

# E2R Checkweigher

PC SOFTWARE

## USER MANUAL

ITKU-76-01-07-16-EN



[www.radwag.com](http://www.radwag.com)



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# 1. GENERAL INFORMATION

## 1.1. Intended Use

**E2R SYSTEM** fully supports manufacturing processes, consisting in various stages, some of which require performance of weighing operations. Its modular structure makes it flexible therefore the system can be adopted to particular company nature and needs, and to individual requirements of the customer.



*E2R CHECKWEIGHER: system diagram*

**E2R CHECKWEIGHER** is a computer system comprising RADWAG-manufactured checkweighers and E2R SYSTEM software. It has been designed to provide synchronization of operators and products databases and to record measurements carried out by ETHERNET-connected scales. With the system, scales state can be previewed in real time.

It enables you to carry out PGC controls and to simultaneously generate reports on completed controls performed by means of checkweighers. Checkweigher-performed weighings are recorded in **MS SQL 2008 R2** database, stored on a computer.

**E2R CHECKWEIGHER** system enables generating advanced reports on statistics, based on weighings acquired from checkweighers over a specified time interval.

Statistics Reports list:

- **Mean mass**
  - detailed report providing products' nominal mass values, average mass values, standard deviation, quantity of weighings with mass value lower than low limit value, quantity of rejected and accepted products, batch giveaway in % and weighed product loss for each shift, given in currency,
  - report providing summary for products, average mass values, standard deviation, quantity of weighings with mass value lower than low limit value, quantity of rejected and accepted products, batch giveaway in % and weighed product loss for each shift, given in currency,
  - report providing summary for nominal mass values, average mass values, standard deviation, quantity of weighings with mass value lower than low limit value, quantity of rejected and accepted products, batch giveaway in % and weighed product loss for each shift, given in currency,
  - chart presenting quantity of accepted products and quantity of products marked with various statuses, e.g. products of mass greater than high limit, products of mass lower than low limit, products with metal contamination,
  - chart presenting quantity of accepted products that are assigned to a particular scale and quantity of products marked with various statuses, e.g. products of mass greater than high limit, products of mass lower than low limit, products with metal contamination.
- **Shifts**
  - detailed report providing e.g. quantity of weighed, accepted and rejected products, total mass of a manufactured product, expected throughput value, average throughput value, product uptime and downtime for each shift,
  - summary for products' nominal mass values, quantity of weighed, accepted and rejected products, average mass value for all products and for accepted products, expected throughput value, average throughput value for each shift,

- chart presenting summary of availability, throughput, quality and performance (efficiency) for each shift,
- chart presenting quantity of manufactured products and total mass for each shift,
- chart presenting mass bar graph for a particular shift,
- chart presenting throughput for a particular shift,
- preview of efficiency coefficient for a particular shift.
- **Hourly**
  - detailed report presenting packagings quantity, packaging quantity increase, packagings total in kg, mass increase in kg,
  - chart presenting total manufactured quantity and providing information on amount of pcs. manufactured per hour,
  - chart presenting total manufactured mass and providing information on mass manufactured per hour.
- **Efficiency**
  - report providing either detailed or summary information on availability, throughput, quality and efficiency for shifts.
- **Productivity**
  - report providing information on productivity of each dynamic scale, comprising data such as total mass and quantity of manufactured pcs.,
  - chart presenting mass bar graph for a particular product,
  - chart presenting throughput for a particular product.
- **Uptime and Downtime**
  - report providing information on status duration for each dynamic scale, comprising data such as mass and manufactured pcs. quantity,
  - mass bar graph for a particular product.
- **Contaminated Pcs.**
  - report providing information on product contamination, comprising data referring to batch and logged operator.

E2R CHECKWEIGHER module, like other E2R SYSTEM modules, is a multi-workstation software that can cooperate with many dynamic scales and computers.

## **CAUTION:**

1. Please note that due to software updates this manual content may be slightly incompatible with the software version you operate.
2. RADWAG company is not responsible for consequences and potential errors being an effect of improper use.

## **1.2. Database**

Engine of the installed database is **SQL Server 2008 R2 Express**. Due to performance, scalability and system reliability use of commercial SQL Server platform is recommended, e.g.: SQL Server 2008 R2.

## **1.3. Minimum System Requirements**

In order to operate and function properly the system requires:

- **server** with Windows Server 2008 R2 operating system,
- **2 GHz quad-core** processor, or better,
- **4 GB** internal memory (16 GB or more preferably),
- at least **100 GB** free disk space, or more depending on amount of stored data,
- monitor of at least 1024x768 resolution,
- DVD drive,
- printer operating in Microsoft Windows OS
- default system font size (**96 dpi**)!

## **CAUTION:**

*It is possible to install the software on a computer not adhering to the above minimum requirements but it can be done only when record of weighings into E2R SYSTEM database is off for each dynamic scale. In such case both weighings carried out using dynamic scales and advanced reports will not be saved!*

Minimum System Requirements when record of weighings into the database and additional customer's computers with option of preview is off:

- **computer** with Windows 7 (Starter version excluded); Windows Server 2003 Service Pack 2; Windows Server 2008 Service Pack 2; Windows Server 2008 R2; Windows Vista Service Pack 2; Windows XP SP 3,
- **2 GHz dual-core** processor, or better,
- **4 GB** internal memory or more,
- at least **10 GB** free disk space,
- monitor of at least 1024x768 resolution,



- DVD drive,
- printer operating in Microsoft Windows OS
- default system font size (**96 dpi**)!

**CAUTION:**

1. *It is not recommended to install any other programs on the computer.*
2. *If the program is to be installed on other than RADWAG-delivered computer, e.g. on customer's computer, then the customer has to:*
  - *install the SQL server (if not installed previously),*
  - *attach databases (if the SQL server has already been installed).*
3. *In case of installing the program on customer's computer, it is the customer who is responsible for any equipment and program related faults.*
4. *RADWAG is not liable for:*
  - *potential influence of E2R CHECKWEIGHER and SQL server on operation of other programs (installed on the computer),*
  - *faulty operation of E2R CHECKWEIGHER and SQL server being a result of other programs' operation (system under heavy load).*

**1.4. Scales Intended for Cooperation**

Due to the applied protocol of data exchange, the **E2R CHECKWEIGHER** software can cooperate with RADAWAG-manufactured scales exclusively.

Scales series cooperating with the program:

**DWR/H**



**DWT/HL/HP**



## DWT/HL/HPW



## DWM/WL/HP



Prior start of program-scale cooperation it is necessary to set respective parameters of each network-connected scale in order to provide expected weighing accuracy and faultless communication between the scale and the program. For detailed information on parameters setup read user manual of a particular scale.

Scale name is a crucial parameter linking scales in the system, make sure that identical names are entered into network-related parameters on the scale and in E2R Synchronizer.

## 2. E2R CHECKWEIGHER INSTALLATION

### **CAUTION:**

- *Complete installation of the program can be performed on a computer on which SQL database engine with BAZARADWAG2008R2 instance has not been installed,*
- *Installation manual has been designed with reference to Windows 7 OS.*

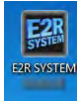
### 2.1. Database

Engine of the installed database is MS SQL Express 2008 R2.

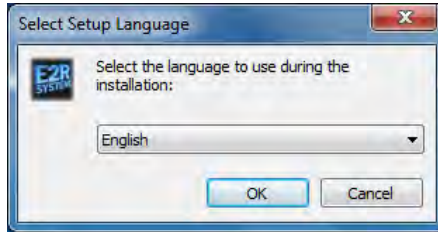
E2R SYSTEM database is saved to system disc in the course of E2R CHECKWEIGHER installation.

### 2.2. E2R CHECKWEIGHER Installation

Run **E2R SYSTEM (program version).exe** file.



Select Installation Language window opens:



Press **OK** button for confirmation.

Follow the Setup Wizard guides.

**E2R SYSTEM Setup Wizard, installation start:**



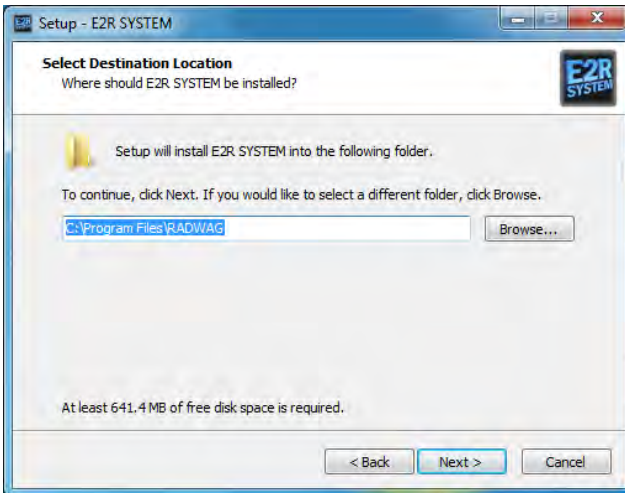
Press **Next** button.

## Licence Conditions screen:



Tick „I agree to License Conditions” box and press **Next** button.

## Installation directory setup:

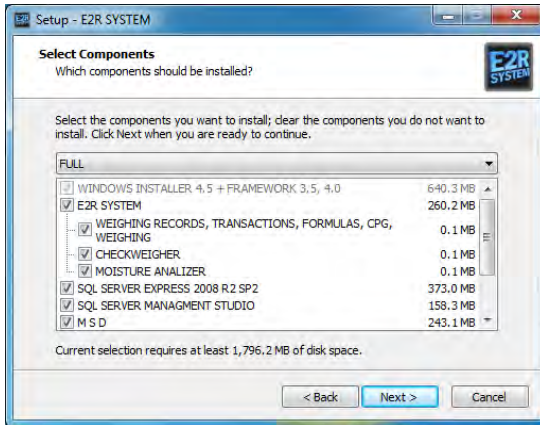


Select directory for the E2R CHECKWEIGHER program (it is recommended to use the default directory), next press **Next** button.

**CAUTION:**

Make sure that the system partition, C drive most frequently, features around 3 GB free space. With this condition met the E2R System will be installed properly.

**E2R SYSTEM components setup:**

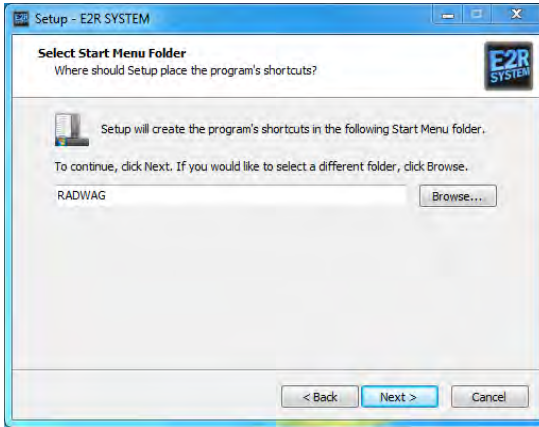


Tick E2R System components that are to be installed (by default all the components required for correct post-installation operation are ticked), next press **Next** button.

**Installation variants:**

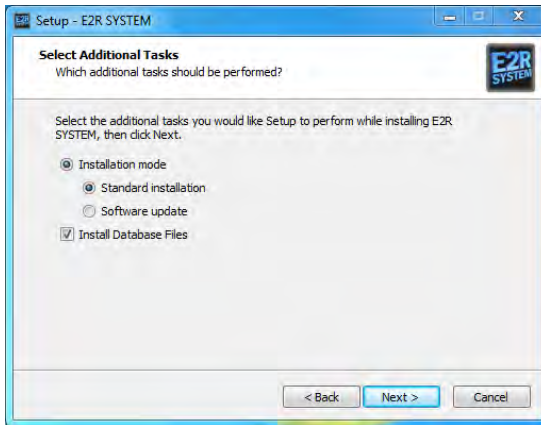
- BASIC / SERVER - Complete server installation of the program, Database, Synchronizer, Manager and MSD. 1 license permits 1 BASIC /SERVER installation on 1 computer/server.
- CUSTOMER / E2R CHECKWEIGHER EXCLUSIVELY - Program installation with preview intended for network-connected computers.
- DATABASE EXCLUSIVELY - Selected MS SQL database installation. By default MS SQL Express 2008 R2 database is required.
- E2R MANAGER EXCLUSIVELY+ SYNCHRONIZER - Synchronizer and E2R Manager installation. In E2R System one Synchronizer and one Manager can operate at a time.
- USER - Selected installation variant defined by a user manually.

## Menu Start directory setup:



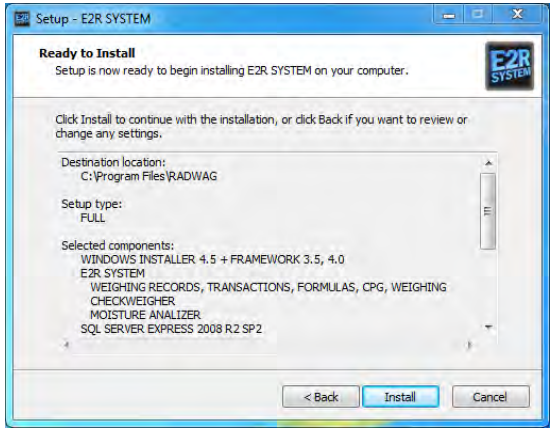
Press **Next** button.

## Setup of extra tasks to be carried out in the course of installation:



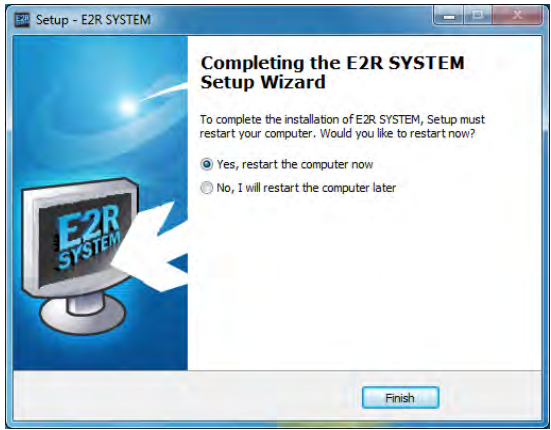
Tick extra tasks that are to be carried out in the course of E2R CHECKWEIGHER installation. If the module has already been installed on your computer then there is no need to install Database files again. Press **Next** button.

## Ready to Install screen:



To start installation press **Install** button.

