

FAG



FAG Administrator User documentation

Imprint

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Software version 4.10.2
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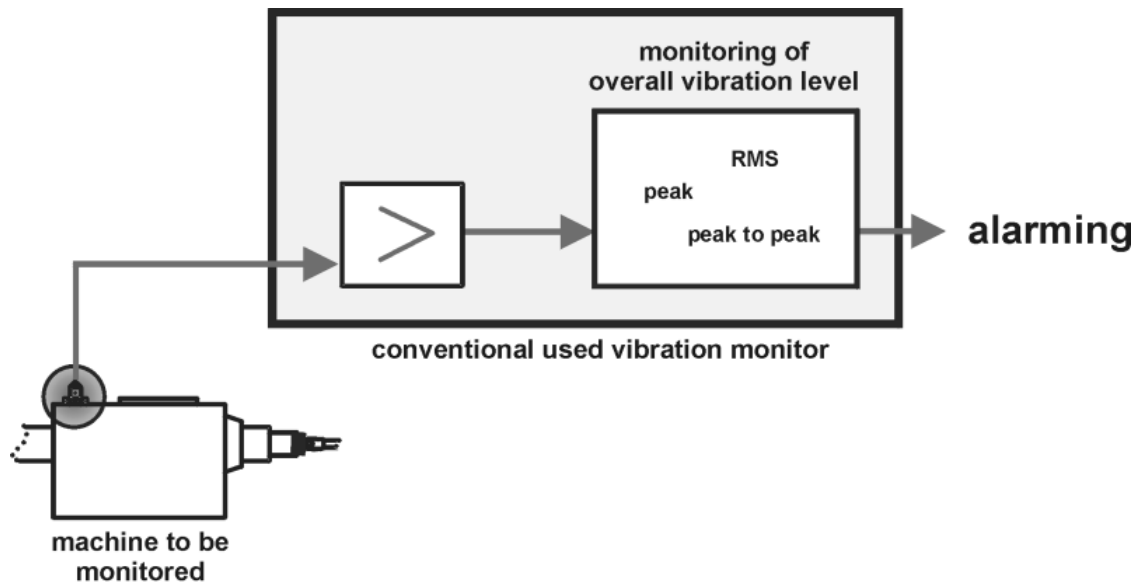
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1 Introduction

An optimum utilization of machinery is only possible with maximum availability. One condition for this is a continuous monitoring of its condition to detect errors or damage as early as possible. The most common method is vibration monitoring.

Machine noises are hereby recorded with a sensor and evaluated in a vibration monitor. In conventional vibration monitors a mean value is formed from the broad band vibration signal, e. g. the RMS-value (root mean square). If this exceeds a pre-defined limit an alarm is triggered.




Principle of a simple vibration monitoring

This type of vibration monitoring is not enough to reliably monitor the condition of complex machines with a number of components since a change in the broad band RMS only occurs in the final stage of damage. Moreover, this method is not effective with changing speeds.

An early detection of damage is only possible by frequency-selective monitoring since small damages or errors cause an increase in amplitude of individual characteristic frequencies. A rise in broad band characteristic values normally only occurs in the final stage of damage. This is then often too late to plan any maintenance work. The machine has to be switched off immediately. This type of unforeseeable shutdown frequently entails high standstill costs. Frequency-selective monitoring is thus the only way to implement a condition-based maintenance. The frequency-selective approach allows the specific monitoring of selected machine parts. This permits a differentiated vibration monitoring.

The FAG Industrial Services GmbH online monitoring systems can thus be used to monitor not only overall vibration levels but also freely adjustable frequency bands. Characteristic values are hereby calculated in the frequency bands and compared to alarm limits. A speed or load-dependent monitoring of frequency bands and their alarm limits is possible depending on the module version.

The online systems perform autonomous monitoring and output an alarm when appropriate. The systems are configured with a control computer via a serial interface. The Administrator software  is used for this purpose and also allows you to load the measuring values and trend data stored in the online system on to the control computer, save them in a database, and display them graphically.

About this manual

In this manual the

- principle of vibration monitoring used by the FAG Dtect X1s, FAG WiPros and FAG ProCheck device and
 - the functions of the FAG Administrator software
- are explained.


Symbols

In this manual the following symbols are used:

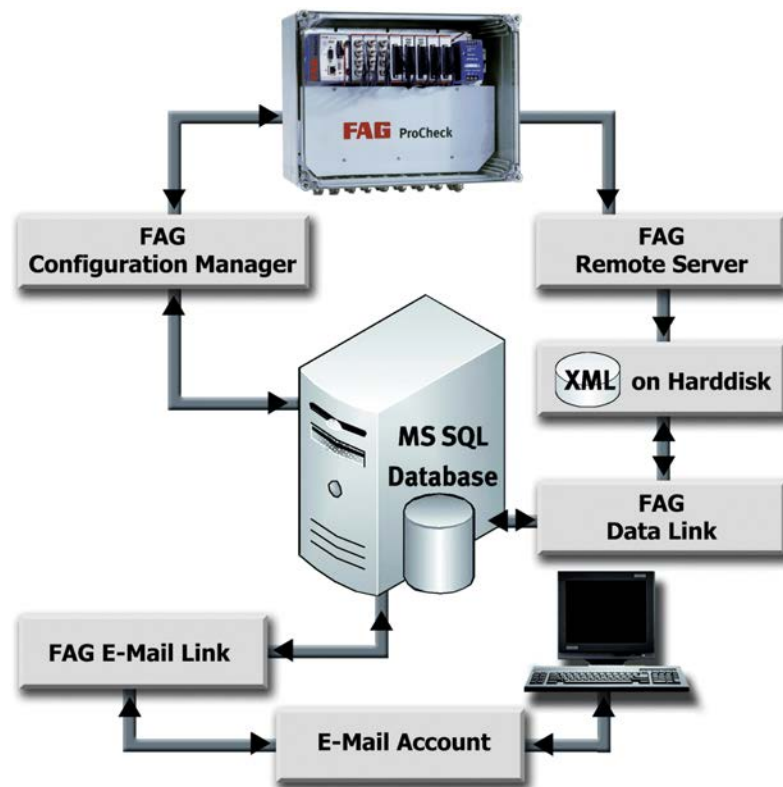


This icon indicates

- *helpful additional information and*
- *Device settings or application tips that help you perform tasks more efficiently.*

Cross reference symbol : This symbol refers to a manual page containing further information. When reading the manual in PDF format on the computer screen you can jump to that page by simply clicking on the word to the left of the symbol.

2 About the Administrator software



Data flow between the Administrator software components

For convenient and comprehensive configuration, for reading out current characteristic values and alarm statuses as well as signals obtained from the vibration measurement system for the purposes of analysis you will require an external computer with the Administrator software installed. The Administrator software incorporates the following components:

- **FAG Configuration Manager:** The Configuration Manager^[31] serves as a central control station on the external computer for the administration of devices, device and monitoring configurations, and managing measuring data and users. The Configuration Manager can manage multiple Dtect X1s or ProCheck devices. Several corresponding configurations for various monitoring tasks may also be saved in each device. The configuration must be transferred to the corresponding device before use. Since devices can usually operate autonomously and can normally be configured in a short space of time, one mobile control computer for several devices is sufficient.
- **FAG Viewer:** The imported data can be displayed in graphical form and analysed in Viewer.
- **FAG Remote Server:** The Remote Server^[20] automatically monitors the data recording process for any number of devices.
- **FAG Data Link:** Data Link^[208] transfers the data recorded by the Remote Server to the CM database^[33]. Further, Data Link can send event-driven e-mails containing data.
- **FAG E-mail link:** You can use Email Link^[215] to receive and manage e-mails centrally, for example e-mails sent from Data Link. The data contained in the e-mails is written into the CM database.
- **FAG Notify Link:** Notify Link^[224] checks whether there are any export data or non-response alarms in the CM database and sends them automatically by e-mail.
- **FAG Transfer Link:** Transfer Link^[231] synchronises the local data directory of the Remote Server via the Cloud with the local directory monitored by Data Link.
- **Application Guard:** By default, the FAG Administrator software is delivered with Application Guard^[214]. This program automatically monitors in the background whether a running program component is working properly.
- **E-MailRelay tool:** With the aid of the E-MailRelay tool^[237] you can forward the unencrypted e-mails sent by the FAG Administrator software with encryption.



- All data is stored centrally in the CM database. This database uses the SQL database Microsoft SQL Express 2012, which is included free of license charges.
- Application Guard uses port 11111. Please make sure that this port is open in the computer's firewall. If necessary, ask your system administrator.

3 Installing the software

This section describes installation of the Administrator software.



Please restart your system once all installations have finished.

Important information on FAG Administrator software version 4.10.2 update

The FAG Administrator software version 4.10 is delivered with the new database program MS SQL Express 2012 (see System requirements^[9]). If you already use an older Administrator version and you want to continue using existing CM databases, you have to convert them into the new format.

CAUTION



Backup^[40] your CM databases before you install the Administrator software update, so they can be reinstalled if necessary.



If you have an older MS SQL database program or if you want to continue using your existing CM databases, please note the following hints:

- *If you are working with the FAG Administrator software version 4.10 and an older database program as MS SQL Express 2012,*
 - *backup^[40] the CM database and update^[42] the database in the database management by using the default update script **update_cm_online.xml**.*
 - *If you are working with the FAG Administrator software version 4.10 and the delivered database program MS SQL Express 2012, but you want to continue using your existing data from MS SQL Server 2005 / 2008 or Express 2005 / 2008,*
 - *backup^[40] the CM database, then export^[133] your data with the older Administrator software version and import^[135] data into the new installation.*
- or:*
- *our experts will perform the entire CM database update for you. For more information about this fee-based service, please contact our support (see "Contact"^[250]).*

You will find further information in the chapter "Update software"^[21].

3.1 System requirements

In order to use the software in an optimal way, the following minimum requirements must be met:

General system requirements

- Pentium III PC with 1 GHz or higher (recommended: 2 GHz)
- min. 2 GB RAM (4 GB recommended)
- Hard disk memory: 16 GB (20 GB recommended)
- Screen resolution: 1280x960 (pixels) at 96 dpi and normal font size (as of Windows 7: classic view)

Operating systems

- Administrator software and components: Windows 7 (32 and 64-bit version), Windows 8 (32 and 64-bit version)
- Database software MS SQL Express 2012: min. Windows Vista SP 2 (recommended: Windows 7 SP 1)



MS Windows Server operating systems are not supported.

Hard disk memory for installing the Administrator software

- Administrator software 4.10.2 (without database and database server): 300 MB

- Bearing database and demo database: 20 MB

Hard disk memory for installing the database server

- MS SQL Express 2012: 1.5 GB

Hard disk memory for the database

- MS SQL Express 2012: min. 6 GB

Other requirements

- DirectX9 graphics adapter with WDDM 1.0 (or higher driver)
- Microsoft Internet Explorer 7 or newer

MS SQL database software

If you are already using an MS SQL database program, you can register the databases with this. You can use the following versions:

- MS SQL Server 2008 and 2012 (requires a commercial license)
- MS SQL Express 2008 and 2012 (free version of MS SQL Server 2005 with limited functions).



If you have an older MS SQL database program or if you want to continue using your existing CM databases, please note the following hints:

- If you are working with the FAG Administrator software version 4.10 and an older database program as MS SQL Express 2012,
 - backup^[40] the CM database and update^[42] the database in the database management by using the default update script **update_cm_online.xml**.
 - If you are working with the FAG Administrator software version 4.10 and the delivered database program MS SQL Express 2012, but you want to continue using your existing data from MS SQL Server 2005 / 2008 or Express 2005 / 2008,
 - backup^[40] the CM database, then export^[133] your data with the older Administrator software version and import^[135] data into the new installation.
- or:
- our experts will perform the entire CM database update for you. For more information about this fee-based service, please contact our support (see "Contact"^[250]).

You will find further information in the chapter "Update software"^[21].



The databases "cm_online" and "cm_bearings" delivered are backwards compatible to MS SQL Server 2008 and cannot be registered with MS SQL Express 2005. If you are working with MS SQL Express 2005, the databases delivered can therefore not be automatically registered. In this case, select the "Create a new database"^[37] action in database administration and select "Administrator database SQL 2005" or, alternatively, "Bearing database SQL 2005" as the database type.

Tips

- If you are operating a large equipment pool (e.g. more than 20 devices), we recommend using MS SQL Server 2012 Standard or Enterprise Edition. Please note the system requirements specified by Microsoft for these server editions!
- Install the databases and the database administration on a central computer that is always available.
- The database may need to be enabled for network access. If necessary, ask your system administrator.

3.2 User rights and write access

To install and run the Administrator software you need special access rights. In the event of problems with the security rules of your system, please contact your system administrator.

User rights

To install the Administrator software you need administrator rights on your system.



Tip: Install the software with administrator rights and then switch back to a normal user.

Write access

The Administrator software saves settings and log files while it is running. They are saved in the directory "c:\Users\All Users\Application Data\Condition Monitoring" (on Windows 7, in the "Common Application Data" directory, e.g. in "c:\Program Data\Condition Monitoring\"). These directories require write access.

3.3 Installation



The installation and the Setup Wizard are available in German and English. You can change the language settings^[148] at any time after installing the software. There are other languages to choose from then.

Please insert the program CD in your CD-ROM drive. Alternatively, you can download the current version Administrator from our website (see Contact^[250]).

You can open the installation directory on CD-ROM in Windows Explorer as follows:

- Open **My computer**.
- Under **Equipment with removable media**, right-click the CD-ROM drive, then
- click **Open**.
- Select the directory "Administrator 4.10.2" and
- select the file "Administrator-Application-Setup 4.10.2.exe".



- *Parts of the Administrator software require the Windows component MS .NET Framework 2.0. If this component is not installed on your system, it is installed automatically.*
- *The software components "E-MailRelay Tool" and "Transfer Link" can be used to encrypt e-mails and to synchronise via the Cloud. The installation is described in sections "The E-MailRelay tool^[237]" and "Installing other components"^[20].*
- *The software components "Flash Updater", "CM Installer" and "Net Utility" are required to start and configure Dtect X1, Dtect X1s, WiPros and ProCheck devices. The installation is described in section "Installing other components"^[20].*

Installation of the Administrator software is described below.

Installation method

Choose whether to install the Administrator software completely on a local computer or divide it among multiple computers (e.g. in a network).

Install software completely on a local computer (default installation)

If you want to install the Administrator software completely on a local computer, please run the application installation (Application Setup). This installs all components of the Administrator software including the databases.

- Start the "Administrator-Application-Setup 4.10.2.exe" installation file by double clicking on it.

The Setup Wizard^[13] guides you through the rest of the installation.

Install software on different computers

If you want to install the Administrator software on different computers, e.g. in order to run different components on different computers, you must install these components separately.

- Open the directory "Administrator 4.10.2" > "Setups".
- Start the "Administrator-Application-Setup*.exe" installation file by double clicking on it.
- Double-click to run the installation file for the appropriate component "**-Setup 4.10.2.exe".

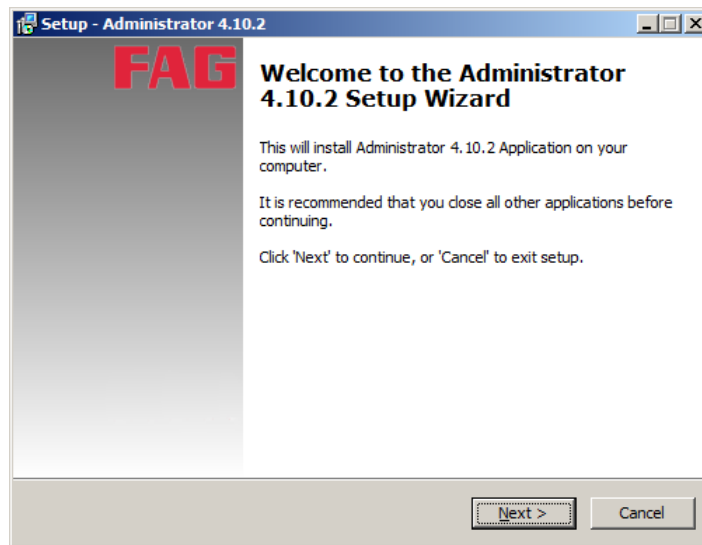
The Setup Wizard^[13] guides you through the rest of the installation.



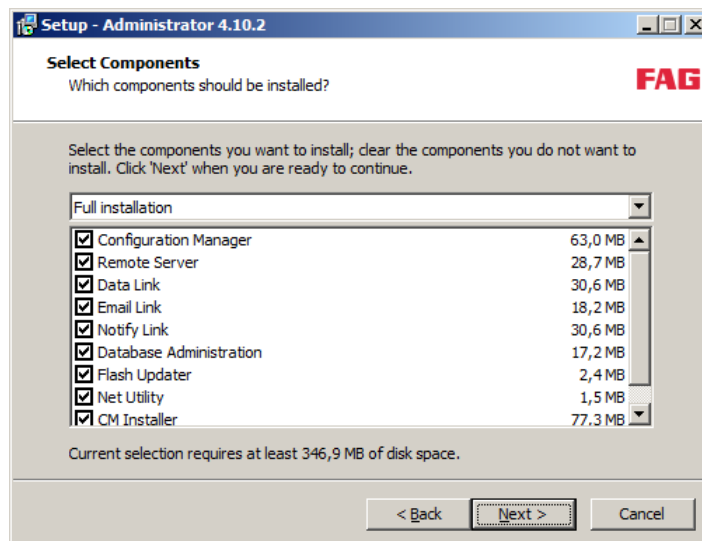
If you want to install components individually, e.g. to distribute them on different computers, make sure that these computers have a network connection so that the components can communicate with each other. In any case the CM database must be installed on a computer (e.g. a server) as all data is stored there.

3.3.1 Administrator Setup Wizard

1. Please select the language of the Setup Wizard. You can choose between English and German. You can change the language setting ^{14b)} at any time after installing the Administrator software. There are other languages to choose from then.



2. **Accept** the licence agreements and click **Next** to continue installing.
3. Select the directory where you want to install the software and click **Next**.



4. Optionally you can choose between different installations. Select from the list:
Full installation to install all components of the software,
Client installation to install the Configuration Manager only,
Compact installation to install the Configuration Manager and database only,
Custom installation to install components individually un/tick the individual software components and click **Next**.



- If CM databases are already installed on the computer, no new databases are installed. You can add new databases from the Database administration ³⁵⁾.
- If you want to install components individually, e.g. to distribute them on different computers, make sure that these computers have a network connection so that the components can communicate with each other. In any case the CM database must be installed on a computer (e.g. a server) as all data is stored there.



Please note that

- the Administrator software requires an MS SQL database program (cf. "System requirements" [9] and "CM Database Setup Wizard" [14]).
- the database administration is installed on the same computer as the databases!

5. Select the Start menu folder and click **Next**.

6. In the next window check your settings and click **Install** or **Back** to correct your settings.

The Administrator software installation now begins.

3.3.2 CM database Setup Wizard

If no CM databases are installed on your computer yet, CM database installation runs automatically. The Setup Wizard guides you through the installation process for the databases required to run the Administrator software.



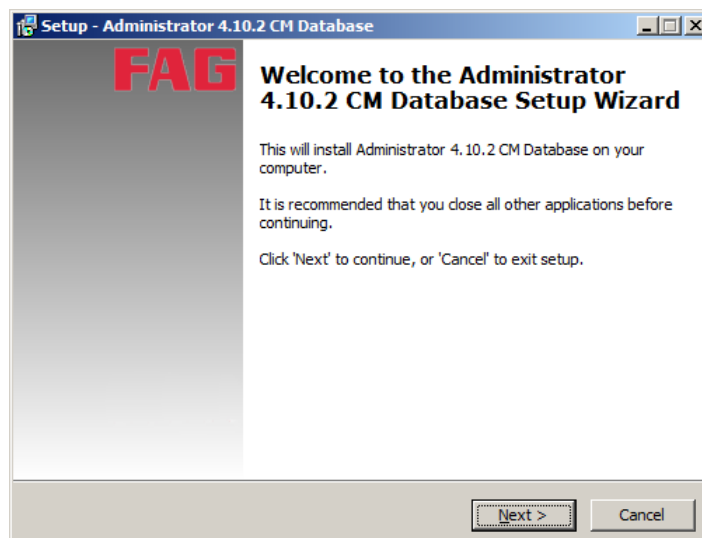
- If no CM database is configured on your system yet, the following databases are installed automatically:
 - cm_online.mdf: empty CM database
 - demo_online.mdf: demo database with example configurations and data (optional)
 - cm_bearings.mdf: bearing database
- Every new database you add is labelled with a serial number.
- All database names are displayed without the ".mdf" extension in the software.



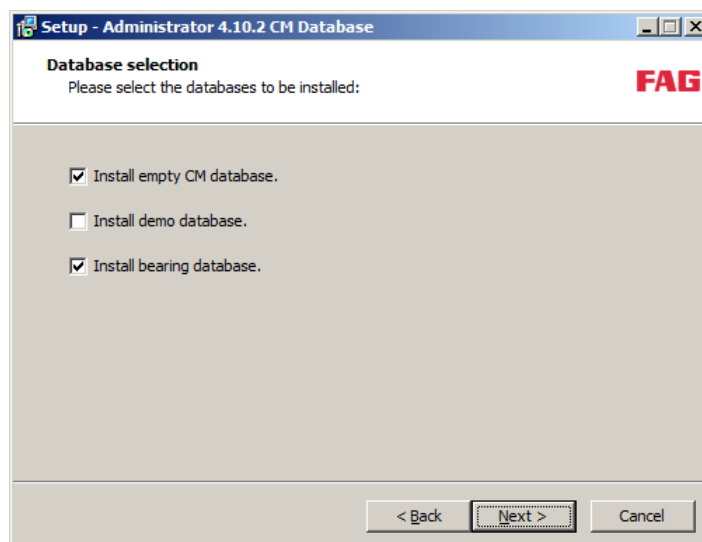
If you have an older MS SQL database program or if you want to continue using your existing CM databases, please note the following hints:

- If you are working with the FAG Administrator software version 4.10 and an older database program as MS SQL Express 2012,
 - backup [40] the CM database and update [42] the database in the database management by using the default update script **update_cm_online.xml**.
 - If you are working with the FAG Administrator software version 4.10 and the delivered database program MS SQL Express 2012, but you want to continue using your existing data from MS SQL Server 2005 / 2008 or Express 2005 / 2008,
 - backup [40] the CM database, then export [133] your data with the older Administrator software version and import [135] data into the new installation.
- or:
- our experts will perform the entire CM database update for you. For more information about this fee-based service, please contact our support (see "Contact" [250]).

You will find further information in the chapter "Update software" [21].



1. **Accept** the licence agreements and click **Next** to continue installing.

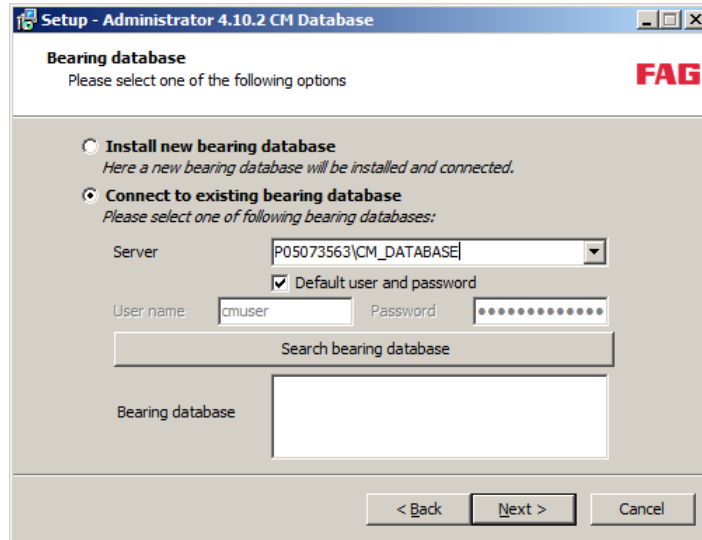


2. Select which database(s) to register) and click **Next**.

Install bearing database

If you have selected "Install bearing database" you can

- install a new bearing database or
- if you already have a bearing database, select an existing database and connect it with the Administrator software.



1. Select **Install new bearing database** and click **Next**.

Or:

1. Select **Connect to an existing bearing database** and
2. select the database server on which the bearing database is installed.
3. Enter **user name** and **password**.



By default, the program created a user account called "cmuser" (password "CM_services\$1user") for accessing the database server during installation. For database servers installed with the Administrator software version 4.4 or older, the user name is "sa" and the password "sql8".

If you were using your own (custom) password, please enter it.

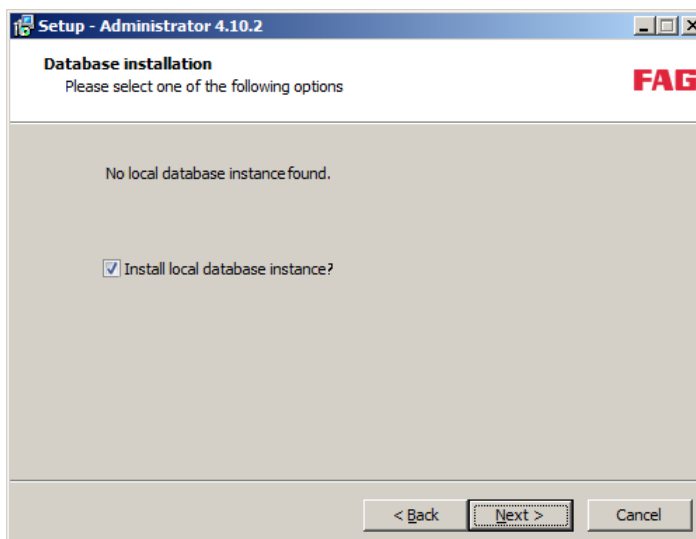
4. Click **Find bearing database**,
5. select a bearing database and
6. click **Next**.

Database program does not exist

If no MS SQL database program is installed on your computer yet, Microsoft SQL Express 2012 is automatically installed and the selected databases registered.



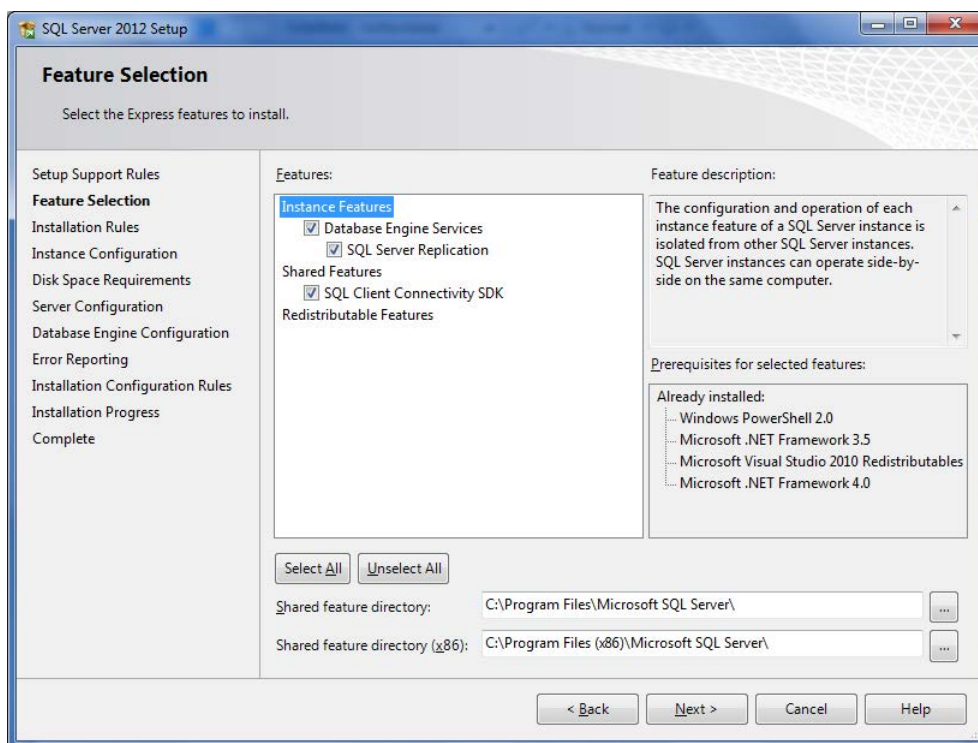
Click **Next** to confirm the **Install local database instance** option in the Administrator Setup Wizard:



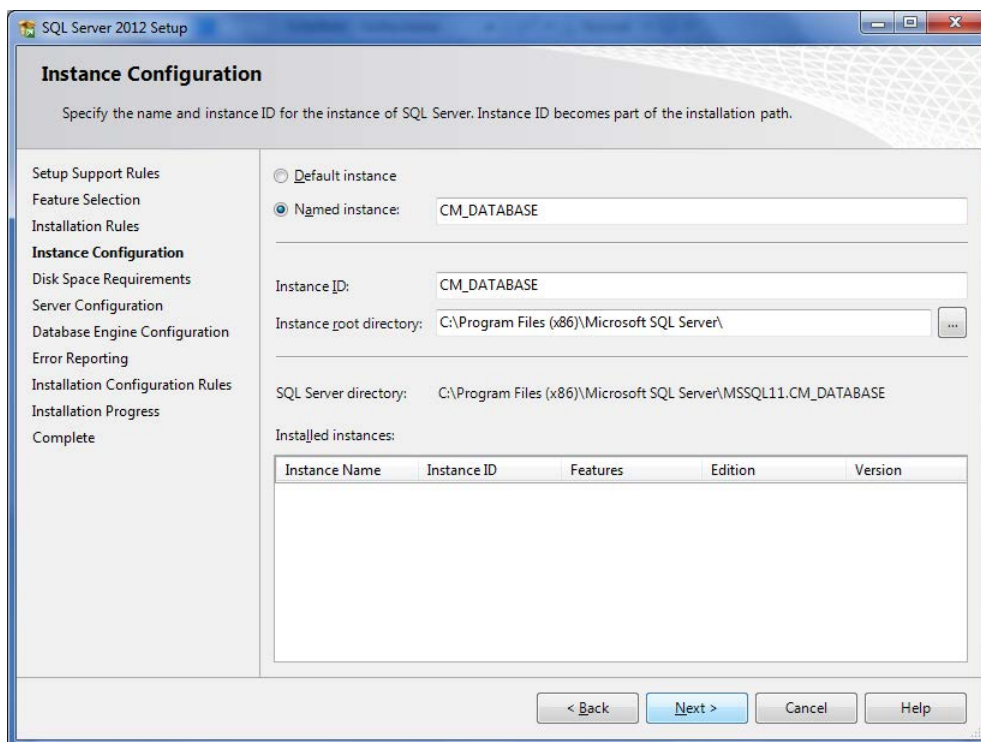
Click **Cancel** if you are working with a server-based central database. Note that Microsoft limits the size of the local database to 10 GB and that it is therefore not suitable for large volumes of data.

The SQL Server 2012 installation is only available in English, regardless of the language of the Administrator Setup Wizard.

1. In the **License Terms** step, activate the option **I accept the license terms** and click **Next**.
2. In the **Install Setup Files** step, click **Install**.
3. In the **Feature Selection** step, confirm the default settings by clicking **Next**.



4. In the **Instance Configuration** step, confirm the default settings by clicking **Next**.

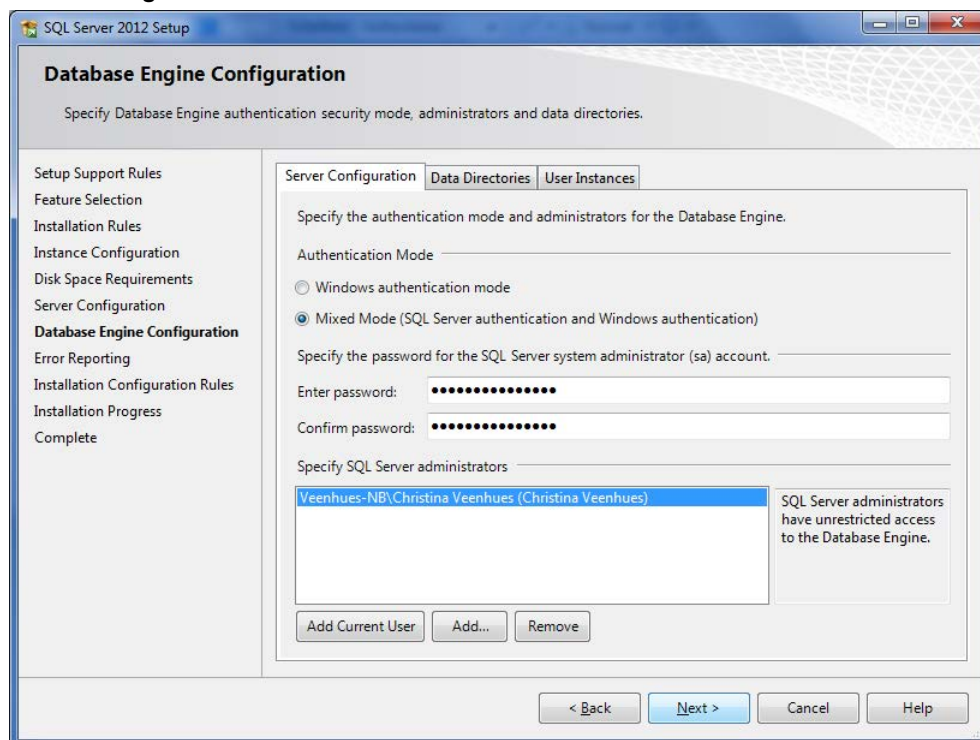


5. In the **Server Configuration** step, confirm the default settings by clicking **Next**.
6. In the **Database Engine Configuration** step, confirm the default settings for server configuration, data directories, and user instances by clicking **Next**.



By default, the program creates a user account called “cmuser” (password “CM_services\$1user”) for accessing the database server during installation.

Alternatively, you can define your own (custom) password in **Database Engine Configuration** > **Server Configuration**:



Your own password may be necessary, for example, if your company prescribes a certain password length.

7. In the **Error Reporting** step, confirm the default settings by clicking **Next**.
8. The program installs Microsoft SQL Server 2012 Edition and the selected databases. An overview of the components

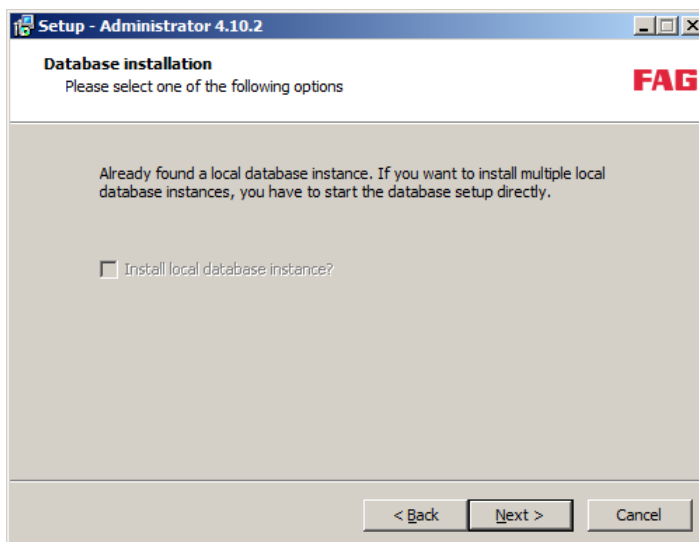
installed is then displayed.

9. Click on **Close**.

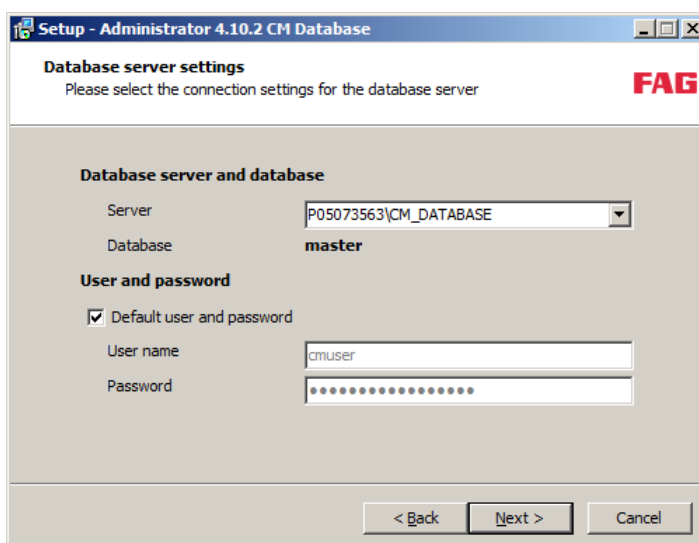
Installation of the Administrator software is finished.

Database program exists

If an MS SQL database program is already installed on your computer (see “System requirements”^[9]), you only need to register the selected databases with the server. To do so, the installation program requires the connection settings for the database server.



1. Click **Continue**.



2. Select the database server containing the “master” database.



By default, the program created a user account called “cmuser” (password “CM_services\$1user”) for accessing the database server during installation. For database servers installed with the Administrator software version 4.4 or older, the user name is “sa” and the password “sql8”.

If you were using your own (custom) password, please enter it.

3. Activate **Default user and password** to use the default settings.

Or:

Deactivate **Default user and password** and enter your own password.

4. Click **Continue**.

This displays a list of components to install.

5. Click **Install**.

The program installs the selected databases and registers them with the database server.

After completing installation, the program displays details of the databases that were installed and the access data.

6. Click **Continue**.

Installation of the Administrator software is finished.

3.3.3 Install additional components

This section describes the installation of additional components of the Administrator software.



The software components "Flash Updater", "CM-Installer" and "Net Utility" are required to start and configure Dtect X1, Dtect X1s, and ProCheck devices.

Install E-Mail Relay tool

With the aid of the E-MailRelay tool you can forward the unencrypted e-mails sent by the FAG Administrator software with encryption. The E-MailRelay tool acts as an e-mail server. Details on installing the E-Mail Relay tool and configuring the Administrator software can be found in the section **The E-MailRelay tool** ^[237].

Install Transfer Link

Transfer Link ^[237] synchronises the local data directory of the Remote Server via the Cloud with the local directory monitored by Data Link.

1. Please select the language to install Transfer Link.
 2. **Accept** the licence agreements and click **Next** to continue installing.
 3. Select the directory where you want to install the software and click **Next**.
 4. Select the Start menu folder and click **Next**.
 5. In the next window check your settings and click **Install** or **Back** to correct your settings.
- Transfer Link installation now begins.

Install CM-Installer

CM-Installer allows you to configure the ProCheck device for network operation. For more information about the program refer to the "FAG ProCheck" manual, section "CM-Installer".

1. Please select the language to install CM-Installer.
 2. **Accept** the licence agreements and click **Next** to continue installing.
 3. Select the directory where you want to install the software and click **Next**.
 4. Select the Start menu folder and click **Next**.
 5. In the next window check your settings and click **Install** or **Back** to correct your settings.
- CM-Installer installation now begins.

Install Net Utility

Net Utility allows you to configure the **Dtect X1s** device for network operation. For more information about the program refer to the "FAG Dtect X1s" manual, section "Net Utility".

1. Please select the language to install Net Utility.
 2. **Accept** the licence agreements and click **Next** to continue installing.
 3. Select the directory where you want to install the software and click **Next**.
 4. Select the Start menu folder and click **Next**.
 5. In the next window check your settings and click **Install** or **Back** to correct your settings.
- Net Utility installation now begins.

Install Flash Updater

Use the Flash Updater to update the firmware of the **Dtect X1** device. The current configuration is retained.



*If the "Flash Updater" component is already installed, please uninstall this component manually. To do so, call up the Start menu and click **Programs > FAG > Administrator > Tools > Uninstall > Uninstall Flash Updater**.*

1. Please select the language to install Flash Updater.

2. **Accept** the licence agreements and click **Next** to continue installing.
 3. Select the directory where you want to install the software and click **Next**.
 4. Select the Start menu folder and click **Next**.
 5. In the next window check your settings and click **Install** or **Back** to correct your settings.
- Flash Updater installation now begins.



Please restart your system once all installations have finished.

3.4 Update



*If the "Flash Updater" component is already installed, please uninstall this component manually. To do so, call up the Start menu and click **Programs > FAG > Administrator > Tools > Uninstall > Uninstall Flash Updater**.*

To update the Administrator software or individual components,

- double-click to run the installation file "Administrator-Application-Setup*.exe" and
- select the **update installation (without database)** from the drop-down box.

The Setup Wizard guides you through the rest of the installation (also see "Administrator Setup Wizard" ^[13]).

3.4.1 Update on Administrator version 4.10.2

The FAG Administrator software version 4.10 is delivered with the new database program MS SQL Express 2012 (see System requirements ^[9]). If you already use an older Administrator version and you want to continue using existing CM databases, you have to convert them into the new format.

CAUTION



Backup ^[40] your CM databases before you install the Administrator software update, so they can be reinstalled if necessary.

You have the following options:

- If you want to update the FAG Administrator software to version 4.10.2 and continue using the database program MS SQL Server 2005 / 2008 or MS SQL Express 2005 / 2008, you can use the existing CM databases as follows:
 - Backup ^[40] the CM database via the database administration.
 - Install ^[9] the Administrator software on your computer completely (the installed MS SQL database program is automatically detected).
 - Update ^[42] the CM database via the database administration with the default script `update_cm_online.xml`.



- *You can still use the MS SQL Server 2005 / 2008 or MS SQL Express 2005 / 2008 without functional limitations.*
- *If you want to update your database program to MS SQL Express 2012, please contact your IT department.*

- If you want to update the FAG Administrator software to version 4.10.2 and the database program on MS SQL Express 2012, you can use the existing CM databases as follows:


- Backup ^[40] the CM database via the database administration.







You have the following two options:

- Export ^[133] your data (or parts) with the older Administrator software version.
- Ask your IT department for installation of the Administrator software and the database program MS SQL Express 2012.
- Import ^[135] the data into the new Administrator software version.

or:

- Ask our experts for updating the entire CM database. For more information about this fee-based service, please

contact our support (see "Contact" .

- If you want to install the FAG Administrator software on a new computer, but want to continue using your existing CM databases, proceed as follows:
 - Backup  the CM database via the database administration.You have the following two options:
 - Export  your data (or parts) with the older Administrator software version.
 - Install  the Administrator software on your computer completely (the database program MS SQL Express 2012 is automatically installed).
 - Import  the data into the new Administrator software version.or:
 - Ask our experts for updating the entire CM database. For more information about this fee-based service, please contact our support (see "Contact" .
- If you want to install the FAG Administrator software on a new computer, but want to work with new CM databases,
 - Install  the Administrator software on your computer completely (the database program MS SQL Express 2012 is automatically installed).

3.5 Uninstalling

To uninstall the Administrator software please click **Programs > FAG > Administrator > Uninstall Administrator in the Start menu**.

To uninstall individual components of the Administrator software, please click **Programs > FAG > Administrator > Tools > Uninstall** in the Start menu. You can select individual software components to uninstall here.



Please note that configuration and export files are left on your computer. For your safety, the database is not deleted either. To completely uninstall, you must delete these files manually.

4 Vibration monitoring with online monitoring systems

This chapter explains the principle of vibration monitoring using FAG online monitoring systems and describes all possible monitoring modes.



