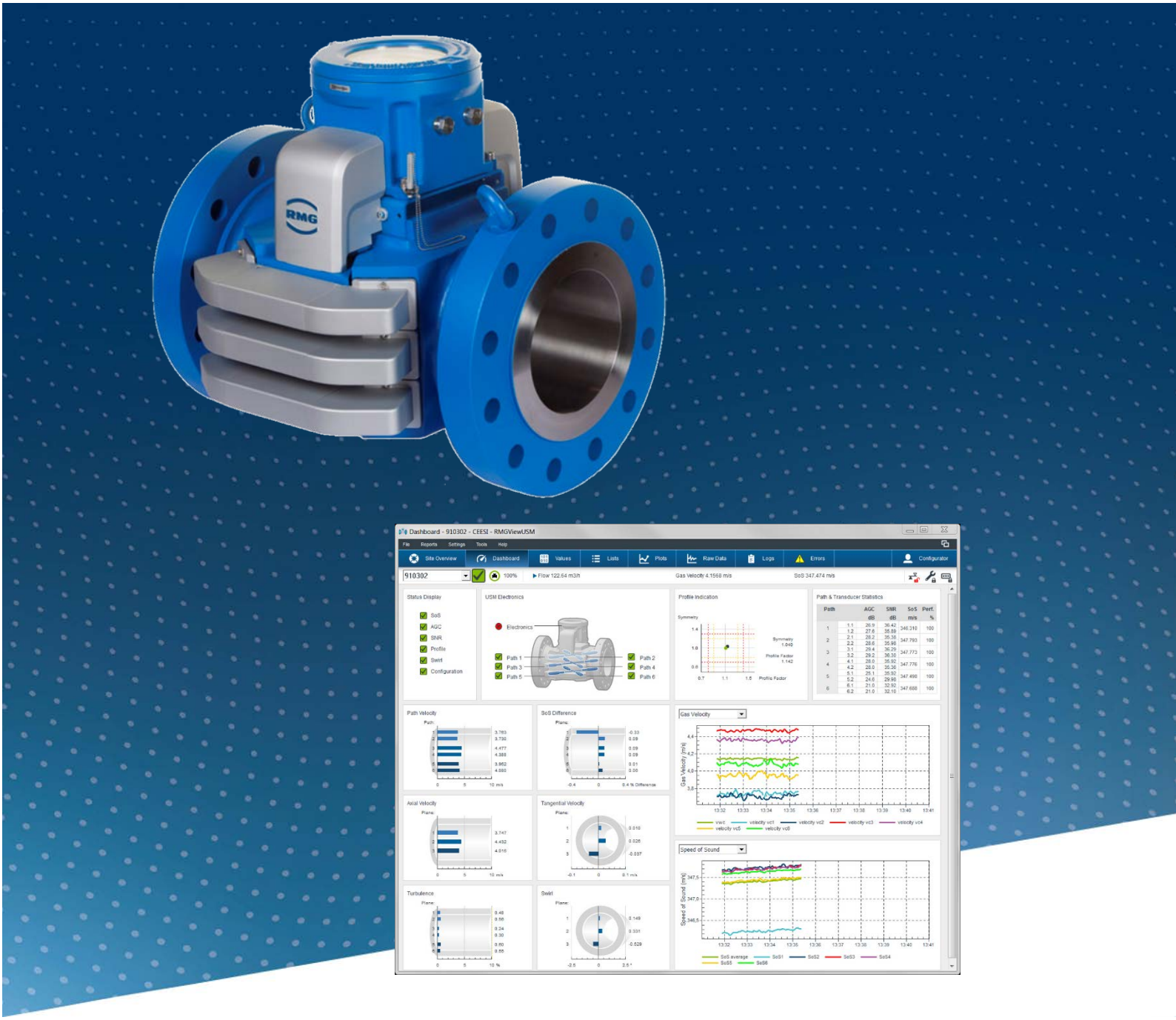

Operating Instruction

RMGView^{USM}

Firmware: 5.0
State: 2021, February 11th
Version: 05 EN

Manufactorer

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Original document

The **RMGViewUSM_manual_en_05** for the USM-GT400 from 2020, April 27th is a translation of the original German manual. Anyhow, this document may serve as reference for translations into other languages. Please use in case of any uncertainties the German version as main reference.

Remark

Note

Unfortunately, paper is not updated automatically, whereas technical development continuously advances. Therefore, we reserve the right to make technical changes in regard to the representations and specifications of these operating instructions. The latest version of this manual (and the one of other devices) can be downloaded at your convenience from our Internet page:

www.rmg.com

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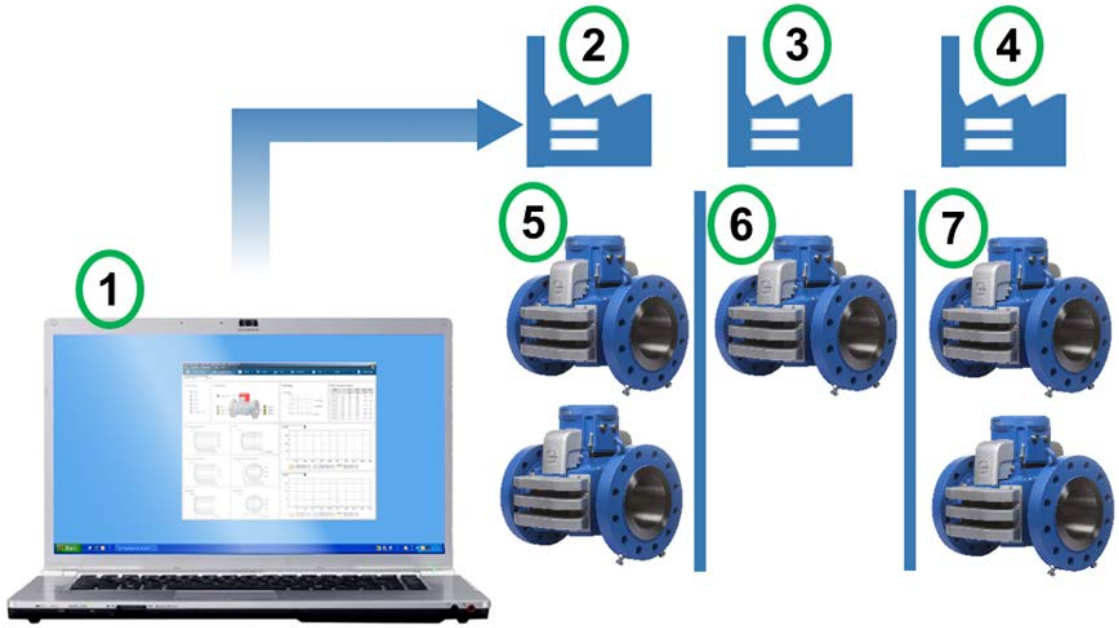
1 General

In this chapter you will receive general information on the manual and on the device.

1.1 Motivation for the software



1	PC with RMGView^{USM}	5	Devices for Site 1
2	Site 1	6	Devices for Site 2
3	Site 2	7	Devices for Site 3
4	Site 3		

Figure 1: Application example

You can manage several sites with the RMGView^{USM} software. For every site you can include as many devices with their connection data as you wish. Using these Modbus addresses, data can be read from the device and data can be transmitted from the PC (1) to the device.

The example shows how three sites (2, 3, 4) can be managed with the RMGView^{USM} software. For every site, Modbus addresses are set up using RMGView^{USM} to enable a connection to the devices.

- For site 1 (2), two Modbus addresses (5) were set up to establish the connection.
- For site 2 (3), one Modbus address (6) was set up.
- For site 3 (4), two Modbus addresses (7) were set up.

With RMGView^{USM} you can:

- Set up and manage several sites.
- Assign several devices (USM) to a site and manage them.
- Read out the actual measured values (actual values) in real time.
- Display values in table form, as diagrams, as graphics or in individual fields.
- Request predefined lists that read out and show certain parameters from the device.
- Request predefined plots that display the parameters in a diagram.
- Create user defined lists and output them as reports.
- Create user defined plots that display the parameters in a diagram.
- RMGView^{USM} automatically recognizes the firmware of the attached device. Only those parameters that are functional with the attached device are displayed
- Parameterize the attached device.
- Create test reports

1.2 About this manual

In this chapter you will receive information regarding the organization and objective of the manual and the knowledge prerequisites needed by the reader.

1.2.1 Trade mark

All the hardware and software names used in the manual may also be registered trademarks of third parties or under other brand protection. In this respect, the trade mark rights of third parties are to be respected.

1.2.2 Objective of the manual

The manual provides you with the information that is needed for trouble-free and safe operation. The software is state of the art and conceived and programmed according to the recognized safety standards and guidelines. However, hazardous situations may arise as a result of their use. Possible hazards for:

- functions of the connected devices

For this reason, you may only operate the software as intended and in technically defect-free condition.

1.2.3 Prerequisite knowledge required

The manual assumes that the users are familiar with Microsoft Windows operating system and the operating elements, e.g. drop-down menus, buttons etc. MS Windows typical screens e.g. **Save As...** and their operating elements are not described in this manual.

1.2.4 Structure of notes

The following information screens are used in the manual:

Note

This warning screen informs you of potentially hazardous situations that can occur as a result of incorrect operation or human error. If these situations are not avoided, they can result in material damage to the machine or in the vicinity.

This information gives you tips on how to simplify your work. With this screen, you additionally receive further information on the product or the work process.

1.2.5 Abbreviations used

In this chapter of the manual, the abbreviations used are explained.

AGC	Automatic Gain Control
ca.	circa, approximately
as app.	as applicable
max.	maximum
MC	Measurement Canada
MID	Measurement Instruments Directive
min.	minimum
SNR	Signal Noise Ratio
SoS	Speed of Sound (ultrasonic velocity)
TD	Transducer
TNG	Transducer of a certain type
USE	Ultrasonic electronic
USM (USZ)	Ultrasonic gas meter
e.g.	For example

1.2.6 Symbols used

1, 2, …	Steps within a work operation.
..	

1.2.7 Validity

This manual describes the software RMGView^{USM}.

The software RMGView^{USM} is only a part of a complete site system. Please also observe the manuals of the other components of the site in order to guarantee safe operation.

2 Installation

In this chapter you will be given information on the system requirements for the PC, on the software installation and on making a connection to the device.

2.1 System requirements

The PC must fulfill following specification:

- Operating system Microsoft Windows 7 (32 Bit and 64 Bit) and Windows 10 (64 Bit)
- Min. screen resolution of 1024 × 768 pixel
- A converter that converts the signal for RS 232 / RS 485 is required for USB or COM interfaces.
- For the conversion “Modbus over IP“ a converter is required, too.

2.2 Files delivered

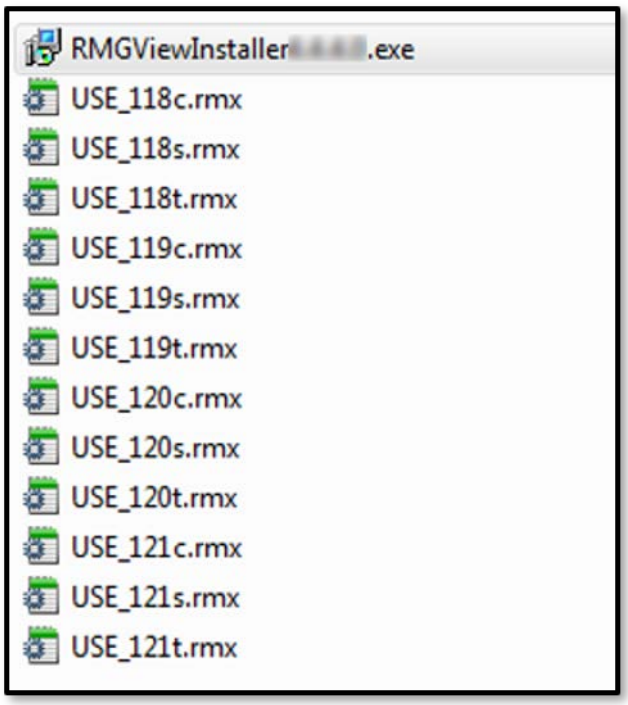


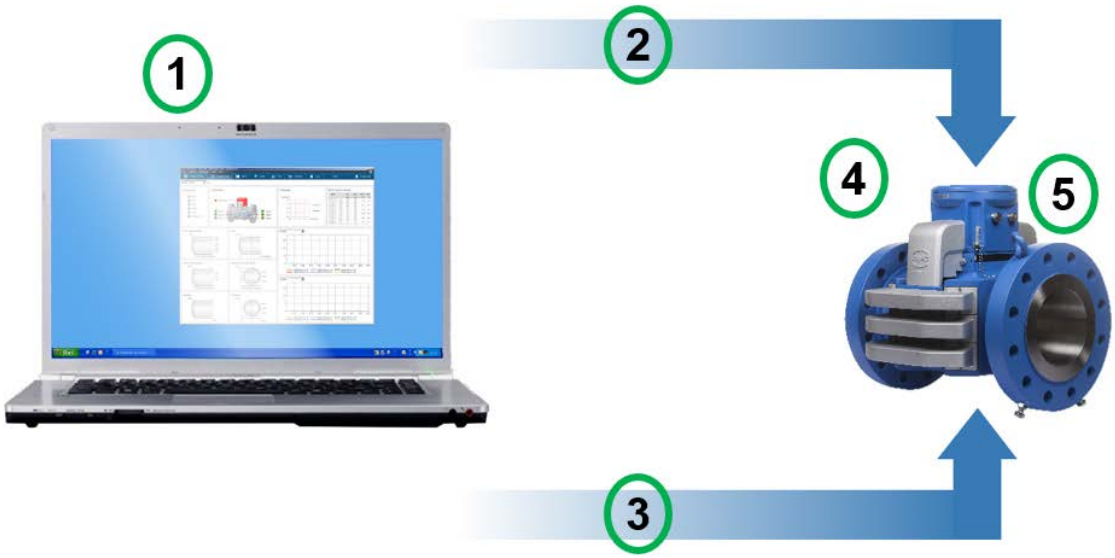
Figure 2: Files delivered

You will receive various files on delivery of the RMGView[USM] software. As an example, the installation files and the associated rmx files in RMGView[USM] 5.0 version are shown.

6

2.3 Preparing devices for connection

During installation, information on the COM port or the IP address will be required in order to make a connection between the software and the ultrasonic electronics.



1 PC with RMGView[USM]
2 IP Address
3 COM Interface (RS485 / RS232)
4 USM-GT400
5 USE (Electronic on the USM-GT400)

Figure 3: Connection scheme

The following connection options to the USE are available to you:

- Connection via a serial COM port (RS 485/RS 232) on the PC.
  PC (1) and USE (5) are connected with a cable.
- Connection via IP address.
  For this the PC is connected to the Internet.

Determine the connection data

1.) Determine the IP address of the USE respectively the name of the COM port on the PC.

2.4 Installing software

Note

In order to install the new version of RMGView^{USM} it is not necessary to uninstall the older version.

Starting Installation

1. Double click here on the installation file e.g. RMGView^{USM} installer xxx.exe.

   The window RMGView^{USM} **X.X Setup** opens.

Figure 4: Agree to license contract

You must read the license contract and agree to it in order to continue with the installation.

2. Check the box **I agree to the terms and conditions of the license contract.**

3. Click the Install button.

The status of the installation is shown by an animated time bar.
The successful installation is displayed in the RMGView^{USM} **xxx Setup** window.

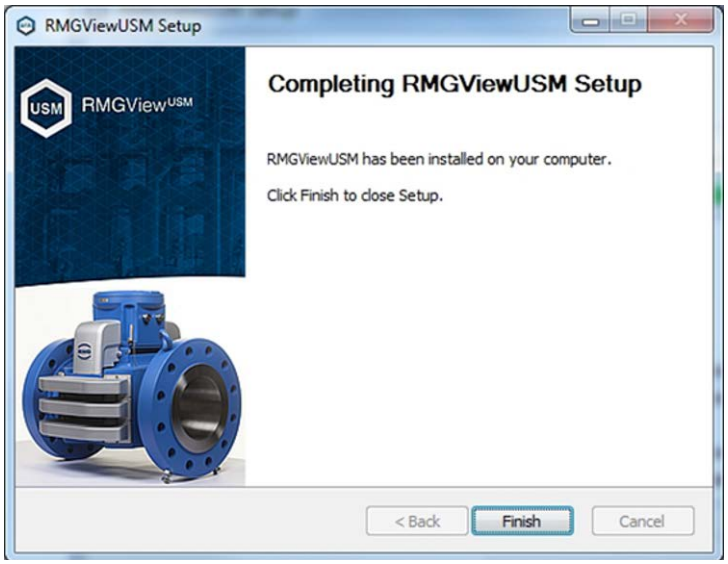


Figure 5: Finish installation

4. Click „**Finish**“.

   The installation is then completed.

Connect PC

1. Connect the PC with the IP address of the device via the network.

   or

   Connect the USE cable to the COM port on the PC.

COM port: see the operating instructions USM-GT400

Connection via cable

Use the following cable:

- Twisted pair and shielded cable
- maximum length 500 m
- Type LiYCX 2 × 2 × 0,75 mm^2

2.5 Configuring the site and devices

Start RMGView^{USM}

1. Press the **Windows** key on the keyboard.
2. Click menu entry **RMGView^{USM}**

A start screen will be displayed.

Note

It is possible that the version and revision number may differ from that of the figure shown.

Figure 6: Start screen

After the starting sequence the **Select Site** screen will be displayed.

With RMGView^{USM} you may manage several sites.

You may install and monitor several devices at each site.

Figure 7: Select Site screen

Assigning site names

After starting RMGView^{USM} a site is shown in the window **Select Site** with the title **New Site 1**. You may give this site any name.

1. Click on **New Site 1** with the right mouse.

   The context menu is opened.
2. Click on the menu entry **Rename** and assign a name.
3. Confirm the name with **Enter**.

The window **Select Site** closes. The window **USM Settings Modbus** opens.

Using the context menu, you can start following actions:

- Menu entry **New Folder**: File sites in folders.
- Menu entry **New Site**: Create further sites.
- Menu entry **Delete Site**: Delete sites. The devices in the site are also deleted.

In this window you can create a first device and set up the connection. You have two alternatives for creating a connection to the device. Connection via:

- IP address
- COM port on the PC

Setting up devices (Ultrasonic gas meter)

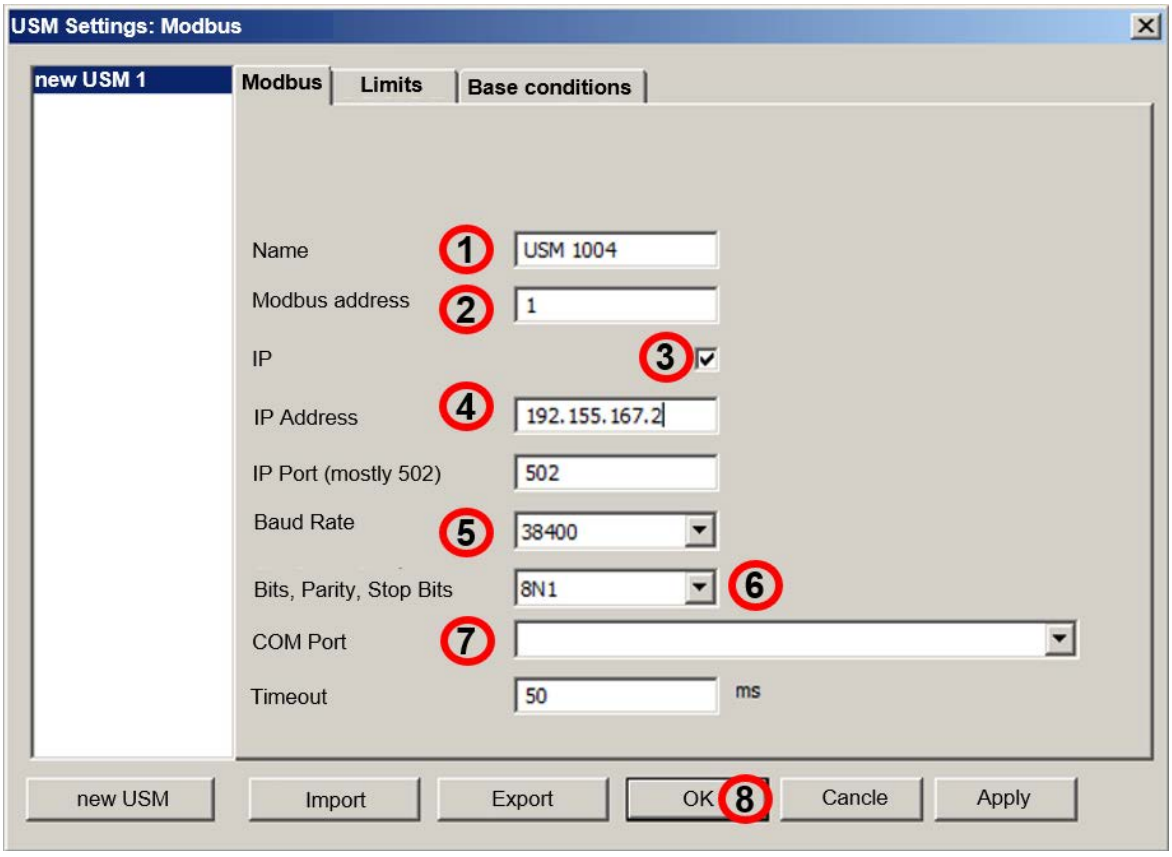


Figure 8: USM settings window: Modbus

1. Select the device to which you want to create a connection. Rename the device - if you require.
2. Enter the Modbus address with which the device should operate.
3. Define type of connection:

   ☑ IP address
   ⇒ *continue at step 4*

   ☐ COM interface
   ⇒ *continue at step 5*

For connections via IP Address

4. Enter the IP address of the USE
   ⇒ *continue at step 8*

Via COM port

5. Select value **38400** for the baud rate.
6. Select value **8N1** for Bits, Parity, Stop Bits.
7. Select COM port on the PC to which the USE is connected.

Finish set up

8. Click button **Apply**.

Note

If you want to create further connection data for a device, you will find information in *chapter 2.7 Adding further devices to the site, p. 20*

The **window USM settings** closes. The window **Site Overview - RMGView^{USM}** opens. Location and meter for the device are defined in this window.

2.5.1 Setting the language and start window

Activate the window for user options

1. Activate window **Dashboard - All USMs**.
   (*see chapter 4.1 Site overview, p. 39*).

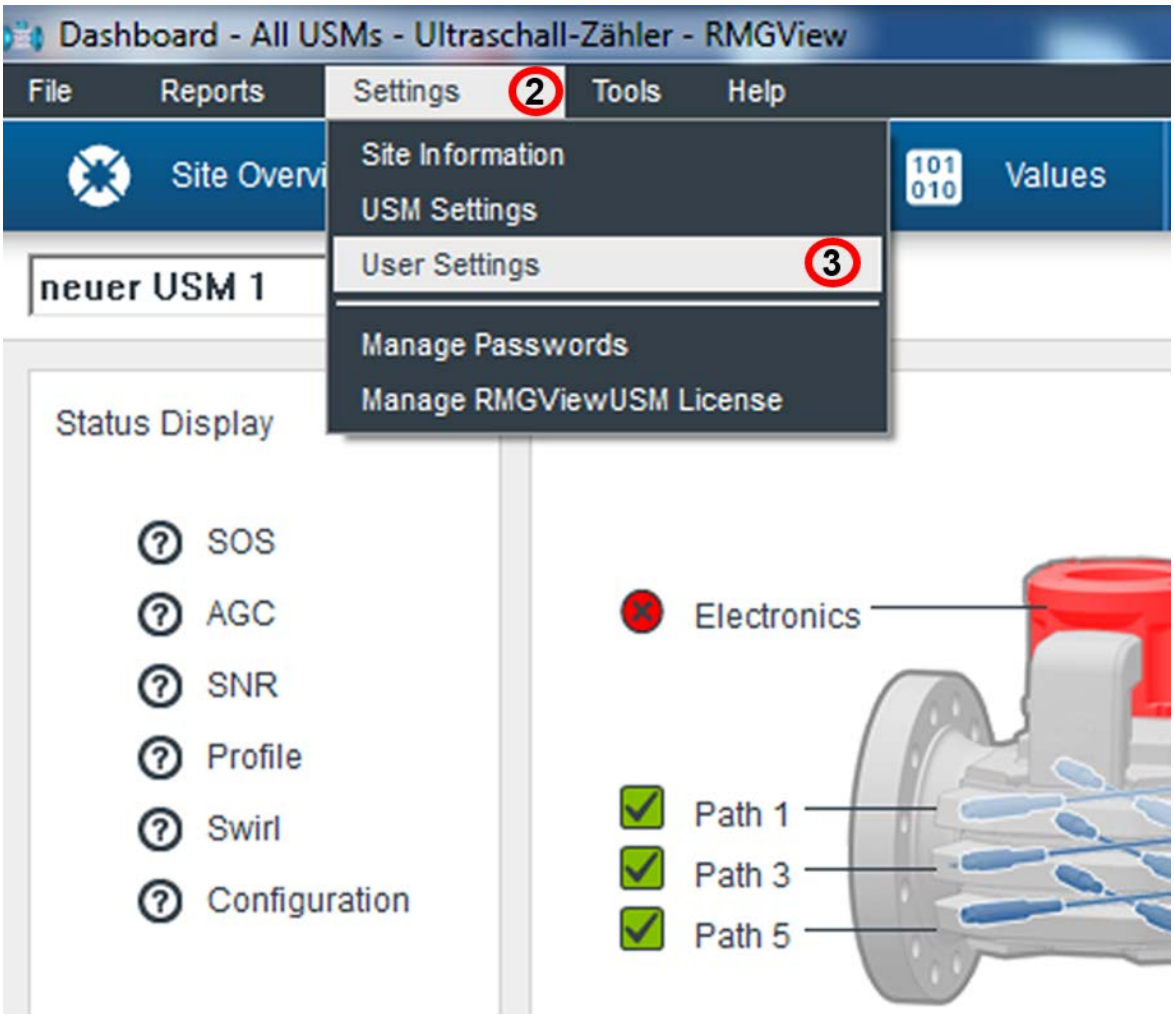


Figure 9: Menu entry select user settings

2. Click on menu **Settings** in the menu ribbon.
3. Click on menu entry **User Settings**.

   The **User Settings: User Interface** menu bar opens.

Set language

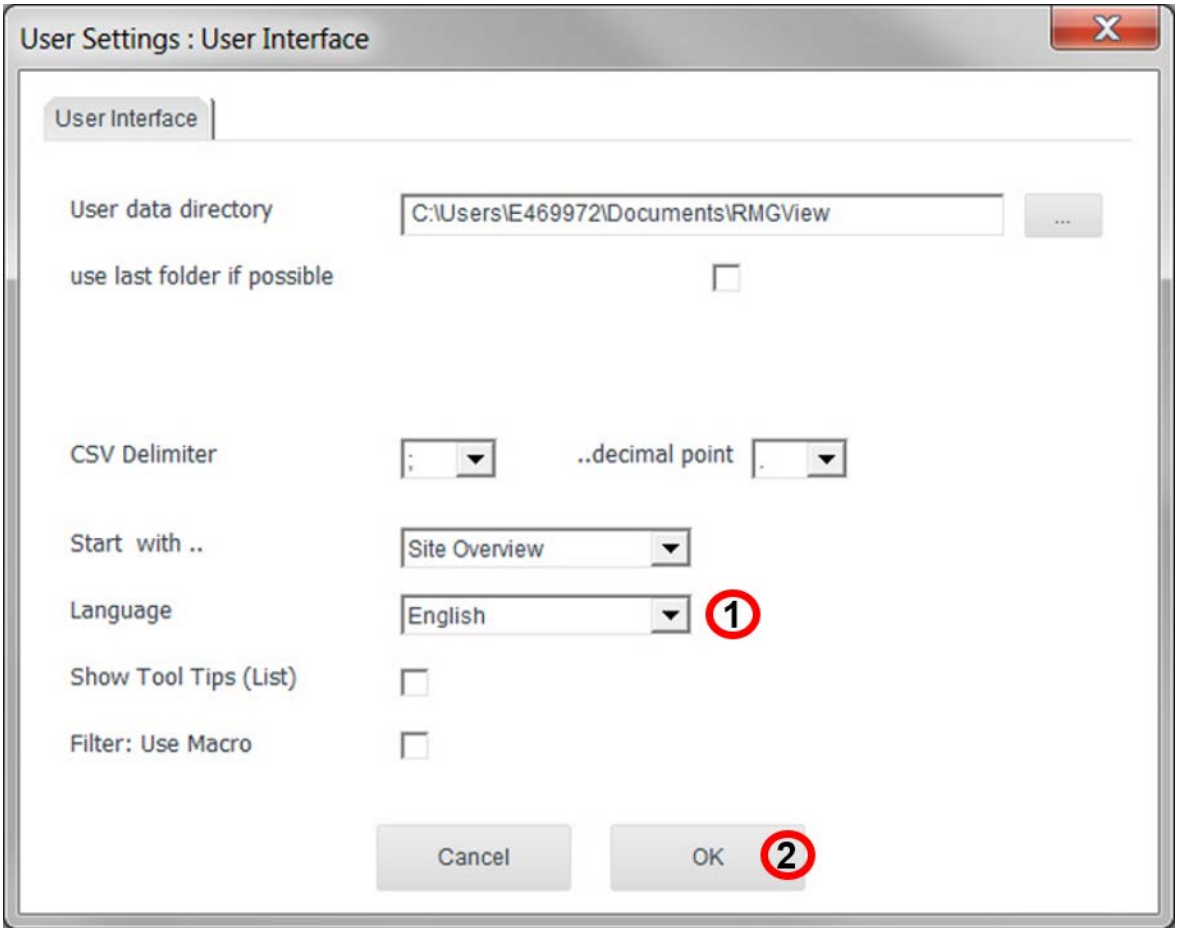


Figure 10: Set language

1. Open drop-down menu **Language** and select the appropriate entry.
2. Click **OK**.

The settings are saved.

Set-up start screen

Note

You can define a window as start screen that is displayed after the software is started. The windows that can be cued via the multifunction bar can be selected. (*see chapter 3.1 Operating and display elements, p. 22*).

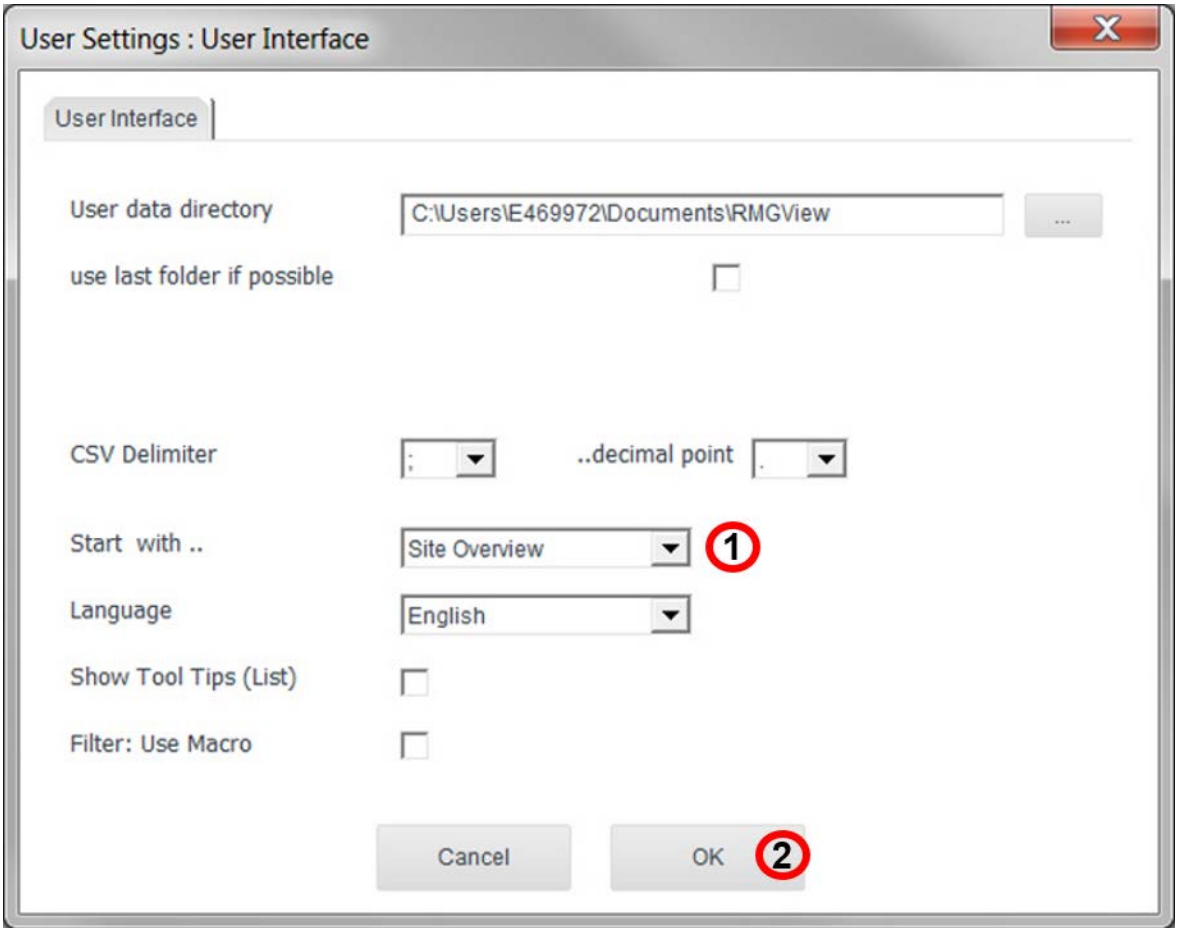


Figure 11: Set-up start screen

1. Open drop down menu **Start with..** and select appropriate entry.
2. Click **OK**.

The settings are saved.