## E2R SYSTEM Setup Wizard, successful completion screen:



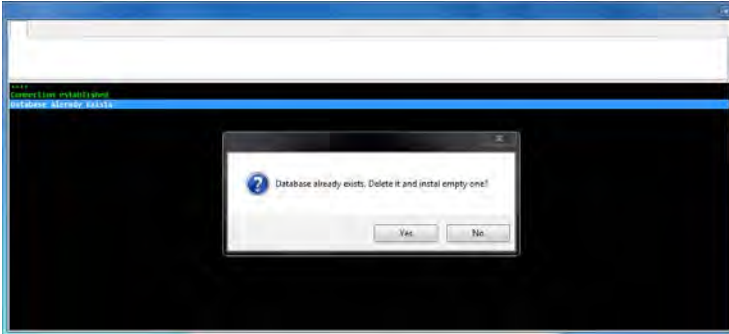
Computer restart is necessary upon successfully completed installation. Press **Finish** button, the computer restart is carried out automatically.

E2R System Database (SQL database) and **E2R Synchronizer** and **E2R Manager** modules are installed along with the E2R SYSTEM program.

### 2.3. E2R CHECKWEIGHER Update

Upon running Setup Wizard, the **E2R Synchronizer** is automatically uninstalled. On successfully completed program update, install and run the synchronizer again.

While updating the program follow Setup Wizard guides. At the final stage the below window opens, using it decide whether to replace the existing database with a new one or not.



**CAUTION:**

*Upon pressing **Yes** button all database stored data gets deleted.*

*Upon pressing **No** button no database stored data gets deleted.*

### 3. E2R SYNCHRONIZER

**E2R Synchronizer** has been designed to enable monitoring of dynamic scales state.

The program operates as a system service – upon successfully completed setup it does not require any user support. It is run automatically in the course of Windows startup (user logging in is not necessary). E2R Synchronizer connects with specified dynamic scales.

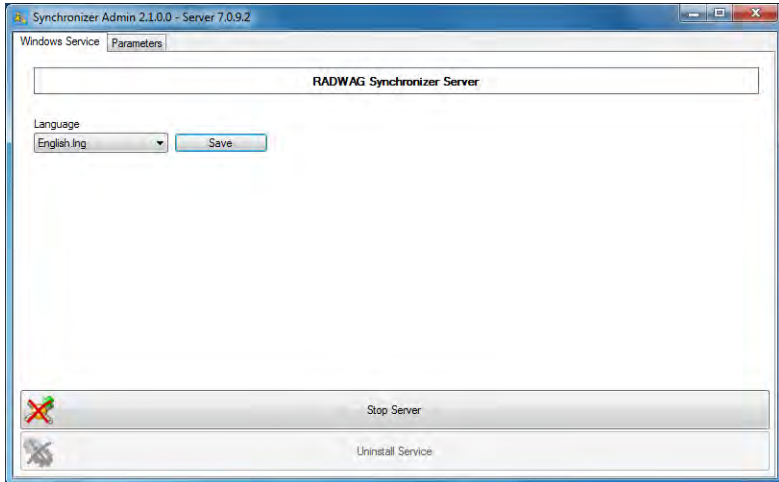
#### 3.1. RADWAG Synchronizer Service – Windows service

**E2R SYNCHRONIZER (SynchAdmin.exe)** home screen features buttons enabling you to operate **Radwag Synchronizer** service and to select software language.





**Home screen:**



Top bar provides information on versions of **RADWAG Synchronizer** components: Admin and Server.

**Where:**

- Install service**      Press to install **RADWAG Synchronizer** service into MS Windows OS.
  
- Uninstall service**      Press to uninstall **RADWAG Synchronizer** service from MS Windows OS.
  
- Start server**      Press to start **RADWAG Synchronizer** service server
  
- Stop server**      Press to stop server enabling program-scale communication.

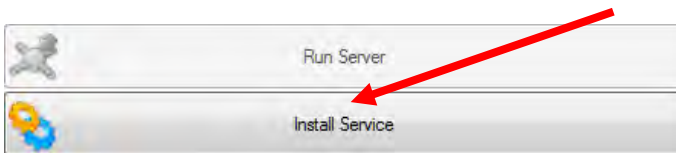
- Language** Press to change language: Polish, English, German, Spanish. Software restart is required upon swapping form one language to another.
- Save** Press to save language change.  
**CAUTION: software language changes upon software restart.**

**CAUTION**

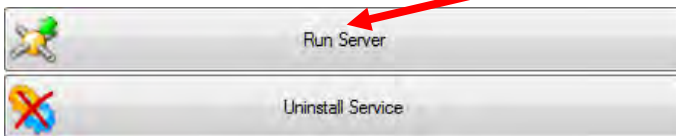
The buttons availability changes automatically in the course installation, uninstallation, start and stop of the of service.

**3.1.1. E2R Synchronizer Service Start**

- Press **Install service** button.



- Press **Start Server** button.



- Upon server start, the **Start Server** button turns to **Stop Server** button. This means that server has been successfully activated.



**3.1.2. E2R Synchronizer Service Restart**

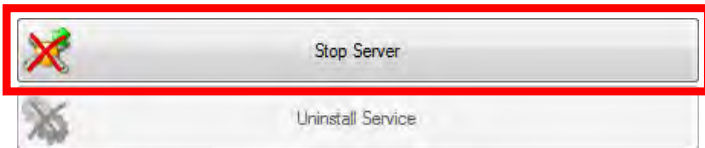
- Press **Stop Server** button.



- Wait 5 seconds and press **Start Server** button.



- Upon server start, the **Start Server** button turns to **Stop Server** button. This means that server has been successfully activated

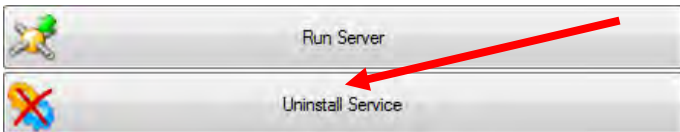


### 3.1.3. Uninstalling E2R Synchronizer Service:

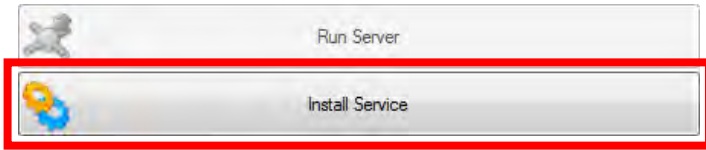
- Press **Stop Server** button.



- Press **Uninstall service** button.

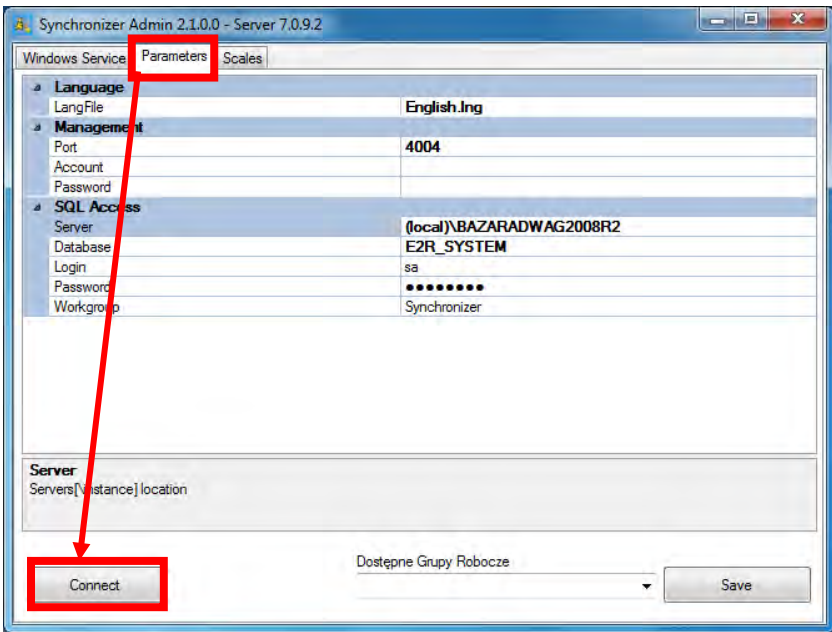


- Upon completed uninstallation, the **Uninstall service** button turns to **Install service** button.



### 3.2. Parameters of RADWAG Synchronizer Server

In order to set parameters of MSSQL server to which the scales are connected go to **Parameters** tab.



Press **Connect** button in order to connect the database and carry out scales setup.

#### Parameters tab:

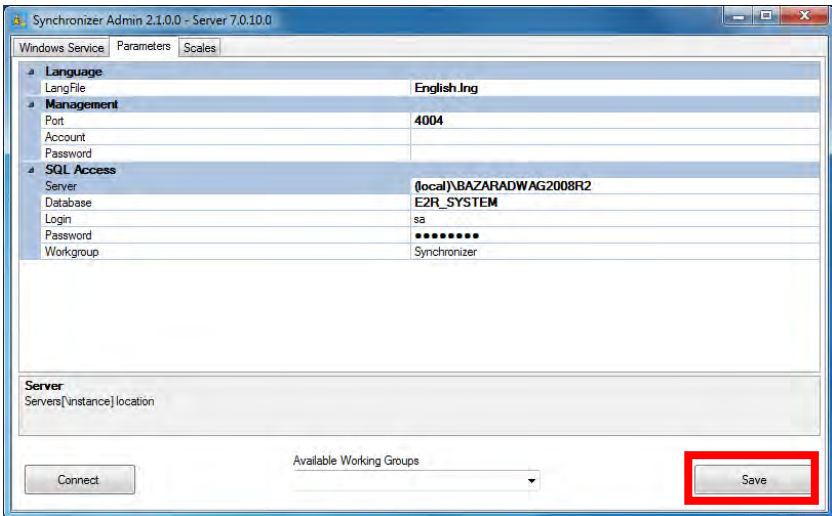
<b>Server</b>	SQL server entry path By default - local server: <b>127.0.0.1\bazaradwag</b>
<b>Database</b>	Database name By default : <b>E2R</b>

<b>Login</b>	Database user name By default: <b>sa</b>
<b>Password</b>	User password By default: <b>radwag</b>
<b>Workgroup</b>	Scales' workgroup used for complex systems By default: <b>Synchronizer</b>
<b>LangFile</b>	Language of scale displayed messages
<b>Port</b>	TCP Port used by E2R Manager By default: <b>4004</b>
<b>Account</b>	E2R Manager user name By default: empty field, no protection
<b>Password</b>	E2R Manager user password By default: empty field, no protection

**CAUTION**

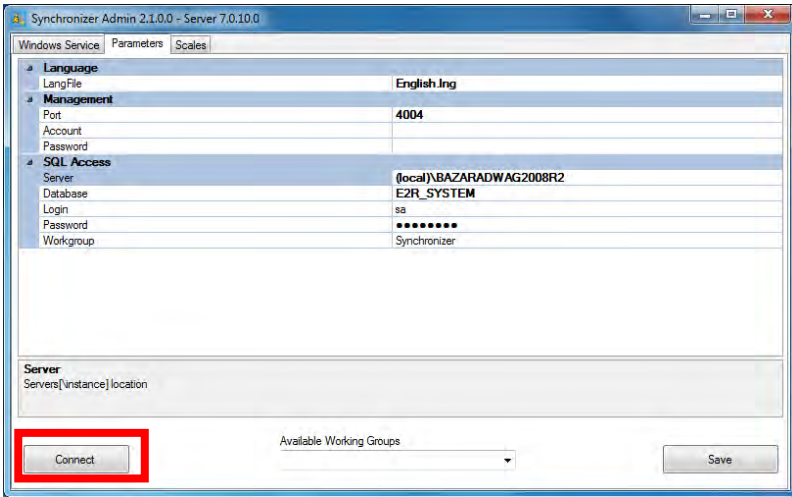
If SQL database has been installed on a different computer then it is necessary to enter its IP address into **Server** field, e.g.: **192.168.1.1** bazaradwag.

Having completed parameters editing press **Save** button.

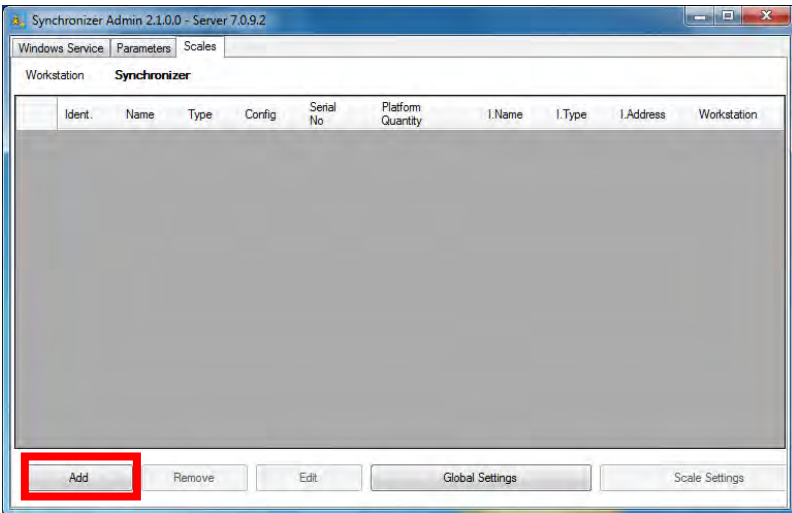


### 3.3. Adding New Sacles to Synchronizer

In order to set scales' parameters connect to database, do it by pressing **Connect** button.

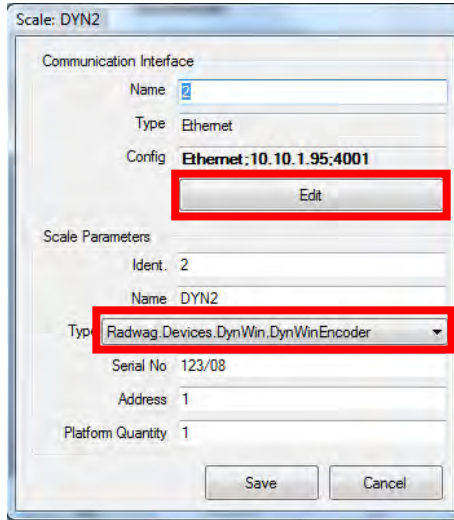


Upon establishing the connection you can add new scales to the E2R Synchronizer, to do it go to **Scales** tab and press **Add** button.



Scales editor opens. Fill in the data (see the figure below).

An example of adding new scale.



