

Q-Commander

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1 Introduction

The program "Q-Commander" is the PC software for the parametrization and data transfer of sensors and data loggers manufactured by the company Sommer GmbH.

The following tasks can be performed:

- Parametrization of sensors and loggers
- Generating of discharge tables using profiles and transmitting these to radar sensors
- Transfer of data from loggers
- Display of measurement values of sensor and loggers
- Recording and display of radar or ultrasonic spectrums
- Terminal to parametrize sensors using the sensor menu and to check the data output
- Management of Stations and connections

The following types of connections are supported:

- Serial connection
- Modem connection
- Bluetooth connection
- Socket connection
- IP-Call

2 System requirements

Supported operating systems

- Windows 7 SP1 (32-bit and 64-bit)
- Windows 8 (32-bit and 64-bit)
- Windows 8.1 (32-bit and 64-bit)
- Windows 10 (32-bit and 64-bit)
- or later

Required Software

- Microsoft® .NET Framework 4.5
- or later

3 Installation

There are different installations of "Q-Commander" available, which have an impact on the automatic generation of the data structure.

Per User

Rights

No admin rights are necessary. Updates are only available for the user who performed the installation.

Installation folder

- **User program folder** (Users\User\AppData\Local\Programs\Sommer\Commander):
Data structure is located in the parent folder (Users\User\AppData\Local\Programs\Sommer)
- **Specific folder** (i.e. c:\Sommer\Commander):
Data structure is located in the parent folder (i.e. c:\Sommer)

Admin

Rights

Admin rights are necessary. Updates may only be performed by admins.

Installation folder

- **Standard program folder** (Program Files (x86)\Sommer\Commander):
Data structure is located in the folder "Public documents" (Users\Public\Public documents\Sommer)
- **Specific folder** (i.e. c:\Sommer\Commander):
Data structure is located in the parent folder (i.e. c:\Sommer)

4 Quick Start

In this chapter guidelines to the following topics are presented:

User interface

Descriptions of the components on the main page.

Language

Instruction how to change the program language.

Communication with devices

Instructions how to communicate with devices.

Parametrization of devices

Instruction how to parametrize devices.

Update

Information about the update of Q-Commander.

4.1 User interface

The Q-Commander window has three main components: the Menu, the Toolbar and the Working Area.

Menu

The menu items execute commands, change the program mode, or open special pop-up windows.

Menu items

Menu item	Purpose
File	Execute commands for the selected program mode or switch to the start-up page.
Tabs	Change the tabs according to the program mode and activate tabs
Options	Open the options window with global settings
Tools	Open special dialogs and execute external programs
Extra	Execute special commands and start external programs
Help	Open the online help
	Perform an update
	Open license manager
	Show program information

Toolbar

With the toolbar the program mode and the tab are changed and in the working area the windows are adjusted according to the program mode. The visibility of the buttons can be changed with the menu "Tabs" or globally in the options on the tab "Tabs".

Program modes

Button	Mode	Shortcut	Purpose
Parameter	Parameter mode	F2	Parametrization of sensors and data loggers
Measurement	Measurement mode	F3	Display of measurement values received from devices, record and display radar or ultrasonic spectra
Data	Data mode	F4	Transfer and management of data
Profile	Profile mode	F6	Generating of discharge tables for radar sensors using profiles
Stations	Station mode	F7	Management of stations
Connections	Connection mode	F8	Management of connections
Terminal	Terminal mode	F9	Working with the device menu and checking of data strings (only with authorization "Expert")

Working Area

In the working area all available windows related to one program mode are displayed. Here commands are performed, displays are visualized and modification can be edited.

Special window are located in the [communication area](#), which is displayed in all program modes. It is located on the right hand side of the working area and controls the communication using the defined stations and connections.

4.2 Language

The program language is defined in the common part of the program options. It can be changed by opening the options window using the menu "Options" and the tab "Common".

Languages

- English
- Deutsch/German
- Français/French
- Español/Spanish
- Português/Portuguese
- Italiano/Italian
- 中文/Chinese (Simplified)
- 日本語/Japanese
- Русский/Russian
- ελληνικά/Greek
- Bahasa Melayu/Malay
- العربية/Arabic
- Hrvatski jezik/Croatian
- Nederlands/Vlaams/Dutch
- Jezyk polski/Polish

4.3 Communication with devices

To communicate with a device a corresponding connection has to be created. Some connection types demand the creation of a station as well. These connection types are: Bluetooth connections, IP calls and modem connections.

The simplest possibility to create connections and stations is the usage of the "Communication assistant", which guides you step by step through the setup of connections and stations.

Communication assistant

1. Open the communication assistant with the button in the communication area.
2. Follow the steps in the assistant and provide the necessary information.
3. Connections will be created automatically and stations can be saved.

A second possibility is the manual setup of connections and stations.

Create a connection

1. Switch to the connection mode with the toolbar button "Connections".
2. Create an empty connection with the button "New connection". This connection is displayed in the window "Connection".
3. Assign a unique name.
4. Select the desired connection type. This causes the connection parameters to switch to the setting of the selected connection type.
5. Edit the connection parameters.
6. Save the connection with the button "Save connection".

Create a station

Stations can either be created completely new or they can be created after a device scan for a connection.

Create a new station

1. Switch to the station mode with the toolbar button "Stations".
2. Create an empty station with the button "New station". This station is displayed in the window "Station".
3. Enter the station number and the Sommer ID and assign a unique name.
4. Activate the connections you want to perform communications with using the square-shaped check-boxes. Define one default connection with the circle-shaped check-boxes.
5. By activating connections special connection parameters for connection types may be displayed (i.e. for Bluetooth, IP Call and Modem). Edit these connection parameters.
6. If the devices of the station have a known system key, enter this system key. Otherwise use the system key 99.
7. Save the station with the button "Save station".

Create a station after a device scan for a connection

1. Select a connection either in the communication area by setting the mode to "Connection" and selecting the connection in the check-box "Connection" or in the connection mode by selecting the connection in the list
2. Perform the procedure "Scan devices".
3. Create a new station with the found devices using the button "Create station"
4. Complete missing information for the station.
5. Save the station with the button "Save station".

If the connection and eventually a station are created the communication can be established.

Communication with a connection

The communication with a connection is only possible for serial connections and socket connection.

Communication with a single remote device

1. Select a connection either in the communication area by setting the mode to "Connection" and selecting the connection in the check-box "Connection" or in the connection mode by selecting the connection in the list.
2. Establish the communication either with the button "Connect" or by a command such as "Load parameters".

