NORTHTEC
automation technology

User Manual

Shadow Memory 4

Version 4.1.0.4

Software for reading out Shadow Impact Logs

Revision history

Revision	Date	Changes	Edited by

Table of Contents

1   Using the Manual

This manual uses the following abbreviations:

Abbreviations   PI   Place of Immission

                      SIM   Shadow Impact Module

                      WTG   Wind Turbine Generator

This manual uses the following terms:

Term   Drag&Drop

                      Refers to a feature where you left-click an object, drag it to another area while keeping the mouse button clicked, and than release the mouse button in order to paste the object.

The following navigation features are available:

Hyper links   If you read this manual on-screen, you may use cross references (e.g. "For further information, please refer to 3.2 Log Columns") as hyper links.

                      To get to the destination of the reference, simply click the respective link.

2 Introduction

Thank you for purchasing our **Shadow Memory** software.

Purpose of the software

Shadow Memory is used for **Reading out the Shadow Memory Log** from Shadow Impact Modules to a PC. The shadow impact data is output in a table format as shown in the example below.

View, **print** or **filter** the data retrieved according to various types of information and conditions as desired.

Using the Log

Can the log be modified?

In order to ensure the probative force of the log data, modifying the shadow impact logs is **not** possible.

Shadow Memory 4 window

2.1 Technical Requirements

Before you use Shadow Memory to read out the shadow impact log, ensure that the following technical requirements are met:

SIM

SIM ZM 3.0 or later

PC

- OS Microsoft Windows 98 or later
- at least 64 MB RAM
- 2 MB of at least free hard disk space
- CD-ROM or DVD drive

Connection

Shadow Impact Module 3.0 and 3.1

The data must be read out on site via a serial interface (COM port). You will need a serial cable (Rx and Tx not crossed over, 9 pin plug).

Shadow Impact Module 3.5 or later

The data must be read out using a network connection. Connect to the SIM via WLAN or using a network cable (crossed Ethernet cable).

2.2 Software Installation

How to install Shadow Memory

1. Exit all other applications.

2. Insert the Shadow Memory CD-ROM into a CD-ROM or DVD drive. After a few seconds, the installation routine will start automatically.

   OR

   Double-click the file **Setup Shadow Memory 4.1.0.4.exe** located on your PC.

3. Choose an installation language (Dansk/Deutsch/English).

4. Follow the on-screen instructions.

After a few minutes, the installation process is finished, and Shadow Memory is ready to be used.

2.3 Before reading out the log

The steps to be performed prior to reading out the log depend on the type of read-out process used as follows:

Steps to be performed prior to reading out via serial interface (SIM 3.0 und SIM 3.1)

For serial connection (SIM 3.0 + SIM 3.1)

Use a serial (Rx and Tx not crossed over, 9 pin plug) to connect **COM port 1 of the Shadow Impact Module** to a **COM port of your computer**.

> Only qualified personnel is allowed to open the cabinet. The high voltage present inside the cabinet may cause **serious injury or even death!**

Now perform the following steps on the **SIM** in order to set the SIM to read-out mode:

1. Press the **Enter** button.

2. Press 2 to select the **Settings** menu.

3. Enter the four-digit password and press **Enter**.

4. Press 2 to select the **Data** menu.

5. In the **Data** menu press 5 to select the **Log data** submenu.

When the SIM is ready for the log transmission, the following will be displayed on the SIM display:

```
waiting for query
```

The SIM is now ready to transmit the log.

Note: The SIM will wait 5 minutes for a log request from the connected computer. If the shadow impact module does not receive a request within this time range, it will return to normal operation automatically.

Steps to be performed prior to reading out via network connection (SIM 3.5 or later)

For network connection (SWM 3.5 or later)

There are two ways to set up a network connection between the computer and the SIM:

• direct connection to the SIM via crossed Ethernet cable.

• WLAN connection to the SIM

Connection via Ethernet cable

Use a crossed Ethernet cable to connect the **Ethernet port of the SIM** to the **Ethernet port of your computer**.

Only qualified personnel is allowed to open the cabinet.
Some of the components in the cabinet carry high
voltages that may cause **serious injuries or death!**

WLAN connection

If your read out the log via WLAN connection, there are no preparational steps to be performed on the SIM.