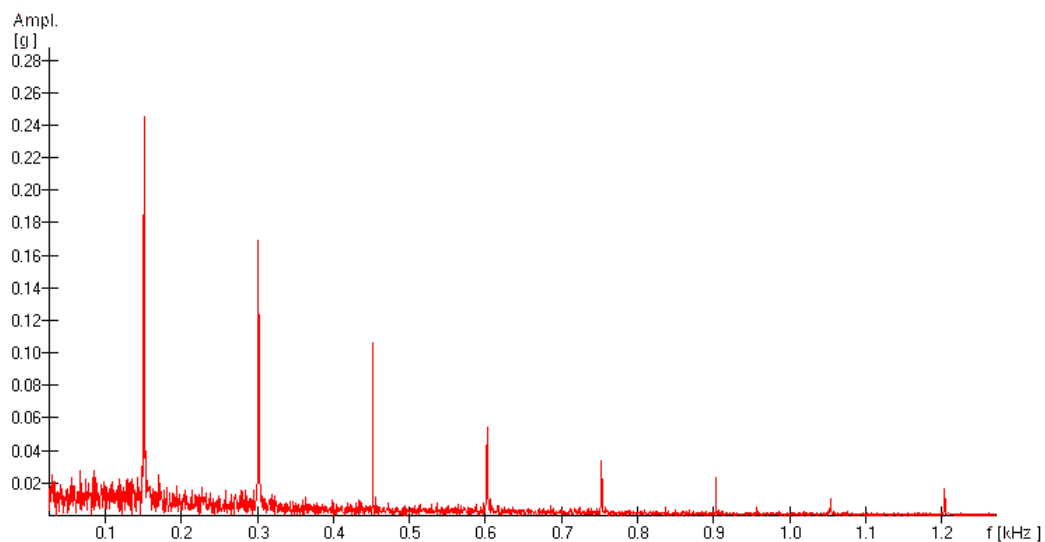
Please note that not all monitoring modes may be available in your version.

Furthermore, the terms which are important for a better understanding of the following chapters in the manual will also be introduced.

4.1 The principle

The principle of vibration monitoring employed by FAG Industrial Services GmbH online monitoring systems is explained taking a damage to a machine component as an example.

This type of damage can be detected at an early stage through characteristic patterns in the frequency spectra of the machine vibrations. For example, damage to the outer ring of a rolling bearing becomes noticeable through higher amplitudes in the demodulation frequency spectrum at the characteristic frequency at which the rolling bearing rolls over a point of damage in the outer race (ball pass frequency of outer race, BPFO) and at the integral multiples of this frequency. The following illustration shows such a demodulation frequency spectrum. The peak amplitudes at around 150 Hz and multiples can be clearly seen.



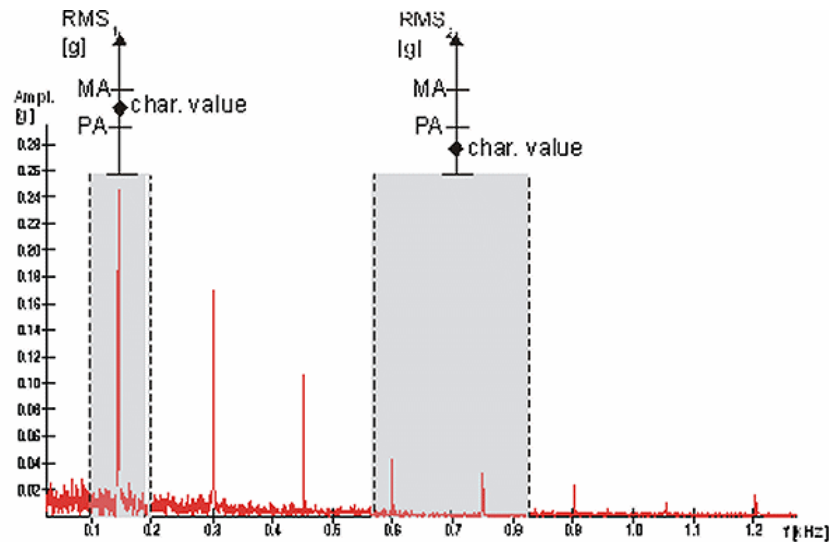
Spectrum through damage to the outer race of a rolling bearing.

The characteristic damage frequencies of a rolling bearing, i.e. outer race, inner race, roller or fundamental train frequency, depend on the bearing geometry and are proportional to the speed.

In order to detect rolling bearing damage at an early stage, a vibration monitor must generate the demodulation frequency spectrum from the vibration signal and monitor the amplitude in selective narrow frequency bands in this spectrum. At variable machine speed, frequency bands must be monitored speed dependent.

The online systems allow this kind of monitoring. Different frequency bands can initially be defined at fixed speeds within which the output is monitored. This output is described by the RMS value in conventional frequency spectra. The LDZ value is used in the demodulation spectrum. If one of these characteristic values exceeds a pre-set limit, the alarm threshold, an alarm will be triggered. A detailed description of these characteristic values as well as further details of the frequency and demodulation analysis can be found in the manual "General information on vibration monitoring".

The following illustration shows two spectra with a representation of the characteristic values for the selected frequency bands and the alarm limits. The situation shown on the left would trigger an alarm.



Spectrum with two frequency bands, characteristic values as well as pre-alarm threshold (PA) and main alarm threshold (MA), 1st frequency band: pre-alarm, 2nd frequency band: no alarm

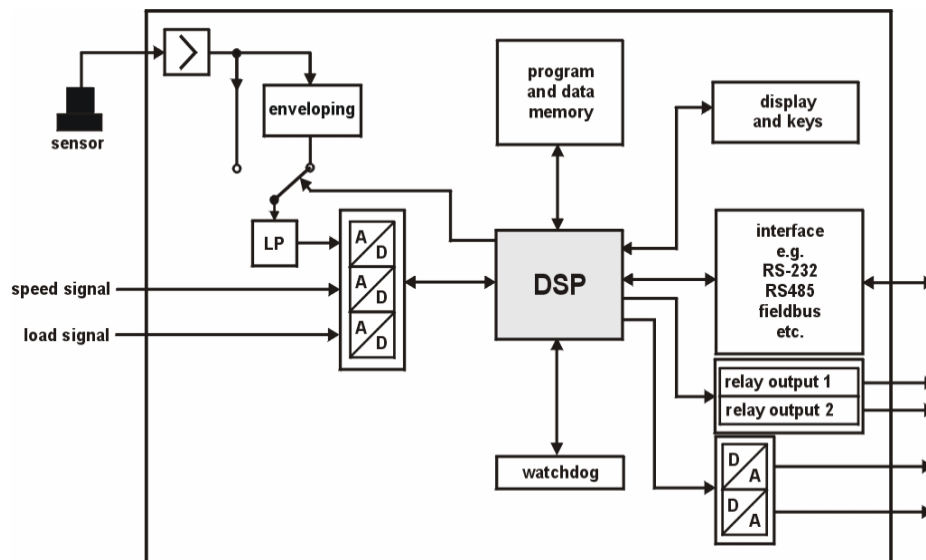
The characteristic values can be monitored with two limits in the FAG Industrial Services GmbH online systems so that a pre-alarm and a main alarm can be reported. Furthermore, the characteristic values in individual frequency bands can also be combined to one common value.

You can also record other process parameters, e.g. rotational speed, and thus plot the positions and widths of the frequency bands as a function of the speed. The alarm limits can also be defined as speed-dependent.

4.2 The hardware concept

The sensor signals are digitized in the online monitoring systems and processed by means of a digital signal processor. The frequency spectrum is generated and the characteristic values calculated from this. These are then compared to the pre-set alarm thresholds.

The layout of a full version of a single-channel Dtect X1s device might be as follows:



Block diagram of a full version of a single-channel Dtect X1s device.

A variety of sensors can be connected to the FAG Industrial Services GmbH online systems, such as acceleration, speed or displacement sensors or particle counters. The sensor signal is forwarded either directly to a programmable anti-aliasing filter or after enveloping and then digitized. This digitized signal is called the time signal, or more precisely the demodulation signal (or demodulated signal) if enveloping has taken place, otherwise it is called the raw signal. The digital signal processor (DSP) calculates the frequency spectrum from the time signal.

Enveloping (demodulation) is carried out in a high-pass filter and subsequent demodulator in the form of a full-wave rectifier. An investigation of demodulation signals is particularly suitable to detect and analyse impact pulses such as can occur for example with bearing damage (see "General information on vibration monitoring" in the manual on the installation CD).

The characteristic values from the frequency spectrum calculated in the hardware trigger a pre-alarm or main alarm if the corresponding limit is exceeded. The alarm messages can be forwarded to analog outputs and/or switching relays. The analog outputs differ depending on online system you are using and may also be configured to output characteristic value levels.



The alarm message can be delayed. The alarm will then only be triggered when the main alarm threshold is exceeded in succession by a pre-set number of measurements.

Depending on the device configuration, the online systems can take up to eight auxiliary signals, that you can evaluate simultaneously with the sensor signal after digitization. The additional channels can be used to track frequencies or as triggers.

All settings and configurations of the Online Systems and the last measured time signals with corresponding frequency spectrum are saved in a data memory. The characteristic values calculated from the spectrum are also saved in non-volatile memory.

You can configure the online systems from an external computer using the FAG Administrator⁸ software through various interfaces (RS 232, TCP/IP). On the Dtect X1s device, you can perform minor changes using the button on the front of the device.



Please remember that the Online Systems are delivered in different designs. There follows a description of a device containing all features. Your device may differ from this.

4.3 Monitoring types in the frequency domain

FAG Industrial Services GmbH online systems monitor the frequency domain of a vibration signal with characteristic values. The RMS value is used for the raw signal and the LDZ value for the demodulation signal.

The RMS -value (root mean square) is calculated from the frequency spectrum of the raw signal by adding together the squares of the amplitudes over a defined range of the frequency spectrum, halving this value and then taking the square root of this figure:

$$RMS\ value = \sqrt{\frac{1}{2} \sum_{\substack{Frequ. \\ area}} Amplitude^2}$$

If a large part of the spectrum is taken into account, one speaks of a broad band characteristic value. If only individual frequency bands are used, this is called a selective RMS value.

If the demodulation signal (demodulated signal) of the vibration acceleration is generated through a suitable configuration of the Online System, the so-called LDZ value can be formed from its frequency spectrum in one frequency band. This value is proportional to the signal strength in this frequency band. The squares of the amplitudes in a selected frequency range are added together and the sum divided by 2 to obtain the LDZ value:

$$LdZ\ value = \frac{1}{2} \sum_{\substack{Frequ. \\ area}} Amplitude^2$$

The LDZ-value is generally standardized, i.e. the level is quoted in relation to $10^{-6} g^2$. This is then called the LDZ_N-value. A differentiation is also made between broad band and selective characteristic values for the LDZ-values.

The individual monitoring modes are explained in the following sections.



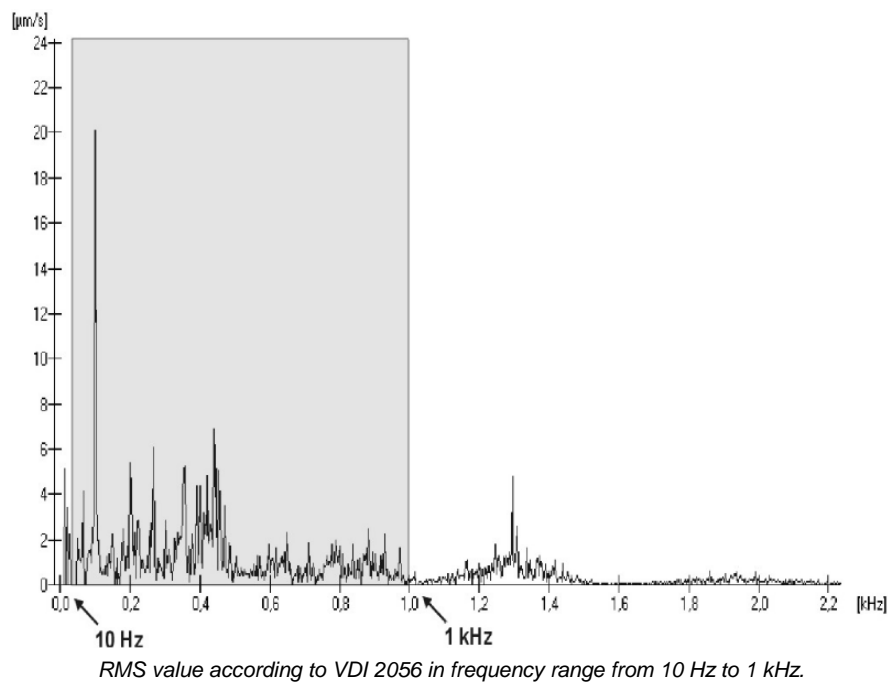
Please note that your device configuration may not support all of these monitoring modes.

4.3.1 Monitoring with broad band characteristic values

Monitoring the vibration velocity in the frequency band from 10 Hz to 1 kHz according to ISO 10816

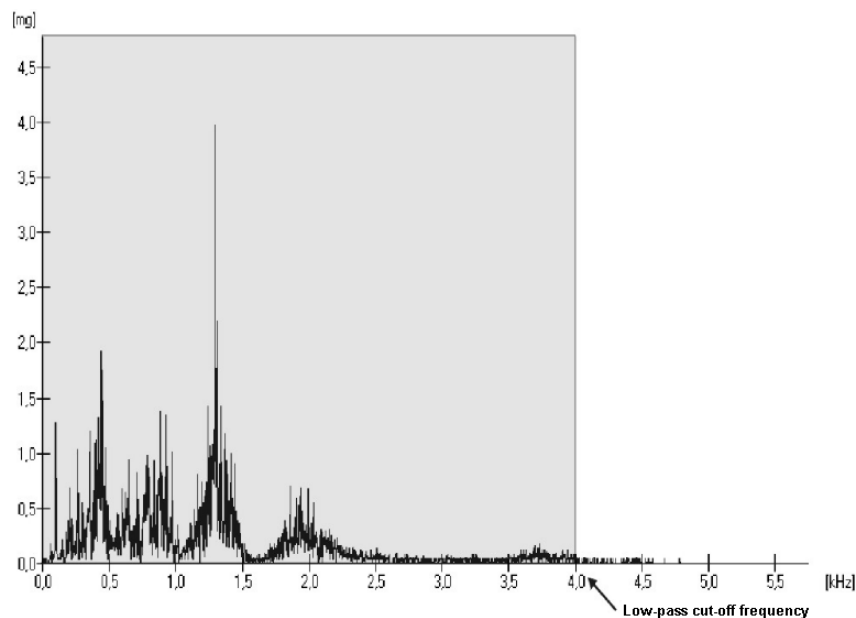
The raw signal obtained from the vibration velocity is used for monitoring purposes in this case. The RMS-value is calculated from the amplitudes in the frequency band from 10 Hz to 1 kHz. This characteristic value is called VDI 2056

in the Dtect X1s, referring to the VDI guideline VDI 2056 which is still frequently used for vibration monitoring. This guideline has been amended several times since and is now called ISO 10816.



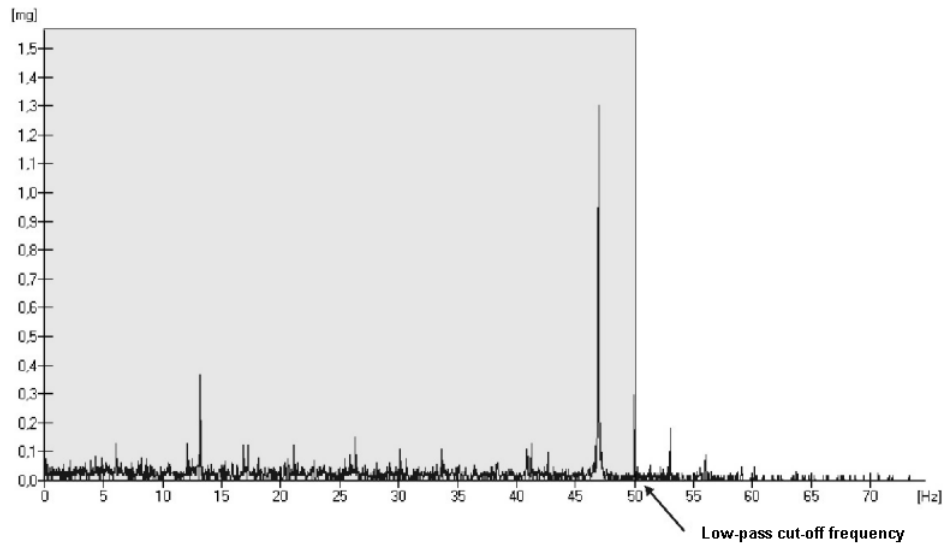
Monitoring the acceleration, velocity or displacement signal with a broad band RMS-value

The basic raw signal for this monitoring mode is obtained from the vibration acceleration, vibration velocity or vibration displacement. The RMS value is determined for the frequency range from 0 Hz to the cut-off frequency of the low-pass.



Monitoring with a broad band LDZ-value

The starting point for this monitoring mode is the demodulation signal for vibration acceleration. To obtain the LDZ_N -characteristic value, its frequency spectrum from 0 Hz to the cut-off frequency of the low pass is evaluated, with the DC level being suppressed.



Broad band LDZ-value in the frequency range from 0 Hz to the cut-off frequency of the low-pass.

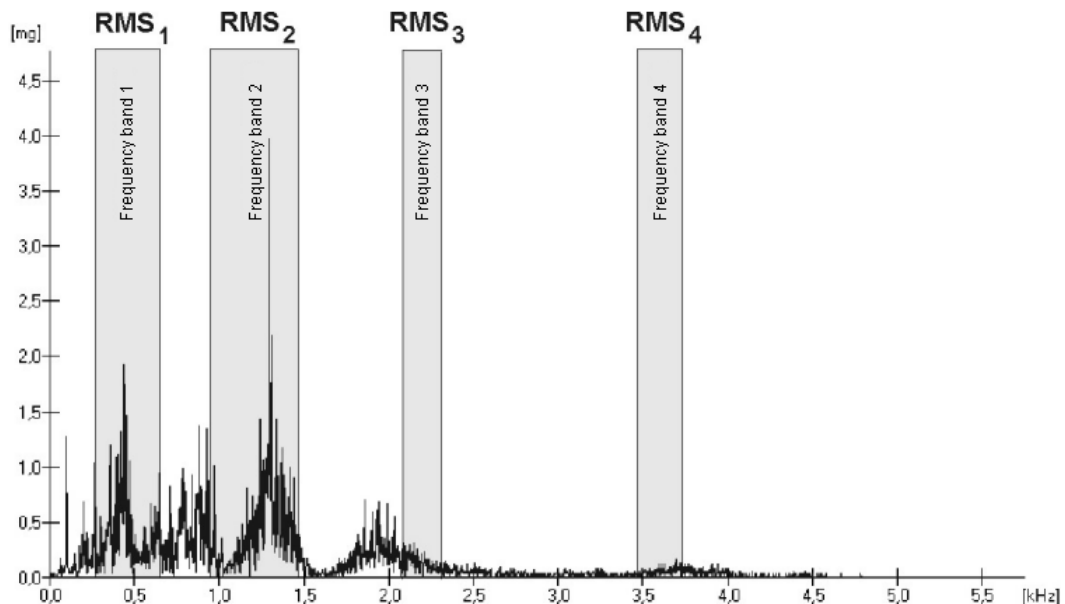
4.3.2 Monitoring with fixed frequency bands and fixed alarm thresholds

For narrow-band, frequency-selective monitoring you can define up to 64 different monitors, each with a maximum of 20 frequency bands, in the online systems, depending on the particular model.

You can combine multiple characteristic values for any frequencies. For example, you can form a characteristic value from the base frequency and the harmonic of an outer race ball pass frequency.

The selective RMS or selective LDZ_N-values are used as characteristic values for monitoring, again depending on the design. Furthermore, both types of characteristic value allow a differentiation between monitoring of the selected frequency bands with one common characteristic value or whether a separate characteristic value is to be used for each frequency band.

The following illustration shows these selection possibilities for four frequency bands when generating the RMS value.



Monitoring with selective characteristic values in four frequency bands.

An RMS value is generated for each individual frequency band, the values RMS₁ to RMS₄. If the frequency bands are monitored individually, the alarm is triggered when one of these characteristic values exceeds its corresponding alarm limit.

When monitoring with a common characteristic value, this is calculated according to the following formula:

$$RMS\ value = \sqrt{RMS_1^2 + RMS_2^2 + RMS_3^2 + RMS_4^2}$$

In this case there is only one limit value for both pre and main alarm.



Please note: The sum total of RMS-values for individual frequency bands does not generally correspond to the calculation of the common RMS-value!

4.3.3 Monitoring with fixed frequency bands and speed-dependent alarm thresholds

If an additional speed signal is recorded via an additional channel the limits for the pre and main alarm can be defined as a function of the speed. The limits are then called speed-dependent or speed-related.

Either the RMS or LDZ_N value can be used for monitoring just like the fixed alarm limits - depending on the Online System.

4.3.4 Monitoring with speed-dependent frequency bands and alarm thresholds

In addition to the alarm limits, the frequency bands can also be speed dependent. Center frequencies and bandwidths are both defined as a function of the speed signal then.

4.4 Order analysis

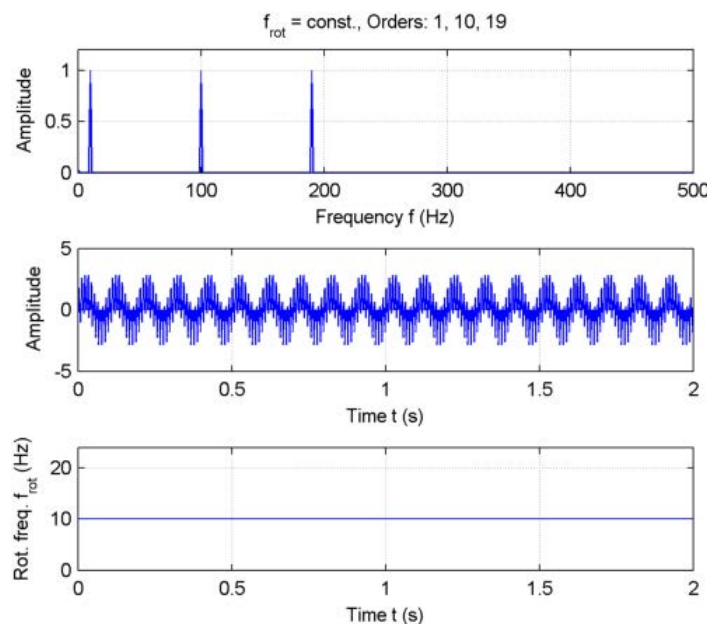
In the order analysis, a vibration signal is analysed for signal components whose frequency has a fixed correlation with the rotational frequency of a rotating shaft. The order analysis is typically used when you are not interested in the periods per unit of time but rather per revolution of the vibration signal. An example of this are damage frequencies that are usually referred to shaft speed and are thus orders.

The result of an order analysis may be an order spectrum, for example, in which amplitude and phase of the signal are applied not above the frequency but rather above the order. The order is dimensionless and indicates the number of periods of the signal per shaft revolution. At a constant shaft frequency, the order O corresponds to the frequency component of the signal at a frequency $f_o = O \cdot f_{rot}$. In this case, we obtain an order spectrum by means of Fourier analysis of the time signal with subsequent normalization of the frequency axis on the rotational frequency.



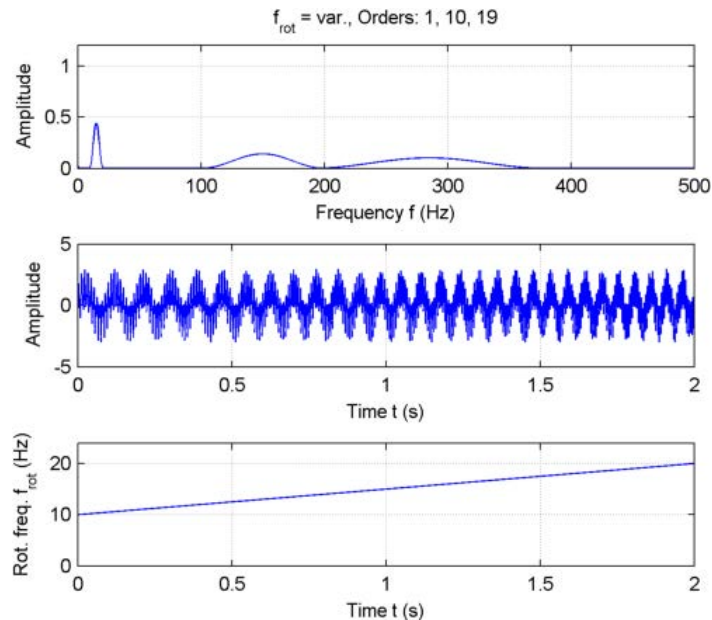
In the FAG Viewer you can change the scaling of the frequency axis to "Order" when displaying an order spectrum (see "Modifying the appearance of a diagram" [163]).

The following diagram shows the spectrum of a synthetic signal with the orders 1, 10 and 19, each with an amplitude of 1 and at a rotational frequency of $f_{rot} = 10$ Hz. The three orders are clearly visible at 10, 100 and 190 Hz.



If rotational frequency f_{rot} of the measured object is not constant during measurement, frequency f_0 belonging to order O also changes. If, in this case, we calculate an order spectrum based on the time signal frequency spectrum and the average rotational frequency, the order O appears "blurred" over several frequency lines. The greater the change of rotational speed, the more difficult it is to analyse the orders.

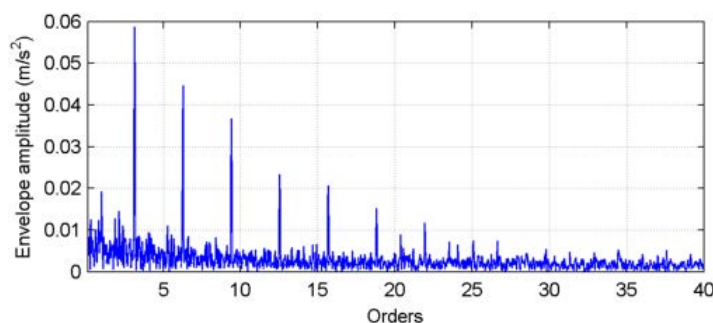
The following diagram shows the spectrum of the signal with the orders 1, 10 and 19, again each with an amplitude of 1. The rotational frequency increases on a linear basis from $f_{\text{rot}} = 10 \text{ Hz}$ to $f_{\text{rot}} = 20 \text{ Hz}$.



The "blurring" of orders in the frequency spectrum is clearly visible and increases with increasing order. As the peaks belonging to the individual orders become wider, amplitude also decreases. Both aspects severely hamper an evaluation of rotational-speed-dependent signal components.

To improve damage pattern recognition at varying rotational speed, ProCheck offers order analysis by resampling raw and demodulation time signals. The time signals are resampled at equidistant angle steps using a simultaneously measured rotary encoder signal. The frequency analysis of the angular signals thus obtained provides the order spectrums of the raw and demodulation data. Signal components whose frequency is in a constant relation to the rotational frequency of the measured object do not appear "blurred" in these order spectrums even if rotational frequency varies. This facilitates detection of typical roller bearing damage patterns at varying rotational speed. Signal components whose frequency is not in a constant relation to the varying rotational frequency, in contrast, are "blurred".

As the result of a demodulation order analysis, the following diagram shows a demodulation order spectrum at an average rotational frequency $f_{\text{rot}} = 30 \text{ Hz}$, that fluctuates by 15%. Despite the severe deviation of rotational speed, the order spectrums are largely independent of the variation in rotational speed. The damage pattern is clearly visible up to the seventh harmonic.



For technical reasons, the permissible measurable rotational speed range is between 0.6 Hz and 4500 Hz at one pulse per revolution.

The maximum permissible rotational speed can be calculated using the following formula, depending on the number of rotational speed impulses per minute:

$4500 / \text{number of pulses per revolution} = \text{max. possible rotational speed (in Hz)}$

Example: "4500/60 (pulses per revolution) = 75 Hz or 4500 rpm"

You can select order analysis in the Configuration Manager, in the monitoring configuration (see "Main channels" ^[106]).



You can only select the order analysis if

- *the ProCheck device is running with a firmware version 2.0.0.0 or newer,*
- *no more than one sensor/filter combination is defined (raw signal **or** demodulation),*
- *no characteristic values of the "time range" type exist.*

In addition, the number of measured values for an order analysis is limited to 16384 and maximum lowpass frequency is 5 kHz.

4.5 Monitoring types in the time domain

The online systems calculate various characteristic values simultaneously from the time signal during monitoring in the time domain. These are

- the root mean square (RMS value),
- the peak,
- the vibration amplitude (peak-to-peak),
- the DC level, and
- the crest factor, the ratio between the signal's effective value and the peak.

More details of these characteristic values can be found in the "General information on vibration monitoring" PDF in the "Characteristic vibration values" section (see installations CD).

4.6 Triggering and validation with auxiliary signals

Depending on the configuration of the systems, up to 8 auxiliary signals can be recorded simultaneously. Additional channels can be used to measure speed, torque, temperature, pressure or other physical parameters. The signals are processed directly after digitalization and used to validate triggering, for example.

The speed signal used to adapt the monitored frequency bands and/or alarm limits as described in section "Monitoring types in the frequency domain" ^[25] can also be recorded via an additional channel.

Triggering means that monitoring is only carried out under certain, predefined operating conditions, e.g. a certain working temperature.

In ProCheck, such a trigger can be applied to multiple vibration channels. For example, such a trigger can ensure that a maximum of 4 channels – depending on the trigger – are recorded on a rolling stand.

On the other hand, monitoring is continuous during validation. The auxiliary signal is recorded simultaneously. However, a limit transgression for a characteristic value only triggers an alarm if the auxiliary signal has fulfilled a pre-defined condition.

For example, if an alarm is only sensible on a machine at speeds between 400 and 600 rpm, this can be controlled via validation.



Only validations are possible with the current design of the Dtect X1s devices. Dtect X1s does not support triggering as defined above. However, almost all monitoring tasks can be performed just as well with validation.

5 Configuration Manager

About the configuration manager

The Configuration Manager serves as a central control station on the external computer and allows you to

- Manage devices [59], device configurations [74] and monitoring configurations [90],
- Load measuring data in the FAG Viewer viewer,
- Export, import or e-mail measured data,
- Create an alarm or measuring value report,
- Manage users [140].

The program can manage any number of Dtect X1s or ProCheck devices and their measuring data. Several corresponding configurations for various monitoring tasks may also be saved in each device. The "demo-online" CM database contains a sample system with devices and configurations.

Launch the Configuration Manager as follows:

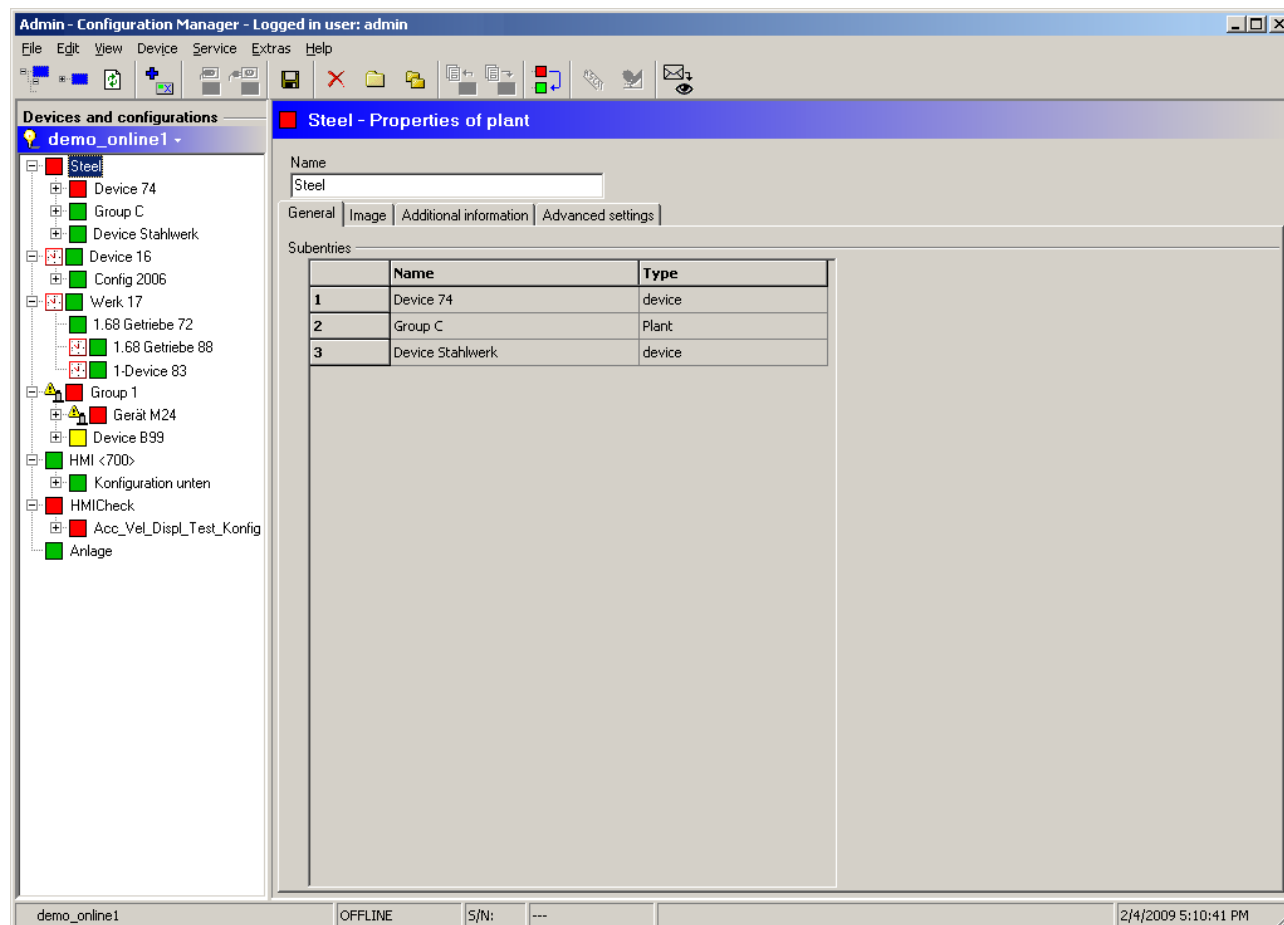
- Click **Start > Programs > FAG > Administrator > Configuration Manager**.
- Log in [46] with your user name.





In order to use the Administrator software, you must log in as a user. In the device factory settings no password is assigned to the "admin" user. To prevent unauthorized access to software and data you should assign a password for this user without delay (). (For further information refer to "Log in/switch user" [46] and "User management" [140]).

Data Link connects with the last database used. If you installed a database during software installation, the program automatically connects to this database when you start the program for the first time. The program uses the default user name and the default password. Further information can be found in "Change CM database" [35].

The Configuration Manager is launched.



The program window is divided into the following sections:

- Click the toolbar (directly below the menu bar) to call up the most important functions.
- The registered devices as well as the corresponding device and monitoring configurations are displayed in the familiar Windows Explorer tree view on the left-hand side of the program window. You can show/hide the entries in the tree view by clicking on  or . You can specify up to 5 planning levels at any level in the tree view. With the aid of these planning levels, you can structure complex system configurations for a better overview.
- The Configuration Manager displays the settings of the element currently selected in the tree view on the right.
- The status bar at the bottom edge of the window displays the currently selected CM database and connection status. The text "Online" or "Offline" indicates whether or not the Configuration Manager is currently connected with a device. If a connection exists the serial number of the device is displayed next to this on the right.



The context menu in the tree view provides additional menu items.

- Left-click on a tree item and
- then right-click on the item.





















You can only invoke Configuration Manager context menu functions if the user has the appropriate permissions and if the function makes sense in the particular context. Disabled functions are greyed out and cannot be invoked.

You can copy the entire tree view to the clipboard and paste it into an editor from there:

- Click on any tree item.
- Press **CTRL+ALT+L**. All levels of the tree view are automatically expanded and copied to the clipboard.
- Open an editor, e.g. MS Excel, and press **CTRL+V**: This pastes the tree view into the application with all planning levels visible.

Icons in the tree view

The following icons are used in the Configuration Manager tree view:

Icon	Meaning
	The alarm state is green; there is no alarm.
	The alarm state is yellow; there is a pre-alarm.
	The alarm state is red; there is a main alarm.
	There is a non-response alarm  .
	There is a sensor error  .
	There is a non-response alarm and a sensor error.
	The configuration is invalid  . This is the case if <ul style="list-style-type: none"> • a device configuration does not contain a monitoring configuration. • a device or monitoring configuration contains an invalid value.
<u>Pump</u>	The configuration is inactive. This is the case if <ul style="list-style-type: none"> • a monitoring configuration was deactivated (ProCheck only: Activate configuration . • as long as a configuration is outdated.
  <i>Device</i>	The configuration is outdated  . If an outdated configuration is displayed, the program shows the time when the configuration became outdated.
	There are time signal data.
	There are FFT data.
	There are alarm FFT data.
	There are characteristic value data.
 Pump (6)	The tree item counter  (n) is activated and the number of subentries is displayed.

Show selection information

In the Configuration Manager you can display additional information for each item in the tree view, including the type of item (e.g. system, ProCheck or Dtect X1s), the position in the tree level (e.g. device, device configuration or monitoring configuration), the time and user when the item was created and when it was last edited.

- Click on an item in the list of devices and configurations and
- select **Show selection information** from the context menu.



5.1 Manage databases

The FAG Administrator software uses SQL databases for condition monitoring and bearing data. The data required for configuration, evaluation of measuring data, and user management is stored centrally in the CM database.



You may only use ANSI characters of the Latin-1 codepage for entries that are stored in the database. This includes, for example, device and configuration names, characteristic value names, channels and the like.

The bearing database contains approx. 20,000 bearings from different manufacturers. The individual programs of the FAG Administrator software use the following SQL databases jointly:

Icon	Name	Description
	cm_online	CM database for the FAG online monitoring systems
	cm_bearings	Bearing database

The Administrator software is delivered with the Microsoft SQL Server 2012 Express Edition database software, but the size of the database is limited to 10 GB for licensing reasons. You can manage the various databases with the database administration [\[35\]](#).



If you have an older MS SQL database program or if you want to continue using your existing CM databases, please note the following hints:

- If you are working with the FAG Administrator software version 4.10 and an older database program as MS SQL Express 2012,
 - backup [\[40\]](#) the CM database and update [\[42\]](#) the database in the database management by using the default update script **update_cm_online.xml**.
 - If you are working with the FAG Administrator software version 4.10 and the delivered database program MS SQL Express 2012, but you want to continue using your existing data from MS SQL Server 2005 / 2008 or Express 2005 / 2008,
 - backup [\[40\]](#) the CM database, then export [\[135\]](#) your data with the older Administrator software version and import [\[135\]](#) data into the new installation.
- or:
- our experts will perform the entire CM database update for you. For more information about this fee-based service, please contact our support (see "Contact" [\[250\]](#)).

You will find further information in the chapter "Update software" [\[21\]](#).

If you require more space in the database please consult FAG Industrial Services GmbH [\[250\]](#).



- To display the memory used in the database click **Extras > Options > Database > General** (see also "Program settings" [\[150\]](#)).
- If there is less than 512 MB of unused space in the CM database, a warning is displayed.

CAUTION



Measured data may be lost if database is full!

If the maximum storage capacity of the CM database has been used up, a warning is displayed. If additional measured data is downloaded from a device when the database is full, this data cannot be saved and will be lost!

Free up storage space in the database by

- deleting unneeded data,
- storing existing data to a different location using the export function and then deleting the CM database.

5.1.1 Select CM database on server

When you first start the Administrator software, you must select the database server and a CM database.

Select a CM database on the database server as follows:

- Click on **File > Open database**.

Or:

- Click **Change database** in the login dialog.


Select CM database

1. Select SQL server


First select the SQL server where the database is located. You have the following options:

- By default, the **Server name** list displays the SQL server applications running on your computer. Select the database:

Or:

- Click  and enter the full server name.



Or:

- Click  to search the SQL servers available in the network and display them in the server list. Then select the server from the list.



If the server list is empty – e.g. due to restricted Windows user permissions – you must enter "PC name\SQLEXPRESS" manually (e.g. if your PC's name is "peters_laptop", then the server name would be "peters_laptop\SQLEXPRESS"). You can find your PC's name above the disk drives in the Windows Explorer. If you are unsure about the computer name ask your sys admin.



Database servers that you added using  are saved in the **Server name** list and are automatically available next time you run the program. Click  to delete items from the list.

2. Select user authentication

There are several options to log on to the database server:

- Activate **Use Windows authentication** to log on with your Windows user name and your Windows password.

Or:

- Activate **Use user name and password** and
- activate **Default user and password** to use the default login (see note).

Or:

- Activate **Use user name and password**,
- deactivate **Default user and password** and
- enter you own user name and password.





By default, the program created a user account called "cmuser" (password "CM_services\$1user") for accessing the database server during installation. For database servers installed with the Administrator software version 4.4 or older, the user name is "sa" and the password "sql8".

If you were using your own (custom) password, please enter it.

3. Select database

After selecting a database server in step 1, the program displays the databases available on the server in the **Database** list.

- The available databases are displayed in the **Name** list. Select a database or click  to refresh the list of databases.
- Click  to test the connection. If the connection fails, check your user data. If necessary, contact your system administrator.

4. Enter database alias

Optionally, you can give the selected database an alias name to make it easier to distinguish it from other databases. If you have already given the database an alias name, this alias is displayed, otherwise the name of the database including the name of the server.

- Click **OK** to use the selected CM database.

5.1.2 Change CM database

You can connect the configuration manager with another CM database as follows:

- Click on **File > Open database**.


Or:

- Click **File > Database history** to select a database from the list of recently opened databases.

Or:

- Double-click on the name of the currently open database in the **Devices and configurations** section.



You can select a CM database by clicking "Change database" in the login dialog. This dialog is not displayed if automatic user login  (auto-login) is activated.

Further steps are described in "Select CM database on server"  34.

5.1.3 Database administration

With the aid of the database management of the Administrator software you can

- Create new databases
- Register databases on a database server
- Deregister databases from a database server
- Update databases (Update)
- Backup databases (Backup)

- Restore databases
- Delete databases.



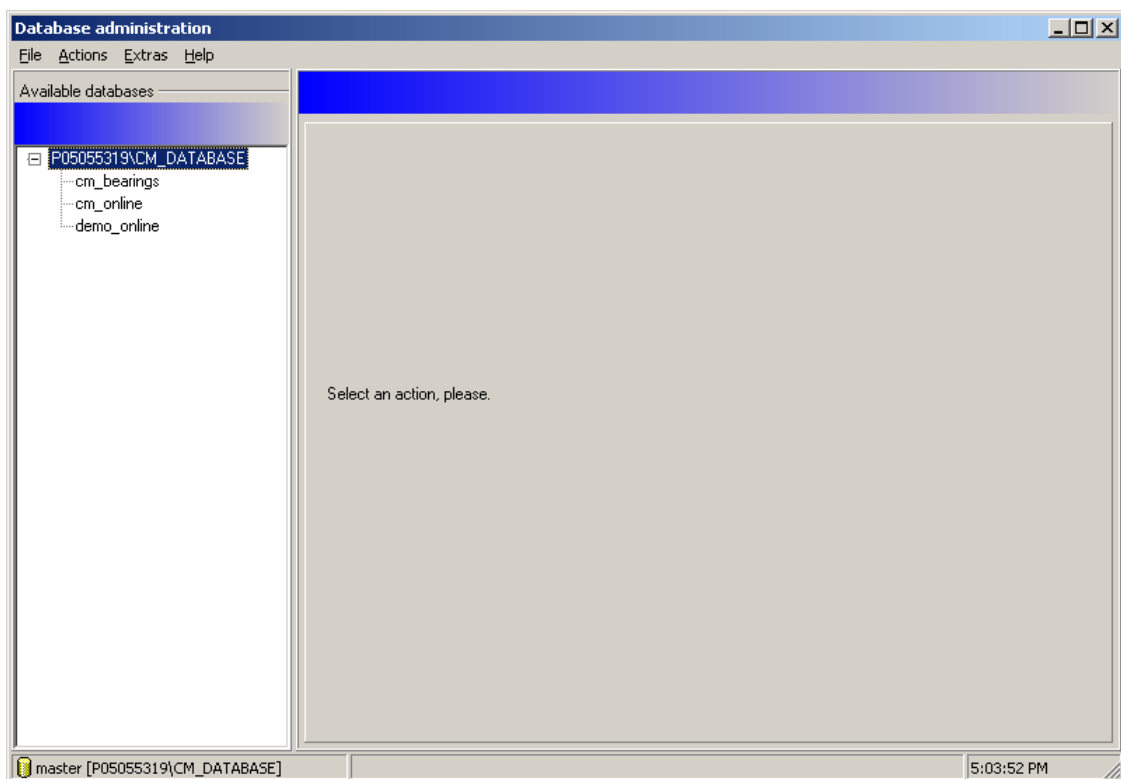
Install the databases and the database administration on a central computer that is always available.