**Parameters:**

<b>Name</b>	Freely selected interface name
<b>Type</b>	Interface type (Serial, Ethernet)
<b>Config</b>	Interface configuration field
<b>Edit</b>	button, press to edit the interface
<b>Ident.</b>	Scales ID (field of numerical character)
<b>Name</b>	Freely selected scale name printed on reports

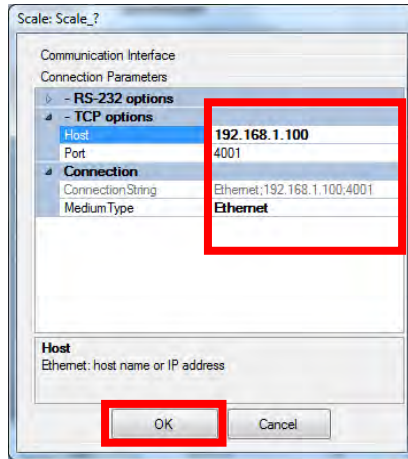
<b>Type</b>	<p>Connection type:</p> <ul style="list-style-type: none"> <li>• <i>Radwag.Devices.PUE41.PUE41Encoder</i> – connection with PUEC41H indicator</li> <li>• <i>Radwag.Devices.PUE7Lab.PUE7LabEncoder</i> – connection with 3Y series balance</li> <li>• <i>Radwag.Devices.PUE7.PUE7Encoder</i> – connection with WLY, WPY and HTY scales featuring standard program version</li> <li>• <i>Radwag.Devices.WeightDryer.WeightDryer Encoder</i> – connection with MAX series moisture analyzer</li> <li>• <b><i>Radwag.Devices.DynWin.DynWinEncoder</i> – connection with a dynamic scale</b></li> <li>• <i>Radwag.Devices.PUE4L.PUE4LEncoder</i> – connection with scales based on PUE4L indicator</li> <li>• <i>Radwag.Devices.PUE7.PUE7PcsEncoder</i> – connection with scales based on PUE7 and HY terminals (version featuring Parts Counting function) <i>Not applicable for standard program version in Parts Counting mode</i></li> </ul>
<b>Serial No.</b>	Scales serial number
<b>Address</b>	Address set on a scale in computer parameters
<b>Platform No.</b>	Platform number

In case of dynamic scales select:

***Radwag.Devices.DynWin.DynWinEncoder*** value for **Type** field.

Press **Edit** button to run editor of communication interface parameters.





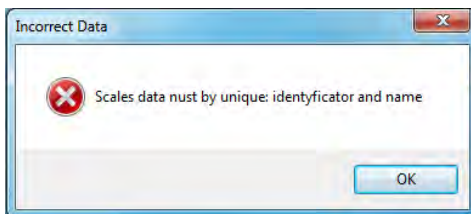
### Interface parameters:

<b>MediumType</b>	Medium type: (None – no connection, Serial – scale connected via RS232, Ethernet – scale connected via Ethernet)
<b>ConnectionString</b>	Shortened connection address, interface configuration preview
<b>Host/IP</b>	Scale-set IP Address (for connection the following types: Ethernet, Tcp)
<b>Port</b>	Local TCP port (by default <b>4001</b> )
<b>BaudRate</b>	Baud rate RS232 (default settings for the moisture analyzer: <b>9600 bps</b> , for WPW and PUE7 <b>scales</b> set <b>115200 bps</b> )
<b>DataBits</b>	Data bits quantity (by default <b>DB_8</b> )
<b>Handshake</b>	Control Protocol enabling communication identification (by default <b>None</b> )
<b>Parity</b>	Parity control (by default <b>None</b> )
<b>Numer portu</b>	Number of COM communication port to which the scale is connected
<b>StopBits</b>	Stop bits value (by default <b>One</b> )

**CAUTION:**

*It is necessary to check and compare all of the above settings with settings of the scale and MS Windows communication port.*

*Shall you see the following message in the course of adding the scale (upon pressing **Save** button while operating editor designed to add a new scale) mind that the scale ID you have just provided is already occupied.*



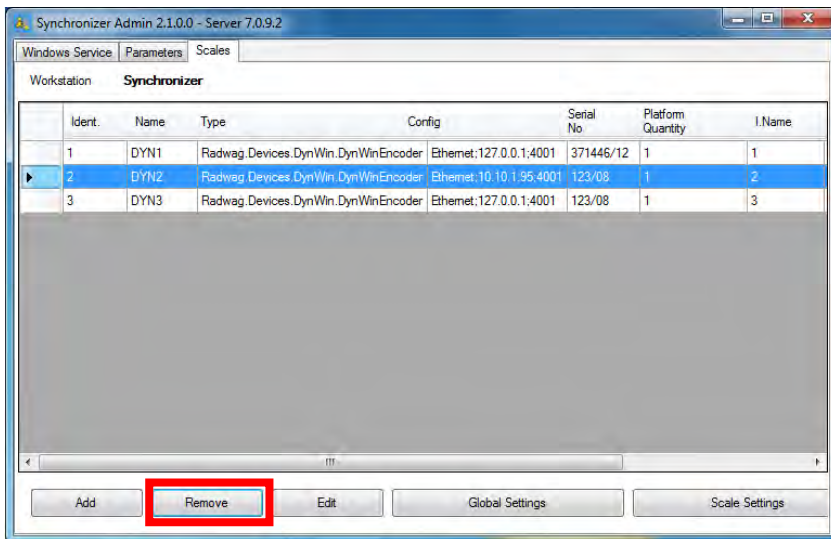
*In such a case change **Scales ID** and press **Save** button again.*

### **3.4. Deleting and Editing Database-Recorded Scale**

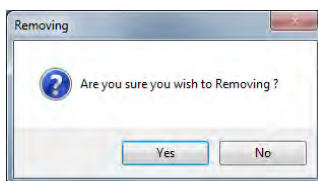
**CAUTION:**

It is not possible to print on a report any weighing data related to a scale that has been deleted form a system.

If a particular scale does not operate in the system then it is possible to delete it form the Synchronizer, scales that have been deleted are not detected in the course of synchronization process. Select scale that is to be deleted and press **Delete** button.



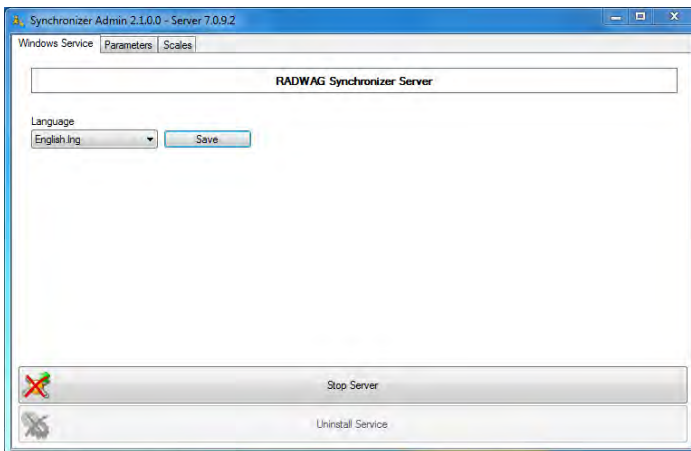
When you press **Remove** button, the following question is displayed:



You are asked twice whether to delete a selected scale or not, this reduces the risk of accidental scale removal. In order to delete the particular scale from the synchronizer list, press **Yes** button.

In order to edit and modify selected scale parameters in the E2R Synchronizer press **Edit** button. Scale editor opens.

With all modifications saved go to **Windows Service** tab and check whether **RADWAG Synchronizer Server** operates or not.



If Synchronizer server is on you can run **E2R Manager** and preview system-connected scales operation.

#### 4. E2R MANAGER

**E2R Manager** program has been designed to display the program-scale communication status, and to monitor the scale displayed state and data relating to an ongoing weighment. Among displayed information there is the following data: logged operator, weighed product, nominal net mass (reference sample mass), weighed product batch/series number, customer, tare, min and max therholds, working mode etc.

All messages serve informative purposes therefore they cannot be recorded or printed. In order to save or print the messages install **E2R SYSTEM** program.

Upon **E2R STSTEM** installation a E2R MANAGER EW shortcut is created on the desktop.



## E2R Manager home screen



## Detailed information on the checkweigher.



In order to enable display of additional scale-referred data, press the scale pictogram. Respective box is displayed.

**Detailed information:**

<b>About scale</b>	Scale parameters,
<b>Scale ID</b>	Scale serial number,
<b>Software version</b>	Scale program version,

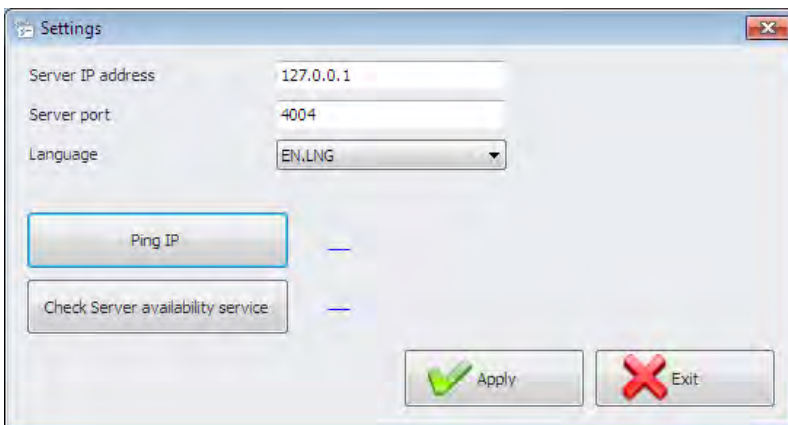
**Caution:**

*When there is no connection between **E2R Manager** and **Radwag Synchronizer** or when Radwag Synchronizer is not activated this window will not be displayed.*

*If the program is activated on more than one computer as a multi-stand software, mind that only one preview at one computer station is possible at a time.*

### 4.1. Connection with Radwag Synchronizer - Settings

To run **Settings** editor press **File** tag, next press **Software settings** button.



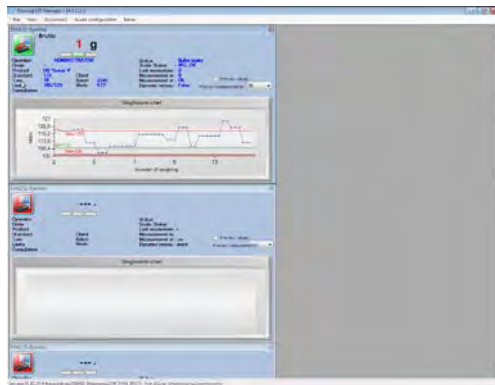
**Where:**

Server IP address	IP address of a computer by which the Synchronizer is operated
Serwera port	TCP port of a computer by which the Synchronizer is operated

Language	Language of E2R Manager program
Ping IP	Test of connection with a selected IP, by default: local IP address
Check Server service availability	Sprawdzenie dostępności programu E2R Synchronizer

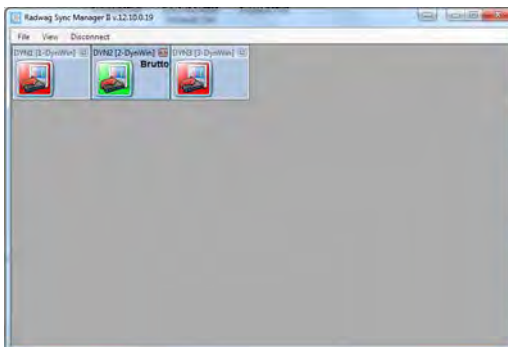
## 4.2. E2R Manager Screen.

Home screen, an extended view (default setting).



To swap to an extended view press **View** tag and press **Extended** button.




Home screen, a standard view (simplified).



To swap to a standard view press **View** tag and press **Standard** button.

### 4.3. E2R Manager: Scale's Status

Status informing you whether communication between a computer and a scale has been established or not.

	Communication established. Correct scale setup. Correct scale setup in E2R Synchronizer.
	Communication established. Temporary lack of response. Incorrect scale setup or incorrect scale setup in E2R Synchronizer.
	Communication not established. Scale switched off or no communication interface connection. Incorrect scale setup or incorrect scale setup in E2R Synchronizer.

### 4.4. Scales Restart and Update in E2R Manager

All databases that can be edited in **E2R System**, except for product databases, are sent (updated) from a computer to scales upon restart of program, connection or scale.

In the course of system operation you can restart the scale using E2R Manager program, to do it click the selected scale twice. Upon few seconds the scale gets reconnected and all the databases are updated.

#### **CAUTION:**

*If scales databases have not been updated, even though they were previously edited, then it is necessary to edit one freely selected database record and to carry out restart once more, update shall proceed.*

*Having encountered problems when updating databases mind that they might be a result of the new scale's ID which could have been previously used as some other device's ID.*

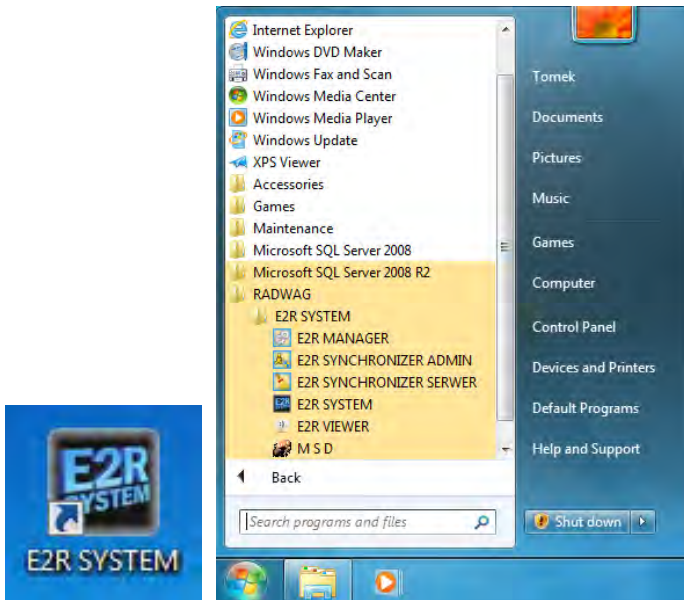


## 5. E2R CHECKWEIGHER

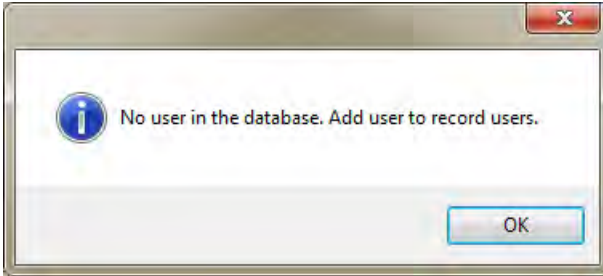
This user manual has been designed with reference to **E2R CHECKWEIGHER**, version **12.10.19**. Mind that it might slightly differ from the software version you operate.

