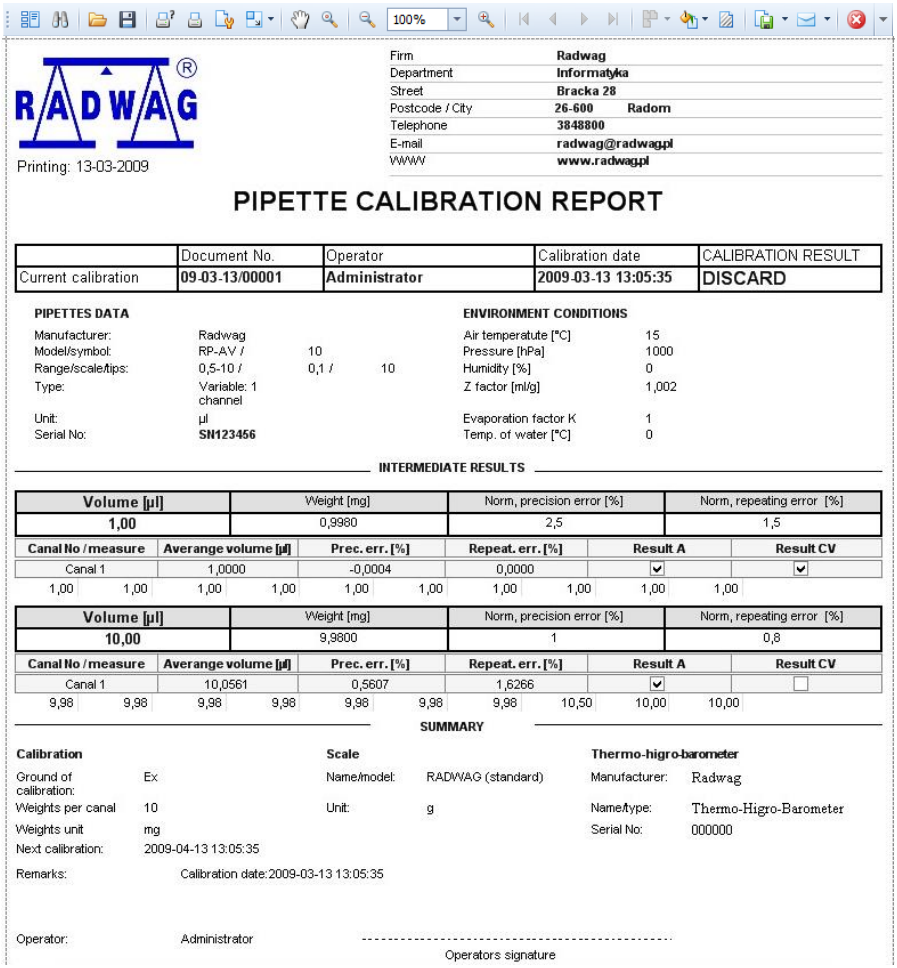


press to save and reopen a printout in a format dedicated for such type of reports



press to export printout to the following document formats: PDF, HTML, Excel, CSV, Text, Image

An example of pipette calibration report:



RADWAG

Printing: 13-03-2009

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

PIPETTE CALIBRATION REPORT

	Document No.	Operator	Calibration date	CALIBRATION RESULT
Current calibration	**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:	**SN123456**		

ENVIRONMENT CONDITIONS

Air temperatute [°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	Averange volume [µl]	Prec. err. [%]	Repeat. err. [%]	Result A	Result CV
Canal 1	1,0000	-0,0004	0,0000	☑	☑

1,00 1,00 1,00 1,00 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	Averange volume [µl]	Prec. err. [%]	Repeat. err. [%]	Result A	Result CV
Canal 1	10,0561	0,5607	1,6266	☑	☐

9,98 9,98 9,98 9,98 9,98 9,98 9,98 10,50 10,00 10,00

SUMMARY

Calibration

Ground of calibration:	Ex
Weights per canal	10
Weights unit	mg
Next calibration:	2009-04-13 13:05:35

Scale

Name/model:	RADWAG (standard)
Unit:	g

Thermo-higro-barometer

Manufacturer:	Radwag
Name/type:	Thermo-Higro-Barometer
Serial No:	000000

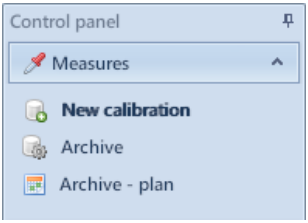
Remarks: Calibration date:2009-03-13 13:05:35