You can start the database administration as follows:

- Click **Start > Programs > FAG > Administrator > Tools > Database administration.**
- Or:
- Click **Extras > Database administration** in the Configuration Manager menu.



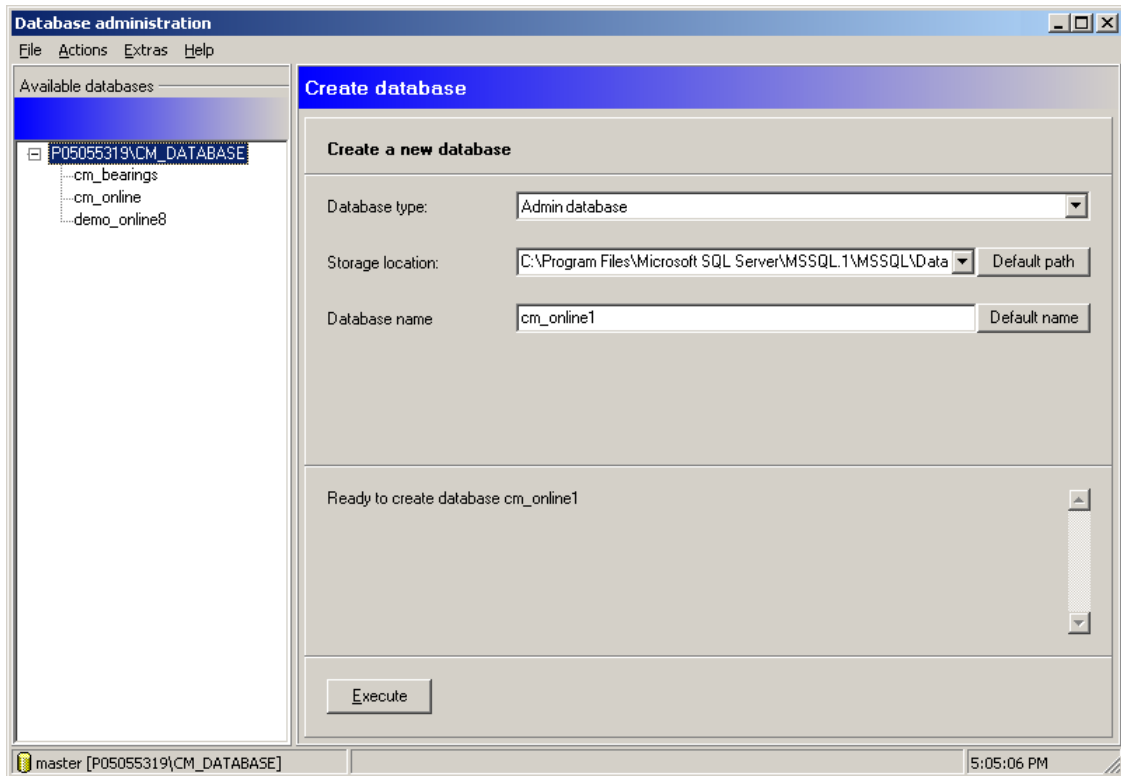
You can only call up the database administration in the Configuration Manager if both software components are installed on the same computer.



5.1.3.1 Create database

You can create a new database as follows:

- Click **Actions > Create database** to create a new CM database.



- Select the type of database from the **Database type** list (currently only Administrator databases are supported).
- Click **Storage location** and select the directory containing the database.



To avoid problems with MS SQL Express, please always use the **default directory** used during installation! The default directory for Microsoft SQL Express is "C:\All Programs\Microsoft SQL Server\MSSQL.1\MSSQL\Data\".

To save a database in a directory other than the default directory, the user must have full access to this directory. If you have any questions, please contact your system administrator.

- Enter a name for the database in **Database name**.



The database name must begin with a letter. It may be max. 120 characters long and only contain the following characters: 'A..Z', 'a..z', '0..9', '_', '@', '#', '\$'.

Or:

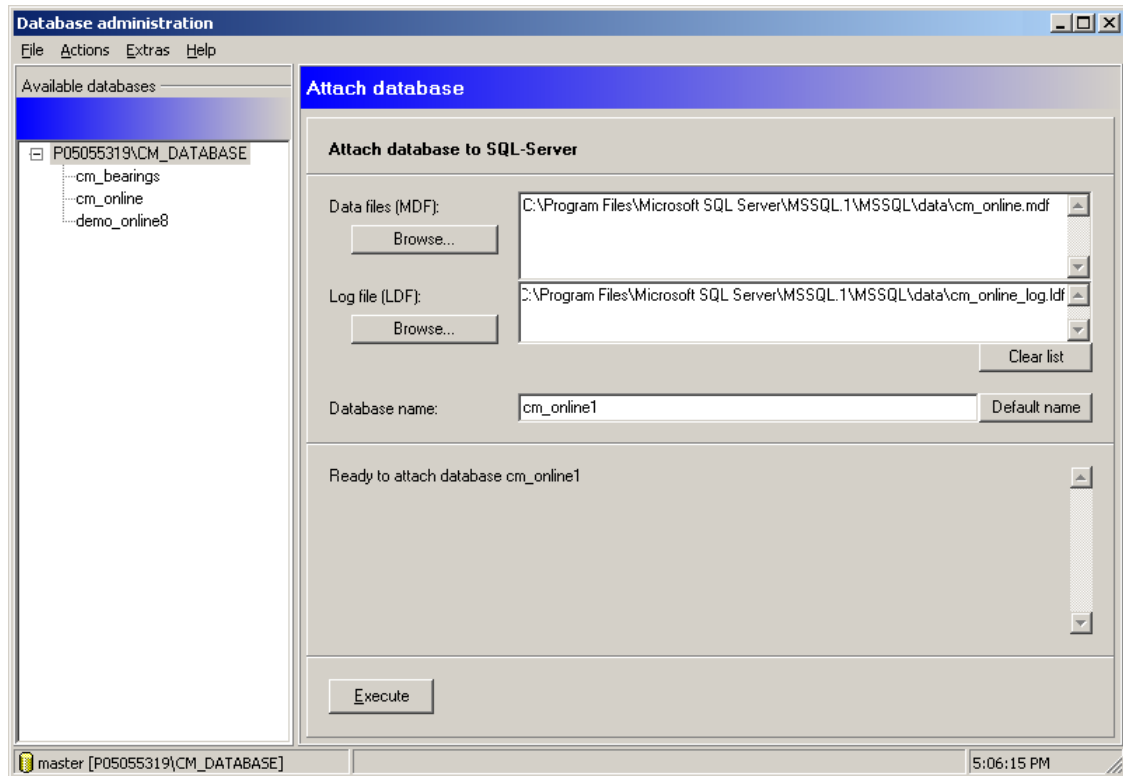
- Click **Default name** to generate a name automatically. The default name is "cm_online". If a database already exists with this name, a serial number is appended ("cm_online1", "cm_online2", etc.).
- Click on **Execute**.

The program creates the database and automatically appends it to the selected CM database.

5.1.3.2 Attach database (register)

Attach a database to the SQL server as follows:

- Select the database server and the database (see “Select CM database on server” (34)).
- Click **Actions > Attach database**.



- Click **Browse...** in the **Data files** section and select the appropriate database file (*.mdf).
- Click **Browse...** in the **Log file** section and select the associated LDF file.



To avoid problems with MS SQL Express, please always use the default directory used during installation for database files! The default directory for Microsoft SQL Express is "C:\All Programs\Microsoft SQL Server\MSSQL.1\MSSQL\Data\".

To attach a database from a directory other than the default directory, the "Everyone" user must have full access to this directory. If you have any questions, please contact your system administrator.

Click **Clear list** to remove the selected database files (MDF and LDF).

- The program automatically detects the database name from the file name. Alternatively, you can enter a different name for the database in **Database name**. Click **Default name** to undo this change and use the name from the file name again.



The database name must begin with a letter. It may be max. 120 characters long and only contain the following characters: 'A..Z', 'a..z', '0..9', '_', '@', '#', '\$'.

- Click on **Execute**. The program attaches the database.

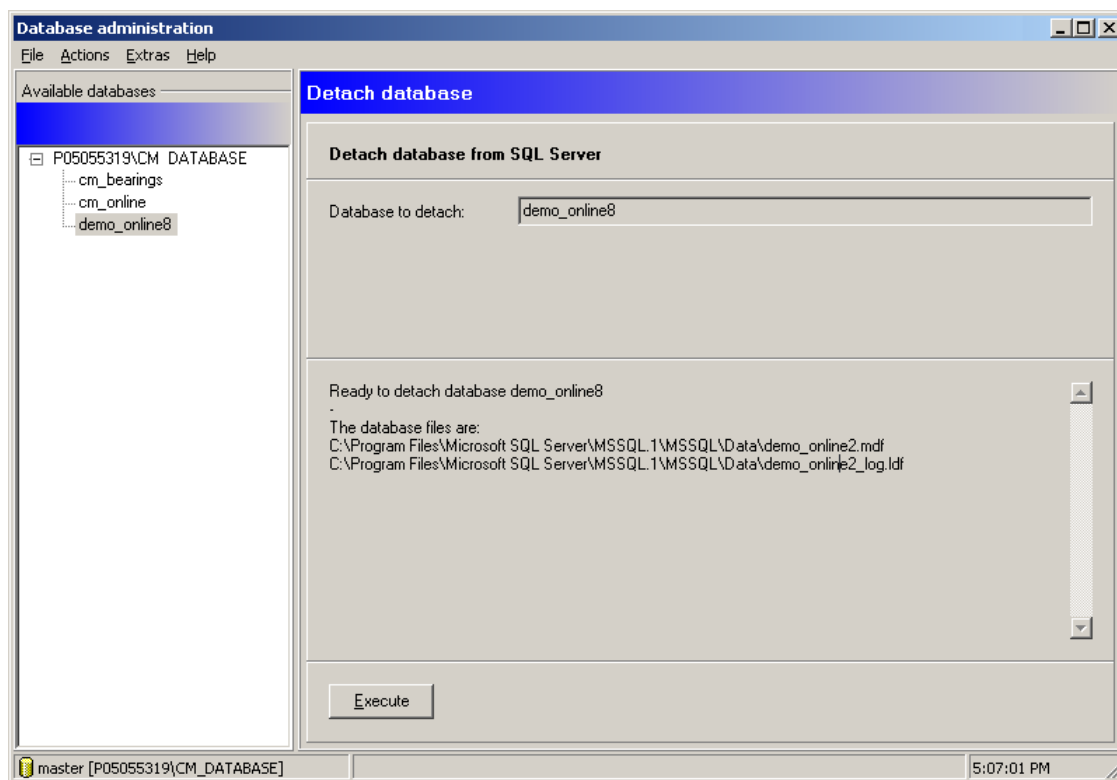
5.1.3.3 Detach database (deregister)



You can only detach a database if it is not being used by the Administrator software or other programs.

You can detach a database from the SQL server as follows:

- Select the database server and the database (see “Select CM database on server” [\[34\]](#)).
- Click on the appropriate database in the list of **Available databases**.
- Click **Actions > Detach database**.



- Click on **Execute**.

The database is detached from the SQL server and removed from the list of available databases.

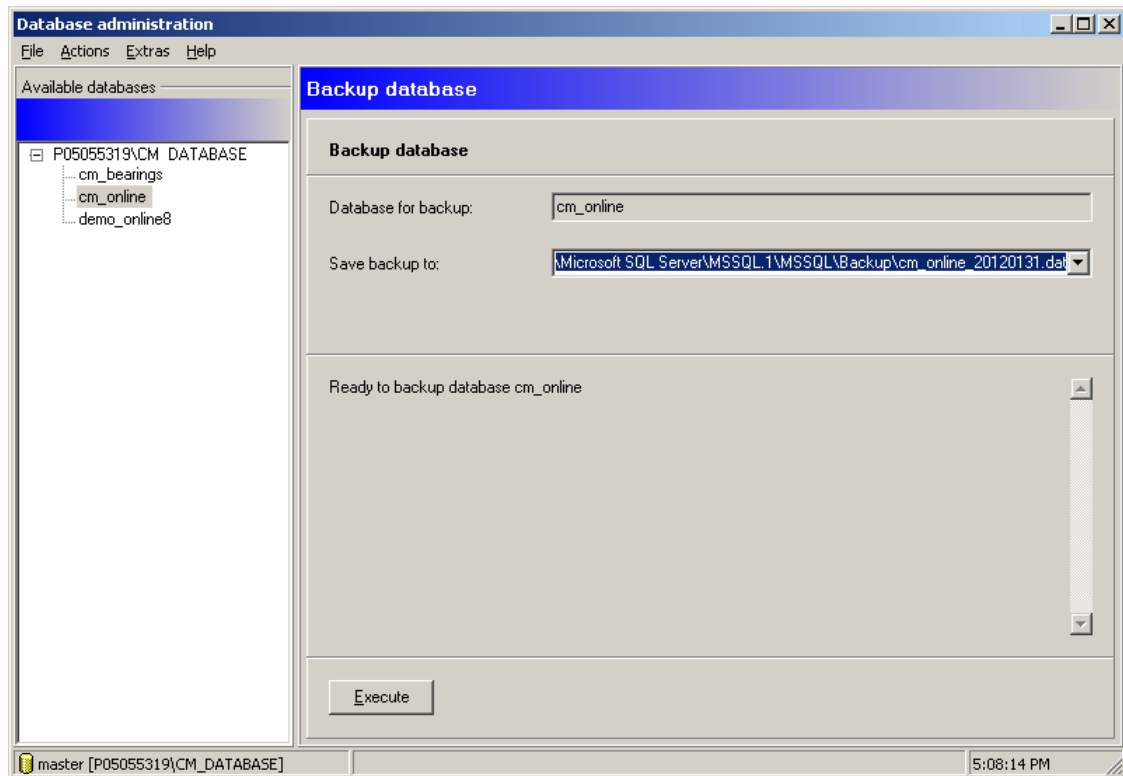
5.1.3.4 Backup database



Secure your CM databases at regular intervals, so that they can be restored if necessary.

You can back-up a database as follows:

- Select the database server and the database (see "Select CM database on server" ⁽³⁴⁾).
- Click on the appropriate database in the list of **Available databases**.
- Click **Actions > Backup database**.



- Click **Save Backup to** and select the MS SQL backup directory and a name for the backup file.
- Click on **Execute**.

The program saves the database.

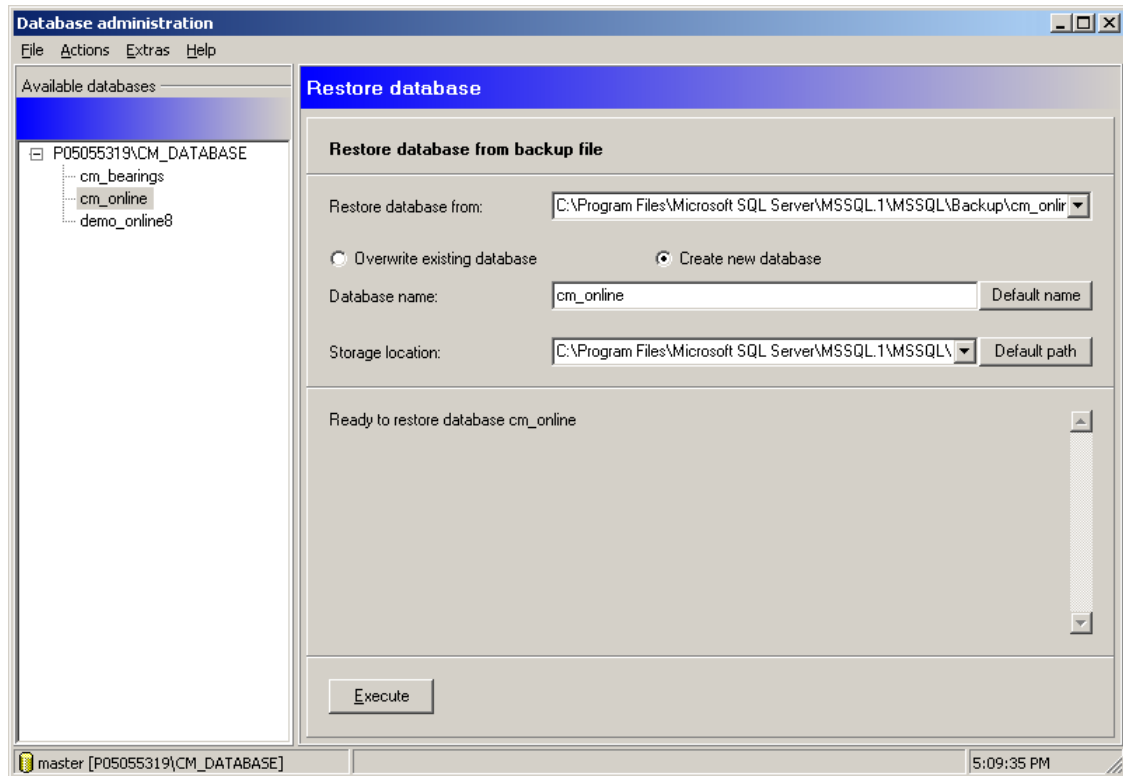


- If you wish to overwrite a backup file, you can keep it as a history. The new backup file is then saved with a serial number.
- To avoid problems with MS SQL Express, please always use the **backup directory** created during installation! The backup directory for Microsoft SQL Express is "C:\Programme\Microsoft SQL Server\MSSQL.1\MSSQL\Backup\".

5.1.3.5 Restore database

You can restore a database as follows:

- Select the database server and the database (see “Select CM database on server” (34)).
- Click **Actions > Restore database**.



- Click **Restore database from** and select the backup file (*.DAT).
- In order to overwrite the existing database with the backup file, close all other programs first. Then click **Overwrite existing database**.



If you select "Overwrite existing database", all data of the existing database will be lost!

Or:

- Click **Create new database** to create a new database from the backup file and automatically append it.
- The program automatically detects the database name from the name of the backup file as the default name. Alternatively, you can enter a different name for the database in **Database name**. Click **Default name** to undo the change and apply the name of the backup file.
- Click on the **Storage location** list and select a directory or click **Default directory**.



*To avoid problems with MS SQL Express, please always use the **default directory** used during installation! The default directory for Microsoft SQL Express is "C:\All Programs\Microsoft SQL Server\MSSQL.1\MSSQL\Data\".*

To save a database in a directory other than the default directory, the user must have full access to this directory. If you have any questions, please contact your system administrator.

- Click on **Execute**.

The program restores the database from the backup file.

5.1.3.6 Update database



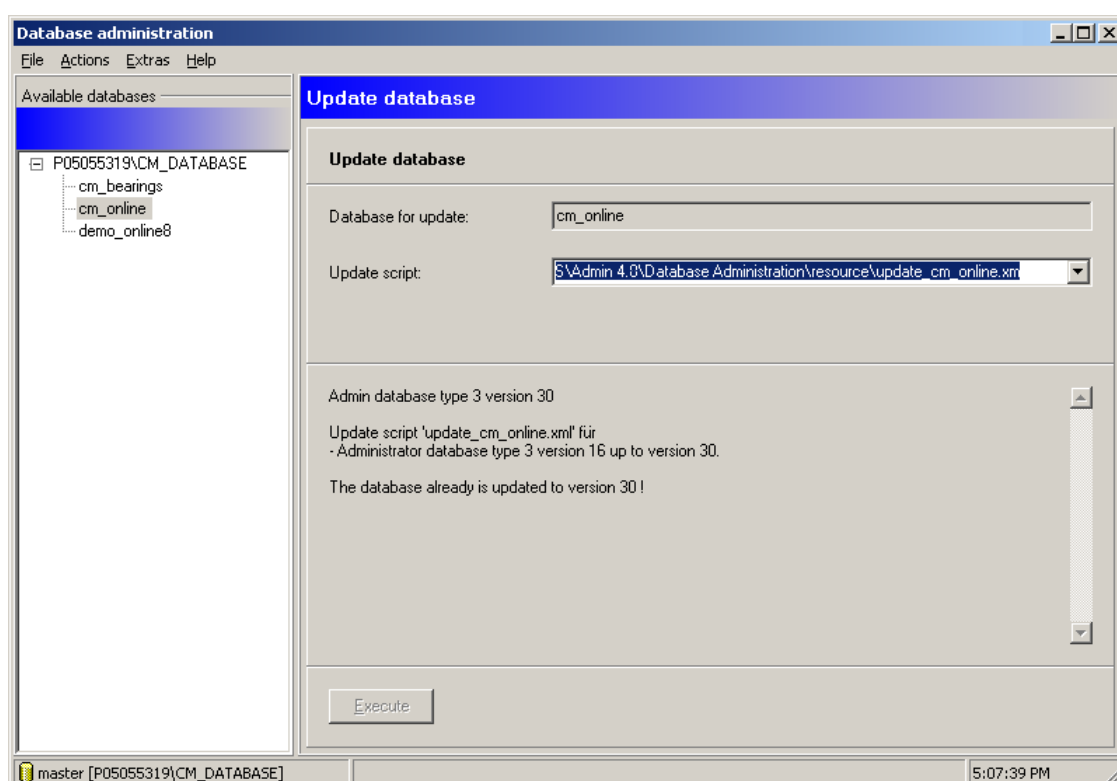
Before you update a database, make a backup^[40] of the database.

This function allows you to

- update a CM database created with Administrator version 4.2 or higher or
- update a bearing database from the FAG Trendline software for use with the current Administrator version.

You can update a database as follows:

- Select the database server and the database (see "Select CM database on server"^[34]).
- Click on the appropriate database in the list of **Available databases**.
- Click **Actions > Update database**.





The database type and version number are displayed.

- Click in the **update script** and select the appropriate script file for the database (see Table below).



By default, the script files (*.XML) for database update are stored in the program directory of the Administrator software in "Database Administration\resource\".

Database type	Icon and label	Update script
CM Database	 cm_online	update_cm_online.xml
Bearing database	 cm_bearings	update_cm_bearings.xml

If you have selected an update script, the program automatically checks whether it can be used with the database. If this check is successful, you can update the database.

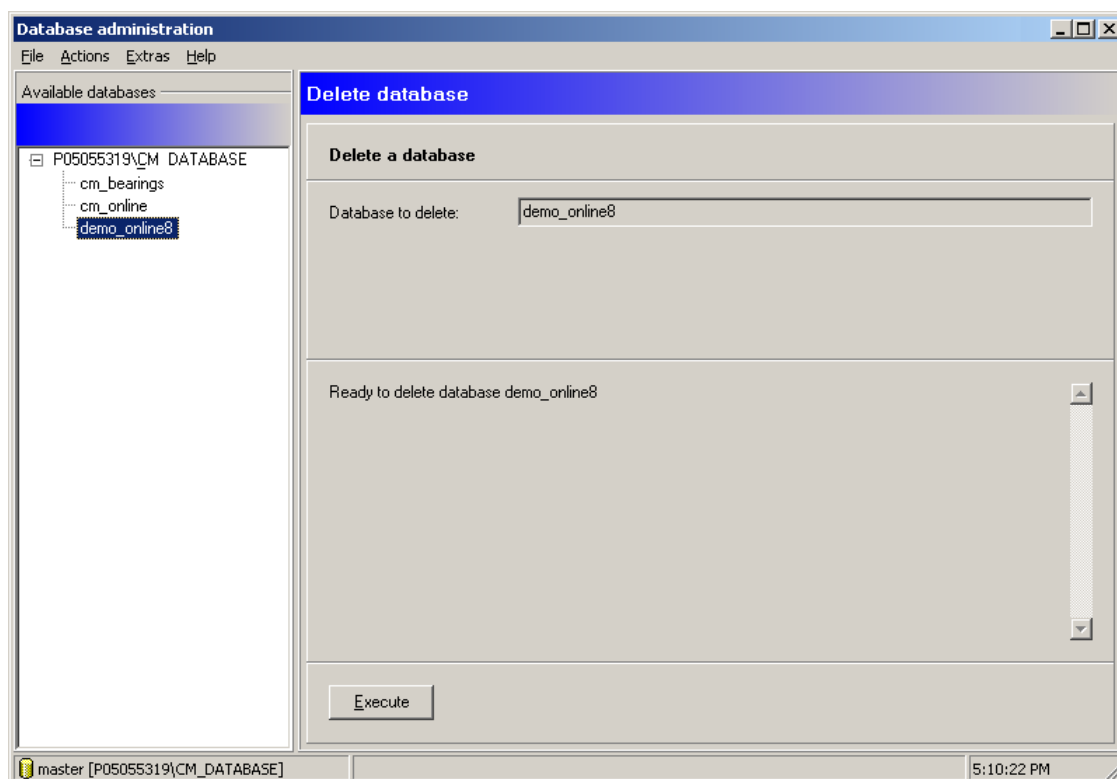
- Click on **Execute**.

The program updates the database.

5.1.3.7 Delete database

To delete a database:

- Select the database server and the database (see “Select CM database on server” [\[34\]](#)).
- Click **Actions > Delete database**.



- Make sure that you have selected the correct database to delete.
- Click **Execute** and confirm the warning about deleting the database.

CAUTION



If you delete the selected database, the database and the data it contains are deleted irretrievably!

5.1.3.8 Refresh view

If you have made changes to the databases you will need to refresh the database view.

- Click **File > Refresh tree**.

Or:

- Press **F5**.

The list of "Available databases" is reloaded.

5.1.3.9 Log files

The Administrator software logs information about system messages, database actions and import/export processes in separate log files.

For support purposes you can automatically assort these log files in Configuration Manager and send them to our Support ²⁵⁰⁷.

Assort log files

- Click **Assort log files** in the **Extras** menu.
- Select the data to save for support purposes.



If you select "data files", the file size may be too big to e-mail the log files.

-
- Define the start date from which to assort the files and
 - select a directory to save to.
 - Click **OK**.



Depending on the version of Windows installed on your system, the log directory is at the following default location:

- *Windows 7, Windows 8: In the "Common Application Data" directory, e.g. c:\Program Data \Condition Monitoring\Administrator\logs.*
-

Open log folder

- Click **Open log folder** in the **Extras** menu.

The log directory is displayed in Windows Explorer. You can open log files in a text editor.

5.1.3.10 Database properties

Displays properties and other information about the selected database.

- Select a database from the **Available databases** list and
- click **Extras > Database properties**.

The following information about the CM database being used is displayed:

- Name of the database server
- Name of the database
- Used memory
- Free memory

The ratio of free to used memory is also presented as a diagram.



The free memory display and the diagram can only return plausible information if the database and database server are on the same system.

Other database properties are displayed in addition to the database information:

- Name of the database
- Type and version of the database
- Storage location of the database files (MDF and LDF)

5.1.3.11 Settings

You can open the general program settings configuration window via the **Tools > Options** menu item.



To change the settings the user currently logged in must have the required access rights (see "User management" ¹⁴⁰).

A tree view is displayed on the left-hand side of the window and shows a range of configuration options arranged in groups. You can expand the view and configuration options by clicking the symbols in front of the groups. Information on the individual configuration options is provided or input masks are displayed on the right-hand side of the window.

General

Language

In this dialog you can choose a different language for the user interface. The program must be restarted if the language setting is changed.

- Select the required language.
- If you wish to apply the change directly close the window with "OK", or you can make additional settings.

Database

History

If this option is selected a list of all databases opened to date is displayed on the right. The entries in this list are the one used to open databases from the **File > Open database** menu. You can also use this option to delete entries in this list for clarity of overview.

To delete an alarm list entry:

- Select one or (by holding the CTRL key down) multiple items from the list and
- press the **Delete item** button to start the deletion operation.

Miscellaneous

The following information about the CM database being used is displayed:

- Name of the database server
- Name of the database
- Used memory
- Free memory

The ratio of free to used memory is also presented as a diagram.



The free memory display and the diagram can only return plausible information if the database and database server are on the same system.

Contact

Our address, telephone and fax number as well as our e-mail and Internet address are provided here.

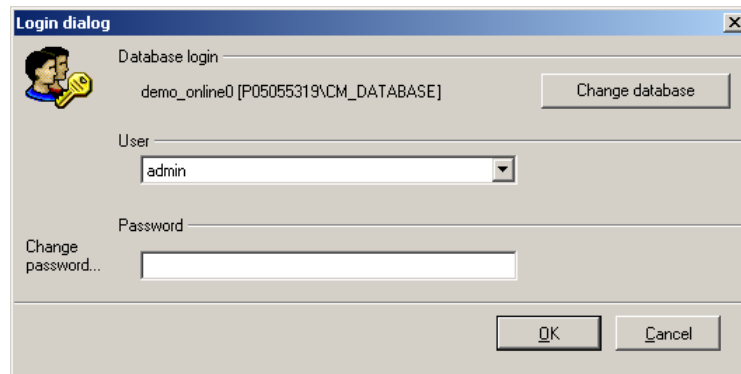
5.2 Log in as / switch user



- You can Change database^[35] in the login dialog by clicking the button.
- The user list always displays the users of the database currently connected.

Log in as user

When you first start the Administrator software, the program prompts you for your user name and password.



Select a user and enter the password. At this stage you can change your password at any time. Click **OK** to start the program.



- In order to use the Administrator software, you must log in as a user. As delivered, there is no password for the "admin" and "guest" users. To prevent unauthorized access to software and data you should assign a password for the "admin" without delay (Further information in User management^[140]).
- A user must always be logged in. If you cancel the Login dialog three times in a row, the software automatically closes.

If you wish to log in automatically with a user name and password, you can configure an "Auto-login"^[148] in the options.

Change user

- Click **Change user** in the **Extra** menu.

Select a log-in name from the list of users created in the user management^[140], enter the password and click **OK**.



If you change user data via the user management (create a new user, for example) the configuration manager must be restarted in order for the updated list of users to be loaded.

5.3 Set up planning level

With the aid of planning levels you can combine devices and their configurations in a branch. For example, you can assign devices in different buildings to a single planning level with the name of the building. You can create planning levels at all levels of the tree structure **Devices and configurations**.

You can build up a hierarchy of up to 5 planning levels. To add a planning level, right-click to call up the context menu in the tree structure:

- Select **Add item** for a planning level of the top hierarchy.
- Select **Add sub-item** to create a subordinate planning level.


Please refer to the following sections for details about working with planning levels.

General

This tab displays all devices, along with their name and type, that are combined in the planning level.

Image

You can store a suitable image for the planning level (for example) here. You can use either JPEG or BMP files. Images with a file size exceeding 500 kB are automatically scaled down and compressed.

- To do this click on  and select the file that contains the preferred image using the selection dialog box.
- Follow the same procedure as above if you wish to change the image.

Click on  to delete the image and click on  to print it.


Additional information

This tab is used to enter any text, e.g. to add further information about the planning level.


Advanced settings

You can configure additional settings for e-mailing export data (E-service) on this tab. For more information, refer to the chapter "Export and send data" ^[134].

Edit name of entry in planning level


- Double-click the name.
- Enter the name in the input box and click  on the toolbar.
- The edited name is displayed in this overview and in the tree view **Devices and configurations**.

Edit additional entry information name in planning level

- Double-click the additional information.
- Enter the text in the input box and click  on the toolbar.

Reset alarm(s)

You can reset the alarm status for an entry (cf. "Reset alarm status" ^[132]):

- Select a device configuration.
- Right-click the selection and select **Device > Reset alarm(s)** or
- click on .

Update alarm state

You can update the alarm state for one or all tree items.

- Select a device and
- click **Update alarm state of selected nodes** in the **Edit** menu.

Or:

- Click **Update all alarm states** in the **Edit** menu.

Display device serial number

You can display the serial number of each device in the tree view. If the device is available, it is displayed:

- Select the device in the tree view.
- Right-click to call up the context menu.
- Select **Go to device** in the context menu.

Or:

- Select the device and press **CTRL+G**.

Refresh tree view

- Click on .

Or:

- Press **CTRL+R** or **F5**.

5.4 Set up device communication

You can connect a device to a PC using the following communication methods:

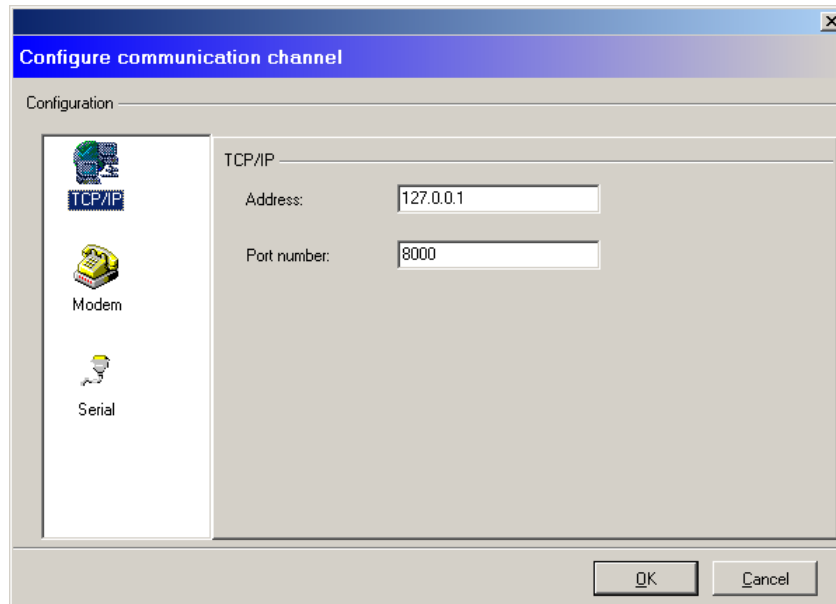
- direct serial connection,
- modem or GSM modem connection,

- TCP/IP protocol network connection. The ProCheck device has a network interface and supports the TCP/IP protocol. In the Dtect X1s device, the integrated "COM server" manages the network connection between the Dtect X1s device and PC.

The program always connects to a device when you do the following in the Configuration Manager

- create a new device [59],
- connect [58] to a selected device.

The connection build-up progress window then appears:



To configure the communication proceed as follows:

- Select the tab containing the required connection type.
- Configure the appropriate settings as described in "Direct serial connection" [48], "Modem connection" [49] and "TCP/IP connection" [55].
- If the device is password-protected, enter the passwords in the Configuration Manager. Cf. "Passwords" [56].
- Click the **OK** button to begin establishing the connection.



You connection mode selection is saved along with your settings.

*If you wish to use the same method to establish a connection with the device the next time round, click **OK** to confirm this.*

5.4.1 Direct serial connection

This connection type is characterized by the serial transfer of data. Before you configure the connection make sure that

- the serial interface is selected on the specific device (see ProCheck and Dtect X1s manual),
- the serial interface of the device is connected to the serial interface of the PC with a suitable serial cable,
- the configuration manager has detected the connected serial interface and the data transfer rates of both interfaces are identical.



A commercially-available serial cable is supplied for connection of the Dtect X1s device to a computer. This cable is not suitable for connecting the Dtect X1s device to a modem. Refer to the Dtect X1s device manual for a wiring layout.

- Select the **Serial** tab.
- Select the serial interface to which the data cable for connecting the device is connected.

- Select the speed to be used for communication with the device via the serial connection. The standard baud rate is 9600 baud.
- Confirm your selection with **OK**.

The connection is automatically established.

If the data transfer rates at the computer and device are not the same you will receive a message that the connection could not be established. In this instance try to establish the connection using another data transfer rate.

You can edit the transfer rate of the interface of the selected device in the Configuration Manager:

- Right-click the device in the Configuration Manager and select **Baud rate**.

Or:

- Click the device in the Configuration Manager and click **Baud rate** in the **Device** menu.



Please observe that the baud rate at the device can only be modified if the device is connected to the control computer via a direct serial connection.

5.4.2 The modem connection

With this type of connection data is transmitted via a fixed line telephone network or a mobile network. Before you configure the connection make sure that

- a landline modem or GSM modem is connected to the "Config/Com" interface of the Dtect X1s device,
- the control computer also has a modem connection configured for Windows. For more information please refer to the documentation supplied with your modem and the Windows manual.

This section describes which minimum requirements the modem must meet and also how to set up the control computer and the ProCheck or Dtect X1s device so they can communicate with one another via the modem.



Please note that you can only connect a landline or GSM modem to the Dtect X1s device using a null modem cable. Refer to the Dtect X1s device manual for a wiring layout.



The following sections explain only how to establish the data connection using commercially-available modems. Consult the instructions for use supplied with the modems to find out about their special features, how they operate and how they can be connected to a telephone network and subsequently configured.

System requirements for the modem

For the modem connection to function correctly it must be possible to make specific settings on the Dtect X1s device side. These are sent to the modem using what are known as AT commands.

The most important configuration options and commands are listed below.



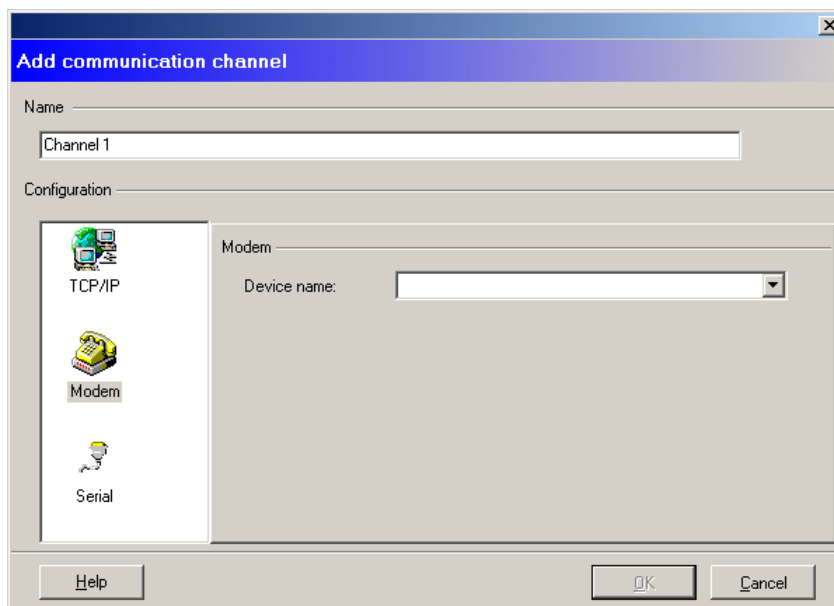
As the configuration options and AT command set may vary between modems, check and compare this information with the instructions provided with your modem.

Function	AT command	Explanation
Echo On Echo Off	ATE1 ATE0	Echo: All characters received by a modem in command mode are returned to the sender.
Auto-Answer on Auto-Answer off	ATS0=1 ATS0=0	Auto-Answer: The modem automatically responds in the event of an incoming call. This function must be switched on at the modem on the Dtect X1s device.
DTR on DTR off	AT&D2 AT&D0	Response of modem to a change of voltage at the DTR line: Modem on Dtect X1s device: "DTR off".


5.4.2.1 Connection with control computer via fixed network modem

Make sure that:

- the modem is connected to the telephone network as described in the relevant manual, is connected to a free serial interface on your control computer and is configured for Windows, and
- the modem is switched on.
- Select the **Modem** tab in the **Add communication channel** window.




- Please enter the phone number of the modem to which the device is connected in the **Telephone number** box. If the modem at the control computer is on a branch line of a telephone system you will probably need to insert the digit 0 in front of the phone number to obtain the network.
- Select the modem you wish to use to establish the connection from the **Modem** list box.
- Click **OK**.

Your input is then saved for the next time you wish to establish a connection and a connection with the device is established. If you selected the "Request password" option when configuring the device (see "Set up modem at device" ) , you will be asked to enter it when the connection is being established.



If your modem is connected on a branch line of the telephone system you will have to make the corresponding settings when installing the modem driver otherwise your modem will not be able to establish a connection.



Please observe that you can only establish the connection if you have configured  the modem which is connected to the device.

5.4.2.2 Connection via GSM modem at control computer

The GSM modem only differs slightly from the fixed network modem when used in conjunction with the control computer. If a Windows driver was not supplied with the GSM modem, install a standard modem with a data transfer rate of 9600 baud.

Make sure that:

- the modem is correctly connected to the control computer,
- a SIM card that is enabled for the outgoing communication of data is used, and
- the modem is switched on.
- Call up an appropriate command in the configuration manager to establish a connection.
- Select the "GSM" tab in the "Connect with device" window.

You can select the modem connected to the control computer and enter the phone number in this tab.

- Select the modem required or GSM operation from the "TAPI Modem" list box.
- Enter the phone number of the modem in the "Telephone number" field by which the device can be contacted.
- Close the dialog box by pressing the **OK** button.

Your input is then saved for the next connection session and a connection with the device is established.

If the GSM modem is not yet registered in the network you will be asked to enter the PIN.

If you selected the "Request password" option when configuring the device (see "Set up modem at device" [51](#)), you will be asked to enter it when the connection is being established.

5.4.2.3 Set up modem at device

ProCheck

To install a modem on the ProCheck, the device must be created in the Configuration Manager and it must be possible to make a connection via the serial interface or TCP/IP network.

- Click the device in the **Devices and configurations** tree view.
- Configure the modem connection in the Communication settings [64](#) tab.
- Send the configuration to the device (cf. "Send device configuration to device" [90](#)).

Dtect X1s

Modem setup is carried out in three steps:

1. The configuration required for operation of the modem is first of all stored in the device with the assistance of the configuration manager.
2. The serial interface of the device is then configured.
3. The modem is then connected to the device and restarted in order to transfer the modem configuration from the Dtect X1s device to the modem.

Start the configuration of the Dtect X1s modem as follows:

- establish and activate a direct serial connection between the Dtect X1s device and control computer.
- Select the connected device in the Configuration Manager then go to the **Device settings** tab in the properties display on the right-hand side.

The configuration data for the Dtect X1s modem currently stored in the database are displayed in this tab. If the bottom section of the tab is coloured red this indicates that the modem configuration saved in the database is not the same as the modem configuration stored in the Dtect X1s device. The **Replace with device values** option overwrites the values stored in the database with those of the Dtect X1s device. Conversely, the **Send to device** option updates the Dtect X1s device with the configuration data saved in the database.

2ch device - Properties of device

Name

2ch device

Software version

3.6.0.0

Device location

Serial number

83886738

Next call

3/23/2008 12:06:57 PM

Last call

11/8/2006 4:16:28 AM

Device properties

Device settings

Image

Additional information

Advanced settings

Password settings

User password

Repeat user password

Power user password

Repeat power user password

Communication settings

☐ Use GSM modem

Initialization

ATS0=1E0&D0&W

+ CR

Phone number

02407914994

Advanced

+ CR

PIN

PIN 2

Reinitialization interval

0

min

0 = Disables this feature!

Dial mode

☐ Pulse dial

☒ Multi-frequency

Refresh with device values

Send to device

Details of configuration:

- Select the modem type to connect to the Dctect X1s device from the "The device communicates via..." list box.
- Enter the AT commands you wish to use to initialize the modem in the **Initialization** field. The **DTR Off**, **Echo Off** and **Auto-Answer On** settings are required. The initialization string with the modem commands described in "Modem requirements" is **ATE0&D0S0=1**. This initialization corresponds to the Dctect X1s device default setting.