Communication with several remote devices

1. Select a connection as described above.
2. Perform the procedure "Scan devices". The found devices are displayed in the communication area in the field "Devices".
3. Select the desired device.
4. Establish the communication either with the button "Connect" or by a command such as "Load parameters".

Remark: The saving of found devices is only possible for stations.

Communication with a station

The communication with a station is only possible for all connections.

1. Select a station either in the communication area by setting the mode to "Station" and selecting the station in the check-box "Station" or in the station mode by selecting the station in the list.

2. Select a connection by selecting the connection in the check-box "Connection" in the communication area.
3. On the first connection perform the procedure "Scan devices". The found devices are saved in the station and are displayed in the communication area in the field "Devices".
4. Select the desired device.
5. Establish the communication either with the button "Connect" or by a command such as "Load parameters".

4.4 Parametrization of devices

To parametrize a device the communication with connection and eventually station has to be defined.

Parametrize device

1. Select the desired communication in the communication area.
2. Switch to the parameter mode with the toolbar button "Parameter".
3. Transfer the parameters from the device with the command "Load parameters". The parameters are displayed in the menu structure in the window "Parameter".
4. If desired, save the unchanged parameters in a local file with the command "Save parameter file".
5. Make the changed in the menu structure in the window "Parameter". Changes are marked pink.
6. Send the changed parameters to the device with the command "Send modified parameters".

Remark: When transferring the parameters from a device for the first time the procedure may last a little longer, as automatically the schema is transferred, if it is not available in the internet.

4.5 Update

If an update of "Q-Commander" is available, a field with information is automatically shown in the main bar. The information field is closed by opening the first communication. The update is started either by the button in the information field or by the menu item "Update" in the menu "Help".

Attention: You have to close all other instances of Commander and Q-Commander before you perform the update.

4.6 Licensing

The installation must be registered for special programs. Thereby the installation is linked to a Sommer account. Registration is performed in the [License manager](#).

5 Program concepts

In this chapter the following concept are introduced:

Communication concept

Concept of the communication.

Parameter and schema concept

Concept of parameters and schema.

5.1 Communication concept

The communication in Q-Commander is carried out between two endpoints: The local endpoint initiating the communication and the remote endpoint (or endpoints) accepting the communication.

Therefore the Q-Commander separates between connections and stations. Connections describe the local endpoint initiating the communication. Stations on the other hand describe the remote endpoint accepting the communication. If the communication can be accepted by several endpoints, these are additionally described in devices.

Connections

As described above a connection describes a local endpoint initiating the communication. It can be of several types:

Connection types

- Serial connection
- Bluetooth connection
- Socket connection
- IP call
- Modem connection

In a connection all the parameters of a connection type are defined, that are necessary to initiate a communication.

But for a part of the connection types these settings are not sufficient to establish the communication with the remote endpoint. Additional information related to the remote endpoint is necessary. This can be illustrated for the example modem connection. Additional to the local connection settings the telephone number at the endpoint is needed. These settings of the remote endpoint are defined in stations.

Therefore communication with a part of the connection type can only be established with stations.

Communication of connection types

Connection type	Connection	Station
Serial	yes	yes
Bluetooth	yes*	yes
Socket	yes**	yes
IP Call	no	yes
Modem	no	yes

* All available Bluetooth devices are searched and displayed for selection.

** Specification of server and port in the communication settings.

Stations

A station describes the remote endpoint accepting the communication initiated by a local endpoint.

That is why the settings of the local endpoint have to be present for a successful communication. For that stations have links to one or more predefined connections. In this way the settings of the local endpoint are described in the connection, which could be linked to other stations too. The settings for the remote endpoint are defined in the station.

Devices

In the simplest case only one remote endpoint (or device) is present for the communication. But there could also be more endpoints (devices) available, which can be arranged in any BUS system. For example a data logger could be connected to one or more sensors. So that the Q-Commander can communicate with any of these devices, the BUS system must be known. In the Q-Commander the BUS system is designated as devices and managed in the stations.

Investigate the devices in a BUS system

This is available with an automatic procedure to scan the devices. Thereby connected devices are searched. If a device is found, it is switched off. The searching for devices continuous until no device is found any more. Then the found devices, as long as they are data loggers, are searched for devices, that might be connected to interfaces. The result of the device scan is a complete image of the BUS system with all its devices, types and protocol addresses.

The device scan does take some time. To avoid performing this procedure for every communication, the found devices are saved in the station.

Routing and Unrouting

For every communication with a station one device has to be assigned, with which the communication should be performed. When the connection is established, all devices located on the path to the assigned device are set transparent. All other devices are temporarily switched inactive. This process is referred to as routing.

During disconnecting the routing has to be undone. All devices are switched active and the transparencies are finished. This is referred to as unrouting.

5.2 Parameter and schema concept

In the parameter mode all parameters are loaded from a device and can therefore locally be displayed, changed and saved.

Thereby a differentiation is made between parameters and schema.

Parameters

Under parameters only the actual numeric values, texts and selections of combo boxes are understood. All further information to the parameters is in the schema.

Schema

A schema is the image of the complete menu structure of a device and is the base for the parameters. For all parameters the labels, units, formatting, upper and lower boundaries, selection parameters and much more are present. The schema is different for every device, even more its usually different for every software version.

Therefore no schema is automatically installed with the Q-Commander. But during any first communication with a device with a specific software version the related schema is automatically transferred from the internet or the device and saved locally. Now this schema is available for the future and does not have to be transmitted again.

5.3 Concept of discharge measurement

In the profile mode functions are available to determinate discharge tables for measurement sites. They are the base for the calculation of the discharge in radar devices. In the parameter mode discharge table can be transferred to radar devices.

Radar devices

Radar devices of Sommer GmbH are continuous measurement devices for the contact-free determination of discharges of open channels and flowing surface waters.

They combine two contact-free measurement principles for radar:

- Measurement of the water level using run-time measurements of radar impulses
- Measurement of the flow velocity at the water surface by the principle of Doppler-frequency shift

Form these two measurements the discharge is calculated internally using a individual calibration of the measurement site, named the discharge table.