2.4 Reading out the log

To read out the log, perform the following steps on **your computer**.

Settings in Shadow Memory 4

• Start Shadow Memory 4.

• Select **Options** > **Communication**. The **Communication** window will be opened:
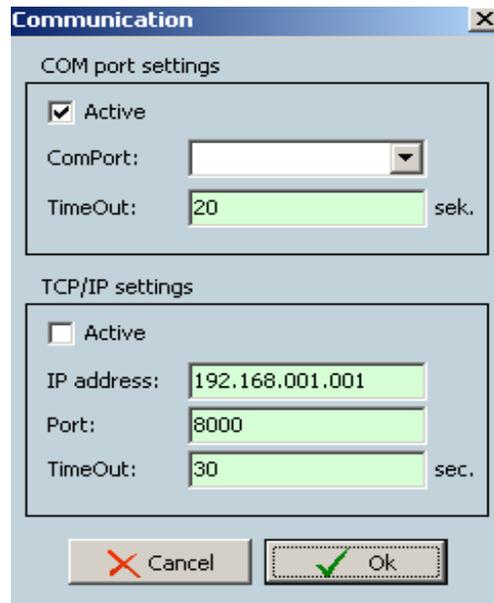
Communication window

Reading out via serial interface

1. Under **COM port settings** select **Active**. Then, under **ComPort** select the COM port on your computer to which you have connected the serial cable.

    OR

Reading out via network connection

Under **TCP/IP settings** select **Active** and set the parameters as follows:

IP address   198.168.001.001 (IP address of the SIM)
Port   8000 (always)

Attention:
If the data are read out using a direct Ethernet cable connection, the first three number sets of the **IP address** ("198.168.001" in the above example) must match the first three number sets of the IP address of the computer, whereas the last number set ("001" in the above example) **must not** match.

Port must always be set to 8000.

2. Under **TimeOut** you can set the number of seconds, the computer will try to connect to the SIM.

3. Please click **OK**.

4. In the lower left of the software window, set the period of which the data will be shown by entering or selecting the desired dates under **From** and **Until**.
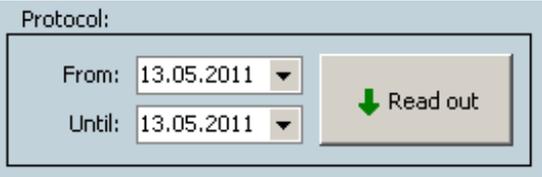
Set the log data period

5. Please click **Read out**. Shadow Memory will now read out the log and show the retrieved data in a table.

3 The Log Data

After you have read out the data as described in Chapter 1, you will see a shadow impact log similar to the following.

A SIM, Location, Vers.

B column header

C log data

Position	Date	Time	PI	WTG	Daycounter	Yearcounter	State WTG	Event
	Shadow impact module: SWM-V3.5-0082 Location: Hohenseefeld Version: 2.1.2.2							
1	07.02.2010	08:04:38	2	4	00:00:00	00:00:00	0	Theoretical shadow impact
2	07.02.2010	08:05:49	2	4	00:00:00	00:00:00	0	Shadow impact end
3	08.02.2010	08:02:46	2	4	00:00:00	00:00:00	1	Theoretical shadow impact
4	08.02.2010	08:05:09	2	4	00:00:00	00:00:00	1	Shadow impact end
5	09.02.2010	08:00:50	2	4	00:00:00	00:00:00	1	Theoretical shadow impact
6	09.02.2010	08:03:24	2	4	00:00:00	00:00:00	1	Shadow impact end
7	18.02.2010	07:42:34	2	3	00:00:00	00:00:00	1	Theoretical shadow impact
8	18.02.2010	07:43:35	2	3	00:00:00	00:00:00	1	Shadow impact end
9	19.02.2010	07:40:20	2	3	00:00:00	00:00:00	1	Theoretical shadow impact
10	19.02.2010	07:42:13	2	3	00:00:00	00:00:00	1	Shadow impact end
11	24.02.2010	07:29:40	1	4	00:00:00	00:00:00	1	Theoretical shadow impact
12	24.02.2010	07:31:05	1	4	00:00:00	00:00:00	1	Shadow impact end
13	25.02.2010	07:27:22	1	4	00:00:00	00:00:00	1	Shadow impact
14	25.02.2010	07:27:22		4			1	Stop WTG
15	25.02.2010	07:31:14	1	4	00:00:55	00:00:55	0	Shadow impact end
16	25.02.2010	07:31:15		4			0	Start WTG
17	26.02.2010	07:25:11	2	1	00:00:00	00:00:00	1	Theoretical shadow impact
18	26.02.2010	07:25:11	1	4	00:00:00	00:00:55	1	Theoretical shadow impact
19	26.02.2010	07:26:56	2	1	00:00:00	00:00:00	1	Shadow impact end
20	26.02.2010	07:30:48	1	4	00:00:00	00:00:55	1	Shadow impact end
21	27.02.2010	07:22:59	2	1	00:00:00	00:00:00	1	Theoretical shadow impact
22	27.02.2010	07:23:00	1	4	00:00:00	00:00:55	1	Theoretical shadow impact