You can execute several AT commands successively. Commands requiring a "Carriage Return" at the end must be completed with the **+ CR** switch. Additional commands may be entered after this.

- It is still necessary to enter the phone number of the Remote Server to be used by the Dctect X1s device to send its data in the **Phone number** field and
- to configure the **dial mode** with which the Dctect X1s device connects using the selection boxes "Multi-frequency" and "Pulse dial". Where GSM modems are used please select "Multi-frequency".

Additional information on remote operation is provided in "The Remote Server".

If a GSM type modem is used:

- enter the 4-digit PIN in the **PIN** field. This is required to verify the access rights during the initialization phase before dialling in to the mobile network. You will be given this four digit PIN when registering with the network operator.

Please enter the PIN carefully. If the incorrect number is sent three times to the mobile network modem any further attempts to enter the PIN will initially be blocked. The PIN input can be enabled again using a suitable program. To do this, refer to the manual supplied with the modem.

A time interval for re-initializing communication can be specified in **Reinitialization interval**. This means (for example) that if the connection with a GSM modem is interrupted, the modem is re-initialized and logs in to the network once this time has elapsed. Set the time interval to "0" if you do not wish the modem to be re-initialized automatically. In this case the Dctect X1s device will only be re-initialized each time it is restarted.

It may also be useful to specify automatic re-initialization where fixed network modems are used. The modem's settings may be lost if it is switched off then switched back on later, for example. Re-initialization ensures that the modem receives the necessary settings again within a defined period and can therefore continue to receive and send data.

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The input in the "Device settings" tab is now complete.

- Save the settings and send them to the Dtect X1s device.

The configuration is now sent to the Dtect X1s device and saved there.

- Adjust the baud rate to be used by the Dtect X1s device to communicate with the modem via the context menu (also see "Direct serial connection" ⁴⁸).



In contrast to fixed network modems, the majority of mobile network modems do not automatically adopt the data transfer rate of the connected Dtect X1s device. Please therefore ensure that the Dtect X1s device and modem are using the same data transfer rate on their shared data connection. The default data transfer rate for GSM modems is normally 9600 baud, but in some cases 19200 baud is also used.

- Now disconnect the serial connection between the control computer and Dtect X1s device.

The Dtect X1s device restarts.

Connect the Dtect X1s modem

Once you have sent the modem configuration to the Dtect X1s device and made sure that the data transfer rate for the connection between Dtect X1s device and modem is configured correctly you can connect the modem to the Dtect X1s device.

- First switch off the Dtect X1s device.
- Connect the modem to the telephone network and the "Config/Com" serial interface on the front panel of the Dtect X1s device as described in the manual supplied with the modem.
- Switch the modem on.
- Switch the Dtect X1s device on.

The Dtect X1s device is then restarted. When the device restarts it detects that a modem is connected to the serial interface and sends it the saved modem configuration. The modem connection has now also been configured on the Dtect X1s device.

Automatic modem detection

Each time it restarts, the Dtect X1s device carries out an automatic search for the modem. This is indicated by the "Search modem" message on the display. If a modem is not connected to the Dtect X1s device, it automatically enters direct serial communication mode.

If the Dtect X1s device detects a modem on the serial interface, this is initialized. All strings sent to the modem for the purposes of initialization as well as the responses by the modem are displayed by the Dtect X1s device. This makes troubleshooting easier should problems arise in conjunction with the modem operation. The sequence is described below using a connected GSM modem as an example.



On the Dtect X1s device, the following messages are displayed in the top two lines of the display.

- Start of modem detection

Search Modem
Wait for answer

Modem detection started, Dtect X1s device waiting for modem to respond.

- The connected modem has been detected.

Search Modem
Modem found

Dtect X1s device has detected modem.

- Checks are carried out to determine whether the GSM modem is already registered in the network.

AT+CPIN=?
+CPIN: SIM PIN

Is modem registered? +CPIN:SIM PIN response means that modem requires a PIN

- If not, the modem is registered by sending the PIN.

Sending Pin
+CPIN: Ready

PIN was sent. Response by modem to confirm acceptance of PIN.

- The modem was successfully registered in the network.

Registered!

Registration of the GSM modem successfully completed.

- The modem is initialized, the corresponding AT command is sent

ATE0&D0S0=1&W

The Dtect X1s device sends initialization string from modem configuration

ATE0&D0S0=1&W
OK

Modem responds with "OK". Initialization successful

- The modem responds with "OK", initialization is complete.

Init modem done!

Initialization successfully completed.

- The Dtect X1s device changes to monitoring mode.

The error messages that can occur when the modem is in operation as well as their possible causes are listed in the table below which is intended as a troubleshooting aid.

Messages	Possible cause
No Answer	Modem is not responding.
Timeout	The maximum waiting period in which a response must be received from the modem has been exceeded. The flow of data has been interrupted.
Wrong Frame	The character frame received contains error(s). The responses from the modem do not start and end with <CR><LF>.
Modem deselected	A modem was detected on the Dtect X1s device. However, the initialization failed. The modem operation was switched off.
Can't init modem	The modem could not be initialised.
Pin rejected!	The PIN that was sent was rejected by the network. The GSM modem cannot be registered.
Pin locked	Sending of the PIN during automatic modem detection has been locked because the PIN has been rejected twice as invalid. This function prevents locking of the SIM card due to repeated restarting and sending of the incorrect PIN. The lock can be removed by sending a new modem configuration to the Dtect X1s device or by resetting the system.
No simcard	A SIM card has not been inserted into the modem.
Send timeout	The Dtect X1s device could not send characters for one of the following reasons: a modem is not connected to the device or the send function for the connected modem has been locked.

5.4.3 TCP/IP connection

ProCheck

- Get the network administrator to give you an IP address for the ProCheck device.
- Configure the TCP/IP network connection with the assigned IP address on the ProCheck device, as described in the ProCheck manual (chapter "Operating instructions → CM Installer → ProCheck Configure device", section "IP settings").

The necessary administrator settings are made in the **Add communication channel** window. This window appears if you wish to register a new ProCheck device in the Configuration Manager or begin establishing a connection for a device already registered in the configuration manager.

- Click the **TCP/IP** tab.
- In the **IP address** box enter the network address (IP address) of the ProCheck device and port number 8000 in the **Port** box.
- Click **OK**.

Your input is saved for the next time you wish to establish a connection and a connection with the device is established.

Dtect X1s

The TCP/IP connection is available to you if your computer is connected to a computer network and the Dtect X1s device is also connected to this network via an auxiliary device known as a "COM server". The internal COM server ensures compatibility of the Dtect X1s device with the network. Before a TCP/IP connection can be established between the control computer on which the configuration manager is loaded and the Dtect X1s device the device must be connected to the computer network. The COM Server serves this purpose. It is a computer network component that can be connected via a serial interface to devices that do not have a network interface.



- For additional information refer to the COM server operating instructions.
- With the Dtect X1 device, you must activate the Telnet client in Windows 7 first. This requires administrator rights on your system. Open "Control Panel > Programs > Programs and Functions > Turn Windows features on or off", activate "Telnet Client" and click OK. You can then establish the connection via the Telnet protocol.
- With the Dtect X1s device, please use Net Utility to configure the communication settings.

Proceed as follows to prepare the Dtect X1s device for the TCP/IP connection.

- Make sure that the TCP/IP protocol is installed on the control computer. Consult your network administrator for more information.
- Ask your network administrator to provide you with a network address (IP address) for the Dtect X1s device.
- Connect the COM server to the network and specify your IP address.



As is the case with the direct serial connection between the computer and Dtect X1s device, a standard cable is used to connect the Dtect X1s device to the COM server. Refer to the COM server manual to find out how to connect it to the network and transfer the IP address.

- Make sure that the serial interfaces on the Dtect X1s device and COM server are operating with the same data transfer rate (see "Direct serial connection" ⁴⁸ or COM server manual)
 - Connect the Dtect X1s device to the COM server using the data line for serial data transmission provided.
- The Dtect X1s device has now been configured for a TCP/IP connection.

TCP/IP connection settings in the configuration manager

The necessary administrator settings are made in the "Establish connection" window. This window appears if you wish to register a new Dtect X1s device in the Configuration Manager or begin establishing a connection for a Dtect X1s device already registered in the configuration manager.

Select the "TCP/IP connection" tab here.

The "TCP/IP connection" tab

- Enter the network address (IP address) of the COM server in the "IP address" field;
- Select the port number of the COM server connected to the Dtect X1s device from the "Port" field;
- Close the dialog box by pressing the **OK** button.

Your input is then saved for the next time you wish to establish a connection and a connection with the Dtect X1s device is then established.

5.4.4 Password settings

To protect against unauthorised access, you can protect ProCheck and Dtect X1s with one password (Dtect X1s with 3.0/3.2 firmware) or two passwords (ProCheck and Dtect X1s as of 3.4 firmware). These are entered in the Configuration Manager ³¹ in **device settings**.

16ch device - Properties of device

Name	16ch device	Software version	1.1.6.4
Device location		Serial number	11117707 (= xA9A48B)
Last call	1/16/2009 12:17:51 PM		

Device properties | **Device settings** | Communication settings | Image | Additional information | Advanced settings

Alarm conditions

Alarm occurrences before output: 1

☐ Reset main alarm manually

☐ Reset pre-alarm manually

Password settings

User password: Repeat user password:

Power user password: Repeat power user password:

Time zone settings

Device time zone: -60 Minutes

Data file size settings

Critical data file size: 8.0 MB

Maximal data file size: 15.0 MB

ProCheck

2ch device - Properties of device

Name 2ch device	Software version 3.6.0.0
Device location	Serial number 83886738
Next call 3/23/2008 12:06:57 PM	Last call 11/8/2006 4:16:28 AM

Device properties | **Device settings** | Image | Additional information | Advanced settings

Password settings

User password	Repeat user password
Power user password	Repeat power user password

Communication settings

☐ Use GSM modem

Initialization
 AT\$0=1E0&D0&W + CR PIN

Phone number
 02407914994 PIN 2

Advanced
 + CR Reinitialization interval
 0 min
 0 = Disables this feature!

Dial mode ☐ Pulse dial ☒ Multi-frequency

Replace with device values | Send to device

Dtect X1s

BOTH passwords must be entered if password protection is required. Once the passwords have been sent, three security levels exist and are set when the connection is being established:

No password (Dtect X1 / Dtect X1s only)	If no password is input when the connection is made, you can only read data from the device. It is not possible to edit device settings or configurations.
User password	If the user password has been entered correctly when the connection is being established the user may also reset the device alarm status and restart the device.
Power user password	If the power user password is entered correctly when the connection is being established the user can then change all device settings. In this case it does not matter whether the first password (user password) has been entered correctly or not.



- The device is supplied ex works with password protection disabled, the passwords in the device settings are empty.
- If a password has not been entered in the device settings but has been entered in the device this will be requested during the connection build-up procedure. If the password entered is incorrect a connection will not be established.

5.4.4.1 Connect to password-protected device

Dtect X1 / Dtect X1s (Firmware 3.0/3.2)

The password input in the device settings is sent to the device. If it matches the password in the device, the connection is established, data can be read and configurations can be written. If password protection is activated but no password has been entered, you are automatically prompted for a password.

ProCheck and Dtect X1 / Dtect X1s (firmware 3.4 or higher)

The first and second password input in the device settings are sent to the device. If the passwords do not match or if the password fields are empty, the user can only read data (but cannot configure any settings).

5.4.4.2 Edit passwords

To edit passwords, first connect to the device using the old passwords. As soon as the connection has been established, the passwords may be changed. Enter the new password twice. Then click **Send to device** to change the passwords.



If the device password protection is deactivated the connection must be established with empty password fields.

5.4.4.3 Activate password protection

To activate password protection, first connect to the device without entering any passwords. As soon as the connection has been established, the passwords may be changed. Enter the user and power user password (as of firmware version 3.4) twice. Then click **Send to device** to activate password protection.



When using devices with firmware version 3.4 or higher, the power user password must always be entered when activating password protection. If the power user password field is empty, password protection is deactivated!

5.4.4.4 Deactivate password protection

To deactivate password protection, first connect to the device with the current passwords. Once connected, clear the password fields. Then click **Send to device** to deactivate password protection.



Password protection is also deactivated in the event of a total system reset.

5.5 Connection to a device

If you wish to:


- transfer a new device configuration to a device or
 - obtain measuring data, alarm statuses and configurations from a device in the configuration manager
- you must establish a data connection with the relevant device.



As of version 3.8 of the Administrator software, Dtect X1s devices do not send modem configurations to the computer.

Establishing a connection

First, open the **Establish connection** window as follows:

- mark the device in the directory of devices and configurations then either
 - open the context menu with the right-hand mouse button
 - and select the item **Device > Connect to selected device**
- or
- press the  button in the button bar.
 - Click the **OK** button in the **Establish connection** window to begin establishing the connection directly using the same method and settings previously used.

Otherwise you can change the connection type or settings as described in "Set up communication with device" [\[47\]](#).


Once the connection has been established, information on the configuration and alarm statuses is transferred. You can then carry out the desired operations.

End connection

You can end a connection with a device as follows:

- by pressing the button  in the button bar.

Check connection to a device

Devices with an overdue remote call that fail to respond are indicated by a clock icon  in the tree. You can have the connection to these devices checked automatically.

- Click **Check connection of not calling devices** in the **Extras** menu.

The software attempts to connect to these devices in order. If this is not possible, you can edit the device's communication settings in the next step. If the next attempt to connect fails too, please check all of the device's connection settings [\[47\]](#). For further information, refer to the "FAQ" [\[246\]](#) section.



*You can also search for overdue remote connections in the CM database. Click **Check database for overdue remote connections** in the **Extras** menu. Then click **Check connection of not calling devices** in the **Extras** menu. The program checks the status of all devices and modifies them if necessary.*

5.6 Manage devices

Create device

Every device to be controlled must be created first.

- Click on  in the toolbar.

Or:

- In the **Device** menu click **Create new device**.
- In **Connect with** select the device type **Dtect X1s** or **ProCheck**.
- Enter the type of connection and appropriate parameters in the **Establish connection** dialog as described in "Setting up communication with a device" [\[47\]](#). Click **OK**.

The Configuration Manager establishes the connection with the selected device and saves the settings for the next time.

- Finally, confirm registration of the device with **OK**.

This adds the device to the list of devices and configurations. The Configuration Manager automatically generates a name based on the serial number of the device.



When you create a new device whose settings are identical to those of an existing device, no new device is created. Instead the existing one is highlighted in the tree.

16ch device - Properties of device

Name: 16ch device Software version: 1.1.6.4

Device location: Serial number: 11117707 (= xA9A48B)

Last call: 1/16/2009 12:17:51 PM

Device properties | Device settings | Communication settings | Image | Additional information | Advanced settings

Module overview

Number of available sensor inputs: 16 MUX type: 2x8_S0K

Number of available digital outputs: 8

Number of available additional channels: 6

Number of available analog outputs: 0

Number of available virtual channels: 0


Slot overview

Slot number	Module type	Module information	Channels from/to
1	Measurement channel	9239	1 - 16
3	Additional channel	9201	1 - 8
4	Digital output	9472	1 - 8

You can enter a **name** and **location** to identify the device in the top part of the Configuration Manager window. These details are only saved in the CM database. In addition, this section also displays the software version, serial number, and times of the last and next scheduled communication (Last call, Next call) with the device.

The tab **Additional information** is used to enter any text, e.g. to add further information about a device.

Edit name and installation location of a device

- Click the device in the **Devices and configurations** list.
- Enter the name and installation location in the appropriate input boxes.
- On the toolbar, click on  or **Edit > Save**.

Delete device



When you delete a device, it is deleted along with all device and monitoring configurations and the associated data from the CM database. It is not possible to restore a deleted device.

Delete a device as follows:

- Right-click the device in the list of **Devices and configurations** and select **Delete** or click **Delete** in the **Edit** menu.
- Click **Cancel** in the confirmation dialog if you do not want to delete the device or **OK** to confirm deletion.



If the configuration to be deleted contains a large number of records (several thousand), the deletion process may take several minutes. During this process, you cannot use the Configuration Manager for any other purpose. If you try to quit the Configuration Manager, the title bar of the program window displays "Not responding" status.

5.6.1 Device properties

This tab displays the hardware properties of the selected device.

You can display the properties of a device in the configuration manager as follows:

- Click on the device in the device and configurations list.
- Click the **Device properties** tab.

ProCheck

16ch device - Properties of device

Name

16ch device

Device location

Last call

1/16/2009 12:17:51 PM

Software version

1.1.6.4

Serial number

11117707 (= xA9A48B)

Device properties

Device settings

Communication settings

Image

Additional information

Advanced settings

Module overview

Number of available sensor inputs

16

MUX type

2x8_SOK

Number of available digital outputs

8

Number of available additional channels

6

Number of available analog outputs

0

Number of available virtual channels

0

Slot overview

Slot number	Module type	Module information	Channels from/to
1	Measurement channel	9239	1 - 16
3	Additional channel	9201	1 - 8
4	Digital output	9472	1 - 8

Module overview

This section displays information on the available input and output channels of the ProCheck device:

- Number of available input channels,
- Number of available digital outputs,
- Number of available additional channels,
- Number of available analog outputs,
- Number of available virtual channels,
- Multiplexer type (MUX type).

Slot overview

This section displays information on the modules used in the ProCheck device:

- Number of connector,
- Module type (measuring channels, additional channels, digital outputs, etc.)
- Module information (e.g. 9233 or 9201)
- Channel numbers (e.g. 1-8, 9-16 for two modules with eight channels each)



Detailed technical information on the available module types can be found in the ProCheck manual or in the ProCheck Modbus TCP manual.

Dtect X1s

2ch device - Properties of device

Name	2ch device	Software version	3.6.0.0
Device location		Serial number	83886738
Next call	3/23/2008 12:06:57 PM	Last call	11/8/2006 4:16:28 AM

Device properties | Device settings | Image | Additional information | Advanced settings

Number of available sensor inputs	2
Number of available additional channels	1
Number of available D/A channels	2
Maximum number of monitoring configurations	4
Maximum number of frequency bands per monitoring configuration	12
Type of the available filter module	Low-pass module 2
<input type="checkbox"/> Speed-dependent monitoring possible	
<input checked="" type="checkbox"/> Demodulation signal possible	

Available sensor types overview

Channel	Input type(s)
1	ICP Input
2	ICP Input

The device properties are:

- number of available sensor inputs,
- number of available additional channels,
- number of available D/A channels,
- maximum number of monitoring configurations,
- maximum number of frequency bands for each monitoring configuration,
- type of the available filter module,
- frequency tracking option;
- demodulation generating option,
- an overview of available sensors on the respective channels.



Note that the performance features of your Dtect X1 / Dtect X1 device depend on the chosen device specification and may not correspond with the information shown in the illustrations.

5.6.2 Device settings

ProCheck

16ch device - Properties of device

Name: 16ch device
 Device location:
 Last call: 1/16/2009 12:17:51 PM
 Software version: 1.1.6.4
 Serial number: 11117707 (= xA9A48B)

Device properties | **Device settings** | Communication settings | Image | Additional information | Advanced settings

Alarm conditions

Alarm occurrences before output: 1
☐ Reset main alarm manually
☐ Reset pre-alarm manually

Password settings

User password:
 Repeat user password:
 Power user password:
 Repeat power user password:

Time zone settings

Device time zone: -60 Minutes

Data file size settings

Critical data file size: 8.0 MB
 Maximal data file size: 15.0 MB

Alarm conditions

- **Alarm occurrences before output:** Enter the number of threshold events before an alarm is given.
- **Reset main alarm manually:** Enable this checkbox to save main alarms until they are manually reset in the Configuration Manager.
- **Reset pre-alarm manually:** Enable this checkbox to save pre-alarms until they are manually reset in the Configuration Manager.

Password settings

Enter the passwords for establishing a connection here (cf. "Passwords" ⁵⁶ for further details).

Time zone settings

Enter the deviation of local ProCheck device time from UTC co-ordinated world time in minutes.

Data file size settings

You can modify the data file size on the ProCheck device here. If the size of the data exceeds the critical file size configured, you can initiate a remote call in case of disk overflow ¹²³. If the maximum data file size is exceeded, the oldest measuring data are deleted!

2ch device - Properties of device

Name	2ch device	Software version	3.6.0.0
Device location		Serial number	83886738
Next call	3/23/2008 12:06:57 PM	Last call	11/8/2006 4:16:28 AM

Device properties | Device settings | Image | Additional information | Advanced settings

Password settings

User password		Repeat user password	
Power user password		Repeat power user password	

Communication settings

☐ Use GSM modem

Initialization	ATS0=1E0&D0&W	+ CR	PIN	
Phone number	02407914994		PIN 2	
Advanced		+ CR	Reinitialization interval	0 min

0 = Disables this feature!

Dial mode: ☐ Pulse dial ☒ Multi-frequency

Replace with device values | Send to device

Password settings

Enter the passwords for establishing a connection here (cf. "Passwords" [56](#) for further details).

Communication settings

Configure the device connection as described in "Setting up device communication" [47](#).

5.6.3 Communication settings



This tab is only used for ProCheck devices.

CAUTION



Loss of data on the ProCheck device if communication intervals are too long

*If you measured data cached on the ProCheck device are not retrieved (by the remote server or manually), the device deletes the oldest records when certain thresholds are exceeded. If you want to manually download data from the ProCheck device during the delete process with the Configuration Manager, they may already have been deleted but this may not have been signalled to the Configuration Manager yet. In this case the Configuration Manager signals that a requested file was not sent by the ProCheck device. **These data are irretrievably lost!***

Because the volume of measured data recorded depends on your system configuration, we recommend using and configuring the remote server accordingly so as to avoid loss of data. If data are only transferred manually, loss of data cannot be ruled out completely.

You can configure the communication channels available on the ProCheck in this tab.

- Serial interface
- modem (via the serial interface)
- Network (via the Ethernet interface)

Also, you can specify the communication mode between a ProCheck device and a remote server.

16ch device - Properties of device

Name: 16ch device Software version: 1.1.6.4
 Device location: Serial number: 11117707 (= xA9A48B)
 Last call: 1/16/2009 12:17:51 PM

Device properties | **Device settings** | Communication settings | Image | Additional information | Advanced settings

Communication settings

Supported communication devices

☒ Serial ☐ Modem ☒ Ethernet

Remote settings | **Serial settings** | Ethernet settings

Remote communication

Preferred communication device: Ethernet

☒ Use remote timer expiration
 Remote timer expires every: 24 h 0 min

☐ Use connection times
 Connection times: []

Max. connection retries: 5 for each remote server address
 Max. connection retries per day: 0 0 = Disables this feature!
 Min. delay between calls: 3 min

Information about communication settings

The volume of measured data recorded depends to a great extent on your individual system configuration. Use the following data volume calculation for a sample configuration to help you choose the appropriate settings. You can determine the appropriate settings for your system with the aid of this information.

Configuration	
Number of monitoring configurations	8
Number of time signals per monitoring configuration	2 (raw and demodulation signal)
Number of samples per time signal	8192
Number of FFT per monitoring configuration	2 (for raw and demodulation signal)
Number of lines per FFT	4096
Number of characteristic values in frequency range	2
Number of characteristic values in time range	2
Interval to save time signals to the ProCheck flash disk	6 h
Interval to save characteristic values to the ProCheck flash disk	10 min.
Interval to transfer measured data to the ProCheck queue	4 h
Interval for remote communication (see also "Remote settings" in this section)	5 h
Data volume	
Total data volume per hour	approx. 200 kB
Total data volume per day	approx. 4.7 MB
Volume per monitoring configuration and day	approx. 600 kB
Number of ProCheck queue items per day	85
Total data volume per year	1.7 GB

Configuration

Note: The data volume caused by alarms cannot be reliably estimated and is therefore not included in this calculation.

Communication devices supported

Select the desired communication devices. Serial connection and modem cannot be selected at the same time as they use the same interface.

Remote settings

In this tab you can specify how a ProCheck device connects to a remote server.

- **Preferred communication device:** Select the communication device to use for communication. If it is not available, the device switches to the next available communication device. If you select **No remote communication**, the device does not communicate autonomously with the PC or remote server.
- **Use remote timer expiration / Remote timer expires every:** You can activate the remote timer and set a delay for the ProCheck device to regularly establish the connection. The timer is reset after this time expires. In many cases a time of 12 hours is sufficient.
- **Use connection times:** Here you can activate a list of times and set a time for the ProCheck device to connect with the remote server. In addition to the list, the specific time is also displayed relative to co-ordinated world time UTC.
- **Max. number of connection attempts n for every remote address:** Restricts the number of connection attempts (minimum 1) per remote address. If a new event occurs in the device, the device attempts to establish a connection with the Remote Server following the expiry of one monitoring cycle. If the connection is established, the data and messages of all events that occurred at the Remote Server to date are transmitted and marked internally in the device as "reported". Events already reported are not reported the next time a connection with the Remote Server is established. If a connection cannot be established with the remote server (telephone line engaged, for example), the device attempts to establish a connection again once the time set at **Minimum delays between connections** has expired. This option can also be used to limit the number of repeat connection attempts per remote address. If a connection cannot be established within this number of attempts a new connection build-up procedure is only started when a new event occurs.
If the **List of remote server addresses** contains multiple servers, the next remote server address in the list is automatically contacted after a failed connection attempt. Every server can be contacted the number of times set in **Maximum number of retries**.
- **Maximum connections per day:** Enter the maximum number of times the device may connect with the Remote Server on any given day (minimum = 1, deactivation = 0).
- **Minimum Delay between connections:** This is the minimum time the device will wait before attempting to connect again once a monitoring cycle has been completed following a failed connection between the device and the Remote Server. In our experience, you should set a time of not less than 5 minutes.

Serial settings

In this section you can configure the serial interface of the ProCheck device (only displayed if you check **Serial**).

- **Baud rate:** Interface speed
- **Serial timeout (sec.):** Communication is stopped if no data is transferred within this time.
- **Packet settings:** These settings should only be changed after consulting our support service (cf. "Contact" ²⁵⁰).

Modem settings

- **Modem type:** Select **Modem** for a landline modem or **GSM** for a GSM modem.
- **Baud rate:** Modem speed
- **Serial timeout (sec.):** Communication is stopped if no data is transferred within this time.
- **Modem initialization:** Enter the AT command sequence for modem initialization here. If your modem requires non-standard commands, please refer to your modem manual.
- **Packet settings:** These settings should only be changed after consulting our support service (cf. "Contact" ²⁵⁰).

Ethernet settings

- **Server port:** Number of the port on which the remote server receives data from the ProCheck device. Must be set to 8000.
- **TCP/IP timeout (sec.):** Communication is stopped if no data is transferred within this time.
- **Packet settings:** These settings should only be changed after consulting our support service (cf. "Contact" ²⁵⁰).

List of remote server addresses

The ProCheck device can communicate with multiple remote servers, which you can specify here. If a connection attempt fails, the next remote server address in the list is automatically contacted. Every server can be contacted the number of times set in **Maximum number of retries**.

- For the modem connection, please enter the phone numbers of the remote servers.
- For the Ethernet connection, please enter the IP address and port number (pattern: <n>.<n>.<n>.<n>:<Port>, e.g. 192.168.0.55:8000).

5.6.4 Advanced settings

You can configure settings for call control and automatic e-mailing of export data and non-response alarms here.

16ch device - Properties of device

Name: 16ch device Software version: 1.1.6.4

Device location: Serial number: 11117707 (= xA9A48B)

Last call: 1/16/2009 12:17:51 PM

Device properties | Device settings | Communication settings | Image | Additional information | **Advanced settings**

☒ **Activate call control**

Next call is expected in: 1 Day(s) 0 h (0 disables this feature)
(A non-response alarm will be raised automatically when the next call is overdue.)

E-mail settings Automatic e-mail notification (via Notify Link)

Here you can define specific e-mail settings.
If you enter nothing, the global e-mail settings (see options) are used.

To: ☐ Send an e-mail in addition to the general address from the e-mail options

Contract number: ☐ Export and send measurement data

Copy text from e-mail options

☒ **Send non-response alarms**


Max. number of alarm e-mails: 5 0 e-mails sent

Copy text from e-mail options

Call control

Define how often a device should call here:

- Activate **Call control** and
- define when you expect the next call from the device. The days and hours input here are added to the time of the **Last call**. The result is the time when the next call is expected.

If the device has not called by the expected time, a clock icon  is displayed next to it in the tree and a non-response alarm is triggered. You can have this alarm e-mailed automatically by the Notify Link software (see "Automatic e-mail notification (via Notify Link)" [168](#)).

E-mail settings (for E-service and Notify Link)

You can define the e-mail settings for sending export data in this section. You can compile and automatically send configurations and measuring data with both the E-service function [134](#) and with the Notify Link software [224](#) for each device in the CM database. By default, the recipient of this e-mail is taken from the details on this tab. If you do not specify a recipient, the global e-mail recipient from the Configuration Manager options [151](#) (for E-service) or from the Notify Link options [226](#) is used.

Proceed as follows to define an alternative e-mail recipient for device export data:

- Enter an e-mail address in "To" and
- if necessary, activate the option to send a copy of this e-mail to the global e-mail recipient. It is displayed below the checkbox for checking.

The contract number and comment can be automatically copied from the program settings.

Automatic e-mailing (via Notify Link)



These settings are only effective if

- *e-mailing is configured in Notify Link and*
- *Notify Link is in run mode.*

The Administrator software does not need to be running.

Export and send measurement data

This function is used to automatically export measuring data and configurations from the CM database and e-mail them via Notify Link.

- Enable the function **Export and send measurement data**.
- Specify the time after which to export data.
- You can limit the data sent by e-mail using the "But only datasets from the last x day(s)" option. The "Only not yet exported data" option prevents resending data already sent (even if they are within the time range configured).

Send non-response alarms automatically

In case a device no longer calls and there is a non-response alarm, you can automatically send an e-mail via Notify Link.

- Activate **Send non-response alarms** and
- set the number of e-mails to automatically send for one and the same alarm event.

Use "Reset" to reset the number of e-mails already sent to "0".



A non-response alarm can only be output if

- *a remote timer has been defined and*
 - *call control expects a call from a device at least once a day (1=minimum, 0=disable).*
-

5.6.5 Read out status report

Status report

The log file can be read out from the device via the **Device > Device log** menu item, provided a connection with the device exists. All important processes are also recorded and can be used as a troubleshooting aid in the event that problems with the device occur. The following messages may be output by the Dtect X1s device:

Message	Meaning
System started	The Dtect X1s device has been switched on or restarted.
Total system reset	A total system reset has been triggered.
Error in global config	Error in device configuration.
Error in modem config	Error in modem configuration.
Loading default configuration	Default configuration has been loaded.
Signal error	The quality check detected an invalid time signal. The time signal was discarded.
PIN lock counter	The content of the PIN lock counter is written into the log file following a restart. If an incorrect PIN is entered when a GSM modem is used the counter counts down by one. If the PIN is entered incorrectly twice the counter is set to zero and the Dtect X1s device will not send a PIN to the modem. The user now has only one more chance to enter the PIN. If this is entered correctly the PIN lock counter is reset, otherwise the PIN lock must be deleted with a PUK and a new PIN must be entered. For more information refer to the operating instructions for your modem. If it is necessary to unlock the PIN using PUK, the Dtect X1s displays an error message and a corresponding entry appears in the status log.
Modem found	A modem has been found.
No modem found	A modem has not been found.
GSM modem registered	The GSM modem has been registered in the network.
GSM modem not registered	The GSM modem could not be registered in the network, the reason for this is also provided.
GSM status unknown	The Dtect X1s has attempted to verify whether the GSM modem is registered in the network but the modem has sent an invalid response.
Can't reset GSM modem	The Dtect X1s device has attempted to trigger a GSM modem reset but has failed.
Init modem done	The modem has been successfully initialized.
Init modem error	The modem could not be initialised.
Modem deactivated	The modem has been deactivated.
Can't detect modem features	The Dtect X1s has attempted to detect the available modem features but the modem has responded incorrectly or not at all.
Modem reset disabled	The modem does not support the reset command which consequently will not be used by the Dtect X1s device.
Baudrate set to ...	The baud rate has been changed.
Invalid baudrate, setting default value	The stored baud rate is not supported and the default baud rate will therefore be used.
Start communication	A connection with the Dtect X1s device has been established.
Reset configurations	The load default configuration command has been sent from the configuration manager. Default configuration is loaded after restart.
Stop communication	Communication has ended.
Reboot system	The Dtect X1s device is restarted after the connection has been terminated.
Received new modem configuration	The Dtect X1s device has received a new modem configuration.
Rejected new modem configuration	The modem configuration received by the Dtect X1s device contained errors.
Set device clock	The Dtect X1s device system clock was reset.
Set update mode	The Dtect X1s device was set to update mode.
Login failed	An incorrect password was entered when attempting to log in.
Start remote communication	The Dtect X1s device is establishing a connection with the Remote Server.

Message	Meaning
Remote connect error	The attempt to establish a connection with the Remote Server has failed. The reason is also provided.
Application connect error	A connection with the Remote Server computer/modem has been established but the Remote Server software is not responding.
Incomplete remote call	The connection was interrupted when transferring data to the Remote Server.
GSM Status:	Status of GSM modem.
Fast COM-Port found	During self test it was discovered that communication with up to 115200 baud (X1S: 230400) is possible.
Standard COM-Port found	During self test it was discovered that communication with up to 38400 baud is possible.
96KB Overlay RAM detected	The additional overlay memory has been found.
Overlay RAM Test failed	The overlay memory is defective.
1MB RAM detected	1MB of memory has been found.
256KB RAM detected	256MB of memory has been found.

5.6.6 Time

Display and synchronize device time

- Right-click the device.
- Click **Device** > **Device time** from the context menu.

Or:

- Click **Device time** in the **Device menu**.

The program displays the device time and system time of your computer.

You can now synchronize the device time with the system time of your computer.

LOSS OF DATA *All data on the device are lost when you synchronize the device time.*



Download all data from the device before synchronizing the time.

- Click **Yes** to synchronize the device time.

The device time is synchronized with your computer. The program disconnects and deletes all data on the device. The device is then restarted.

Or:

- Click **No** to close the window without setting the time.

5.6.7 Firmware version

The firmware version of the selected device can be displayed via the **Device** > **Device version** menu.

5.6.8 Restart



This function is only available for ProCheck devices with firmware version 2.0.4 or higher!

You can reboot the device from the menu: **Device** > **Reboot device**. Although the default configuration is loaded if the "Load default configuration after reboot" option is activated, the communication settings remain unchanged. This means that the modem settings, PIN, telephone number, baud rate, etc. are retained and communication will still be possible following a restart.

5.7 Configure device for remote server

5.7.1 Communication/connection parameters

All connection types that are available for manual operation are also available for remote operation. First configure the ProCheck or Dtect X1s device for the preferred connection type as described in "Set up communication with the device" [47](#).

In order for a device to be able to connect with the remote server, it requires information on how to contact the remote server:

Modem connection

- With a modem connection, this is the telephone number of the modem connected to the remote server. This number must be entered in the modem configuration as described in the section "Set up modem at device" [51](#).

TCP/IP connection

- **Dtect X1s:** With remote operation via TCP/IP, the COM Server carries out the task of assigning an address to the remote server. For this, the COM Server must be configured as a "Socket Client". Further details are provided in the operating instructions for the COM Server. The necessary parameters for configuring the socket client include the IP address of the computer running the Remote Server. Then the port number on which the Remote Server accepts the connection. This port number must also be specified when configuring the remote server. The standard port number is 9000.
- **ProCheck:** In remote operation via TCP/IP, the ProCheck device communicates directly with one or more remote servers. Enter the address(es) in the ProCheck device communication settings (cf. "Communication settings" [64](#)).



- *With the Dtect X1s device, please use Net Utility to configure the communication settings.*
- *With the Dtect X1 device, you must activate the Telnet client in Windows 7 first. This requires administrator rights. Proceed as follows: Open "Control Panel > Programs > Programs and Functions > Turn Windows features on or off", activate "Telnet Client" and click OK. Only then can you establish the connection via the Telnet protocol."Control Panel > Programs > Programs and Features > Turn Windows features on or off" > Telnet Client*

Continue with the device configuration [71](#).

5.7.2 Device configuration



This tab is only displayed in Dtect X1s device configurations.

Remote operation settings in device configuration

- Click the **General settings** tab in the corresponding Dtect X1s device configuration.

2ch device - Device configuration

Name

Konfiguration 2

Overview

General settings

D/A channels

Sensors

Additional channels

Image

Additional information

Alarm conditions

☐ Reset main alarm manually
☐ Reset pre-alarm manually
☐ Do not reset alarm if validation fails.

Alarm occurrences before output

4

Remote settings

Remote communication device

Ethernet

Remote timer expires every

24

h

5

min
☐ Send 'Still Alive' message after remote timer has expired

Max. retries

5

Max. connections per day

10

0 = Disables this feature!

Min. delay between calls

2

min

0

sec

Boot delay

Boot delay at device

10

sec

Alarm conditions

- **Reset main alarm manually:** Enable this checkbox to save main alarms until they are manually reset in the Configuration Manager.
- **Reset pre-alarm manually:** Enable this checkbox to save pre-alarms until they are manually reset in the Configuration Manager.
- **Do not reset alarm if validation fails:** Tick this checkbox to save alarms until validation has been performed successfully.

Remote settings

- **Remote communication device:** Select the preferred connection type.



The settings for the Dtect X1s communication device must correspond to the settings specified in the "Device settings" tab when configuring the communication.

- **Remote timer expires every ... h ... min:** Enter the time that must elapse before the timer expired global event is triggered. Possible settings range between 3 minutes and 96 hours. The start of this time interval can either be the time the Dtect X1s device is switched on or the last "Timer expiry" event.
- **Send 'Still Alive' message when the remote timer has elapsed:** A "Still alive" message is sent when this option is activated. This can be used to monitor and therefore ensure problem-free remote operation, also if no data or alarms are sent. If the "timer expiry" event is not evaluated in any monitoring configuration (i.e. if the "Device calls at elapsed remote timer" option is deactivated in the monitoring configuration), the Dtect X1s only sends a signal to the Remote Server if the "Still alive" option has been activated.
- **Maximum connection attempts:** This option limits the number of connection attempts. If a new event occurs in the Dtect X1s device, the Dtect X1s device attempts to establish a connection with the Remote Server following the expiry of one monitoring cycle. If the connection is established, the data and messages of all events that occurred at the Remote Server to date are transmitted and marked internally in the device as "reported". Events already reported are not reported the next time a connection with the Remote Server is established. If a connection cannot be established with the remote server (telephone line engaged, for example), the Dtect X1s device attempts to establish a connection again once the time set at "Minimum delays between connections" has expired. This option can also be used to limit the number of repeat connection attempts. If a connection cannot be established within this number of attempts a new

connection build-up procedure is only started when a new event occurs.

- **Maximum connections per day:** Enter the maximum number of times the Dtect X1s device may connect with the Remote Server on any given day. If you select "0" an infinite number of connections are permitted.



This option is only available if a firmware version 3.6.0. or later is installed on the Dtect X1s device.

- **Minimum Delay between connections:** This is the minimum time the Dtect X1s device will wait before attempting to connect again once a monitoring cycle has been completed following a failed connection between the Dtect X1s device and the Remote Server.

Continue with the monitoring configuration [73](#).

5.7.3 Monitoring configuration



This tab is only displayed in Dtect X1s monitoring configurations.

In the configuration manager you can specify, separately for each monitoring configuration, the corresponding data and messages for events to be transferred to the Remote Server in the "Remote" tab in the monitoring configuration.

- Click the corresponding monitoring configuration in the **Remote** tab.

Device calls at

This setting can be used to specify which events trigger a remote connection. Select the options you require.

- **Main alarm:** The monitoring configuration triggers a remote connection if a main alarm occurs.
- **Pre-alarm:** The monitoring configuration triggers a remote connection if a pre-alarm occurs.
- **Ring buffer overflow:** The monitoring configuration triggers a remote connection if the characteristic value memory is

full.

- **Remote timer elapsed:** This monitoring configuration triggers a remote connection if the remote timer has expired.



The "Remote timer expiry" event applies globally. This means that one timer is managed in the Dtect X1s device. This timer triggers the "Remote timer expired" event once a preset interval has elapsed. This can then be evaluated by the individual monitoring configurations.

The alarm and characteristic value memory overflow events are known as local events. The response to these local events may be configured separately in the respective monitoring configurations.

The evaluation of events and connection with the Remote Server always takes place at the end of a monitoring cycle to keep the number of required connections to a minimum. This means that messages for several events can be grouped together.

Device sends on call:

Here you can define which data is sent to the Remote Server if one of the events described above has occurred.

Once you have made the settings for remote operation at the Dtect X1s device you must send the new configuration to the Dtect X1s device. The Dtect X1s device restarts once the connection is ended. The remote operation in the Dtect X1s device is now active.

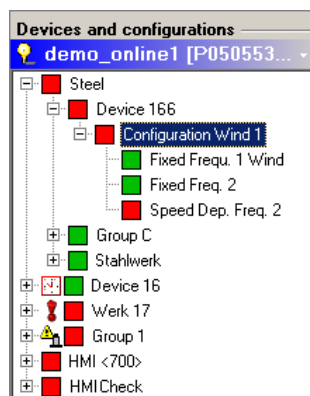
5.8 Device configuration

The device configuration contains all shared monitoring configurations and information to be processed by the device. This information must initially be defined.

Create device configuration

- Click the name of the device for which a configuration is to be created in the left-hand window of the Configuration Manager.
- Right-click the name of the device again and select **Create new device configuration** from the context menu.

The new configuration is inserted under the name of the device.



- Click **Save** in the **Edit** menu to save the current status.

Or:

- Click on  in the toolbar.



- *As long as a device configuration does not contain a monitoring configuration, it is invalid and highlighted yellow in the tree view (see [Invalid configurations](#)^[125]).*
- *You can create a suitable device configuration for each device that accommodates several monitoring tasks.*

Edit name of device configuration

Change the name of the device configuration as follows:

- Click the device configuration in the tree view.
- Enter the new name in the **Name** field in the right-hand window.
- Click **Save** in the **Edit** menu to save the current status.

Or:

- Click on  in the toolbar.

Delete device configuration



When you delete a device configuration, it is deleted along with all monitoring configurations and the associated data from the CM database. It is not possible to restore a deleted device configuration.

Delete a device configuration as follows:

- Right-click the device configuration in the list of **Devices and configurations** and select **Delete** or click **Delete** in the **Edit** menu.
- Click **Cancel** in the confirmation dialog if you do not want to delete the device configuration or **OK** to confirm deletion.



If the configuration to be deleted contains a large number of records (several thousand), the deletion process may take several minutes. During this process, you cannot use the Configuration Manager for any other purpose. If you try to quit the Configuration Manager, the title bar of the program window displays "Not responding" status.

5.8.1 Overview

This tab contains a list of monitoring configurations under the relevant device configuration.

- Click the **Overview** tab in the device configuration.

ProCheck

The overview of monitoring configurations created for the selected ProCheck device displays:

- **Number:** Serial number of the monitoring configuration
- **Monitoring configuration:** Name of monitoring configuration
- **Active:** Green check if the monitoring configuration is active, otherwise empty

If you have assigned bearings to one or more monitoring configurations, they are displayed by monitoring configuration in the **list of bearings**.

16ch device - Device configuration

Name

Overview | Sensors | Additional channels | Digital outputs | Analog outputs | Image | Additional information

Monitoring configuration overview

Number	Monitoring configuration	Active
1	Fixed Frequ. 1 Wind	✓
2	Fixed Frequ. 2	✓
3	Speed Dep. Frequ. 2	✓

Bearings overview

Number	Monitoring configuration	Bearing identifier	Manufacturer	Description	Inner race freq.	Outer race freq.	Rc
1	Fixed Frequ. 1 Wind	Lager 1	Beispiel	Beispiel-Lager 1	6	4	2
2	Fixed Frequ. 1 Wind	Lager 2	Beispiel	Beispiel-Lager 2	6	2	1

Dtect X1s

The overview lists the following for each monitoring configuration:

- Name of **monitoring configuration**
- **number of input channel**
- **input type**
- **sensor type** used to record the signals, and
- **type of characteristic value** used for the monitoring.