2.5.2 Entering user data

Open window for site information

1. Activate window **Dashboard - All USMs**.
   (*see chapter 4.1 Site overview, p. 39).*

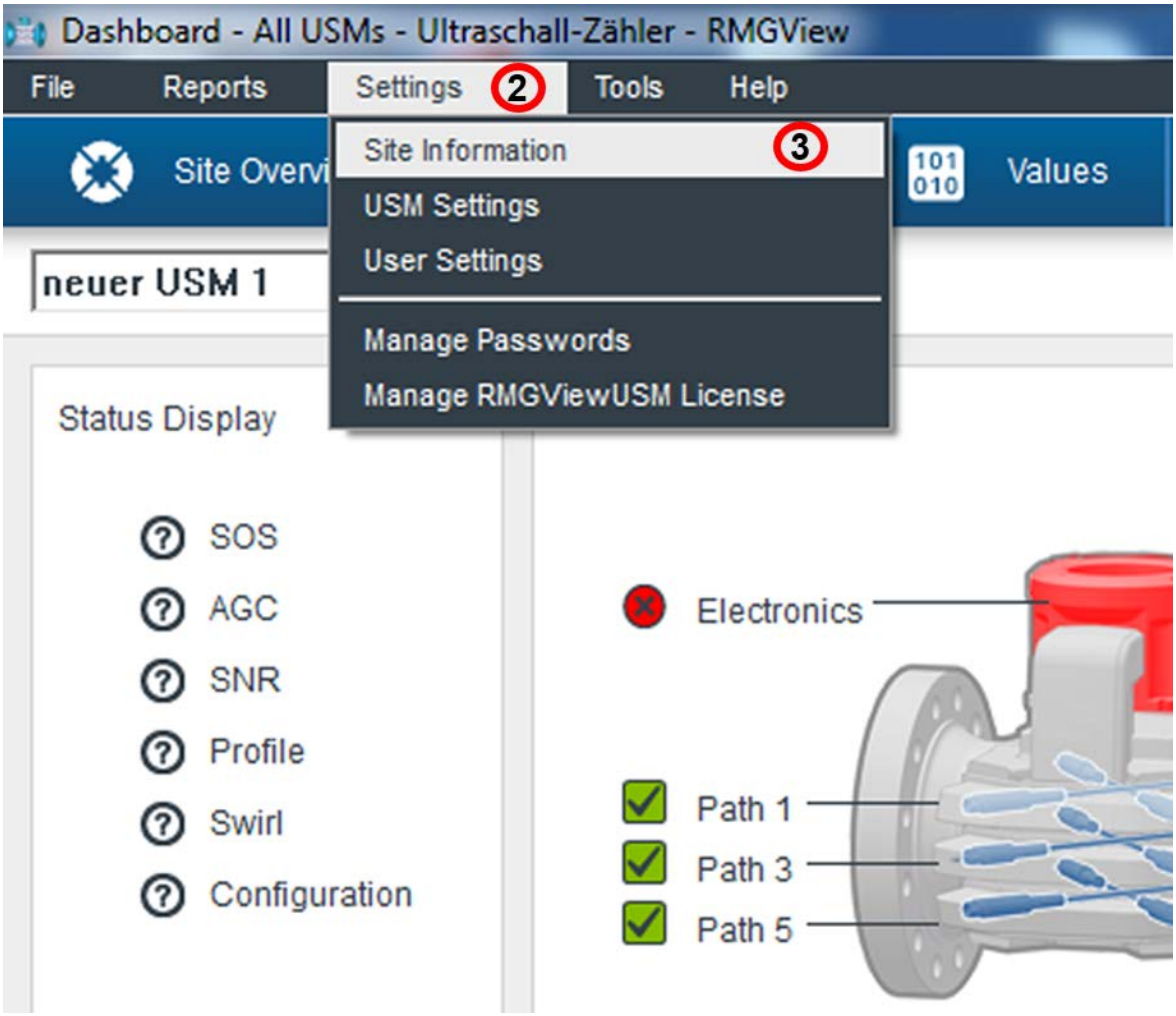


Figure 12: Select menu entry Site Information

2. Click on menu **Settings** in the menu bar.
3. Click menu entry **Site Information**.

The **Site information** window opens.

Enter values

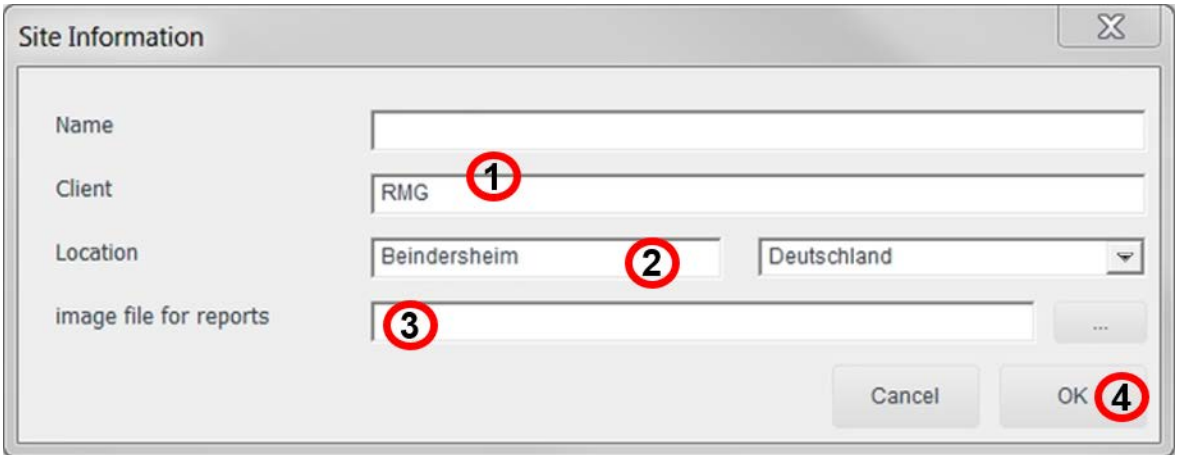


Figure 13: Select menu entry Site Information

1. Complete fields **Name**, **Client** and **Location**.
   (*see chapter 4.16 Information on installation, p. 66).*
2. Open drop-down menu **Location** and select appropriate entry.
3. You may choose an image that will be displayed at the protocol as a logo.
   Press the button "..." and choose the appropriate image in the directories.
4. Click **OK**.

The settings are saved.

2.6 Ensuring connection

In the **Site Overview** you can view the connection status for the installed Modbus addresses. Usually the connection can be realized without any problems.

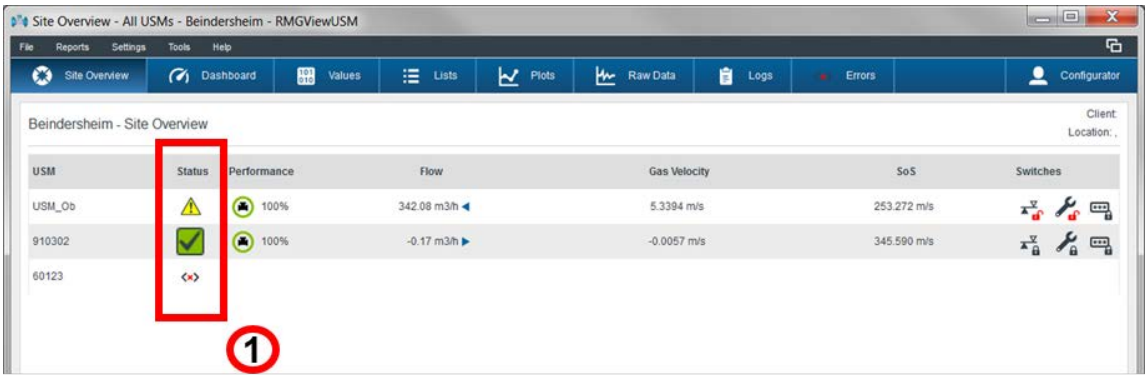


Figure 14: Overview installation window

For a successful connection:
The connection status to the device is shown as **(1)**.

The device is operating correctly. There are no errors..

A warning exists.

An alarm is pending.

There is an interruption between the PC and the device.

Open details on connection problem

You can find more information on the problem occurring in the window **Errors**. (*see chapter 4.8 Errors, p. 57*).

1. Click **Errors**.

The window **Errors** opens. The list informs you about the actions for setting up connections.

Open details on connection problem

You can find more information on the problem occurring in the window **Errors**. (*see chapter 4.8 Errors, p. 57*).

Click the window **Errors**.

The window **Errors** opens. The list informs you about the actions for setting up connections.

Fix connection problems

1. Check physical connections.
2. Check the Modbus address settings, if necessary, recreate Modbus address.
3. If the connection problems still exist, contact RMG service. (*Contact see p. II*)

2.7 Adding further devices to the site

You can add further devices to particular installation retroactively.

Open the window USM Settings

1. Activate window Dashboard - All USMs.
   (*see chapter 4.1 Site overview, p. 39).*

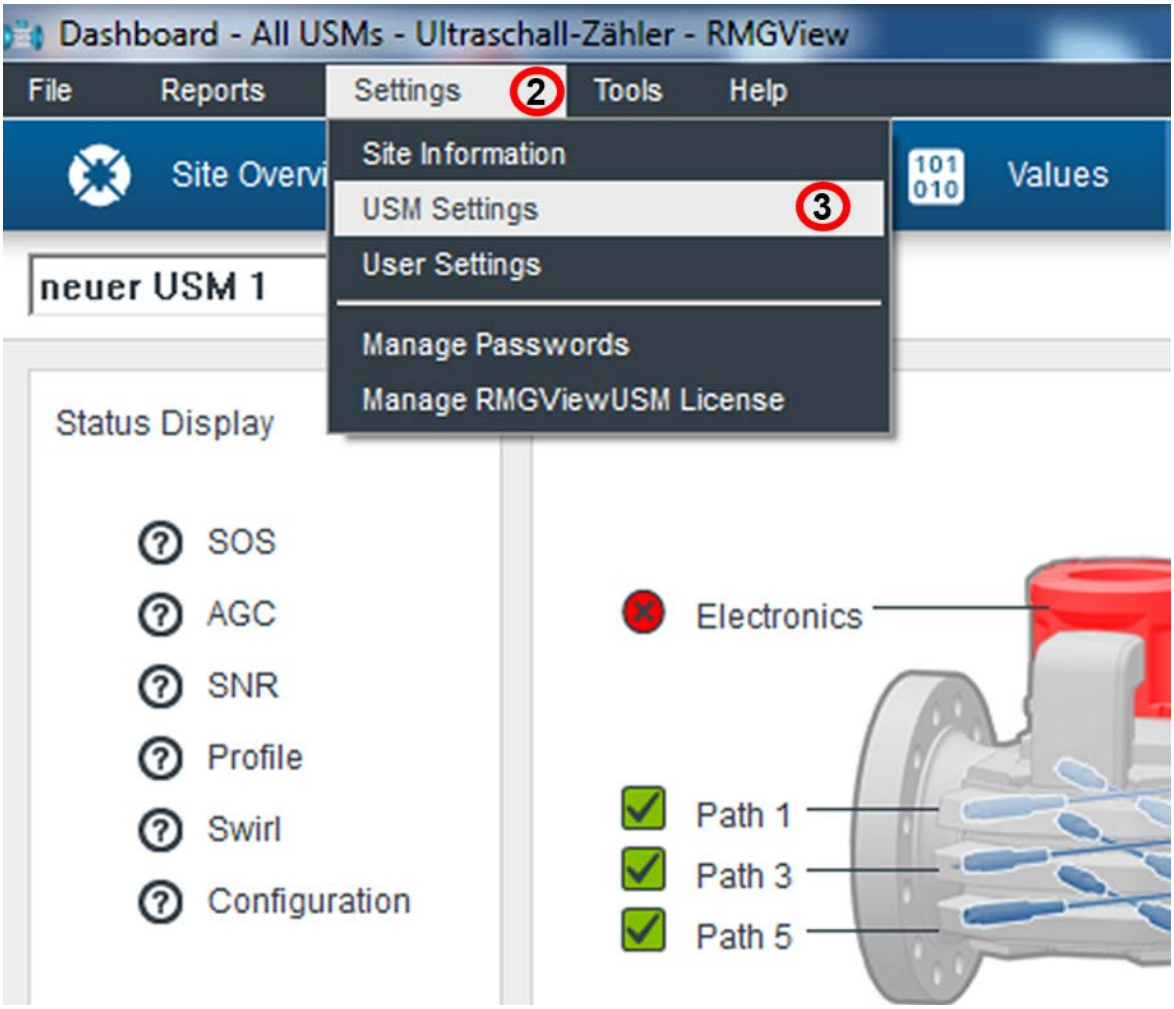


Figure 15: Select menu entry Site Information

2. Click on menu **Settings** in the menu bar.
3. Click menu entry **USM Settings**.

   The window **USM Settings** opens.

Setting up additional devices (USM)

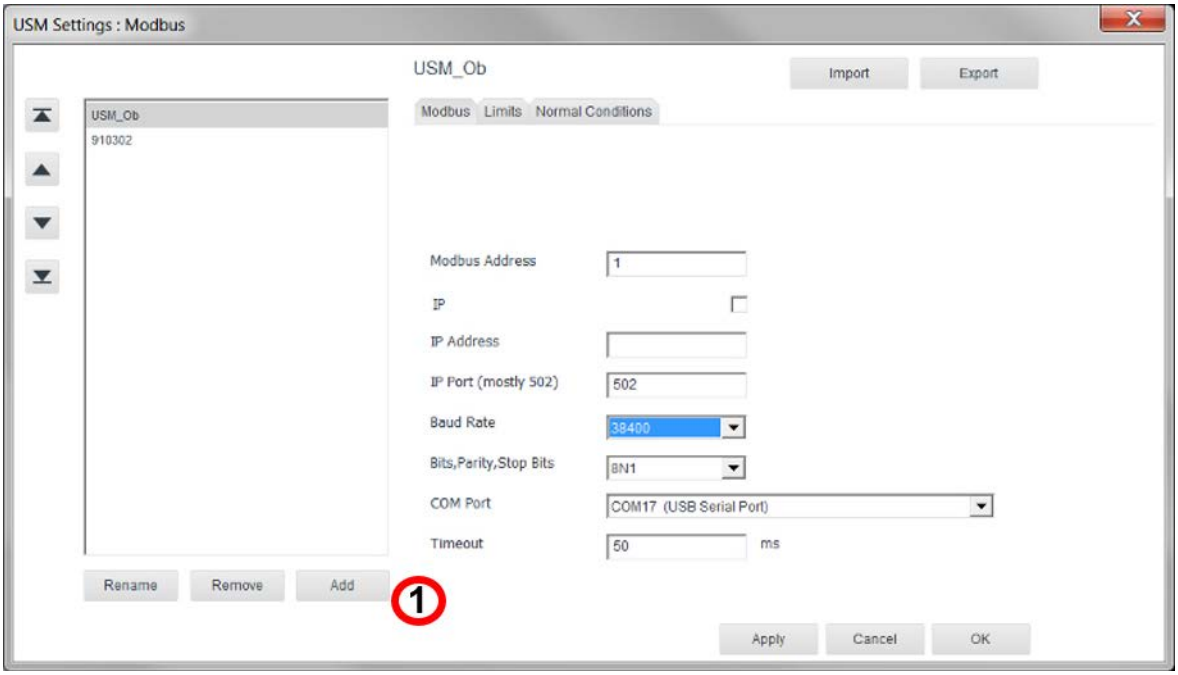


Figure 16: USM Settings window: Modbus

1. Click button **aAdd**.

   An additional device will be shown in the list.

2. Enter the device data.
   (*see chapter 2.5 Configuring the site and devices, p. 9*)

3 Software overview

In this chapter you will be given detailed information regarding user interface elements as well as functions and operating capabilities of the software.

3.1 Operating and display elements

In this chapter you get an overview of the user interface for RMGView^{USM}. You will find the description of the individual windows and functions in *chapter 4 Software description, p. 38*.

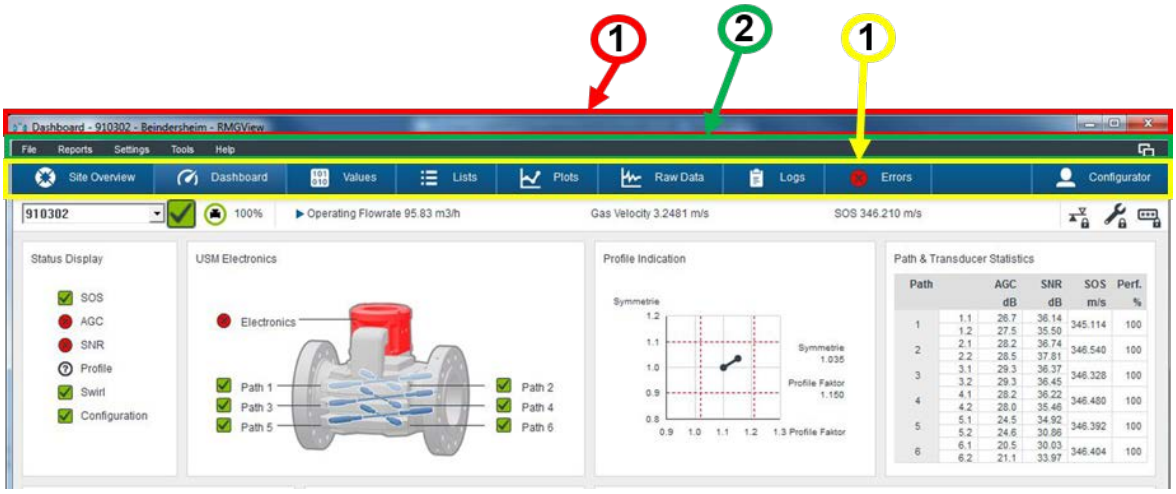


Figure 17: Dashboard window

Header

Figure 18: Header

The header shows the name of the window opened. The description of the window can be found under this name in chapter "Description of the software". The content of the header for some windows changes depending on the lists, plots or parameters selected.

Menu bar

Figure 19: Menu bar

The menu bar contains various menus with which the functions and windows can be called up. Using the menus you can open following windows/functions:

- **File**

Clone opened window. Close window for a device. Open and save window arrangement on the desktop. Open folder for APP data and user data. Close RMGView^{USM}.

- **Reports**

Conduct device check. Output test reports as log file. Open the parameter list and the list of parameter changes. Depending on the license settings, there is the optional function of creating user-defined logs or changing existing logs.

- **Setting**

Enter user information for the device. Show or hide the window **Select Site** for software start. Set communication settings for the device, change or add a new device for the selected site. Switch software to another language. Set start screen for the software to start. Show or hide tool tips display. Show or hide macro names for filtering certain data. Open the password list for the selected device, change, create and delete. Change current license settings.

- **Tools**

Open the log player. The log player plays the recorded log files in real time. Parameterize the ultrasonic gas meter with opened calibration switch. Calculate a characteristic curve correction for the values determined

- **Help**

Open the operating instructions as a PDF file. Open the RMG website. Request information on the software

Multifunction bar

Figure 20: Multifunction bar

The multifunction bar comprises single buttons. Using these buttons you can access following data:

- **Site Overview**

List of devices that are set up for the selected site.
(see chapter 4.1 Site overview, p. 39).

- **Dashboard**

Request values and status of the selected device. The values are displayed in graphic form *(see chapter 4.2 Dashboard, p. 41).*

- **Values**

Display parameter, readings or display values (*see chapter 4.3 Values, p. 45*).

- **Lists**

Request lists for one selected ultrasonic gas meter, for all ultrasonic gas meters or for several particular ultrasonic gas meters (*see chapter 4.4 Lists, p. 47*).

- **Plots**

Request lists for one selected ultrasonic gas meter, for all ultrasonic gas meters or for several particular ultrasonic gas meters. Open predefined or user defined plots. Create and change user defined plots (*see chapter 4.5 Plots, p. 49*).

- **Raw data**

Request data from selected sensors. The data is displayed with the help of a plot (graphic illustration of the values). Create an image file of the plots (*see chapter 4.6 Raw* data*, p. 50*).

- **Logs**

Request list of actions, ParameterLog and EventLog, that are carried out via the software (*see chapter 4.7 Logs, p. 52*).

- **Errors**

Request list of errors and warning messages that have occurred (*see chapter 4.3 Values, p. 45*).

- **Password Input**

Log into password-protected user level. (*see chapter 4.9 Password input, p. 58*).

Figure 21: Dashboard window

Ultrasonic gas meter preselection (1)
The information on the selected device such as live values, functions or parameters are shown in the display area.

Display area (3)
The display area shows the contents of the windows that have been opened using the multifunction bar.

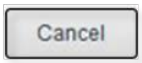
Status bar (2)
The status bar gives information on the current status of the selected device. Connection to selected device, current readings and position of the service switch and of the calibration switch. A percent display gives information on the actual utilization of the device. The status for the code word of the device is displayed.

You may find possible symbols for the actual status here *chapter 3.3 Status icons, p. 27*.

3.2 Standard buttons

The following buttons are a feature of many windows. Their functions are the same in all windows.

Confirm the entered value. The values will be saved.



Cancel the current entry. The entered values will not be saved.

The current screen will be saved as a jpg file

Create a new, user-defined list or plot.

Delete user-defined list or plot.

Process user-defined list or plot.

Export data.

Import data.

Move an entry down a list.

Move an entry up a list.

Record values or list and stop recording.

Refresh screen.

Clone window. The selected window will be opened a second time.

Enlarge view of plot.

Display plots in original size.

3.3 Status icons

The following icons are a feature of many windows. Their functions are the same in all windows.

Calibration switch for ultrasonic electronics is closed. The parameters of the ultrasonic electronics cannot be programmed.

Calibration switch for ultrasonic electronics is open. The parameters of the ultrasonic electronics can be programmed.

The ultrasonic gas meter does not match the basic configuration of the CFG file. The device cannot be used.

The ultrasonic gas meter matches the basic configuration of the CFG file. The device can be used.

Connection between PC and the device is OK.

There is a discontinuity between PC and device.

The device is operating correctly. There is no warning.

A warning exists.

There is a defect.

The element (list or plot) is protected and cannot be changed.

The symbol is an attribute for lists or plots that are used by more than one device.

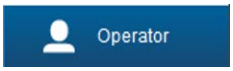
No password has been entered. Device is password-protected. Parameters that are protected by the password cannot be changed.

The password has been entered. Password-protected parameters can be changed.

Service switch is locked. Only for RMG service.

Service switch is open. Only for RMG service.

The user level **Monitor** is active
See chapter 3.4 User levels, p. 29



The user level **Operator** is active.

The user level **Configurator** is active.

The user level **Expert Mode** is active

Performance display for correct measurements.
The performance display can be customized. You can define the thresholds in percent below which a warning message or a defect message will be displayed.

3.4 User levels

To avoid incorrect operation the RMGView^{USM} software is divided into different user levels. These user levels are assigned to certain user groups.

Note

Not all the contents and functions of the RMGView^{USM} are displayed for every user group.

Only after you have entered a password for the user level the information and functions for this user group are displayed and can be operated.

The description of the windows and menus indicates which user level is enabled in the respective windows or menus
(*see chapter 4 Software, p. 38*).

The following user groups are assigned to the user level:

Monitor **All user groups**
No password required. This user level serves to display the contents of the windows. The data cannot be processed.

Operator **Operating personnel**
Password for operator required. The operating personnel can create user-defined lists, change parameters and delete user-defined lists.

Configurator **Maintenance/setup personnel**
Password required for Configurator. Set up all access rights and password for operating personnel.

Expert mode **Service personnel** (from RMG)
Password for Expert Mode required. All access rights for operating personnel, maintenance and setup personnel. In addition, the licenses can be managed.

3.5 Structure of the Software

The following chart shows the structure of the RMGView^{USM} software. Every field represents a window.

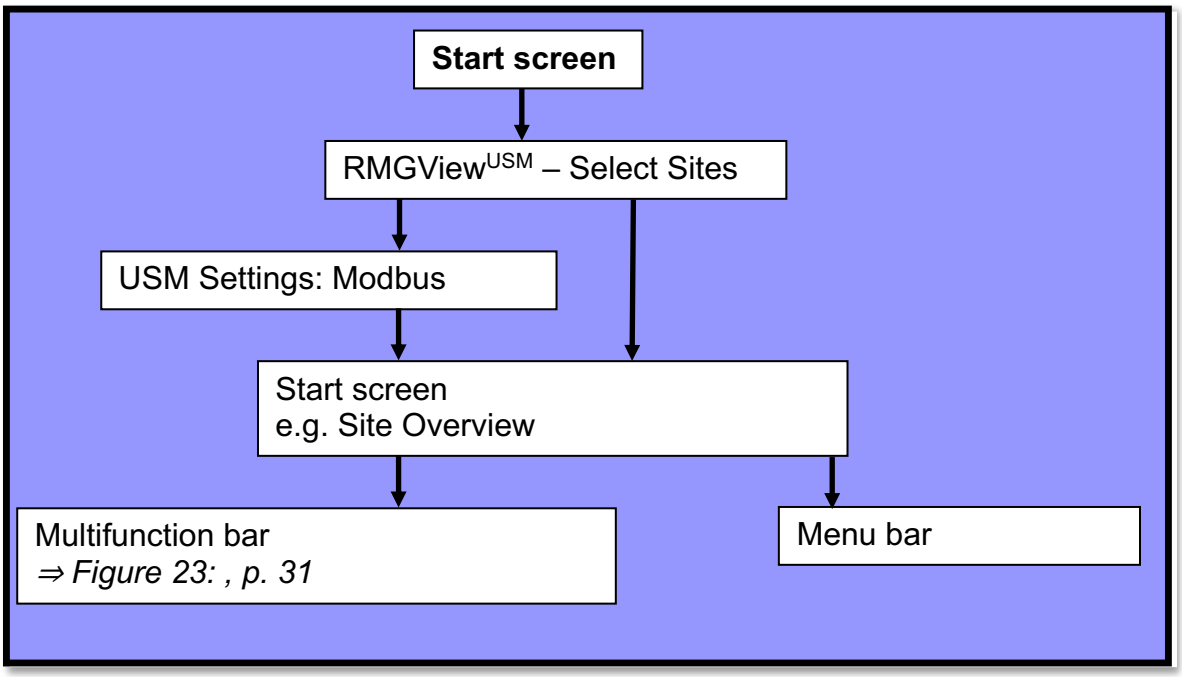


Figure 22: Structure of the software

Note

The start screen can be specified. The following windows can be selected as start screen:

- **Site Overview**
- **Dashboard**
- **Lists**
- **Plots**
- **Raw data**
- **Logs**
- **Errors**
- **Input Password**

See chapter 2.5.1 Setting the language and start window, p. 13

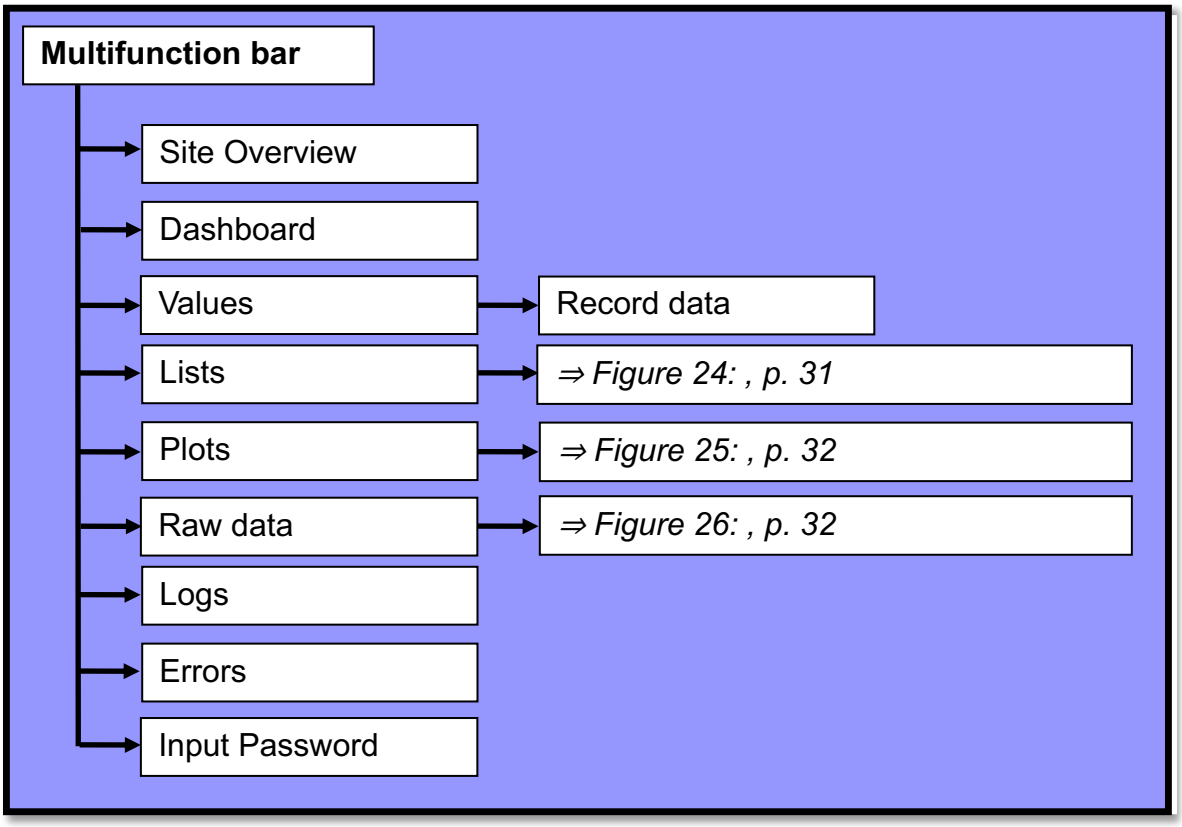


Figure 23: Structure of multifunction bar

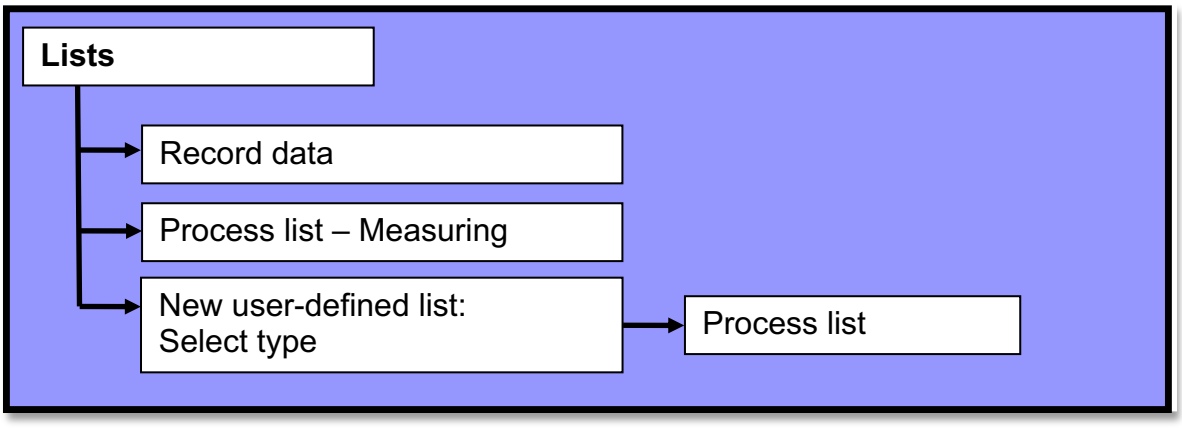


Figure 24: Structure of lists

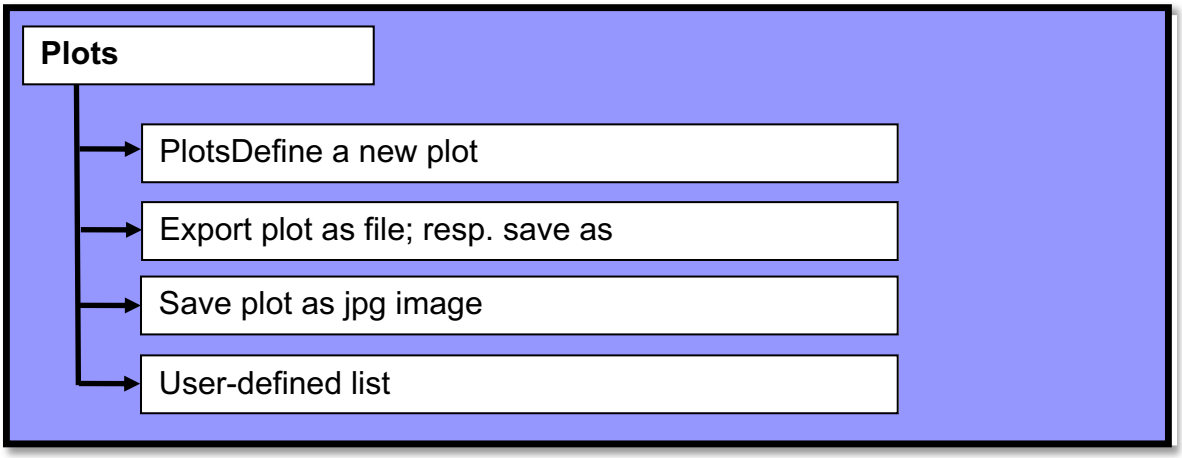


Figure 25: Structure of plots

Figure 26: Structure of raw data

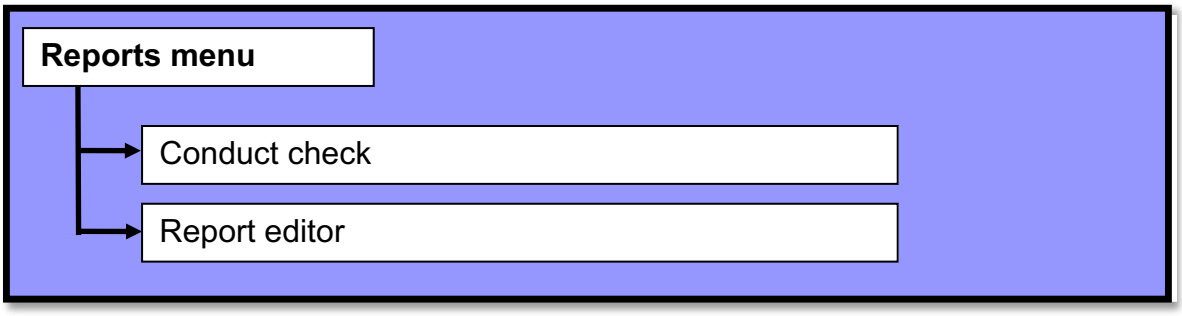


Figure 27: Structure of reports menu

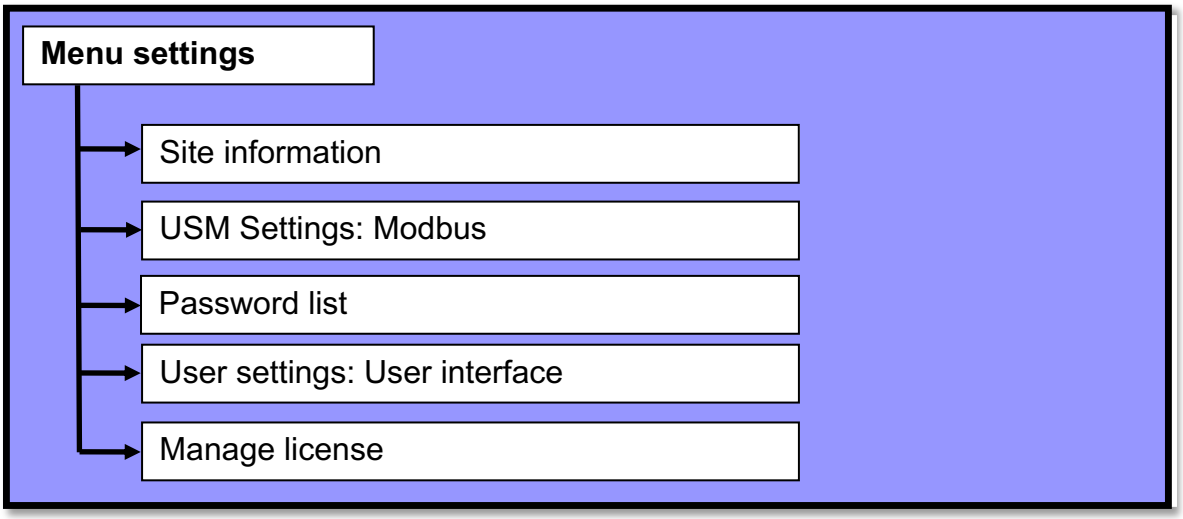


Figure 28: Structure of menu settings

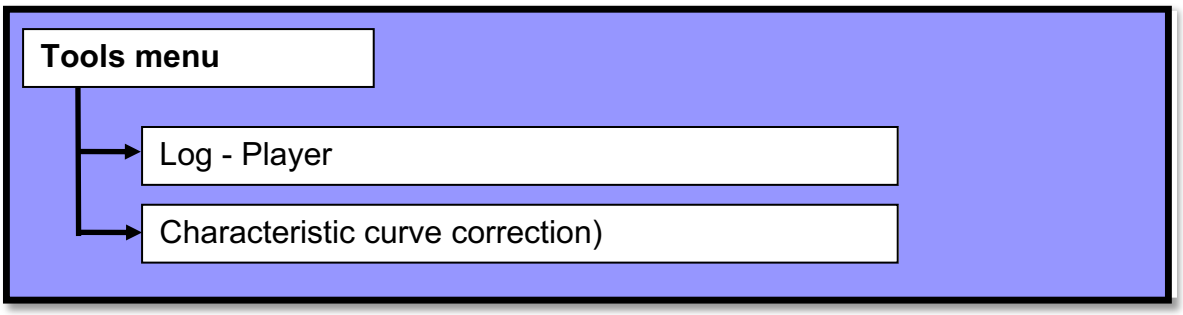


Figure 29: Structure of tools menu

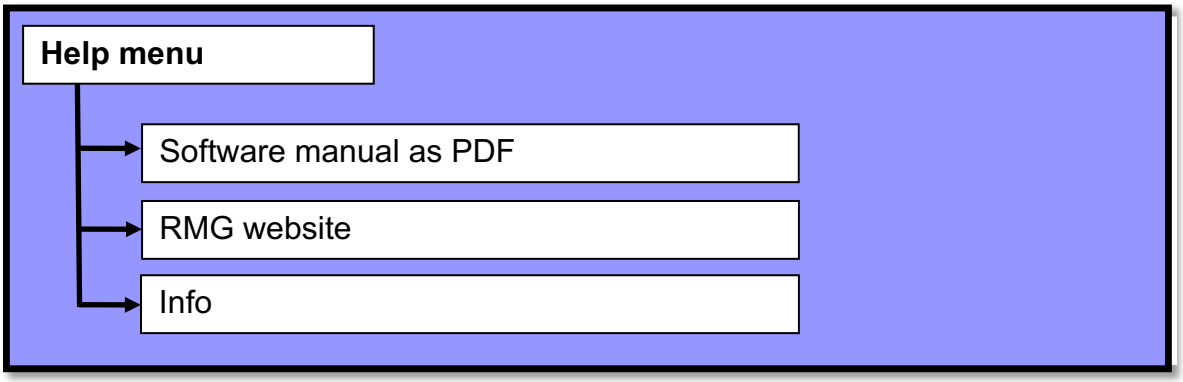


Figure 30: Structure of help menu

3.6 Data/readings/parameters

The data/readings/parameters are stored in a coordinate system. Via the coordinates (letter for column and number for a row) data / readings / parameters can be addressed. The data / readings / parameters can be opened using the ultrasonic electronics display or with the software RMGView^{USM} and can be selected for tasks such as user-defined lists
(*see chapter 4.13 Site specific, user defined list (Plot), p. 62*).