Example of a read-out shadow impact log

A   This line shows the name of the SIM, its location and the software version of the Shadow Impact Module.

B   This line shows the log column headers. In the **View** menu, you can show or hide the available columns. For a list of available log columns with descriptions, please refer to "3.1 Log Columns" on page 13.

C   In this area, you will see the log data read out from the SIM.

3.1 Log Columns

Default Columns

If you have not yet changed the view of your shadow impact module, the screen will show the following default columns.

Position	Date	Time	PI	WTG	Daycounter	Yearcounter	State WTG	Event
1	07.02.2010	08:04:38	2	4	00:00:00	00:00:00	0	Theoretical shadow impact
2	07.02.2010	08:05:49	2	4	00:00:00	00:00:00	0	Shadow impact end
3	08.02.2010	08:02:46	2	4	00:00:00	00:00:00	1	Theoretical shadow impact
4	08.02.2010	08:05:09	2	4	00:00:00	00:00:00	1	Shadow impact end
5	09.02.2010	08:00:50	2	4	00:00:00	00:00:00	1	Theoretical shadow impact
6	09.02.2010	08:03:24	2	4	00:00:00	00:00:00	1	Shadow impact end
7	18.02.2010	07:42:34	2	3	00:00:00	00:00:00	1	Theoretical shadow impact
8	18.02.2010	07:43:35	2	3	00:00:00	00:00:00	1	Shadow impact end
9	19.02.2010	07:40:20	2	3	00:00:00	00:00:00	1	Theoretical shadow impact
10	19.02.2010	07:42:13	2	3	00:00:00	00:00:00	1	Shadow impact end
11	24.02.2010	07:29:40	1	4	00:00:00	00:00:00	1	Theoretical shadow impact
12	24.02.2010	07:31:05	1	4	00:00:00	00:00:00	1	Shadow impact end
13	25.02.2010	07:27:22	1	4	00:00:00	00:00:00	1	Shadow impact
14	25.02.2010	07:27:22		4			1	Stop WTG
15	25.02.2010	07:31:14	1	4	00:00:55	00:00:55	0	Shadow impact end
16	25.02.2010	07:31:15		4			0	Start WTG
17	26.02.2010	07:25:11	2	1	00:00:00	00:00:00	1	Theoretical shadow impact
18	26.02.2010	07:25:11	1	4	00:00:00	00:00:55	1	Theoretical shadow impact
19	26.02.2010	07:26:56	2	1	00:00:00	00:00:00	1	Shadow impact end
20	26.02.2010	07:30:48	1	4	00:00:00	00:00:55	1	Shadow impact end

Shadow impact module in default view

Log column	Explanation
Position	Serial number of the log entry
Date	Date of creation of the entry by the SIM
Time	Time of creation of the entry by the SIM
PI	Number of place of imission where the shadow impact event occurred
WTG	Number of the wind turbine generator
Dayounter	Indicates the period over which actual shadow impact has already taken place in the PI on the respective day (hh:mm:ss).
Yearcounter	Indicates the period over which actual shadow impact has already taken place in the PI during the respective year (hh:mm:ss).
State WTG	Indicates the status of the WTG as follows: **1= WTG is running** OR **0 = WTG stopped**.
Event	Type of event, e. g. "Shadow impact end" or "Stop WTG". For a detailed list of possible events, refer to "3.3 Shadow Impact Events" on page 18.