If you have assigned bearings to one or more monitoring configurations, they are displayed by monitoring configuration in the **list of bearings**.

2ch device - Device configuration

Name
Konfiguration 2

Overview | General settings | D/A channels | Sensors | Additional channels | Image | Additional information

Monitoring configuration overview

Monitoring configuration	Channel	Input	Characteristic
ISO 10816	1	ICP Input Acceleration sensor	LDZ
Speed und Resonanzbereiche	1	ICP Input Acceleration sensor	selective RMS
Rohsignal bis 200 Hz	1	ICP Input Acceleration sensor	RMS
Lagerfrequenzen	1	ICP Input Acceleration sensor	selective LDZ

Bearings overview

Number	Monitoring configuration	Bearing identifier	Manufacturer	Description	Inn	Out	Roll.ele	Fundam	Fix
1	ISO 10816	Lager 1	Beispiel	Beispiel-Lager 1	6	4	2	0.0001	Ja
2	ISO 10816	Lager 2	Beispiel	Beispiel-Lager 2	5	3	1	0.0001	Ja
3	Speed und Resonanzbereiche Rohsignal	Lager 1	Beispiel	Beispiel-Lager 1	6	4	2	0.0001	Ja
4	Speed und Resonanzbereiche Rohsignal	Lager 2	Beispiel	Beispiel-Lager 2	4	3	1.0001	0.0001	Ja

5.8.2 General settings



This tab is only displayed in Dtect X1s device configurations.

This tab can be used to make settings that influence the behaviour of the system in the event of an alarm, to configure the remote functionality and to define the starting characteristics of the Dtect X1s device.

2ch device - Device configuration

Name

Konfiguration 2

Overview

General settings

D/A channels

Sensors

Additional channels

Image

Additional information

Alarm conditions

☐ Reset main alarm manually
☐ Reset pre-alarm manually
☐ Do not reset alarm if validation fails.

Alarm occurrences before output

4

Remote settings

Remote communication device

Ethernet

Remote timer expires every

24

h

5

min

☐ Send 'Still Alive' message after remote timer has expired

Max. retries

5

Max. connections per day

10

0 = Disables this feature!

Min. delay between calls

2

min

0

sec

Boot delay

Boot delay at device

10

sec

Alarm conditions

The alarm delay is defined in the "Alarm conditions" group field by specifying how often a threshold may be exceeded before the alarm signal is output.

It is also possible here to define how the alarm should be reset: either manually (i.e. using the Configuration Manager [\[31\]](#) or buttons on the control panel of the Dtect X1s device) or automatically (if the cause of the alarm signal no longer exists).

Pre-alarms are reset automatically by default whereas main alarms must be cancelled manually.

You can use the **"Do not reset alarm if validation fails"** checkbox to define how the device should respond if a validation condition is not met (also refer to "Validation" [\[114\]](#)).

- If the checkbox is activated and a validation cannot be found any alarms that exist are not reset. The previous status of alarm LEDs, relays and power outputs before omission of the validation also remains the same. The previous status of the alarm delay counter is also retained.
- If the checkbox is deactivated **AND** the **"Delete main alarm/pre-alarm manually"** option is also deactivated an existing alarm is reset if the validation is missing. The alarm LEDs go out, the relays revert to the idle state and the power outputs produce a quiescent current level of 0 or 4 mA, depending on the configuration. The alarm delay counter is reset to zero.

Remote settings

You can activate the remote functionality here which enables an Dtect X1s device to send a signal to the Remote Server [\[201\]](#) if certain events occur. Input in this dialog box is only possible if the remote function was activated beforehand. For more information refer to "The Remote Server" [\[201\]](#).

Boot delay

You can use this field to specify how much longer the Dtect X1s device should wait in addition to the normal starting time when it is restarted. This means that, where the Dtect X1s device and peripherals are activated centrally, the Dtect X1s device can be prevented from entering measuring mode before all peripherals (such as modem) are ready for operation.

5.8.3 D/A channels



This tab is only displayed in Dtect X1s device configurations.

If the Dtect X1s device is equipped with D/A outputs the signals to be applied at the outputs can be specified here.

The following may be output:

- a current proportional to the characteristic value of a frequency band for a selected monitoring operation or
- a predefined pre- or main alarm current level in the event of an alarm.

The standard amperages are within a range of 4-20 mA. Alternatively, you can select the 0-20 mA range.

2ch device - Device configuration

Name
Konfiguration 2

Overview | General settings | **D/A channels** | Sensors | Additional channels | Image | Additional information

Current range
☒ 4 - 20 mA ☐ 0 - 20 mA

Channel 1
☒ Related characteristic value ☐ Pre-alarm and main alarm limit
 Source configuration: ISO 10816
 Charac. value: 1. Kennwert
☐ Lock to special value
 20 mA correspond to: 0.00 dB

Channel 2
☒ Related characteristic value ☐ Pre-alarm and main alarm limit
 Source configuration: ISO 10816
 Charac. value: 1. Kennwert
☐ Lock to special value
 20 mA correspond to: 0.00 dB

Additional options

Current signal proportional to a characteristic value

The analog signal is proportional to the characteristic value of a monitoring configuration. For the purposes of signal output the characteristic value is linked to the main alarm threshold or a fixed related value.

You can obtain this signal at the desired channel as follows:

- First, select the "Related characteristic value" option in the "Channel" group field.
- Enter the number of the monitoring configuration in "Source configuration" and
- Select the desired characteristic value at "Characteristic value".
- If you do not wish the output current to be dependent on the main alarm threshold activate the "Lock to special value" option. This may be desirable if the main alarm threshold changes in relation to a reference variable through speed-dependent alarm limits.

Current signal in the event an alarm is triggered

The signal can be referenced to:

- the alarm status of a frequency band for a monitoring configuration
- or

- the alarm status of all monitoring configurations



In the alarm-free state a current of 4mA is applied at the output. In the event of a pre- or main alarm this value changes to a value specified by the user. A maximum of 19 mA for pre-alarms and 20 mA for main alarms is possible.

Proceed as follows to obtain the analog signal at a D/A channel:

- First, select the "Pre-alarm and main alarm limit" option in the "Channel" group field.
- Specify the monitoring configuration under "Source configuration" or, if you wish to record all configurations, select the entry "Connect all configurations".
- Finally, select the frequency band.

Invert relay

You can invert the function of the switching relay by activating the checkbox at the bottom of the tab. If this option is activated the rest position of the relay is the alarm position. As this corresponds to the status of a deactivated Dect X1s device this also allows the operating status of the Dect X1s device to be monitored.

5.8.4 Sensors

To configure the properties of the sensors, click the **Sensors** tab in the device configuration.



If you make any changes to the device configuration that affect the monitoring configuration(s), a message is displayed. Click "Yes" to edit the configuration. Click "No" to reset the changes to the device configuration.

ProCheck

16ch device - Device configuration

Name: Configuration Wind 1

Overview | **Sensors** | Additional channels | Digital outputs | Analog outputs | Image | Additional information

Sensor list:

- Sensor 1
- Sensor 2
- Sensor 3
- Sensor 4
- Sensor 5
- Sensor 6
- Sensor 7
- Sensor 8

Sensor details:

Sensor name: Sensor 1

Channel: 1 at connection board row 1

Input type: ICP

Sensor type: Acceleration sensor

Sensor unit: g

Sensitivity: 100.000 mV/g

Offset: 0.000 g

Sensor OK detection:

- ☐ Min. bias voltage: 1.200 V
- ☐ Max. bias voltage: 7.800 V
- ☒ Min. signal level: 2.000 %
- ☒ Max. signal level: 70.000 %

The left part of the dialog displays a list of sensors, while the right side displays the properties of the sensor selected in the list and the sensor function test setting (**sensor OK setting**) under **Sensor details**:



If the ProCheck device has a multiplexer, you must assign the existing ProCheck signal channels to different Multiplexer banks. Otherwise, the ProCheck device cannot perform the measurement.

Examples:

- Sensor 1 on channel 1, sensor 6 also on channel 1 → Measurement **not** possible!
- Sensor 1 on channel 1, sensor 9 on channel 2 → Measurement possible.

Currently, the Configuration Manager cannot prevent a misallocation of channels when using a multiplexer.

- **Sensor name:** Enter a text.
- **Channel:** Sensor input channel number on the ProCheck device (cf. → Slot overview).
- **Input type:** ICP (integrated circuit piezoelectric) is currently the fixed default.
- **Sensor type:** Select the signal for the sensor to measure here (acceleration, acceleration, speed, pressure, particle, etc.).
- **Sensor unit:** Automatically selected depending on the type of sensor, e.g. "g" for acceleration sensors. If you select the sensor type "Engineering Sensor", you can enter a freely definable unit here. In this case the signal must be in the range +/-10 V.
- **Sensitivity:** Unit is automatically selected depending on the type of sensor, e.g. "g" for acceleration sensors.
- **Offset:** Must be indicated if the sensor delivers a steady component. The unit is automatically selected depending on the type of sensor.
- **Min. / Max. bias voltage:** The values 5 V / 15 V are pre-defined.



Only if a multiplexer is installed can you check bias voltage and configure default values.

These settings should only be changed after consulting our support service (cf. "Contact" ²⁵⁰).

- **Min./Max. signal level:** If the sensor signal is below the limits specified here (input in %), the sensor is reported as defective.





Channel and sensor type cannot be changed if the sensor is already being used in a monitoring configuration.


Adding a sensor

- Click on .
- Enter the properties of the sensor in **Sensor properties** and **Sensor OK detection**.
- Click .


Editing a sensor

- Select the sensor from the **sensor list**.
- Click .
- Enter the properties of the sensor in **Sensor properties** and **Sensor OK detection**.
- Click .

Deleting a sensor

- Select the sensor from the **sensor list**.
- Click on .

Sensor overview

Click  to display a list and detailed information of all sensors. The sensor overview is displayed.

Overview												
Channel overview												
Number	Channel name	Channel	Type	Sensor type	Sensitivity	Unit	Offset	Unit	Max. bias voltage	Min. bias voltage	Max. signal level [%]	Min. signal level [%]
1	Sensor 1	1	ICP	Acceleration sensor	100	mV/g	0	g	---	---	70,000	2,000
2	Sensor 2	2	ICP	Acceleration sensor	100	mV/g	0	g	---	---	---	---
3	Sensor 3	3	ICP	Acceleration sensor	100	mV/g	0	g	---	---	---	---
4	Sensor 4	4	ICP	Acceleration sensor	100	mV/g	0	g	---	---	---	---
5	Sensor 5	5	ICP	Acceleration sensor	100	mV/g	0	g	---	---	---	---
6	Sensor 6	6	ICP	Acceleration sensor	100	mV/g	0	g	---	---	---	---
7	Sensor 7	7	ICP	Acceleration sensor	100	mV/g	0	g	---	---	---	---
8	Sensor 8	8	ICP	Acceleration sensor	100	mV/g	0	g	---	---	---	---

Dtect X1s

If the Dtect X1s device is equipped with selectable input types these can be selected individually for the various channels from the list of input types. The sensor type can be selected from a list for each input channel and the sensitivity of each sensor must be entered.

It is also possible to specify which sensor signal should be assigned to the BNC port of the Dtect X1s device.



If a multiplexer is connected to the Dtect X1s device each input channel has a separate sensor output that can be picked up via a BNC port at the multiplexer. In this case no function is assigned to the BNC port of the Dtect X1s device.

2ch device - Device configuration

Name

Konfiguration 2

Overview

General settings

D/A channels

Sensors

Additional channels

Image

Additional information

With BNC socket connected sensor input.

☒ Sensor 1

☐ Sensor 2

Sensor settings

Channel no.	Input type	Sensor type	Sensitivity
1	ICP Input	Acceleration sensor	100.00000149 mV/g
2	ICP Input	Acceleration sensor	100.00000149 mV/g
3			0.00000000
4			0.00000000
5			0.00000000
6			0.00000000
7			0.00000000
8			0.00000000

5.8.5 Additional channels

The additional channels of the device are configured in this tab. These are subsequently available in the validation, alarm and frequency tracking monitoring configurations.

- Click the **Additional channels** tab in the device configuration.



If you make any changes to the device configuration that affect the monitoring configuration(s), a message is displayed. Click "Yes" to edit the monitoring configuration(s). Click "No" to reset the changes to the device configuration.

ProCheck

The left part of the dialog displays a list of additional channels, while the right side displays the properties of the additional channel selected in the list under **Additional channel details**:

- **Channel name:** Enter a text.
- **Channel:** Displays the number of the additional channel on the ProCheck device (cf. "Device properties" → Slot overview). Virtual channels are additionally labelled "Virtual Channel".
- **Input type:** DC (direct current) is currently the fixed default.
- **Sensor type:** Select what signal the sensor measures (acceleration, velocity, pressure, etc.).
- **Sensor unit:** Automatically selected depending on the type of sensor, e.g. "g" for acceleration sensors. If you select the sensor type "Engineering Sensor", you can enter a freely definable unit here. In this case the signal must be in the range +/-10 V.
- **Factor:** Enter the conversion factor between the measured variable and sensor voltage/current. The unit is automatically selected depending on the type of sensor, e.g. "rpm/V" for rotational speed sensors. No unit is displayed for virtual channels.
- **Frequency relation:** This value is required to configure frequency tracking. The value defines the extent to which the reference variable (in other words, the signal measured at the additional channel) influences the position of the frequency bands in the frequency spectrum. The unit used to express the frequency relation is [Hz] / [unit]. Example: If you measure the rotational speed [rpm] at the auxiliary channel, the frequency relation is 1 Hz/60 rpm which means that 1 Hz in the frequency spectrum corresponds to 60 rpm. The unit is automatically selected depending on the type of sensor. No unit is displayed for virtual channels.
- **Offset:** Must be indicated if the additional channel delivers a steady component. The unit is automatically selected depending on the type of sensor. No unit is displayed for virtual channels.

Sample calculation for a rotational speed signal (1-1000 rpm) available as an analog signal (4-20 mA or 2-10 V).

Select rotational sensor as sensor type and enter the factor: 1000 rpm must be divided over a bandwidth of 10 V

- 2 V = 8 V or 20 mA - 4 mA = 16 mA, therefore: factor = 1000 rpm / 8 V = 125 rpm/V.
Enter the offset dependent on the factor. In this example, the signal is offset by 2 V, i.e. by a rotational speed of 2 V * 125 rpm/V = 250 rpm. Therefore: Offset = -250 rpm.

- **Digital input:** Must be enabled if the additional channel is a digital input. Not available for virtual channels.

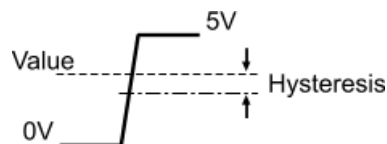


- You can only enable this field if a rotational speed sensor (rpm) or a rotational frequency sensor (Hz) was selected.
- Observe the information regarding configuring digital input signals in the ProCheck manual. Digital input signals are fed into the ProCheck device via a voltage divider that limits input voltage to max. 6 V.

- **Trigger on rising edge:** Must be enabled if you want the channel to switch to "1" if the signal exceeds the input level defined in **Value**. If this checkbox is not checked, the channel switches to "1" if the signal displays a falling edge, i.e. if it drops below the input level defined in **Value**.
- **Level:** Input level that, if exceeded (rising edge) or not reached (falling edge), causes the digital input to switch to "1".
- **Hysteresis:** Range in which the input level may drop below or exceed the level defined in **Value** without the input changing state.
- **Pulse factor:** Enter the number of pulses that the sensor delivers per rotation.

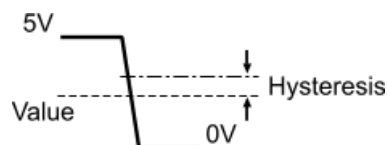
Example of trigger on rising edge:

In the following example these settings were chosen: **Trigger for rising edge** = enabled, **Value** = 3 V, and **Hysteresis** = 1 V. The auxiliary channel switches to "1" if the input level displays a rising edge and exceeds 3 V. Only when the input level drops below 2V (Value - Hysteresis) again does the additional channel switch back to "0".



Example of trigger on falling edge:

In the following example these settings were chosen: **Trigger for rising edge** = disabled, **Value** = 3 V, and **Hysteresis** = 1 V. The auxiliary channel switches to "1" if the input level displays a falling edge and drops below 3 V. Only when the input level rises above 4V (Value + Hysteresis) again does the additional channel switch back to "0".



Add additional channel

- Click on
- Enter the properties of the additional channel in **Additional channel details**.
- Click .

Edit additional channel

- Select the additional channel from the **list of additional channels**.
- Click .
- Enter the properties of the additional channel in **Additional channel details**.
- Click .

Delete additional channel

- Select the additional channel from the **list of additional channels**.
- Click on .

Additional channel overview

Click  to display a list and detailed information of all additional channels. This displays a list of additional channels.

Overview												
Additional channel overview												
Number	Channel name	Channel	Input type	Sensor type	Factor	Unit	Offset	Unit	Digital input	Rising edge	Level (V)	Hysteresis (V)
1	Drehzahlsignal	1	DC	Speed sensor (Hz)	3.52	Hz / V	0.00	Hz	---	---	---	---
2	Leistungssignal	2	DC	Load sensor	10.66	% / V	0.00	%	---	---	---	---

OK

Dtect X1s

2ch device - Device configuration

Name

Konfiguration 2

Overview

General settings

D/A channels

Sensors

Additional channels

Image

Additional information

Define channels

Additional channel 1

Signal type

Speed input

Name

1. Validierer

Unit

RPM

Sensitivity

1.0000

RPM / V

Frequency relation

0.0167

Hz / RPM

Additional channel 2

Signal type

Name

Unit

Sensitivity

1.0000

Frequency relation

1.0000

Signal type

You can initially select one of several input types from this list box (rotary speed input, rotational frequency input, load input and free input) depending on the signal type you wish to use with the additional channels. If the required signal type is not available you can specify the sensor unit itself at "Free input".

Name

You can assign a name to an additional channel in the Name field. This name is used in the monitoring configurations for subsequent configuration. If the name "engine speed" is entered here for example, you will be able to access the corresponding additional channel in the monitoring configurations using this name.

Unit

If you selected the "Free input" signal type you can enter a unit here that corresponds to the input signal measured. The input is limited to a maximum of 6 characters. If you selected a predefined signal type this field is filled out automatically and cannot be changed.

Sensitivity

You can enter the sensitivity of the sensor used in this field. The sensitivity is expressed as [unit] / [volt].

Frequency relation

This value is required to configure frequency tracking. This value defines the extent to which the reference variable (in other words, the signal measured at the additional channel) influences the position of the frequency bands scaled in [Hz] in the frequency spectrum. The unit used to express the frequency relation is [Hz] / [unit].

Example: If you measure the rotational speed [rpm] at the additional channel, the frequency relation is 1 Hz/60 rpm which means that 1 Hz in the frequency spectrum corresponds to 60 rpm.



If you plan to carry out speed-dependent tracking of frequency bands or alarm limits for monitoring configurations to be defined at a later date, you must specify the additional channel that is connected to the speed sensor here.


5.8.6 Digital outputs



This tab is only displayed in ProCheck device configurations.


If the selected ProCheck device has digital outputs, you can set their properties in this tab.

The left part of the dialog displays a list of digital outputs, while the right side displays the properties of the output selected in the list under **Digital output details**:



- **Output name:** Enter a text.
- **Channel:** Channel number of the digital output on the ProCheck device (cf. "Device properties"  → List of connectors).
- **Inverted:** Must be enabled if you want to invert the output signal.

Add digital output


- Click on .

- Enter the properties of the output.
- Click .


Edit digital output

- Select the digital output from the **List of digital outputs**.
- Click .
- Enter the properties of the output.
- Click .

Delete digital output

- Select the digital output from the **List of digital outputs**.
- Click on .

Overview of digital outputs

Click  to display a list and detailed information of all digital outputs. This displays a list of digital outputs.

Overview			
Digital output overview			
Number	Output name	Channel	Inverted
1	Digital output 1	1	---
2	Digital output 2	2	---
3	Digital output 3	3	---
4	Digital output 4	4	---
5	Digital output 5	5	---
6	Digital output 6	6	---
7	Digital output 7	7	---
8	Digital output 8	8	---

OK



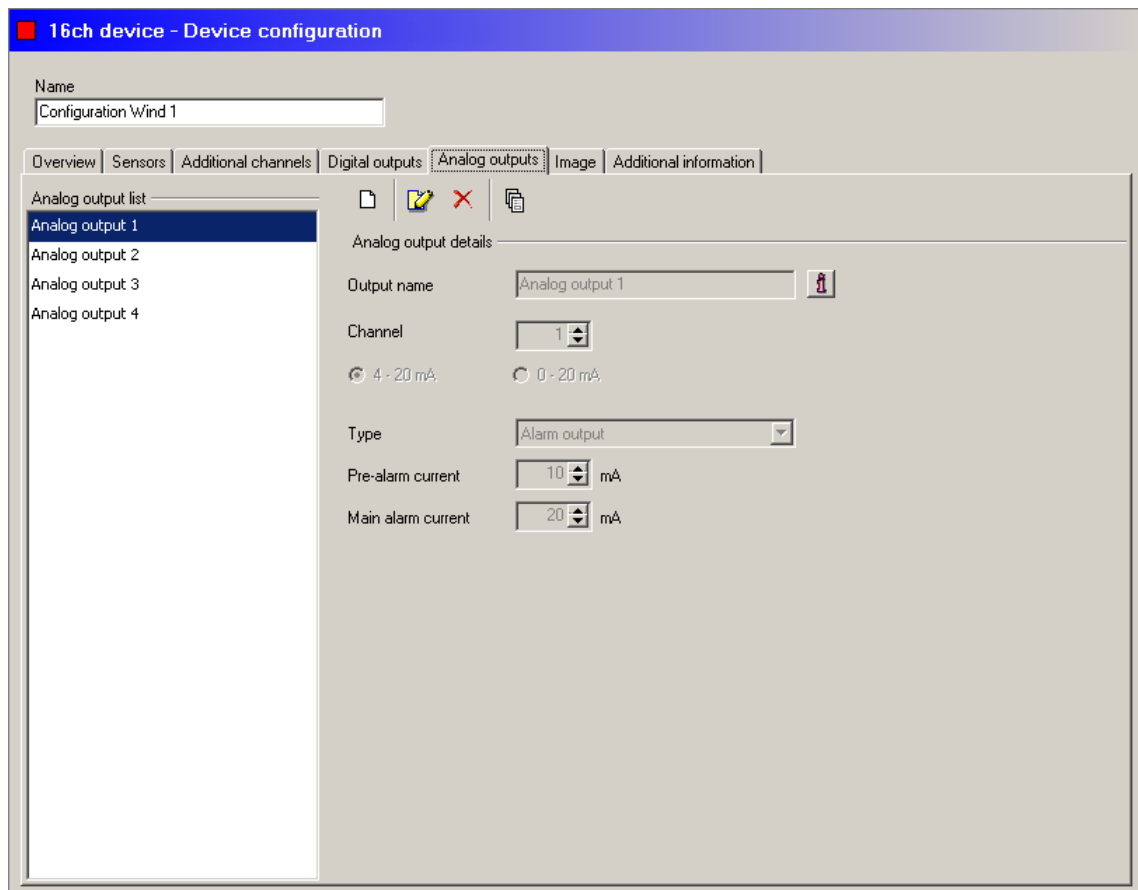
If you make any changes to the device configuration that affect the monitoring configuration(s), a message is displayed. Click "Yes" to edit the configuration. Click "No" to reset the changes to the device configuration.

5.8.7 Analog outputs




This tab is only displayed in ProCheck device configurations.



If the selected ProCheck device has analog outputs, you can set their properties in this tab.





The left part of the dialog displays a list of analog outputs, while the right side displays the properties of the output selected in the list under **Analog output details**:

- **Output name:** Enter a text.
- **Channel:** Channel number of the analog output on the ProCheck device (cf. "Device properties"  → List of connectors).
- **Current range:** Select the range in which the current must be here. It is automatically selected if you choose **Related value** as the type of analog output.
- **Type:** Select the type of analog output
 - **Alarm output:** In the event of a pre-alarm/main alarm, the current defined below is applied to the output.
 - **Related value:** The output signal is proportional to the characteristic value of a monitoring configuration. For signal output, the characteristic value is related to a fixed related value (cf. monitoring configuration → Characteristic values .
 - **Main alarm related value:** The output signal is proportional to the characteristic value of a monitoring configuration. For signal output, the characteristic value is linked to the main alarm threshold.
- **Pre-alarm current:** Enter the value in mA that the ProCheck device applies to the output to signal a pre-alarm. You can only input a value if you have selected the **Alarm output** setting in **Type**.
- **Main alarm current:** Enter the value in mA that the ProCheck device applies to the output to signal a main alarm. You can only input a value if you have selected the **Alarm output** setting in **Type**.


Add analog output

- Click on .
- Enter the properties of the output.
- Click .


Edit analog output

- Select the analog output from the **analog output list**.
- Click .
- Enter the properties of the output.
- Click .

Delete analog output

- Select the analog output from the **analog output list**.
- Click on .

Analog output overview

Click  to display a list and detailed information of all analog outputs. This displays the analog output overview.


Overview							
Analog output overview							
Number	Output name	Channel	Type	0 - 20 mA	4 - 20 mA	Pre-alarm (mA)	Main alarm mA
1	Analog output 1	1	Alarm output	---	X	10	20
2	Analog output 2	2	Related value	---	X	10	20
3	Analog output 3	3	Alarm output	---	X	10	20
4	Analog output 4	4	Main alarm related value	---	X	10	20



If you make any changes to the device configuration that affect the monitoring configuration(s), a message is displayed. Click "Yes" to edit the configuration. Click "No" to reset the changes to the device configuration.

5.8.8 Image

You can store a suitable image for the configuration (for example) here. You can use either JPEG or BMP files.

- To do this click on  and select the file that contains the preferred image using the selection dialog box.
- Follow the same procedure as above if you wish to change the image.

Click on  to delete the image and click on  to print it.

5.8.9 Additional information

Additional information can be entered in this field as required.



The data entered here is stored in the CM database^[33] currently being used, and not in the device. If a configuration is read out from a different database, the above information will no longer be available.

5.8.10 Import device configuration from device

You can read out a device configuration e.g. in order to

- add a new device to the CM database with the existing configuration or
- update the configuration in the Configuration Manager after changing the device configuration.

New registration of a device configuration in the configuration manager

Proceed as follows if you wish to register a new device configuration for a device in the configuration manager:

- First, establish a data connection^[58] between the configuration manager and device.
- Open the context menu under the name of the device in the configuration manager then go to the corresponding sub-menu under the **device** menu item.
- Select **Read device configuration and create** from this sub-menu.

The configuration is then read out from the device and entered as a device configuration in the configuration manager.

- To resume measuring mode you should now end the data connection.

Update configuration of a device in the configuration manager

It is important to carry this out if you have made changes to a device configuration at the device itself and wish to adapt this configuration in the configuration manager.

- First, establish a data connection ^[58] between the configuration manager and the Dtect X1s device.
- Open the context menu on the name of the device configuration you wish to update, click **Device**, then click **Send device configuration to device**.

The configuration is now updated.

- To resume measuring mode you should now end the data connection.

5.8.11 Send device configuration to device

If you wish to reconfigure a device, a new device configuration must initially be created in the configuration manager (see "Create device configuration ^[74]" and "Create monitoring configuration ^[90]") and sent to the device.

First, establish a data connection between the configuration manager and device (see "Connection with a device" ^[58]).

- Then open the context menu by right-clicking the mouse on the device configuration that you wish to send in the configuration manager and click **Device**.
- Select the **Send device configuration to device** menu item and wait until the transfer is complete.
- End the connection if you do not wish to carry out any further operations.



From here, first-time users can change to "Reset and update alarm status ^[132]", where an explanation is provided on how the configuration manager can be used to reset an alarm.

5.8.12 Search for device configuration

Once the configuration manager has established a connection with a device you can search for a device configuration in the database that matches the connected device.

- To do this, right-click the device and select **Device > Search for current device configuration in database** from the context menu.

5.9 Monitoring configuration

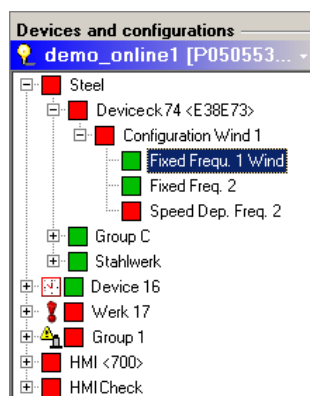
Depending on the features of the ProCheck or Dtect X1s device in use, every device configuration can process different monitoring modes for different input signals or types of characteristic values. The information required for this, such as the maximum frequency of the low-pass filter, characteristic value type, location and width of frequency bands and alarm limits comprises the monitoring configuration. These are carried out one after the other in monitoring mode.

In order to be executed, a monitoring configuration must be activated.

Set monitoring configuration

- In the tree view, click the device configuration for which a new monitoring configuration should be defined.
- Right-click again on the device configuration and select **Add sub-item** from the context menu.

The new configuration is inserted under the name of the device configuration.



- Click **Save** in the **Edit** menu to save the current status.

Or:

- Click on  in the toolbar.

Activate monitoring configuration

- Check the **Active configuration** checkbox..

Edit name of monitoring configuration

Change the name of the monitoring configuration as follows:

- Click the monitoring configuration in the tree view.
- Enter the new name in the **Name** field in the right-hand window.



Please note that the characters <, >, &, ' and " cannot be used in monitoring configuration names.



- Click **Save** in the **Edit** menu to save the current status.

Or:

- Click on  in the toolbar.

Delete monitoring configuration



- If you delete a monitoring configuration that contains no measuring data, this monitoring configuration is deleted from the CM database and cannot be restored.
- If you delete a monitoring configuration that contains measuring data, a copy of the higher-level device configuration is created first. The monitoring configuration to be deleted is then deleted from this copy and then the device configuration is activated. This modified device configuration should be sent to the device (cf. "Send device configuration to device" ). The original device configuration, including the deleted monitoring configuration, is disabled and hidden. You can display the "old" data at any time (cf. "Outdated configurations" .

- Right-click the monitoring configuration in the list of **Devices and configurations** and select **Delete** or click **Delete** in the **Edit** menu.
- Click **Cancel** in the confirmation dialog if you do not want to delete the monitoring configuration, or **OK** to confirm deletion.



If the configuration to be deleted contains a large number of records (several thousand), the deletion process may take several minutes. During this process, you cannot use the Configuration Manager for any other purpose. If you try to quit the Configuration Manager, the title bar of the program window displays "Not responding" status.

5.9.1 Data

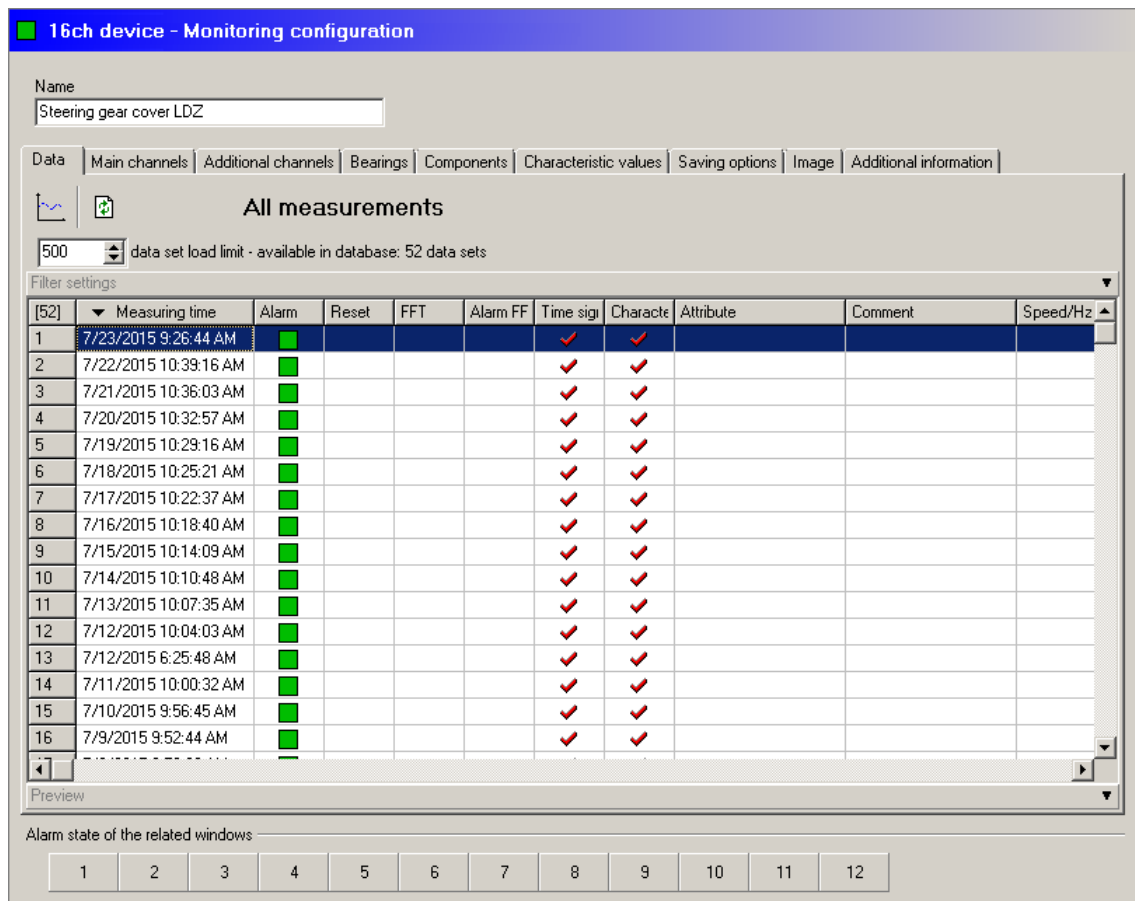
This tab displays an overview of the measuring data available for the monitoring configuration.

Select the measuring data as follows:

- Expand the relevant device in the tree view until you reach the measuring data level.
- Click the monitoring configuration and then on the **Data** tab to display all measurements.

Or:

- Click the appropriate measuring data in the tree view (FFTs, time signal, characteristic values) and then on the **Data** tab to display the measured data of the selected type.



The following information is displayed:

- Measuring time
- Alarm status:
 - - Green if there is no alarm in the monitoring configuration.
 - - Yellow if there is a pre-alarm in the monitoring configuration.
 - - Red if there is a main alarm in the monitoring configuration.
- The alarm was acknowledged: If you manually reset an alarm (cf. Reset alarm status ¹³²), the measuring data entry is marked with a check.
- Low level (ProCheck only): The level of the measured and filtered signal is too low and therefore so is the signal-to-noise ratio. The cause may be, for example, a defective sensor or faulty filter configuration. The display refers to the signal level at the time of measuring. The current signal level may thus deviate.
- Channel:: Sensor channel used for measurement.
- Signal type (ProCheck only): Indicates whether the raw signal or the demodulation signal is measured on the sensor channel.
- FFT, time signal, characteristic values: A check indicates the data contained in the measuring data entry.
- Attribute: Textbox in which you can enter up to 100 characters.
- Comment: Textbox in which you can enter any text.
- Rotational speed: Double-click on a rotational speed to edit it.
- Additional channels: One column containing the associated measured value is displayed for each additional channel defined in the monitoring configuration.

Limit records displayed

With the aid of the "Dataset load limit" you can limit the number of datasets displayed. The limit begins with the most recent dataset.

- Configure how many datasets to display and
- click on

If you set the dataset load limit to "0", all datasets in the database are displayed.

Sort columns in ascending/descending order

You can sort a column in ascending order (A-Z, 0-9, pre-alarm-alarm, etc.) or in descending order (Z-A, 9-0, alarm-pre-alarm, etc.) by double-clicking on the column header. You can reset this setting by selecting "Default sorting" in the context menu.


5.9.1.1 Working with measured data

Filter measuring data

You can filter the entries displayed in the measuring data view according to the following criteria:

- alarm status,
- time range,
- measured values of additional channels.


Define filter settings

- Click the black arrow in the filter settings section.
- Configure filter settings and
- click on .



Click on the black arrow again to minimise the filter pane.



- *If you change the filter settings you will need to refresh the view. Click  on the toolbar or press CTRL+R.*
- *When the filter settings are enabled, the table of measuring data is displayed with a yellow background. In addition, "Filtered view - Refer to filter settings" is displayed in the table header to show that you may not be seeing all measuring data, depending on the filter settings.*

16ch device - Monitoring configuration

Name:

Data | Main channels | Additional channels | Bearings | Components | Characteristic values | Saving options | Image | Additional information

All measurements

500 data set load limit - available in database: 52 data sets

Filter settings

Select alarm state

☒ No alarm ☒ Pre-alarm ☒ Main alarm

☐ Time range

Start date: 05.07.2015 00:00:00

End date: 05.08.2015 00:00:00

[52]	▼ Measuring time	Alarm	Reset	FFT	Alarm FF	Time sign	Character	Attribute	Comment	Speed/Hz
1	7/23/2015 9:26:44	■				✓	✓			3.08
2	7/22/2015 10:39:16	■				✓	✓			4.18
3	7/21/2015 10:36:03	■				✓	✓			4.21
4	7/20/2015 10:32:57	■				✓	✓			2.28
5	7/19/2015 10:29:16	■				✓	✓			2.82
6	7/18/2015 10:25:21	■				✓	✓			4.71
7	7/17/2015 10:22:37	■				✓	✓			2.08

Preview

Alarm state of the related windows

1 2 3 4 5 6 7 8 9 10 11 12

Select alarm status

Select the **No alarm**, **Pre-alarm** and **Main alarm** statuses to display corresponding entries.

Select time range

Select this option to view data from a specific period only. Enter the start and end time.

Filter by comments and attributes

Select this option to view data with certain comments and attributes only. You can refine the search results by selecting "equals", "starts with" or "includes".

Select signal level state

You can show or hide below-threshold signals and signals with sufficient level here.

Select sensor channel

Select the sensors whose measured data you wish to display.

Select signal type

You can show or hide raw signal/demodulation measured data here.

Limit additional channel value range

Select this option to filter the displayed measurements depending on the values of the additional channels.

- ProCheck: You can select an independent upper and lower limit for each of the additional channels defined in the monitoring configuration.
- Dtect X1s: You can select an independent upper and lower limit for the two available additional channels.

Reset filter settings

- Right-click the selection and select **Reset filter settings**.
This resets filter settings and refreshes the measuring data view.

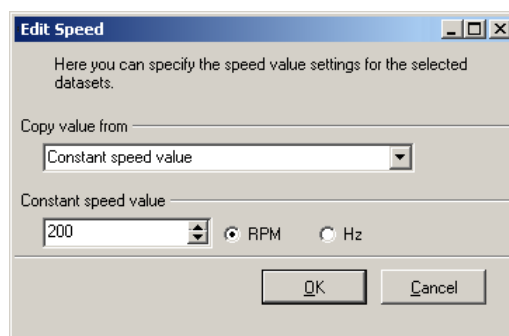
Edit rotational speed

You can edit the rotational speed value of one or more datasets in measuring data view.

- Double-click on a rotational speed field and enter a rotational speed.
- Click on **Save**.

Or:

- Select one or more datasets and
- right-click on a rotational speed field and select **Edit rotational speed**.
- Configure the rotational speed settings and click **OK**.



In **Copy value from** you can

- enter a constant rotational speed value.
- use the value of a validator or additional channel for the rotational speed.
- add a certain fixed value (offset) to the current rotational speed value.
- multiply the current rotational speed value by a certain factor.

Calculate FFTs from time signals

If there are measuring data with time signals but without FFTs, you can calculate FFTs at a later time.

- Select several datasets and
- right-click on the highlighted area.
- Select **Calculate FFTs from time signals** from the context menu.

Measuring data preview

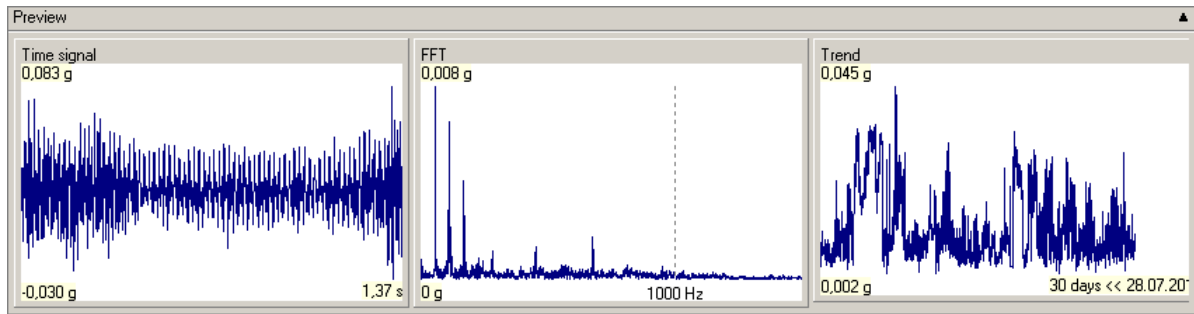
A preview is displayed at the bottom of the measuring data view. You can display the time signal, FFT and/or trend as a preview for the selected dataset.

- Select a dataset and
- click the black arrow in the preview bar.



Use the "Up" ↑ and "Down" ↓ arrows on your computer keyboard to navigate quickly through the items.

Click on the black arrow again to minimise the preview pane.



The following information and functions are available here:

- Time signal** The following information is displayed next to the graphic:
- Lower / upper value (Y-axis)
 - Signal length (bottom right)
- FFT** The following information is displayed next to the graphic:
- Lower/upper value (Y-axis)
 - Low-pass (bottom right): A value of **1000 Hz**, for example, indicates usable values up to 1000 Hz.
- Trend** The trend display provides a first indication of whether there is a trend at all. The following information is displayed next to the graphic:
- Lower/upper value (Y-axis)
 - Number of days until the current date (bottom right): The trend displayed is limited to this period. You can display the complete trend in FAG Viewer, where you can also configure how many days to display. This setting is found in **Extras > Options > Trend diagram**.
- Trend context menu** Right-click on the trend preview to call up the context menu. This context menu is only available for tracked rotational speed values, but not for fixed windows. The following display options are available here:
- **Trend:** The entire range is displayed with all rotational speeds.
 - **Filtered trend:** The area displayed is limited according to the selected dataset and depending on the rotational speed.
 - **Trend and filtered trend:** These two display options are highlighted in colour. You can then compare the trend values at different rotational speeds.
 - **Speed filter range:** This option opens a window in which you can set the rotational speed range in %.

View measuring data in Viewer

You can view **one** data set in the FAG Viewer as follows:

- Double-click the entry in the measuring data view.

Or:

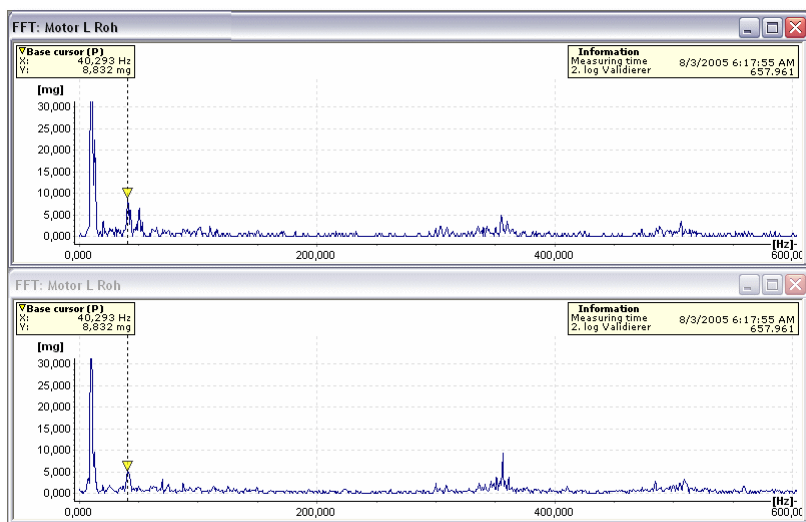
- In the **View** menu, click **Show data in Viewer > Show data in Viewer**.