Example Parameter structure

Figure 31: Structure of a parameter

As a rule, parameters are structured as follows:

- Associated USM (**1**), e.g. 910302.
- Coordinates of the parameter (**2**), e.g. H-1.
- Name of the parameter (**3**), e.g. for base value.
- Value that the parameter should read out or specify (**4**), e.g. 122.527.
- Assignment of the unit (**5**), e.g. m3/h.
- Assignment to the Modbus address (**6**), e.g. 6248.

3.7 Help function

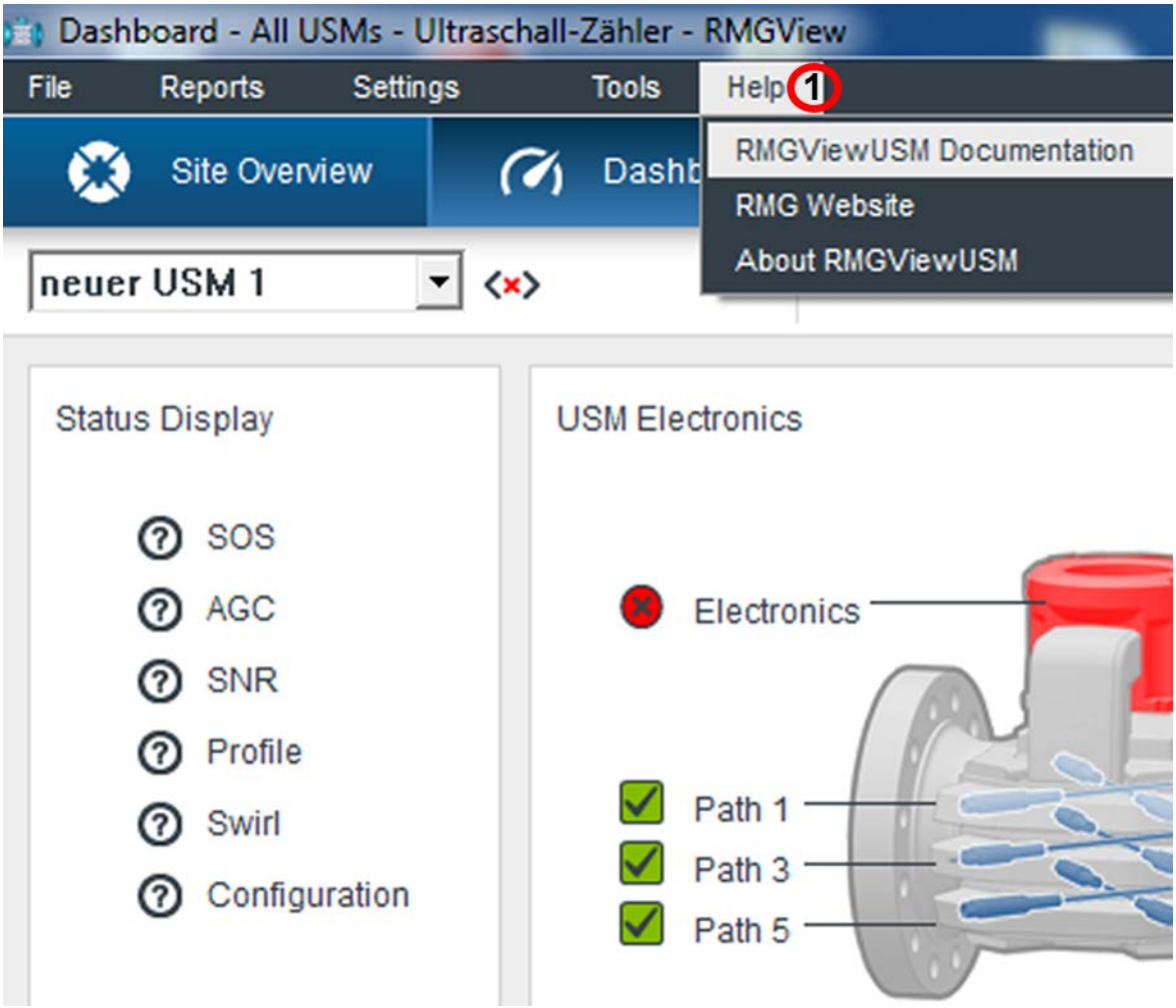


Figure 32: Help menu

1. Using the Help menu, you receive following information:

- Details of the software version and the license number (*see chapter 4.23 License info, p.86*)
- Software manual as PDF-file
- Website www.rmg.com

3.8 File types

The following table describes the file types (file suffixes) that are needed to work with the RMGView^{USM} software.

CSV	List with recorded values of parameters, events or plots: The list can be imported for processing in a spreadsheet program.
RPR	File contains a template for generating PDF files.
RMW	Stored screen configurations. After this file has been opened the screens will be arranged according to the settings of this file.
CFG	The file stores the configuration of an ultrasonic gas meter. Based on CFG files, differences to start configuration can be identified.
RMX	Software system file. RMGView^{USM}.
EXE	Executable files
HTML	Output format for a RPR file, can be opened in any browser.
PDF	Output format for a RPR file, reports, graphic representation of readings (plots) or test certificate. This file can be opened by every PDF viewer.
JPG	Image file for graphics of readings (plots).
BIN	Output file for the raw data of the sensors. Recording of the signals, without any changes, from the ultrasonic electronics.
XML	File stores the RMGView^{USM} settings, e.g. language settings, screen configuration.

3.9 Password

With a password you will be given access to protected user levels in the software RMGView[USM]. On delivery of the software RMGView[USM], you will have received a password from RMG for every protected user level.

Note

Should the passwords no longer be available, then request these from the RMG service (*contact see p. II*).

The user with the password to the user level **Configurator** can generate passwords with user level assignment (*see chapter 4.20 Password list, p. 81*).

3.10 License

Mit Hilfe der Lizenz können Sie die Funktionen des Protokoll-Editors, Kennlinienkorrektur und Header-Daten der Rohdaten freischalten. Mit dem Protokoll-Editor können Sie Protokolle nach eigenen Bedürfnissen zusammenstellen.

With the help of the license you can enable the functions of the report editor, characteristic curve correction and header data for the raw data. With the report editor you can compile reports according to your requirements.

Note

Training by RMG is required for working with the report editor (*contact see p. II*).

As an alternative RMG offers the service of creating client-specific reports.

4 Software description

This chapter contains information on fields, sectors and other contents of the windows. Operating system windows, e.g. **Save as** are not described.

You will find following information with respect to the windows

- Name of the window.
- Details on the window path.
- Illustration of the window.
- General description of the window's functions.
- Field elements in the window.

Depending on the user level certain contents and functions of RMGView^{USM} are displayed or hidden *(see chapter 3.4 User levels, p. 29)*.

Note

The RMGView^{USM} software offers the possibility to create, organize and present data and parameters (and additionally calculated parameters) of the USM-GT400 and USZ08 ultrasonic gas meters.

- **Note that certain parameter settings may change the measuring behavior of ultrasonic gas meters.**
- **Since usually Ultrasonic gas meter and RMGView^{USM} are used together it will not be distinguished between individual parameters of this units**

4.1 Site overview

RMGView^{USM} > Select Site > Site Overview

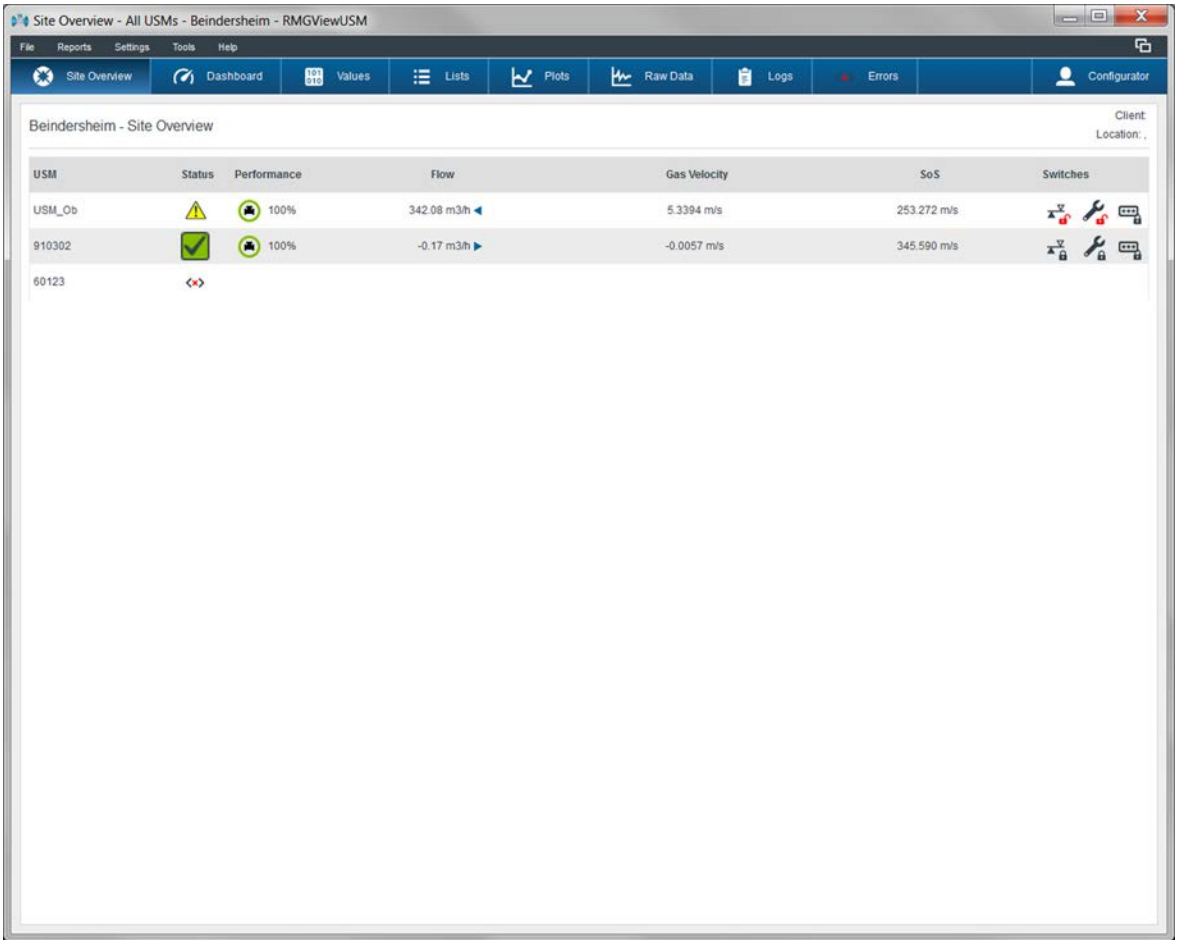


Figure 33: Site Overview

In the window **Site Overview** you can manage the ultrasonic gas meter.

USM
Name of the ultrasonic gas meter. By clicking on an entry, you can switch to the **dashboard** of the selected ultrasonic gas meter.
(*see chapter 4.2 Dashboard, p. 41).*

Status
Connection status between ultrasonic gas meter and RMGView^{USM}
(*see chapter 3.3 Status icons, p. 27*).

Performance
Display of valid measurements in percent. Performance values <100 means invalid measurements have occurred and have been discarded.

Flow
Volume flow rate per hour, e.g. cubic meters

- Positive value = Gas is flowing in the flow direction.
- Negative value = Gas is flowing against the flow direction.

Gas velocity
Velocity of the gas, e.g. meters per second.

SoS
Speed of Sound. Speed of the ultrasonic waves that are used to measure the gas velocity.

Switches
Configuration options for following switches:

- Calibration switch
- Service switch
- Password for the PC (*see chapter 3.3 Status icons, p. 27*)

4.2 Dashboard

RMGView^{USM} > Select Site > Dashboard

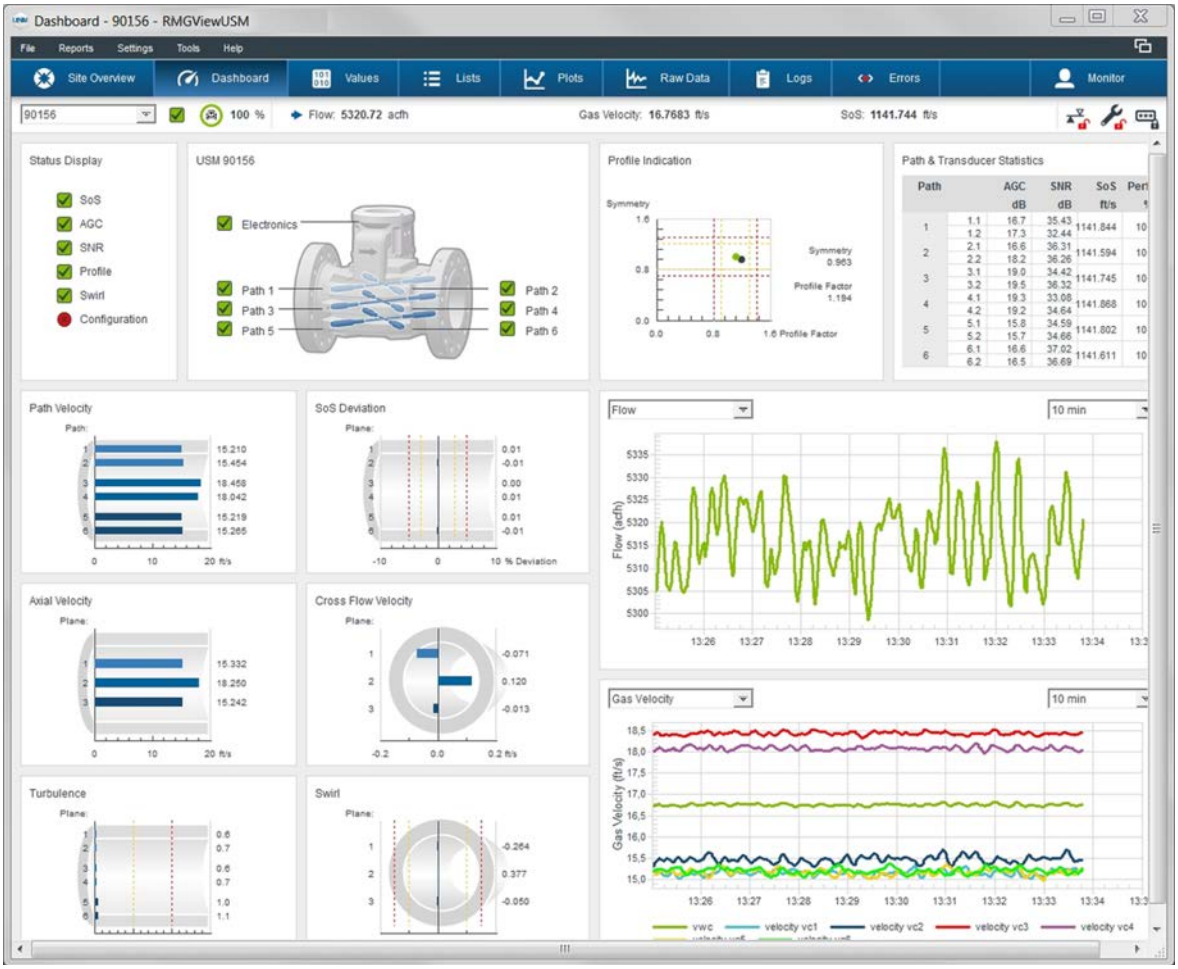


Figure 34: Dashboard

In the window **Dashboard** you can display the current measurement values of the ultrasonic gas meter.

Status display
Symbols for the user-defined warning and alarm signals.

- SoS
- AGC
- SNR
- Profile = Profile indication
- Swirl = Angle of flow of the gas in a plane

- Configuration = Comparison of the parameters in the ultrasonic gas meter with the parameters saved in the configuration file in the RMGView^{USM} (*see chapter 3.3 Status icons, p. 27*)

USM Electronics
Display for measuring errors or hitches in the ultrasonic gas meter:

- Electronics = Status display for the ultrasonic electronics.
  - Grey = Ready for operation.
  - Yellow = Ready for operation, measurement error recognized.
  - Red = Not ready for operation.
- Path 1-6 =
  Transducer's measurement paths for the gas flow. If errors occur on a path, then these are displayed as status symbols in front of the path. If an error occurs at a transducer, the transducer is highlighted in color:
  - Blue = High enough portion of valid measurements.
  - Yellow = Warning, portion of invalid measurements is too high.
  - Red = Problem, component is not ready for function.

  (*see chapter 3.3 Status icons,p. 27*)

Profile Indication
Profile for the flow distribution in the pipe. The optimum value (reference value) for the symmetry is 1.0 and for the profile factor 1.1. and is displayed as a green dot. Deviations from the optimum value are shown in the graphics with a connecting line to a black dot. The red dashed borderline shows the limits for triggering of alarm signals. The ultrasonic gas meters are delivered with the limit values preset.

The site-specific limits for warnings are set by RMG service.

Path & Transducer Statistics
Overview of the transducer's individual configurations and measurement values.

- Path = Number of the transducer path.
- Column with no name = Number of the transducers.
  The transducers are numbered in the ultrasonic gas meter accordingly.
- AGC dB = Automatic Gain Control (Transducer's amplifier unit)
  This is the value of the transducer's signal amplification in decibels.
- SNR dB = Signal Noise Ratio
  This is the power ratio between signal and background noise in decibels.

- SoS m/s = Speed of Sound
  SoS for the transducer signals in meters per second.
- Perf. % = Performance
  Performance of the path is the portion of valid measurements in percent. Performance values < 100 means invalid measurements have occurred and have been discarded. The difference between 100 % and the percent value displayed gives the error rate.

Path Velocity
Graphic display of the gas speed measured on the transducer paths. Two matching paths, each give the gas speed for one of the three meter levels in the ultrasonic gas meter.

SoS
Graphic display of the speed of sound measured on the transducer paths.

Axial Velocity
Graphic display of the gas speed measured in the meter levels.

Tangential Velocity
Graphic display of the horizontal deviations measured to the gas's direction of flow in meters per second.

Turbulence
Graphic display of the speed and the change of direction for the gas flow. A yellow dashed line is the user-defined limit for warning signals. A red dashed line is the user-defined limit for alarm signals.

Swirl angle
Graphic display of the horizontal deviations measured in degrees of an angle in relation to the direction of gas flow. A yellow dashed line is the user-defined limit for warning signals. A red dashed line is the user-defined limit for alarm signals.

Trend overview 1

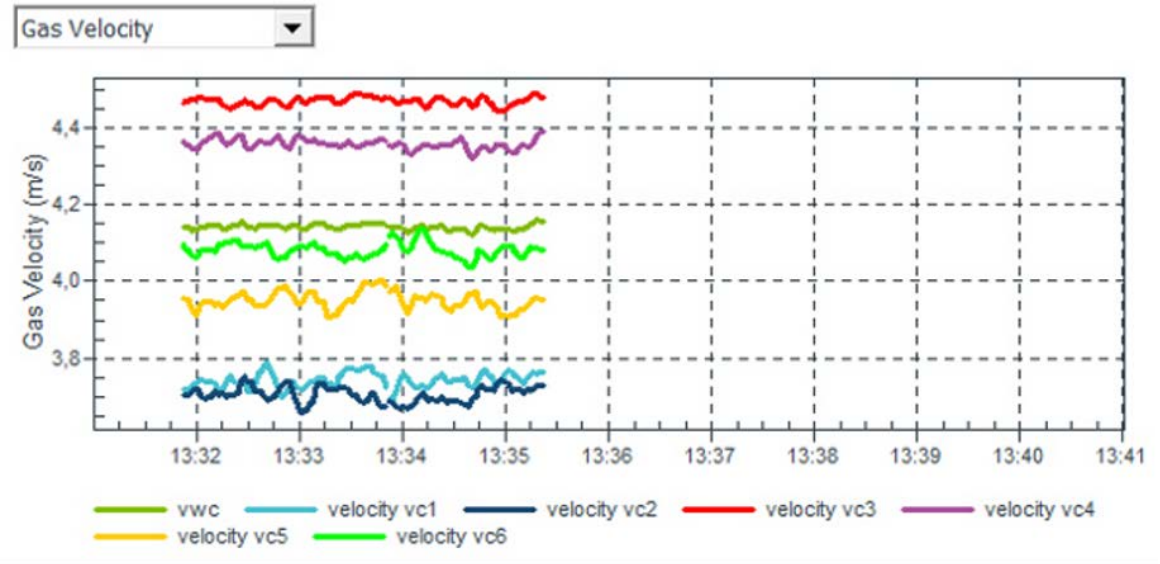


Figure 35: Trend overview 1

Trend overview 2

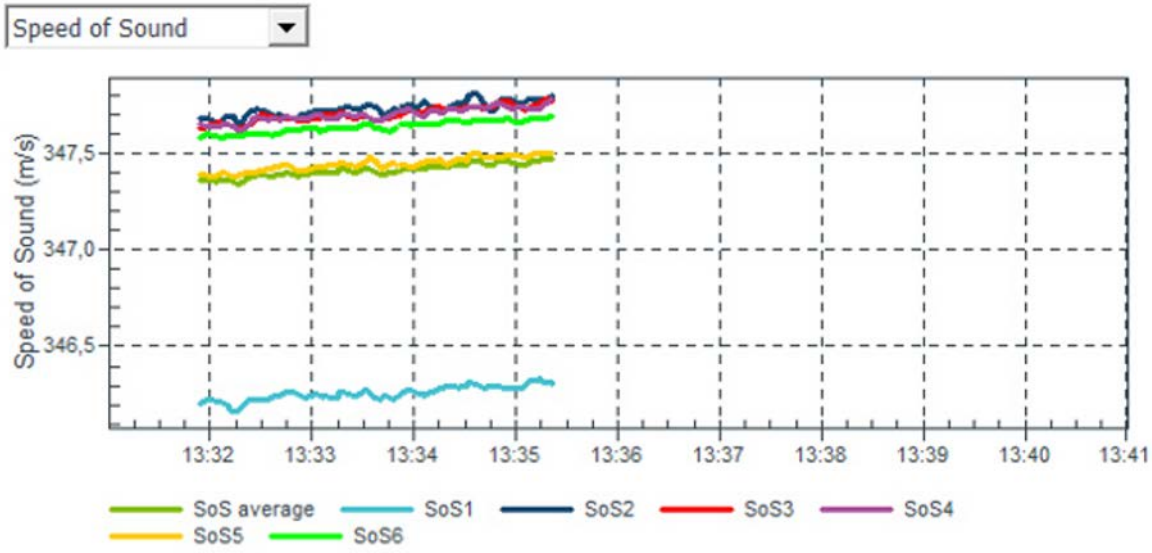


Figure 36: Trend overview 2

The trend overview 1 in *Figure 35:* shows the temporal behavior of the speed of the gas along the measuring path. This can be compared with trend overview 2 in *Figure 36:* , that shows the SoS along the measuring paths.

Using the drop-down menu you may select predefined calculations and have these values displayed in a (new) trend overview.

4.3 Values

RMGView^{USM} > Select Site > Values

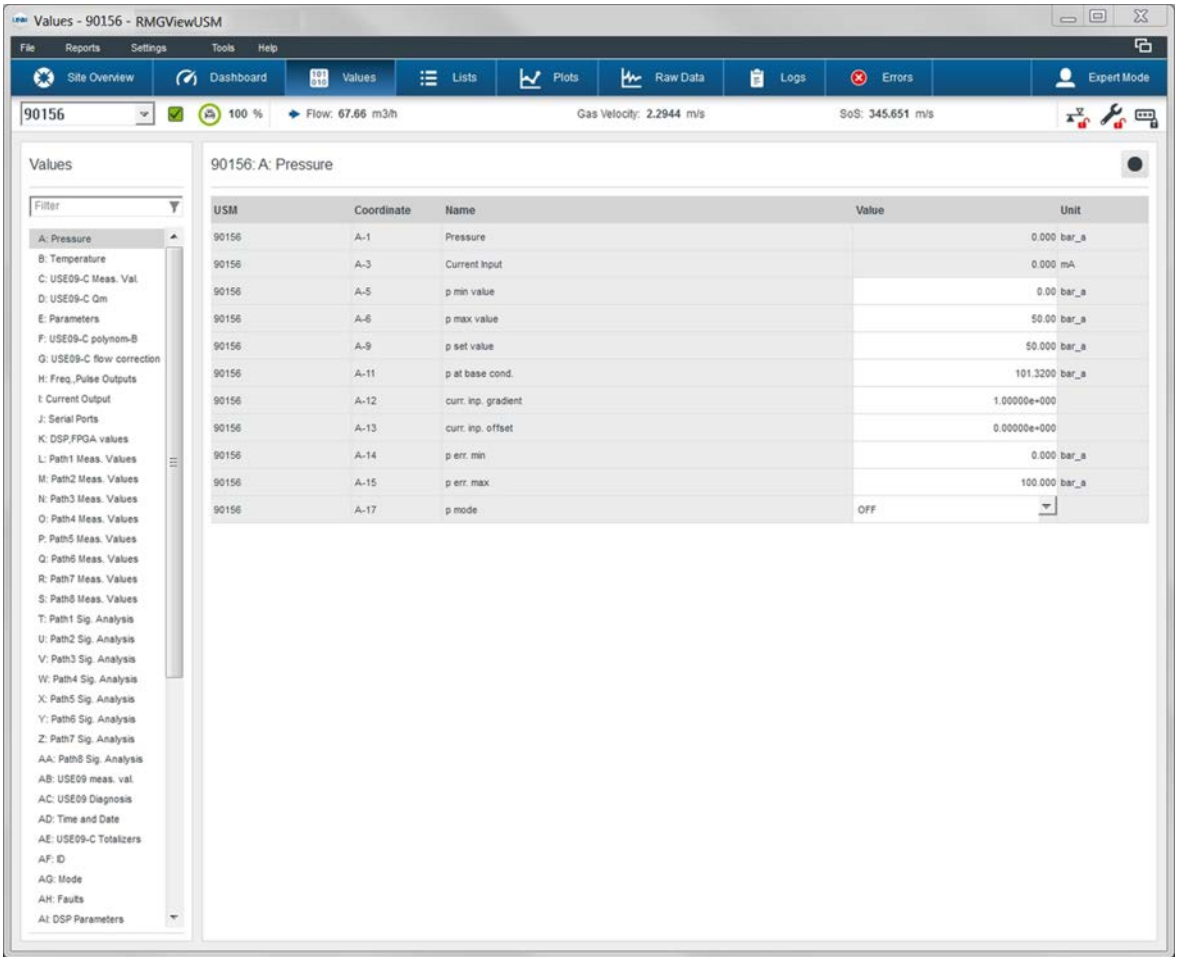


Figure 37: Values

In the Values window you can have the actual data, measured values and parameter displayed. The data measured values and parameter are read out via the RMGView^{USM} from the ultrasonic electronics.

Values
List with predefined data, measured values or parameter lists. The parameters associated can be displayed in the right-hand window area.

Filter
Filter panel for searching for data, measured values or parameters, e.g. frequency. For the search you can enter keywords or parts of keywords but not use wildcards.

USM
Name of the ultrasonic gas meter.

Coordinate
Memory cell for the parameter in the device. The parameter is stored in a coordinate system. A parameter can be addressed using the coordinates (letter for the column, number for the row).

The parameter can be called up using the window **Lists** and selected for tasks e.g. creating user-defined lists. (*see chapter 4.4 Lists, p. 47*).

Name
Description of the parameter to be measured.

Value, unit
Numerical value and unit of the parameter to be measured.

Modbus address
Address of the communication protocol between PC and ultrasonic gas meter.

4.4 Lists

RMGView^{USM} > Select Site > Lists

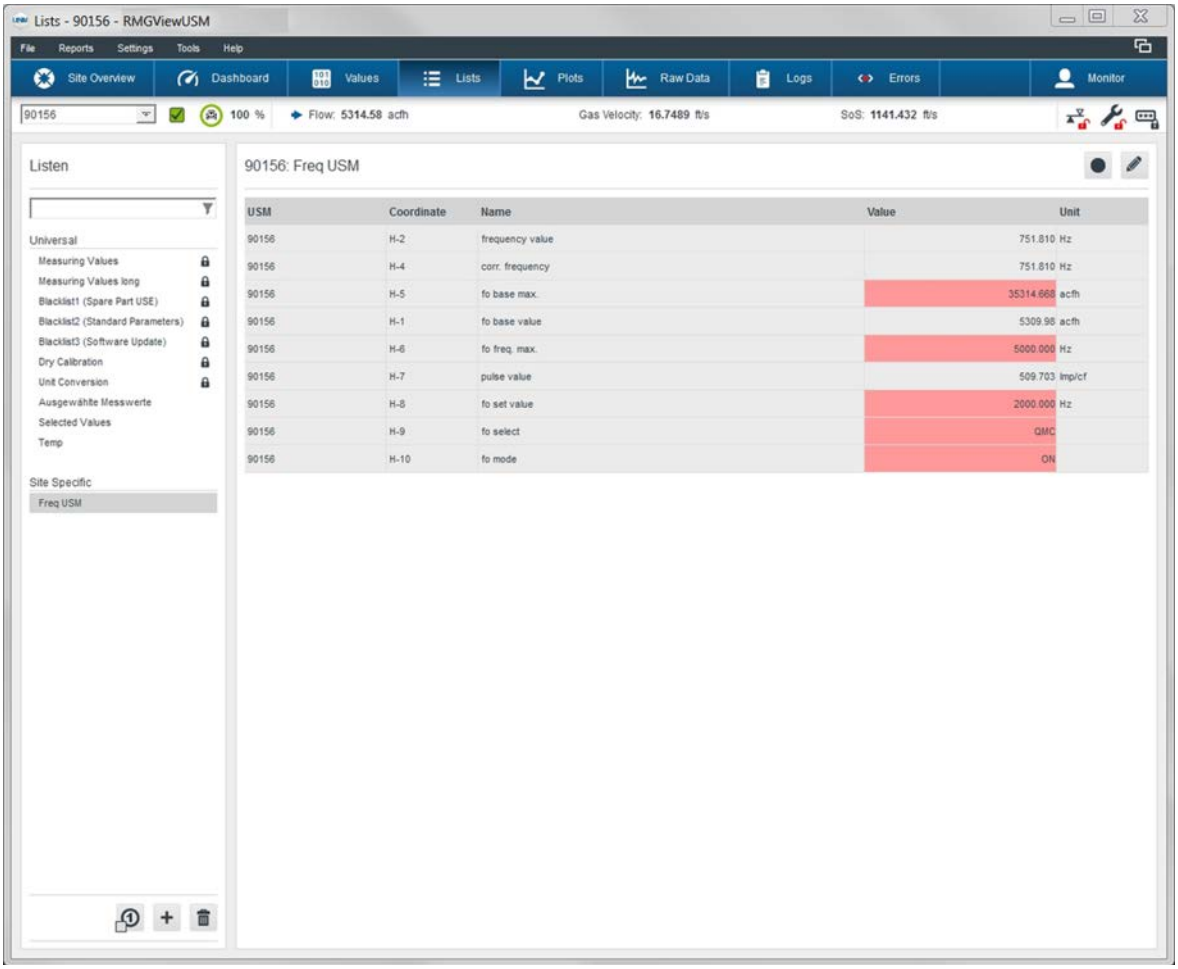


Figure 38: Lists

In the window **Lists** you can, in the left-hand window sector, administer the predefined and the user-defined lists with the system parameters contained. In the right-hand window area, you can view the parameter in the selected list. With lists you configure the parameter that are to be read out of the device.

Lists
Universal or site-specific list. A list can contain predefined or user-defined system parameter:

- Universal = Universal lists are configured with parameters for all types of ultrasonic gas meters in a site.
- Site-specific = Site-specific lists are configured with parameters for a selection of certain types of ultrasonic gas meters in a site.

- Predefined lists are marked with the symbol of a locked padlock and cannot be changed or deleted.
- User-defined lists are shown without a symbol and can be changed or deleted.

- Several meters in a list are marked with the multi-USM symbol.
    - For universal parameters the symbol contains a list with values for all ultrasonic gas meters of a site.
    - For site-specific parameters the symbol contains a list with values for all ultrasonic gas meters of a site.

Filter
Filter panel for searching for data, measured values or parameters, e.g. frequency. For the search you enter keywords or parts of a keyword. You cannot use wildcards.