### 5.1. E2R System Start-up

To run the program press desktop icon or use Start Menu of the operating system: **START/PROGRAMS/RADWAG/E2R SYSTEM/E2R SYSTEM**.

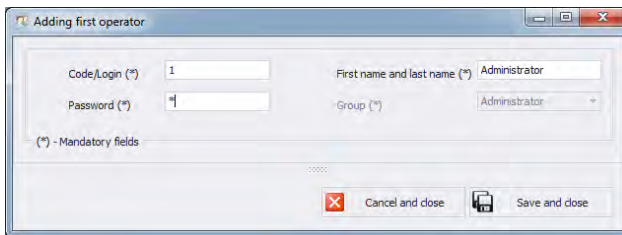


When running the program for the first time, message informing you on an empty Operator Database is displayed. Press **OK** button, **Operator** editor opens automatically, add the operator.



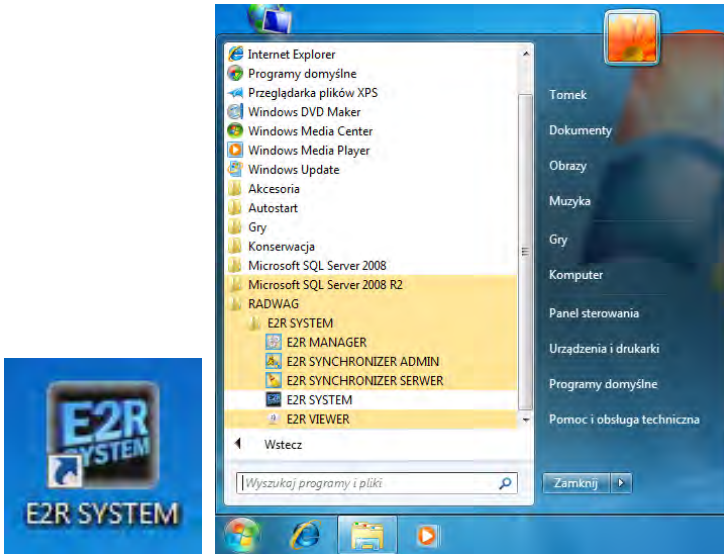
**CAUTION:**

*Make sure that the first operator you add is the administrator. With this you will avoid problems when setting program parameters in the future. Fill in all mandatory fields, remembering that the code is login.*






## 5.2. Running E2R System

To run the program press desktop icon or use Start Menu of the operating system: **START/PROGRAMS/RADWAG/E2R SYSTEM/E2R SYSTEM.**



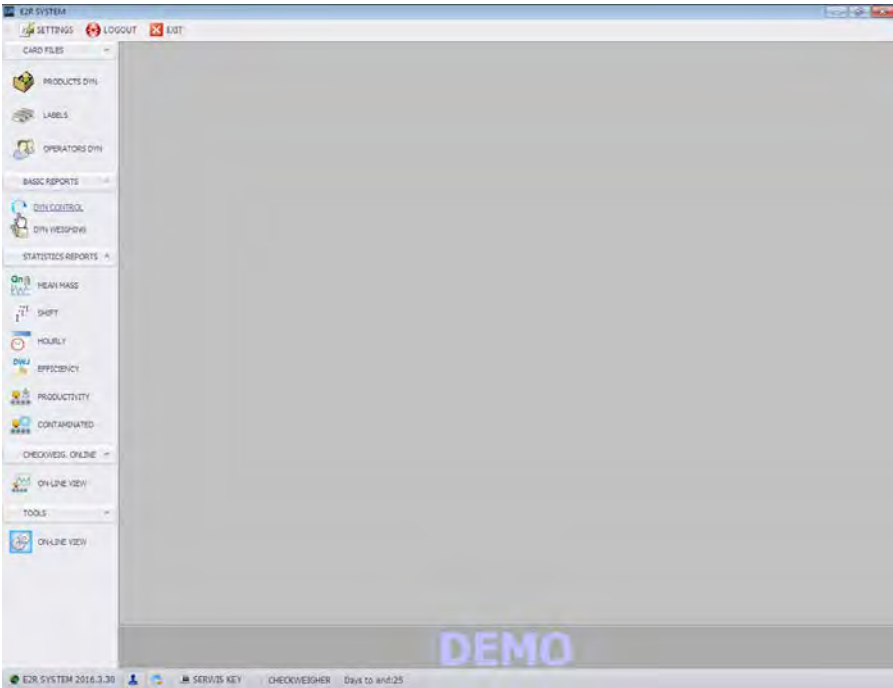
Upon running the program, it is obligatory to log in. Enter respective **Login** and **Password**.

	<b>Login (Code)</b> <input type="text"/>
	<b>Password</b> <input type="text"/>
 Close	 Log in

Press **OK** button to confirm the entered values, the program displays Home Screen.

### 5.3. E2R System Home Screen

Home Screen of **E2R SYSTEM** is displayed upon successfully completed logging in operation.



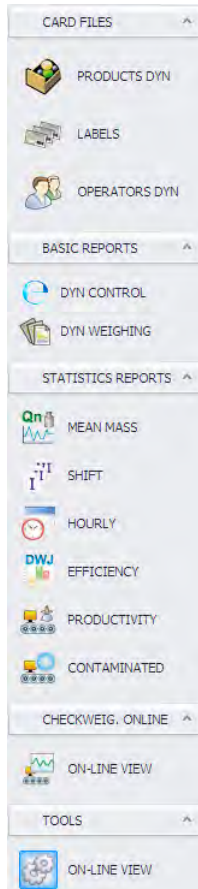
**The Home Screen has been divided into 4 sections:**

- Top bar – System toolbar,
- Side bar – Navigation pane,
- Bottom bar – Status bar,
- Workpane.

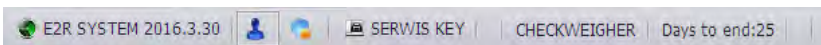
System toolbar features **Exit** and **Logout** buttons along with program **Settings** and **Layout** (E2R System skins) setup.



Navigation pane comprises modules featuring buttons for activation of program functions.



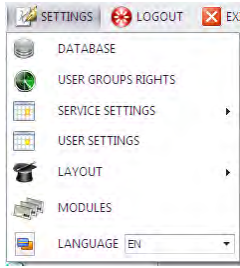
Status bar displays information on software version, logged in user, user permissions level and current operation mode.




Workpane has been designed to display windows triggered by Navigation Pane buttons. The windows provide all data and information.

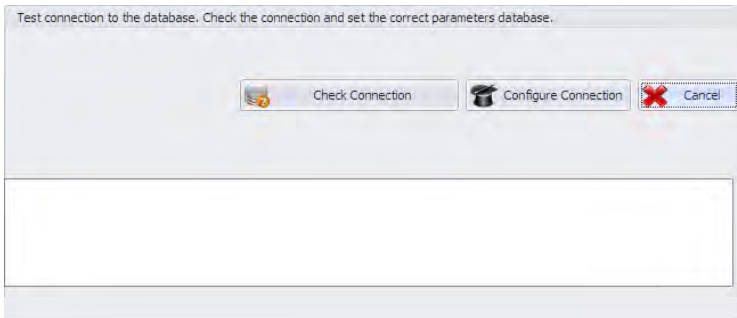
#### 5.4. E2R System Settings

To run settings go to the system toolbar and press **Settings** tag,  .



### 5.4.1. Database


To run Database settings go to the system toolbar and press **Settings** tag, , next press **Database** button.



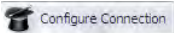
**Database setup features the following functions:**

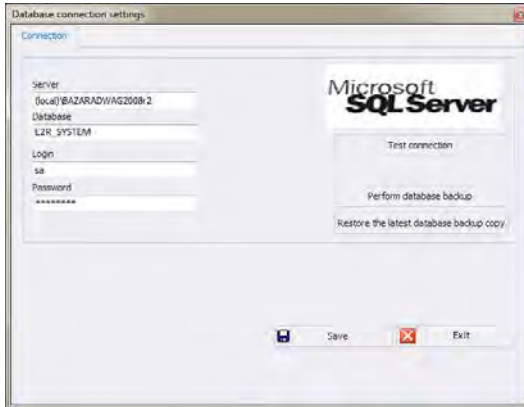
- Check Connection,
- Configure Connection.

Top section of the window features status of connection with the database. Bottom section of the window features parameters for connection with the database.

Press  button to cancel introduced changes.

### 5.4.2. Setting up Connection

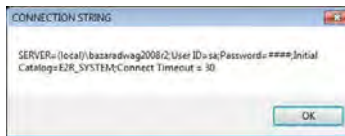
Press  button to activate window with database settings providing parameters for connection.



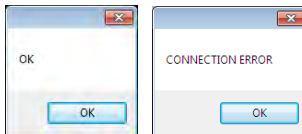
**Where:**

- Server** IP or name of server with running SQL server (add also server instance if declared).  
Format: SERVER\INSTANCE
- Database** SQL database name
- User** Operator's name, by default: **sa**
- Password** User's password, by default: **Radwag99**

To check connection with database, press **Test connection** button. **Connection String** window, featuring previously specified data, is displayed.



Press **OK** button to confirm, window informing on connection status is displayed.



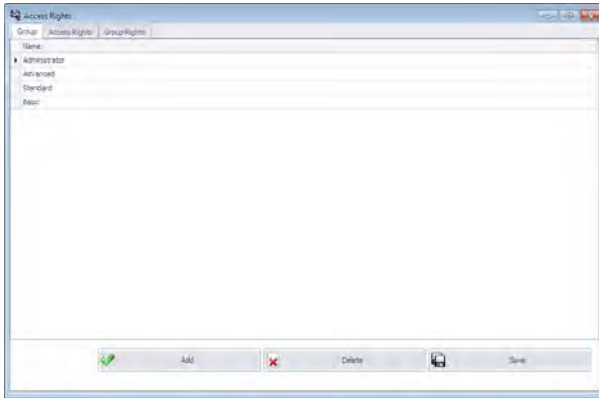
**5.4.3. Checking Connection**

To check connection with database, press **Check connection** button.

#### 5.4.4. Users Groups and Access Rights

To run User and Users Group access rights go to the system toolbar and press **Settings** tag, , next press  **USER GROUPS RIGHTS** button.

Go to **Group** tab to view defined groups of users.



**Where:**

**Add** Button for adding group of users

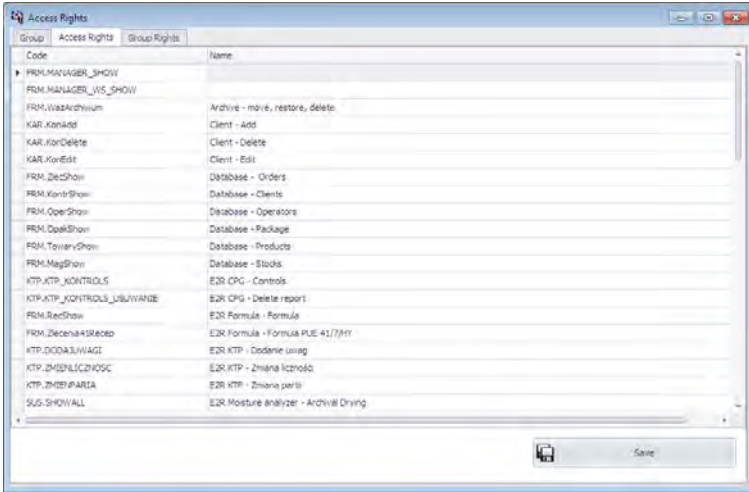
**Delete** Button for deleting group of users

*It is not recommended to delete any of the 4 default groups. They are added automatically upon program restart.*

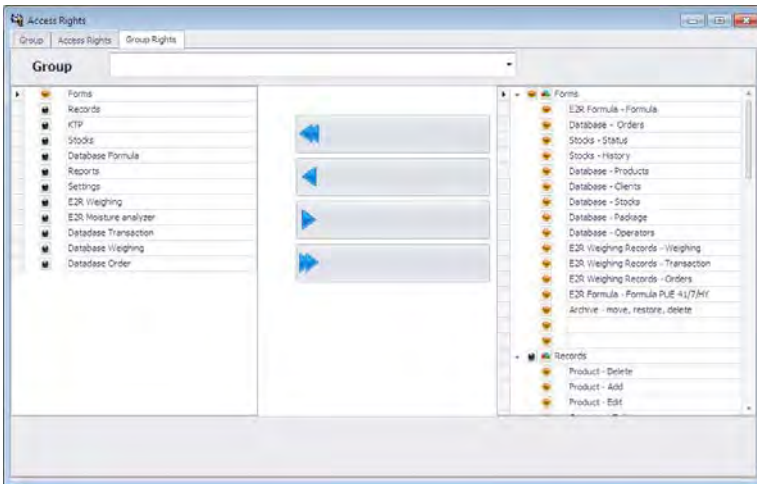
**Save** Button for saving the settings

**Access Rights** tab provides list of all codes and assigned names used in Group Rights tab.





**Group Rights** tab has been designed to enable you to set permissions levels for particular groups to program modules.



Using **Group** combo box select particular group and enable or disable it with given set of rights.

### 5.4.5. Service Settings



To run service settings go to the system toolbar and press **Settings** tag,

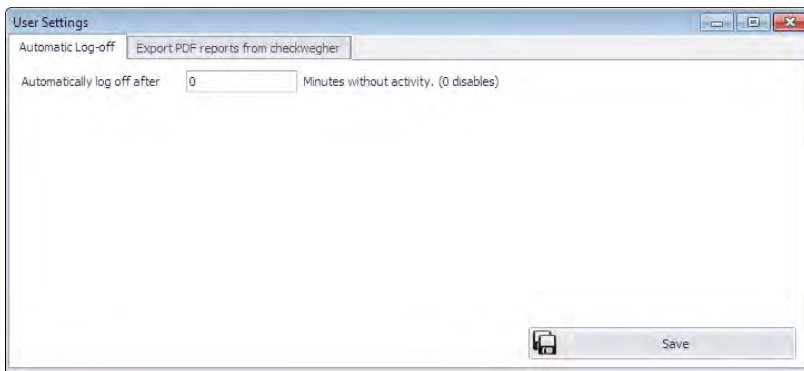
 **SETTINGS**, next press  **SERVICE SETTINGS** button.