Operator: Administrator

Operators signature

10. ARCHIVE

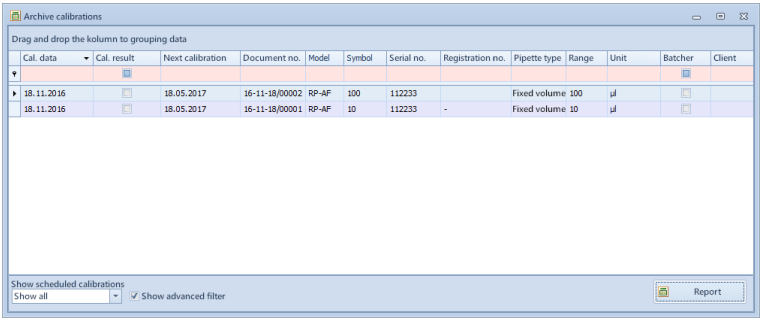
To access this menu press **„Archive”** button located in Control panel:



The table containing all carried out calibration processes is displayed.

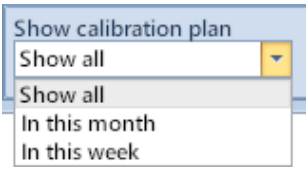
Functions:

- Browsing and filtering (searching) carried out calibrations,
- Printing reports from carried out pipettes calibrations,
- Browsing pipettes to be calibrated,
- Carrying out new calibrations based on already existing ones.



10.1. Scheduled Adjustments

On displaying the form, the calibrations scheduled for current month are displayed. You can filter calibrations in three ways, as it is shown below:

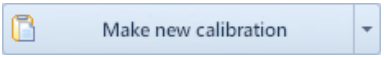


Where:

Show all	-	displaying all calibrations regardless the scheduled date
This month	-	displaying calibrations scheduled for current month (default setting)
This week	-	displaying calibrations scheduled for current week

10.2. Calibration Start

In this menu, you can start new calibration process.
In order to use this function, select a calibration record of specified pipette and press:

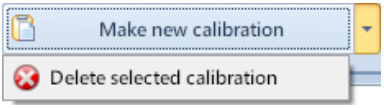


This option is useful for managing scheduled calibrations.
With scheduled date of pipette calibration, on using the above-presented button, a form of new calibration is automatically filled in with parameters of selected pipette including its serial number.

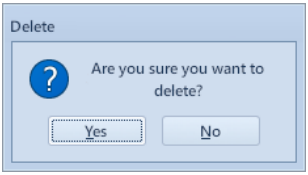
Caution:
The option is available only when there is no calibration carried out in the moment.

10.3. Deleting Selected Calibrations

Displayed calibrations can be deleted from the archive using **„Delete the selected calibration"** option that is to be found in a menu next to **„Make new calibration"**.



On pressing **„Delete the selected calibration"** option, a message box for confirmation is displayed. On confirmation, selected records are deleted.

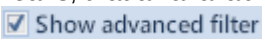


Caution:
The function is available when you are logged in and have administrator permissions level.

Caution:
Deleting calibration from the archive is irreversible.

10.4. Filtering

The table, displaying carried out calibrations, filters the records. First record in a table (in the picture marked red) contains filtered fields. The filtering fields are empty by default. It means, that all available records are displayed.

In order to filter, select 

field. Next, enter some values into the columns (fields) and select type of displayed calibration results.

Displaying calibration results:



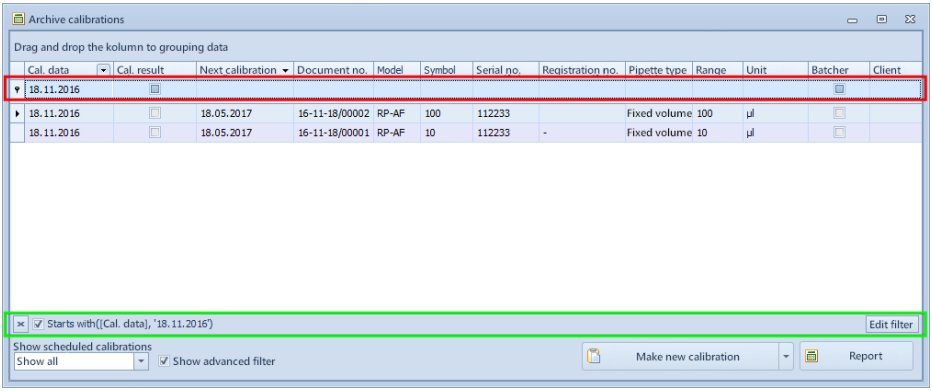
- all calibrations
- rejected calibrations
- accepted calibrations

Displaying type of calibrated device:



- show all
- pipette
- dispenser

Using filtering option, bar with information on currently used filtering parameters is displayed in the bottom part of the table (in the picture marked green).