The columns are described in *chapter 4.3 Values, p. 45*

4.5 Plots

RMGView^{USM} > Select Site > Plots

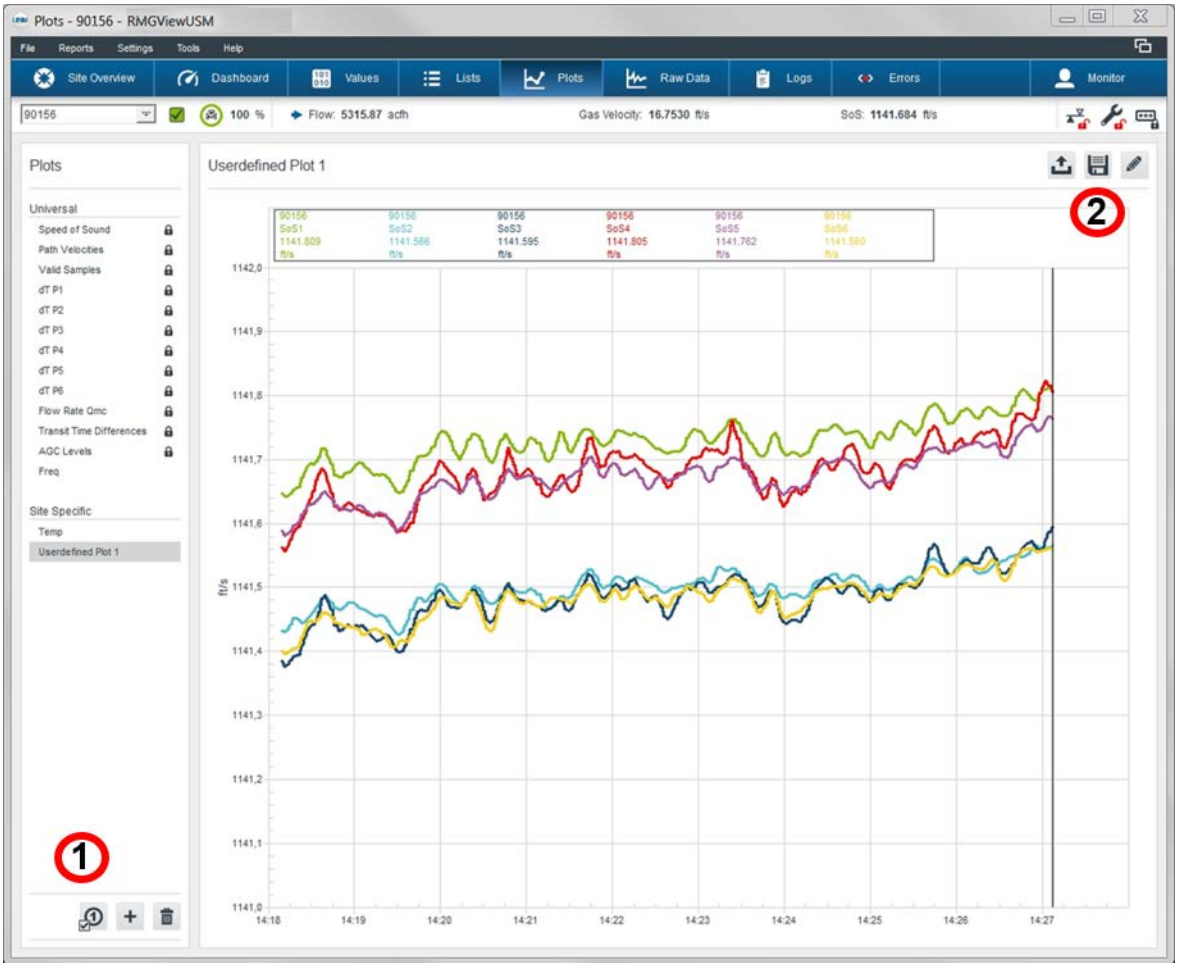


Figure 39: Plots

In the window **Plots** you can show the trend as a graphic of the readings listed. Using the drop-down menu, you must first select the device for the measurements.

In the left window you can select a parameter, e.g. speed of sound. In the right-hand window sector the values measured for the parameter can be listed and displayed in a trend graphic.

The button at the left bottom **(1)** allows you to set the plot as default when starting.

Using the diskette symbol **(2)** you can export a screenshot of the graphic displayed, as a jpg file (*see chapter 4.15 Save plot as JPG image, p. 65*).

4.6 Raw data

RMGView^{USM} > Select Site> Raw Data

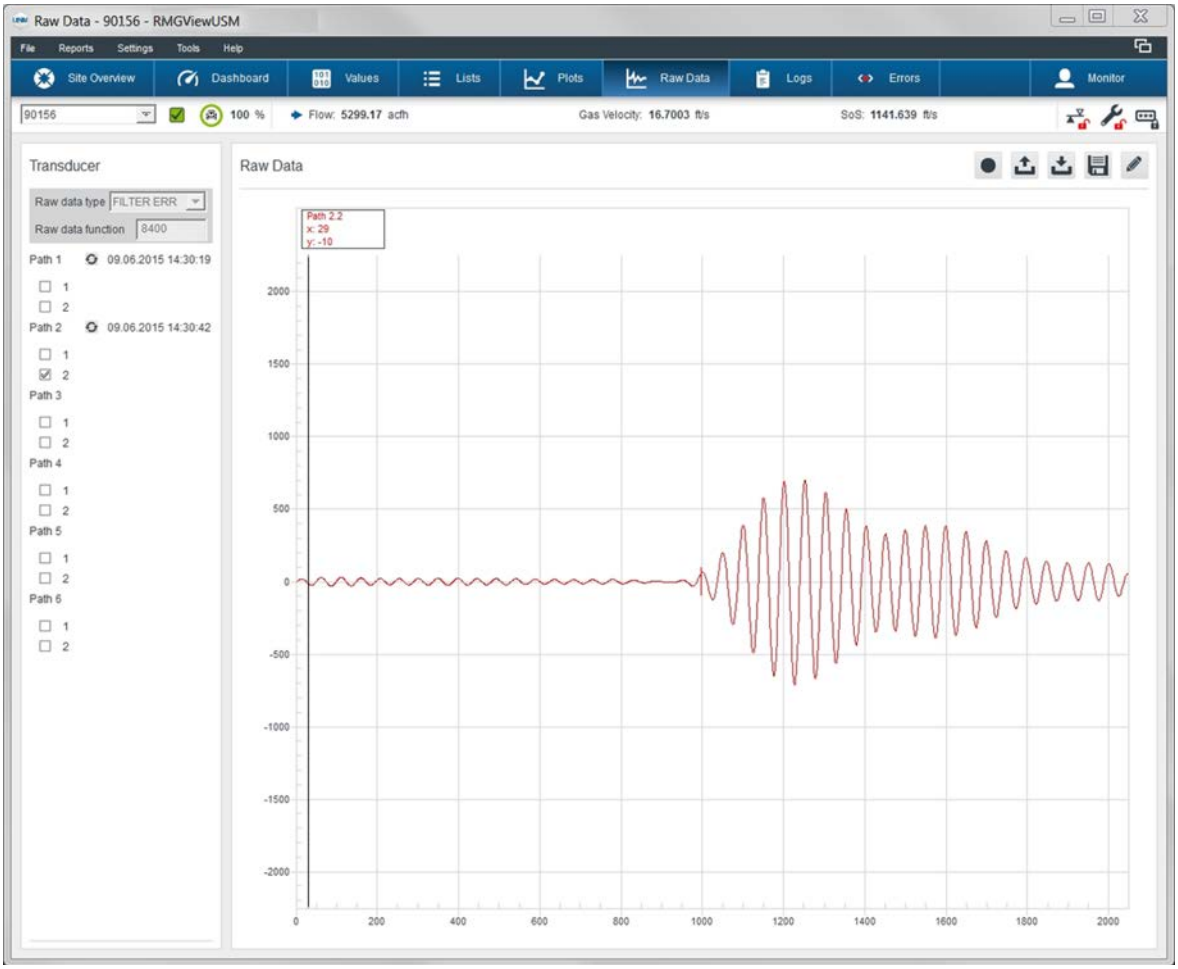


Figure 40: Raw data

In the window **Raw Data,** you can display the readings for the individual transducers or their paths. Two connected transducers form a measurement path.

Note

Please regard that here you have access to parameters of the USE and may change them.

Transducer
In this window sector you can administer the parameters for the measurements.

Raw data type
Filtered display type of raw data. Raw data can be displayed graphically with and without filtered values.

Only for RMG service personnel. If you have any questions or queries please contact the RMG service personnel (*contact see p. II*).

Raw data function
Type of function in order to calculate raw data.

Only for RMG service personnel. If you have any questions or queries please contact the RMG service personnel (*contact see p. II*).

Path 1, 2, 3, 4, 5, 6
Measuring path for ultrasonic transducers. Two paths represent a level of the total of three levels for the measurements in the ultrasonic gas meter:

- Path 1+2 = Level 1.
- Path 3+4 = Level 2.
- Path 5+6 = Level 3.

☐ **1**
Transducer for measurements in the direction of flow.
Transducer 1+2 give the flow velocity of a path.

- ☑ = Read values measured and display.
- ☐ = No measured values read.

☐ **2**
Transducer for measuring against the direction of flow.
Transducer 1+2 give the flow velocity of a path.

- ☑ = Read values measured and display.
- ☐ = No measured values read.

Raw Data
In this window sector the values of the measurements and the corresponding graphic illustrations can be displayed. Using the diskette symbol you can export a screen shot of the graphic displayed, as a jpg file
(*see chapter 4.15 Save plot as JPG image, p. 65*).

4.7 Logs

RMGView^{USM} > Select Site > Logs

In the window **Logs** you can manage all RMGView^{USM} reports.

In the left window sector, you can select a protocol type:

- USM History = Overview of all reports created.
- USM Parameter Log = Reports of all changes to parameters.
- USM Event Log = Reports of all events that have occurred.
- Modbus Messages = Reports of the connection status.

In the right-hand window sector, the reports in the report types can be displayed.

4.7.1 USM history

The window **USM History** all reports created can be displayed.

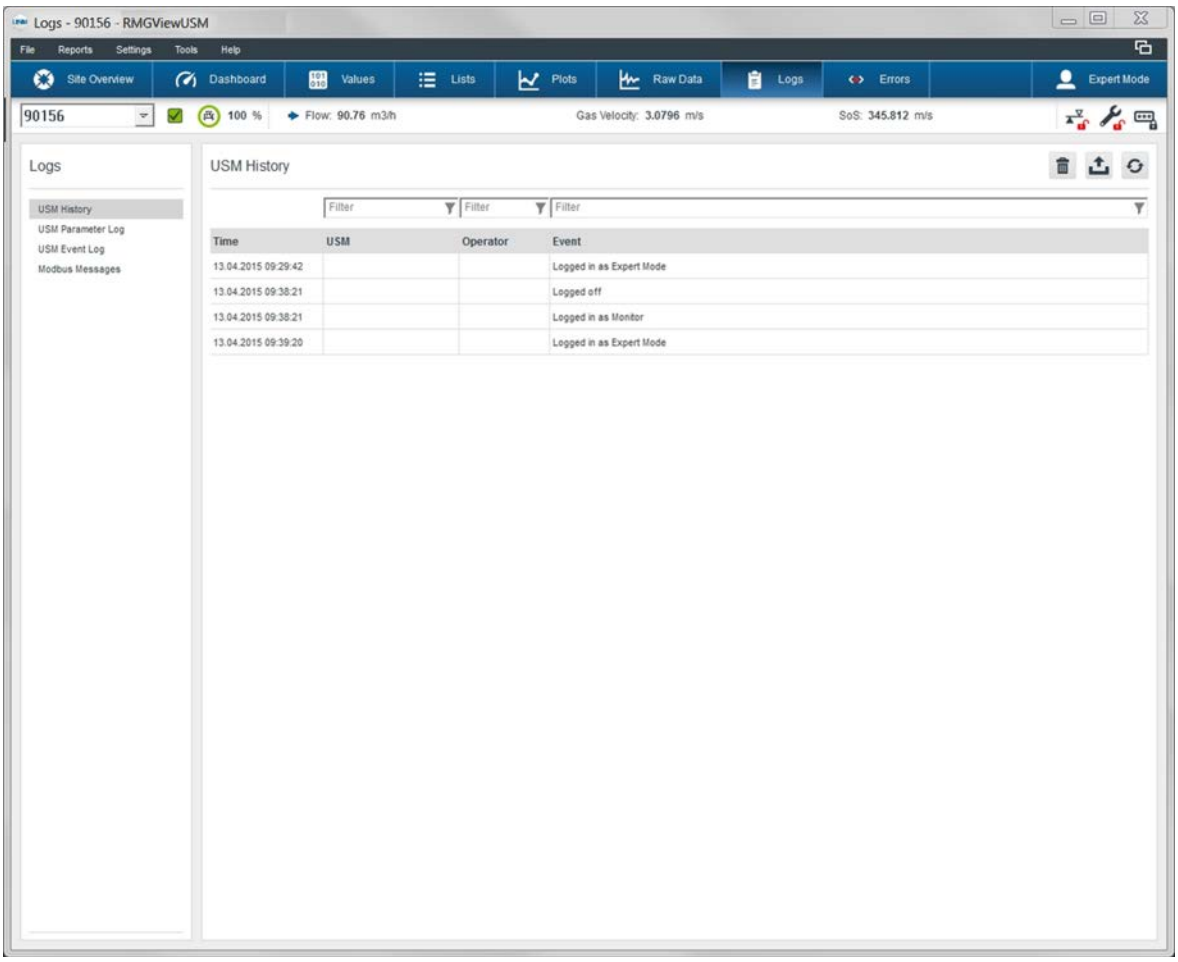


Figure 41: USM History

Time
Time stamp of the device for which a protocol entry was created.

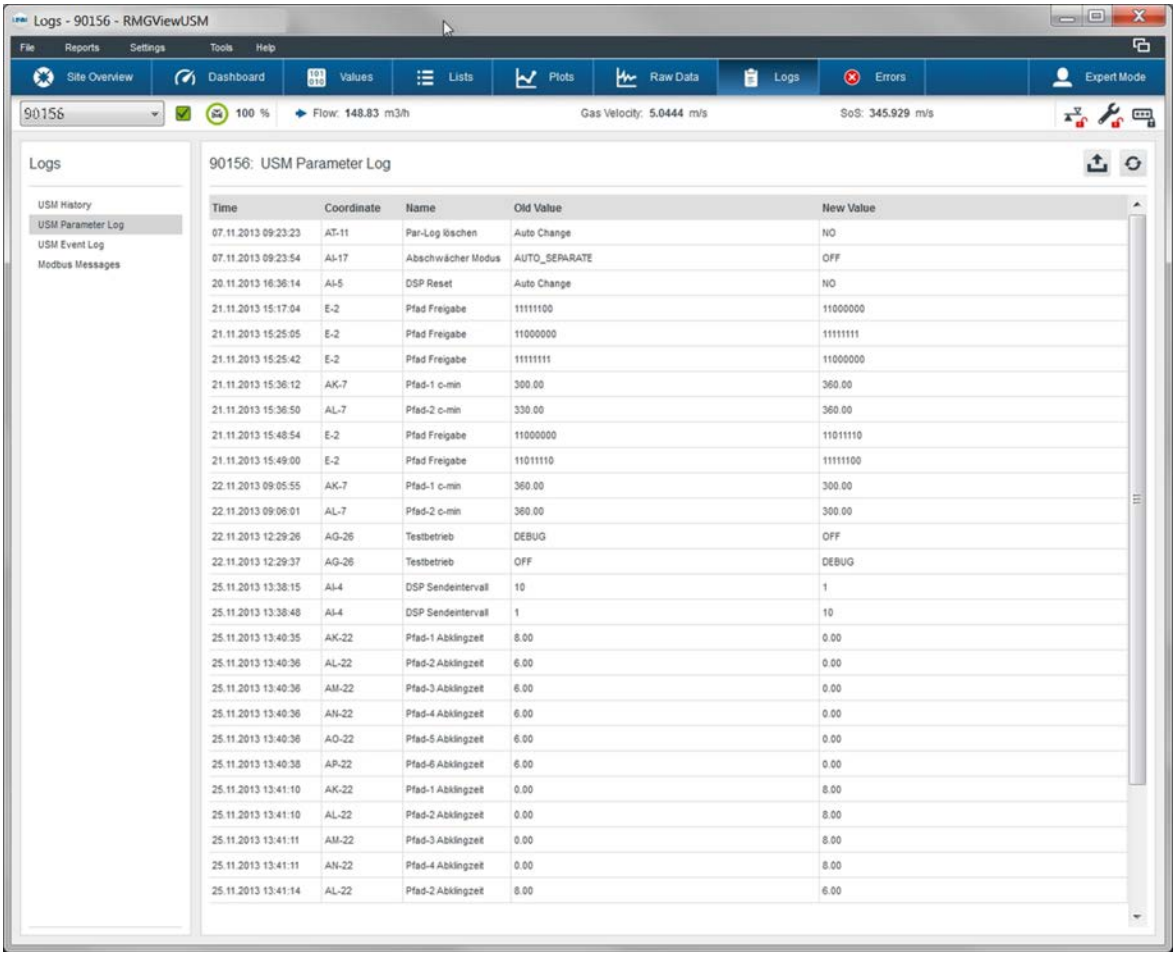
USM
Label of the device for which a protocol entry was created.

Operator
Name of the user who caused an event.

Event
Message for which a protocol entry was created.

4.7.2 USM parameter log

In the window **USM Parameter Log** you can display the reports for all parameters of the selected device. You select the device using the drop-down menu in the upper left-hand corner.



Time	Coordinate	Name	Old Value	New Value
07.11.2013 09:23:23	AT-11	Par-Log löschen	Auto Change	NO
07.11.2013 09:23:54	AI-17	Abschwächer Modus	AUTO_SEPARATE	OFF
20.11.2013 16:36:14	AI-5	DSP Reset	Auto Change	NO
21.11.2013 15:17:04	E-2	Pfad Freigabe	11111100	11000000
21.11.2013 15:25:05	E-2	Pfad Freigabe	11000000	11111111
21.11.2013 15:25:42	E-2	Pfad Freigabe	11111111	11000000
21.11.2013 15:36:12	AK-7	Pfad-1 c-min	300.00	360.00
21.11.2013 15:36:50	AL-7	Pfad-2 c-min	330.00	360.00
21.11.2013 15:48:54	E-2	Pfad Freigabe	11000000	11011110
21.11.2013 15:49:00	E-2	Pfad Freigabe	11011110	11111100
22.11.2013 09:05:55	AK-7	Pfad-1 c-min	360.00	300.00
22.11.2013 09:06:01	AL-7	Pfad-2 c-min	360.00	300.00
22.11.2013 12:29:26	AG-26	Testbetrieb	DEBUG	OFF
22.11.2013 12:29:37	AG-26	Testbetrieb	OFF	DEBUG
25.11.2013 13:38:15	AI-4	DSP Sendeintervall	10	1
25.11.2013 13:38:48	AI-4	DSP Sendeintervall	1	10
25.11.2013 13:40:35	AK-22	Pfad-1 Abklingzeit	8.00	0.00
25.11.2013 13:40:36	AL-22	Pfad-2 Abklingzeit	6.00	0.00
25.11.2013 13:40:36	AM-22	Pfad-3 Abklingzeit	6.00	0.00
25.11.2013 13:40:36	AN-22	Pfad-4 Abklingzeit	6.00	0.00
25.11.2013 13:40:36	AO-22	Pfad-5 Abklingzeit	6.00	0.00
25.11.2013 13:40:38	AP-22	Pfad-6 Abklingzeit	6.00	0.00
25.11.2013 13:41:10	AK-22	Pfad-1 Abklingzeit	0.00	8.00
25.11.2013 13:41:10	AL-22	Pfad-2 Abklingzeit	0.00	8.00
25.11.2013 13:41:11	AM-22	Pfad-3 Abklingzeit	0.00	8.00
25.11.2013 13:41:11	AN-22	Pfad-4 Abklingzeit	0.00	8.00
25.11.2013 13:41:14	AL-22	Pfad-2 Abklingzeit	8.00	6.00

Figure 42: Protocols of the parameters of the selected device

Time
Time stamp when a parameter change was logged.

Coordinates
Memory cell for the parameters in the device.

Name
Identifier of the parameter.

Old value
Value no longer currently valid.

New value
Currently valid value.

4.7.3 USM event log

In the window **USM Event Log** you can display the reports for all occurring events of the selected device You select the device using the drop-down menu in the upper left-hand corner.

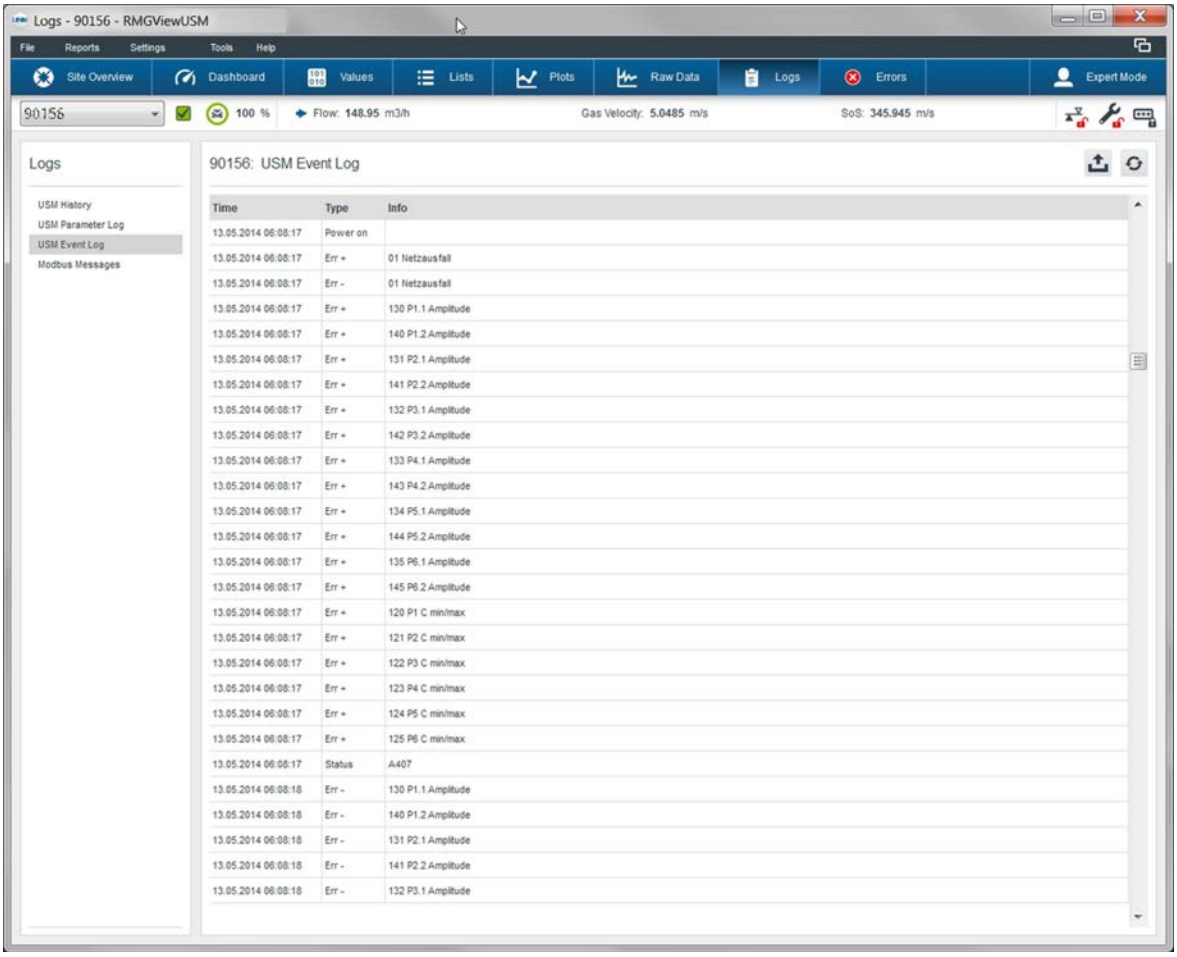


Figure 43: Protocols of the parameters of the selected device

Time
Time stamp when an event was logged.

Type
Type of event, e.g. error.

Info
Additional information on the event.

4.7.4 Modbus messages

In the window **Modbus Messages** you can display the messages of the status of the communication protocol.

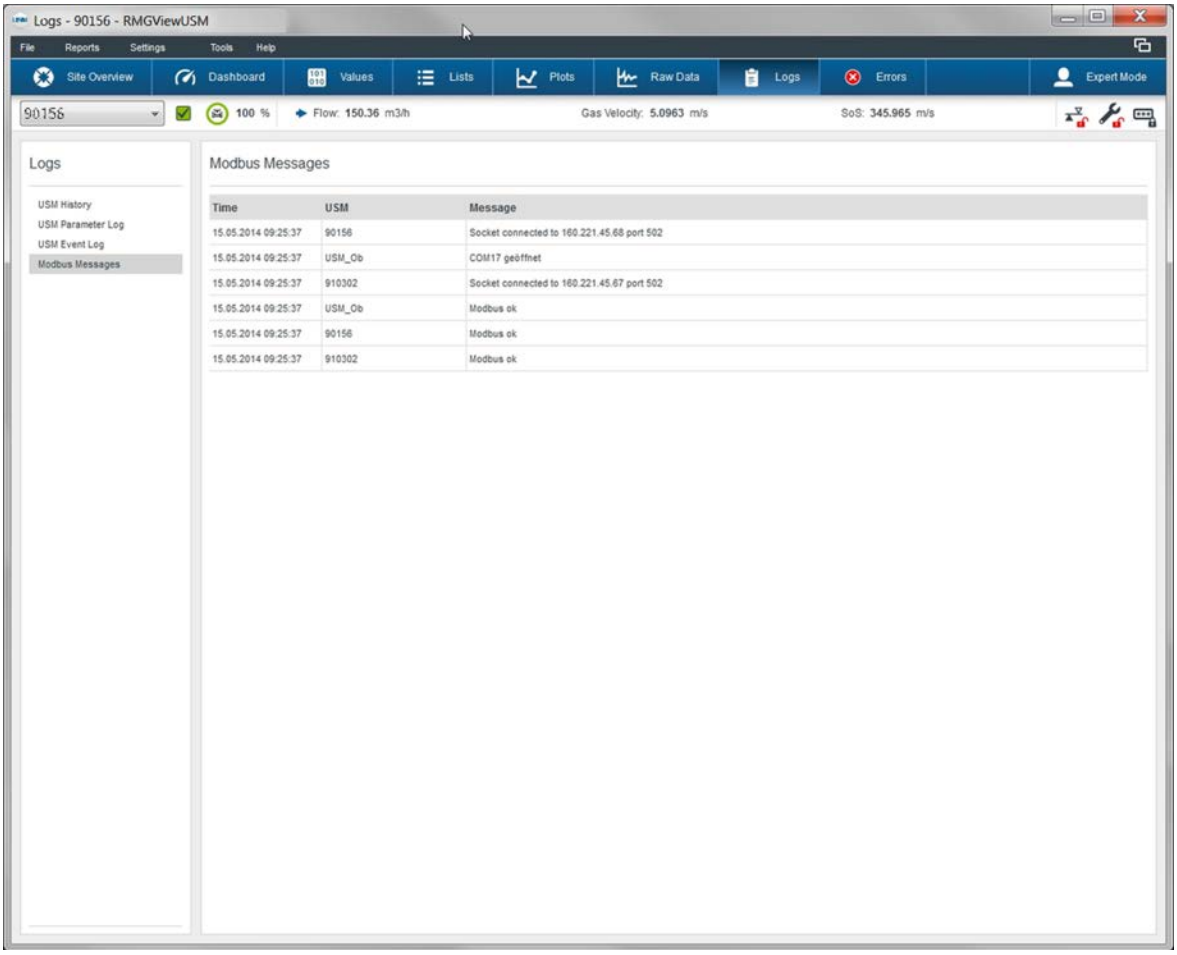


Figure 44: Messages to the status of the communication protocol

Time
Time stamp of the device for which a protocol was created.

USM
Time stamp of the ultrasonic gas meter for which a protocol was created.

Message
Messages on the status of the communication protocol.

4.8 Errors

RMGView^{USM} > Select Site > Errors

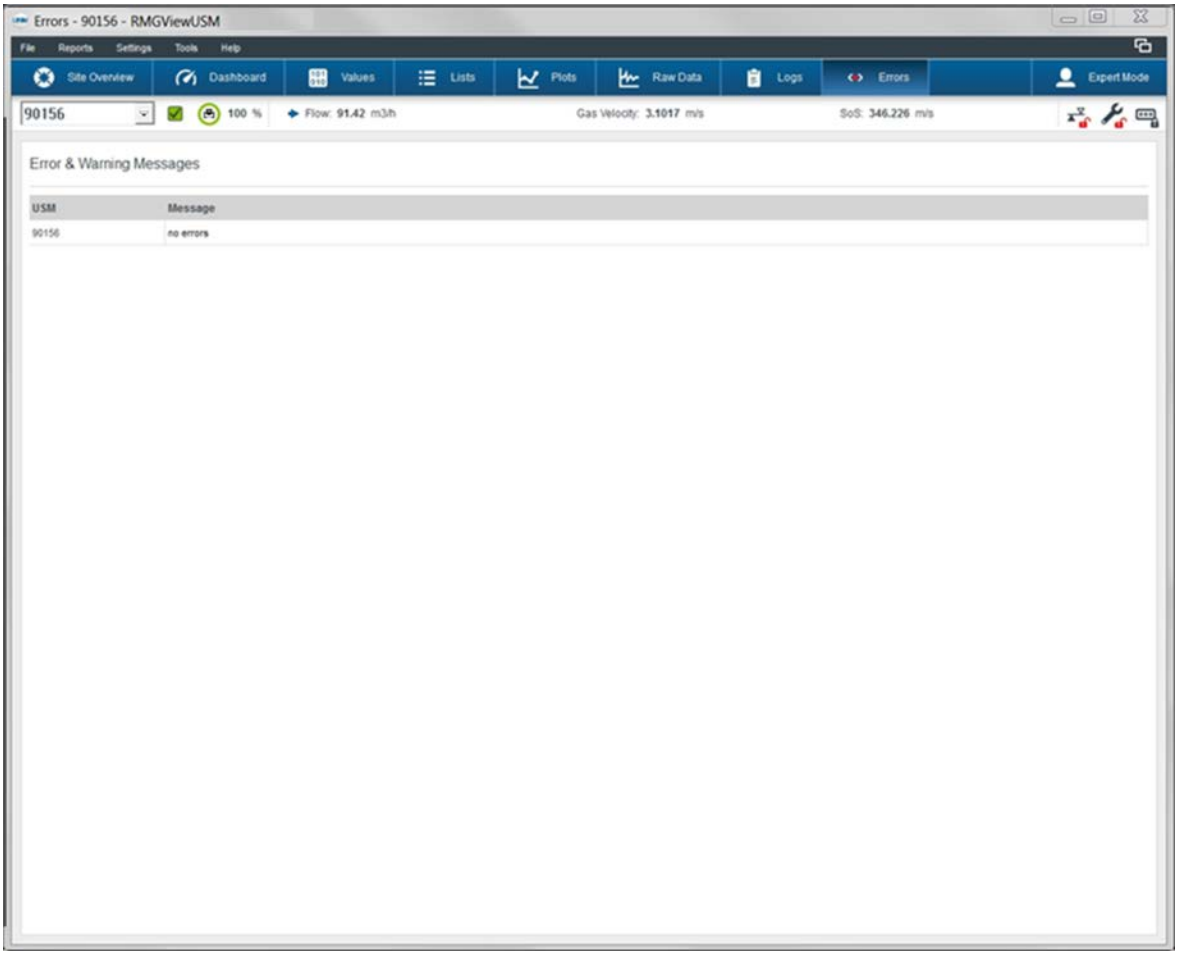


Figure 45: Errors

In the window **Errors** you can display the warnings and error messages for the ultrasonic gas meter selected or for all ultrasonic gas meters.

USM
Name of the ultrasonic gas meter.

Message
Status display with messages about warnings and errors
(see chapter 3.3 Status icons*, p. 27)*.

4.9 Password input

RMGView^{USM} > Select Site > Multi-function Ribbon > User Symbol

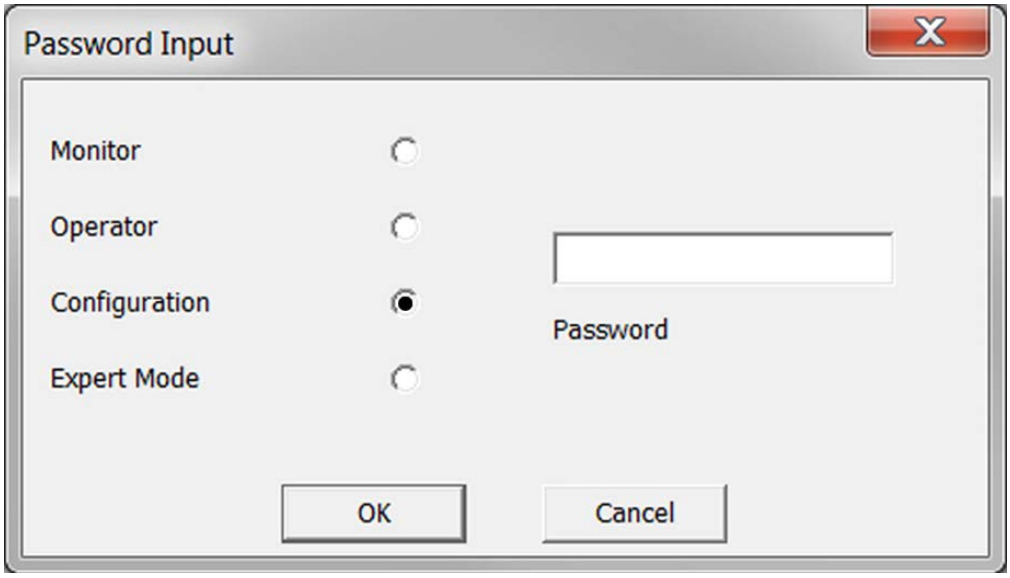


Figure 46: Password Input

In the window **Password Input** you can log-in for a user level. Depending on the user level you have extended access to RMGView^{USM}. Depending on the user level certain contents and functions of RMGView^{USM} are displayed or hidden.

Radio button user groups
Radio button for selecting the user groups.

- Monitor
- Operator
- Configuration
- Expert mode

Further information on the possibilities of the user groups can be found in *chapter 3.4 User levels, p. 29.*

Password
Entry field for the password. As a default setting you may use the following passwords:

- configurator: RMGUSE-P
- expert: RMGUSE-E

4.10 Record data

RMGView^{USM} > Select Site > Lists > Filled Circle
RMGView^{USM} > Select Site > Values > Filled Circles

In the figures, which you may see if you activate one of two links above, a small black circle on a light-grey square can be seen in the upper right corner. If you click on it with the mouse, the following window is opening.

Figure 47: Record data

In the window **Record Data,** you can record the trend data and save it in a file.

File
Storage location and name of the file.

Time Base
Recording intervals of the trend values.

As soon as the entries in this field are confirmed with "OK", the recording starts. This is indicated by changing the circle to a square. At the same time, a clock is running, which indicates the duration of the recording.

By clicking on the square, the recording ends.