Calculation of the discharge

The discharge Q is the volume of water V flowing through a cross section of a channel in a time unit t .

$$Q = V \cdot t$$

Q	Discharge [m^3/s]
V	Water volume [m^3]
t	Time unit [s]

With the continuity equation the upper equation can be transformed into the base equation of discharge measurements:

$$Q = A \cdot v_m$$

Q	Discharge [m^3/s]
A	Flowed through cross-sectional area [m^2]
v_m	Mean flow velocity [m/s]

A radar device measures the local velocity v_l at the water surface and not the mean velocity v_m of the channel. Therefore a one dimensional correction factor k is implemented, which transforms the local velocity into the mean velocity.

$$v_m / v_l = k \rightarrow v_m = k \cdot v_l$$

k	Correction factor or k-factor
v_m	Mean flow velocity [m/s]
v_l	Local flow velocity [m/s]

Using the upper equation the calculation of the discharge in the radar sensor can expressed as following:

$$Q = A(W) \cdot k(W) \cdot v_l$$

Q	Discharge [m^3/s]
A	Flowed through cross-sectional area [m^2]
k	Correction factor or k-factor
v_m	Local flow velocity [m/s]

The k-factor is depending on the flow situation and thereby the water level. Usually it is in the range of 60 to 90 %.

Discharge table

The radar devices of Sommer GmbH use a discharge table to calculate the discharge. It consists out of a maximum of 16 level inputs W , the cross-section areas $A(W)$ and the k-factors $k(W)$ and is unique for every measurement site. The cross-section area and the k-factors are determined according to the measured water level using linear interpolation. Crucial thereby is, that the level of the discharge table is in the same reference system as the level of the radar device.

The determination of the discharge table is performed in profile mode. The first step is to enter a cross section. Form the cross section the cross-section areas of the given levels are calculated. Additionally the k-factors are modeled using the horizontal radar position and the roughness of the wetted cross-section profile.

The resulting discharge table can be transferred to a radar device in parameter mode.

Reference discharges

For a more precise adjustment of the k-factors reference discharge can be used. They are discharges measured with an alternative measurement method. For these discharges the measured level and velocity of the radar device has to be known for the point in time of measurement. The reference discharge can be compared with the discharges from the discharge table and the k-factors of the discharge table can be adjusted to fit the reference discharges. This is done in the graph of the k-factors. There the k-factors of the reference discharges are displayed with black points. The k-factors can be shifted horizontally with the mouse until the trend k-factors fits the reference discharges.

6 Communication area

The communication area is displayed on all program modes. It consists out of settings, commands and a terminal.

Communication settings

The settings define, if the communication is performed using a connection or a station, and the station, the connection and the device is selected.

Commands

The commands establish and close communications and special procedures can be started.

Terminal

In the terminal the communication is tracked and the sensor menus of connected devices can be operated.

6.1 Communication settings

Mode

the communication mode define, if the communication is performed using a connection or a station.

Station

In the communication mode "Station" the station for the communication is selected from the stations managed in the [stations mode](#). Stations can be selected in the list of the station mode too.

Connection

The connection for the communication is selected from the connections managed in the [connection mode](#) and activated for the selected station. Connections can be selected in the list of the connection mode too.

Devices

The device for the communication is selected. The devices are determined with the command "Scan devices" and are saved in stations. Additionally the displayed parameters can be switched between different devices, if they have been transferred from the devices before.

Logging

The communication can be logged in a log file. With the check-box the logging is activated. The file name of the log file is either set in the text box or can be selected in a dialog opened by the button with the folder icon. The folder selected in this dialog is saved and used for any log file.

6.2 Commands

The available communication commands depend on the program mode and the selected connection type.

General commands

These commands are always available.

Communication assistant

The communication assistant is opened which guides you step by step through the setup of connections and stations.

Connect

The selected communication is established and necessary routing is performed.

Disconnect

The communication is closed with performing necessary unrouting.

Route device

The selected device is routed for the open communication.

Remark: This command is only available for open communications with multiple devices, if no device is routed.

Special commands

These commands are only available in connection and station mode depending on the selected connection type.

Scan devices

All available devices at the endpoint of the communication are searched. In the station mode all found devices are automatically saved in the station.

Create station

After devices have been scanned for a communication with a connection the information can be saved in a new station.

Remark: This command is only available with the communication mode "Connection".

Scan port

For the port of the selected serial connection the connections with all possible baud rates and combinations of parity and stop bits are sequentially established and checked, if a Sommer devices answers. If a device is found, the procedure is finished.

Remark: This command is only available for serial connections in the communication mode "Connection".

Scan Bluetooth devices

All available Bluetooth devices are searched. the found devices are displayed in a list and one device can be selected for the station.

Remark: This command is only available for Bluetooth connections.

6.3 Terminal

The window "Terminal" is displayed right at the bottom in the communication area and can be hidden in the options.

Purpose

Working with the sensor or device menu

Any device has a menu, which can be directly edited in the terminal. The sensor or device menu is opened with three question marks (???).

Checking of data strings

Data strings transmitted from devices can be check are displayed in the terminal and can be checked.

7 Parameter mode

The parameter mode supports the parametrization of devices (sensors and data loggers). If multiple devices are available for a station or communication, the devices can be switched and one device can be selected for the parameter mode. This is performed with the selection list "Devices" in the communication area or with the header in the parameter or measurement mode.

There are different windows available.

Devices

The devices of a station or a connection are displayed in a horizontal bar.

Parameter

Here all parameters of a device are displayed in a menu structure. The parameters can be transferred from a device or are opened from a parameter file.

Information

In this window information to the device is displayed.

Commands

The commands perform the transfer of data from or to a device as well as the opening and saving of parameter files.

7.1 Information

Information to the selected device is displayed.

Information

Device

The type of the selected device is displayed.

Protocol address

The protocol address is displayed. It consists out of the "Complex key" and the "Device number".

Parameter

The state of the local parameters is displayed.

Parameter

Synchronized	The local parameters correspond with the parameters on the connected device. The parameters are synchronized.
Not synchronized	The local parameters do not correspond with the parameters on the connected device.
Changed locally	The local parameters have been changed manually and do not correspond with the parameters on the connected device.
From file	The local parameters have been opened from a file and do not correspond with the parameters on the connected device.

File name

The name of the file is displayed from which the parameter have been opened.

Serial number

The serial number of the device is displayed.

Setup version

The setup version of the device is displayed.

Software version

The software version of the device is displayed.

Time

The date and time on the device are displayed.

7.2 Commands

In parameter mode following commands are available:

File commands

Open parameter file

The parameters of the selected device are loaded from a local parameter file.