Other Log Columns

In the **View** menu, you can show or hide the log columns listed as follows by activating or deactivating the respective check box.

Wind direction   Wind direction at the location of the WTG

Wind speed   Wind direction at the location of the WTG

Rotorspeed   Rotational speed of the WTG in rpm

Nacelle position   Indicated in degrees

(0 ° = North, 90 ° = East, 180 ° = South, 270 ° = West)

Power   Power of the WTG in kW

Temperature   Temperature at the location of the WTG in °Celsius

3.2 Customising the Log View

You can customise the view of your log. The customising options are described in the following.

Show/hide columns in the View menu

In the **View** menu, you can show or hide the available columns. For a list of available log columns with descriptions, please refer to "3.1 Log Columns" on page 13.

To show or hide a log column, open the **View** menu and activate or deactivate the desired items.

Changing the column order

You can change the order of the log columns through simple Drag&Drop operations. Please refer to the following example:

View before moving the columns

View after moving the columns
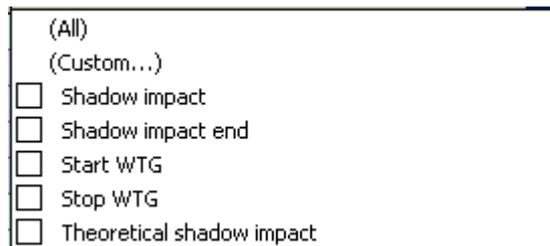
Sorting by log columns

You can sort the data by various log columns. Simply click on the header of the column by which you would like to sort the data. In the following example, the data have been sorted by the **Date** column which is also indicated by the small triangle shown next to the column header.

Position	Date	△	Time	PI	WTG	Daycounter	Yearcounter
1	07.02.2010		08:04:38	2	4	00:00:00	00:00:00
2	07.02.2010		08:05:49	2	4	00:00:00	00:00:00
3	08.02.2010		08:02:46	2	4	00:00:00	00:00:00
4	08.02.2010		08:05:09	2	4	00:00:00	00:00:00
5	09.02.2010		08:00:50	2	4	00:00:00	00:00:00

Sorting by the **Date** column

Show/hide entries

If you move the mouse over the area to the right of a log header and make a left-click, a drop-down menu will open.

|	
	(All)
	(Custom…)
☐	Shadow impact
☐	Shadow impact end
☐	Start WTG
☐	Stop WTG
☐	Theoretical shadow impact

Example: drop-down menu of the **Event** column

If you activate one of the five log entries, only the lines containing that entry will be shown. It is also possible to activate more than one entry at the same time. To return to the display of all data, select (All).

Customised filters

If you press **(Custom ...)** in the drop-down menu shown above, the **Custom Filter** window will open. Here you can set two filter conditions and connect them using AND or OR.