4.11 Edit list (Creating a new list)

RMGView^{USM} > Select Site > Lists > Select List > ***Pencil Symbol***

RMGView^{USM} > Select Site > Lists > Plus Symbol > Select Type > ***OK Button***

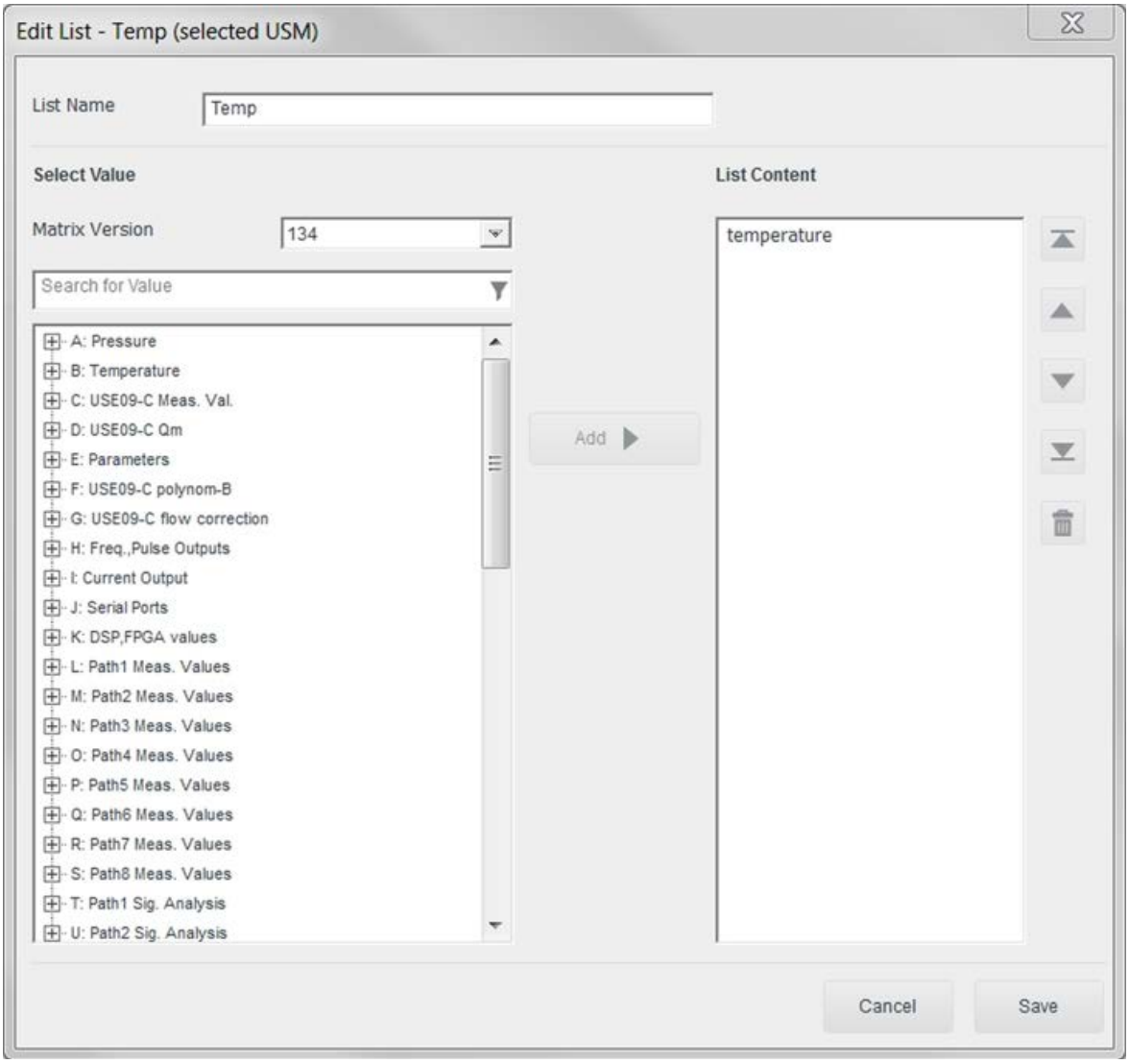


Figure 48: Edit list

In the window **Edit List** you can process the parameter lists for the ultrasonic gas meters or create new ones. Using the parameter readings reports and maintenance reports can be created. You can reuse the parameter lists for devices of the same type.

The elements of the window are shown in *chapter 4.13 Site specific, user defined list (Plot), p. 62.* In addition, following fields are displayed:

List name
Identifier for self-defined list.

Select Value
Select parameters for the self-defined list.

4.12 New user defined list: Select type

RMGView^{USM} > Select Site > Lists > Symbol Plus

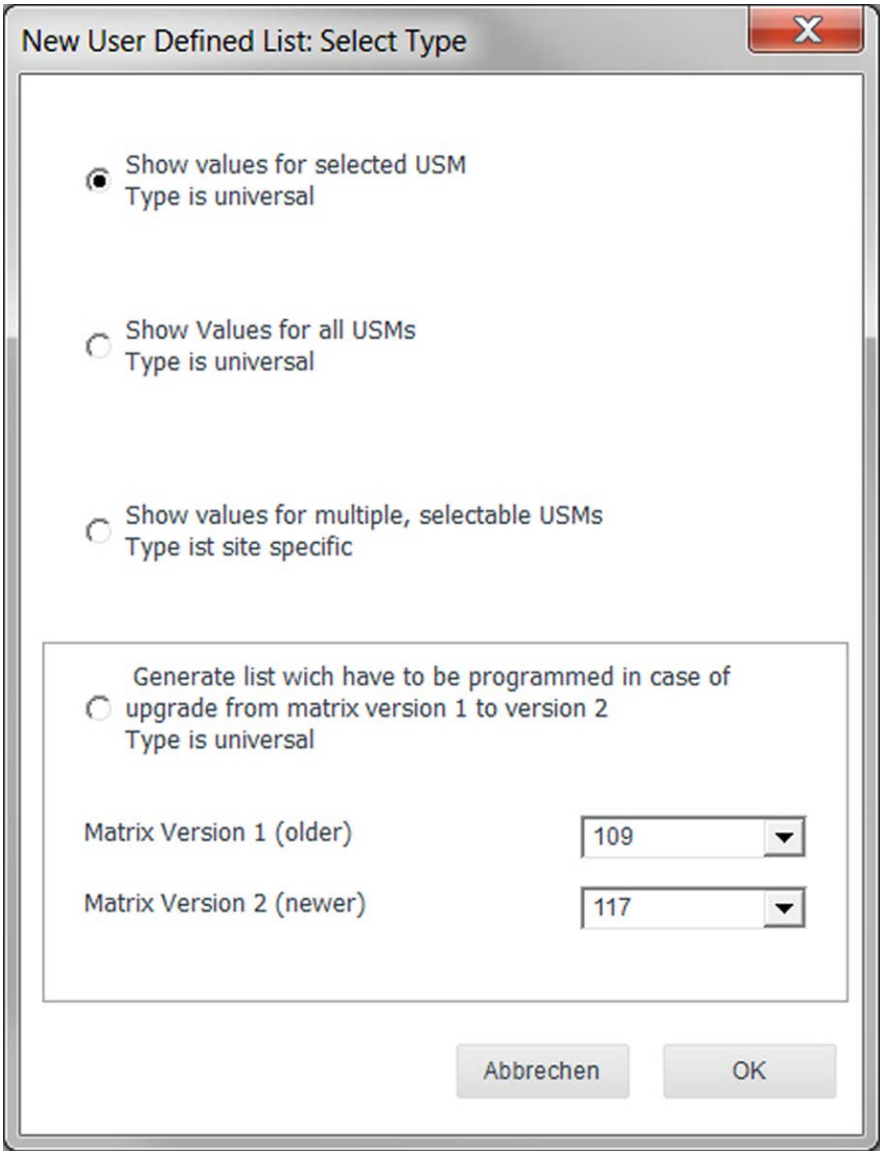


Figure 49: New User-Defined List: Select Type

In the window **New User-Defined List: Select Type** you can create a new parameter list. Using parameter lists the values measured in the device can be read out.

- Display values for the selected ultrasonic gas meter.
  Type is universal:
  List for the selected ultrasonic gas meter.
  List of ultrasonic gas meters is selectable for all sites.
- Display values for all ultrasonic gas meters.
  Type is universal:
  List of all ultrasonic gas meters in a site.
  List of ultrasonic gas meters is selectable for all sites.
- Display values for different, selectable ultrasonic gas meters.
  Type is site-specific:
  List for selected types of ultrasonic gas meters of a single site.
- Framed field:
  Is only available for user level service personnel.

4.13 Site specific, user defined list (Plot)

RMGView^{USM} > Select Site > Lists / Plots > Plus Symbol > Select Type > OK

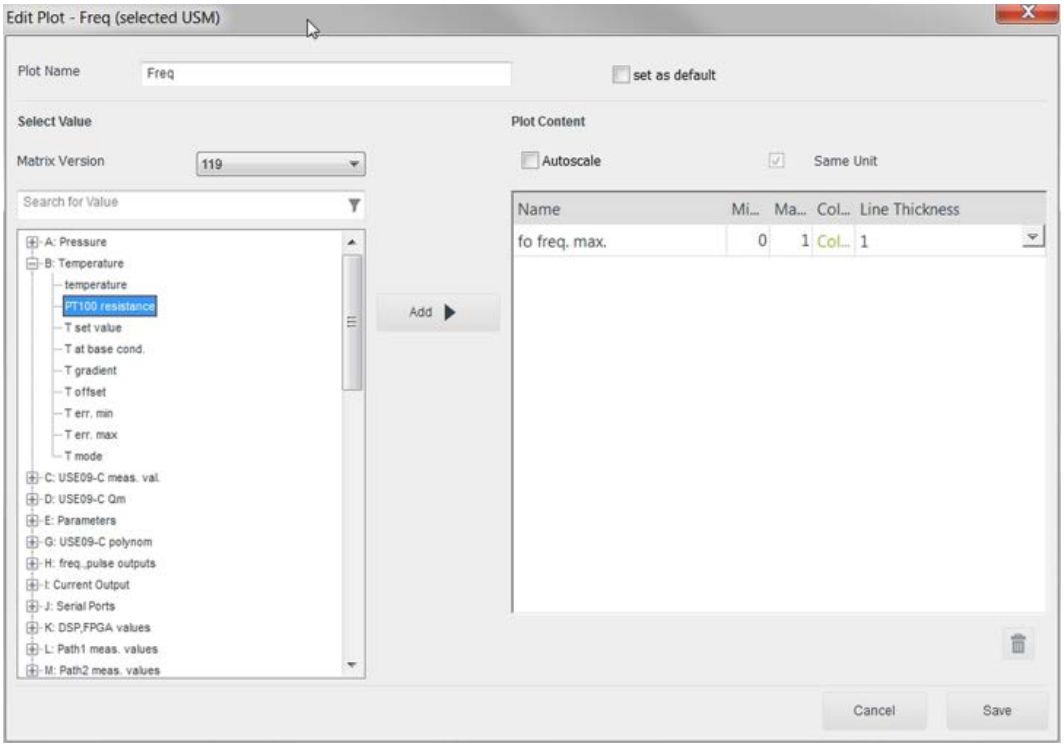


Figure 50: User-defined list

In the window **Edit List** you can compile self-defined lists of parameters or measurements or self-defined lists of parameter plots Trend overviews are created using the values read out for the parameters or the values measured. You can reuse the parameter lists and parameter plots for devices of the same type.

Name of the plot
Label for plot.

Select USM
List of ultrasonic gas meters in the site.

Select value
Select parameters for the plot graphic.

Filter panel (search for values)
Text panel to filter the list of parameters.

Values in the plot

USM
Name of the ultrasonic gas meter.

Name
Parameter label for the plot.

Minimum
Minimum value for the parameter in the plot.

Maximum
Maximum value for the parameter in the plot.

Color
Name of the color for the graphic in the plot.

Line Thickness
Line thickness in pixels.

Values in the list

USM
Name of the ultrasonic gas meter.

Text
Parameter in the self-defined list.

4.14 Color, line thickness

RMGView^{USM} > Select Site > Raw Data > Pencil Symbol

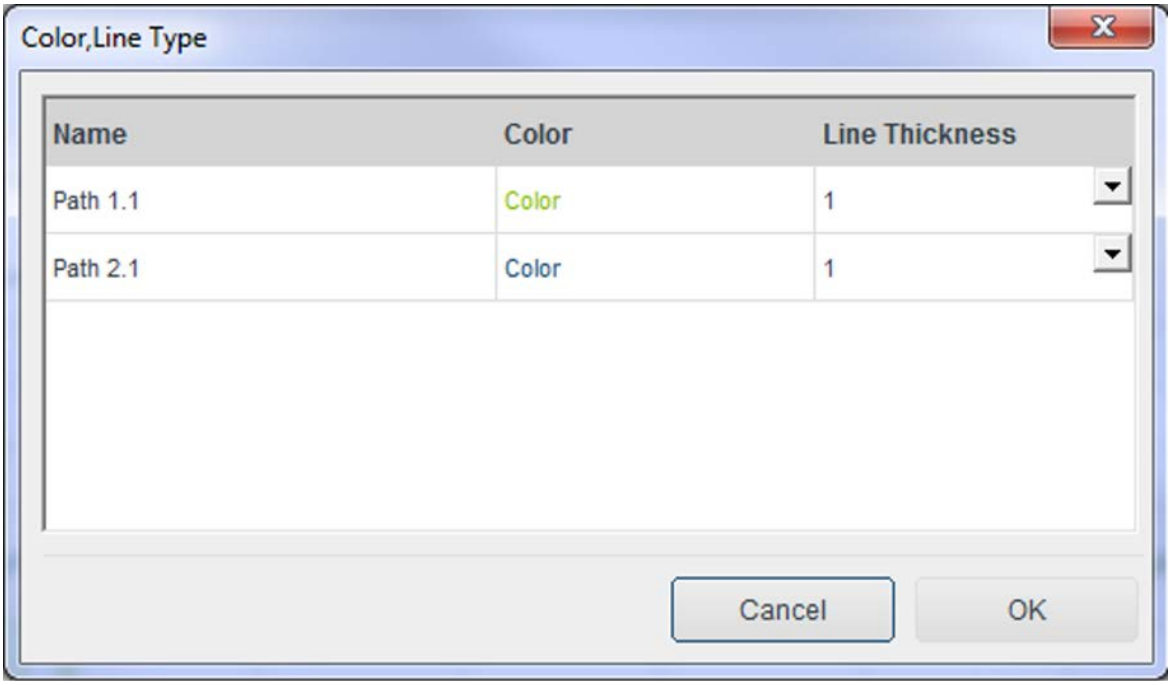


Figure 51 Color and line size selection

In the Color, Line Thickness window you can configure the graphic display of the trend curves for individual ultrasonic paths.

Name
Name of the ultrasonic path.

Color
Specification of color.

Line Thickness
Line thickness in pixel.

4.15 Save plot as JPG image

RMGView^{USM} > Select Site > Raw data > Diskette Symbol
RMGView^{USM} > Select Site > Plots > Diskette Symbol

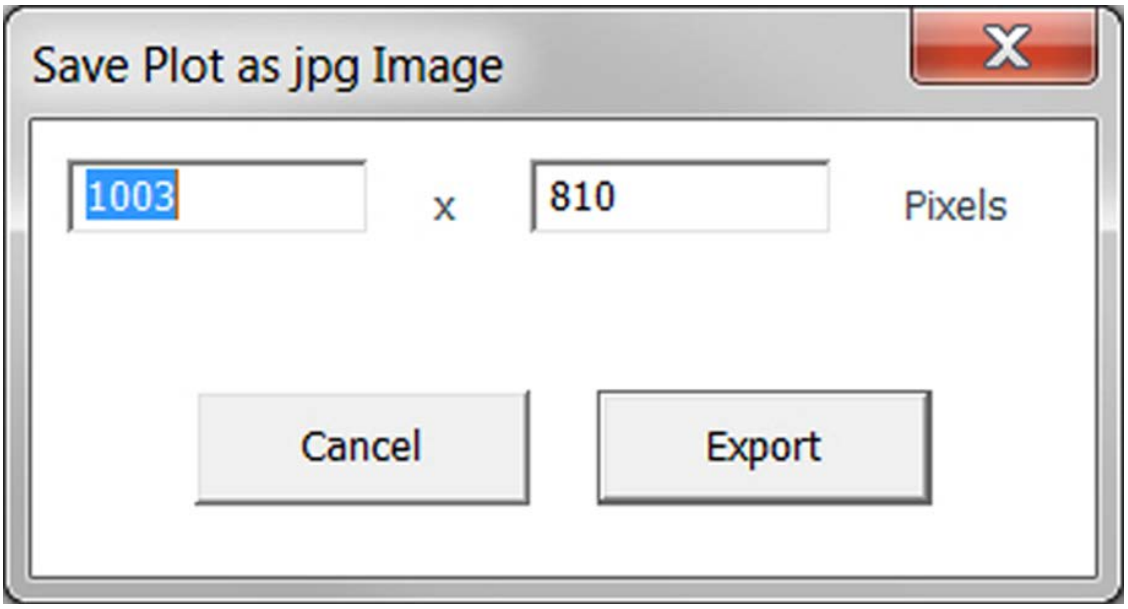


Figure 52: Save Plot as a jpg Image

In the window **Save Plot as jpg Image** you can export the current display as a jpg image.

???? x ???? Pixels
Width x height of the image in pixels.

4.16 Information on installation

RMGView^{USM} > Select Site > Settings > Site Information

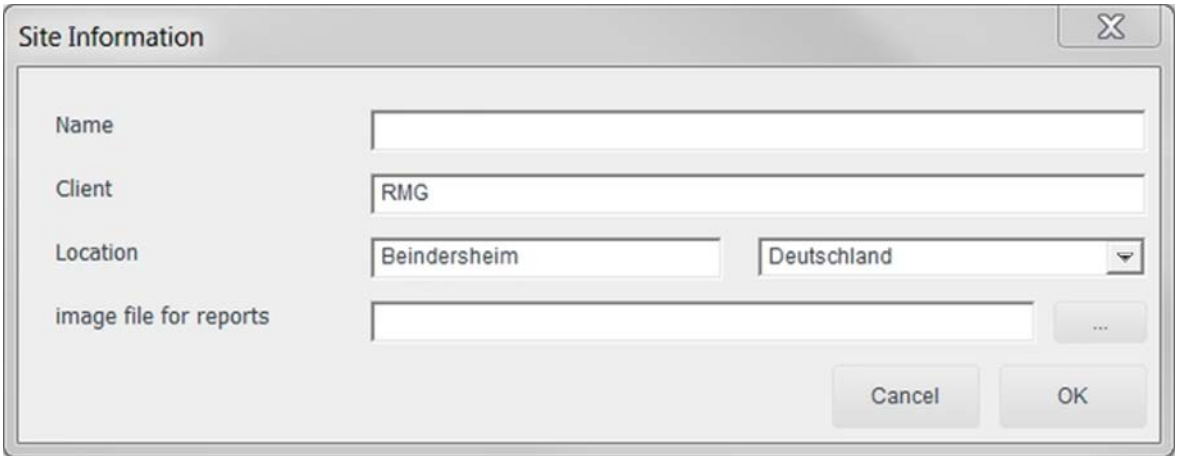


Figure 53: Site information

In the window **Site Information** you can manage the information on the client and the location of his site.

Name
Station name of the site.

Customer
Name of the customer.

Location
Location of the site.

Always use this site, Skip Site Selection
If you want to manage a single site, then – at the start of RMGView^{USM} – you can skip the window for Site Selection.

- ☑ Skip the window **RMGView^{USM}** – **Select Site**.
- ☐ Open window **RMGView^{USM}** – **Select Site**.

4.17 USM settings

RMGView^{USM} > Select Site > Settings > USM Settings

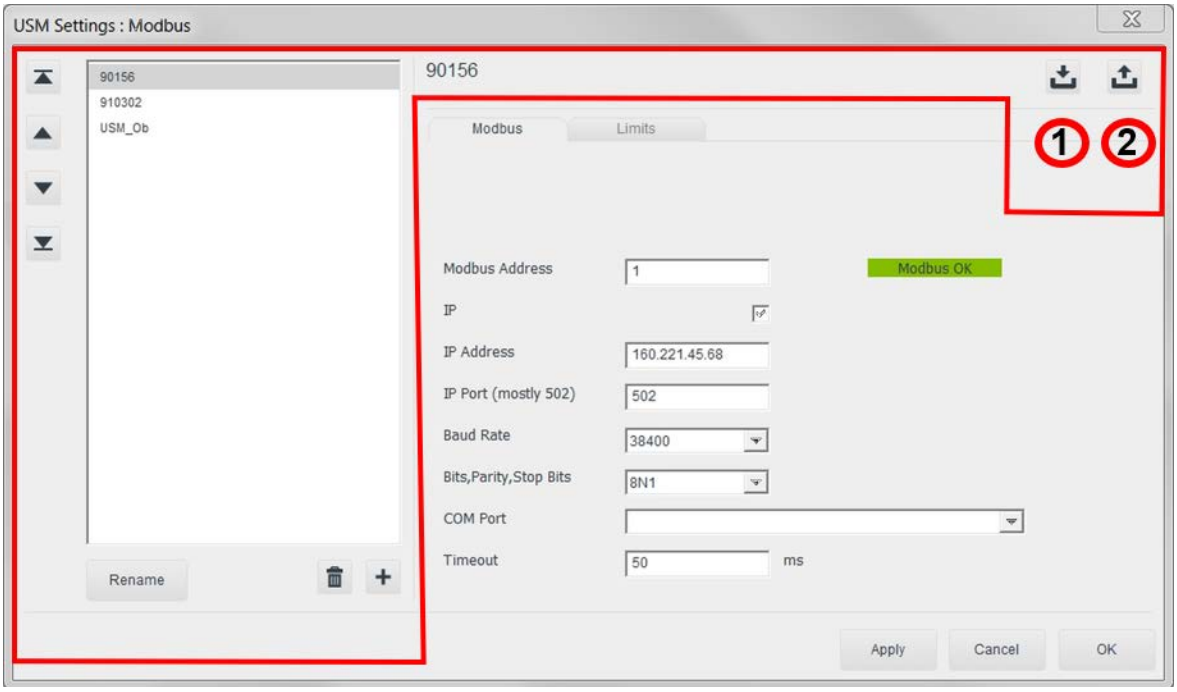


Figure 54: USM Settings

In the window **USM Settings: Modbus** you can conduct the configuration of the ultrasonic gas meters in the site using the tabs. In the left window sector you can maintain the list of the ultrasonic gas meters (USM):

- Select USM
- Rename USM
- Delete USM
- Add USM

The tabs for the configuration settings for the ultrasonic gas meters (*see chapter 4.17.1 Modbus, p. 68*) and an overview of the limit values for warning and alarm signals (*see chapter 4.17.2 Limits tab, p. 68*) are in the right window sector.

1. **Import**

This button can be used to import the configurations from a file.

2. **Export**

This button can be used to export the configurations to a file.

4.17.1 Modbus tab

RMGView^{USM} > Select Site > Settings > USM Settings

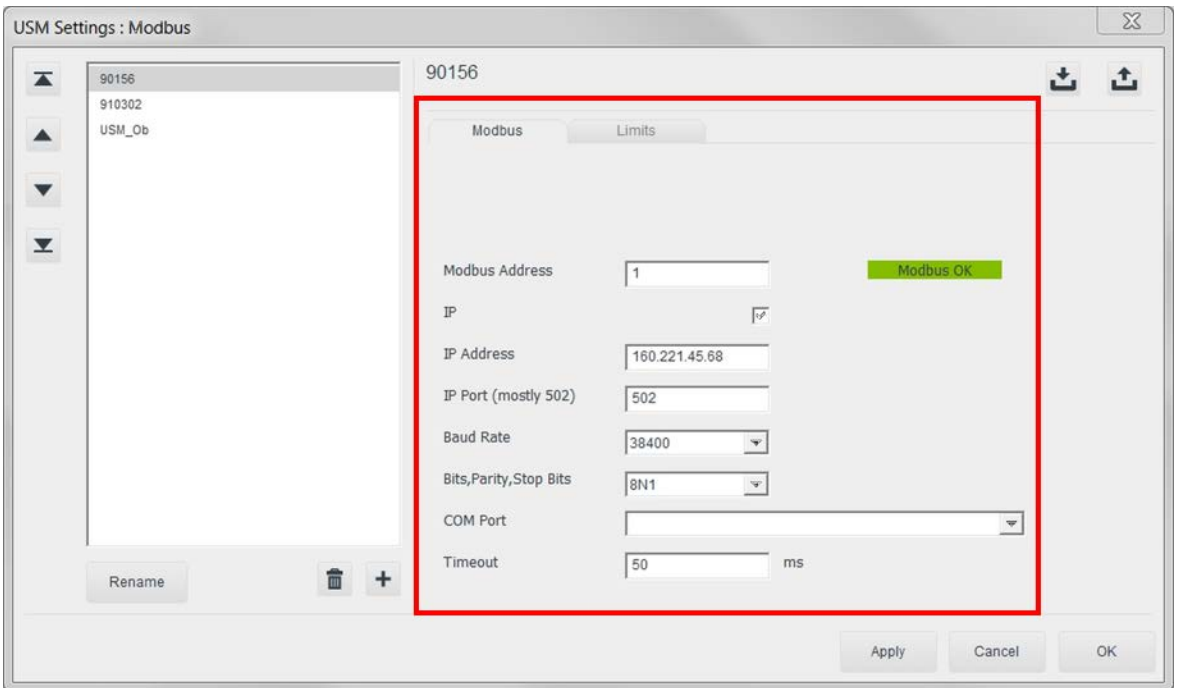


Figure 55: USM Settings – Modbus

In this tab you configure the communications connection between RMGView^{USM} and ultrasonic gas meter.

Modbus Address
Address of the ultrasonic gas meter at the bus.

IP
Use connection via Internet protocol address of a network or a serial interface.

- ☑ Use IP address for the connection (network cable).
- ☐ Use serial port (e.g. RS485) for the connection (serial cable).

IP-Address
IP address, for the connection between ultrasonic gas meter and RMGView^{USM}, e.g. 192.168.100.125

IP-Port (mostly 502)
Port number of the RMGView^{USM} service for the connection via the IP Address.

Baudrate
Transfer rate for serial communication.

Bits, Parity, Stop Bits
Parameter interface.

COM-Port
Name of the serial port for the connection between the ultrasonic gas meter and RMGView^{USM}.

Timeout
Time span until a communication attempt is dropped as an error.
Recommendation for connections:

- IP-Address = timeout of 500 ms (milliseconds).
- Serial Port = timeout of 50 ms (milliseconds).

4.17.2 Limits tab

RMGView^{USM} > Select Site > Settings > USM Settings > Limits

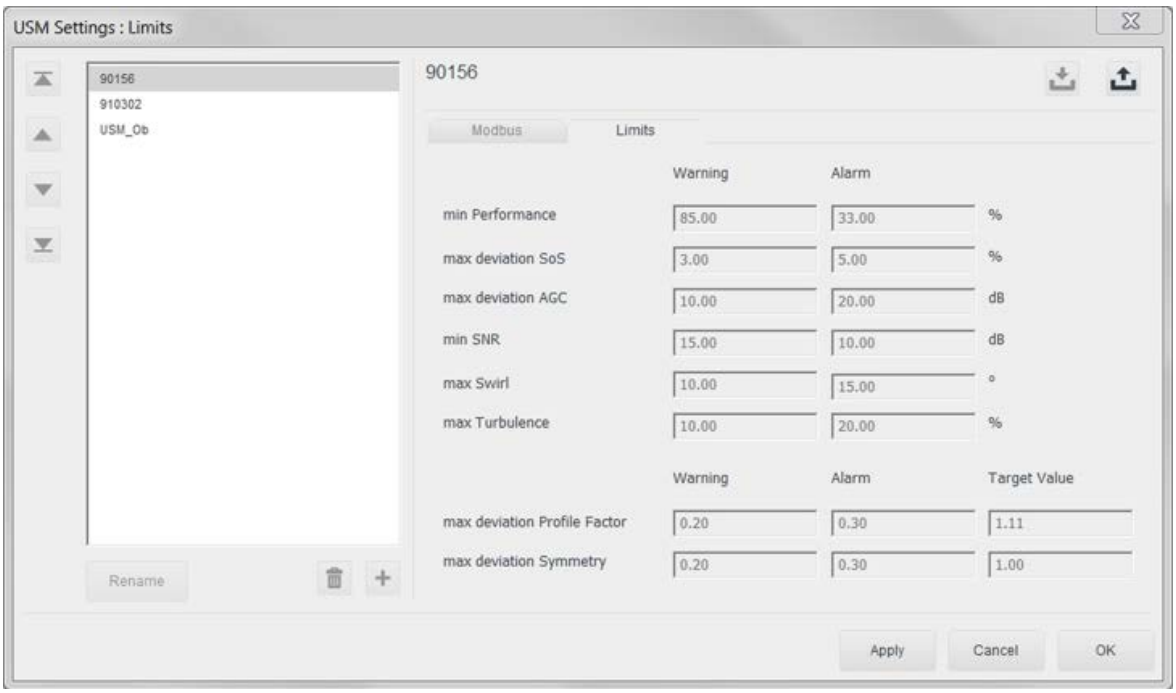


Figure 56: USM Settings – Limits

Note

Note that you have access to USE parameters here and that you can vary them. This means that the measuring behavior may clearly change.

4.17.3 Register Card Advanced

RMGView^{USM} > Select Site > Settings > USM Settings > Register Card Advanced

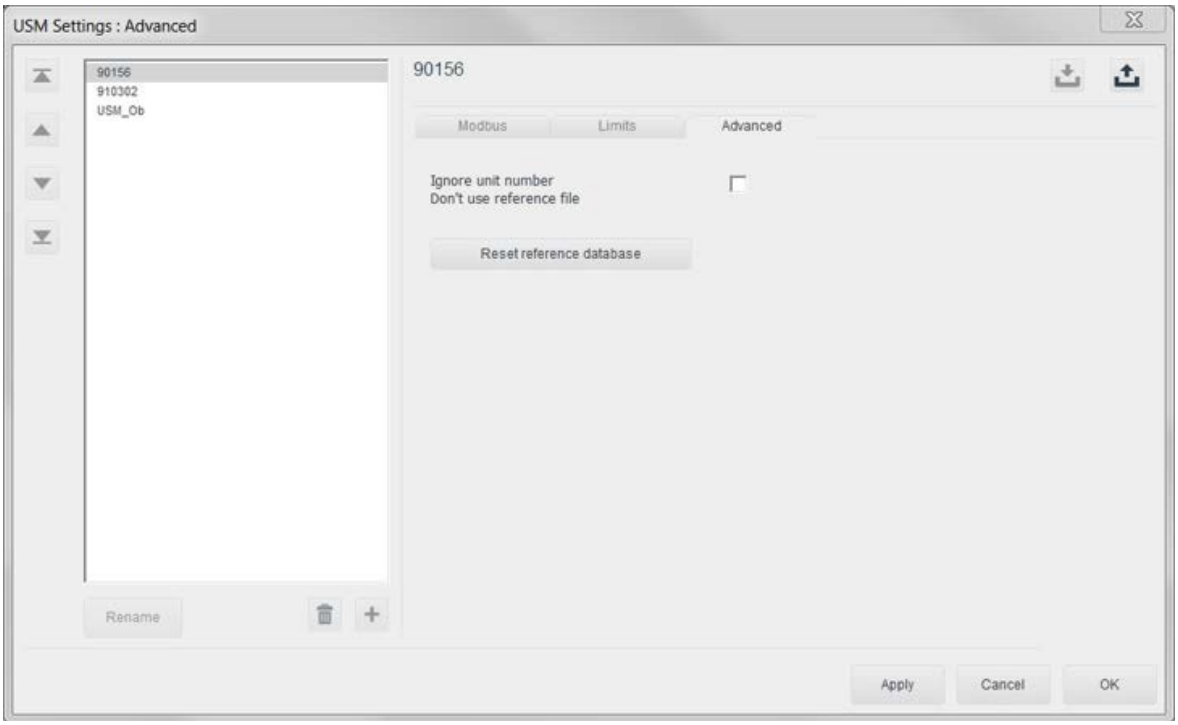


Figure 57: USM Settings – Register Card Advanced

With the help of the check box you may selected here to create a reference database for the selected device or not.

With “reset reference database“ an existing reference database can be deleted.

The reference database is used for the function "conduct test". It stores flow rate dependent reference values.

4.18 Log-Player

RMGView^{USM} > Select Site > Tools > Log Player

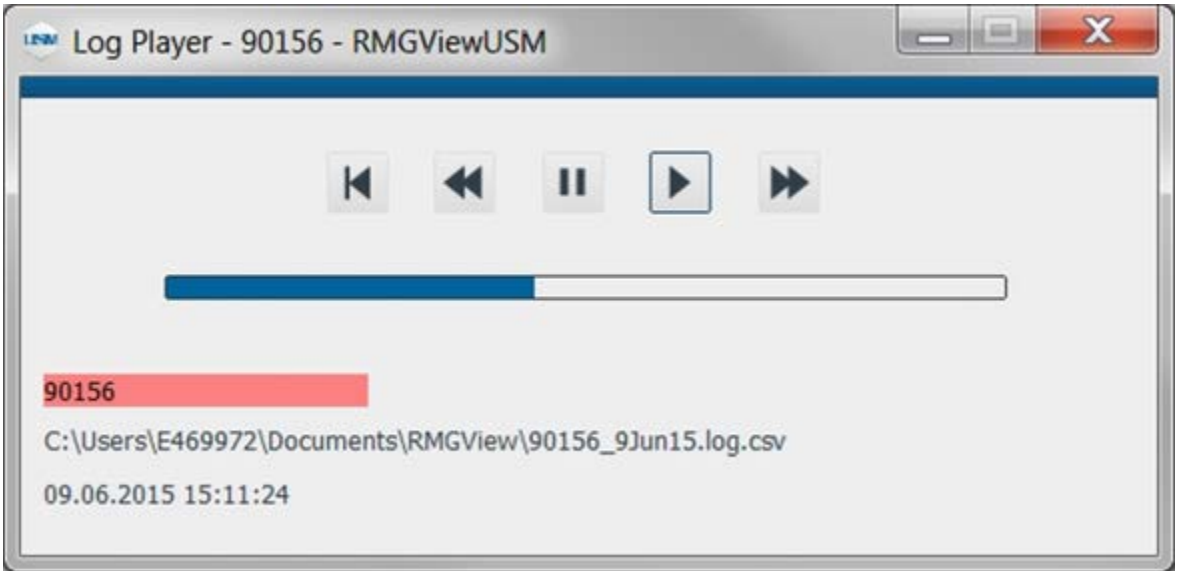


Figure 58: Log Player

In *chapter 4.10 Record data, p. 59* was explained, how data logs can be recorded.

Using the **Log Player** you can display a data protocol. The **Log Player** has the standard functions e.g. play, fast-forward and pause.

4.19 Inspection test

RMGView^{USM} > Select Site > Protocols > Inspection Test

In "**test protocol from log file**" you can create a maintenance report from a log file.

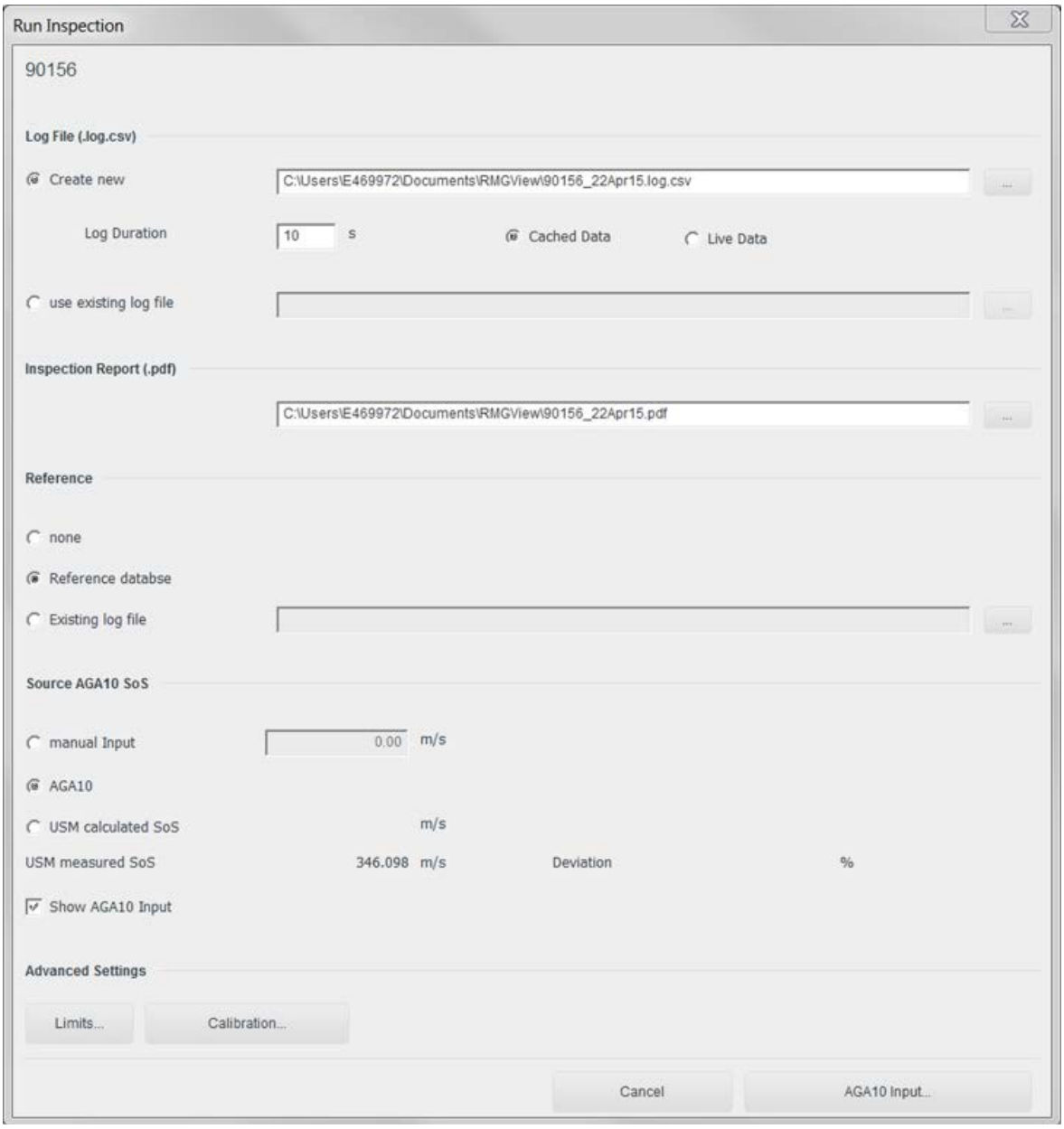


Figure 59: Inspection Test

Here you may set parameters for an USM inspection test.