Or the parameters of all devices are loaded from a devices parameter file. If the station the devices are based on is known, the station is selected. Otherwise the connection mode is used.

Save parameter file

The parameters of the selected device are saved in a local parameter file.

Or the parameters of all devices are saved in a devices parameter file.

Device commands

Download parameters from device

All parameters are downloaded from the device and are displayed. Thereby the parameters are synchronized.

Download parameters from all devices

All parameters are downloaded sequentially from all devices. Thereby the parameters are synchronized.

Upload modified parameters to device

All modified parameters are uploaded to the device.

Remark: Modified parameters are marked with a pink background.

Upload all parameters to device

All parameters are uploaded to the device.

Attention: The station number and the Sommer ID are not transferred.

RQ and SQ commands

Adopt discharge table

The discharge table of the opened profile is adopted into the parameters. With the button "Upload modified parameters" the discharge table can be transmitted to the radar sensor.

Upload discharge table

The discharge table of the opened profile is transmitted to the radar sensor.

Special commands

Set device time

A dialog to set the date and time of the device is opened.

Select APN

A dialog with predefined APN settings is opened. These modem settings can be selected and adopted for the device. The settings consist out of APN, user and password.

Remark: This button is only available for devices with modem functionality.

Analog inputs assistance

Below the parameters a window is displayed, which supports the configuration of the analog inputs.

Remark: This button is only displayed with the authorization "Expert" and is only available for devices with analog inputs.

7.3 Devices

In a horizontal bar the devices of a station or connection are displayed and allows the switching between the devices.

Remark: The bar is only visible if multiple devices are available.

7.4 Parameter

The parameters of a device are displayed in parameter menu. The structure of the menu correlates with the according device menu. This structure is named as schema and is automatically transferred during the first communication with the device.

The parameters are either transferred from a device or opened from a file. Sub-menus can be expanded. Parameter can be edited and are highlighted with a pink background. The changed parameters have to be send to the device with a command. Selected commands can directly be executed from the menu.

Remark: The language of the menu is based on the selected language of the device. It can be changed in the menu "Technics".

8 Measurement mode

In the measurement mode measurement values received from devices (sensors and data loggers) are displayed as text or in a measurement graph.

The measurement values are either requested per commands or they are sent automatically by the device in a defined interval.

Additional spectrums from radar or ultrasonic devices can be recorded and displayed. Images of cameras connected to data loggers can be transferred.

The following windows are available.

Devices

The devices of a station or a connection are displayed in a horizontal bar.

Measurement values

Here the measurement values transmitted or requested from a device are displayed.

Measurement data graph

In the measurement data graph the values from the device are displayed as time series.

Spectrum graph

In the spectrum graph the spectrums from a radar or ultrasonic device are displayed. It is possible to switch between spectrums and to display additional information to a spectrum.

Self-check

The information of the self-check of the device are presented.

Information

In this window information to the device is displayed.

Commands

With the commands measurement values can be requested from a device.

8.1 Commands

The following measurement commands can be performed. Most of these are only available after the parameters of the device have been requested.

Polling commands

Start polling

A dialog is opened to select the polling mode:

Polling of measurement values

A polling sequence is started, that requests the measurement values in a defined interval.

Polling with measurements

A polling sequence is started, that continuously performs measurements and requests these values in a defined interval.

Attention: During this polling the saving of data in the device is deactivated.

Remark: This command is only displayed with the authorization "Expert".

Polling of storage values

A polling sequence is started, that requests the storage values in a defined interval.

Stop polling

The polling sequence is stopped.

Image commands

Download camera image

If cameras are connected to a data logger, images can be made, transferred and opened with the default program of the operating system.

Parameter commands

Download parameters

All parameters are downloaded from the device and are displayed. Thereby the parameters are synchronized.

Download parameters of all devices

All parameters are downloaded sequentially from all devices. Thereby the parameters are synchronized.

Measurement data commands

Clear measurement data

The time series in the measurement graph are deleted.

Save measurement data

The measurement data are saved in a data file.

Spectrum commands

Remark: These commands are only displayed if the setting "Show spectrum" is activated in the options "View".

Start spectrum mode

The connected radar or ultrasonic device is set into the spectrum mode. The output spectrums are recorded and displayed in the spectrum graph.

Stop spectrum mode

The spectrum mode is stopped and the radar or ultrasonic device is set back into the normal mode.

Open spectrum file

Spectrums are opened from a local spectrum file.

Save spectrum file

Spectrums are saved in a local spectrum file.

Clear spectrums

All spectrums are deleted and removed from the spectrum graph.

Create PDF file

A PDF file with the spectrum graph and information is created.

8.2 Measurement values

In a list the measurement values of a device are displayed.

Device bar

On the top a bar is located, which allows to switch between the devices of the bus system of a station or connection.

Remark: The bar is only visible if multiple devices are available.

Measurement values list

All valid transferred measurement values are displayed in a list. The name and the unit of the measurement values are adopted from the related parameters. Therefore the parameters have to be downloaded before.

8.3 Measurement data graph

In the measurement data graph the values from the device are displayed graphically as time series and can be saved in data files.

There are [mouse- or keyboard actions](#) available.

8.4 Spectrum graph

In the spectrum graph the spectra from a radar or ultrasonic device are displayed.

Commands

Arrows

With the arrows below the spectrum graph the selected spectrum is switched.

Number of spectrums

The number of the displayed spectrums in the spectrum graph can be selected.

There are [mouse- or keyboard actions](#) available.

With the bar right of the spectrum graph a window can be expanded, which displays additional information to the selected spectrum.

8.5 Self-check

During operation some devices continuously perform a self-check to identify any abnormal system behavior or device failure. This self-check is returned as a code (SFCH-code) with a value of 1 to 16. Icons are linked to each code to indicate the significance of a detected abnormality. Additionally a description, causes and solutions for the abnormality are presented.

9 Data mode

In the data mode data can be transferred from data loggers and can be opened from data files.

Remark: The data mode is only available, if activated in the [view options](#).

Purpose

Transferring of data

Data can be transferred from data loggers.

Displaying of data

In a graph the transferred data or data from a data file can be displayed.

Passing on of data

Data can be uploaded to web or ftp server for further processing or storage in a database.

There are three windows available.

Commands

With the commands data can be transferred from data loggers, special commands for data loggers can be performed and data file can be opened, archived and uploaded to web or ftp server.