**CAUTION:**

Access to the service settings is enabled for authorized users only.

### 5.4.6. User Settings

To run user settings go to the system toolbar and press **Settings** tag, , next press  **USER SETTINGS** button.





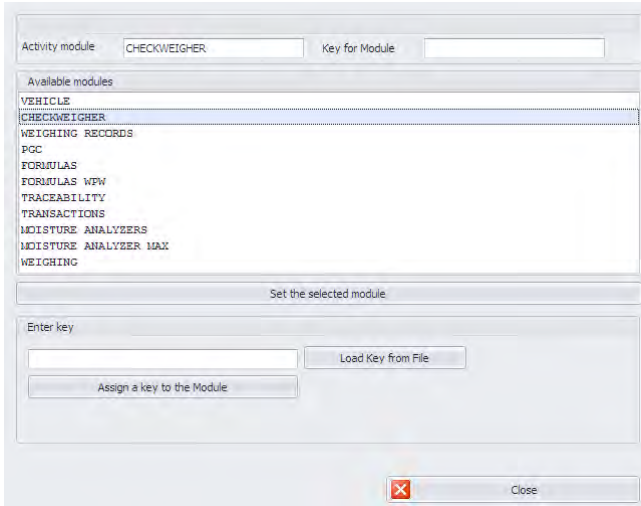
**Where:**

**Automatically log off after**

Option enabling to log the user off after passage of predefined number of minutes. With value set to 0 the function is off.

### 5.4.7. Modules

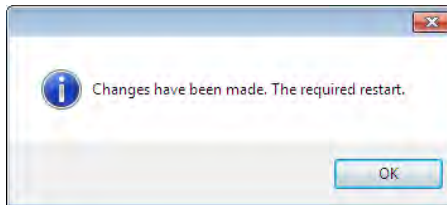
To access license key in order to modify it or to assign it to a current module, press **Settings** tag, , next press  **MODULES** button.



The window provides you with a list of available program modules. Here you can check what key numbers are assigned to particular modules.

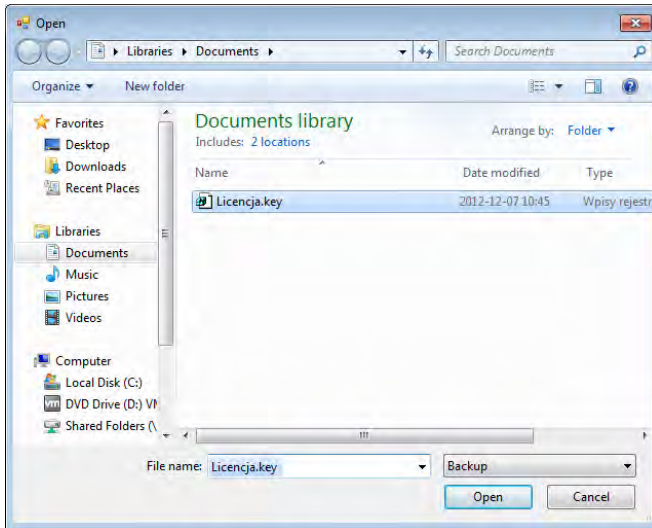
- **Module change**

Select particular module from the list and press **Set the selected module** button. The program restart proceeds, the selected module is run upon the restart.

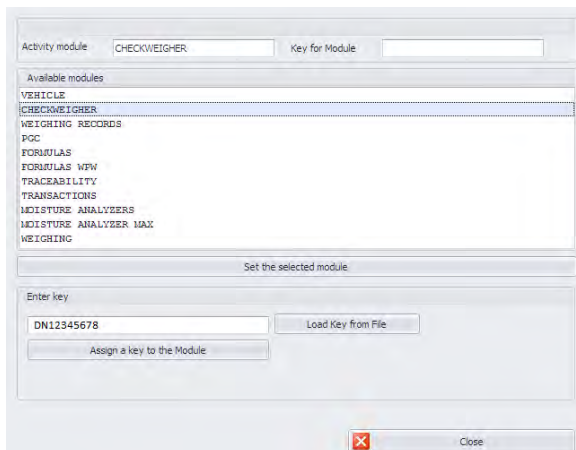


- **Assigning module key from file**

In order to read licence key from file press **Load key from file** button. Operating system window opens, search for the licence file, select it and press **Open** button.



The key is displayed in **Enter key** box. Now select the purchased module and press **Assign a key to the module** button. Confirm and restart the program.



- **Entering module key**

Another method for update of licence key is to paste it or enter by means of a keyboard.

Copy the licence key from a file or an e-mail, place a mouse cursor over the **Enter key** box, press the right mouse button and select **Paste** option. The key is displayed in the box. Now select the purchased module and press **Assign a key to the module** button. Confirm and restart the program.

## 5.5. Miscellaneous Settings

### 5.5.1. Language Setup

To swap between software languages use **Language** combo box providing you with list of available languages.

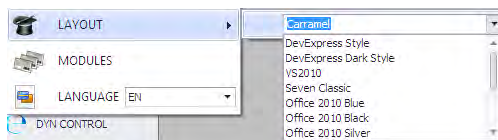


Where:

<b>PL</b>	Polish
<b>EN</b>	English
<b>DE</b>	German
<b>ES</b>	Spanish
<b>RU</b>	Russian

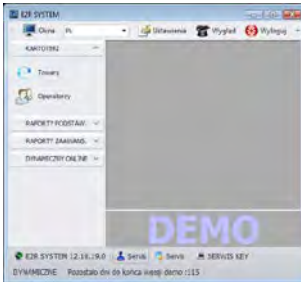
### 5.5.2. Program Layout

To customize program layout press  **LAYOUT** button and select respective option.

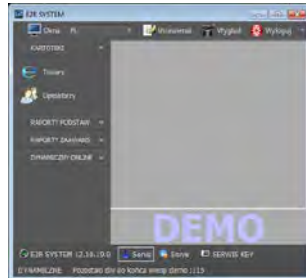


Available program skins:

## DevExpress Style



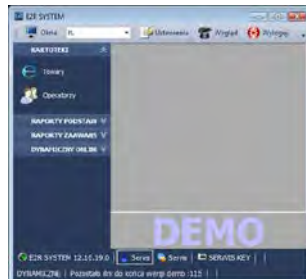
## DevExpress Dark style



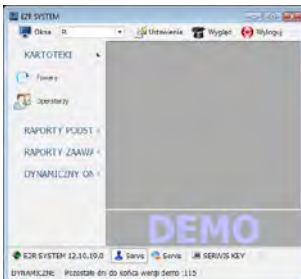
## Metropolis



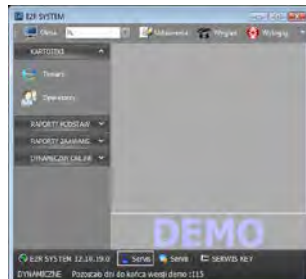
## VS2010



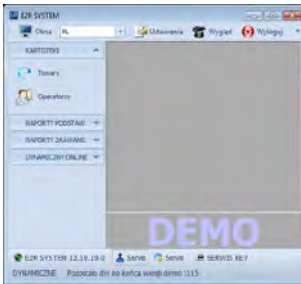
## Seven Classic



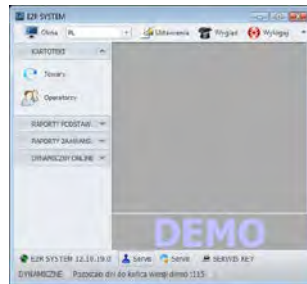
## Office 2010 Black




## Office 2010 Blue



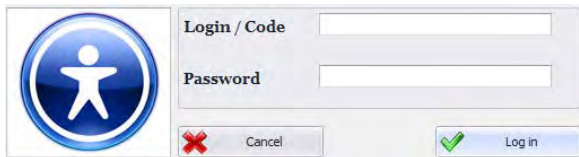
## Office 2010 Silver




### 5.5.3. Logout Procedure

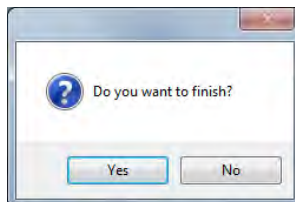
Upon pressing  button you are logged out and the following window is displayed.

If you still want to operate the software, provide **Login (Code)** and **Password**, next press **Log in** button to confirm.



### 5.5.4. Exit Operation

To exit the program press  button, respective window requesting your confirmation is displayed.



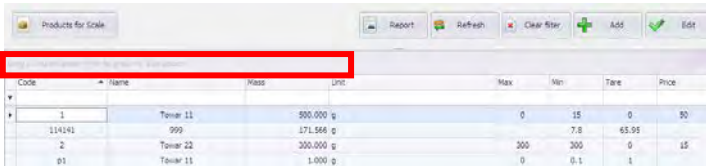
Press **Yes** button to exit, press **No** button to display Home Screen of E2R SYSTEM software.

## 5.6. Work Pane

### 5.6.1. Data Sorting

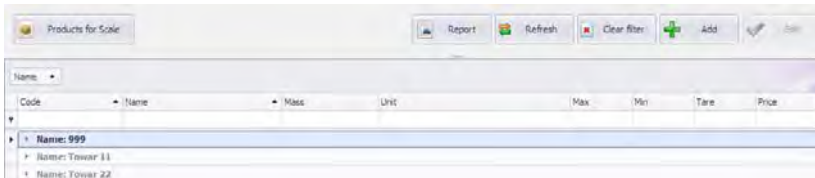
Data displayed in a work pane of any available module can be freely sorted.

In order to group displayed data, first select particular column header, next drag it over the area marked with a red border and drop it.



Code	Name	Mass	Unit	Max	Min	Tare	Price
1	Towar 11	500,000	g	0	15	0	50
114141	999	171,566	g		7.8	65.95	
2	Towar 22	300,000	g	300	300	0	15
01	Towar 11	1,000	g	0	0.1	1	

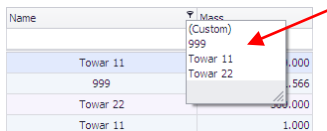
Dropped header turns into a button with a name. Press the button once to enforce list sorting in either ascending or descending order.



Code	Name	Mass	Unit	Max	Min	Tare	Price
Name: 999							
Name: Towar 11							
Name: Towar 22							

### 5.6.2. Extra Filtering Options

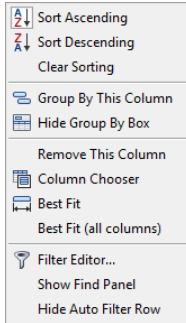
In order to activate extra filtering options, press right hand top corner of a particular column's header. List of available options is displayed.



Name	Mass
Towar 11	500,000
999	171,566
Towar 22	300,000
Towar 11	1,000

Click the right mouse button to operate the following context menu with sorting options.





**Where:**

- Sort Ascending** Click to sort from A to Z
- Sort Descending** Click to sort from Z to A
- Clear Sorting** Click to delete grouping filter
- Group By This Column** Click to group data by selected column
- Hide Group By Box** Click to hide quick grouping option
- Remove This Column** Click to delete selected column, the column is no longer displayed in a window
- Column Chooser** Click to run column view editor
- Best Fit** Click to modify column width to get the most optimal view
- Best Fit (all columns)** Click to modify all columns widths to get the most optimal view
- Filter Editor...** Advanced filter
- Show Find Panel** Click to run common filter field allowing search all columns for specified value
- Hide Auto Filter Row** Click to hide filter row option

Each work pane features navigation bar allowing you to add, edit or delete records and to move forward or backward.




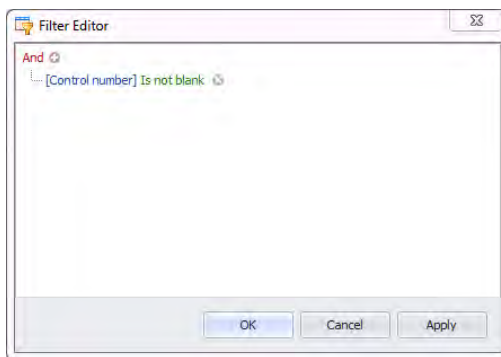
Bottom work pane area features handy data filter allowing to generate 5 basic statistics for a particular column. To select statistics type, move the cursor over the bottom bar of a work pane and press right mouse button.

### Basic statistics:

- Sum** Click to display sum of all values of particular column
- Min** Click to display minimum value of particular column
- Max** Click to display maximum value of particular column
- Count** Click to display quantity of rows of particular column
- Average** Click to display average value of particular column

### 5.6.3. Filter Editor

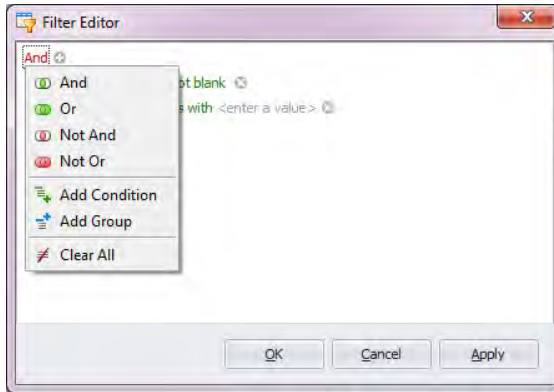
Upon setting a filter,  button is displayed in the bottom part of a workpane. By means of this button Filter Editor window is activated where database data can be freely filtered.



Using the editor you can set one or many filtering conditions, this provides detailed filtering. It is possible to generate reports on the filtered data.