Logfile
During the test, USM data are stored in a log file. There are two possibilities:

- Create a new log file.
  RMGView^{USM} suggests a directory path as well as a file name consisting of the USM name and the current date. Also, to be set is:
  - Duration of the logging process in seconds.
  - Whether Cache or Live data of the USM should be used
- Use an existing file.
  A former log file is used.
  (There are not append of new data.)

Inspection report
A test of an USM is documented with an inspection report. To store the inspection report name and directory path has to be defined. RMGView^{USM} suggests a file-name consisting of the USM name and the current date.

Reference
A USM test can be done against a reference. An internal database (flow rate de-pendent) or an existing log file can be used for the reference data.

Source AGA10 SoS
There are the following possibilities to determine SoS, which is required for the in-spection:

- Manual entry
  The value of SoS is entered manually.
  (You don‘t need to enter any gas data.)
- AGA10
  RMGView^{USM} calculates SoS based on gas data according to AGA10 rules.
  Gas data may be entered in the window „**AGA10 measurement values**“.
- Calculated by USM
  The gas data are taken from the USM, which calculates SoS according to AGA10.

Extended settings
Further test settings are possible clicking the following buttons:

- Limits
- Transmitter calibration
- AGA10 readings
  (The start of the test is carried out in this window!)

RMGView^{USM} > Select Site > Protocols > Perform testing > ***limits***

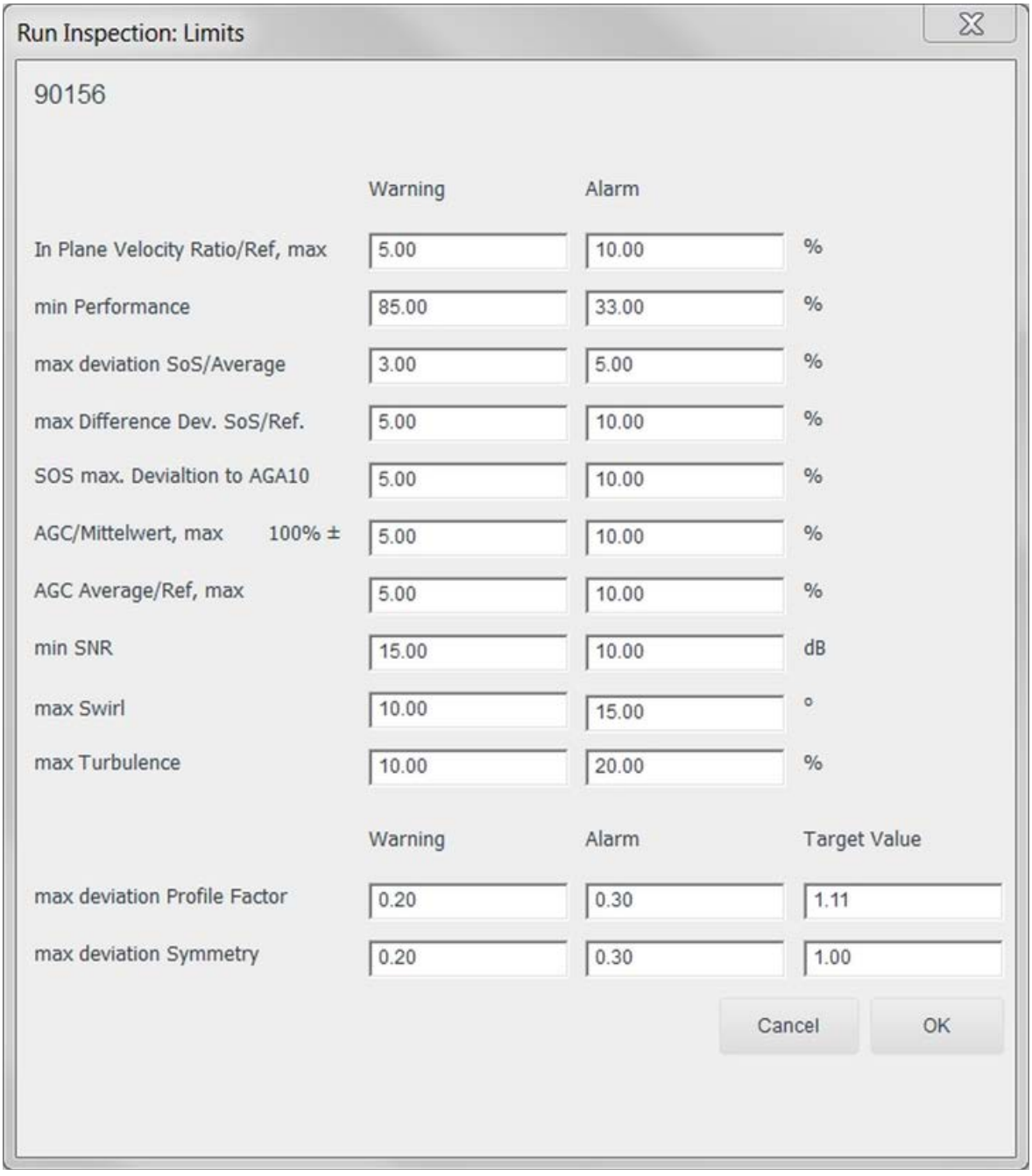


Figure 60: Inspection test: Limits

During USM testing all characteristic parameters are monitored. In this window you can define possible deviations for each measured or calculated value, separately as warning and alarm. The percentages given are the maximum deviations from the current mean value. The turbulence is given in percent, too. The limits for warning and alarm are absolute values here.

For "max. deviation Profile Factor" and "max. deviation Symmetry" the set point has to be entered additionally.

RMGView^{USM} > Select Site > Protocols > Perform testing > ***Transmitter calibration***

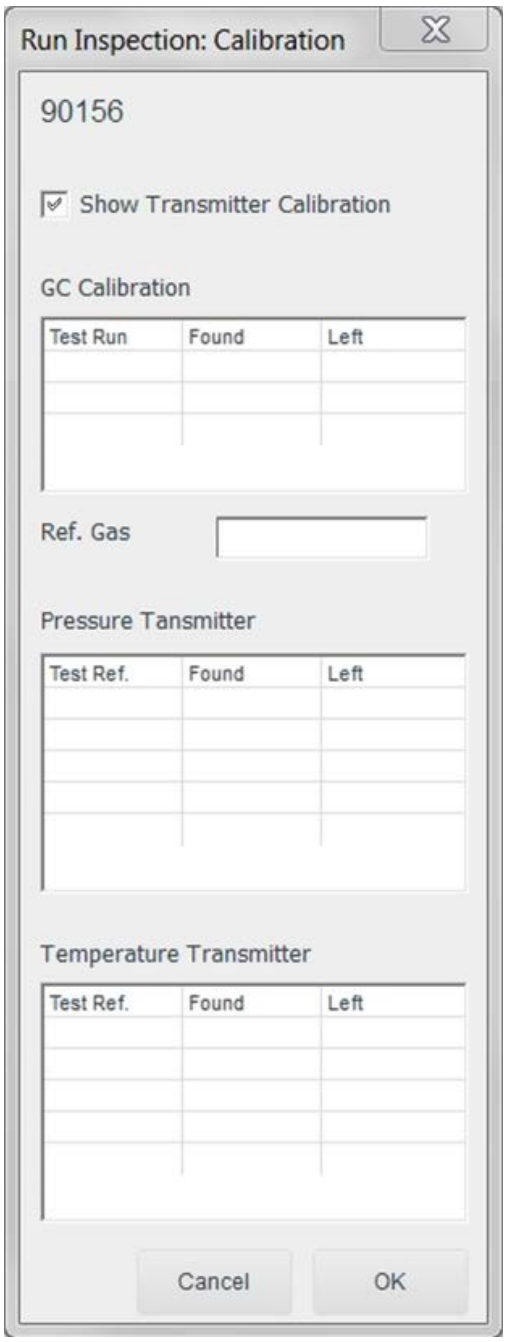


Figure 61: Inspection test: Calibration

In this window you may enter the calibration data of the PGC pressure and temperature transmitters. These will be displayed in the final test protocol, too.

RMGView^{USM} > Select Site > Protocols > Perform testing > ***AGA10 readings***

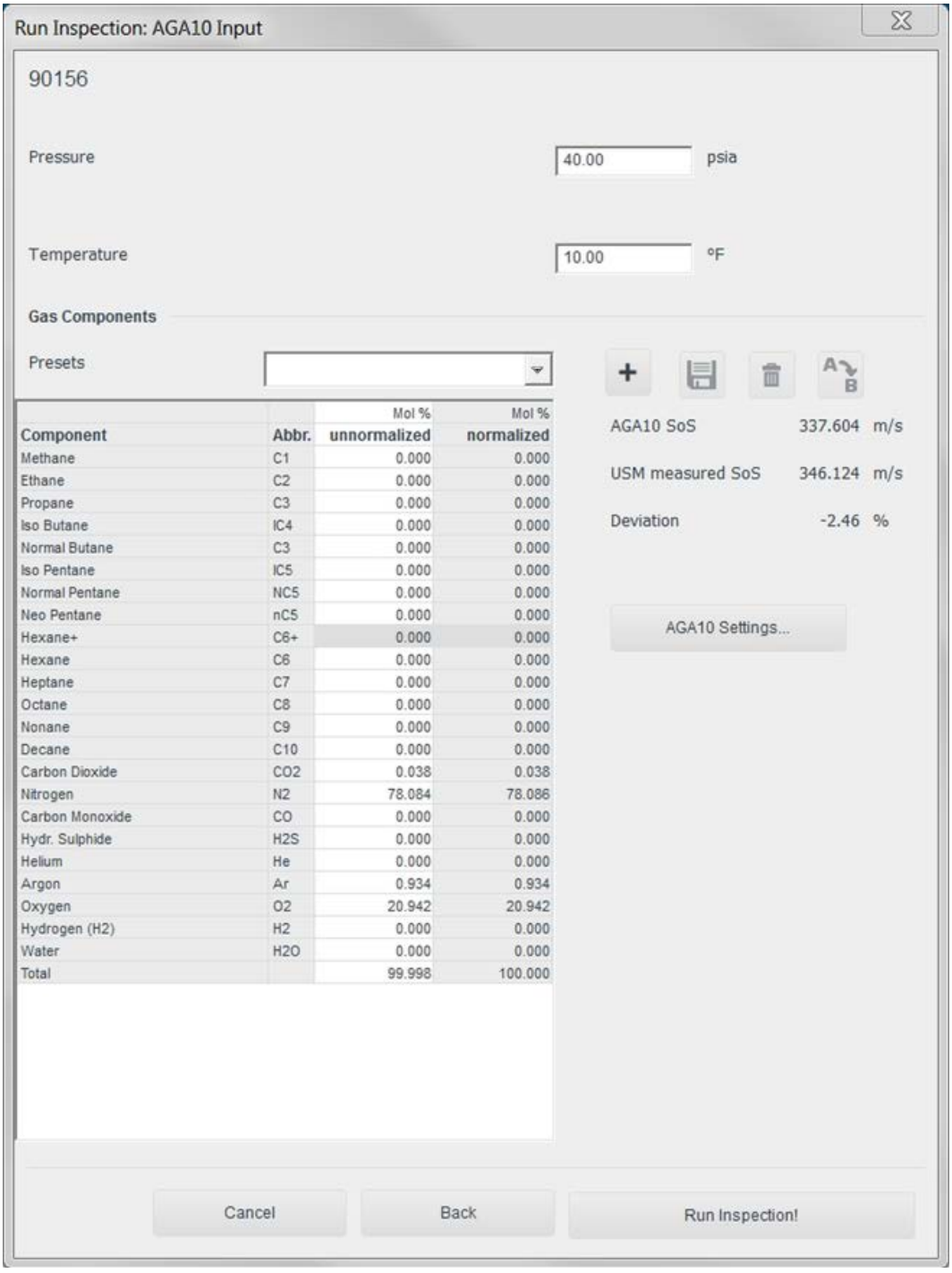


Figure 62: Inspection test: AGA10 readings

This window summarizes the default values for the SoS calculation according to the AGA10. This relates to pressure, temperature and the gas components. The default values for pressure and temperature can be entered directly, too. There are also presets as defaults for the gas components.

For some known gases records already exist. These are marked with a lock symbol (see left) that means they are protected and can‘t be changed.

The required data can be selected from a list. New components of a gas can be entered if is chosen from empty.

Save the selected record under a new name. He is not generally protected and requires amending the only active when you create access right.

Save the selected record under its previous name.

Delete the selected record, and remove from the list of existing records.

Rename the selected record.

- With the above-mentioned default values SoS can be calculated due to AGA10. It is displayed in the window under "**SOS AGA10**".
- Directly under it appears the actual measured value from the USM “measurement value USM“.
- Below the percental deviation of both values is displayed.

Using “**AGA10-setting**“ you‘ll have access to the related parameters..

RMGView^{USM} > Select Site > Protocols > Perform testing > AGA10 readings > ***AGA settings***

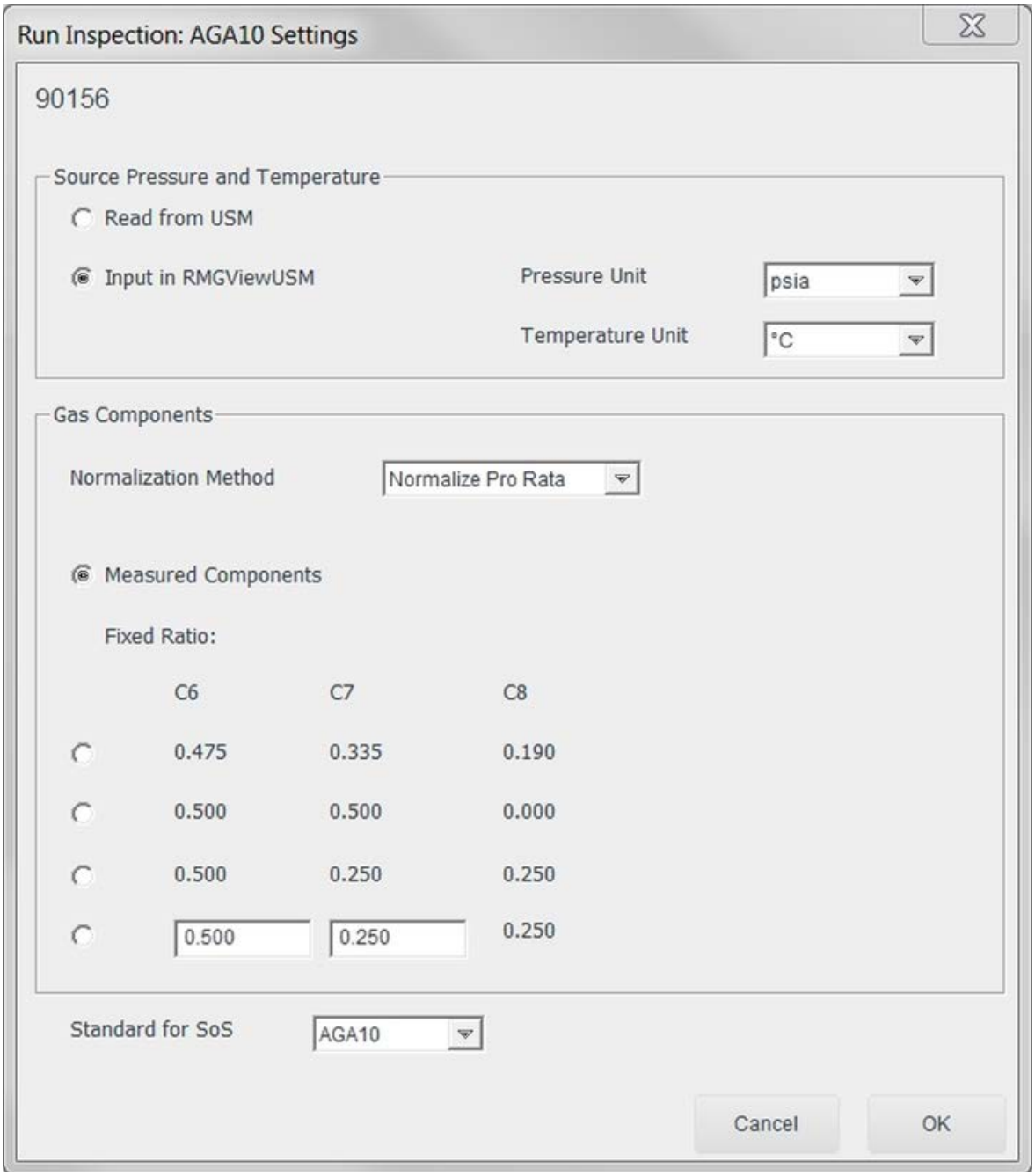


Figure 63: Performing test: AGA10 setting

This window summarizes the settings for the SoS calculation due to AGA10.

Select the source for pressure and temperature.

- Read values from USM.
- Use the input values of RMGView^{USM}.
  Check and fix the units of these values.

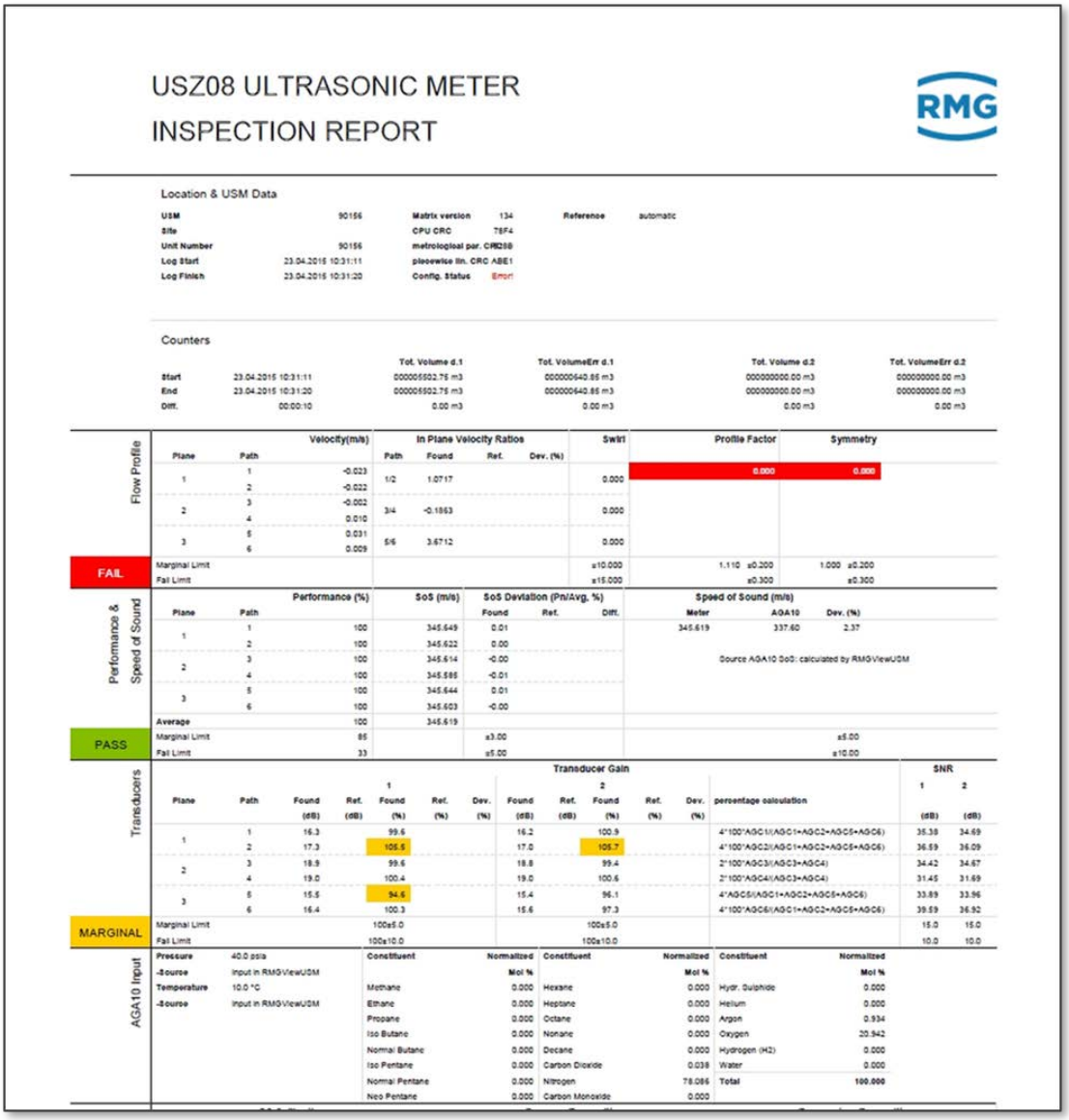
Use the gas components

- Select the normalization method.
  A requirement for the SoS calculation due to AGA10 is that the sum of all gas components is exactly 100%. To ensure this the gas components are automatically normalized. There are two possibilities:
  - Pro-Rata method
  - Normalize on C1
- Select the gas components ratio..
  The ratio between hexane C6, heptane C7 and octane C8 have to be fixed. There are 2 methods:
  - The Components be read as independent readings from USM.
  - The Components are in fixed relationship.
    Three predefined combinations can be selected.
    In the fourth combination of two components can be freely entered.

Standard selection for SOS
There are two possibilities to calculate SoS:

- AGA10
- ISO20765

RMGView^{USM} > Select Site > Protocols > Perform testing > AGA10 readings > ***Perform Testing***



USZ08 ULTRASONIC METER
INSPECTION REPORT

RMG

Location & USM Data

USM	90156	Matrix version	134	Reference	automatic
Site		CPU CRC	78F4		
Unit Number	90156	metrological par. CRC	58		
Log Start	23.04.2015 10:31:11	piecewise lin. CRC	ABE1		
Log Finish	23.04.2015 10:31:20	Config. Status	Error!		

Counters

		Tot. Volume d.1	Tot. VolumeErr d.1	Tot. Volume d.2	Tot. VolumeErr d.2
Start	23.04.2015 10:31:11	000005502.75 m3	000000640.85 m3	000000000.00 m3	000000000.00 m3
End	23.04.2015 10:31:20	000005502.75 m3	000000640.85 m3	000000000.00 m3	000000000.00 m3
Diff.	00:00:10	0.00 m3	0.00 m3	0.00 m3	0.00 m3

Flow Profile

Plane	Path	Velocity(m/s)	In Plane Velocity Ratios: Path	Found	Ref.	Dev. (%)	Swirl	Profile Factor	Symmetry
1	1	-0.023	1/2	1.0717			0.000	0.000	0.000
	2	-0.022							
2	3	-0.002	3/4	-0.1863			0.000		
	4	0.010							
3	5	0.031	5/6	3.6712			0.000		
	6	0.009							
FAIL	Marginal Limit						±10.000	1.110 ±0.200	1.000 ±0.200
	Fail Limit						±15.000	±0.300	±0.300

Performance & Speed of Sound

Plane	Path	Performance (%)	SoS (m/s)	SoS Deviation (Pn/Avg, %) Found	Ref.	Diff.	Speed of Sound (m/s) Meter	AGA10	Dev. (%)
1	1	100	345.649	0.01			345.619	337.60	2.37
	2	100	345.622	0.00					
2	3	100	345.614	-0.00			Source AGA10 SoS: calculated by RMGViewUSM		
	4	100	345.585	-0.01					
3	5	100	345.644	0.01					
	6	100	345.603	-0.00					
	Average	100	345.619						
PASS	Marginal Limit	85		±3.00					±5.00
	Fail Limit	33		±5.00					±10.00

Transducers

Plane	Path	Transducer Gain 1 Found (dB)	1 Ref. (dB)	1 Found (%)	1 Ref. (%)	1 Dev. (%)	2 Found (dB)	2 Ref. (dB)	2 Found (%)	2 Ref. (%)	2 Dev. (%)	percentage calculation	SNR 1 (dB)	SNR 2 (dB)
1	1	16.3		99.6			16.2		100.9			4*100*AGC1/(AGC1+AGC2+AGC5+AGC6)	35.38	34.69
	2	17.3		105.5			17.0		105.7			4*100*AGC2/(AGC1+AGC2+AGC5+AGC6)	36.59	36.09
2	3	18.9		99.6			18.8		99.4			2*100*AGC3/(AGC3+AGC4)	34.42	34.67
	4	19.0		100.4			19.0		100.6			2*100*AGC4/(AGC3+AGC4)	31.45	31.69
3	5	15.5		94.6			15.4		96.1			4*AGC5/(AGC1+AGC2+AGC5+AGC6)	33.89	33.96
	6	16.4		100.3			15.6		97.3			4*100*AGC6/(AGC1+AGC2+AGC5+AGC6)	39.59	36.92
MARGINAL	Marginal Limit			100±5.0					100±5.0				15.0	15.0
	Fail Limit			100±10.0					100±10.0				10.0	10.0

AGA10 Input

		Constituent	Normalized Mol %	Constituent	Normalized Mol %	Constituent	Normalized Mol %
Pressure	40.0 psia	Methane	0.000	Hexane	0.000	Hydr. Sulphide	0.000
-Source	Input in RMGViewUSM	Ethane	0.000	Heptane	0.000	Helium	0.000
Temperature	10.0 °C	Propane	0.000	Octane	0.000	Argon	0.934
-Source	Input in RMGViewUSM	Iso Butane	0.000	Nonane	0.000	Oxygen	20.942
		Normal Butane	0.000	Decane	0.000	Hydrogen (H2)	0.000
		Iso Pentane	0.000	Carbon Dioxide	0.038	Water	0.000
		Normal Pentane	0.000	Nitrogen	78.086	Total	100.000
		Neo Pentane	0.000	Carbon Monoxide	0.000		

Figure 64: Inspection report

In the next figure you may see a part of a test protocol that is automatically generated after the test of the USM.

4.20 Password list

RMGView^{USM} > Select Site > Settings > Manage Passwords

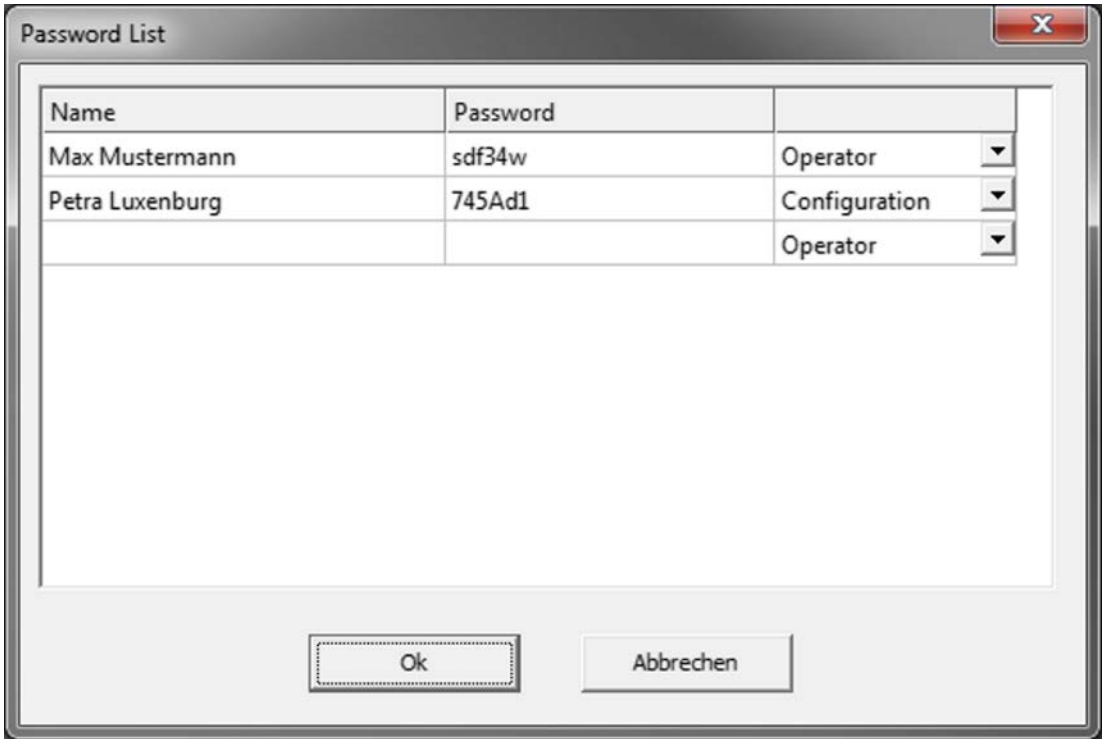


Figure 65: Password List

In the window **Password List** you can manage the user and passwords.

Name
User's name.

Password
Password character sequence.

Unnamed column
User level selection.

4.21 User settings

RMGView^{USM} > Select Site > Settings > User Settings

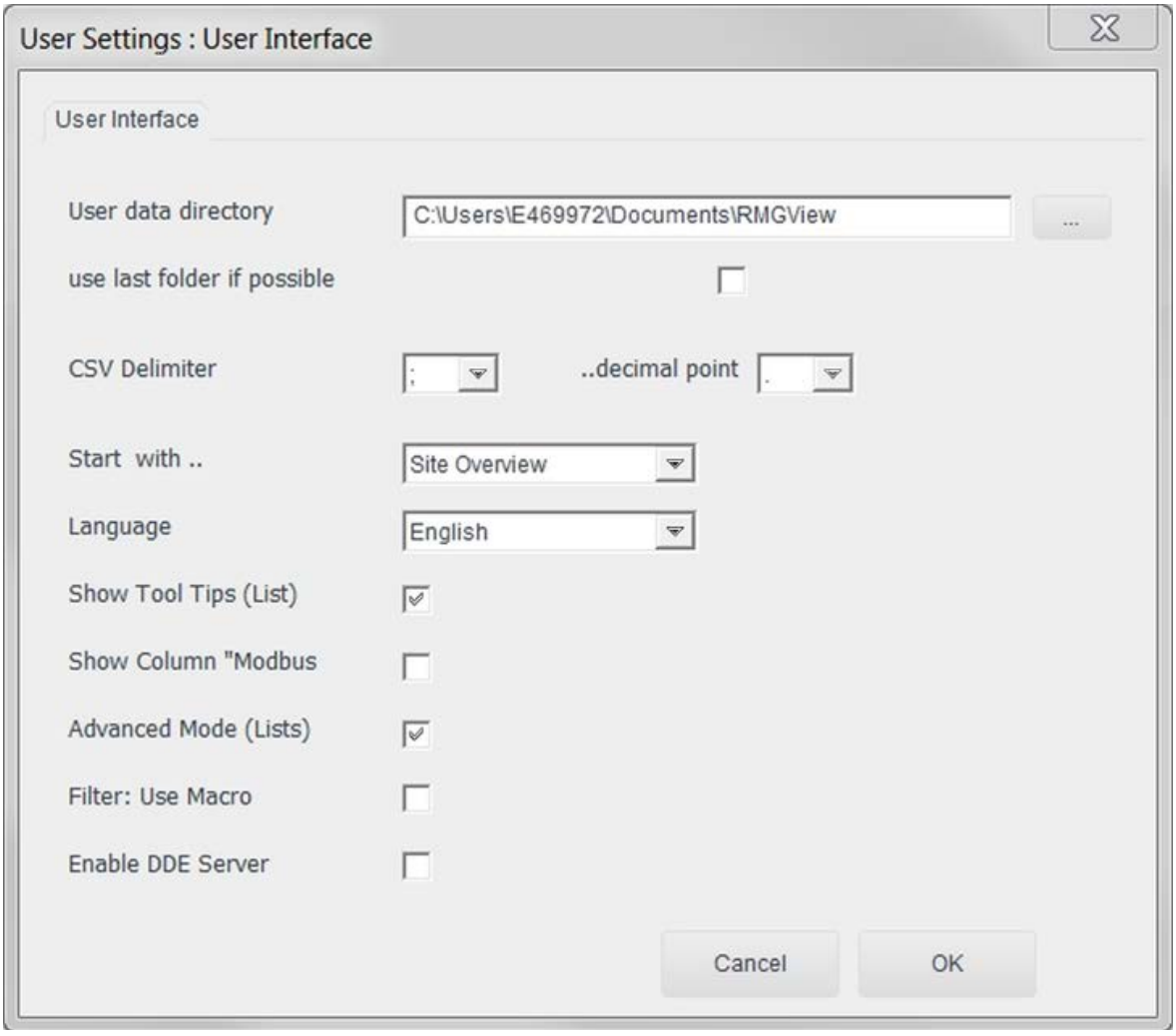


Figure 66: User Settings: User Interface

In the window **User Settings**: **User Interface** you can maintain the user – defined settings in RMGView^{USM} for the graphic interface.

User data directory
Source path for user interface configuration file.

Use last folder if possible, folder as standard
Use last default setting:

- ☑ Use the lastly selected directory path.
- ☐ Do not use default setting.

CSV Delimiter
Selection of the delimiter used in CSV files.

- ; = use semicolon separator.
- TAB = Use tabulator separator.

..decimal point
Select the indicator for the decimal place for values.

- . = Use point, e.g. 15.0 bar.
- , = Use comma, e.g. 15,0 bar.

Start with..
Select the window with which RMGView^{USM} is started:

- Site Overview
- Dashboard
- Values
- Lists
- Plots
- Raw data
- Reports
- Errors

Language
Language to be used for the user interface.

Display tool tips (list)
Display information on list elements in tool tips.

- ☑ Display tool tips for list elements.
- ☐ Do not display tool tips for list elements.

Filter: Use Macro
Filter macro and display.

- ☑ Filter for macros and list..
- ☐ Do not filter for macros.

4.22 Base line correction

RMGView^{USM} > Select Site > Tools > Base line correction

The base line correction of the ultrasonic meter (USM-GT400) can be done either with two different methods.