Stations

In this window all stations are displayed in a list. The list can be filtered and sorted using the fields in the header row.

If a station is the list is selected, the station is selected for the communication and data transfer.

Station settings

In this window the station parameters of the selected or a new station are displayed. The settings can be edited and saved with the command "Save station".

Data graph

In the graph the transferred data or data from data files are displayed.

9.1 Commands

Transfer commands

Transfer data

Data beginning with the last transfer position is downloaded from the data logger. The transferred data is archived and the last transfer position is saved.

Transfer data manually

The complete data range available on the data logger is displayed. With help of a slider the data range for the transfer from the logger is selected. Thereby only older data can be ignored as data are always transferred until the end of the available data range.

Attention: The last transfer position is not saved for this data transfer mode.

Logger commands

Clear data memory

The data memory on the logger is completely deleted.
Attention: No data is available on the logger any more.

Data file commands

Upload to server

An assistant supports the uploading of data files to web or ftp servers.

Import assistant

The assistant supports the importing and archiving of data files.

Open data file

A data file can be opened and displayed in the data graph.

Station commands

New station

A new empty station is created.

Delete station

The selected station is deleted completely.

Save station

The selected station is saved. If the station number or the Sommer ID of a saved station is changed, the station can either be overwritten or it can be created new.

Extra commands

Remark: Additional data commands are available in the menu "Extra".

Download data dump

A copy of the complete data memory is downloaded from the logger.

Delete all data pointers

All data pointer and consequently the saved transfer positions are deleted on the logger.
Attention: Deleting the data pointers causes the deletion of the last data positions for all other users, which load data from the data logger.

9.2 Stations

All stations are displayed in a list. The list can be filtered and sorted with the fields in the header. By selecting a station it is selected for data download.

Name

The unique name of the station.

Station ID

The unique ID to identify the station and its data.





Last data

The last time-stamp in the data or the last time-stamp of data transferred.

Connections

All connections available for communication are listed in a combo box and can be selected for communication. Filtering selects stations with any connection of the filtered connection type.

Buttons

	Transfer data	Transfer the actual data from the logger.
	Upload data	Upload data to a web or ftp server
	Open data archive folder	Open the folder with the data archive.
	Station settings	Expand or collapse Station settings.

9.3 Data graph

In the data graph transferred data and data opened from data files are displayed. Displaying of failure values can be activated or deactivated in the options.

There are [mouse- or keyboard actions](#) available.

10 Profile mode

In the profile mode discharge tables can be created from cross sections. Discharge tables are necessary for radar devices to calculate the discharge.

Profile graph

In the two graphs the cross section and the trend of the k-factors are displayed.

Discharge table

In this list the results of the modeling of the profile are displayed, which can be transferred to radar devices.

Profile lists

In different lists the profile items of a cross section, the related ranges of roughness and reference discharges are managed.

Settings

With the settings information to the profile is displayed and can be edited.

Calculation

In this window the calculation of the discharge for the actual profile can be tested.

Commands

The commands perform the opening and saving of profile files and the adding and removing of profile items.

10.1 Commands

File commands

Open profile file

A profile is loaded from a local profile file.

Save profile file

The profile is saved in a local profile file.

Create new profile

All profile items are removed and the settings are set to default.

Import profile

A dialog to import a profile from a CSV-file is opened.

Create PDF file

A PDF file with the profile graphs and the discharge table is created.

Profile list commands

Add point

A new point is added to the profile list.

Add circle

A new circle or circle segment is added to the profile list.

Add rectangle

A new rectangle is added to the profile list.

Add trapeze

A new trapeze is added to the profile list.

Standardized cross-sections

A predefined cross-section with a fix width-height ratio is created.

Remove item

The selected profile item is removed from the profile list.

Remove all items

All profile items are removed from the profile list.

Transfer commands**Adopt discharge table**

The discharge table of the opened profile is adopted into the parameters. With the button "Upload modified parameters" the discharge table can be transmitted to the radar sensor.

Upload discharge table

The discharge table of the opened profile is transmitted to the radar sensor.

10.2 Settings

In the settings information to the cross profile are displayed and can be changed. Some settings are necessary to model the k-factors in the discharge table correctly.

Settings**File name**

The file name of the opened profile file is displayed without its file path.

Title

A title can be set for the profile.

Unit

The unit of the distance is displayed and can be changed. For new profiles the unit defined in the options is selected.

Distortion

The cross section is displayed either distorted or optimized. For new profiles the setting is set to the setting in the options.

Roughness

The information to the roughness is necessary to model the k-factors in the discharge table. Either the setting is edited directly or it can be selected from a list.

This setting is valid for the complete cross profile. Multiple ranges of roughnesses are edited in the roughness list. If ranges are set in the roughness list, this setting cannot be edited any more. The type of the roughness coefficient is defined in the options.

Radar position

The horizontal position of a radar device has to be set, as it influences the modeling of the k-factors.

Height input

The setting defines the type for the input of the height information.

Height input

- Height The height information is a relative height.
- Sea level The height information is a absolute height (i.e. sea level).
- Distance to ground The height information is a distance to ground

Zero point

With the zero point the height input of the profile is transformed into the level of the radar device. The zero point can either be edited directly or a dialog to calculate the zero point can be opened.

If a zero point is set, an additional right axis is displayed in the graphics.

Max. line spacing

The maximal line spacing defines how wide the spacing between to lines in the discharge table can be, before additional lines are automatically inserted. This settings helps to avoid only a small number of lines in the discharge table especially for simple forms of profiles.

This function can be activated or deactivated with the check box.

Silt level (only for composite forms and standardized cross-sections)

A silt layer can be defined by the setting of its total height. It is taken in concern during the calculation of the areas and k-factors for the discharge table.

Silt roughness (only for composite forms and standardized cross-sections)

The roughness for the surface of the silt layer is set.

10.3 Calculation

In this window the calculation of the discharge for the actual profile can be tested. Based on the level and the velocity the area, k-factor and discharge are calculated.

Input

The following values are used for the calculation:

Level

Level according to the discharge table and thereby the radar level

Surface velocity

The surface velocity at the horizontal position of the radar device

Output

The following values are calculated from the discharge table according to the level and velocity:

Area

Wetted area according to the level

k-Factor

k-factor according to the level

Discharge

Discharge according to the calculated area and k-factor as well as the velocity

10.4 Profile graph

There are two profile graphs available:

Cross profile graph

The graph shows the cross section of the profile, the radar device at its horizontal position and the selected level in the discharge table or discharge calculation.

k-factor graph

The graph shows the trend of the k-factor related to the level. Reference discharges are displayed as points. The k-factors can be shifted with the left mouse button pressed.