For instance, to determine the events WTG 2 and WTG 4 have caused in the place of immission 1, set the **Custom Filter** window of the columns **WTG** and **PI** as shown in the two following figures:
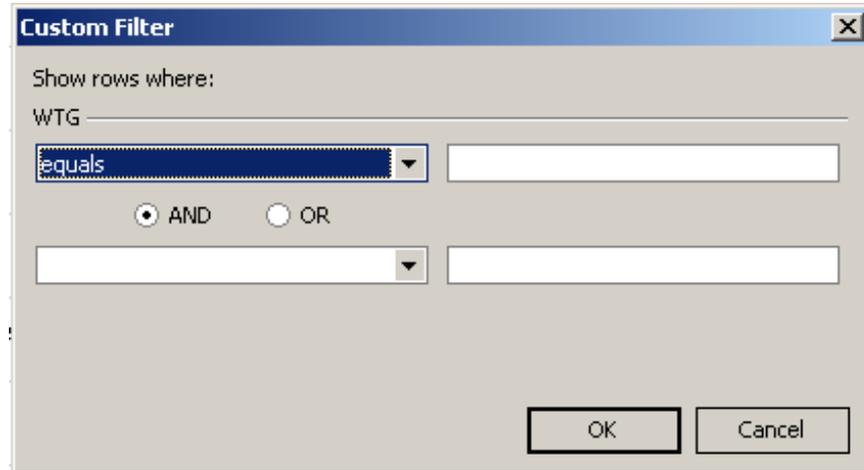
Customised Filter window of the **WTG** column.
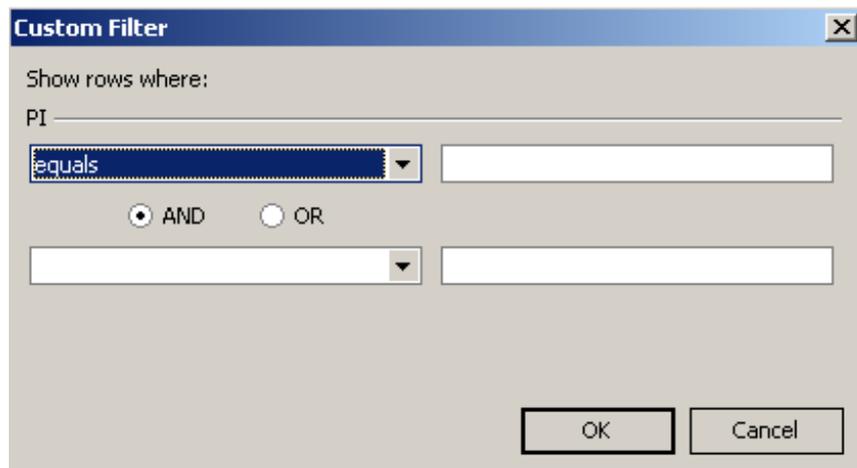
Customised Filter window of the **PI** column

After you have performed these settings, the log table shows only the data of the following relations **PI 1 to WTG 2** und **PI 1 to WTG 4.**

Expanded filter

In addition to the log customising options described above, there is the **Expanded Filter** feature in the **Options** menu. For a description of this feature, please refer to chapter 5 "Troubleshooting" on page 24.

3.3 Shadow Impact Events

In the **Event** column, the shadow impact module can display the events described in the following:

Event	Explanation
Theoretical shadow impact	The corresponding WTG causes theoretical shadow impact in the corresponding PI. However, the direct sun radiation is not strong enough to cause real shadow impact.
Shadow impact	The corresponding WTG causes real shadow impact in the corresponding PI. The direct sun radiation is strong enough to cause real shadow impact.
Stop WTG	The corresponding WTG was stopped.
Shadow impact end	The shadow impact in the corresponding PI caused by the corresponding WTG has ended as the sun has changed its position.
Start WTG	The corresponding WTG has been released by the SIM.

4   Menus and Functions in Shadow Memory

This chapter describes how to customise the data read out according to
your requirements. Furthermore, you it will outline the functions
available in Shadow Memory.

4.1   File menu

File > Exit   Exits the program.

4.2   View menu

View   In the **View** menu, you can show or hide the available items. For a list
                              of available log items with descriptions, please refer to "3.1 Log
                              Columns" on page 13.

4.3   Protocol menu

Protocol > Open   Opens an existing log.

Protocol > Save   Saves a log that has been read out.

Protocol > Print   Use this option to print a saved log. You can set the following
                              parameters:

           Printer   Select the printer to be used.

           Copies   Set the number of copies to be printed.

           Export   If you want to output the log to a file instead of print
                              it, select one of the following formats by clicking:
                              CSV, PDF or HTML.

           Cancel   Click this button to cancel the settings and the print
                              process.

Protocol > Operating   The operating protocol is read out separately. Here, you can show, e.g.
Protocol   the date and time of a light sensor failure.

4.4 Statistics menu

Statistics > Shadow impact

Selecting **Statistics > Shadow impact** will open the following window:

Statistics > Shadow impact window

In this window you can display the following statistics by clicking the corresponding button:

Actual Shadow Impact
Displays statistics of the actual shadow impact caused in the corresponding PI by the corresponding WTG.

Shadow impact without WTG stop
Displays the shadow impact that would have occurred in the corresponding PI caused by the corresponding WTG had there not been a Shadow Impact Module.

Max. possible shadow impact
Displays statistics of the maximum shadow impact that can be caused theoretically by the corresponding WTG in the corresponding PI.

The information in the window above shows e.g. the following:

• WTG 2 has caused shadow impact in PI 1 for 4 minutes.

• WTG 1 has caused shadow impact in PI 2 for 10 minutes.