Or:

- Right-click the entry in the measuring data view. Select **Show data in Viewer** from the context menu.

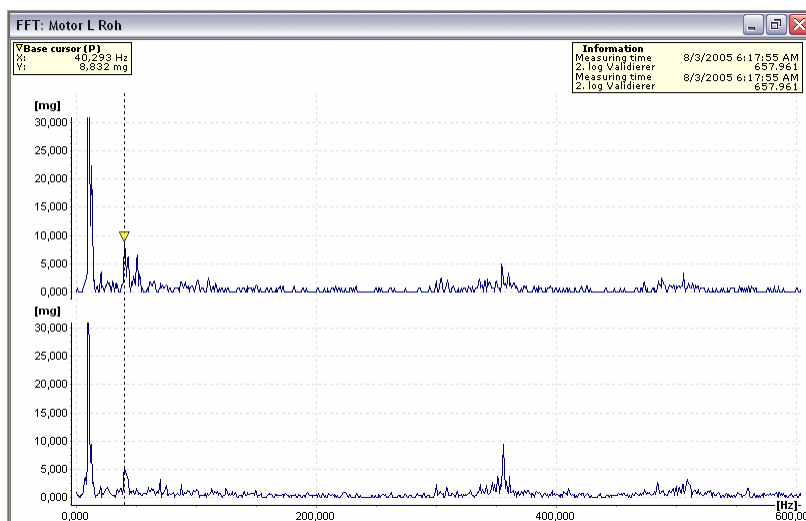
You can view several data sets in the FAG Viewer as follows:

- Select the required measuring data. Use the Shift or CTRL key to select several datasets.
- In the **View** menu, click **Show data in Viewer**.
- Click **Every signal in separate diagram** to open each dataset in a separate window.



Or:

- Click **Signals of same type in one diagram** to display the selected records in a diagram with their own axes.



Or:

- Right-click the entry in the measuring data view. Select **Show data in Viewer** from the context menu with the appropriate display option.

Or:

- Click on .

5.9.2 General details



This tab is only displayed in Dtect X1s monitoring configurations.

You can specify the following settings in this tab:

- the variable type being monitored for the input channel to be used,
- characteristic value type, as described in the section "Monitoring types in frequency range";
- low-pass filter cutoff frequency,
- amplification;
- overload detection,
- window evaluation of time signal for FFT calculation;

- DC component suppression and
- maximum frequency of high pass filter where an demodulation signal is to be generated

Input channel

Select the channel containing the signals to be processed from the list box of the same name. The entries contain the number of the channel and the sensor type.

Set particle counter

Click **Set particle counter** to automatically configure all default settings for the "Particle counter (Fe/nFe)" sensor type (see "Set pre-defined characteristic values" [\[116 \]](#)).

Characteristic value mode

You can enter one of the characteristic value types presented in the "Monitoring types in frequency range" section here. All characteristic values with the exception of time range monitoring are calculated from the frequency spectrum of the recorded time signal. With time range monitoring, characteristic values are monitored directly from the time range and the frequency spectrum calculation is omitted.

Characteristic value type	Meaning
ISO 10816	RMS of velocity between 10 Hz and 1 kHz
LDZ	High-bandwidth LDZ _N value between 0 Hz and low pass cutoff frequency
RMS	High-bandwidth RMS value between 0 Hz and low pass cutoff frequency
Selective LDZ	LDZ _N value in fixed frequency bands
Selective RMS	RMS in fixed frequency bands
Selective LDZ tracked	LDZ _N value in frequency bands subject to speed-dependent tracking. For this, an additional channel with speed signal must be defined (see "General settings" [77]).
Selective RMS tracked	RMS value in frequency bands subject to speed-dependent tracking. For this, an additional channel with speed signal must be defined (see "General settings" [77]).
Time domain monitoring	Monitoring of the time signal using the characteristic values specified.

LDZ value in g

If one of the LDZ characteristic values is selected it is possible to choose between the units g and dB. For g the "LDZ values in [g]" option must be selected.



Observe that this unit will also be used for the tracking of alarm thresholds. If a value in dB appears here, the value calculated from the supporting points is added to the alarm limits (as this is a logarithmic value). In the case of g values these are multiplied by the alarm limits.

Monitored parameter

If the characteristic value selected is an RMS value and an acceleration sensor is selected, you can select in the group field whether you wish to convert the acceleration signal by integrating it into a speed signal or a distance signal. You can make your selection in the group field. This option is only available for RMS values calculated from the frequency spectrum and not for the characteristic values of time domain monitoring.

LDZ_N values can only be monitored using an acceleration signal and monitoring in accordance with ISO 10816 is only possible using a speed signal. The standard unit for LDZ characteristic values is dB. However, if you wish to display LDZ values with the unit g select the "LDZ values in [g]" option. Observe that this unit will also be used for the speed-dependent alarm limits. If a value in dB appears here, the value calculated from the supporting points is added to the alarm thresholds (as this is a logarithmic value). In the case of g values these are multiplied by the alarm limits.

Low-pass

The low-pass filters out the useful frequency range from the time signal which is either a raw signal or demodulation signal. The cutoff frequency must therefore be adapted to the frequency ranges which are to be monitored.

You can make this adjustment in the "LP cutoff frequency" list box. The available values depend on the low-pass module you have selected for your Dtect X1s device.

Click on  to display more detailed information on the selected cutoff frequency:

Information about selected low-pass	
Low-pass:	
1000	Hz
Sample rate	
3000	Hz
FFT resolution	
0.73	Hz
Measurement period	
0: m : 1: s : 365: ms	
<input type="button" value="OK"/>	

With the ISO 10816 characteristic value type, the low pass cutoff frequency is automatically set to 1000 Hz. In the case of "tracked" characteristic values, the system automatically sets the low pass cutoff frequency to the optimum frequency range obtained from the configuration of the monitored frequency bands.

Sample rate and number of measured values

The sample rate is always set at three times the cutoff frequency of the low pass. 4096 measured values are recorded during each measurement. The duration of a measurement can be obtained by dividing the number of measured values by the sample rate.



Please observe that the low pass cutoff frequency and the sample rate are set automatically for tracking of RMS or LDZ values.

Amplifier setting

The input signal is amplified in an initial stage directly behind the input. A second amplifier stage is located behind the low pass.

The amplification is set automatically if the entry "Automatic" is selected in the "Stage 1" list box. Suitable amplification factors are determined via a preliminary measurement and subsequently used for the actual measurement.

The amplification factors at both stages can also be manually applied. The following options are available:

Amplifier stage	Amplification factor
1. Level	1, 2, 4, 8, 32, 64, 128
2. Level	1, 2, 4, 8



If the amplifier is adjusted manually the amplitudes of the input signal should be precisely known to prevent overloading.

Overload detection

This checkbox can be used to switch the automatic overload detection on or off. If the input signal contains individual a high amplitude pulses the signal chain may become overloaded. The Dtect X1s device interrupts the measurement of the monitoring configuration and begins the next one. If a configuration is always to be measured the overload detection can be deactivated.

Windowing of time signal

Here you can specify whether or not you wish the time signal for monitoring operations in the frequency range to be evaluated using a Hanning windowing operation.

High-pass cutoff frequency

If a LDZ value is selected for monitoring purposes, the demodulation signal is formed from a raw signal using a high-pass (amongst others). The maximum frequency of the high-pass can be specified in the "High-pass cutoff frequency" group field. The possible values are 2 kHz and 750 Hz.

DC component suppression

Mark this item if you wish to suppress the DC component of the recorded time signal. This occurs automatically when generating an demodulation.

Signal configuration

Where a LDZ_N value is used for monitoring, the "demodulation signal" or otherwise "Raw signal" option is checked here.

5.9.3 Main channels



This tab is only displayed in ProCheck monitoring configurations.

16ch device - Monitoring configuration

☒ Active configuration

Name
Pump

Data | Main channels | Additional channels | Bearings | Components | Characteristic values | Saving options | Image | Additional information

General settings

Window selection: Fixed windows

Additional channel for window selection: No channel

Additional channel for alarm calculation: Add_channel_1

Sensor/filter settings overview

Sensor/filter combination list

Sensor 10

Sensor/filter combination settings

Selected sensor: Sensor 10 at channel 10 (at connection board row 2)

Raw signal

☒ Filter raw signal

High-pass frequency (Hz): 0

Low-pass frequency (Hz): 1000

No. of samples: 4096

Demodulation signal

☒ Filter demodulation signal

High-pass frequency (Hz): 2000

Low-pass frequency (Hz): 1000

No. of samples: 4096

FFT settings

Windowing function: Hanning

Characteristic value calculation

Characteristic value unit: g

Number of integrations: None

The characteristic values are measured in g.

☒ Remove DC level

ISO 10816 settings

General settings

- **Window selection:** Select whether to monitor with fixed or speed-tracked frequency bands or whether to perform an order analysis^[28]. If you want to track frequency bands, you must measure the speed on an additional channel. In this case, select the additional channel with the speed signal in **Additional channel for window selection**.



You can only select the order analysis if

- the ProCheck device is running with a firmware version 2.0.0.0 or newer,
- no more than one sensor/filter combination is defined (raw signal or demodulation),
- no characteristic values of the "time range" type exist and
- the rotational speed to measure is in the range from 0.6 Hz to 4500 Hz.

If you select order analysis although more than one sensor/filter combination is defined, a warning is displayed and the previous window selection setting is restored.

If any "time range" characteristic values are defined in the monitoring configuration, a warning is displayed and the Configuration Manager asks you whether to delete these characteristic values. Click **OK** to delete the "time range" characteristic values and activate order analysis. Click **Cancel** to keep the "time range" characteristic values and not activate order analysis.

- **Additional channel for window selection:** From the Additional channels^[82] defined in the device configuration, select the channel which sends the speed signal for the speed-dependant tracking. Not available for order analysis.
- **Rotational speed channel for order analysis:** From the Additional channels^[82] defined in the device configuration, select the channel which supplies the speed signal for order analysis. Only available for order analysis. Measuring inaccuracies may result with analog or virtual additional channels.
- **Additional channel for alarm calculation:** If you want to monitor with speed-tracked alarm thresholds, select the channel to track the alarm threshold speed from the Additional channels^[82] defined in the device configuration. Only then can you enable the **Tracked alarms** option in the Characteristic values^[110] tab.

Sensor and filter settings

In this section you can assign filter settings to the sensors defined in the device configuration (cf. "Sensors"^[80]).

Observe the following restrictions:

- You can filter up to four signals at the same time. That means a maximum of four sensor/filter combinations if you filter the raw **or** demodulation signal in every combination. If you filter the raw **and** demodulation signals in a combination, the available filter capacity is reduced to two signals, which you can, in turn, split up into one or two combinations.
- You can only add sensors of the same type (acceleration, velocity, path, etc.) to the list of sensor/filter combinations. For example, if you have defined six acceleration sensors and two velocity sensors in the device configuration, you can select four of the six acceleration sensors or the two velocity sensors here.
- You need at least one characteristic value for each sensor/filter setting. If you have not created a characteristic value, the program automatically creates one.

The left section displays the list of sensor/filter combinations, while the right section displays the settings of the combinations selected in the list:

- **Selected sensor:** Sensor for which filter settings are defined. If you create new settings, you can only select sensors here for which no settings exist yet!
- **Raw signal:** Enable the checkbox **Filter raw signal** to define the filter for the raw signal. Select **High pass frequency** and **Low pass frequency** and the **number of measured values**. If you selected **order analysis** in **window selection**, the frequencies are automatically selected. Also, the number of measured values is limited to 16384.
- **Demodulation signal:** Enable the checkbox **Filter demodulation signal** to define the filter for the demodulation signal. Select **High pass frequency** and **Low pass frequency** and the **number of measured values**. If you selected **order analysis** in **window selection**, the frequencies are automatically selected. Also, the number of measured values is limited to 16384.



If you have created more than two sensor/filter combinations and selected lowpass frequencies, the sensor channels are not distinguished on the ProCheck device. Instead, a uniform lowpass frequency is calculated from the highest band frequency of all characteristic values of the monitoring configuration, that is used for all sensor channels. If the sensor channel frequency bands differ significantly from each other, this may result in an unfavourable resolution in the FFT of one or more sensor channels.

Add sensor/filter combination

- Click on
- Adjust the settings.
- Click

Edit sensor / filter combination

- Select the sensor / filter combination.
- Click
- Adjust the settings.
- Click

Delete sensor / filter combination

- Select the sensor/filter combination.
- Click on

Overview of sensor/filter combination

Click to display a list and detailed information of all sensor/filter combinations.

Overview									
Sensor/filter combination overview									
Number	Selected sensor	Sensor OK min. level	Save low level signals	Raw signal Low-pass (Hz)	Raw signal High-pass (Hz)	Raw signal samples	Demodulation Low-pass (Hz)	Demodulation High-pass (Hz)	Demodulation samples
1	Sensor 10	0.00	X	1000.00	0.00	4096	1000.00	2000.00	4096

FFT settings

Specify the settings for calculating the FFT from the time signal in this section.

- **Windowing type:** You can evaluate the time signal with Hanning, Hamming or Flat Top windowing.

Characteristic value calculation

Specify the settings for calculating the characteristic values from the time signal in this section.

- **Characteristic value unit:** Depends on the type of sensor.
- **Number of integrations:** Select how often to integrate the time signal (max. 2 times). This setting is not available for the order analysis.
- **Remove DC level:** Enable this checkbox to suppress any steady component in the measured value when calculating the characteristic value.

You can also automatically apply pre-defined characteristic values (see "Predefined characteristic values" ):

- **ISO 10816 settings:** Click the button to create a characteristic value to ISO 10816.
- **Set particle counter:** Click this button to automatically configure all default settings for the sensor type "Particle counter Fe/nFe".



You can only edit these settings if you have finished editing the sensor/filter combinations!

5.9.4 Additional channels



This tab is only displayed in ProCheck monitoring configurations.

16ch device - Monitoring configuration

☒ Active configuration

Name: Pump

Data | Main channels | **Additional channels** | Bearings | Components | Characteristic values | Saving options | Image | Additional information

Additional channel options

Sample rate of the analog additional channel: 1000 samples / s

Selected trigger channel: No channel

Rotational speed settings

60.00 ☐ RPM ☒ Hz

Validation settings

Validation list

- Add_channel_1

Validation details

Validation name: Add_channel_1
 Selected channel: Add_channel_1
 Validation type: Minimum/Maximum
 Conversion factor: 1.000000
 Maximum signal change: 0.00 RPM
 Upper limit: 10000.000000 RPM
 Lower limit: -10000.000000 RPM
 Use as speed source: ☐

Additional channel options

Settings in this section globally affect all additional channels in a monitoring configuration with the exception of virtual channels. The additional channel options do not affect virtual channels.

Sample rate of the analog additional channel: Select the sample rate (max. 10000). This applies to all additional channels^[82] defined in the device configuration.

Selected trigger channel: You can select a digital channel from the additional channels to trigger measurement here. The other additional channels can be used as validators.

Rotational speed settings

If you are not using frequency tracking but rather "Fixed windows", you need the rotational speed information for the FFT display in FAG Viewer.

- Specify whether to enter frequencies in Hz or rpm.
- Enter the number of revolutions.

Validation settings

In this section you can select and configure validators for the selected monitoring configuration. Validators are those additional channels^[82] (defined in the device configuration) used to validate measurements. You can use validation to ensure that only measurements obtained under predefined operating conditions are recognized and that alarm signals are only output under these conditions.

The left section displays the list of validators, while the right section displays the settings of the validator selected in the list:



- **Validation name:** Name of the validator.
- **Selected channel:** Additional channel to be used as a validator. You can select from the additional channels^[82] defined in the device configuration.
- **Validation type:** How should the validator work?
 - **Deactivated:** No validation.
 - **Minimum / Maximum:** Measurement only if the validator signal is within defined thresholds.
 - **Signal change:** The validator signal may only change by the defined maximum value during measurement.

- **Min./Max. + signal change:** Combination of **Minimum/Maximum** and **Signal change**.
- **Conversion factor:** The conversion factor is used where rescaling of the reference variable is required. To achieve this, the reference variable is multiplied by the conversion factor prior to evaluation by the ProCheck device. This conversion factor is required for gearboxes (for example) where the measured rotational speed does not match the speed of the component being monitored due to a gear ratio.
- **Maximum signal change:** Input for **Signal change** or **Min./Max. + signal change** as **Validation type**.
 - **Relative signal change (%):** If this option is enabled, signal change is calculated by adding the percentage to or subtracting it from mean rotational speed. This function is only available as of ProCheck firmware version > 2.2.4.
- **Upper limit:** Maximum if **Minimum / Maximum** is selected as the **Validation type**.
- **Lower limit:** Minimum if **Minimum / Maximum** is selected as the **Validation type**.
 - **Mirror limits:** This option is only available if **Minimum/Maximum** is selected as **Validation type**. Activate this option to mirror the upper and lower limit, i.e. for rotational speeds in reverse operation. This function is only available as of ProCheck firmware version > 2.2.4.
- **Use as speed source:** If activated, a validator can be used as a speed source.





If you make any changes that affect supporting points, you can have them automatically modified. The program adjusts the reference variables and deletes values outside the new reference variables. This may reduce the number of supporting points.


Add validator

- Click on .
- Adjust the settings.
- Click .

Edit validator

- Select the validator.
- Click .
- Adjust the settings.
- Click .

Delete validator

- Select the validator.
- Click on .

Overview of validators

Click  to display a list and detailed information of all validators.

Overview							
Validation channel overview							
Number	Selected channel	Validation type	Factor	Maximum signal change	Lower limit	Upper limit	Unit
1	Add. channel_1	Minimum/Maximum	1.000000	---	-10000.000000	10000.000000	RPM
OK							

5.9.5 Bearings

16ch device - Monitoring configuration

Name: Steering gear cover LDZ

Tab: Bearings

Bearing list: FAG\6200

Bearing details:

- Bearing identifier: 6200
- Manufacturer: FAG
- Description: FAG\6200
- Inner race freq.: 4.4723
- Outer race freq.: 2.5277
- Roll. elem. freq.: 1.6610
- Fixed race: ☒ outer race ☐ inner race
- Fundamental train freq.: 0.3611
- Speed correction factor: 1.000000

Create characteristic values


Alarm state of the related windows: 1 2 3 4 5 6 7 8 9 10 11 12

On this tab you can assign bearings from the bearing database¹⁴² to the monitoring configuration. The associated kinematic frequencies can be displayed in the evaluation diagram in the FAG Viewer. If you add a bearing to a monitoring configuration, the associated kinematic frequencies are copied from the bearing database to the Configuration Manager. Changes made to the kinematic frequencies in the Configuration Manager are not saved back to the bearing database!

Add bearing



You can assign a maximum of 40 bearings to a monitoring configuration!

- Click on .
 - Select the bearing from the database as described in "Search for bearings"¹⁴³.
- The bearing is added to the monitoring configuration.





The fundamental train frequency is relative to the respective fixed race, that you can toggle between **Fixed outer race** and **Fixed inner race** using the **Fixed race** option.

Edit bearing data

Changes to bearings in the monitoring configuration do not affect the bearing database. If you edit a bearing or subsequently add the original bearing from the bearing database, the latter is appended to the list of bearings without overwriting the modified bearing. Therefore, it makes sense to indicate any changes to the characteristic values of a bearing in the identifier so as to make it easier to distinguish the modified bearing from the original bearing.



You can enter a maximum of 60 characters in the input boxes **Bearing name** and **Description**.

- Click on .
- Make the appropriate changes and
- click again on  to save the changes.

Create bearing-related characteristic values

You can automatically create bearing-specific characteristic values for each bearing.



On the Dtect X1s device you can only create characteristic values if you are using the characteristic value mode "selective RMS / LDZ" or "selective RMS / LDZ tracked" (see "Characteristic value mode" ⁹⁸). Otherwise the button is disabled.

- Click on **Create characteristic values**.
- Enter a characteristic value name.
- Select the **sensor** and the **signal type** for which to create the characteristic value (ProCheck only).

In the next step, select which kinematic frequency to monitor:

- Tick the Frequency checkbox and
- configure how many harmonics to include in the monitoring.

Alternatively, you can click **Default setting** to use the "Bearing-related characteristic values" ¹⁵⁴ predefined in the program settings.

If you have selected "Fixed windows" or "Selective RMS / LDZ",

- configure the rotational speed settings.
- Click **OK**.


The characteristic bearing values are generated automatically.



- If you exceed the maximum permissible number of characteristic values, the software displays a warning. You can then modify the number of characteristic values.
- On the Dtect X1s device, you can create a maximum of 12 windows. If there are already any windows in the window options, you can overwrite the old windows or append the new windows. The maximum number of 12 windows must not be exceeded.

Deleting a bearing from the monitoring configuration

Deleting a bearing from the monitoring configuration removes all bearing data.

- Click on .

Displaying a list of bearings


- Click on  to display a list of allocated bearings with the associated bearing data.

Overview									
Bearing overview									
Number	Bearing identifier	Manufacturer	Description	Inner race freq.	Outer race freq.	Roll.elem.freq.	Fundamental train frequency	Fixed outer race	Speed factor
1	7004-B-2RS-TVP	FAG	FAG\7004-B-2RS-TVP	6.548424274	4.451575726	1.936309557	0.404688702	Ja	1
2	7004-B-TVP	FAG	FAG\7004-B-TVP	6.548424274	4.451575726	1.936309557	0.404688702	Ja	1

OK

Replacing a bearing

If you replace a bearing on a monitored machine, the bearing data may also change.

- Click on .

Confirmation

Revise bearing

What would you like to do?

In order to complete the operation please select an option below:

Revise only (i.e. due to maintenance). Only a comment will be written!

OK Cancel

- Select **Revision only** if you are replacing the existing bearing with a bearing of the same type with identical characteristic values. A comment in the trend indicates the time of replacing the bearing.
- Select **Replace bearing with bearing of different type** to use a different type of bearing. You must then select the new bearing from the bearing database. The new bearing replaces the one replaced in the list of bearings. The new characteristic bearing values are used immediately.
- Save the monitoring configuration to activate the new bearing data.

5.9.6 Components

16ch device - Monitoring configuration

Name: Steering gear cover LDZ

Tabs: Data | Main channels | Additional channels | Bearings | **Components** | Characteristic values | Saving options | Image | Additional information

Component list: <not set>

Component details:

- Component identifier: Engagement
- Description: <not set>
- Frequency: 20
- Speed correction factor: 1.5
- is fixed: ☐
- has harmonic: ☒
- has sidebands: ☒

Create characteristic values


Alarm state of the related windows: 1 2 3 4 5 6 7 8 9 10 11 12

On this tab you can add additional components to the monitoring configuration that do not belong to the bearings and that are manifested in the vibration measurement with periodic signals. These may include tooth engagement frequencies, mains hum or interference from other machines. These components have no effect on monitoring, they merely provide additional information for analysis.

Add component




- You can assign a maximum of forty components to a monitoring configuration.
- You can enter a maximum of 20 characters in the Component identifier **input box**. You can enter a maximum of 60 characters in the Description **input box**.

- Click on . The new component is displayed in the component list on the left.
- Enter the appropriate details in **Component details**:
 - **Component identifier**: Name of the component
 - **Description**: Additional information about the component
 - **Frequency**: Frequency of the periodic signal characterising the component. The characteristic value is generated from this frequency.
 - **Speed correction factor**: Factor by which the measured rotational speed must be multiplied to obtain the rotational speed of the component.
 - **is fixed**: This frequency is independent of rotational speed, e.g. a mains hum of 50 Hz.
 - **has harmonic**: The component creates vibrations at the specified frequency and multiples thereof.
 - **has sidebands**: The component creates a vibration with sidebands.
- The component is added to the monitoring configuration.

Edit components

Proceed as follows to edit a component:

- Click on .
- Make the appropriate changes.
- If you switch to another section, you are prompted to save the changes.

Create component-related characteristic values

You can automatically create specific characteristic values for each component.



On the Dtect X1s device you can only create characteristic values if you are using the characteristic value mode "selective RMS / LDZ" or "selective RMS / LDZ tracked" (see "Characteristic value mode" ⁹⁸). Otherwise the button is disabled.

- Click on **Create characteristic values**.
- Enter a characteristic value name.
- Select the **sensor** and the **signal type** for which to create the characteristic value (ProCheck only).

In the next step, please select what to monitor:

- Tick the **Base frequency** checkbox and
- configure how many **harmonics** to include in the monitoring.
- Alternatively, you can click **Default setting**. This activates the base frequency and configures 5 harmonics.


Click **OK** to create the component characteristic values automatically.




- *If you exceed the maximum permissible number of characteristic values, the software displays a warning. You can then modify the number of characteristic values.*
- *On the Dtect X1s device, you can create a maximum of 12 windows. If there are already any windows in the window options, you can overwrite the old windows or append the new windows. The maximum number of 12 windows must not be exceeded.*

Delete component from monitoring configuration

Deleting a component from the monitoring configuration removes all component data.

- Click on .

Display component overview

- Click  to display an overview of the assigned components and the related data.

Overview

Component overview

Number	Component identifier	Comment	Frequency	Speed correction factor	is fixed	has harmonic	has sidebands
1	Engagement	New component added <<not set>>	20.0000	1.5000	No	Yes	Yes
<div>OK</div>							

5.9.7 Characteristic values



This tab is only displayed in ProCheck monitoring configurations.

In this tab you can define the characteristic values to be calculated by ProCheck.

Set predefined characteristic values

You can automatically apply predefined characteristic values here (see "Predefined characteristic values" ^[126]):

- **ISO 10816 settings:** Click this button to create a characteristic value to ISO 10816.
- **Set particle counter:** Click this button to automatically configure all default settings for the sensor type "Particle counter Fe/nFe".

16ch device - Monitoring configuration

☒ Active configuration

Name:

Data | Main channels | Additional channels | Bearings | Components | **Characteristic values** | Saving options | Image | Additional information

Set pre-defined characteristic values

Characteristic value list | Characteristic value details

☒ RMS raw signal
☒ RMS envelop
☒ BPFI env. NU2216E
☒ BPFO env. NU2216E
☒ 2xBSF env. NU2216E
☒ BPFI env. NU2213E
☒ BPFO env. NU2213E
☒ 2xBSF env. NU2213E
☒ BPFI env. QJ216
☒ BPFO env. QJ216
☒ 2xBSF env. QJ216
☒ BPFI env. 6316
☒ BPFO env. 6316
☒ 2xBSF env. 6316
☒ BPFI env. QJ313
☒ BPFO env. QJ313
☒ 2xBSF env. QJ313
☒ BB
☒ Char value_1

Global settings

Name:

Sensor:

Signal type: ☒ Raw signal ☐ Demodulation sig

Characteristic value type:

Characteristic value settings | Speed-dependent alarms | Windows

Characteristic values settings

Alarm limits

Main alarm: g

Pre-alarm: %

Digital output

Main alarm output:

Pre-alarm output:

Analog output

Analog output:



Type:

Main alarm: mA



Pre-alarm: mA

The left part of the tab displays the list of characteristic values already defined, while the right section displays the settings of the characteristic value selected in the list.


Add characteristic value

- Click on .
- Adjust the settings.
- Click .


Edit characteristic value

- Select the characteristic value.
- Click .
- Adjust the settings.
- Click .


Delete characteristic value

- Select the characteristic value.
- Click on .

Maximum possible rotational speed (for order analysis only)

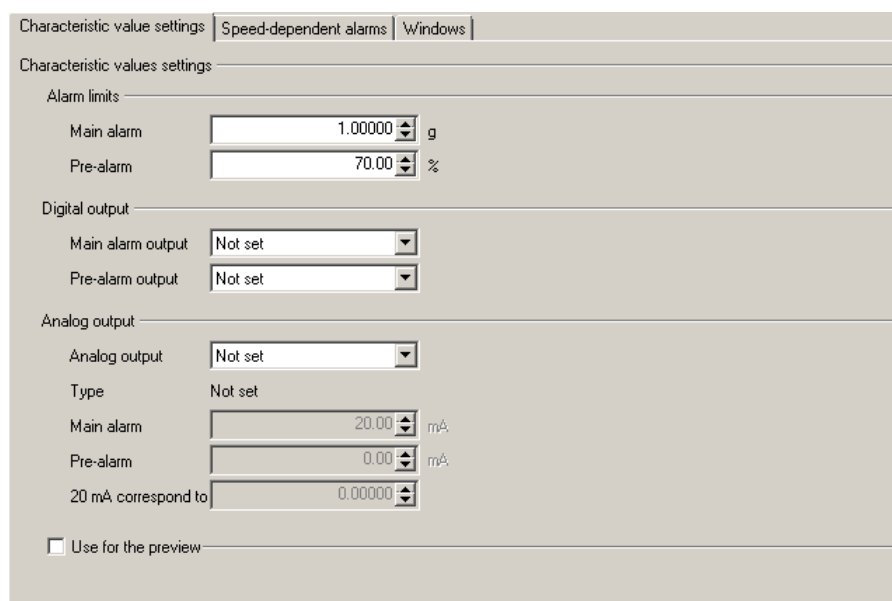
If you have selected order analysis  on the **Main channels** tab, the maximum measurable rotational speed is calculated from the selected settings and the ProCheck maximums for lowpass frequency and order. Click **Max. possible rotational speed** to display the maximum measurable rotational speed.



General settings

- **Name:** Enter a text.
- **Sensor:** Sensor channel whose measured values are used to calculate the characteristic value. You can only select sensor channels that you have created in the **Main channels** tab (cf. "Main channels" .
- **Signal type:** ProCheck can record either the raw signal or the demodulation signal on a sensor channel.
- **Characteristic value type:** Select whether the characteristic value refers to monitoring in a time or frequency range. The other characteristic value settings depend on this selection.


Characteristic value settings

If you selected **Monitoring in time range** in **Characteristic value type**, you can configure RMS, DC level, peak, peak-peak and crest factor alarm thresholds and alarm outputs for the available characteristic values. You can specify additional window settings for monitoring in a frequency range.



- **Alarm thresholds:** Enter the threshold for triggering a main alarm in g. Enter the pre-alarm threshold as a percentage relative to the main alarm threshold.
- **Digital output:** If you have configured digital outputs (cf. "Digital outputs" ), you can select which of these outputs to activate in the event of a pre- or main alarm.
- **Analog output:** If you have configured analog outputs (cf. "Analog outputs" ), you can select which of these

outputs to activate in the event of a pre- or main alarm. Also, you can enter the reference value to relate the characteristic value to if the type of analog output was set to **Relate value** (cf. Device configuration → Analog outputs [87]).

- **Use for the preview:** Activate this option to display the selected characteristic value as a trend in the trend preview.
- Click  to display a list of characteristic value settings for the time range.

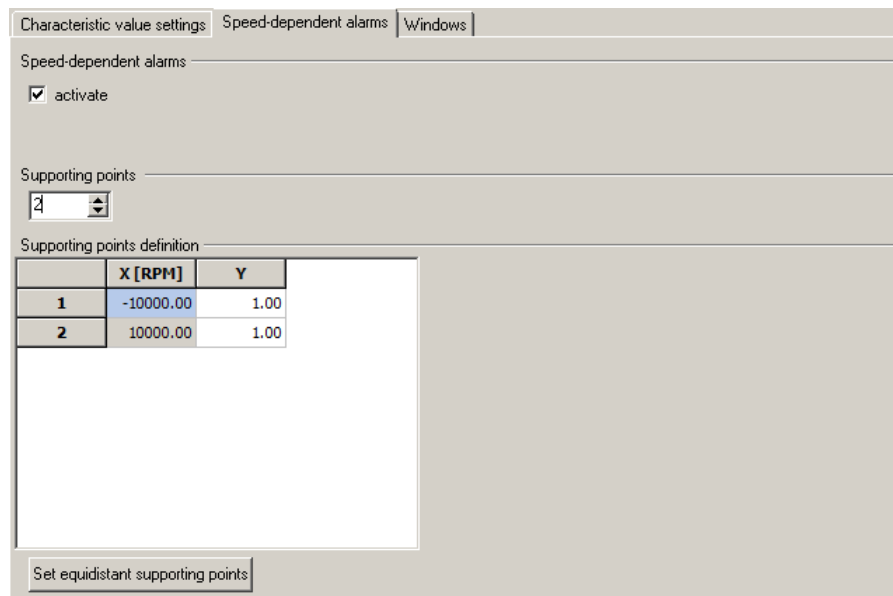
Speed dependent alarms

All valid alarm thresholds can be tracked as a reference variable on an additional channel if this additional channel was activated as a velocity channel in the Main channels [100] tab. If alarm threshold tracking is selected, the fixed alarm threshold settings are retained in the **Characteristic value settings** tab. The tracking involves multiplying the fixed alarm thresholds by a factor which is dependent on speed.

To calculate this scaling factor the value pairs for the rotational speed range being monitored, comprising the rotational speed and corresponding factor, are stored. A minimum requirement here is that both value pairs for the rotational speed range limits are specified. The scaling factor for all other rotational speeds in the rotational speed interval is then calculated by means of linear interpolation. These value pairs, referred to in this context as supporting points, can be entered in the Tracking of alarm thresholds tab. In this case the reference variable of both outer supporting points is specified in the validation settings.



If you make any changes that affect supporting points, you can have them automatically modified. The program adjusts the reference variables and deletes values outside the new reference variables. This may reduce the number of supporting points.



	X [RPM]	Y
1	-10000.00	1.00
2	10000.00	1.00

- Check the **Enable** checkbox. A table showing two supporting points for both limits of the reference variable range is displayed in this tab. The X values are the reference variables and the Y values are the scaling factors.
- First, select the preferred number of supporting points.
- Enter the data for the supporting points, i.e. reference variables under "X" and scaling factors under "Y".



If you right-click the table you can copy the values entered here to the clipboard and vice versa. This method can be used to copy values from one configuration to another. It is also possible to paste these values into a spreadsheet program or copy them from there and insert them into the table of supporting points.

Windows

You can specify the frequency bands for monitoring in the frequency range in this tab.

Characteristic value settings | Speed-dependent alarms | Windows

Max. peak
☒ Use 'Max. peak'

Number of windows used for characteristic value calculation
 2

Window settings

	1	2
Normalized center frequency	1.00000	1.00000
Normalized width	1.00000	1.00000
Window name	window 1	window 2

Set harmonic frequencies

- **Use peak mode:** If you enable this checkbox, when the characteristic value is calculated, rather than calculating the root mean square across all frequency lines in a window the software searches for the highest peak in each window. Therefore for calculation of the characteristic value only one value from each window is used (the highest peak) to calculate the root mean square (RMS value). If a significant amount of noise or smaller signals are present in the window next to the peak then the impact of a significant change of the normal characteristic value peak is less severe because the characteristic value obtained from the RMS calculation is only an average value for the window. In peak mode a change in the peak would cause the characteristic value in this window to change to exactly the same extent.
- **Number of windows used for characteristic value calculation:** You can select a maximum of 12 windows.
- **Window settings:**
 - Fixed windows:
 - Enter the **upper** and **lower threshold frequency** for the first window and then define the harmonic frequencies (see Defining harmonic frequencies ^[113]).
 - Tracked windows / order analysis:
 - **Normalized average frequency / Hz:** For the first window, enter the frequency relative to rotational speed where you want the middle of the window to be.
 - **Normalized bandwidth / Hz:** Enter the bandwidth of the **first and last** window in Hz then define the harmonic frequencies (see Defining harmonic frequencies ^[113]).

Example:

With a normalized average frequency of 4 and a normalized bandwidth of 0.5 you will have a window ranging from 3.75 times (4 - half bandwidth) to 4.25 times (4 + half bandwidth) the rotational speed. With a rotational speed of 1200 min⁻¹ = 20 Hz, the window would be between 75 and 85 Hz.



The sum of normalized average frequency and half the normalized bandwidth must not exceed 239.95 Hz.

- **Window name:** Enter the desired window name. By default, the Configuration Manager names the windows "window <n>".
- **Define harmonic frequencies:** Defines the harmonics based on the first window.
 - For fixed windows: The frequencies for windows 2 to n are calculated based on the values of the first window by multiplying them by 2 to n. The windows are named according to this pattern: "n*<name of first window>".
 - Tracked windows / order analysis: The normalized average frequencies for windows 2 to n are calculated based on the values of the first window by multiplying them by 2 to n. The normalized bandwidths of windows 2 to n-1 are calculated by interpolating from the normalized bandwidths of the first and last window. The windows are named according to this pattern: "n*<name of first window>".

Example:

Window 1: normalized average frequency = 1.1, normalized bandwidth = 1.0; window 3: normalized bandwidth = 0.5
 The following values are calculated: window 2: normalized average frequency = 2.2, normalized bandwidth = 0.75; window 3: normalized average frequency = 3.3.



- If an input value is outside the measurable range, the result may be that measuring data are invalid or a measurement cannot even be performed. A warning draws attention to this situation, and the invalid value is highlighted yellow until a valid value is input.
- If you save the configuration with the invalid values, the appropriate monitoring configuration is highlighted yellow up to device level (see Invalid configurations¹²⁵).

5.9.8 Validation



This tab is only displayed in Dtect X1s monitoring configurations.

If additional channels for the tracking of frequencies, speed-dependent alarm limits and for validation are installed in the Dtect X1s device, these are defined in the "Validation" tab.



Where frequencies are tracked the additional channel to which a speed sensor is connected must be specified in the General settings⁷⁷ tab of the device configuration.

Rotational speed settings


If you are not using frequency tracking you need the rotational speed information for the FFT display in FAG Viewer.

- Specify whether to enter frequencies in Hz or rpm.
- Enter the number of revolutions.

Additional channel for the tracking of frequencies

If you select the "tracked" characteristic values in the General data⁹⁷ tab or wish to use speed-dependent alarm limits

 you must first specify the additional channel to be used as the reference variable.


- Enter a label for the validator in "Validation 1".
- Select whether to use the validator for tracked windows and/or tracked alarm limits.
- Select the additional channel with the reference value in the "Linked additional channel" list box. The names of the additional channels in this case correspond to the names you assigned in the device configuration .
- Enter a conversion factor if you want. The conversion factor is used where rescaling of the reference variable is required. To achieve this, the reference variable is multiplied by the conversion factor prior to evaluation by the Dtect X1s device. This conversion factor is required for gearboxes (for example) where the measured rotational speed does not match the speed of the component being monitored due to a gear ratio.

Validation via an additional channel

You can use validation to ensure that only measurements obtained under predefined operating conditions are recognized and that alarm signals are only output under these conditions.

Two threshold ranges per validation channel are available. This means that the user can classify the signals for each validation channel (high speed or load and low speed and load). You can also use the "Mirror limits" option to mirror upper and lower limits, e.g. for rotational speeds in reverse. If you activate "Mirror limits", the second validation section is no longer available.

You can use positive and negative values for validation. This allows you to selectively exclude a system's resonance ranges that could otherwise distort measurements and thus result in false alarms.

If the validation condition becomes invalid existing alarms are reset, providing the "Manual reset" option (see "General settings"  tab in the device configuration) is not activated. In this case you must define a condition for the auxiliary signal by activating the individual checkboxes and entering the assigned maximum values. If this condition is satisfied for the duration of the measurement, the result is accepted.

A maximum of one validator per additional channel is possible. The validators are defined under the headings "Validation 1" or "Validation 2" and are logically ANDed.

Create a validation

- Enter a label for the validation.
- Select which additional channel to use in the "Linked additional channel" listbox. The names of the channels in this case correspond to the names you assigned in the device configuration.
- Enter a conversion factor (see above) as required.
- Compile a validation condition.

The three individual conditions and corresponding limit values produce a validation condition. The conditions are logically ANDed but are only taken into account if the checkbox is activated.

Individual condition	Meaning
Maximum signal change	Maximum permitted change of additional signal during a measurement.
Relative signal change (%)	If this option is enabled, signal change is calculated by adding the percentage to or subtracting it from mean rotational speed.
Upper limit	Highest value permitted for auxiliary signal.
Lower limit	Lowest value permitted for auxiliary signal.


Combination of validations

If two validations are defined these are logically ANDed as standard.

Validation with high sample rates

The A/D converter in the Dtect X1s device has a overall sampling rate of roughly 80kHz. It is therefore no longer possible to measure both validators and the measurement signal at the same time at sample rates greater than 15 kHz, i.e. at a low pass frequency of 5 kHz. However, with high sample rates it may be assumed that the rotational speed changes only slightly for the duration of the measuring time because the measurement is completed in a very short space of time (only 137ms with 30kHz sample rate, for example). It is therefore sufficient in this case to measure the input signal of the validator before and after the actual measurement in order to monitor the validation window.



- If you make any changes to the validation that affect the characteristic values frequency window, a message is displayed indicating which characteristic values and frequency windows need to be modified. Click "Yes" to change the validations (the characteristic values and frequency windows that need to be changed are highlighted yellow). Click "No" to reset the changes to the validation.
- If you save the configuration with the invalid values, the appropriate monitoring configuration is highlighted yellow up to the device (see Invalid configurations .

5.9.9 Window options



This tab is only displayed in Dtect X1s monitoring configurations.

This tab only appears if you selected a characteristic value for monitoring in the frequency range in the General information⁹⁷ tab. The frequency bands (for selective characteristic values) and alarm limits are defined here. Each option is explained below.

2ch device - Monitoring configuration

Name
Steering gear cover LDZ

Data | General data | Validation | Bearings | Components | **Window options** | Speed-dependent alarm limits | Saving options | Remote | Image | Additor

Number of windows used for characteristic value calculation
1

Characteristic value calculation
☒ One characteristic value for all frequenc ☐ One characteristic value per frequency band

Max. peak
☐ Use 'Max. peak' mode

Alarm limit / g
0,02810

Pre-alarm
70,00

Settings for the respective windows

	1	2	3	4	5	6	7	8	9	1
Lower cut-off frequency / Hz	2,198	--	--	--	--	--	--	--	--	--
Upper cut-off frequency / Hz	1000,000	--	--	--	--	--	--	--	--	--
Pre-alarm / %	70,00	--	--	--	--	--	--	--	--	--
Alarm limit / g	0,02810	--	--	--	--	--	--	--	--	--
Window name	Broadband	--	--	--	--	--	--	--	--	--

Alarm state of the related windows

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

Alarm limits for high-bandwidth "ISO 10816", "RMS" and "LDZ" characteristic value types

The ISO 10816, RMS and LDZ characteristic value types are high-bandwidth types (refer to section "Monitoring with high-bandwidth characteristic values") which means that only the pre- and main alarm thresholds must be defined here.

Enter...

- the value of the main alarm threshold in the same units as the characteristic value in the field with the **main alarm** designation and
- specify the pre-alarm threshold as a percentage of the main alarm threshold in the field with the **pre-alarm** designation.



- Note that the LDZ values are standardized and subsequently output as dB values. The main alarm threshold must therefore also be defined in dB.
The pre-alarm threshold values on the other hand are based on the LDZ value prior to standardization. If the main alarm threshold is 10dB for example, a pre-alarm threshold of 50% will cause the pre-alarm to be triggered from an LDZ value of 7dB. The pre-alarm is calculated according to the following formula:
$$\text{pre-alarm threshold} = \text{main alarm threshold} - 10 * \log(\text{percentage value}).$$
- The main alarm limit in dB can be set in a range from -699 to 800 dB.