Filter Editor window provides the following filtering criteria:

- a) Filtering groups** (and, or, not and, not or)

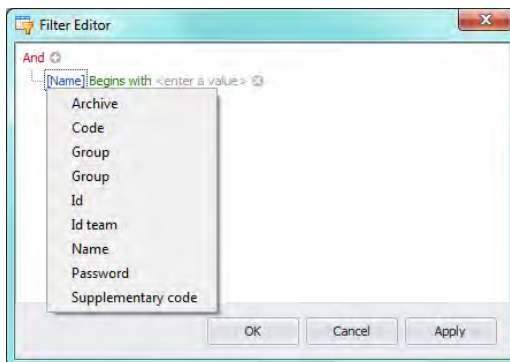


**Where:**

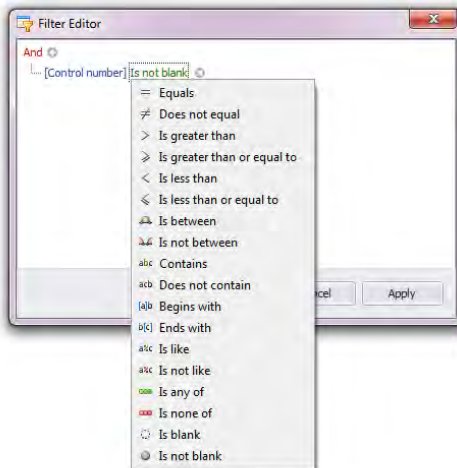
- And** all filter criteria are met
- Or** one of filter criteria is met
- Not And** opposites of all filter criteria are met
- Not Or** opposite of one filter criteria is met
- Add Condition** adding a new filter criteria
- Add Group** adding a new group of filtering criteria
- Clear All** deleting all filtering criteria

**b) Filtering conditions** – specifies the data to be filtered and the methods of filtering:

- selecting a column for filtering (Operator or Product in this very case, the columns may differ depending on a work pane)



- selecting filtering range and method



Where:

<b>Equals</b>	Displaying only records from the selected column which are exactly the same as the entered value
<b>Does not equal</b>	Displaying all records from the selected column which are different from the entered value (opposite to filter „Equal“)
<b>Is greater than</b>	Displaying only records from the selected column which values are greater than the entered value,
<b>Is greater than or equal to</b>	Displaying only records from the selected column which values are greater or equal to the entered value,
<b>Is less than</b>	Displaying only records from the selected column which values are lower than the entered value,
<b>Is less than or equal to</b>	Displaying only records from the selected column which values are lower or equal to the entered value,
<b>Is between</b>	Displaying only records from the selected column which values are in the range between two given values
<b>Is not between</b>	Displaying only records from the selected column which values are beyond the range between two given values

<b>Contains</b>	Displaying only records from the selected column which include the given string of characters
<b>Does not contain</b>	Displaying only records from the selected column which do not include the given string of characters
<b>Begins with</b>	Displaying only records from the selected column which start form the given string of characters
<b>Ends with</b>	Displaying only records from the selected column which end with the given string of characters
<b>Is like</b>	Displaying only records from the selected column which have the same beginning and end, the filtering criterion has the following format „begin%end”
<b>Is not like</b>	Displaying only records from the selected column which have not the given beginning and end, the filtering criterion has the following format „begin%end”
<b>Is blank</b>	Displaying only records from the selected column which are empty
<b>Is not blank</b>	Displaying only records from the selected column which are not empty
<b>Is any of</b>	Displaying only records from the selected column which are the same as one of the given patterns
<b>Is none of</b>	Displaying only records from the selected column which are different from all of the given patterns – opposite to „Is any of” filtering

Here you can specify the exact criterion for filtering the selected column, e.g.: if you want to get a result concerning product „**Apple**” choose „**Name - Equals – value: Apple**”. Press „**+**” button, located next to the filtering group, to add another criterion.

Having completed operating Filter Editor, when all necessary filters are set, press **Apply** button, the filter gets activated.

The bottom bar displays selected filter type.



In order to display **Filter Editor** again press **Edit Filter** button.

## 6. DATABASES

E2R CHECKWEIGHER comprises the following databases:

- Products,
- Operators.

Products database may be edited by the checkweigher and by a computer. Operators database can be edited by a computer exclusively.

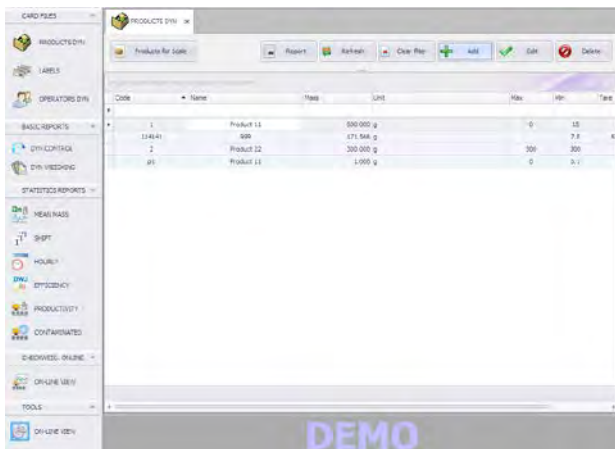
## 6.1. Products

Each product added to a database is sent to a checkweigher only upon being assigned to the checkweigher.

Product database allows managing records of products. To run **Products** module, press **Products** button of the side toolbar.

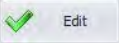


**Products work pane:**



### 6.1.1. Adding / editing a product

To add a new product to the database, press  **Add** button.

To edit a particular product, press  **Edit** button.

## Product editor (window for adding and editing product records):

The screenshot shows a window titled "Checkweigher Product" with the following fields and controls:

- Product code: [Text input]
- Name: [Text input]
- Mass net (nominal): [Text input] Unit: [Dropdown menu] g
- Tare: [Text input]
- TU1 tolerance (Tolerance -): [Text input]
- Upper limit (tolerance +): [Text input] 0
- Lo Threshold: [Text input]
- Lower dosing: [Text input]
- Upper dosing: [Text input]
- Metal detector prod No: [Text input]
- Barcode: [Text input]
- Price: [Text input]
- Efficiency plan [pcs/min]: [Text input]

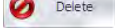
At the bottom, there are "Save" and "Close" buttons, with a Save icon to the left of the Save button.

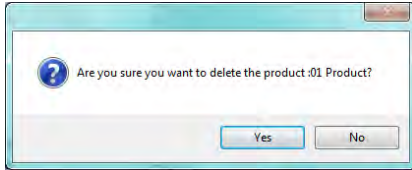
### Where:

<b>Name</b>	Product name comprising 50 alphanumeric characters
<b>Product Code</b>	Alphanumeric product code
<b>Mass net (nominal)</b>	Nominal weight value of a product given in grams
<b>Tare</b>	Tare value for products packed into packaging of constant tare weight, taring carried out automatically by scale upon product selection
<b>TU1 Tolerance (Tolerance -)</b>	Deviation for TU1 or tolerance (-), T1 error
<b>Upper limit (Tolerance +)</b>	Deviation for high limit or tolerance (+)
<b>LO Threshold</b>	LO threshold value,
<b>Lower Dosing</b>	Deviation for dosing – low limit,
<b>Upper Dosing</b>	Deviation for dosing – high limit,
<b>Metal detector prod No.</b>	Serial number of metal detector which is to be used in order to carry out metal detection
<b>Price</b>	Product loss cost per kg (loss – surplus amount of product),
<b>Efficiency plan [pcs/min]</b>	Planned throughput expressed as pcs./min.,
<b>Barcode</b>	Product's barcode

When all required product data has been entered press **<Save>** button, next press **<Close>** button.

### 6.1.2. Deleting Product


To delete a particular product from a database press  button. The following message is displayed:



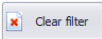
Press **Yes** button to confirm deletion of a selected product.

### 6.1.3. Product Finding and Filtering

Each product registered by the system can be found by name, number etc., i.e. by an appropriate string of characters entered in a given column.

Code	Name	Mass	Unit	Max	Min	Tare	Price	Archive
☺								


After typing the characters in the selected column, a list of products with the same string of characters is displayed.

To delete a filter for products display, press  button.

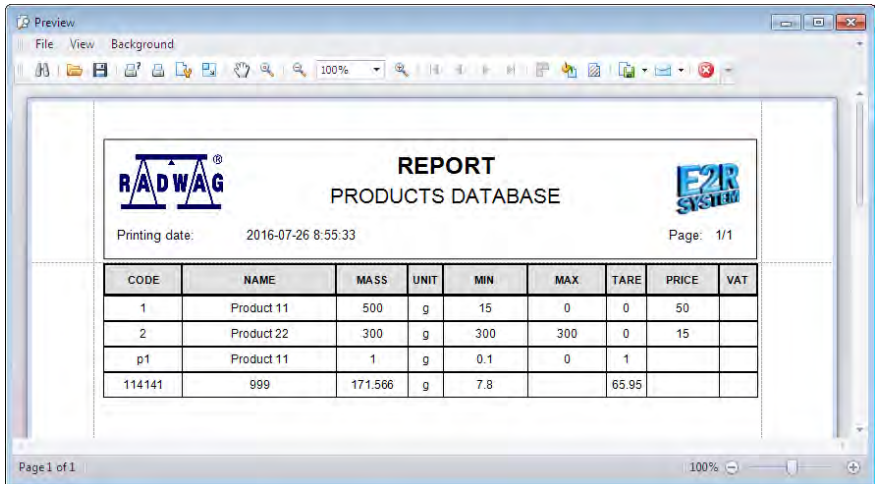
#### **CAUTION!**

***Information displayed in Products database work pane can be sorted and filtered with use of additional filtering options.***

### 6.1.4. Products Report

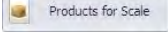
To generate report featuring list of products, go to Products work pane and press  button. A report is generated and opened is a **<Preview>** window.

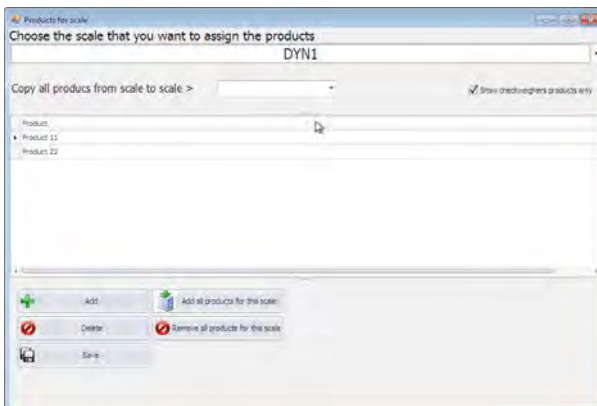




The generated report can be exported to the following file formats: **PDF, HTML, MHT, RTF, XLS, XLSX, CSV, TXT, BMP, JPEG, PNG, TIFF, GIF, WMF, EMF.**

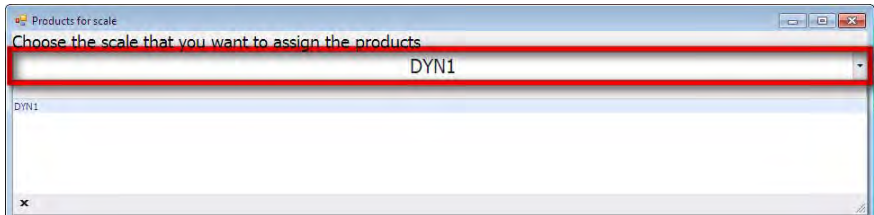
### 6.1.5. Assigning Products to Scales

In order to assign particular products to a given scale press  button. **Product for Scale Editor** opens. Use it to assign selected products to a scale of your choice or to copy products from one scale to another.

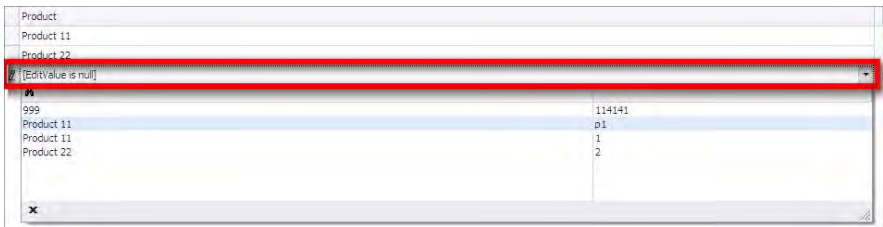


- **Assigning operation:**

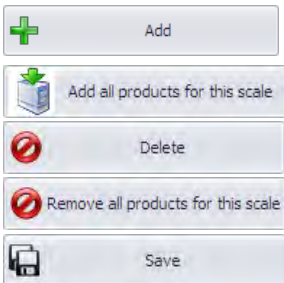
Using combo box select the scale.



Press  **Add** button, products list is displayed, select the product.



### Button

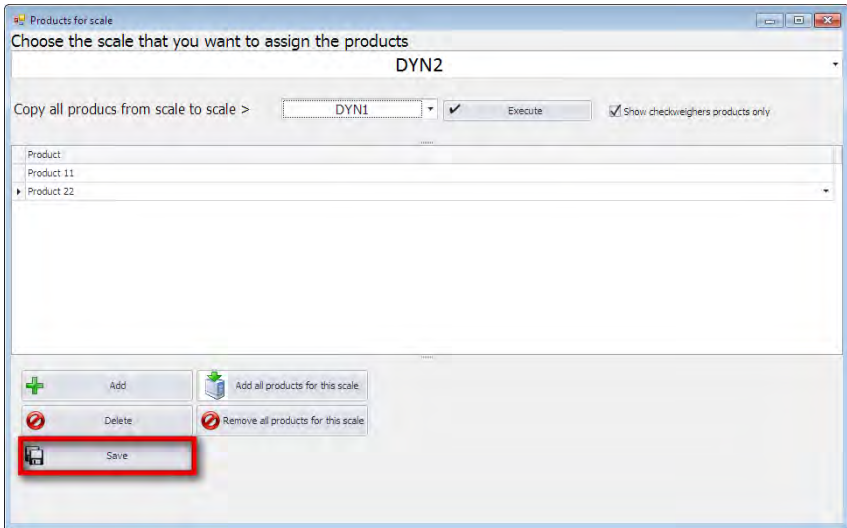


### Buttons list

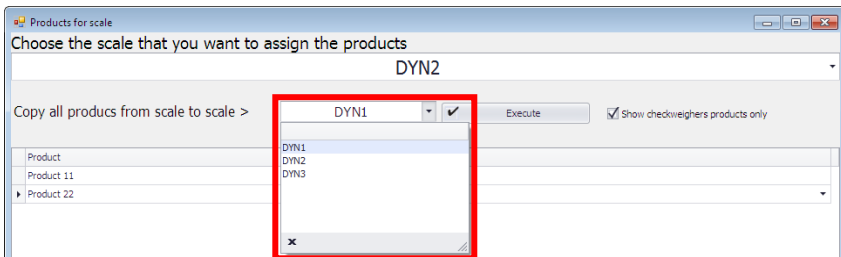
### Function

- Press to add a new database-stored product.
- Press to add all database-stored products.
- Press to delete selected product
- Press to delete all selected products
- Press to save changes

In order to save the assigned products press **<Save>** button.