10.5 Discharge table

The discharge table is the basis for the calculation of the discharge in radar devices. It is calculated and modeled from the entered profile information. It consists out of lines with decreasing levels according to the profile. In the lines the calculated areas and k-factors are displayed.

Columns**Act.**

The check-box sets the line active or inactive.

Type

The type describes special lines.

Types

- M Manually inserted line
- A Automatically inserted line according to the maximal line spacing
- E Extrapolated k-factor

Level

The level in the reference system of the radar device

Area

The calculated area from the profile according to the level

Auto.

The check-box defines, if the k-factor is either automatically modeled or defined manually by a direct editing or by shifting with the mouse in the k-factor graph.

k-Factor

The k-factor which is either automatically modeled or manually set.

Roughness

The roughness of the wetted circumference according to the level

10.5.1 Pop-up menu

The right mouse button opens a pop-up menu with the following commands.

Commands

Insert manual line

A new manual line item is inserted in the discharge table above the selected line.

Remove manual line

The selected manual line is removed from the discharge table.

Set all lines active

All lines are set to active.

Set all lines inactive

All lines are set to inactive.

10.6 Profile lists

In lists the profile and additional settings are described.

Profile items

With profile items the cross section of a profile is described.

Roughnesses

Ranges with different roughnesses can be defined.

Reference discharges

If discharges with related levels and velocities are known, reference discharges can be defined. These reference discharges support the simple adjustment of k-factors.

10.6.1 Profile items

The cross section of a profile is described with profile items. There are three possibilities of descriptions available.

Point profiles

The cross section is described exclusively with points with information to height and position.

Composite shapes

The cross section is described with one or multiple geometric forms.

Geometric forms

- Circle and circle segment
- Trapeze
- Rectangle

Standardized cross-sections

The cross-section is one single predefined form with a fix width-height ration. The lines in the discharge

table are set automatically.

Standardized cross-sections

- Circle w:h = 1:1
- Ovoid w:h = 2:3
- Arch w:h = 2:1,5

The profile items are displayed in a list. With the commands of the command window or the pop-up menu of the list profile items can be added or removed. The settings of profile items can be edited directly in the list.

10.6.1.1 Pop-up menu

The right mouse button opens a pop-up menu with the following commands.

Commands

Add point

A new point is added to the profile list.

Composite shapes

Add circle

A new circle or circle segment is added to the profile list.

Add rectangle

A new rectangle is added to the profile list.

Add trapeze

A new trapeze is added to the profile list.

Standardized cross-sections

A new cross-section is selected and added.

Remove

Remove point

The selected profile point is removed from the profile list.

Remove item

The selected profile item is removed from the profile list.

10.6.2 Roughnesses

In the roughness list horizontal ranges with different roughnesses can be specified. The settings can be edited directly in the list. With a pop-up menu ranges can be added and removed.

Attention: The information in the roughness list dominates the roughness for the complete profile in the profile settings.

Columns

From

The begin of the horizontal range of roughness

To

The end of the horizontal range of roughness

Roughness

The roughness of the horizontal range is defined. The type of the roughness coefficient is defined in the options.

10.6.2.1 Pop-up menu

The right mouse button opens a pop-up menu with the following commands.

Commands**Add roughness**

A new roughness item is added to the roughness list.

Insert roughness

A new roughness item is inserted in the roughness list prior to the selected roughness item.

Remove roughness

The selected roughness item is removed from the roughness list.

10.6.3 Reference discharges

In the list reference discharges can be specified, which can be used to adjust the k-factors. Reference discharges are discharges measured i.e. with manual measurement methods, for which level and velocity measured from the radar device at the point in time of the reference measurement are present. With level and velocity the discharge can be calculated from the discharge table. This discharge can thereafter be compared with the reference discharge.

For a simple visualization the reference discharge is additionally transferred into a reference k-factor. This k-factor is plotted in the k-factor graph, where the k-factors can be adjusted manually with the mouse.

Columns**Level**

Level of the radar device at the point in time of the measurement of the reference discharge

Velocity

Velocity of the radar device at the point in time of the measurement of the reference discharge

Q

Discharge calculated with level and velocity from the discharge table

Ref. Q

Reference discharge measured with an alternative measurement method

Error.

Percentage error between calculated discharge and reference discharge

10.6.3.1 Pop-up menu

The right mouse button opens a pop-up menu with the following commands.

Commands

Add reference discharge

A new reference discharge is added to the list.

Insert reference discharge

A new reference discharge is inserted in the list prior to the selected reference discharge.

Remove reference discharge

The selected reference discharge is removed from the list.

11 Station mode

In the station mode stations are managed.

Remark: The station mode is only available, if activated in the [view options](#).

Purpose

Communication with a station

Stations are used to communicate with devices using the activated connections.

Managing devices of a BUS system

Opposed to connections stations can manage the devices in a BUS system.

Managing of data

Stations are required to manage data in the data archive.

There are three windows available.

Commands

With the commands a new station can be created and the selected station can be saved or deleted.

Stations

In this window all stations are displayed in a list. The list can be filtered and sorted using the fields in the header row.

If a station in the list is selected, the station parameters are displayed in the window "Station" and the station is selected for the communication as well.

Station settings

In this window the station parameters of the selected or a new station are displayed. The settings can be edited and saved with the command "Save station".

11.1 Commands

Station commands

New station

A new empty station is created.

Delete station

The selected station is deleted completely.

Save station

The selected station is saved. If the station number or the Sommer ID of a saved station is changed, the station can either be overwritten or it can be created new.

Export stations

The selected stations are exported into a folder or a ZIP archive.

Import stations

Stations are imported from a folder or a ZIP archive.

11.2 Stations

All stations are displayed in a list. The list can be filtered and sorted with the fields in the header. By selecting a station it is selected for communication.

Name

The unique name of the station.

Station ID

The unique ID to identify the station and its data.

Last data

The last time-stamp in the data or the last time-stamp of data transferred.

Type

The type of the station. Data transfer and archiving is only possible for stations of the type "logger".

11.3 Station settings

The station parameters define a station and can be edited in the station mode.

Identification

Station ID

The Station ID is the unique ID of the station used to identify data. Usually it is the station number but it may include the Sommer ID too.