Frequency bands and alarm limits for "selective LDZ" and "selective RMS" characteristic value types

If you selected the "selective LDZ" and "selective RMS" characteristic value types in the "General data" tab, you can do the following here:

- define the frequency bands to be taken into consideration,
- specify whether a characteristic value should be calculated separately for each frequency band or whether a common characteristic value should be calculated for all bands,
- assign a name to the individual frequency bands, and
- specify the corresponding alarm limits.

Proceed as follows:

- First, enter the number of frequency bands that are to be taken into account under "number of windows" at the top of the tab.
- Specify a common characteristic value or separate characteristic values for each frequency band in the "Characteristic value calculation" group field.
- Assign names to the frequency bands if required.

If a common characteristic value is to be calculated,

- define both alarm limits on the right-hand side of the tab and the upper and lower limit of the frequency bands at the foot of the table.

If individual characteristic values are to be calculated,

- enter the lower and upper limit of the frequency bands and corresponding alarm limits at the foot of the table.

Frequency bands and alarm limits for the "selective LDZ speed-dependent" and "selective RMS speed-dependent" characteristic values.

If you selected the "selective LDZ speed-dependent" and "selective RMS speed-dependent" characteristic value types in the "General information" tab, you can do the following here:

- define the frequency bands to be taken into account based on the rotational frequency,
- specify whether a characteristic value should be calculated separately for each frequency band or whether a common characteristic value should be calculated for all bands,
- specify names for the frequency bands, and
- specify the corresponding alarm limits.

Now proceed as follows:

- First, define the number of frequency bands that are to be taken into account under "number of windows" at the top of the tab.
- Specify a common characteristic value or separate characteristic values for each frequency band in the "Characteristic value calculation" group field.

If a common characteristic value is to be calculated,

- enter both alarm limits on the right-hand side of the tab and enter the average frequency and width of the frequency bands based on the rotational speed at the foot of the table.

If individual characteristic values are to be calculated,

- enter the average frequency and width of the frequency bands based on the rotational speed and corresponding alarm thresholds at the foot of the table.

You can determine the average frequencies and widths to be entered in the table as follows: Assuming that, for a machine component turning at a frequency of f_D , you anticipate an unusual signal to occur between the $f_S - \Delta f/2$ and $f_S + \Delta f/2$ frequencies, f_S is the average frequency and Δf is the width of the frequency interval. With tracked frequency bands

you must enter the following values in the table: f_S/f_D for the average frequency and $\Delta f/f_D$ for the width of the frequency band.

Peak mode

It is possible to activate the "Use max peak" option in the monitoring configuration window options. This means that, when the characteristic value is calculated, rather than calculating the root mean square across all frequency lines in a window the software searches for the highest peak in each window. Therefore for calculation of the characteristic value only one value from each window is used (the highest peak) to calculate the root mean square (RMS value).

If a significant amount of noise or smaller signals are present in the window next to the peak then the impact of a significant change of the normal characteristic value peak is less severe because the characteristic value obtained from the RMS calculation is only an average value for the window. In max peak mode a change in the peak would cause the characteristic value in this window to change to exactly the same extent.



If you right-click the table you can copy the values entered here to the clipboard and vice versa. This method can be used to copy values from one configuration to another. It is also possible to paste these values into Excel from the table in the window or vice versa.

Configure particle counter window

Click **Configure particle counter window** to automatically configure all default settings for the "Particle counter (Fe/nFe)" sensor type (see "Set pre-defined characteristic values" [\[110\]](#)).

Review window settings



- If an input value is outside the measurable range, the result may be that measuring data are invalid or a measurement cannot even be performed. A message draws attention to this situation, and the invalid value is highlighted yellow until a valid value is input.
 - If you save the configuration with the invalid values, the appropriate monitoring configuration is highlighted yellow up to device level (see Invalid configurations [\[125\]](#)).
-

5.9.10 Alarm thresholds



This tab is only displayed in Dtect X1s monitoring configurations.

This tab is only displayed if you have selected time domain monitoring, i.e. the "Time domain" characteristic value mode, on the General data [\[97\]](#) tab.

2ch device - Monitoring configuration

Name
Pinion shaft gear end LDZ

Data | General data | Validation | Bearings | Components | Alarm limits | Speed-dependent alarm limits | Saving options | Remote | Image | Additional inf

Characteristic value	Pre-alarm	Main alarm
<input checked="" type="checkbox"/> RMS	50,00 %	0,00555 g
<input checked="" type="checkbox"/> DC level	50,00 %	0,01920 g
<input type="checkbox"/> Peak	50,00 %	0,00807 g
<input type="checkbox"/> Peak-to-peak	50,00 %	0,00851 g
<input type="checkbox"/> Crest factor	50,00 %	1,40000

Alarm state of the related windows

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

- Mark the characteristic values to be used to monitor the time signal (all characteristic values are always calculated but only the marked values will be taken into account for alarm messages).
- Enter the main alarm threshold value and pre-alarm threshold value for the characteristic values selected as a percentage of the main alarm threshold.

5.9.11 Speed-dependent alarm thresholds



This tab is only displayed in Dtect X1s monitoring configurations.

All valid alarm limits can be tracked as a reference variable via an additional channel providing this has been activated in the Validation tab as the additional channel for the tracking of frequencies, i.e. as the 1st validator of the monitoring configuration.

2ch device - Monitoring configuration

Name

Data
General data
Validation
Bearings
Components
Alarm limits
Speed-dependent alarm limits
Saving options
Remote
Image
Additional inf

Speed-dependent alarm limits

☒ activate To activate speed-dependent alarm limits, please define at the 'validation' tab a linked additional channel for validation 1.

Supporting points ▼

10

Supporting points definition

	X / (RPM)	Y
1	-745,42	1,20
2	28,03	1,20
3	130,30	1,63
4	232,94	1,76
5	335,22	1,89
6	437,86	26,94
7	540,14	140,43
8	642,78	213,00
9	744,69	287,15
10	745,05	287,15

Alarm state of the related windows

1

2

3

4

5

6

7

8

9

10

11

12

If tracking of alarm limits is selected, the fixed alarm limit settings are retained in the Window options 116 tab. The tracking involves multiplying the fixed alarm limits by a factor which is dependent on speed.

To calculate this scaling factor the value pairs for the rotational speed range being monitored, comprising the rotational speed and corresponding factor, are stored. A minimum requirement here is that both value pairs for the rotational speed range limits are specified. The scaling factor for all other rotational speeds in the rotational speed interval is then calculated by means of linear interpolation.



If the monitored characteristic value is an LDZ_N value measured in dB, the change to the characteristic value is saved in dB and used for interpolation. In the case of the LDZ value, it should be noted that the multiplication changes to addition as a result of the dB standardization and scaling.

These value pairs, referred to in this context as supporting points, can be entered in the Speed-dependent alarm limits tab. In this case the reference variable of both outer supporting points is specified in the validation settings. A maximum of eight additional supporting points can be defined between these points.

- Open the Validation 114 tab, activate the "lower" or "upper threshold" checkbox under the "Validation 1" heading and enter the lower and upper limit for the reference variable to be monitored.
- Switch to the **Speed-dependent alarm limits** tab and select the **Activate** option.

A table showing two supporting points for both limits of the reference variable range is displayed in this tab. The X values are the reference variables and the Y values are the scaling factors.

- First, select the preferred number of supporting points.
- Enter the data for the supporting points, i.e. reference variables under "X" and scaling factors under "Y".



As the program checks each entry to determine whether the X values of the supporting points increase as the supporting point number increases, values should be entered in ascending order, i.e. starting with the highest supporting point number. Note that with LDZ_N values changes to alarm thresholds must be specified in dB.



If you right-click the table you can copy the values entered here to the clipboard and vice versa. This method can be used to copy values from one configuration to another. It is also possible to paste these values into a spreadsheet program or copy them from there and insert them into the table of supporting points.

5.9.12 Memory options

You can configure how the device saves characteristic values on the **Saving options** tab. Characteristic values are always saved if you have triggered an alarm, regardless of the settings. This forced storage ensures that no important characteristic values are lost.

ProCheck

16ch device - Monitoring configuration

☒ Active configuration

Name:

☐ Data
 ☐ Main channels
 ☐ Additional channels
 ☐ Bearings
 ☐ Components
 ☐ Characteristic values
 ☒ Saving options
 ☐ Image
 ☐ Additional information

Characteristic values saving options

☐ Save always
☐ Save every measurement(s)
☒ Save every h min sec.
☐ Save on changes of more than %

Time signal and FFT saving options

Save signals: every h min
☒ Raw signal
☒ Demodulation signal
☐ FFT

Save on main alarm: ☒ Raw signal
☒ Demodulation signal
☐ FFT

Save on pre-alarm: ☒ Raw signal
☒ Demodulation signal
☐ FFT

Data storage settings:

Save data every h min

Remote call

Device calls at

☒ main alarm
☐ pre-alarm

Characteristic value save options

- **Save always:** The characteristic values of a monitoring configuration are saved with every measurement. The time interval between two successive characteristic values corresponds to the duration of a complete monitoring cycle.
- **Save every <n> measurements:** The characteristic values of a monitoring configuration are saved after a specified number of measurements. The time interval between two successive characteristic values corresponds to the N-fold duration of a complete monitoring cycle.
- **Save every <n> h/m/s:** You can use this setting to specify the time interval during which two successive characteristic values are saved. The time interval set must be regarded as the minimum interval between two characteristic values. This minimum time interval can be extended by the duration of one monitoring cycle at the most.



Please observe that the time interval set is a minimum time which can be extended in each case by the duration of a monitoring cycle. The use of time intervals smaller than the duration of a monitoring cycle is not expedient as the characteristic values of the monitoring configuration are consequently always saved.

- **Saving on changes of more than +/- %:** Characteristic values are only saved if they deviate from the previous measurement by a specified percentage.

Time signal and FFT save options

- **Save signals every <n> h/min:** Enter an interval at which to save time signals and FFTs and select the data to save.
- **Save on main alarm:** Select the data to save in the event of a main alarm.
- **Save on pre-alarm:** Select the data to save in the event of a pre-alarm.



- You can only save raw and demodulation signals if they are enabled for the respective sensor on the **Main channels** tab (see "Main channels" ^[100]).
- FFTs can only be saved if you have created at least one characteristic value of the **frequency range monitoring** type for the respective signal type on the **Characteristic values** tab (see "Characteristic values" ^[110]). If you have only defined characteristic values of the time range monitoring type there, you cannot save any FFTs.

Data storage settings

- **Save data every <n> h/min:** Enter an interval after which the characteristic values must be transferred and stored.

Remote call

In this section you can specify whether the ProCheck device should automatically report and send data via the selected communication channel if certain events occur.

- **Device calls at:**
 - Main alarm: Device reports if a main alarm has occurred in this monitoring configuration.
 - Pre-alarm: Device reports if a pre-alarm has occurred in this monitoring configuration.
 - Disk overflow/Low memory: The critical data file size ^[63] in the data storage of the ProCheck device has been reached. Read out the data as soon as possible to free up memory.
 - Elapsed remote time: One of the conditions defined for remote communication (see "Communication settings" ^[64] → Remote communication) is fulfilled.



Note that these settings affect the monitoring configuration! Therefore, the device only reports when the selected events occur if they occur during the monitoring configuration.

Detect X1s

The storage options are defined in the upper section of the tab and the validators saved with the characteristic values are displayed in the lower section of the tab. The following storage options exist:

2ch device - Monitoring configuration

Name
Pinion shaft gear end LDZ

Data | General data | Validation | Bearings | Components | Alarm limits | Speed-dependent alarm limits | Saving options | Remote | Image | Additional info

Characteristic values saving options

☐ Always save characteristic values

☒ Save characteristic values after measurement(s)

☐ Save characteristic values if time exceeds h min sec

☐ Save when characteristic value changes of more than ☐ absolute

RMS % DC level % Peak % Peak-to-peak % Crest factor %

☒ Save timestamp of characteristic dataset

Number of validation channels saved to the characteristic dataset

Alarm state of the related windows

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

Always save characteristic values

The characteristic values of a monitoring configuration are saved with every measurement. The time interval between two successive characteristic values corresponds to the duration of a complete monitoring cycle.

Save characteristic values after n measurement(s)

The characteristic values of a monitoring configuration are saved after a specified number of measurements. The time interval between two successive characteristic values corresponds to the N-fold duration of a complete monitoring cycle.

To configure this option proceed as follows:

- Activate the checkbox next to the "Save characteristic value every N measurements" option.
- Now enter the number of measurements that must be made before the respective characteristic values for this monitoring configuration are saved in the activated field.

Save characteristic values if time exceeds

You can use this setting to specify the time interval during which two successive characteristic values are saved. The time interval set must be regarded as the minimum interval between two characteristic values. This minimum time interval can be extended by the duration of one monitoring cycle at the most.

To configure this option proceed as follows:

- Activate the checkbox next to the "Save characteristic value after..." option.
- Enter the preferred minimum time interval that should exist between two characteristic values in the activated hours, minutes and seconds fields. The maximum time interval is 49 hours, 59 minutes and 59 seconds.



Please observe that the time interval set is a minimum time which can be extended in each case by the duration of a monitoring cycle. The use of time intervals smaller than the duration of a monitoring cycle is not expedient as the characteristic values of the monitoring configuration are consequently always saved.

Save characteristic values where change is greater than +/- <n> % (for characteristic values from the frequency spectrum)

With this setting the characteristic values are only saved if they differ from the previous characteristic value by a minimum percentage "X". Where this parameter is set correctly this results in a greater density of data in the characteristic value ring and also results in changing trends being presented more clearly. The option "absolute" can be used to specify that changes of X percent in a positive as well as negative direction are saved. If this option is not selected the symbol in front of the specified percentage determines whether the characteristic value is saved, i.e. if it increases by X percent (positive symbol) or decreases by X percent (negative symbol). If several characteristic values in a monitoring configuration are calculated, all characteristic values are subsequently saved providing the storage condition for at least one characteristic value is met.

To configure this option proceed as follows:

- Activate the checkbox next to the "Save characteristic if changed..." option.
- If positive and negative changes to characteristic values are to be saved activate the "absolute" checkbox.
- Now enter the preferred percentage in the field in front of the percentage symbol. If the "absolute" option is not activated, check that the symbol entered in front of the value is the correct one.

Save characteristic values where change is greater than +/- <n> % (for characteristic values from the time domain)

If you opted to calculate characteristic values from the time range in your monitoring configuration, the appearance of the input screen will be slightly different than the screen used to determine characteristic values from the frequency spectrum (see above). The functional method is essentially the same. However, in this characteristic value mode you can also define a separate change threshold for each characteristic value.

The "absolute" option in this case relates to all change thresholds. Here too the following also applies: if the storage condition for at least one characteristic value is met, all characteristic values of the monitoring configuration are saved. If change thresholds are not to be taken into consideration for individual characteristic values, the relevant change threshold settings must be sufficiently high.

To carry out the configuration please follow a similar procedure to the one described above under "Storage option for characteristic values from the frequency range".



Please observe that, owing to the percentage, the change threshold depends on the size of the characteristic value which means that characteristic values are saved even if relatively small changes are made to small characteristic values in terms of amount.

Save timestamp of characteristic dataset

You can switch the option for storing the system time together with the characteristic values on or off here. If this option is activated the time the measurement was taken is stored alongside each characteristic value.

This option therefore influences the display of characteristic values stored in the trend memory. If the time stamp storage option is active this results in a linear presentation of trend data for the time period. It follows therefore that the intervals between the characteristic values represent the actual time intervals of the measurement. If the time stamp storage option is not activated the distances between all characteristic values displayed will be the same irrespective of how much time has passed between two measurements.

Below, you can configure the number of validation channels to save with the characteristic values.



- To obtain valid trends, the characteristic values must always be saved with a timestamp.
- The condition for cumulating characteristic values is that characteristic values be saved with a timestamp (see "Saving options" ¹²⁷).

5.9.13 Remote




This tab is only displayed in Dtect X1s monitoring configurations.

For details about this tab please refer to the section "Configure device for remote server" ⁷¹.

5.9.14 Image

You can store a suitable image for the configuration (for example) here. You can use either JPEG or BMP files.

- To do this click on  and select the file that contains the preferred image using the selection dialog box.
- Follow the same procedure as above if you wish to change the image.

Click on  to delete the image and click on  to print it.

5.9.15 Additional information

This tab is used to enter any text, e.g. to add further information about a device. You can also enter a link as information. Double-click it to open it in your default browser.

5.10 Copy configuration(s)

You can copy a device configuration or monitoring configuration as a template for new configurations. Device configurations are copied together with their monitoring configurations. Data or alarm settings of the original monitoring configuration are not copied.




If you copy a configuration between two different devices:

- the device type and device properties of both devices must be identical
- the firmware version of both devices must be identical or the firmware version of the target device must be newer.

Copy device configuration

- Highlight the device configuration you wish to copy.
- Select **Copy** from the context menu or press **CTRL+ALT+C**.
- Highlight the device to add the copy of the device configuration to.
- Select **Paste** from the context menu or press **CTRL+ALT+V**.


The copy of the device configuration is inserted at the last position of the device level, with “Copy of” added. You can edit the device configuration as usual (see sections Device configuration | 74 and Monitoring configuration | 90).

- Click on  on the toolbar or press **F5** to refresh the display.

Copy monitoring configuration

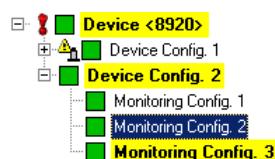
- Highlight the monitoring configuration you wish to copy.
- Select **Copy** from the context menu or press **CTRL+ALT+C**.
- Highlight the device configuration under which you wish to add a copy of the monitoring configuration.
- Select **Paste** from the context menu or press **CTRL+ALT+V**.

The monitoring configuration is inserted at the last position of the device level, with “Copy of” added. You can edit the monitoring configuration as usual (see section Monitoring configuration | 90).

- Click on  on the toolbar or press **F5** to refresh the display.

5.11 Invalid configurations

If you have created an invalid configuration in the FAG Administrator software, it is highlighted yellow in the tree view. The highlight extends from the relevant monitoring configuration to the device level.



A device or monitoring configuration is invalid if a value is outside a valid range. The result may be that measuring data are invalid or a measurement cannot even be performed. In the event of an invalid configuration, we recommend that you always check the settings.



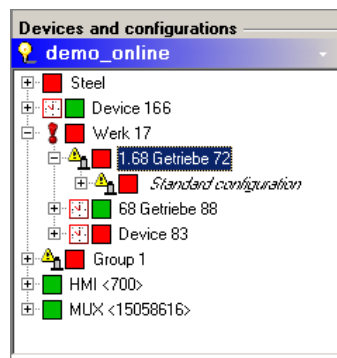
As long as a device configuration does not contain a Monitoring configuration, it is also invalid and is highlighted yellow in the tree view.

5.12 Outdated configurations

If you change the device or monitoring configuration of a device, the corresponding data stored in the CM database is no longer comparable. Therefore, the configurations are marked as outdated, i.e. the data is removed from the tree view **Devices and configurations** but not deleted from the database. You can continue to analyse the stored data.

Show outdated configurations

- Click a device or device configuration.
- Right-click the device configuration and select **Show outdated configurations**.
- The outdated configurations are displayed in italics under the active configuration.



*You can have outdated configurations shown automatically. To do so, activate the **Always show outdated configurations** option in **Extras > Options > General > Miscellaneous**. Press **F7** to deactivate this setting.*

Hide outdated configurations

- Right-click an element in the tree view.
- Select **Refresh tree / selected item**.

Or:

- Press **CTRL+ALT+R**.

What to observe when deleting outdated configurations

- If you want to delete an invalid device configuration, for which there are both active and outdated device configurations, you can select whether to delete only the active or the active and outdated device configurations.
- If you delete a monitoring configuration, the device configuration to which the monitoring configuration belongs is flagged as outdated. If you do not want this, first delete all measuring data in the monitoring configuration and then the monitoring configuration itself.

5.13 Predefined characteristic values

You can configure various predefined characteristic values in the Administrator software depending on your settings.

ISO 10816

The following defaults are configured for monitoring to the ISO 10816 standard:

- Monitored parameter: "Velocity"; low-pass frequency "1 kHz"; integrations: "1" (with acceleration sensors).

Particle counter settings

The following defaults are configured for the sensor type "Particle counter (Fe/nFe)":

- ProCheck: Window selection "Fixed windows"; signal type "Raw signal"; low-pass frequency "1 kHz"; number of

measuring values "4096"; windows for characteristic value calculation "11"; characteristic value type "Frequency domain monitoring"; number of windows "1".

- Dtect X1s: Characteristic value mode "selective RMS"; low-pass frequency "1 kHz"; windows for characteristic value calculation "11"; one characteristic value per frequency band.
- Particle class frequencies are at 54; 81; 135; 189; 297; 351; 459; 513; 621; 783 and 837 Hz.



Bearing-related characteristic values can only be created on the "Bearings" tab (see "Create bearing-related characteristic values" [107]).

5.14 Automatic alarm level adjustment

The user can use this function to generate alarm thresholds for the characteristic values defined in the system. An algorithm developed by FAG Industrial Services GmbH is used in this case. Specific information which is required for calculation of the alarm limits must be provided by the user. The user can adapt the alarm thresholds again at any time or change the limits manually at a later date.

Before this function in the system can be used it is necessary for the data to have been recorded by the system over a longer period of time. The more comprehensive the base data, the more precise the results determined by the system for the various characteristic values will be.



- This function is not available for the tracking of alarm thresholds [119].
- Automatic alarm limit adjustment ignores faulty peaks with values greater than 10^{100} .

You can define minimum and maximum values for all characteristic values available in the system in the options dialog [152] for Dtect X1s and ProCheck devices.

If the values specified when adjusting the alarm threshold fall below the lowest or exceed the highest peaks defined for the relevant characteristic value (see "Program settings" [152]) the corresponding maximum values from the options dialog are set as the alarm limits. This data can be adapted by users to the specific vibrational properties of the mechanical assemblies being monitored based on their own experience.

Further, in order to exclude specific conditions of a system when calculating the alarm limits, it is also possible for characteristic values that are above or below specific limits not to be taken into account during modification. These can also be optimized by users according to their experience and entered in the Program settings [152].



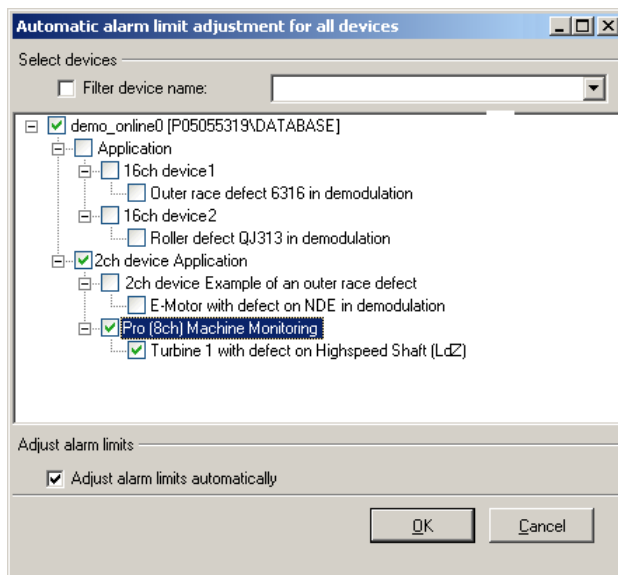
Use of the alarm threshold adjustment wizard does not relieve the user of the responsibility of critically analysing the maximum values set. This is only intended as an aid and not as a replacement for the experience accumulated by the operator with the system concerned.

You can modify the alarm limits as follows:

- Highlight a device in the tree and
- click **Automatic alarm limit adjustment** in the **Edit** menu.

Or:

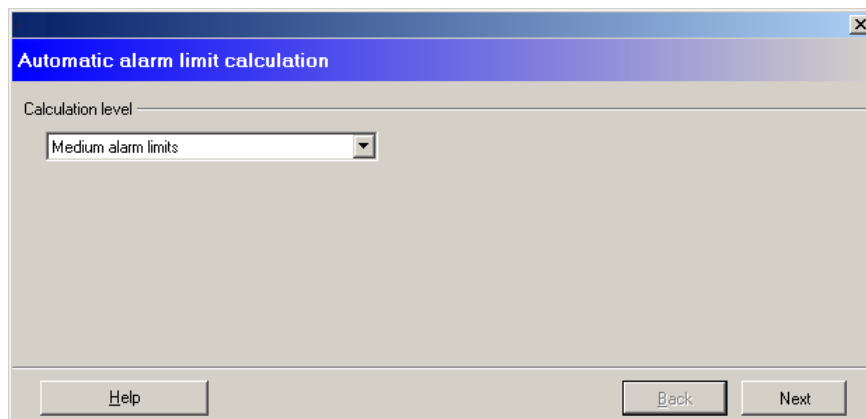
- Click **Automatic alarm limit adjustment for all devices** in the **Edit** menu and
- select the devices whose alarm limits you want to edit:



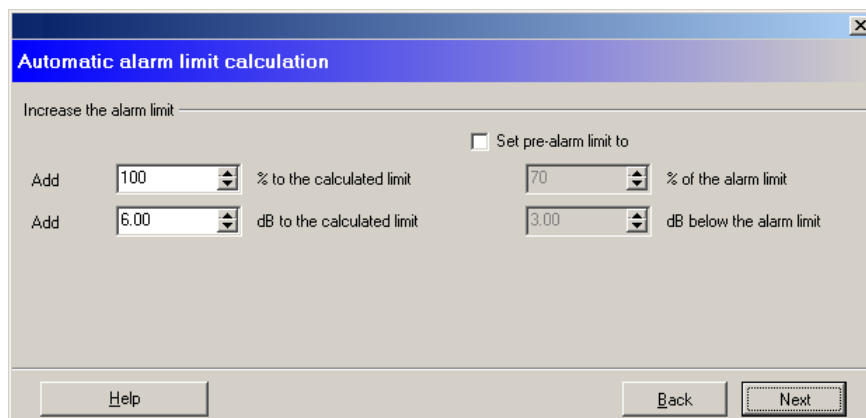
All devices in the database are displayed. Click on the checkbox before a device to select it. If you only want devices with a certain name, you can filter the list. To do so, enter a name (e.g. ProCheck) and tick the checkbox next to "Filter device names". The list displays only devices with this name.

- Select the devices,
- activate **Adjust alarm limits automatically** and
- click **OK**.

The alarm limit adjustment wizard is displayed:

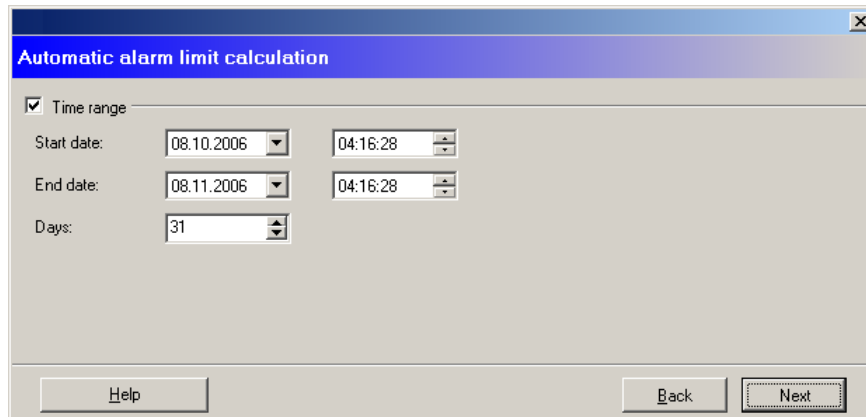


- Select an adjustment mode (low, medium, high) and click **Next**.



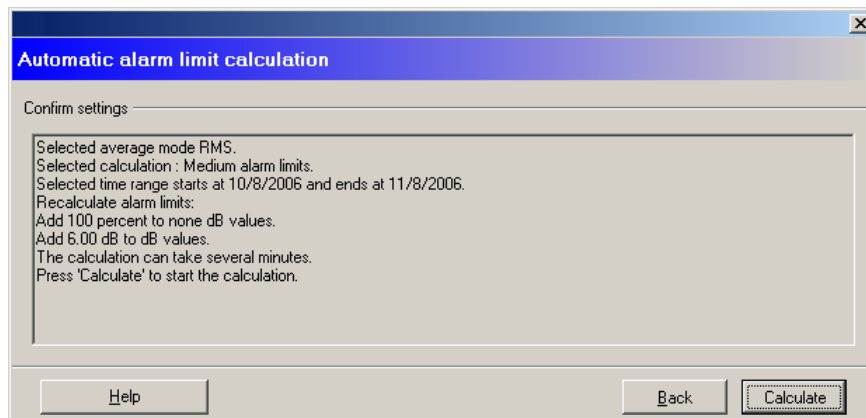
- Specify the extent to which the alarm thresholds should be increased in percent or dB.

- In order to also adapt the pre-alarm values to the new alarm limits, select the **Set pre-alarm limit to** option and enter the required % or dB values.
- Click **Continue**.



The dialog box titled "Automatic alarm limit calculation" has a blue header bar. Below the header, there is a section labeled "Time range" with a checked checkbox. This section contains three rows of input fields: "Start date:" with a date picker set to "08.10.2006" and a time spinner set to "04:16:28"; "End date:" with a date picker set to "08.11.2006" and a time spinner set to "04:16:28"; and "Days:" with a spinner set to "31". At the bottom of the dialog, there are three buttons: "Help", "Back", and "Next".

- If you wish to limit the adjustment of alarm thresholds to a specific period of data measurement, select **Time period**.
- You can define a date and time for the time range in **Start date** and **End date**. If you wish to adapt the alarm thresholds from a specific period up to the end date you can enter the number of days in the corresponding input field. The start date is then adjusted automatically.
- Click **Continue**.



The dialog box titled "Automatic alarm limit calculation" has a blue header bar. Below the header, there is a section labeled "Confirm settings". This section contains a text area with the following text: "Selected average mode RMS. Selected calculation : Medium alarm limits. Selected time range starts at 10/8/2006 and ends at 11/8/2006. Recalculate alarm limits: Add 100 percent to none dB values. Add 6.00 dB to dB values. The calculation can take several minutes. Press 'Calculate' to start the calculation." At the bottom of the dialog, there are three buttons: "Help", "Back", and "Calculate".

- Check your settings and click **Calculate** to adjust the alarm thresholds or click **Back** to edit the settings. An overview of all modified values is displayed. You can copy them to the clipboard from the context menu.

5.15 Alarm list management

The alarm list administration feature provides you with a chronological overview of various events that have occurred as well as changes made to the system. This is identical to the data administration feature in that you have access to the data as soon as it has been read out from the device and saved.

The following events are logged in the alarm list administration:

- Changes to a device configuration
- Triggering of a pre-alarm
- Triggering of a main alarm
- Resetting of an alarm

Launch the alarm list administration as follows:

- Click on **Show alarm list** in the **View** menu.

I...	Date	Action	Seri...	Name	Device con...	Monitoring conf...	F...	U...	Co...
	1/21/2009 11	Überwachungskonfiguration hat sich g	83886	Device Stahl	Konfiguration	ISO 10816		admi	
	1/20/2009 3	Überwachungskonfiguration hat sich g	83886	Device Stahl	Konfiguration	ISO 10816		admi	
	1/20/2009 3	Gerätekonfiguration wurde geändert.	83886	Device Stahl	Konfiguration			admi	
	1/20/2009 2	Gerätekonfiguration wurde geändert.	83886	Device Stahl	Konfiguration			admi	
	1/20/2009 2	Gerätekonfiguration wurde geändert.	83886	Device Stahl	Konfiguration			admi	
	1/20/2009 2	Überwachungskonfiguration hat sich g	83886	Device Stahl	Konfiguration	Speed und Resor		admi	
	1/20/2009 2	Gerätekonfiguration wurde geändert.	83886	Device Stahl	Konfiguration			admi	
	1/20/2009 2	Überwachungskonfiguration hat sich g	83886	Device Stahl	Konfiguration	Speed und Resor		admi	
	1/19/2009 2	Überwachungskonfiguration hat sich g	14913	Device Stahl	Konfiguration	Fixed Frequ. 1 Wi		admi	
	1/19/2009 2	Überwachungskonfiguration hat sich g	14913	Device Stahl	Konfiguration	Fixed Frequ. 1 Wi		admi	
	1/19/2009 2	Überwachungskonfiguration hat sich g	83886	Device Stahl	Konfiguration	ISO 10816		admi	
	1/12/2009 1	Überwachungskonfiguration hat sich g	83886	Device Stahl	Konfiguration	ISO 10816		admi	
	1/8/2009 12	Überwachungskonfiguration hat sich g	83886	Device Stahl	Konfiguration	ISO 10816		admi	
	12/17/2008	Überwachungskonfiguration hat sich g	14913	Device Stahl	Konfiguration	Speed Dep. Freq.		admi	
	12/17/2008	Überwachungskonfiguration hat sich g	14913	Device Stahl	Konfiguration	Fixed Freq. 2		admi	
	12/17/2008	Überwachungskonfiguration hat sich g	15054	Device Stahl	Acc_Vel_Disp	10. Monitoring coi		admi	
	12/17/2008	Überwachungskonfiguration hat sich g	15054	Device Stahl	Acc_Vel_Disp	9. Überwachungs		admi	
	12/17/2008	Überwachungskonfiguration hat sich g	15054	Device Stahl	Acc_Vel_Disp	Vel_Sens_1		admi	
	12/17/2008	Überwachungskonfiguration hat sich g	15054	Device Stahl	Acc_Vel_Disp	Vel_Sens_0		admi	
	12/17/2008	Überwachungskonfiguration hat sich g	15054	Device Stahl	Acc_Vel_Disp	Displ_Sens_0		admi	
	12/17/2008	Überwachungskonfiguration hat sich g	15054	Device Stahl	Acc_Vel_Disp	Acc_Sens_2		admi	
	12/17/2008	Überwachungskonfiguration hat sich g	15054	Device Stahl	Acc_Vel_Disp	Acc_Sens_1		admi	
	12/17/2008	Überwachungskonfiguration hat sich g	15054	Device Stahl	Acc_Vel_Disp	Acc_Sens_0		admi	
	12/17/2008	Überwachungskonfiguration hat sich g	15054	Device Stahl	Acc_Vel_Disp	2. Monitoring contl		admi	

The alarm list itself is located below a menu bar and a panel containing various command buttons. This contains data, more information on which is provided below:

Nomenclature of alarm list data fields:

Field name	Meaning								
Symbol	<p>The symbol in front of each data set allows you to identify the associated event more easily. The meanings of the individual symbols are:</p> <table> <tr> <td>blue i:</td><td>General information</td></tr> <tr> <td>yellow square:</td><td>A pre-alarm was triggered.</td></tr> <tr> <td>red square:</td><td>A main alarm was triggered.</td></tr> <tr> <td>red/green square:</td><td>The alarm was reset.</td></tr> </table>	blue i:	General information	yellow square:	A pre-alarm was triggered.	red square:	A main alarm was triggered.	red/green square:	The alarm was reset.
blue i:	General information								
yellow square:	A pre-alarm was triggered.								
red square:	A main alarm was triggered.								
red/green square:	The alarm was reset.								
Date	The Date field contains information on the day and time a new entry was entered in the alarm list.								
Action	The Operation field contains a brief description for each entry of the event that led to the entry.								
Serial number	This field contains the serial number of the device that the entry refers to.								
Name	Name given to the device during configuration.								
Device configuration	This field contains the name of the device configuration.								
Monitoring configuration	This field contains the name of the monitoring configuration.								
Frequency band	Displays the name of the relevant frequency band.								
User name	Name of the person who configured the device and the monitoring parameters.								
Comment	This is the comment that was entered when specifying the settings of the monitoring configuration.								

A context menu can be opened and the data administration functions called up by right-clicking any field containing a data set.

Functions for the alarm list administration

The most important functions of the alarm list administration can be called up via the context menu, which can be accessed from any marked data set. Several of these functions can also be called up via the button bar or menu bar.











Context menu in alarm administration

The context menu can be used to navigate through the data sets. You can also specify a filter or edit the comment for a data set.

Menu items	Function
Use current data set to filter list	You can use this option to filter the list using the selected data set as the basis.
Reset filter settings	Resets the filter in order to display all data sets in the alarm list.
Edit comment	Opens a dialog box in which the comment can be edited.
First	Moves to the first data set in the alarm list.
Next	Positions the cursor at the next data set.
Previous	Positions the cursor at the previous data set.
Last	Jumps to the last entry in the alarm list.

The button bar

You can quickly access frequently used functions via the button bar elements. A data set must be marked before the data set functions can be called up.

Button	Meaning
	Exit the alarm list administration
	Jumps to the first data set in the alarm list.
	Positions the cursor at the previous data set.
	Positions the cursor at the next data set.
	Jumps to the last entry in the alarm list.
	Deletes the selected entry in the alarm list.
	Opens a dialog box in which the comment can be edited.
	You can use this option to filter the list according to the selected dataset.
	Resets the filter in order to display all data sets in the alarm list.
	Opens the print preview for the report.

The menu bar

Several commands from the context menu can also be called up via the menu bar.

Menu	Menu items and function
File	Export data You can use this button to save the data in the alarm list in a CSV file. Close Exit the alarm list administration
Alarm list	Use current data set to filter list You can use this option to filter the list according to the selected dataset. Reset filter settings Resets the filter in order to display all data sets in the alarm list. Edit comment Opens a dialog box in which the comment can be edited. First Moves to the first data set in the alarm list. Next Positions the cursor at the next data set. Previous Positions the cursor at the previous data set. Last Jumps to the last entry in the alarm list.

Filter settings


You can use the filter settings to define precisely which data should be displayed. You can display the filter settings options via the "Filter settings" button. The various options are explained below:

Option	Function
Period of time	You can display alarms from a specific period by activating this option.
Filter	Serial number If you enter a serial number here alarms from the device with this serial number will be displayed. Device config. name If you enter the name of a device configuration here only data originating from this device configuration will be displayed.

Option	Function
	User name When this filter setting is applied, only configurations defined by this user and corresponding data sets will be displayed. Name This provides the user with the option of displaying only the data of a specific device. Monitoring config. name Here you can enter the name of a monitoring configuration, which is then used as filter criterion.

The print preview

The print preview window opens when the button in the alarm list administration toolbar is pressed.

You can navigate through the individual pages of the report and change the size of the view with the help of the button bar in the print preview. Once you are satisfied with the report you can press the  button to print it out.


Exit the alarm list administration

You can end the alarm list administration using one of the following commands:

either

- from the menu **File > Close**

or

- by clicking  on the menu bar.

5.16 Alarm status

Update alarm state



You can update the alarm state for one or all tree items.

- Select a device and
- click **Update alarm state of selected nodes** in the **Edit** menu.

Or:

- Click **Update all alarm states** in the **Edit** menu.

Reset alarm status

If the **Reset pre/main alarm manually** option is selected (ProCheck see section "Manage devices" → "General settings" , Dtect X1s see section "Device configuration" → "General settings" ) , the triggering monitoring configuration is removed from monitoring mode in the event of a main alarm. This is only taken into account again during measuring mode once the alarm has been reset.

You can reset the alarm status as follows:

- Make sure that a connection to the device has been established.
- Select a device or one or several configurations.
- Right-click the selected entries and select **Reset alarms...** from the context menu.

Or:

- Click on  in the toolbar.


All alarms for the element selected, including all sub-elements, are reset. The relevant elements in the tree view are highlighted in green once again.



The original alarm status remains displayed in the measuring data view .

5.17 Data export/import

The configuration manager provides the following options:

- Store (i.e. export) device information, configurations and measuring data in an external file and also
- import  such files.

This means that data and configurations can easily be exchanged between different installations. To migrate databases

created and edited with Configuration Manager (as of version 4.0), you can import them completely into the current Configuration Manager.

Export format

The Configuration Manager exports data in "4.x Export-Format (*.x5)" format.

Import formats

The Configuration Manager can import the following formats:

- Files in "4.x Export Format (*.x5)"
- Files or databases in "4.0 Export Format (*.zip)"
- Configuration Manager version 3.x: V3 files (*.x11) or databases (from a directory)

5.17.1 Export data

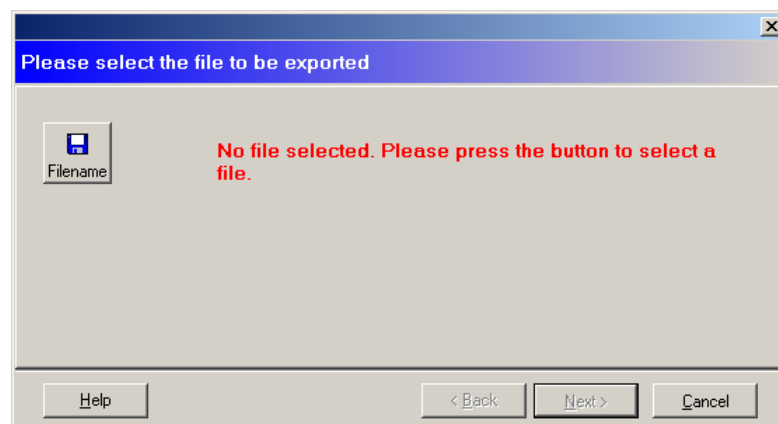
In the FAG Administrator software you can export device information, configurations and measuring data with the aid of the Export Wizard.

- To do so, select a device, configuration or the complete system in the tree view and
- click **Export selection** in the **File** menu.

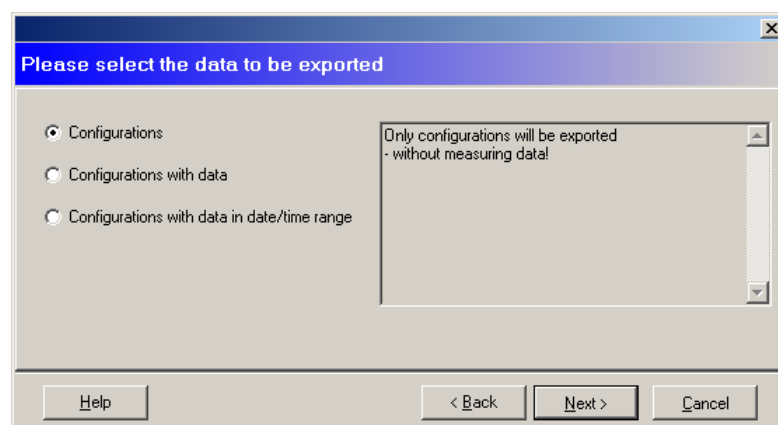
Or:

- Select one or more datasets in the data view of a monitoring configuration and
- select "Export selected rows" from the context menu.

The wizard helps you put together the export data:



- Enter the path and **file name** for the export file.
- Click **Continue**.



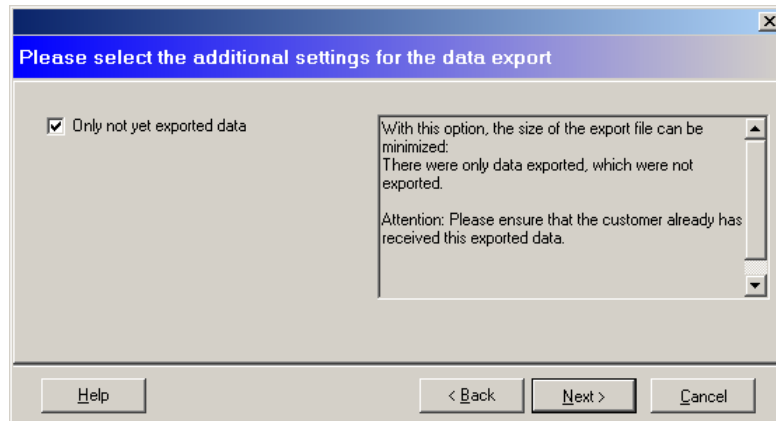
- The following options are available:
 - **Configurations** to export only the configuration of the devices (no export data exported).
 - **Configurations with data** to export the configuration of the devices and the measuring data.
 - **Configurations with data in date/time range** to export the configurations with data from a specific time period.