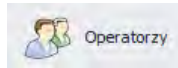
- **Copying operation:**



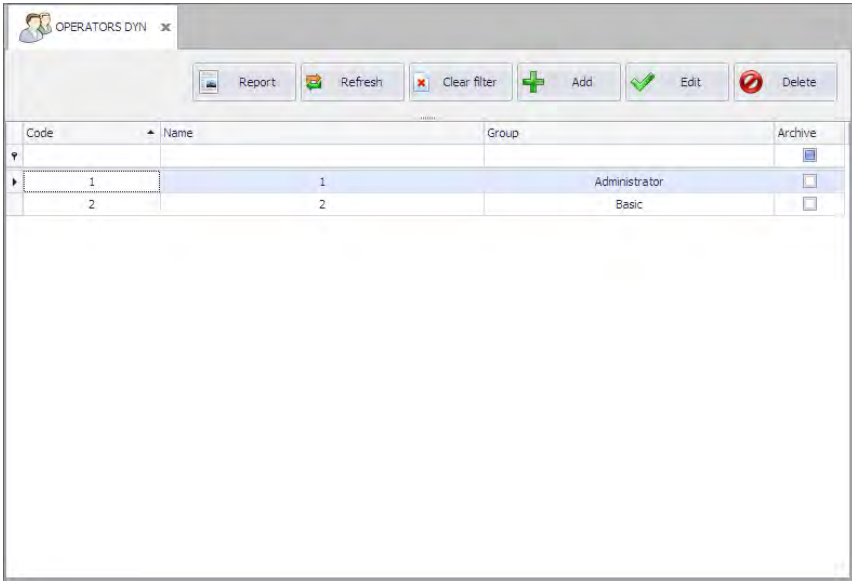
Using combo box select the scale. Press **Execute** button.  
In the above example products are copied from DYN2 scale to DYN1 scale.

## 6.2. Operators

Operators database allows managing records of program users. To run **Operators** module, press **Operators** button of the side toolbar.



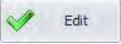
### Operators work pane:



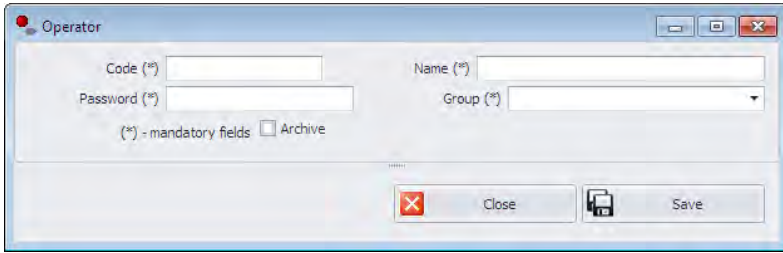
Operators work pane enables adding, deleting, modifying accounts of operators.

### 6.2.1. Adding / editing an operator

To add a new operator to the database, press  button.

To edit a particular operator, press  button.

## Operator editor (window for adding and editing operators records):

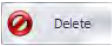


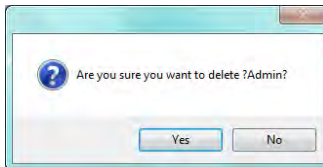
### Where:

<b>Code</b>	Operator's code, login
<b>Name</b>	Operator's name and surname
<b>Password</b>	Operator's password
<b>Group</b>	Authorization group specifying access levels to particular program functions. <b>&lt;Administrator&gt;</b> – full access to program functions <b>&lt;Wagowy&gt;</b> – limited access to program functions
<b>Archive</b>	This box, when ticked, makes the particular operator inactive

When all required data has been entered or modified press <Save> button, next press <Close> button.

### 6.2.2. Deleting Operator

To delete a particular operator from a database press  button. The following message is displayed:



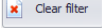
Press **Yes** button to confirm deletion of a selected product.

### 6.2.3. Operator Finding and Filtering

Each operator registered by the system can be found by name, number etc., i.e. by an appropriate string of characters entered in a given column.

Code	Name	Group
▼		


After typing the characters in the selected column, a list of operators with the same string of characters is displayed.

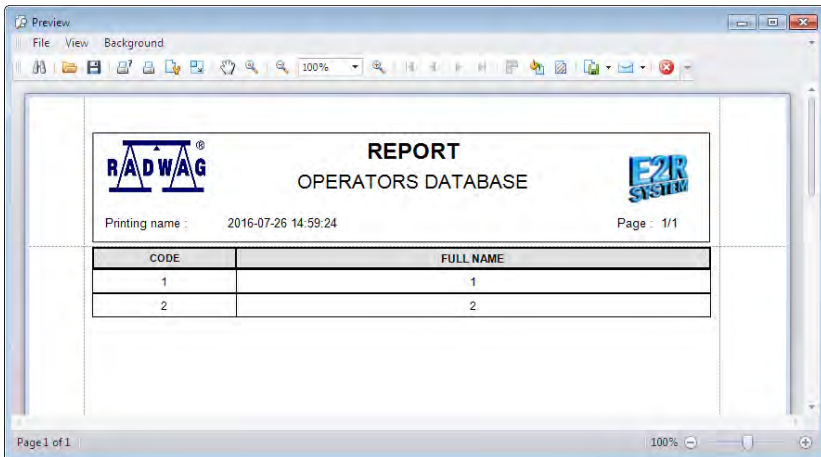
To delete a filter for products display, press  button.

#### **CAUTION!**

***Information displayed in Operators database work pane can be sorted and filtered with use of additional filtering options.***

### 6.2.4. Operators Report

To generate report featuring list of operators, go to Operators work pane and press  button. A report is generated and opened is a <Preview> window.



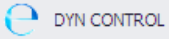
The generated report can be exported to the following file formats: **PDF, HTML, MHT, RTF, XLS, XLSX, CSV, TXT, BMP, JPEG, PNG, TIFF, GIF, WMF, EMF.**

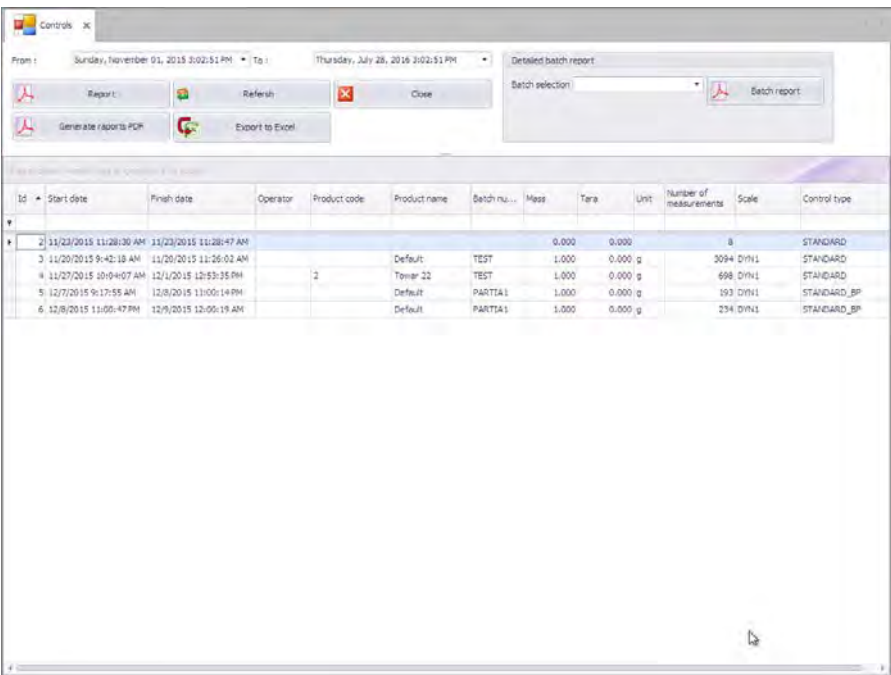
## 7. STANDARD REPORTS

### 7.1. CONTROLS

Controls work pane features reports generated and stored by each checkweigher.

#### 7.1.1. Control Work Pane

To open Control work pane press press  button of the side toolbar.

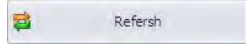


Control work pane enables preview and printout of Control Reports.

Reports can be sorted by more than one column at a time, e.g. by start date, control type and product.

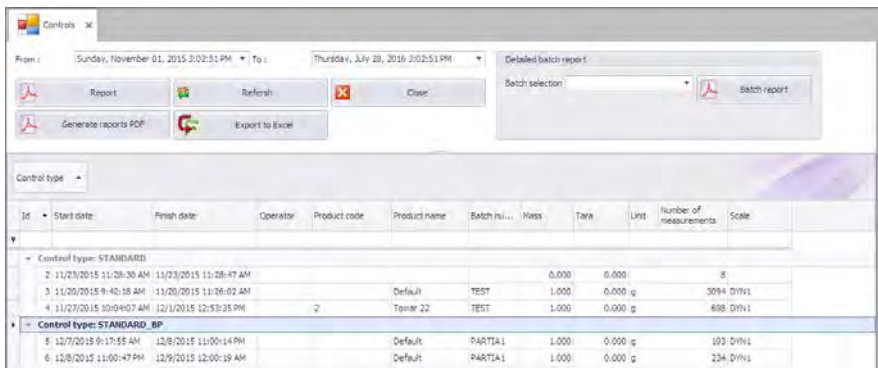
Sorting conditions are grouped depending on order of addition. Section enabling operator to set time interval for the report is to be found at the top.

Upon editing time parameters it is necessary to press



Control work pane features option of advanced filtering carried out using **Filter Editor**.

Reports grouping example:



ID	Start date	Finish date	Operator	Product code	Product name	Batch (u...)	Mass	Tare	Unit	Number of measurements	Scale
Control type: STANDARD											
2	11/23/2015 11:28:30 AM	11/23/2015 11:28:47 AM					0.000	0.000		8	
3	11/20/2015 9:40:18 AM	11/20/2015 11:26:02 AM			Default	TEST	1.000	0.000	g	3094	DIV1
4	11/27/2015 10:04:07 AM	12/1/2015 12:53:35 PM	2		Temp# 22	TEST	1.000	0.000	g	688	DIV1
Control type: STANDARD_BP											
5	12/7/2015 9:17:55 AM	12/8/2015 11:00:14 PM			Default	PARTIA1	1.000	0.000	g	193	DIV1
6	12/8/2015 11:00:47 PM	12/9/2015 12:00:19 AM			Default	PARTIA1	1.000	0.000	g	234	DIV1

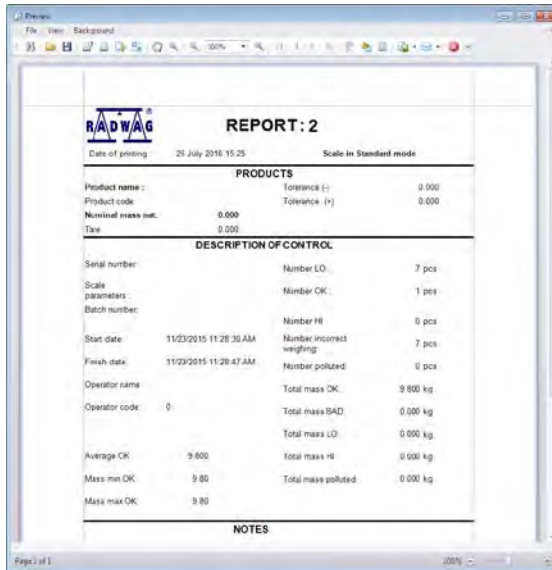
### 7.1.2. Report Preview

There are three report types:






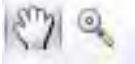
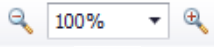


- PGC
- STANDARD
- PRODUCT

It is possible to preview all reports of particular type for a specified time interval.





## Functions Overview

-  Print, options of printer selection and print setup enabled
-  Page Setup
-  Quick Print
-  Scale
-  Search button enabling to find a given phrase
-  Mouse operation mode change
-  Zoom in/out
-  Report's background colour
-  Watermark



Export to file



Preview exit

**List of available file formats:**

- ✓ PDF File
- HTML File
- MHT File
- RTF File
- XLS File
- XLSX File
- CSV File
- Text File
- Image File

## 7.2. FG WEIGHINGS

Preview of weighings carried out by the scale.

## 8. STATISTICS REPORTS

**<Statistics Reports>** database enables:

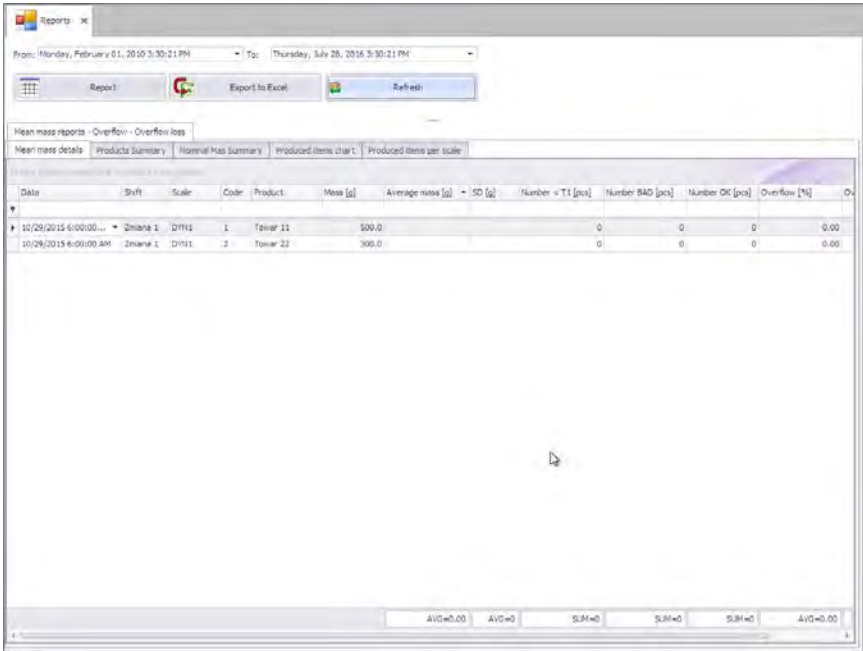
- generating various types of reports for user-specified time interval
- analysis of weighing process and production performance based on weighings that can be filtered and presented in a graphic form (graphs).

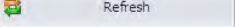
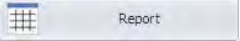
Reports types:

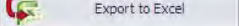
- Mean Mass Report
- Shift Report
- Hourly Report
- Efficiency Report
- Productivity Report
- Uptime/Downtime Report
- Contaminated Pcs.Report

## 8.1. Mean Mass Report

To run **Mean Mass Report** module, press **Mean Mass** button of the side toolbar.



Specify time interval and press  button. In order to generate report, press  button. The generated report is based on **Mean Mass Report** work pane table, it can be either printed or saved.