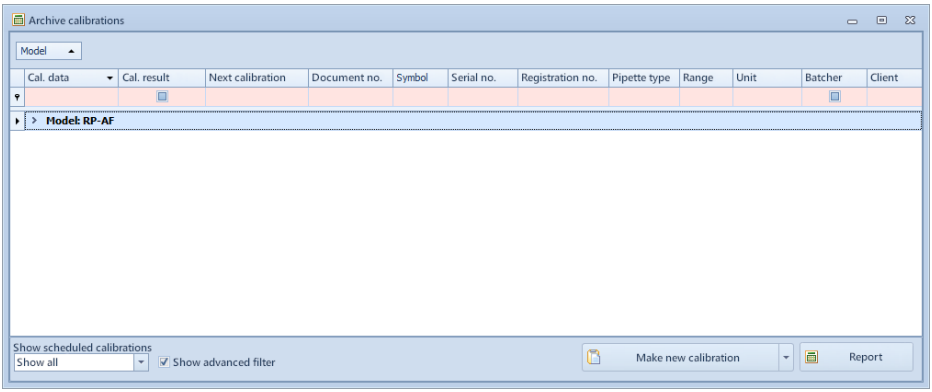
This example is to be interpreted as follows:

Display records, where **„Next calibration”** = **2010-02-11**
and **„Model”** starts with **rp** value,

The following columns are filtered:

- Calibration date
- Calibration result
- Next calibration
- Document No.
- Model
- Symbol
- Pipette serial no.
- Identification no.
- Pipette type
- Range
- Unit
- Dispenser
- Client

You can use grouping function to find certain pipette. In order to group pipettes by **„Model ”**, press and drag **„Model”** column header to the **„Drag and drop column to group data”** field.



10.5. Printing

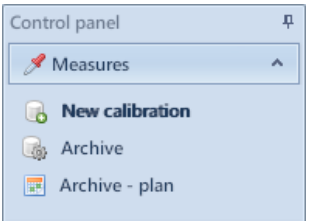
Select calibration record that is to be printed.

Press  button to display calibration printout preview.

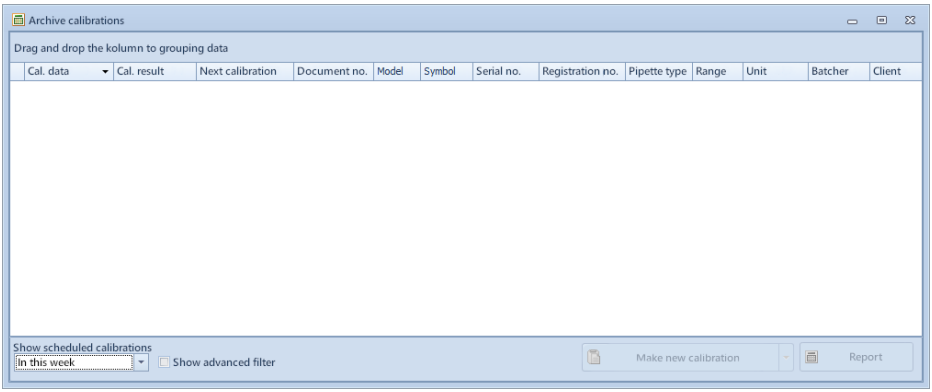
For more information on report options, go to the following chapter:
Calibration– weighing> Calibration report printout.

11. REVIEW ARCHIVE

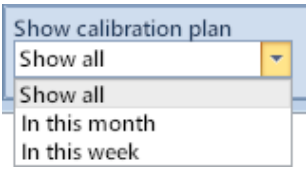
To access this function, press **„Archive-schedule”** button located in the Control panel:



„Review archive” function displays archive window and disables function for adding and deleting records and generating reports.



„Review archive” enables immediate previewing of carried out tasks with the filter set to the current week by default.



12. RECALCULATION COEFFICIENT

Z factor value is calculated using the following formula:

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

ρ_b - liquid standard density (constant 8000 kg/m^3)

ρ_a - air density

ρ_w - water density