Base line correction of the flow rate using a polynomial fit

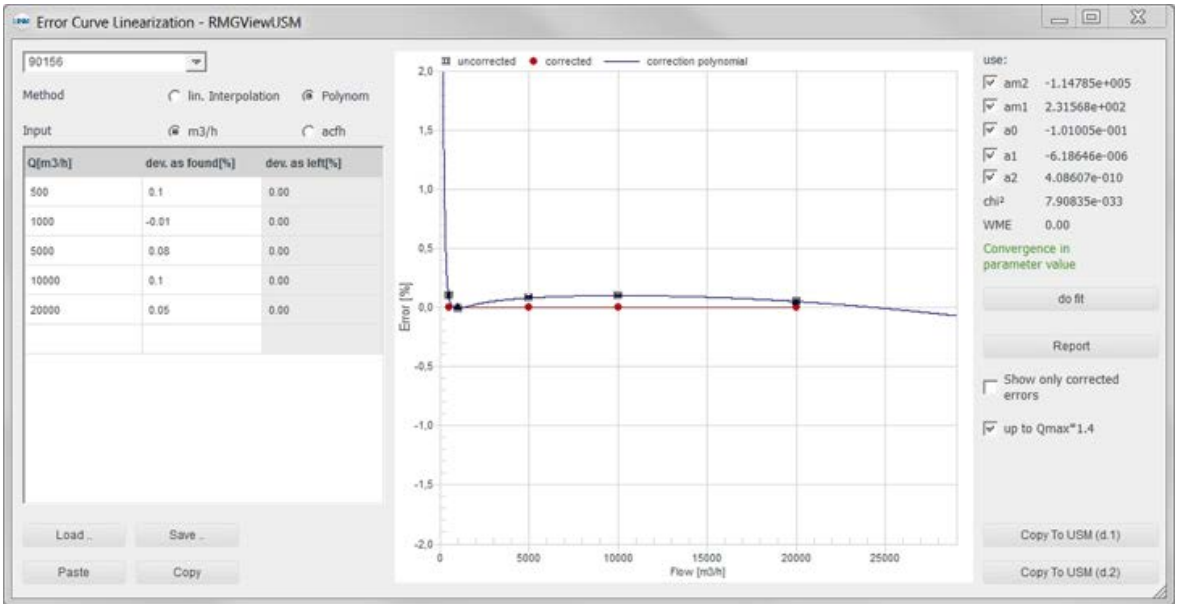


Figure 67: Base line correction using a polynomial fit

The correction is realized using a polynomial of degree 4. This reproduces the error curve of the USM depending on the flow.

$$F = \frac{A_{-2}}{Q_{Vb}^2} + \frac{A_{-1}}{Q_{Vb}} + A_0 + A_1 \cdot Q_{Vb} + A_2 \cdot Q_{Vb}^2$$

Legend

F	=	Deviation form baseline [%]
Q_{Vb}	=	Volume flow rate at operating conditions [m³/h]
A_n	=	Constants (n =-2, -1, 0, 1, 2)

The coefficients of the polynomial A_n (n = -2 bis n = 2) are determined using the values of the deviation F_i at the individual process flow rates Q_{Vb_i}. Instead of the constant meter factor K_V the corrected factor K_{Vk} will be used for further calculations.

$$K_{Vk} = K_V \cdot \left(1 + \frac{F}{100}\right)$$

Legend

K_V	=	Constant factor

The coefficients of the polynomial A_n are determined and given from the manufacturer of the USM-GT400.

Base line correction of the flow rate using a piecewise linear interpolation

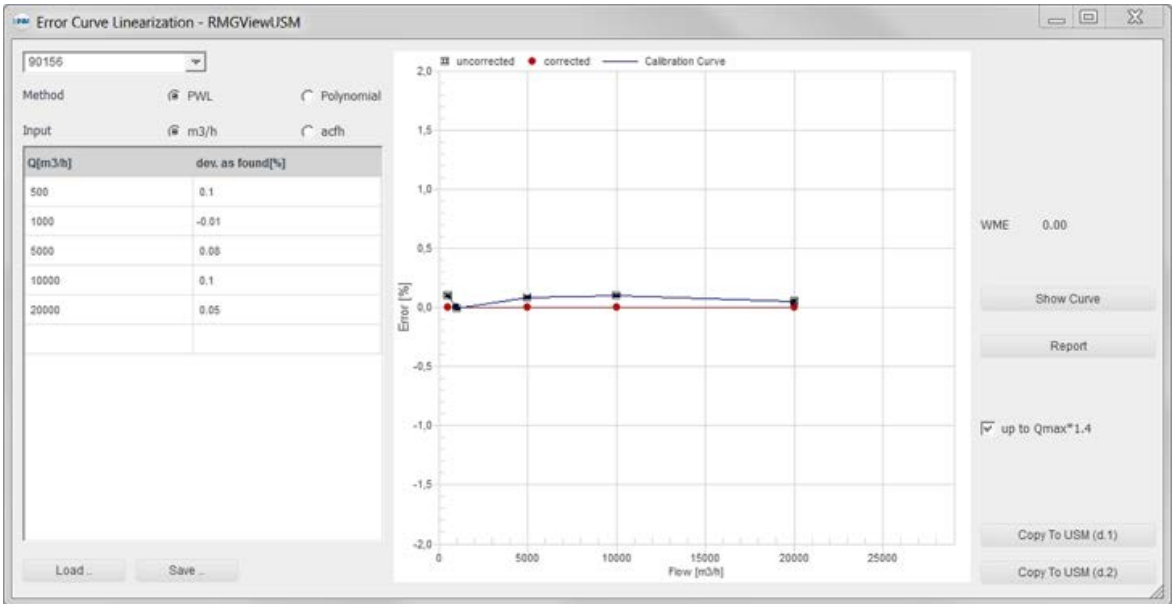


Figure 68: Base line correction

This method takes into account up to 12 free chose-able set points in each direction of the flow, means in total up to 24 points. The input values from the reference are given for the x- axis. At each point of the reference the deviation of the USM has to be entered. Between the set points a linear interpolation is assumed.

Instead of the constant meter factor K_V, the corrected meter factor K_{VC} for further calculation is used:

$$K_{VC} = K_V \cdot \left(1 + \frac{F}{100}\right)$$

The set points and the deviations from the base line are given from the error curve of the USM.

The corrected process volume flow rate is then calculated using the following equation:

$$Q_{pVf} = \frac{f_V}{K_{VC}} \cdot 3600$$

Legend

Q_{pVf}	=	corrected volume flow rate at operating conditions [m^3/h]
K_{VC}	=	corrected gas meter factor [Imp/m3]
f_V	=	Frequency of the meter [Hz]
K_V	=	uncorrected meter factor of the USM [Imp/m3]

4.23 License info

RMGView^{USM} > Select Site > Help > About RMGView^{USM}

In the window **License Info**, information on the software license is displayed: If you have any questions or queries please contact the RMG service personnel (*contact see p. II*).

4.24 Process license

RMGView^{USM} > Select Site > Settings > RMGView^{USM} Process License

4.25 Report editor

RMGView^{USM} > Select Site > Reports > User-Defined Reports > Report Editor

In the window **Report Editor** you can compile protocols according to your requirements. A training by RMG is required before working with the Protocol Editor. As an alternative RMG offers the service of creating client specific reports.

If you have any questions or queries, please contact the RMG service personnel. *(contact see p. II).*

5 Operation

In this chapter you will receive information on carrying out operations with the software.

5.1 User settings

In this chapter you will receive information on logging in and out of a user level.

5.1.1 Login users

The users are assigned the access rights for the user level by logging in with their password.

Logging users in at a protected user level

Figure 69: Opening Password Input window

The following steps are conducted from the RMGView[USM] window **Dashboard – All USMs** (see chapter *4.1, „Übersicht Anlage“ auf Seite 46)*

1 Click the buton **Password Input**
The window **Password Input opens**.

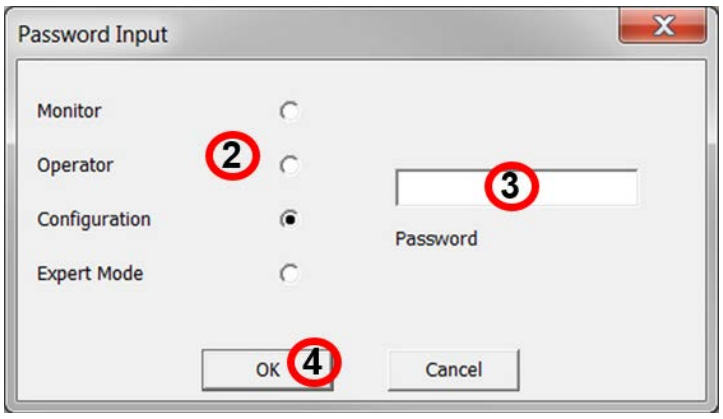


Figure 70: Login user

2 Click the radio button for the user level e.g. **Configurator**.

3 Enter the password in the **Password** field.

4 Click the **OK** button.

If the password was entered correctly, the button on the **Password Input** field changes to the name of the user e.g. **Operator**.

If the password was not entered correctly the user level switches to Monitor and in in **red letters appears**: „**Wrong Password**“.

Note
The number of login attempts is not limited.

5.1.2 User log out

For security reasons you must make sure that you log out of the protected user level before you leave the PC.

Logging out users from a protected user level

1 Open the window **Password Input**.

For this you carry out following steps:

Step 1: Logging users in at a protected user level
e.g. as „Monitor“

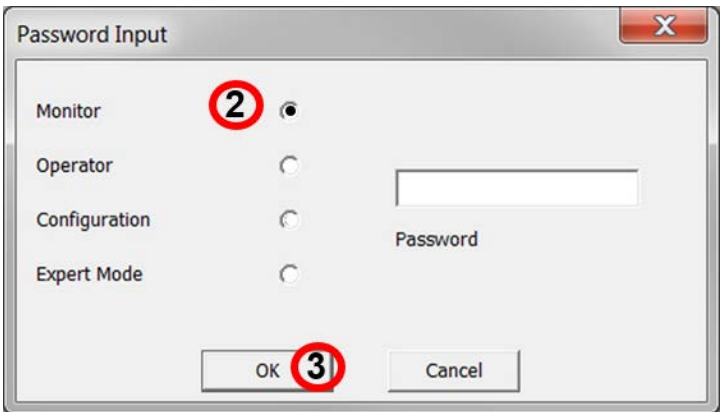


Figure 71: Login users

2 Click the **Monitor** radio button.

3 2 Click the **OK** button.

Access to the previously opened user level is disabled.

5.2 Adjusting the size of graphic contents

In order to enhance your view, you can enlarge or shrink areas of diagrams (plot).

Enlarging areas

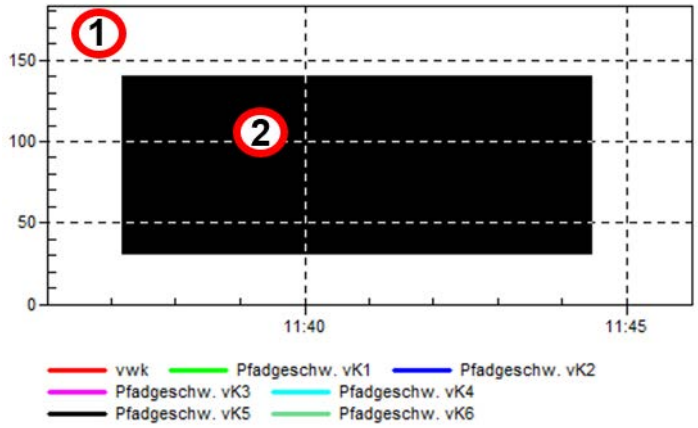


Figure 72: Enlarging areas

1 With left mouse button pressed mark the desired area **(2)** of the plot **(1)**.
2 After releasing the left mouse button, the view of the marked frame is enlarged.

Reset areas

1 Press the **Z** key on the keyboard.

The previously enlarged view is set back to the original size.

5.3 Working with windows

In this chapter you will receive information on organizing the windows.

5.3.1 User defined window configurations

You can arrange the windows on your desktop and save the configuration under a desired name. This configuration can be opened again any time.

Save Window Configuration

1. Open the window **Dashboard - All USMs** (*see chapter 4.1 Site overview, p. 39*).
2. Arrange the windows on the desktop to your requirements.

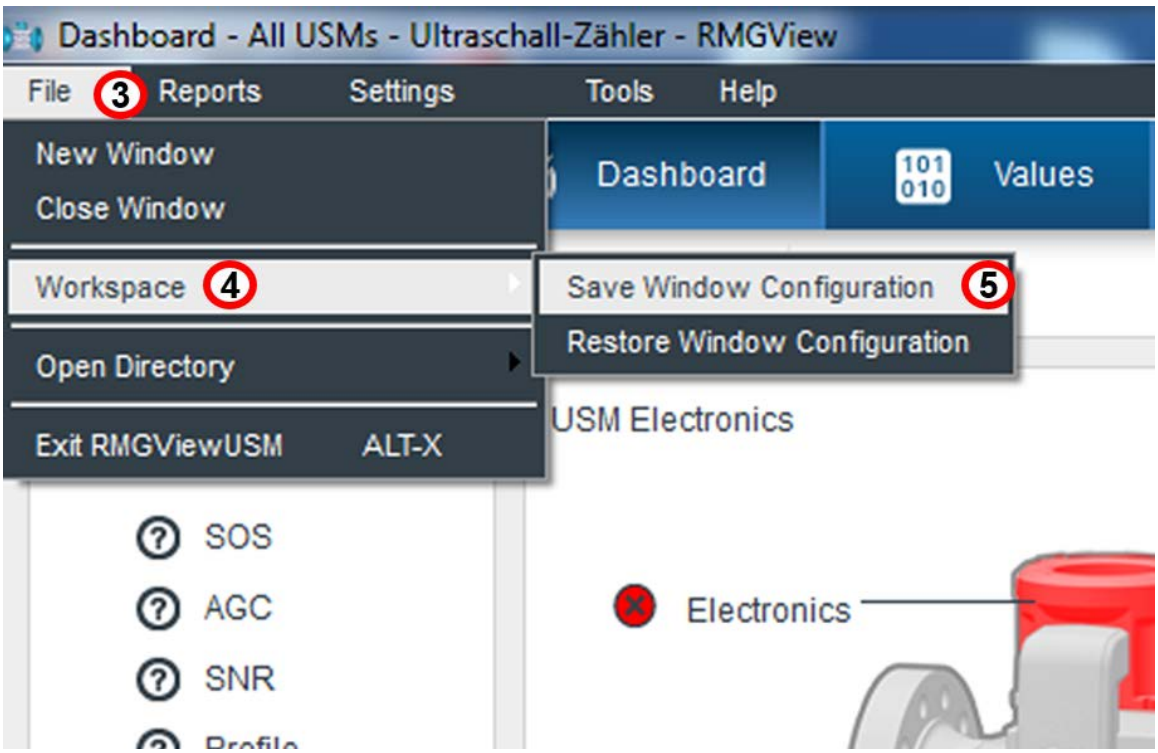


Figure 73: Save window configurations

3. Click menu item **File** in the menu bar.
4. Click menu item **Workspace**.
5. Click menu item **Save Window Configuration**.
   The arrangement of the opened windows is saved as a RMW file.

Note

Give the RMW file a name that you can easily recognize as being your configuration.

Opening window configurations

1. Open the window **Dashboard - All USMs**
   (*see chapter see chapter 4.1 Site overview, p. 39*).

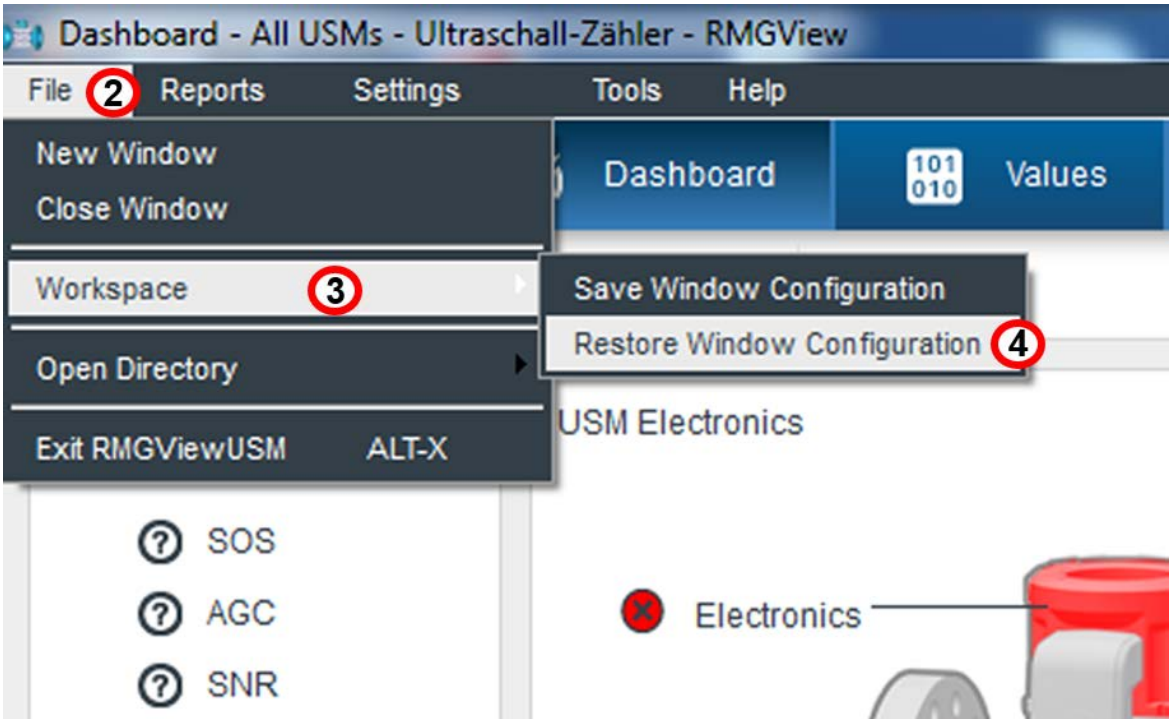


Figure 74: Save Window Configuration

2. Click menu item **File** in the menu bar.
3. Click menu item **Workspace**.
4. Click menu item Restore Window Configuration.
   Windows are opened automatically and arranged according to the configuration on the desktop.

5.3.2 Cloning windows

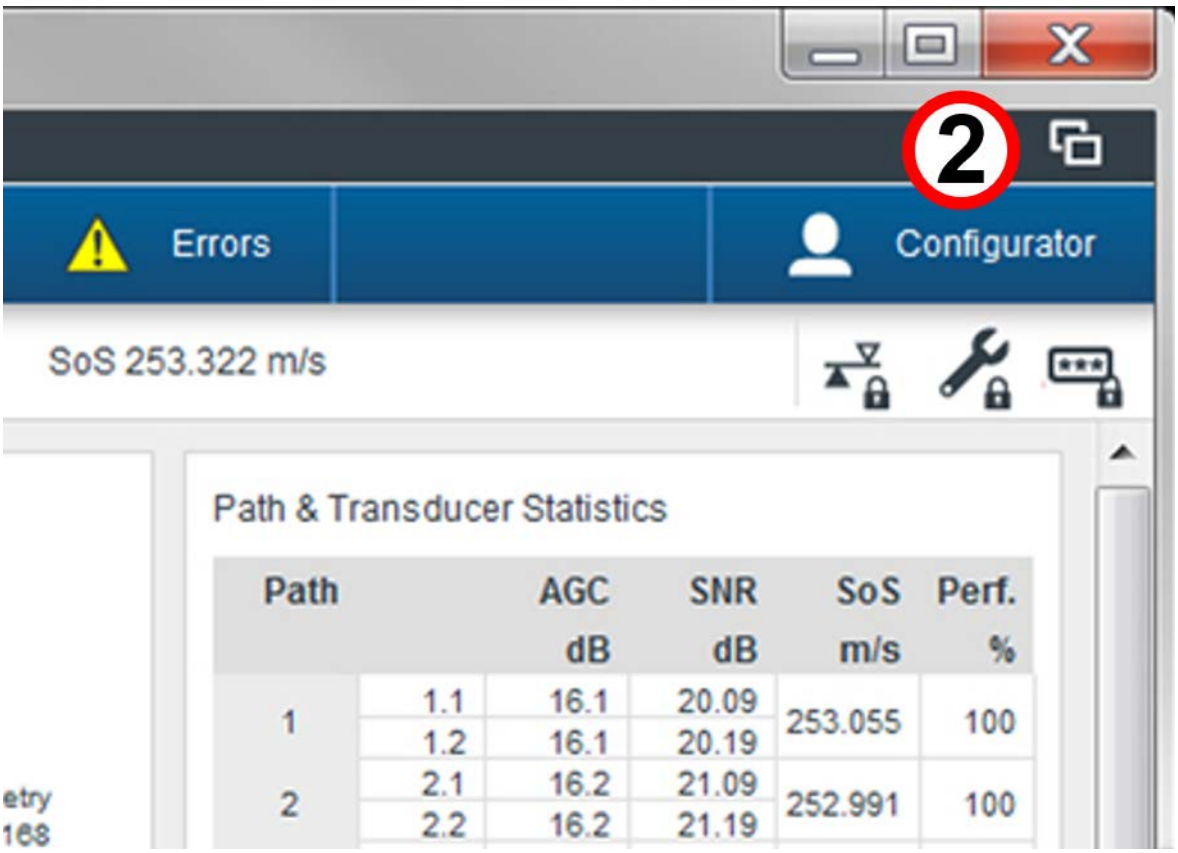


Figure 75: Cloning buttons

1. Open window that is to be opened again.
2. Click the **Clone window** button.
   The current window is opened once again.

5.3.3 Closing RMGView[USM]

You can close all RMGView[USM] windows with just a few mouse clicks.

Exiting the software

1. Open the window **Dashboard - All USMs** (*see chapter 4.1 Site overview, p. 39*).

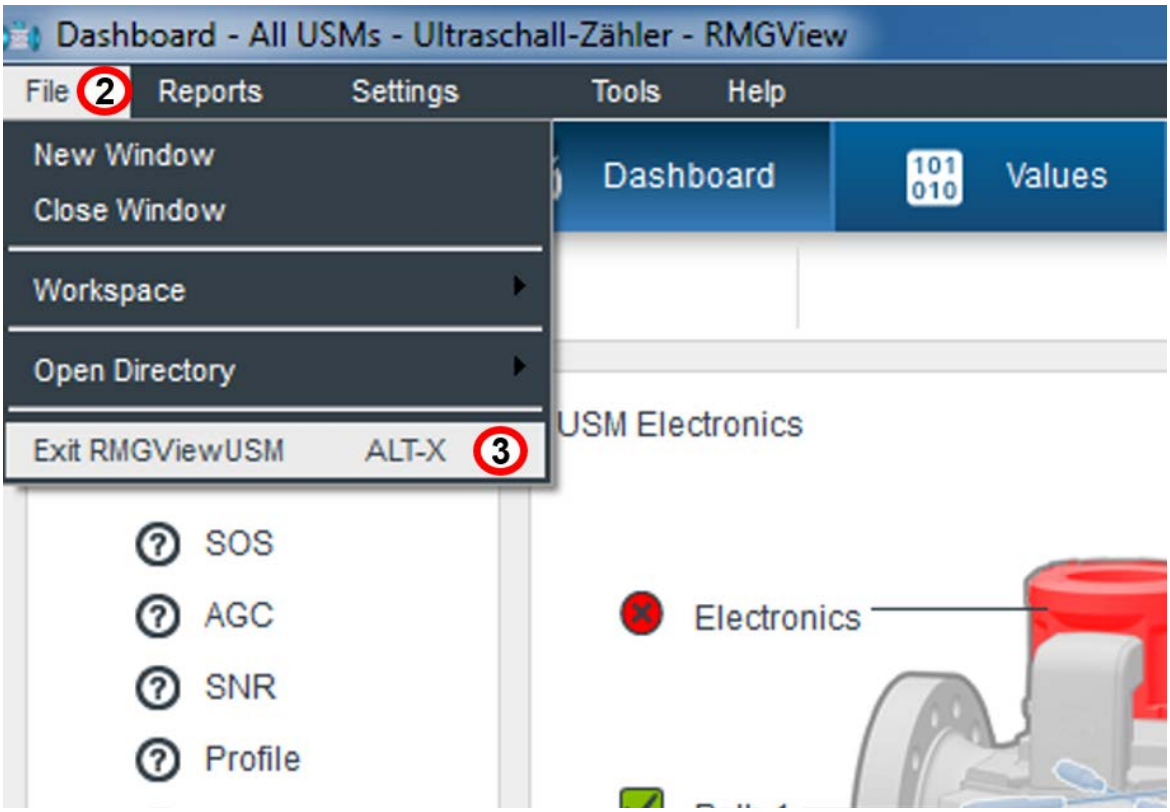


Figure 76: Menu item RMGView[USM]

2. Click menu item **File** in the menu bar.
3. Click menu item **Exit RMGView[USM]**.
   All windows of the software are closed.

5.3.4 Close windows for a device

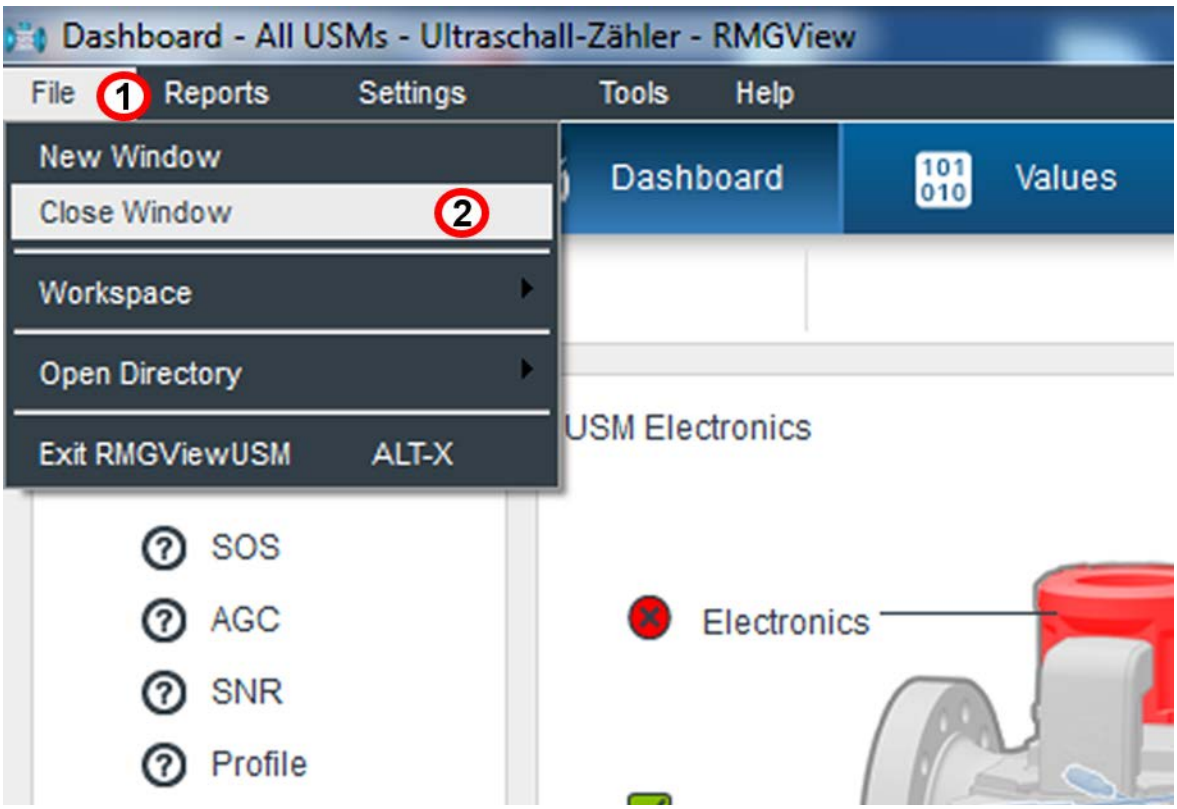


Figure 77: RMGView^{USM} close windows

1. Click menu item **File** in the menu bar.
2. Click menu item **Close Window**.
   The current window is closed.

5.4 Parametrize USM

Note
To use this function you have to login as a configurator user (at minimum).

You must open the ultrasonic electronics' calibration switch so that values can be transferred to the ultrasonic electronics. Please note that for this task the lead seal

must be broken. The ultrasonic gas meter may not be run with a broken seal. The device no longer has the status "calibrated".

- Only carry out these tasks if you are authorized.
  Please observe the "Operating instructions ultrasonic gas meters".

Create a CSV file for parameterizing

1. Create a CSV file.
2. Remove the lead seal from the calibration switch.
3. Set the calibration switch to the switch position Parameterize, by sliding the switch upwards. *Please observe the "Operating instructions ultrasonic gas meters".*

   If the calibration switch is not correctly set to the switch position **Parameterize**, then following message is displayed:

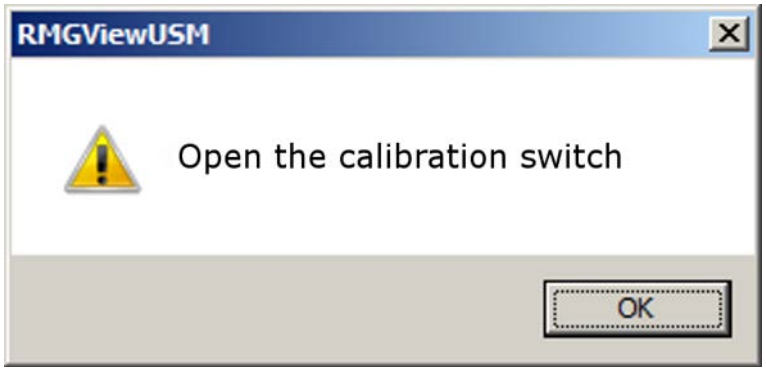


Figure 78: Status message

If this message is displayed, check the setting of the calibration switch.

Transfer CSV file to USE

1. Login user in at user level **Configurator** (*see chapter 5.1.1 Login users, p. 87*).
2. Open the window **Dashboard - All USMs** (*see chapter 4.2 Dashboard, p. 41*).

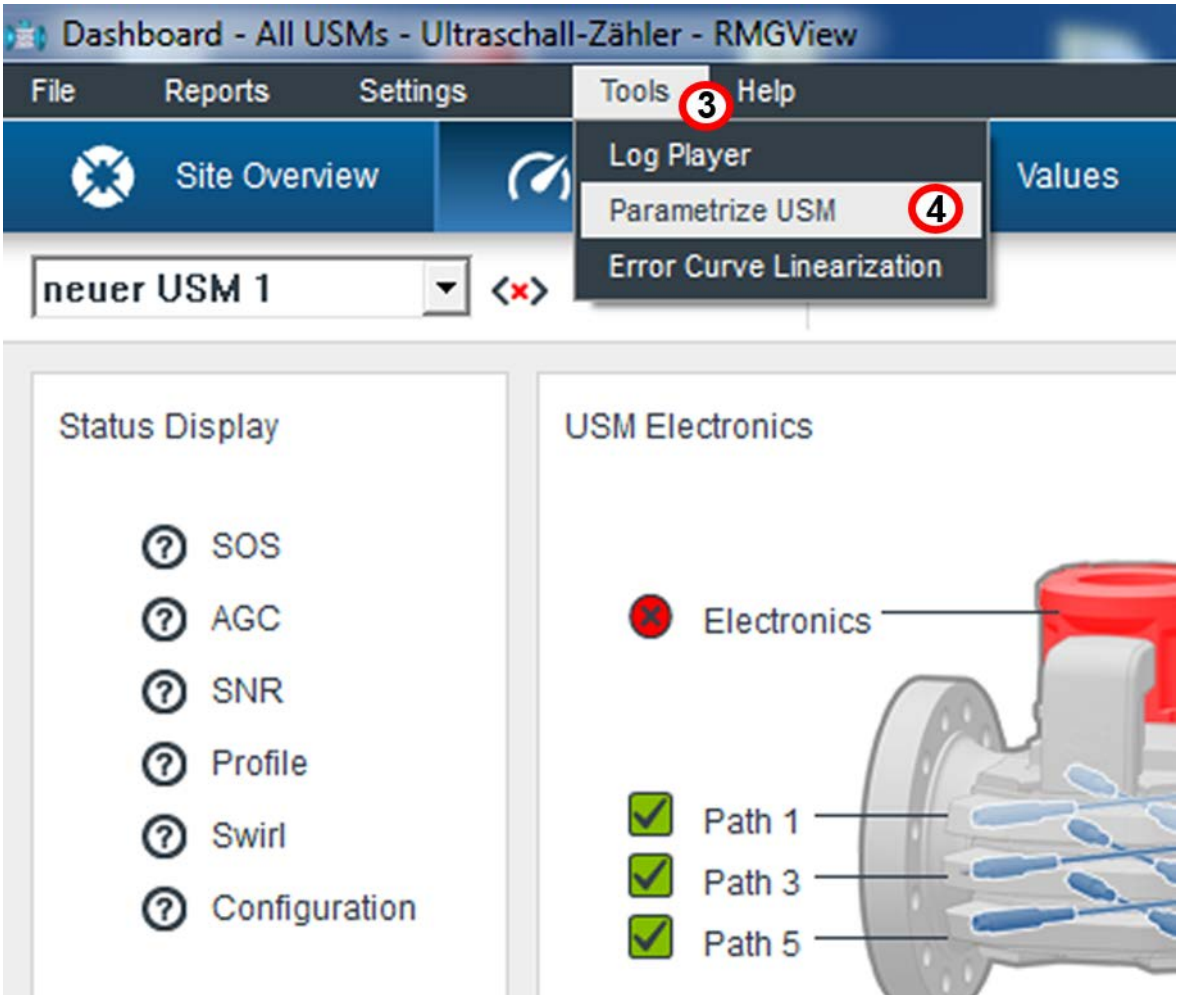


Figure 79: Menu item parameterize USM

3. Click menu item **Tools** in the menu bar.
4. Click menu item **Parameterize USM**.
   A windows screen for selecting a CSV file will be displayed.
5. Select CSV file and confirm selection.
   The window **Parameterize USE: Parameter_OB.csv** opens.