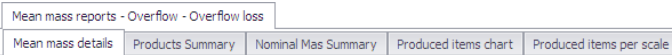
To export table data to MS Excel press  button.

The data can be sorted by more than one column at a time, e.g. by date, product and a nominal mass.

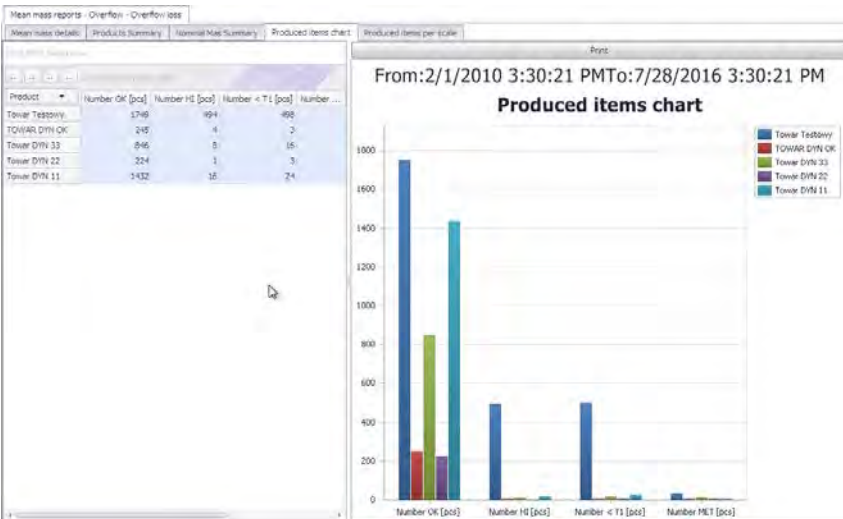
The Mean Mass work pane features option of advanced filtering carried out using **Filter Editor** (read section 4.6.2. and 4.6.3.).

Work pane tabs provide access to the following reports and graphs:

- Mean mass details
- Product summary
- Nominal mass summary
- Produced items chart
- Produced items per scale



Graph are generated on the basis of specified data range. The data can be filtered, for instruction on filtering read section 5.6. The graph can be printed, to do it press **<Print>** button.

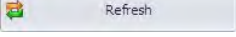
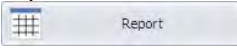


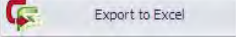
Data selection is carried out using the mouse, drag the cursor over particular cells pressing left button down.

## 8.2. Shift Report

To run **Shift Report** module, press **Shift** button of the side toolbar.

Shift	Date	Start date	Finish date	Scale	Code	Product	Mass [g]	Number of weig...	Number OK [pcs]	Number BAD [pcs]	Average mass [g]	SD [g]	Mass
Zmiana 2	3/13/2012			DW11	22	Towar DY...	95.0000	0	0	0			
Zmiana 1	3/14/2012			DW11	22	Towar DY...	95.0000	0	0	0			
Zmiana 2	3/14/2012			DW12	2	Towar DY...	100.0000	0	0	0			
Zmiana 2	11/30/2011	11/30/2011 2:12:31 PM	11/30/2011 2:14:27 PM	DW13	2	Towar DY...	100.0000	230	224	6	99.061	5.6627	2
Zmiana 2	11/30/2011	11/30/2011 2:12:03 PM	11/30/2011 2:14:29 PM	DW13	8A1	Towar DY...	80.0000	441	423	18	79.417	5.1251	3
Zmiana 2	11/30/2011	11/30/2011 2:12:18 PM	11/30/2011 2:14:26 PM	DW12	T1	TQIWAR...	800.0000	234	245	9	499.928	8.0827	12
Zmiana 2	11/30/2011	11/30/2011 2:12:03 PM	11/30/2011 2:14:29 PM	DW14	8A1	Towar DY...	80.0000	441	423	18	79.417	5.1251	3
Zmiana 2	11/30/2011	11/30/2011 1:54:32 PM	11/30/2011 2:14:31 PM	DW11	22	Towar DY...	95.0000	737	715	21	94.611	5.6020	6
Zmiana 2	11/30/2011	11/30/2011 1:54:32 PM	11/30/2011 2:14:31 PM	DW16	22	Towar DY...	95.0000	737	715	21	94.611	5.6020	6
Zmiana 1	11/2/2011	11/2/2011 9:51:53 AM	11/2/2011 10:02:47 AM	DW11	16	Towar Te...	500.0000	2771	1749	1022	504.675	47.5538	139

Specify time interval and press  button. In order to generate report, press  button. The generated report is based on **Shift Report** work pane table, it can be either printed or saved.

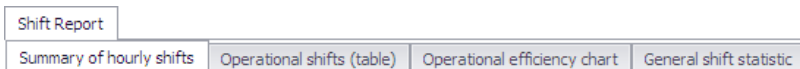
To export table data to MS Excel press  button.

The data can be sorted by more than one column at a time, e.g. by date, product and a nominal mass.

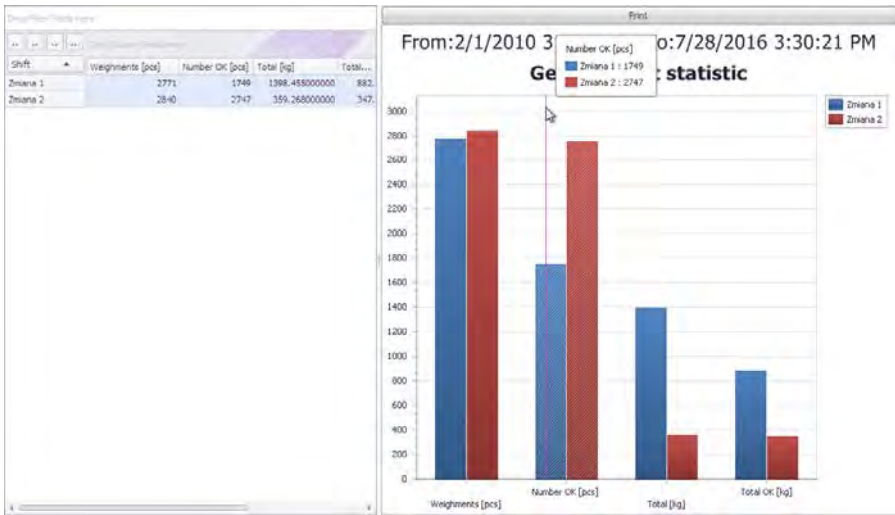
The **Shift Report** work pane features option of advanced filtering carried out using Filter Editor (read section 4.6.2. and 4.6.3.).

Work pane tabs provide access to the following reports and graphs:

- Summary of hourly shifts
- Operational shifts (table)
- Operational efficiency chart
- General shift statistics



Graph are generated on the basis of specified data range. The data can be filtered, for instruction on filtering read section 5.6. The graph can be printed, to do it press **<Print>** button.

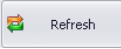
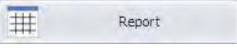


Data selection is carried out using the mouse, drag the cursor over particular cells pressing left button down.

### 8.3. Hourly report

To run **Hourly Report** module, press **Hourly** button of the side toolbar.

Start	Stop	Started	Finished	Number product per hour [pcs]	Final number products [pcs]	Total mass per hour [kg]	Final total mass [kg]
2011-11-2 9	2011-11-2 10	11/2/2011 9:51:53 AM	11/2/2011 9:57:21 AM	648	648	326.8040	326.804
2011-11-2 10	2011-11-2 11	11/2/2011 10:00:23 AM	11/2/2011 10:02:47 AM	2123	2771	1071.8510	1988.458
2011-11-30 13	2011-11-30 14	11/30/2011 1:54:32 PM	11/30/2011 1:59:38 PM	600	3371	56.3530	1455.308
2011-11-30 14	2011-11-30 18	11/30/2011 2:12:03 PM	11/30/2011 2:14:31 PM	2882	4433	187.6640	2832.472
2012-2-12 15	2012-2-12 16	3/13/2012 3:11:40 PM	3/13/2012 3:14:45 PM	133	4566	12.6510	2685.622
2012-2-14 9	2012-2-14 10	3/14/2012 9:51:46 AM	3/14/2012 9:56:43 AM	477	3042	46.4640	1711.077
2012-3-14 10	2012-3-14 11	3/14/2012 10:09:05 AM	3/14/2012 10:56:18 AM	5837	10680	2598.9380	4310.015
2012-3-14 11	2012-3-14 12	3/14/2012 11:33:46 AM	3/14/2012 11:59:59 AM	1787	12467	250.6110	4560.626
2012-3-14 12	2012-3-14 13	3/14/2012 12:00:00 PM	3/14/2012 12:59:59 PM	7003	19470	733.5470	5294.173
2012-3-14 13	2012-3-14 14	3/14/2012 1:00:00 PM	3/14/2012 1:30:40 PM	3662	23132	363.4070	5657.550

Specify time interval and press  button. In order to generate report, press  button. The generated report is based on **Hourly Report** work pane table, it can be either printed or saved.

To export table data to MS Excel press  button.

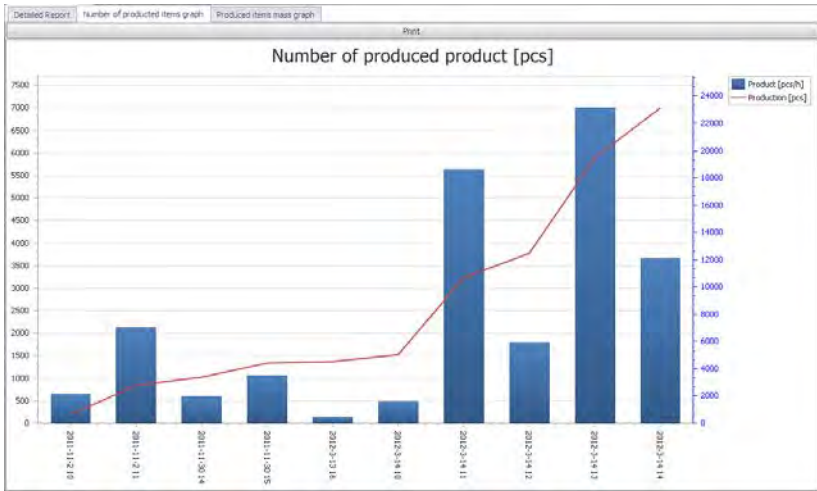
The data can be sorted by more than one column at a time, e.g. by date, product and a nominal mass.

The **Hourly Report** work pane features option of advanced filtering carried out using Filter Editor (read section 4.6.2. and 4.6.3.).

Work pane tabs provide access to the following graphs:

- Number of produced items graph
- Produced items mass graph

The graphs are generated for a specified time interval.



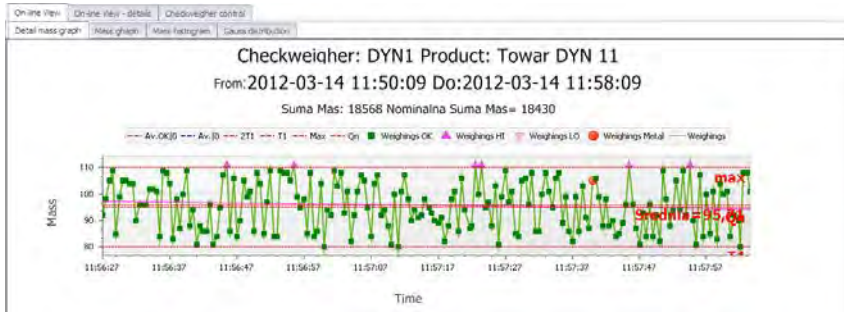
By pressing <Print> button you can access print settings and save graph.

#### 8.4. Efficiency report.

### 9. Checkweigher Online

#### 9.1. Online Preview

To run **Online Preview** window, press **Online Preview** button of the side toolbar.





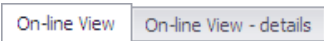
Operating this window enables online preview of weighings carried out on system-connected scales and analysis of measurements performed within specified time interval.

Select scale and specify how long the measurement is to be previewed (1 – 120 minutes). The window provides information on currently selected product.



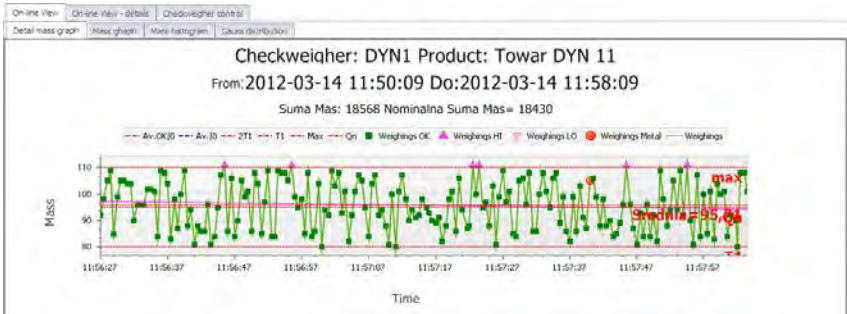
There are two preview types:

- On-line View
- On-line View - details

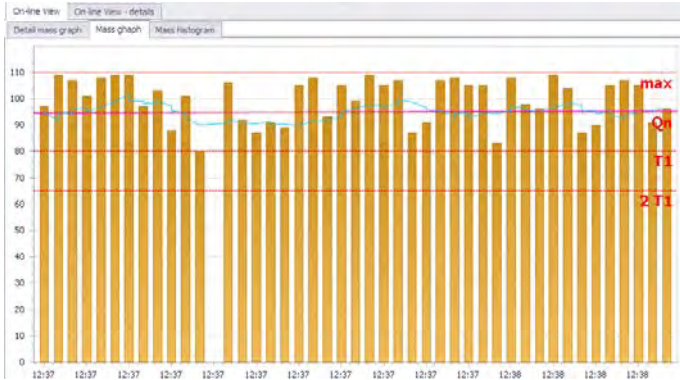


On-line preview enables you to watch particular scale in the course of operation. The measurements are previewed on the basis of:

- detailed mass graph
- mass graph
- mass bar graph



Detailed mass graph



Mass graph

On-line2 enables you to analyse measurements of all scales at one time.

The analysis is based on bar charts and tables with the following data:

Quantity of all measurements

Quantity of measurements below LO threshold

Quantity of measurements above HI threshold

Quantity of measurements with metal contamination detected

Quantity of measurements per minute

Nominal mass of product Qn

Permissible minimum mass

Maximum measured mass

Average mass







**RADWAG BALANCES AND SCALES**  
ADVANCED WEIGHING TECHNOLOGIES