To close the shadow impact statistics, click **Close**.

Statistics > Holding time

Selecting **Statistics > Holding time** will open the following window:

Statistics – Holding Time		
Holding Time:		
WTG	Holding Time	
1	0 days 0 hours 27 minutes	
2	0 days 0 hours 9 minutes	
3	0 days 0 hours 10 minutes	
4	0 days 0 hours 9 minutes	

✕ Close

Statistics > Holding time window

This window shows the period over which each WTG was shut down. The period is displayed as follows: day/hour/minute.

To close the shadow impact statistics, click **Close**.

4.5 Options menu

Select Options > Communication

Under **Options > Communication**, you can set the connection to the SIM. For a description of this procedure, please refer to "2.4 Reading out the log" on page 10 .

Options > Languages

Here you can select one of the following languages: **Deutsch**, **English** and **Dansk**.

Options > Marking

Here you can activate or deactivate the coloured background of the events **Start WTG**, **Stop WTG**, **Shadow Impact**, **End of Shadow Impact** and **Theoretical Shadow Impact** by selecting or deselecting the corresponding check box.

Example: If you select **End of Shadow Impact** the log will show all events of this type with a **blue** background.

Options >
Expanded filter

After selecting this option, you will see a dark-grey field above the column headers displaying the following:
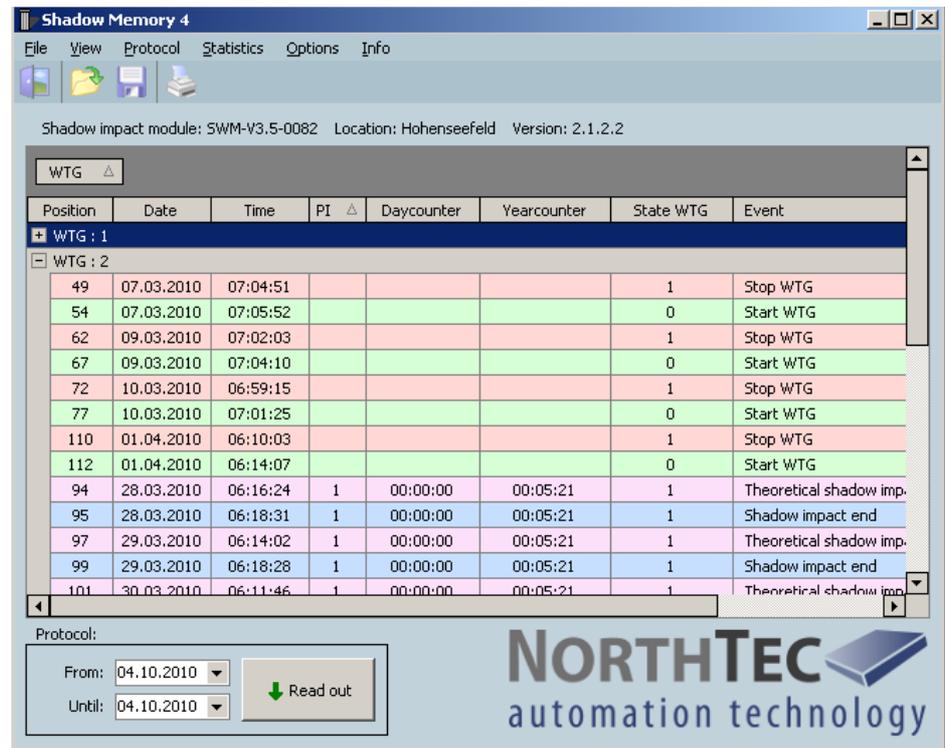
Drag a column header here to group by that column.

For example, if you drag and drop the column header **WTG** to the grey field, your log will be displayed in way similar to the following:
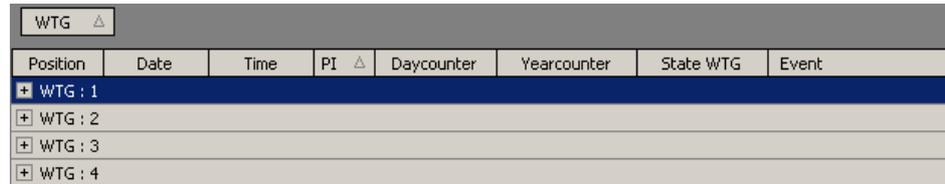
Group by column header **WTG**

If you now click on the "+" next to **WTG : 2**, all data corresponding to **WTG 2** will be displayed as shown in the following.