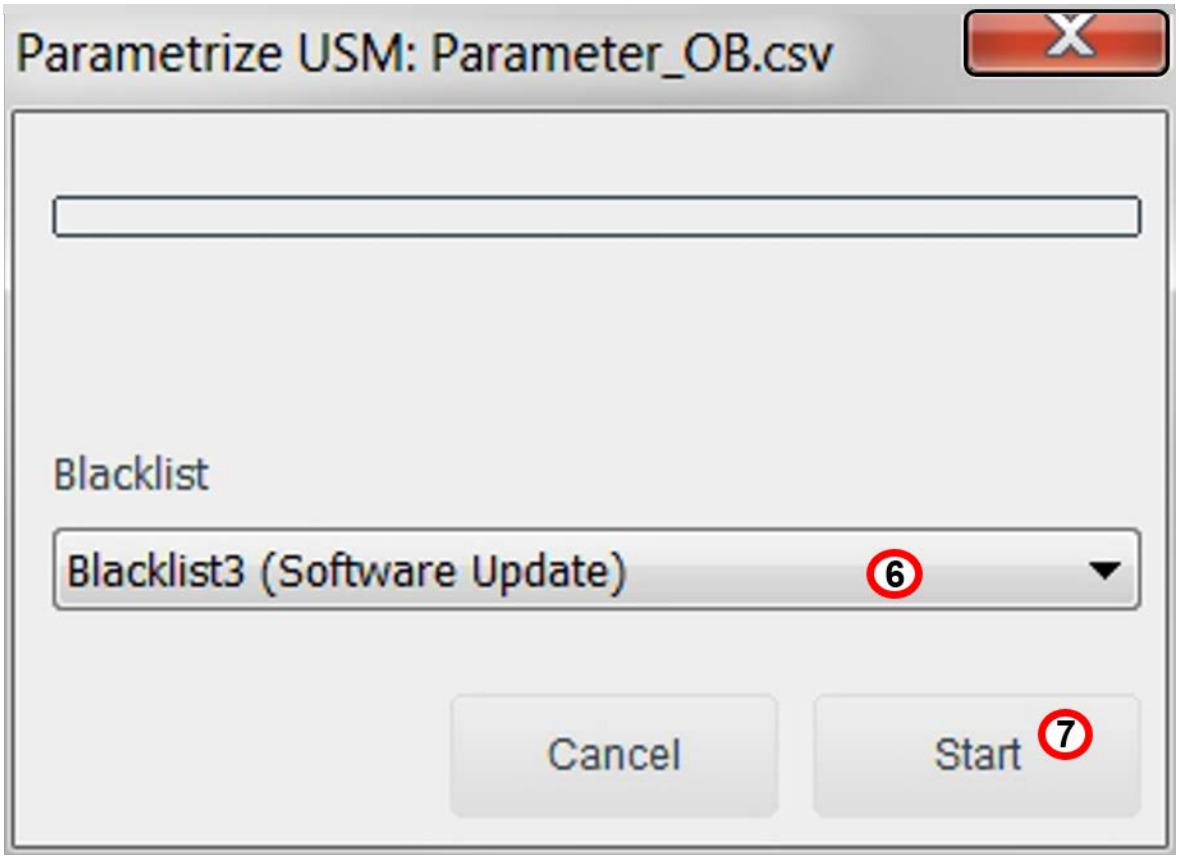


Figure 80: Select Blacklist and start process

Collect all the parameters that are not to be transferred to the ultrasonic electronics in a list. Ready-made lists (blacklists) are available.

6. Select blacklist.
7. Click the **Start** button.

The status of parameterization is illustrated by an animated time bar.

The CSV file is transferred to the ultrasonic electronics and the ultrasonic electronics are parameterized with the values from the CSV file.

Successful parameterization is displayed in the window **Parameterize USE: Parameter_OB.csv**.

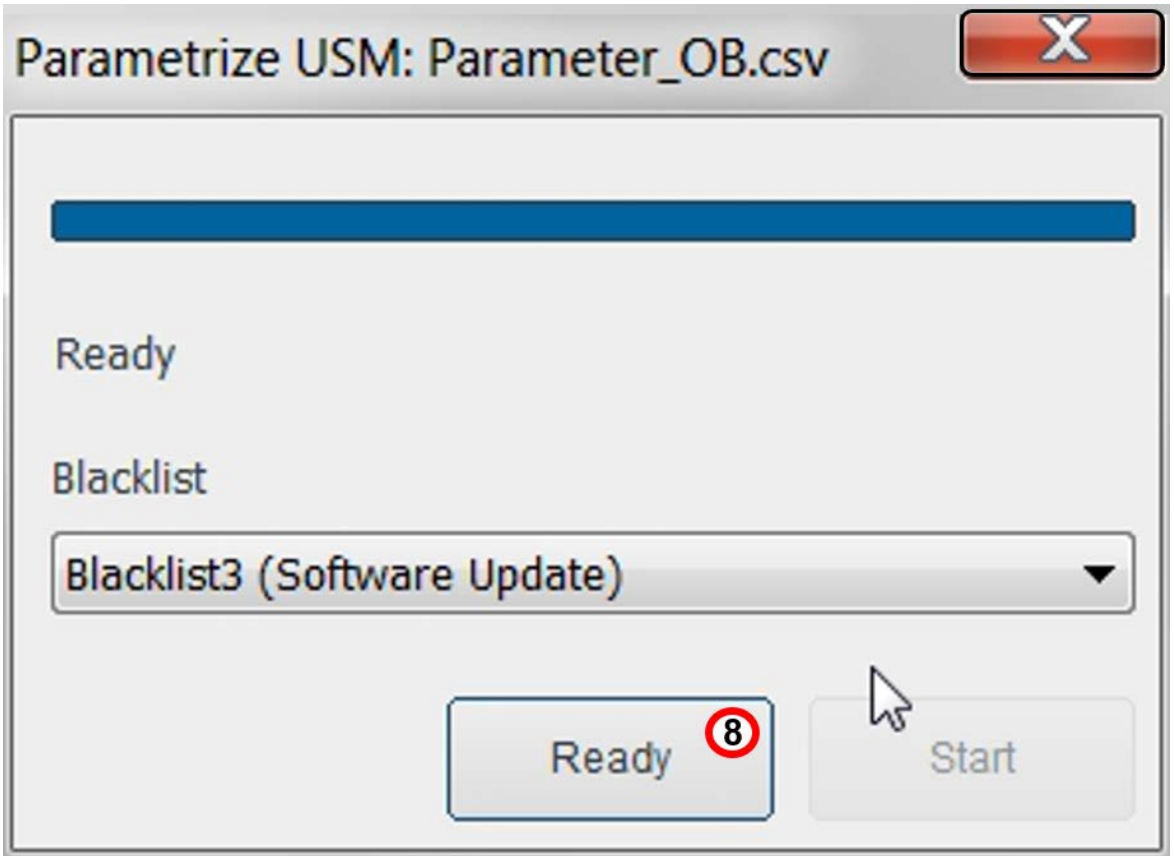


Figure 81: Parameterization successfully completed

8. Click the **Ready** button.

Parameterization is completed.

Complete work on the USE

9. Set the calibration switch to the switch position **Protected**, by sliding the switch downwards *(see operating instructions ultrasonic gas meters).*
10. Have the lead seal on the calibration switch replaced by an authorized calibration center.

5.5 Open folder user data

You can open the folder User Data using the RMGView^{USM} software.

Open Folder User Data

1. Open the window **Dashboard - All USMs** (*see chapter 4.1 Site overview, p. 39*).

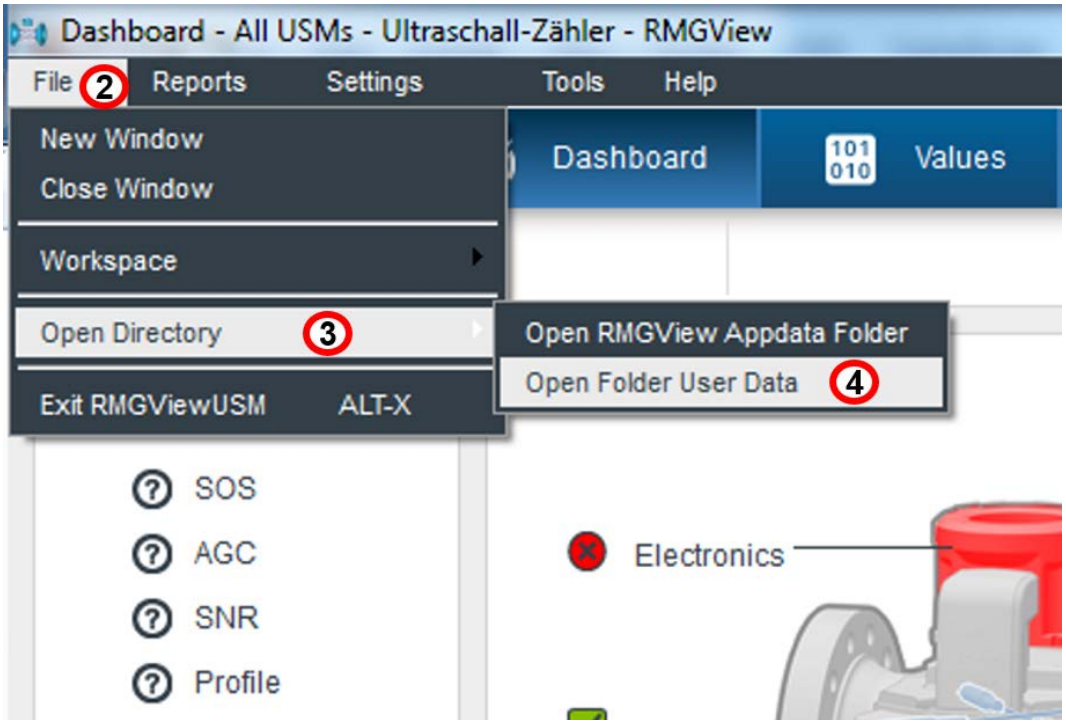


Figure 82: Menu item Open Folder User Data

2. Click menu item **File** in the menu bar.
3. Click menu item **Open Directory**.
4. Click menu item **Open Folder User Data**.

   Windows Explorer opens. The filing location is displayed.

5.6 Open folder APPDATA

You can open the Appdata Folder using the RMGView^{USM} software.

Opening the APPDATA Folder

1. Open the window **Dashboard - All USMs**.
   (see chapter 4.1 Site overview, p. 39).

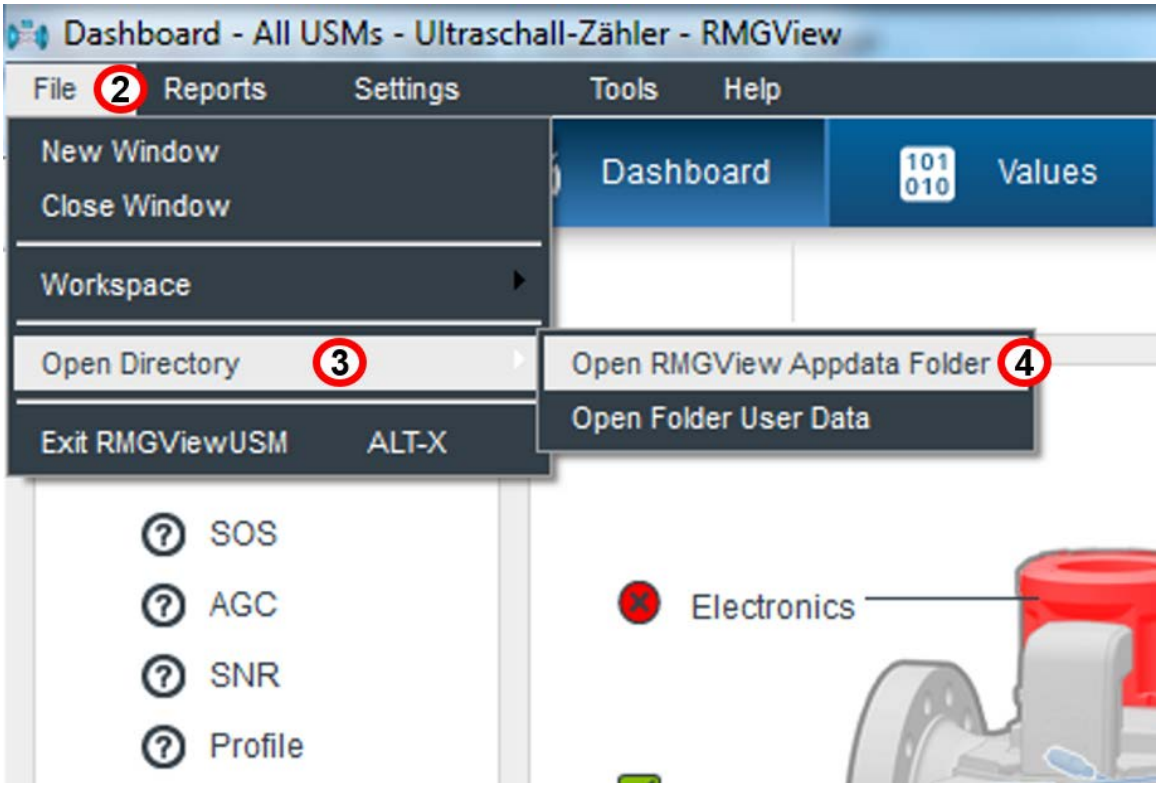


Figure 83: Menu item APPDATA Folder

2. Click menu item **File** in the menu bar.
3. Click menu item **Open Directory**.
4. Click menu item **Open RMGView Appdata Folder**.

   The Windows explorer opens. The filing location of the APP data is displayed.

5.7 Screen dump in jpg format

You can create a jpg file of the **Plots** and **Raw Data**. The JPG file is created in the same manner for both windows.

Creating the jpg file

1. Open the **Raw Data** window
   (see *chapter 4.6 Raw data p. 50*)

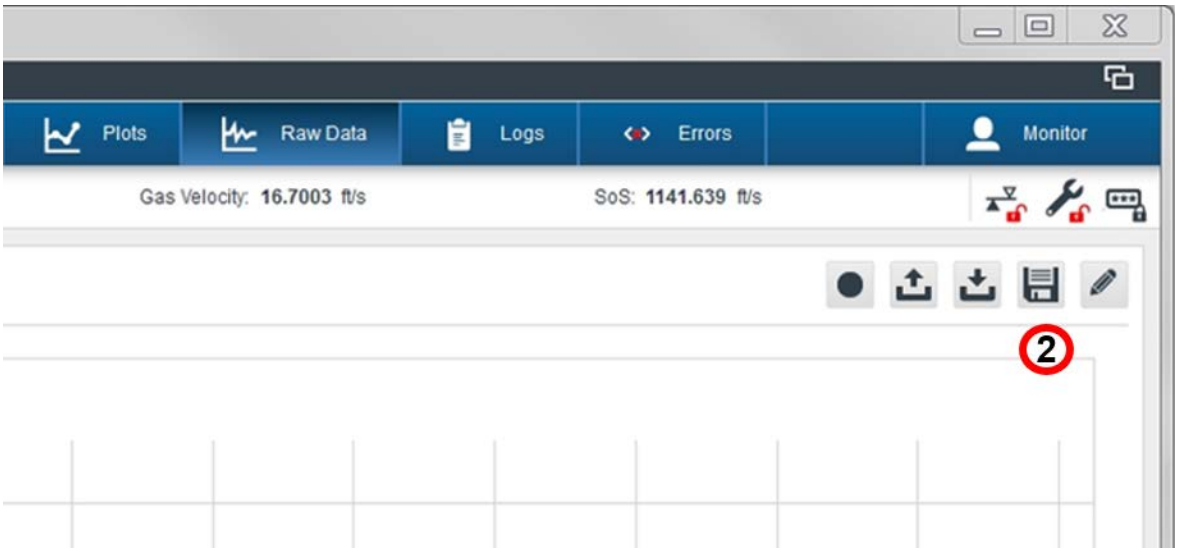


Figure 84: Button save as jpg image

2. Click the button **Save as jpg image**.

   Windows explorer opens. The jpg file is created

5.8 Error- and warning messages

The RMGView^{USM} software stores error and warning messages from the ultrasonic electronics. For analysis purposes, the error and warning messages can be called up.

Retrieving error and warning messages

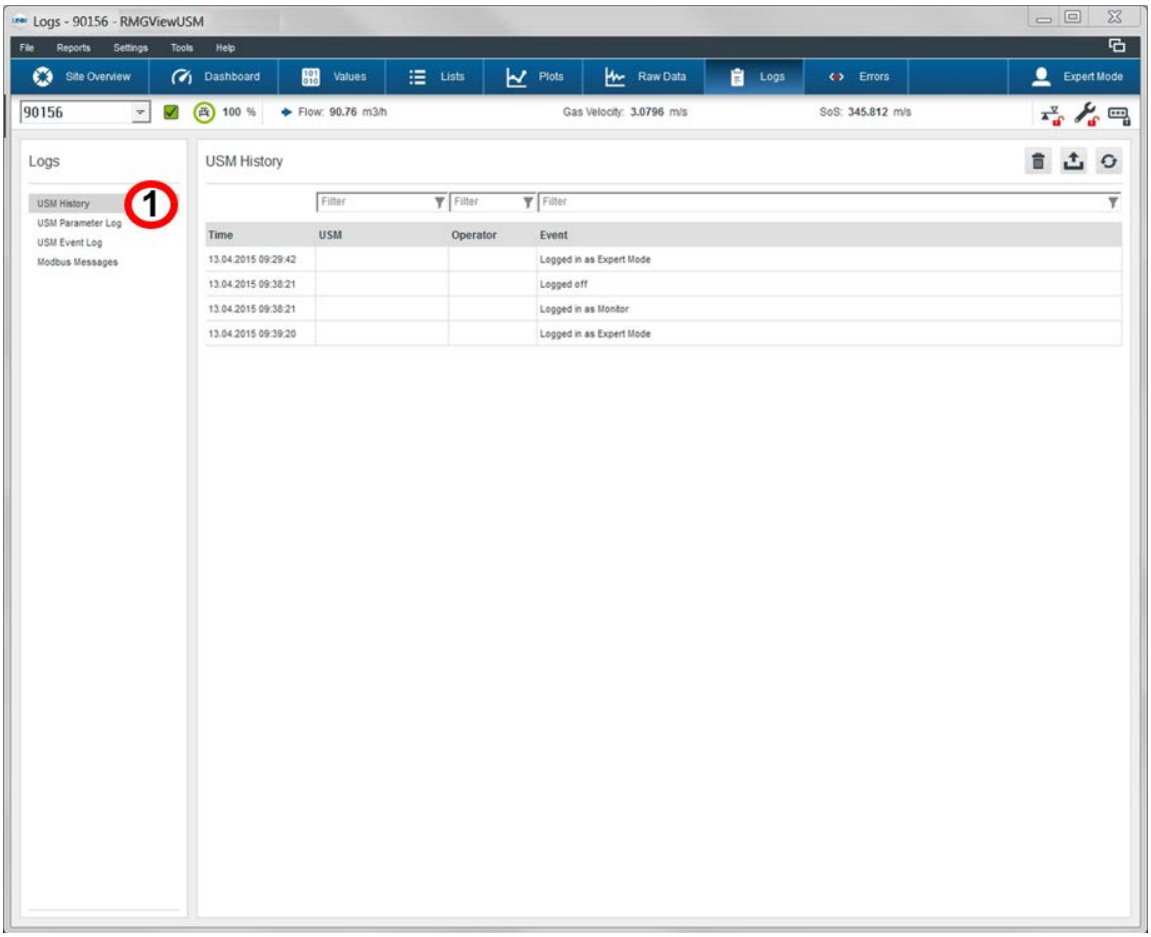


Figure 85: Errors window

1. Open Errors window
   (*see chapter 4.8 Errors, p. 57*)

5.9 Creating a log of a user action

Every user action executed by the user is recorded by the RMGView^{USM} software. You can open this list as a window. It is also possible to export this list as a PDF file.

Display log

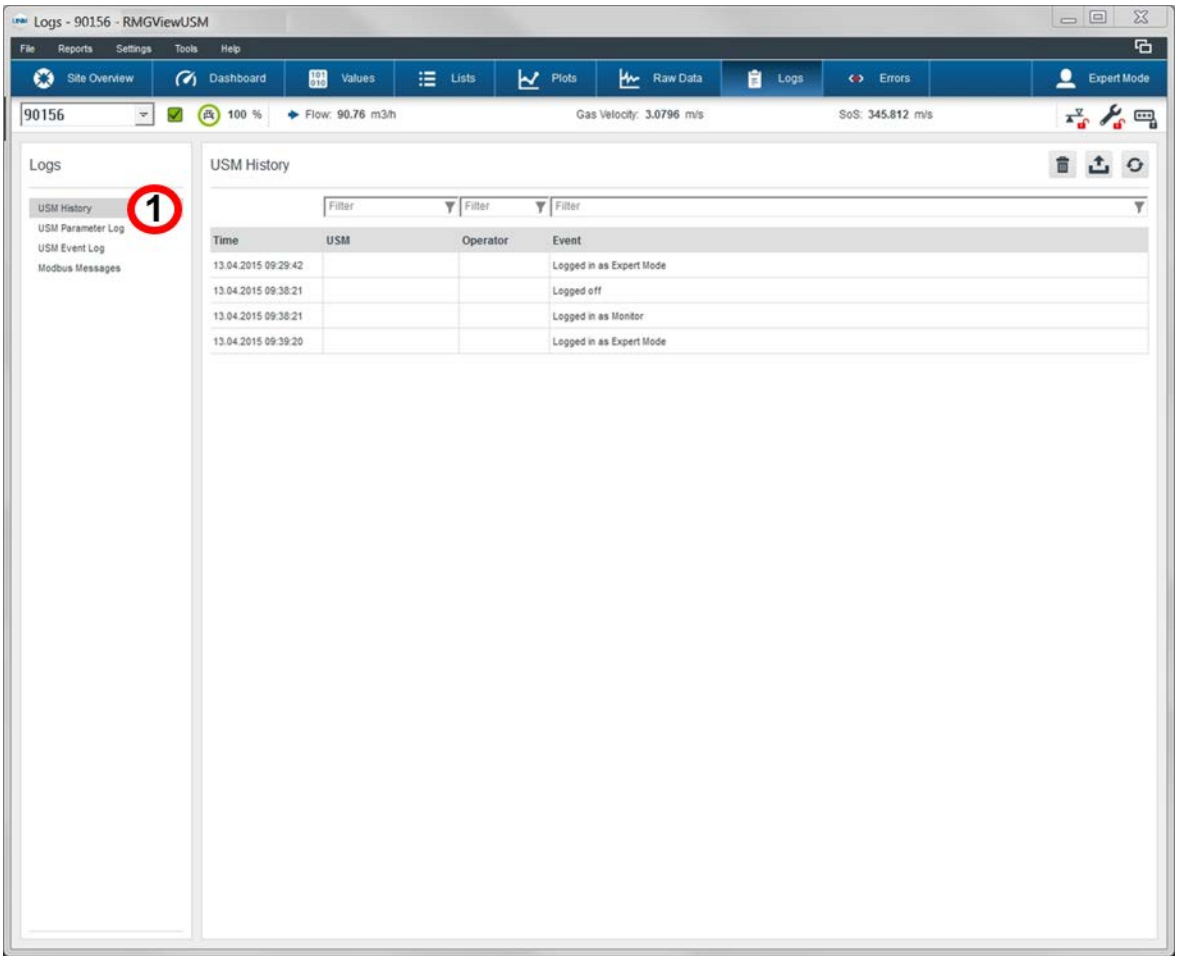


Figure 86: USM history

1. Click the **USM History** entry.

   The window USM History opens. All the actions taken are listed.

Note

The contents of the list can be filtered for a certain meter, user or for a message. (*chapter 4.7 Logs p. 52*).

Creating a log file as a PDF

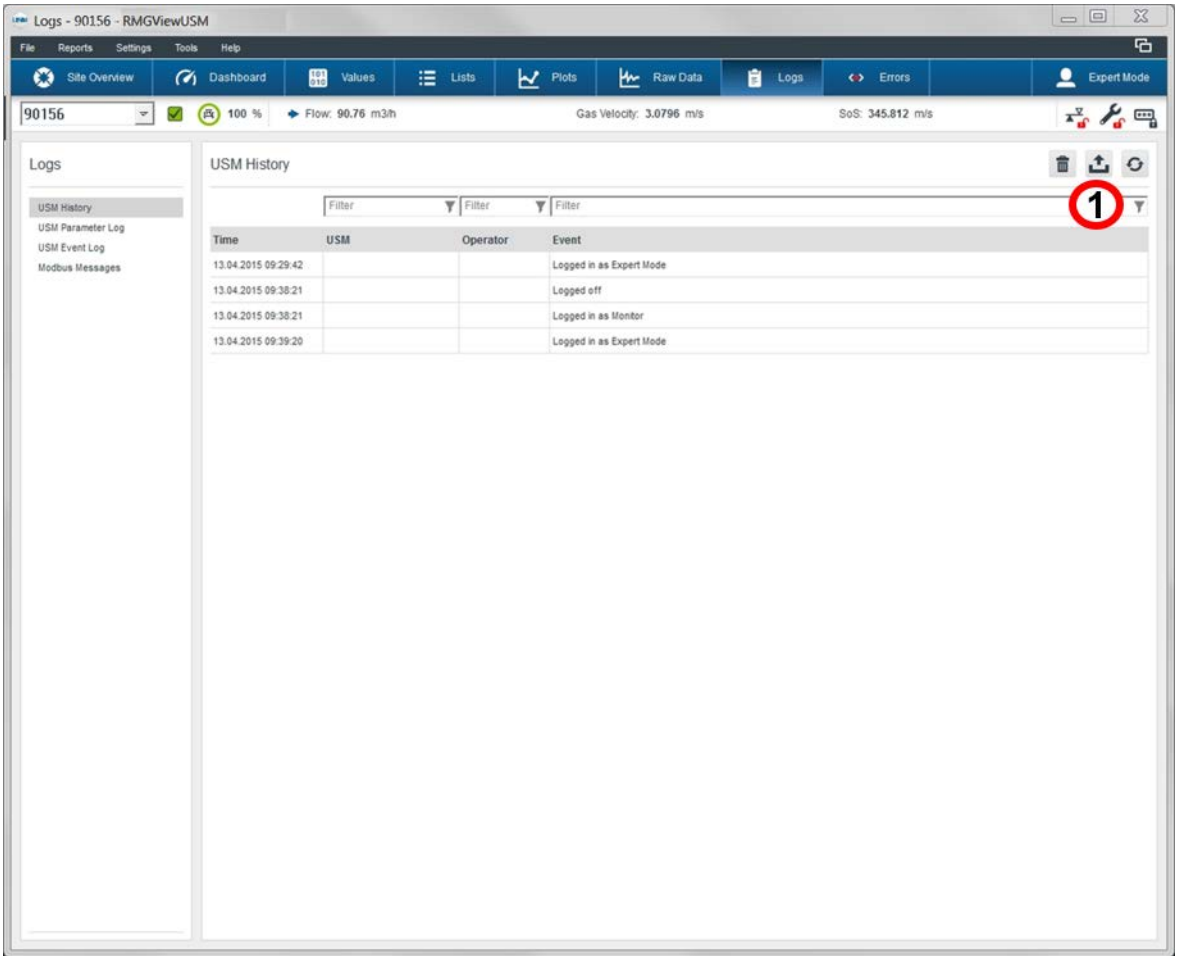


Figure 87: Exporting a list as a PDF file

1. Click the **Export** button..

   The **Save as...** dialog box opens. The filing location must be selected. The PDF file is created.

5.10 Creating a log on parameter change

Every parameter change that can have an impact on the accuracy of measurement is recorded by the ultrasonic gas meter. You can open this list as a window. In addition, it is possible to export this list as a PDF.

Display log

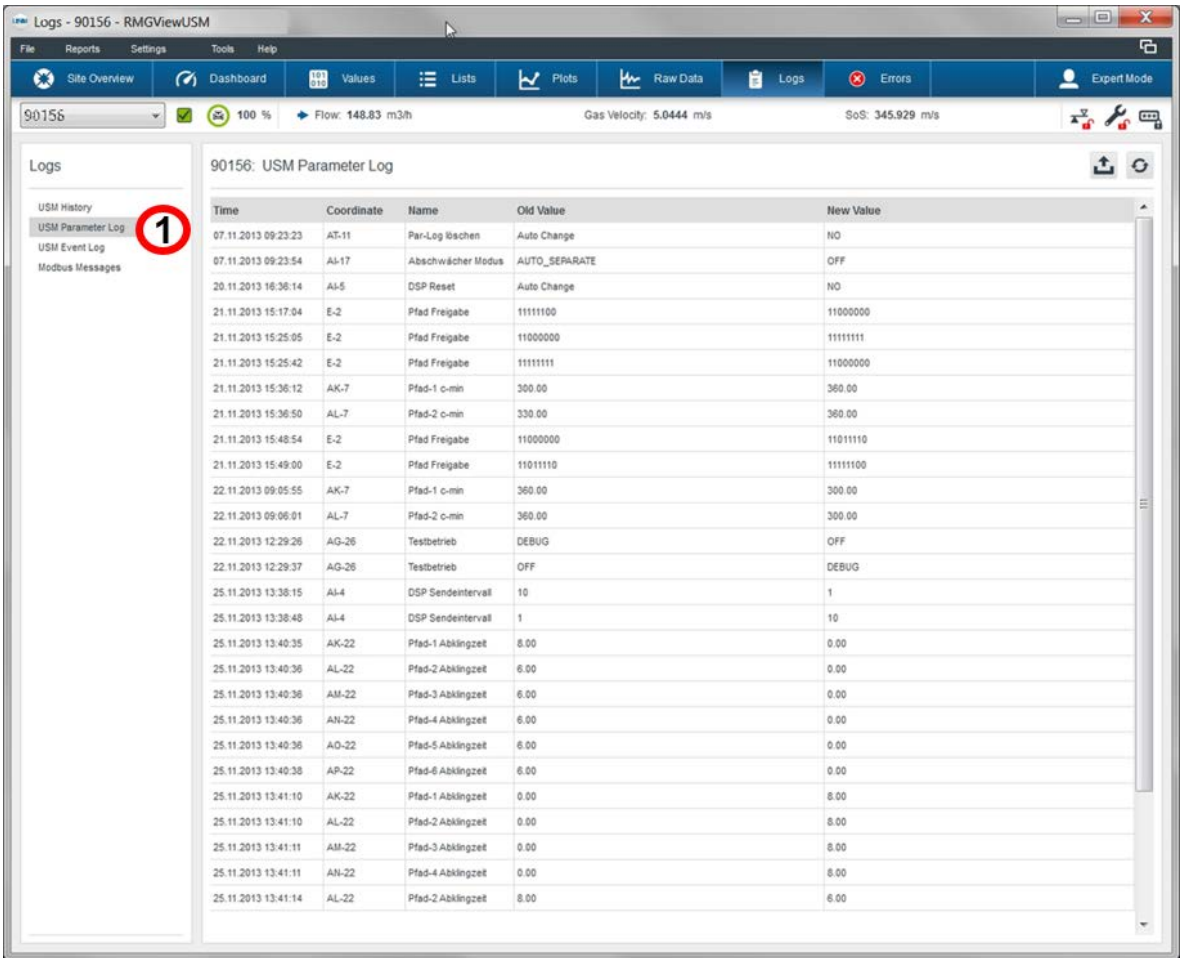


Figure 88: List of changed parameters

1. Click the **USM Parameter Log** button.

   The list opens. All the actions taken are listed.

Note

The contents of the list can be filtered for a certain meter, user or for a message (*chapter 4.7 Logs p. 52*).

6 Troubleshooting

In this chapter you will receive information on possible problems and how you solve the problems.

Note

If you cannot find a solution to your problem with the RMG component, then please contact the RMG service. (*contact see p. II*).

6.1 cfg-file missing

The cfg file should have been filed in the specified directory during installation and should be able to be called up from there.

6.1.1 cfg-file creation

You can create a cfg-file in the RMGView^{USM} via the dashboard. If you move the mouse pointer over the symbol from

Status Display -> Configuration

you get - in a yellow frame - the hint that you can select further features with a "right click" of the mouse.

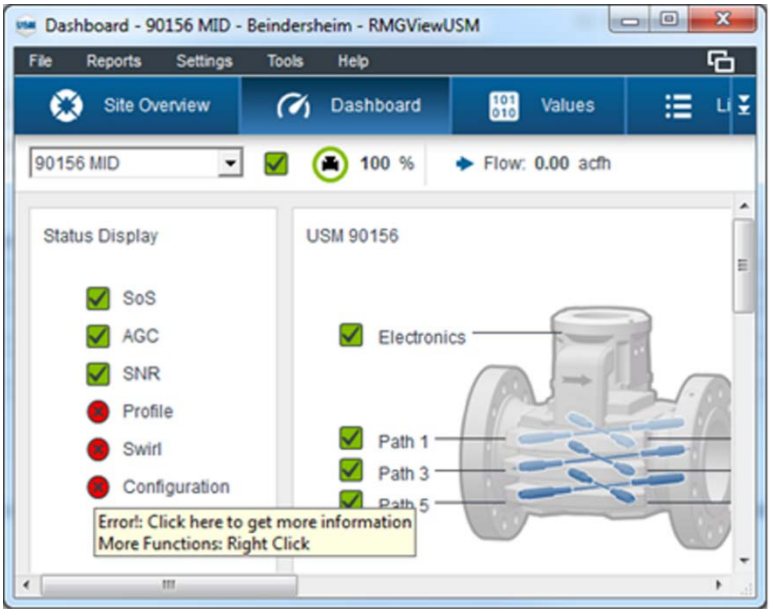


Figure 89: Features „under“ the mouse pointer

With a right-mouse-click you may now generate a new cfg-file.

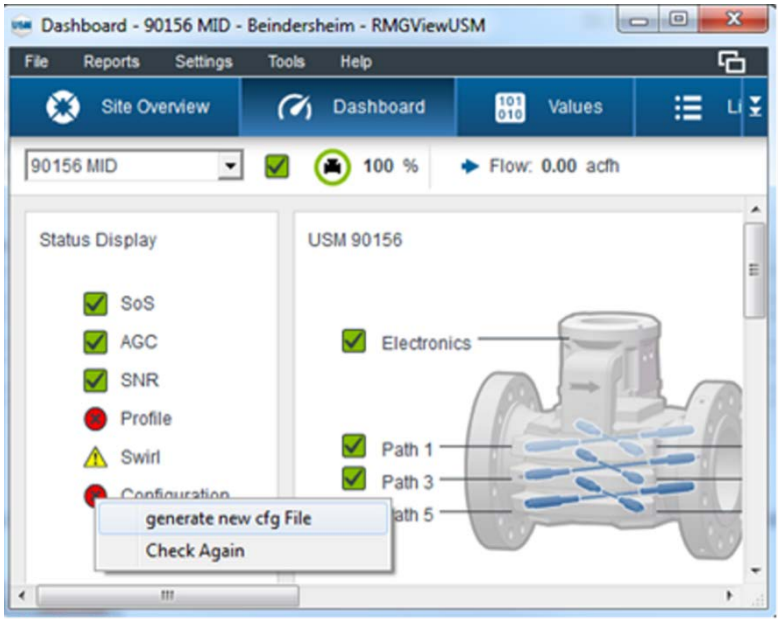


Figure 90: Generation of a cfg-file

The cfg-file is required to get all necessary parameters. RMGView^{USM} cyclically checks whether the parameters of the ultrasonic gas meter still match the parameters from the cfg-file.

6.2 Discontinuity in connection to the meter

The following message will be displayed: „You have just removed COM 5.“

1. Please check the USB cable connection from the device to the computer.

   A loose USB connection could also be responsible for the timeout. The cause could also be an excessively long or poorly shielded cable.

   Please only use twisted pair shielded cables up to a maximum length of 500 m. Recommended type LiYCX 2 x 2 x 0.75 mm². The green status LED at the bottom left shows if communication is operating correctly.

6.3 Display „RMGView^{USM} is already running… “

The following message will be displayed: „ RMGView^{USM} is already running on COM 5“

This means that one instance of RMGView^{USM} is already running. It cannot be started a second time at the same interface.

Fix

1. Close RMGView^{USM} or, if this doesn't work, use the Windows Task Manager, (right mouse key on the Windows task bar -> Start Task Manager) to end the RMGViewUSM.exe process in the processes tab.

If a connection from the same computer to several ultrasonic gas meters is desired, then initially, in the already opened instance of RMGView^{USM} you must switch to the second, connected COM port before RMGView^{USM} can be restarted on the standard COM port.

6.4 Display „The file USE_112c.rmx … “

…could not be found. Get in touch with RMG in order to receive a USE_xxx.rmx file that is suitable for your USM09.

1. Procure an .rmx file suitable for the firmware of your ultrasonic gas meter.
   a. Disconnect your ultrasonic gas meter.
   b. Start RMGView^{USM}.
   c. Select the menu item
      Tools->RMGView^{USM} Open RMG APPDATA folder
   d. Copy the .rmx file into the folder displayed.
2. Close RMGView^{USM}.
3. Reconnect the ultrasonic gas meter. Start RMGView^{USM}.

Subject to technical modification.

For further information
If you would like to learn more about the products and solutions from RMG, please visit our website:

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or your local support office
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ONE STEP AHEAD