Type

The setting defines the type of the station.

Type

- **Logger** The station has a data logger in its devices and therefore has a station number. Data transfer and archiving is not possible.
- **Station** The station has only sensors as devices. Data transfer and archiving is not possible.

Entire ID

The entire ID uses the station number and the Sommer ID for the Station ID.

Station number

The unique number of the station, to identify the logger

Sommer ID

The Sommer ID is preset in the device and corresponds to the serial number of the device. It is used additionally to the station number in case identical station numbers occur more than once.

Name

The unique name of the station.

Connections

All available connections are displayed in a list. Check-boxes define if connections are activated for stations and which connection is used as default connection.

<input checked="" type="checkbox"/>	<input type="radio"/>	ComPort
<input checked="" type="checkbox"/>	<input checked="" type="radio"/>	Bluetooth
<input checked="" type="checkbox"/>	<input type="radio"/>	IP Call

Activation

The square-shaped check-box defines if the connection is activated for the station.

- activated
- not activated

Default connection

One connection can be defined as default connection using the circle-shaped check-box. This connection is preselected when changing to the station.

- default connection
- not default connection
- connection not activated and default connection not possible as

Bluetooth

Remark: These parameters are only available if a Bluetooth connection is activated for the station.

Address

The MAC address is the unique hardware address of the remote Bluetooth adapter.

Pin

The pin code used for pairing (default 1234).

IP Call

Remark: These parameters are only available if an IP Call is activated for the station.

IMSI number

The International Mobile Subscriber Identity (IMSI) is a unique identification used to identify the user of a cellular network.

Socket

Remark: These parameters are only available if a socket connection is activated for the station.

Server

The server for the communication is set.

Port

The port of the server is set.

Modem

Remark: These parameters are only available if a modem connection is activated for the station.

Number

The number is the telephone number for the modem connection.

Devices

System key

The system key is used for the command "Scan devices" in the communication area. Only devices with this system key are accepted as devices for the station. With the system key 99 all devices are accepted.

Devices

In the hierarchic list all devices of the station are listed. (see [Communication concept](#))

Data

Last data

The last time-stamp in the data is displayed. In a menu, opened with a click of the right mouse button, the time-stamp can be determined manually.

Archive type

The setting controls the file system of the data archive.

Archive types

- None Data is not archived.
- Month Data is archived in monthly files.
- Year Data is archived in yearly files.

Archive sub folder

All data is automatically saved in the data folder "Data". With this setting a sub-folder for the data of the station can be created.

12 Connection mode

In the connections mode connections are managed.

Purpose

Communication with a connection

Connections are used to communicate directly with devices using the connection.

Usage in stations

The managed connections are used in stations. Stations communicate with these links connections. Thereby connections can be used in several stations.

There are three windows available.

Commands

With the commands a new connection can be created and the selected connection can be saved or deleted.

Connections

In this window all connections are displayed in a list, which can be filtered by the type of the connections.

If a connection is the list is selected, the connection parameters are displayed in the window "Connection" and the connection is selected for the communication as well.

Connection settings

In this window the connection parameters of the selected or a new connection are displayed. The settings can be edited and saved with the command "Save connection".

12.1 Commands

Connection commands

New connection

A new empty connection is created.

Delete connection

The selected connection is deleted completely.

Save connection

The selected connection is saved. If the name of a saved connection is changed, the connection can either be overwritten or it can be created new.

12.2 Connection settings

The connection parameters define a connection and can be edited in the connections mode.

Common parameters

Name

Every connection has to have a unique name to identify the connection.

Type

The parameter sets the type of the connections.

Connection types

- Serial connection
- Bluetooth connection
- IP Call
- Socket connection
- Modem connection

Attention: The establishing of IP Call and modem connections is only possible with station communications.

Default connection

One connection can be defined as default connection, which will be preselected for communications in the mode "Connection".

Connection parameters

The connection parameters are displayed according to the selected connection type.

Serial parameters

Port

The port for the connection is selected. Only available ports are displayed in the selection. To update the list of ports click the right button.

Baud rate

The baud rate is selected from a select list.

Baud rates

- 1200
- 2400
- 4800
- 9600
- 19200
- 38400
- 57600
- 115200

RTS/CTS handshake

The switching of the RTS/CTS control line (hardware-handshake) is activated or deactivated.

XON/XOFF

The XON/XOFF software-handshake is activated or deactivated.

Parity and stop bits

The parity and the number of stop bits are selected using predefined combinations:

Parity and stop bits

- | | |
|-------------------------|---------------------------|
| • No par., 1 stop bit | No parity, one stop bit |
| • No par., 2 stop bits | No parity, two stop bits |
| • Even par., 1 stop bit | Even parity, one stop bit |
| • Odd par., 1 stop bit | Odd parity, one stop bit |

IP Call parameters

Server

The switching server controlling the communication set.

Port

The port of the switching server is set.

Waiting time

The waiting time defines, how long to wait for the answer of a device after sending a command. For poor internet connections the waiting time possibly must be increased to prevent the communication to be closed due to time-outs.

Socket parameters

Waiting time

The waiting time defines, how long to wait for the answer of a device after sending a command. For poor internet connections the waiting time possibly must be increased to prevent the communication to be closed due to time-outs.

Modem parameters

Port

The port for the connection is selected. To update the list of ports click the right button.

Baud rate

The baud rate is selected from a select list.

Baud rates

- 1200
- 2400
- 4800
- 9600
- 19200
- 38400
- 57600
- 115200

RTS/CTS handshake

The switching of the RTS/CTS control line (hardware-handshake) is activated or deactivated.

XON/XOFF

The XON/XOFF software-handshake is activated or deactivated.

Parity and stop bits

The parity and the number of stop bits are selected using predefined combinations:

Parity and stop bits

- | | |
|-------------------------|---------------------------|
| • No par., 1 stop bit | No parity, one stop bit |
| • No par., 2 stop bits | No parity, two stop bits |
| • Even par., 1 stop bit | Even parity, one stop bit |
| • Odd par., 1 stop bit | Odd parity, one stop bit |

Initialization string

The initialization string consists of modem specific commands.

Dialing prefix

The dialing prefix is output prior to the dialing number. It is for example used to set the prefix of a telephone system, which is usually 0.

Configuration string

The configuration string consists of modem specific commands.

Data transfer parameters

Type

The data transfer can be performed in different ways. Usually a streamed transfer is recommended.