Displaying the data corresponding to **WTG 2**

To return to the original log display, simply drag the **WTG** column header back to the column header bar.
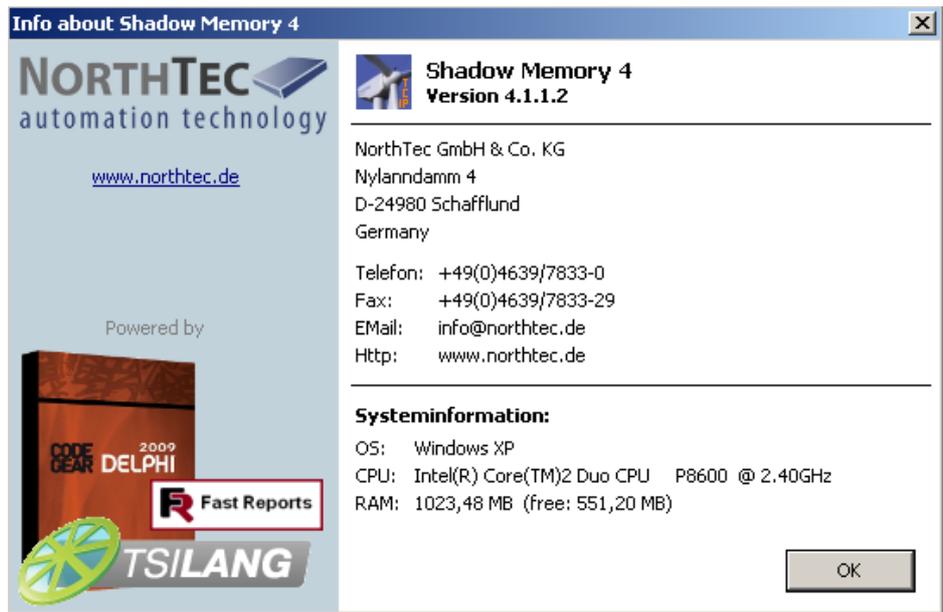
Of course, using the **Expanded filter** option, you can also group the data by all other headers as desired.

4.6 Info menu

Info > Info about
Shadow Memory 4

Here you will find the following information

• Information on the software version

• Our contact information

• System information on your operating system

Info about Shadow Memory 4 window

5 Troubleshooting

If you should encounter any problems with reading out the shadow impact module data, please read the information in this chapter. You may be able to quickly find the cause & solution for your problem.

In case the information provided does not solve your problem, you can reach us at +49 46 39 78 33 0.

Problem	Possible cause and solution
The log table is empty. Despite the fact that the log has been read out, the program does not display any data.	You have selected a period during which the SIM did not record any data. • Check the period and change it as necessary. See step 4 under 2.4 "Reading out the log" on page 10.

... more problem descriptions on the next page ...

Problem	Possible cause and solution
It is not possible to read out the log using a serial connection. When trying to read out the log using a serial connection, Shadow Memory displays the following message: „The connection to the module was interrupted".	The cable you are using is not suitable. Check if the cable used to connect the PC to the SIM complies with the following requirements: • The cable used for transmission of data is a serial cable. • The cable is a straight cable (Rx and Tx not crossed over). • The cable has a 9 pin plug. • The cable is in a good condition (not kinked or porous). • The cable is connected firmly. The SIM has not been set to read-out mode. • Set the SIM to read-out mode, see 2.3 "Before reading out the log" on page 8.
The data cannot be read out via network connection. When trying to read out the log using a network connection (cable or WLAN), Shadow Memory displays the following message: „The connection to the module was interrupted."	The cable used for a physical connection is not suitable. Check if the cable used to connect the PC to the SIM complies with the following requirements: • The cable used is a crossed Ethernet cable. • The cable is in a good condition (not kinked or porous). • The cable is connected firmly. The IP addresses used are wrong: • When reading out the data using a physical connection (cable), the first three number sets of the IP addresses of Notebook and SIM must match. • In this case, the fourth number set must **not** be identical.