Data transfer types

- **Block wise** The data is requested block-wise by the Q-Commander. After every block a check sum is output, which is checked. If the check is not successful the block is requested again.
- **Streamed** The data is transferred autonomous and block-wise from the device. After every block a check sum is output, which is checked. If the check is not successful the transfer is aborted.

13 Options

The options are the global settings of the program. The settings can be changed in the window "Options", which is opened using the menu and the menu item "Options".

Common

Language

The language of the program is changed and all texts of the program are displayed in the selected language.

Languages

- English
- Deutsch/German
- Français/French
- Español/Spanish
- 日本語/Japanese
- 中文/Chinese (Simplified)
- Русский/Russian

Attention: The language of the parameters of sensors and data loggers is not influenced by this setting. The setting of the device language is set directly on the device.

Font size

The font size of the program is changed. All texts are displayed in the selected font size.

Authorization

This setting changes the authorization of the user. It defines, if special settings can be edited in the parameter mode. Settings, that cannot be edited, are displayed gray.

Authorizations

- Normal The user has the normal restricted rights.
- Expert The user has advanced rights and can edit all settings in the parameter mode.

Start-up mode

The start-up mode determines which software is executed on start-up.

Start-up mode

- Start-up page A start-up page for selecting the software is displayed on start-up.
- Commander Commander is executed on start-up.
- SQ-Commander SQ-Commander is executed on start-up.

Profile

Roughness coefficient

The wall roughness of profiles is indicated with a coefficient. The type of coefficient can be defined.

Roughness coefficient

- Sand roughness k_s The parameter defines the equivalent sand roughness used in the formulas of Colebrook-White and Darcy-Weisbach. The parameter is entered in mm.
- Strickler coefficient k_{st} The roughness is expressed with the Strickler coefficient as it is used in the Gauckler-Manning-Strickler formula. The parameter is entered in $1/m^3s$.
- Manning coefficient n The roughness is expressed with the Manning coefficient, the reciprocal value of the Strickler-Coefficient. The parameter is entered in m^3s .

Distortion

The cross section is displayed either distorted or optimized.

Max. line spacing

The maximal line spacing defines how wide the spacing between to lines in the discharge table can be, before additional lines are automatically inserted. This settings helps to avoid only a small number of lines in the discharge table especially for simple forms of profiles.

Communication

These settings control the transfer of commands in the Sommer protocol.

Maximal number of characters

The maximal length of a transmitted protocol string. This setting overrules the maximal number of commands.

Maximal number of commands

The maximal number of commands transmitted together in a protocol string.

Schema from Web

An unknown schema is first requested from the internet. Only if then the schema was not found, it is requested with direct communication.

Polling interval

The value defines the seconds for the interval used to poll measurement values or measurements from a device.

Log outgoing commands

The setting defines, if additionally to the received data the sent commands are logged in the log file too.

Bluetooth scan

When scanning for Bluetooth devices, the following Bluetooth types are scanned.

Bluetooth scan

- Bluetooth LE and Classic Bluetooth Low Energy and Bluetooth Classic and Classic
- Bluetooth LE only Bluetooth Low Energy
- Bluetooth Classic only Bluetooth Classic

Graph

Failure values in data graph

Failure values are displayed in the data graph.

Units

The global settings for the units are defined.

Distance

The unit for distances is set.

Velocity

The unit of the velocity is set.

Discharge

The unit of the discharge is set.

Area

The unit of ares is set.

Tabs

The visibility of the buttons in the toolbar are defined globally.

Show data tab

The button "Data" is displayed in the main toolbar.

Show stations tab

The button "Station" is displayed in the main toolbar.

Show connections tab

The button "Connections" is displayed in the main toolbar.

Show terminal tab

The terminal mode is available and the button "Terminal" is displayed in the main toolbar.

Remark: The terminal mode is only available with the authorization "Expert".

14 License manager

The license manager is used to register the installation and to activate additional programs and modules. By registering, the installation is coupled with a Sommer account and thereby registered.

Registration with a new Sommer account

To create a Sommer account you need an account name, an organization, a valid email address and a password (at least 8 characters, a number and an uppercase letter).

The Sommer account provides an overview of all installations of programs registered under the account. In addition, the Sommer account is required for the later activation of additional modules. It can be managed for which installations registered under the Sommer account will modules will be activated.

Attention: Keep the account name, email address and password in a safe place.

You need the Sommer account to register further installations or to activate additional modules.

Attention: The e-mail address is required to receive e-mails to confirm registrations.

Remark: It is recommended that you use a single Sommer account for a company, department, or organizational structure. The advantage is that an overview of all registrations and licensing is possible and thus the activation of additional modules for all the registered installations is possible.

Registration with an existing Sommer account

For the log-in with existing Sommer account the account name and the password are required.

Unregister

To unregister a installation the password of the Sommer account is necessary.

Changing a Sommer account

To change the registration of an installation to a different Sommer account, first the current installation has to be unregistered. Then the installation can be registered to another Sommer account.

15 Appendix

15.1 Parameter menu

Shortcuts

The following shortcuts are available in the parameter menu:

Shortcuts in the menu

Keyboard	Action
• ↑ and ↓	Change menu item
• ← and →	Expand and collapse sub-menus
• + and -	Expand and collapse sub-menus
• Tab	Switch into editor

Shortcuts in editors

Keyboard	Action
• Return	Confirm editor and switch in menu item
• Esc	Dismiss changes and switch in menu item
• Tab	Proceed to next editor

15.2 Graphs

Actions for graphs

In the graphs the following mouse and keyboard actions are available.

Mouse actions

Mouse	Label	Action
• Click check-box in the legend	Visibility of the curve	The labeled curve is shown or hidden.
• Click with left mouse button in the legend	Visibility of all curves	A menu to show or hide all curves is opened.
• Double click with right mouse button	Reset graph	The graph is reset to its origin zoom.
• Drag with pressed right mouse button	Zoom rectangle	The selected rectangle is zoomed.
• Mouse wheel	Zoom	The zoom range is increased or decreased.
• Click with left mouse button and selection of a data point	Show information	Information to the selected data point is displayed.

Keyboard actions

Keyboard	Label	Action
• Escape	Reset graph	The graph is reset to its origin zoom.
• + and -	Zoom	The zoom range is increased or decreased.
• ←, →, ↑ and ↓	Scroll	The graph range is switched in the according direction.

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