- Press **Next** to confirm your selection.

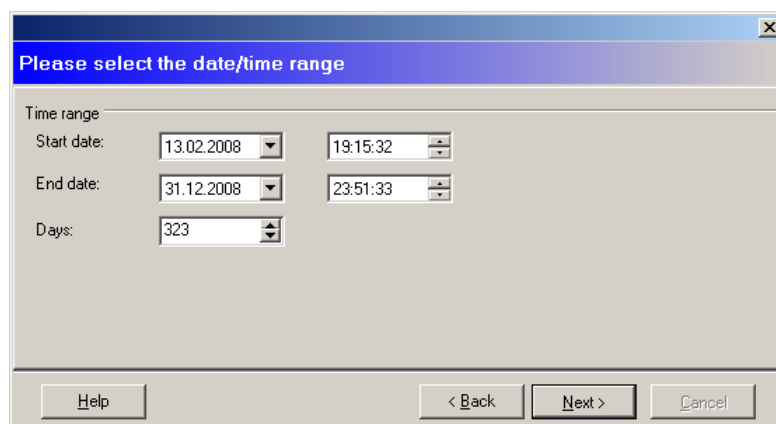
If you only export the configurations, you will arrive directly at an overview of the settings you made. Click on **Finish** to export the data.

If you have already exported data from the database and only want to export new datasets, perform the following steps:

- Select **Only not yet exported data**. The advantage of this is that a much smaller file will be generated. However, the recipient of the data must already have access to an exported database.



- Press **Next** to confirm your selection.
- If you have selected "Configurations with data in date/time range", you can define the time range of the data to export. You can define a date and time for the time range in **Start date** and **End date**. If you wish to export the data from a specific period up to the end date you can enter the number of **days** in the corresponding input field. The start date is then adjusted automatically:




- Press **Next** to confirm your selection.
- Click **Finish** to export the data.

The export file is saved to the selected directory.


5.17.2 Export and send data (E-service)

You can compile and automatically send configurations and measuring data with the E-service function. By default, the recipient of this e-mail is taken from the details on the "Advanced settings" tab. If you do not specify a recipient, the global e-mail recipient from the options is automatically used.

Configure the E-service function as follows:

- First configure the e-mail settings in the Configuration Manager options .

If you would like to have different e-mail recipients for each system or device, you can specify them on the "Advanced settings" tab:

- Select a system or device in the Configuration Manager tree view and
- enter an e-mail recipient on the "Advanced settings"  tab.

Export data with the E-service function as follows:

- Select a device or the entire system in the tree view and
- Click **E-service** in the **Service** menu.

Use the Export Wizard  to compile the export data. The data are then automatically sent by e-mail.




You can end the Wizard at any time by clicking on the "Cancel" button.


5.17.3 Export and send data automatically

You can automatically export configurations and measuring data from any device in the CM database and send them by e-mail using the Notify Link software. By default, the recipient of this e-mail is taken from the details on the "Advanced settings" tab. If you do not specify a recipient, the global e-mail recipient from the Notify Link options is used.

You can configure the automatic data export as follows:

- First configure the e-mail settings in the options  of the Notify Link and
- enter a "global" e-mail recipient.

If you would like to have a different e-mail recipient for each device,

- select a device in the Configuration Manager tree view,
- call up the "Advanced settings"  tab, and
- enter an e-mail recipient in **E-mail settings**.

- Tick the checkbox next to **Export and send measurement data** in the "Automatic e-mails (via Notify Link)" section.
- Specify the number of days and hours to export after.
- You can restrict the data transferred to data from a specific number of days using the "But only datasets from the last X day(s)" option. If the "Only not yet exported data" option is selected, data already sent at an earlier date/time will not be transferred again.

If the Notify Link is in run mode, it checks the CM database in the configured time range and sends e-mails as soon as there are any export data. The Administrator software does not need to be running.

5.17.4 Import data

- *Depending on the volume of data to be imported, this process may take some time. Do not interrupt the import process in order to avoid inconsistencies in the database.*
- *If you import configurations that already exist in the database, the imported configurations overwrite the existing configurations, which are then flagged as changed.*

You can import data in V5 format (Dtect X1s and ProCheck) as follows:

1. Click **Import** in the **File** menu, then **Import file** to call up the file selection window.
2. Specify the file (*.x5) you wish to import here.
3. Click **Open**.

The content of the file is integrated into the device and configuration structure.

You can import data in V4 format (Dtect X1) as follows:

How to import V4 files:

- Import the export file in V4 format (*.zip): The content of the export file is imported into the current database. After import, the Configuration Manager displays an import report indicating the number of imported (first-time imported) and changed (already existing and overwritten) devices and configurations.
- Import database: Reads the database and imports all data into the current CM database.

To import V4 data:

- Click **Import** in the **File** menu.
- To select an export file:
 - Click **Import 4.0 file**.
- Select the file you want to import, then click **Open**.

Or:

- o Click on **Import 4.0 database**.
- o Select the database as described in "Select database" ^[34].

You can import data in V3 format (Dtect X1) as follows:

If you wish to import data in Administrator software version 3.6 or 3.8 format you can import the individual files in *.x11 format, import a complete V3 database or import the V3 user administration data.

- Click **Import** in the **File** menu.
- Then select **Import 3.x file** or **Import 3.x database** and select the file, folder or database to import.
- Click **Open**.

Import V3 user management data as follows:

- Click **Import users from version 3.x** in the **Extra** menu.
- Select **Import users from version 3.x** and select the file 'user_dat'.
- Click **Import users**.



- Data from Administrator versions lower than version 3.6 cannot be imported.
- You can only import Dtect X1/Dtect X1s data if the characteristic values were saved with timestamps (see "Saving options" ^[121]). If not, you can activate this option later: load the configuration of the Dtect X1/Dtect X1s device, activate the save option "Save timestamp of characteristic dataset" and send the modified configuration back to the device. You can then import the data as usual.

Log file for data import

The Administrator software logs information about import processes in separate log files.



- Click **Show import logs** in the **File** menu.

Provides an overview of all import processes.

No.	Read	Stat	Ver	Start date	Details	Message	Dev	Im	Devices	Igno	Devi	Measuring	Impo	Igno	Filen
1			4.x	1/31/2012 3:54:00 PM		Import terminated: 1/31/2012 3:54:02 PM 1	0	0		0		0	0	0	
2			4.x	1/31/2012 3:12:48 PM		Import terminated: 1/31/2012 3:12:55 PM 7	1	1	'Check 2 (16ch)' [11117707]	0	6	0	6	0	
3			4.x	1/31/2012 2:58:14 PM		Import terminated: 1/31/2012 2:58:20 PM 6	1	1	'Check 2 (16ch)' [11117707]	0	6	0	6	0	
4			4.x	1/31/2012 2:14:47 PM		Import terminated: 1/31/2012 2:15:02 PM 14	2	2	'Check 1 (16ch)' [11035761], ...	0	6	6	0	0	
5			4.x	9/20/2011 4:08:46 PM		Import terminated: 9/20/2011 4:09:14 PM 27	2	2	'2ch device Example of an outer	0	0	0	0	0	
6			4.x	9/2/2011 11:47:14 AM		Import terminated: 9/2/2011 11:47:25 AM 11	1	1	'Check 1 (16ch)' [11035761]	0	0	0	0	0	

Using the import filter you can filter processes by "All logs", "Successful imports" and "Not successful imports". The following information is displayed:

Field name	Meaning
Read	Import message already read can be ticked. Press the "Mark all as read" button to select all messages. You can automatically delete these messages when you close the import log.
Status	The import status is displayed with the following icons: Import was successful, all data were imported.

Field name	Meaning
	 Import was successful, but not all data were imported or the timestamp of the data was changed.
	 Import failed, no data were imported.
Version	The Version field contains information about the Administrator software version of the imported data.
Start date	The Start date field contains information about the day and time the import was started.
Details	Click this icon to display further details about the import process.
Message	The Message field contains information about the day and time and how long the import took.
Devices (imported, ignored)	This field contains the number, name and serial number of the device data to import. It also displays the number of devices imported and ignored.
Measuring data (imported, ignored)	This field contains the number of measuring data to import. It also displays the number of measuring data imported and ignored.
File	Click this icon to display the import log file in a text editor.

5.18 ASCII export



The ASCII export only works with Dtect X1 data.

During the ASCII export, a separate file is generated consisting of a header segment and a data segment for each existing data type. The header segment contains the Administrator version number and measurement configuration data. The information is saved in the Windows INI file format. The measuring data is contained in the data segment. The file names are made up of the name of the measuring data and the file extension. The file extensions are assigned automatically according to data types. The file extensions and assignment to the corresponding data type are shown in the table below.


File extension	Data type
.X1AscActTime	Time signal
.X1AscActFFT	FFT
.X1AscAlarmFFT	Alarm FFT
.X1AscCharacteristics	Characteristic value data
.X1AscAlarms	Alarm data

Manual export

Using manual export, only the monitoring configuration which is currently selected will be exported.


- Select a monitoring configuration in the tree view.
- Select the dataset to export in the "Data" window.
- Click **ASCII export** in the **Service** menu.

Or:

- Click on  in the toolbar.
- Select the path to be used for the export of data sets in the "Select export directory" dialog box which subsequently opens.
- Click **OK** to close the dialog box.

The selected data sets are now exported using the path you selected.

5.19 Create reports

You can output detailed reports for monitoring configurations or alarm reports for devices in Configuration Manager. You can configure additional settings for both types of report, e.g. graphics or the folder, in the **Extras** menu, **Report** .

Depending on the selection, the **detail report** for monitoring configurations contains information about device properties and device settings, device and monitoring configurations, and measuring data.


The **alarm report** for devices contains information about the status of the components monitored by a device, e.g. vibration changes that have occurred since the last report, the status of the monitored components, and warnings about sensor or transfer errors.

Create detail report for a monitoring configuration

Proceed as follows to create a detail report:

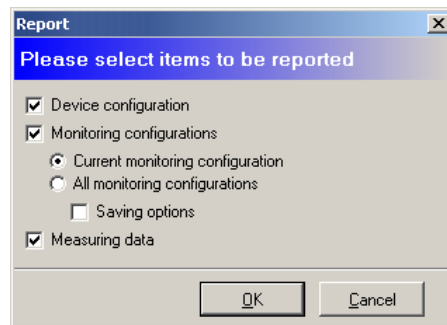
- Select the appropriate monitoring configuration.
- Select the appropriate data on the Data tab.
- Click **Reports... > Detail report** in the Service menu.

Or:

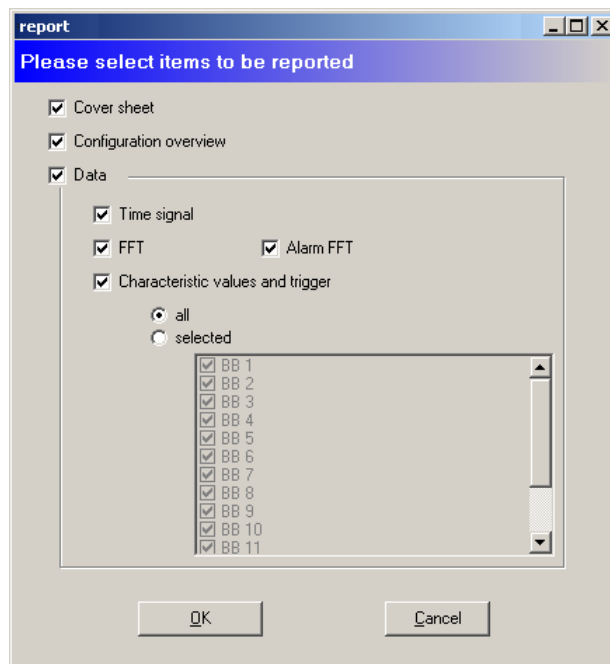
- Click  on the toolbar and select **Detail report**.

Or:

- Click on the measuring data pane on the right and select “Detail report” from the context menu.



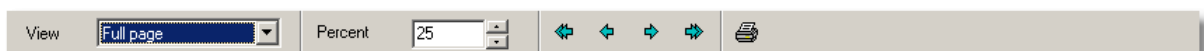
ProCheck




Dteet X1s

Select the content of the report and click **OK**.

You can view the report on-screen or print it out in the **Report** window. You can use the toolbar to control the screen display:



- The display size can be defined in **View**. Select **Percent adjustable** to enter a zoom factor expressed as a percentage in the **Percent** input field.
- You can navigate forwards or backwards through the report and also jump to the start or end of the report using the arrow buttons.

- Click on  to print out the report.

Create alarm report for one or all devices




*Before you can create an alarm report, you must define a folder in the **Extras > Options > Report** menu.*

How to create an alarm report:

Create alarm report for one device

- Click the device in the device and configurations list.
- Click **Reports... > Alarm report** in the Service menu.

Or:

- Click  on the toolbar and select **Alarm report**.

Or:

- Click on the measuring data pane on the right and select “Alarm report” from the context menu.

The alarm report is stored in the specified directory.

Create alarm report for all devices

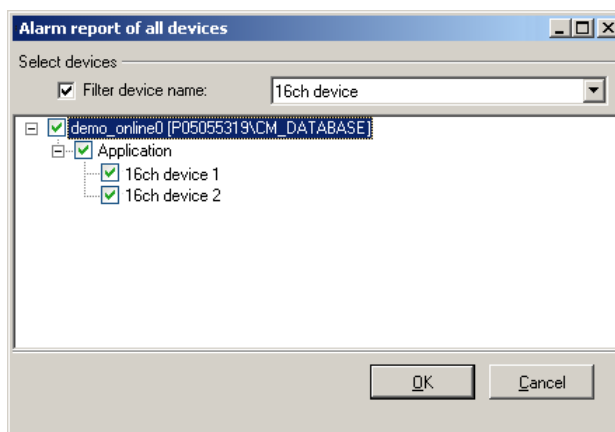
- Click on a device in the device and configurations list.
- Click **Reports... > Alarm report for all devices** in the Service menu.

Or:

- Click  on the toolbar and select **Alarm report for all devices**.

Or:

- Click on the measuring data pane on the right and select “Alarm report for all devices” from the context menu.



All devices in the database are displayed. Click on the checkbox next to a device to select it for the alarm report. If you only want devices with a certain name, you can filter the list. To do so, enter a name (e.g. ProCheck) and tick the checkbox next to “Filter device names”.

- Select the devices and click **OK**.

The alarm report is stored in the specified directory.



*To create an alarm report for all devices of a planning level, highlight the planning level and select **Service > Reports... > Alarm report**.*

Open alarm report

The alarm reports are stored in HTML format in the selected folder. Each report is stored in a separate directory. The directory name consists of the timestamp of report creation (e.g. "2010-02-10-16-42-25-387").

To open an alarm report,

- switch to the appropriate directory and
- open the file "index.html".

The alarm report is displayed in your default browser.



If no browser is installed on your system, you can open the report in an HTML-enabled text editor.

Edit alarm report


You can add information to an alarm report. To do so, open the alarm report in an HTML-enabled text editor and edit the report accordingly.

5.20 Mail server messages

All information about e-mail sending is logged in Konfigurations-Manager, in Data Link and in Notify Link.

- Click **Show mail server results** in the **Service** menu.

Results of e-mail delivery							
Filter				Mark all read			
All results							
No.	Read	Sent	Send date	Error message	Recipient	Subject	Detailed
1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	14.02.2012 09:29:56		control@company.com	"Check 1 (16ch): Manueller E-Mail-Export"	
2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	14.02.2012 09:26:03		control@company.com	"Check 1 (16ch): Manueller E-Mail-Export"	
3	<input checked="" type="checkbox"/>	<input type="checkbox"/>	14.02.2012 09:23:00		control@company.com	"Check 1 (16ch): Manueller E-Mail-Export"	
4	<input checked="" type="checkbox"/>	<input type="checkbox"/>	10.02.2012 08:38:16		control@company.com	"Exportiere Anlage: Application"	
5	<input checked="" type="checkbox"/>	<input type="checkbox"/>	31.01.2012 14:51:26		control@company.com	"Exportiere Anlage: Application"	
6	<input checked="" type="checkbox"/>	<input type="checkbox"/>	31.01.2012 14:50:47		control@company.com	"Check 1 (16ch): Manueller E-Mail-Export"	
7	<input checked="" type="checkbox"/>	<input type="checkbox"/>	2011-09-16 14:24:41		control@company.com	"Check 1 (16ch): Manueller E-Mail-Export"	
Close							

You can filter the messages by "All results", "Only sent results" and "Unsent results". If an e-mail was sent successfully, a latter icon ☒ is displayed; an exclamation mark  indicates an unsent e-mail. The send date, recipient and subject of the e-mail are also displayed. In the event of an error, a detailed error message is displayed.

If there are any e-mails in "Unsent results" that could not be sent, for example because the e-mail settings were not correct, you can automatically correct and resend them.

- Click **Mail server maintenance> Send not sent e-mails again** in the **Service** menu.

5.21 User management

About user management

You can use the Configuration Manager to create users and assign individual rights of use. The standard definition for a user is "admin" without password which provides the user with unrestricted access and use of all functions of the Administrator software. The "guest" (guest) user has only restricted permissions, but does not have a password either. You can use the user management to set up as many users as you require and assign individual access rights to these users which means that they will only be able to access functions that are relevant to them.



In the device factory settings no password is assigned to the "admin" user. To prevent unauthorized access to software and data you should assign a password for this user without delay. For further information about switching users, see here [46](#).

You can start the user management as follows:

- Click on **User management** in the **Tools** menu.

The user management window is split into two sections.

- The administration of users is carried out in the upper section where you can select, create, modify and delete users and assign passwords, providing the user in question has been assigned the corresponding rights.
- The rights of the user selected can be restricted or activated in the bottom section of the window, as required.

The following three buttons are positioned next to the user selection box:

Button	Meaning
	Opens a dialog box where you can enter a new user name.
	Allows you to change the user name.
	Deletes the user and corresponding rights.

5.21.1 Create/modify user




Make sure that at least one user has administrator rights as otherwise you run the risk of not being able to access the user management! If this does happen, please get in touch with Support (see "contact" ²⁵⁰).

Create a user


- Click on
- Enter the user name in the dialog box that appears and confirm this with "OK".
- Assign a **password** for this user in "Password".
- Confirm the password in **Repeat password**.
- Continue with assign rights ¹⁴².

Rename user

- Select a user from the list.

- Click on .
- Edit the user name in the dialog box that appears and click "OK" to confirm.

Delete user

- Select a user from the list.
- Click on .
- Click **OK** to confirm.

5.21.2 Assign rights

The rights for each user can be assigned simply by marking the corresponding form fields. The following overview provides you with information on the available rights and their corresponding meanings:

Editing/change rights

Name	Meaning
Configurations	Enables a user to change existing configurations.
Alarms	Enables the user to reset alarms.
User rights	Enables a user to change the user rights.
Measuring data comments	The user can edit comments for the measuring data.
Database connections	Enables the user to edit existing databases.

Delete rights

Name	Meaning
Configurations	If this right is activated a user can delete existing configurations.
Alarm data	Enables the user to delete alarm data from the alarm list via the options menu.
Users	Enables a user to delete users.
Measuring data	Enables the user to delete measuring data.

Rights to start services

Name	Meaning
Manual service	If this option is activated the user can connect to the Dtect X1s device on his own and download data, for example.
Remote service	Enables the user to start and stop the Remote Server.
Database administration	

Create rights

Name	Meaning
Configurations	If this right is activated a user can create new configurations.
Users	Enables a user to create and change users.

Import/export rights

Name	Meaning
Export	If this right is activated the user can export data from databases.
Import	Enables a user to import data into an existing database.
E-service	Enables the user to send data by e-mail.

5.22 Bearing database

The bearing database provides you with data on the most widely used bearings for use in your individual configuration.

You can also add your own bearings ^[145] to the existing bearing data. Furthermore, the bearing database also includes a group administration feature ^[146] which you can use, for example, to group bearings of different makes that have similar characteristics.

Click **Tools > Bearing database** to open the bearing database.

Select the database as described in "Select database" ^[34]. The name of the included bearing database is "cm_bearings". If you installed it during software installation, it is automatically opened when you call the bearing database function for the first time. The program uses the default user name and the default password.

Opens the bearing database.

Bearing database

Bearing database

Search bearing

Add bearing

Edit bearing

Delete bearing

Add manufacturer

Edit manufacturer

Delete manufacturer

Manage group

Export bearings

Import bearings

Change database

Close

Search bearing

Manufacturer

Group

Search criteria

Search result

Bearings	Manufacturer

No. of hits

Geometry data or kinematic frequencies

☐ Geometry ☒ Frequencies

Inner race frequency

Outer race frequency

Rolling element frequency

Fundamental train frequency at fixed outer race

Fundamental train frequency at fixed inner race

Dispose

5.22.1 Search bearing

To find a bearing click on **Search bearing** in the bearing database.

- Click on to display all bearings.
- To restrict the search you can specify the **manufacturer** and/or **group**.
- You can also further restrict the search to specific bearing designations in **Search criterion** using the standard wildcards "?" and "*", e.g.:
 - "**1200*" to find all bearing names containing 1200 or
 - "?200*" to find all bearings whose name includes the text "200" at position 2-4.

The list of hits is displayed in **Search result**.

5.22.2 Add bearing

To add a bearing to the bearing database click on **Add bearing**.

- Select a **manufacturer** from the list.
- Enter a name for the bearing in the **Label** field.
- Detailed comments may be entered in the **Comment** field (optional).

Geometry data or kinematic frequencies

- Use the **Geometry** and **Frequencies** options to switch between the input fields in the right-hand area of the window in order to enter corresponding data. When inputting the contact angle select either **degrees** or **radians** for units. When specifying the frequencies enter whether these should be in **Hz** or **rpm**.

Geometry data or kinematic frequencies

☒ Geometry ☐ Frequencies

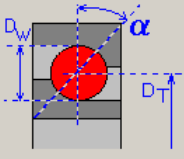
Force angle (α)

☒ in degrees ☐ in rad

Pitch circle diameter [mm] (DT)

Rolling elements diameter [mm] (D_W)

Number of rolling elements



Geometry data or kinematic frequencies

☐ Geometry ☒ Frequencies

Inner race frequency

Outer race frequency

Rolling element frequency

Fundamental train frequency at fixed outer race

Fundamental train frequency at fixed inner race



The bearing database indicates whether any information still needs to be input in the bottom right-hand area of the window. The bearing can be added to the database only if all inputs are completed.

- Click on **Continue** to store the bearing in the bearing database.

5.22.3 Edit / delete bearings

Editing bearings

Click on **Edit bearing** and start by searching for the corresponding bearing as described at Search bearing ¹⁴³.

Search bearing

Manufacturer: All

Group: All

Search criteria:

Search result

Bearings	Manufacturer
108-TVH	FAG
11204-TVH	FAG
11205-TVH	FAG
11206-TVH	FAG
11207-TVH	FAG
11208-TVH	FAG
11209-TVH	FAG
11210-TVH	FAG
11211-TVH	FAG
11212-TVH	FAG
1200-TVH	FAG
1201-TVH	FAG
1202-TVH	FAG
1203-TVH	FAG
1204-K-TVH-C3	FAG
1204-K-TVH-C3 + H	FAG
1204-K-TVH-C3+H	FAG
1204-TVH	FAG
1205-K-TVH-C3	FAG
1205-K-TVH-C3 + H	FAG

No. of hits: 21365

Geometry data or kinematic frequencies

☐ Geometry ☒ Frequencies

Inner race frequency: 6.0591

Outer race frequency: 3.9409

Rolling element frequency: 2.2027

Fundamental train frequency at fixed outer race: 0.3941


Fundamental train frequency at fixed inner race: 0.6059

Dispose

The list of bearings found is displayed in the **Search results** as well as the **number of hits**.

- Select the bearing to be modified and click on **Continue**.
- Enter the data for the required bearing as described under Add bearing ¹⁴³.
- Click **Continue**.



Click on  to open the **Manufacturer details** window. You can find the contact details for the manufacturer here.

Deleting a bearing

- Perform your search as described above ¹⁴⁴. Then select the desired bearing for deletion from the **Search results**.
- Click on **Delete bearing** to remove the bearing from the database.




You can only delete bearings that you have entered ¹⁴³ yourself! Once all the bearings for a particular manufacturer have been deleted you can also delete the manufacturer ¹⁴⁷.

5.22.4 Export bearings/import bearings


Exporting bearings

Click on **Export bearing** and search for the bearing you would like to edit as described in Edit/delete bearings ¹⁴⁴.

- You can use the **Export self-created bearings only** option to restrict the export to bearings you yourself have entered.
- Click  and select the path and file name. By default, the program uses a file name with the following pattern:

FAGBearingDB_export_<year>_<month>_<day>.zip. Alternatively, you can use your own file name.

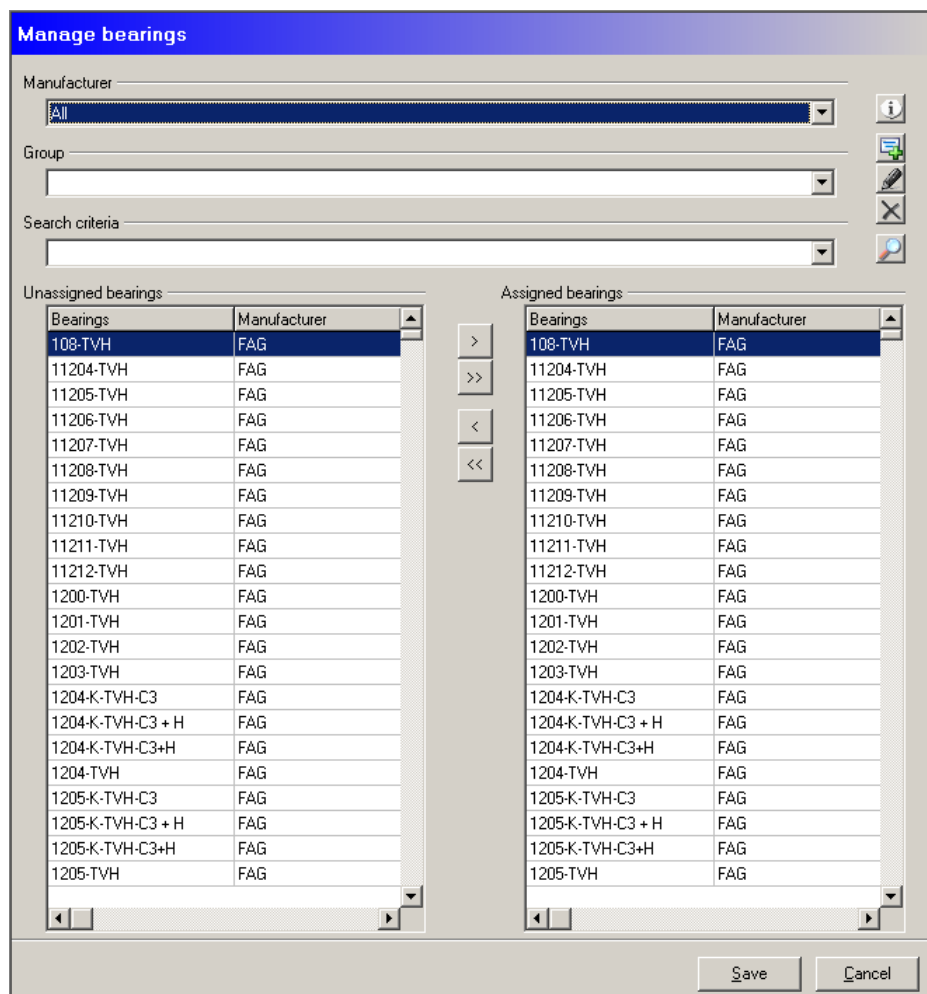
Importing bearings

- Click on **Import bearings**, then on .
- Select the import file.
- Select whether to import with confirmation for a bearings and/or manufacturers.
- Click **Next** to start the import.

5.22.5 Manage groups

You can use the manage group feature to classify bearings with similar characteristics, regardless of their manufacturer.

- Click on **Manage groups** to call up the bearing database group administration feature.




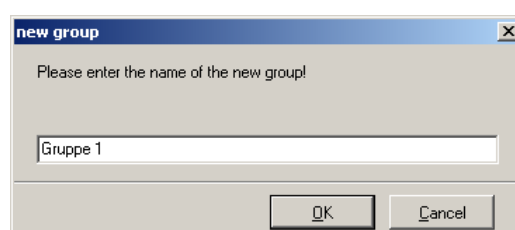
The 'Manage bearings' dialog box is used for managing bearings. It features a 'Manufacturer' dropdown menu set to 'All', a 'Group' dropdown menu, and a 'Search criteria' dropdown menu. Below these are two tables: 'Unassigned bearings' and 'Assigned bearings'. Both tables list bearings and their manufacturers. The 'Unassigned bearings' table has 20 rows, and the 'Assigned bearings' table has 20 rows. Between the tables are navigation buttons: '>', '>>', '<', and '<<'. At the bottom right are 'Save' and 'Cancel' buttons.

Bearings	Manufacturer
108-TVH	FAG
11204-TVH	FAG
11205-TVH	FAG
11206-TVH	FAG
11207-TVH	FAG
11208-TVH	FAG
11209-TVH	FAG
11210-TVH	FAG
11211-TVH	FAG
11212-TVH	FAG
1200-TVH	FAG
1201-TVH	FAG
1202-TVH	FAG
1203-TVH	FAG
1204-K-TVH-C3	FAG
1204-K-TVH-C3 + H	FAG
1204-K-TVH-C3+H	FAG
1204-TVH	FAG
1205-K-TVH-C3	FAG
1205-K-TVH-C3 + H	FAG
1205-K-TVH-C3+H	FAG
1205-TVH	FAG

Bearings	Manufacturer
108-TVH	FAG
11204-TVH	FAG
11205-TVH	FAG
11206-TVH	FAG
11207-TVH	FAG
11208-TVH	FAG
11209-TVH	FAG
11210-TVH	FAG
11211-TVH	FAG
11212-TVH	FAG
1200-TVH	FAG
1201-TVH	FAG
1202-TVH	FAG
1203-TVH	FAG
1204-K-TVH-C3	FAG
1204-K-TVH-C3 + H	FAG
1204-K-TVH-C3+H	FAG
1204-TVH	FAG
1205-K-TVH-C3	FAG
1205-K-TVH-C3 + H	FAG
1205-K-TVH-C3+H	FAG
1205-TVH	FAG

Create a new group

- To create a new group click on .



The 'new group' dialog box prompts the user to enter the name of the new group. It has a text input field containing 'Gruppe 1' and 'OK' and 'Cancel' buttons at the bottom.

Please enter the name of the new group!

Gruppe 1

OK Cancel


- Enter a name for the new group and click **OK**.

Assign bearings to a group

To assign one or more bearings to a group proceed as follows:

- Select the desired group from the **Group** list.
- Search for one or several bearings as described in "Search bearing" ¹⁴³⁾. The bearings found are displayed in the **Unassigned bearings** list.
- To assign a bearing to the group click on it then click on **>**. The bearing should now be displayed in the **Assigned bearings** list.
- To assign all bearings found to the group, click on **>>**. All bearings should now be displayed in the **Assigned bearings** list.
- To delete a bearing from the group click on the bearing in the **Assigned bearings** list then click on **<**.
- To delete all bearings from the group, click on **<<**.
- Click on **Save** assign the bearings to the group in the bearing database.

Rename a group

- To rename a group, select it from the **Group** list and click on .
- Enter a new name for the group and click on **OK**.

Delete a group

- To delete a group, select it from the **Group** list and click on .



Warning! the group is deleted immediately - you will not be prompted to confirm this! You should therefore only use these functions if you are sure that you want to delete a group.

5.22.6 Add manufacturer

- Click on **Add manufacturer** to create a new manufacturer.
- Enter the manufacturer's data in the appropriate input fields and click on **Next**.
- Check your input in the next window that appears. If the input is correct, click **Add** to save the manufacturer in the bearing database or click **Back** to modify your input.

5.22.7 Edit / delete manufacturers

Edit manufacturer

- Click on **Edit manufacturer** to modify the data for a manufacturer.
- Modify the manufacturer data and click on **Next**.
- In the next window the Trendline shows your changes and the original data for an easy compare. Click on **Save** to store your changes in the bearing database or click on **Back** to change your data.

Delete manufacturer

If you have deleted all bearings from a manufacturer from the bearing database (see "Edit/delete bearings" ¹⁴⁴⁾), you can also remove the manufacturer.

- Click **Delete manufacturer**.
- Then select the manufacture from the **Manufacturer** list and click **Continue**.

The manufacturer is then deleted from the bearing database.



You can only delete manufacturers which have been added ¹⁴⁷⁾ by yourself!

5.22.8 Select different bearing database

- Click on **Change database**.
 - Select the database as described in "Select database"^[34]. The name of the included bearing database is "cm_bearings".
- Opens the bearing database.

5.22.9 Close

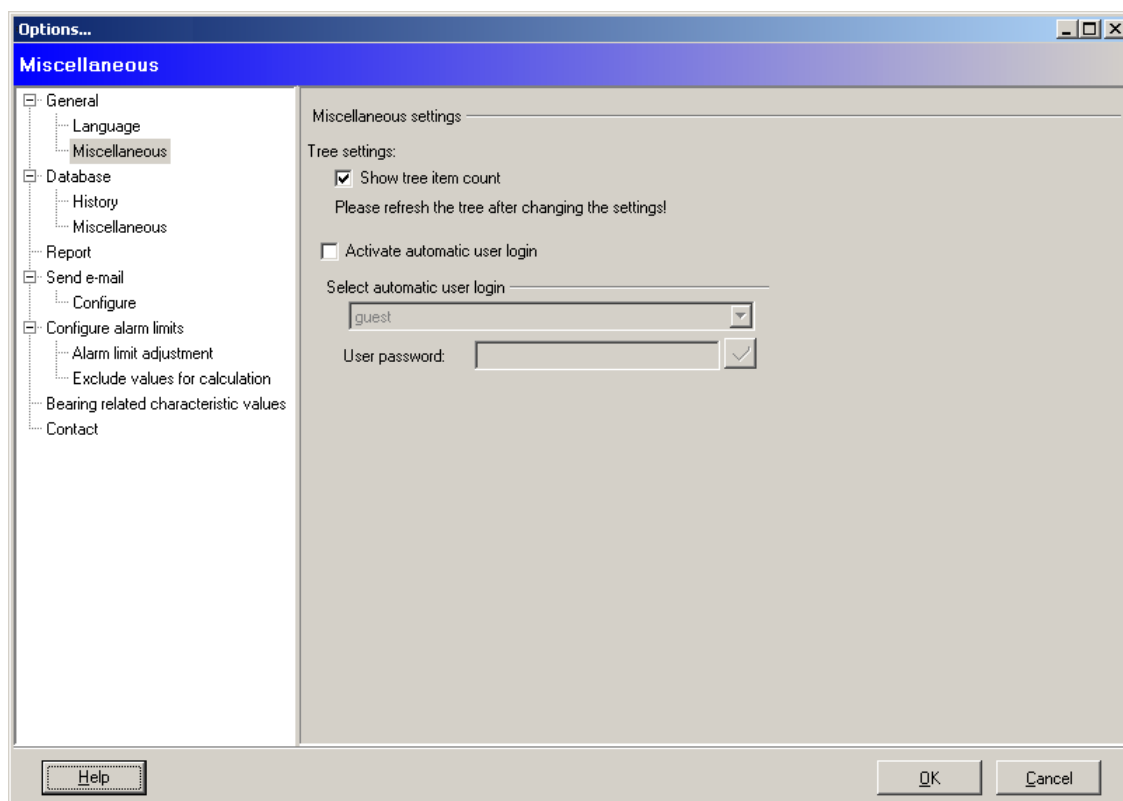
To close the bearing database, click **Close**.

5.23 Program settings

You can open the general program settings configuration window via the **Tools > Options** menu item.



To change the settings the user currently logged in must have the required access rights (see "User management"^[140]).



A tree view is displayed on the left-hand side of the window and shows a range of configuration options arranged in groups. You can expand the view and configuration options by clicking the symbols in front of the groups. Information on the individual configuration options is provided or input masks are displayed on the right-hand side of the window.

Contact

Our address, telephone and fax number as well as our e-mail and Internet address are provided here.

5.23.1 General

Click **OK** to complete program settings and apply the changes.

Language

The Administrator software can be displayed in German, English and Chinese. If you select a different language, the software restarts automatically.



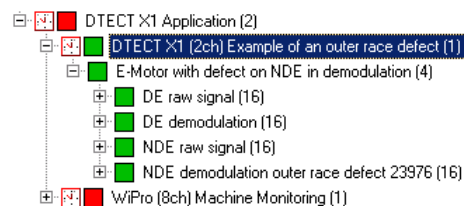
You may only use ANSI characters of the Latin-1 codepage for entries that are stored in the database. This includes, for example, device and configuration names, characteristic value names, channels and the like.

Miscellaneous

Tree settings

• Show tree item count

Activate this counter to display the number of subentries in brackets after each level in the tree. This allows you to see how many active configurations are below a particular device, for example.




• Always show outdated configurations

If you change the device or monitoring configuration of a device, the corresponding data stored in the CM database is no longer comparable. Therefore, the configurations are marked as outdated, i.e. the data is removed from the tree view **Devices and configurations** but not deleted from the database.

Activate the option **Always show outdated configurations** to always see these configurations in the tree view. Note that this also increases program loading time.

• Show maximum alarm status of the data in the tree

By default, the maximum alarm state is always displayed in the tree view. The alarm must always be reset manually, i.e. by clicking the  button. However, if you do not (cannot) perform an evaluation of your local database, for example, this may cause all configurations to display a main alarm.

You can deactivate the option **Show maximum alarm state in the tree**. Then the tree view always shows the current alarm state.




- The tree view context menu contains the option **Show outdated configurations**. This also allows you to display outdated configurations again.
- If you have changed settings in the tree view, they are not automatically visible. Refresh the tree to see the changes.

Preview settings

Configure the rotational speed range in % for the trend preview here.

Activate automatic user login

Whenever you start the software, the program prompts you for your user name and password. You can skip this step by configuring an auto-login for automatic user login.

- Select a user to log in automatically and enter the password.
- Click on the check mark  to check the user data.

Next time you launch the software, you will be automatically logged in with the configured user data.

☒ Activate automatic user login
 Select automatic user login:
 User password: ☒

5.23.2 Database

You can configure the database history and display information about the selected database here. You can also delete entries from the alarm list.

History

If this option is selected a list of all databases opened to date is displayed on the right. The entries in this list are the one used to open databases from the **File > Open database** menu. You can also use this option to delete entries in this list for clarity of overview.

To delete an alarm list entry:

- Select one or (by holding the CTRL key down) multiple items from the list and
- press the **Delete item** button to start the deletion operation.

Miscellaneous

Database information

The following information about the CM database being used is displayed:

- Name of the database server
- Name of the database
- Used memory
- Free memory

The ratio of free to used memory is also presented as a diagram.



The free memory display and the diagram can only return plausible information if the database and database server are on the same system.

Miscellaneous settings

- **Number of connection attempts:**

Number of attempts by the program to connect to the database after start-up.

- **Notify timer (min):**

Interval at which Notify Link checks whether it needs to send data. It is in standby mode between intervals. This reduces the database load.

- **Call control verification interval (min):**

Interval at which call control checks whether data have arrived. It is in standby mode between intervals. This reduces the database load.

- **Dataset load limit:**

Maximum number of datasets loaded in the data grid. The limit reduces the database load.

- **Delete entries from alarm list**

Using this function you can delete entries from the alarm list in order to make this alarm list more concise.



Warning! If you delete entries from the alarm list they are removed permanently and can not be restored!

Proceed as follows to delete items from the alarm list:

- Click **Select date / time range** and select the period in the new window.
- Click **OK** to confirm deletion.

5.23.3 Report

You can configure basic settings for detailed reports and alarm reports here.

Report images (detail report and alarm report)

You can configure the following here:

- a **company logo** for the header (width-to-height ratio 4:1)
- an **image for the cover page** (max. 460 x 490 pixels)

Alarm report settings

You can configure the following here:


- **Report folder:** Defines the folder for storing alarm reports.
- **Information for the report header:** You can enter additional information to display in the report header here.
- **HTML preview:** Click here to display a preview of the alarm report with your settings in the browser.

Edit report settings

To define or edit a graphic or the folder for reports,

- click  and select the directory.

To delete settings,

- click on .

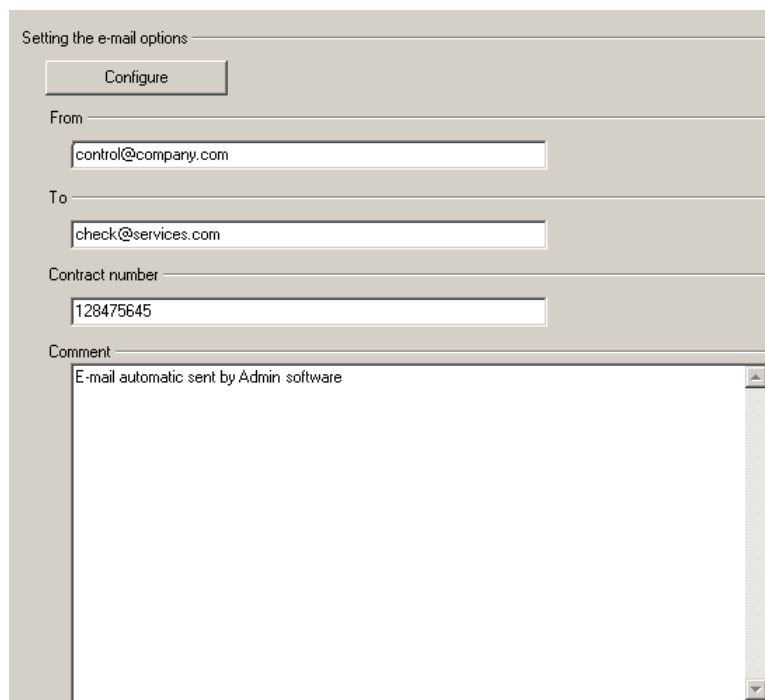
5.23.4 Send e-mail

The automatic export of data via e-mail is configured and activated in this window.

Configure e-mailing

You can configure the dispatch of e-mails as follows:

- Click **Options** in the **Extras** menu.
- Select **Send e-mail**.
- Click **Configure**.



Setting the e-mail options

Configure

From
control@company.com

To
check@services.com

Contract number
128475645

Comment
E-mail automatic sent by Admin software

- The "Configure" button opens the "E-mail options settings" dialog box where you can select and configure the method used to send e-mails.
- Please enter a valid e-mail address in the input box labelled "From" as the mail account to use for sending.
- The e-mail address of the recipient is entered in the "To" input field.

- Please enter the number of your service contract at "Contract number", if applicable.
- You can also enter a custom text "Comment" input box to append to the e-mails created.
- Click **Configure** to set the protocol for the program to send e-mails.

Configure e-mailing

The program supports sending e-mails via **Microsoft Outlook**, **MAPI** or **SMTP**. To obtain the correct settings consult your network administrator.

- Select the transfer method.

If you are using the SMTP protocol, you must enter either the name or IP address of the e-mail server in "host". Optionally you can enter a user name and password for SMTP authentication. If you are using the TLS encryption protocol (SMTP via SSL), you must also configure the TLS port. In "Timeout" you can define a time range after which to automatically stop trying to make a connection.

- To test the connection to the mail server, click **Test connection**.
- Click **OK** to save the settings.



The Administrator software uses the separate E-MailRelay tool^[237] for SSL encryption. You can find this tool on the program CD.

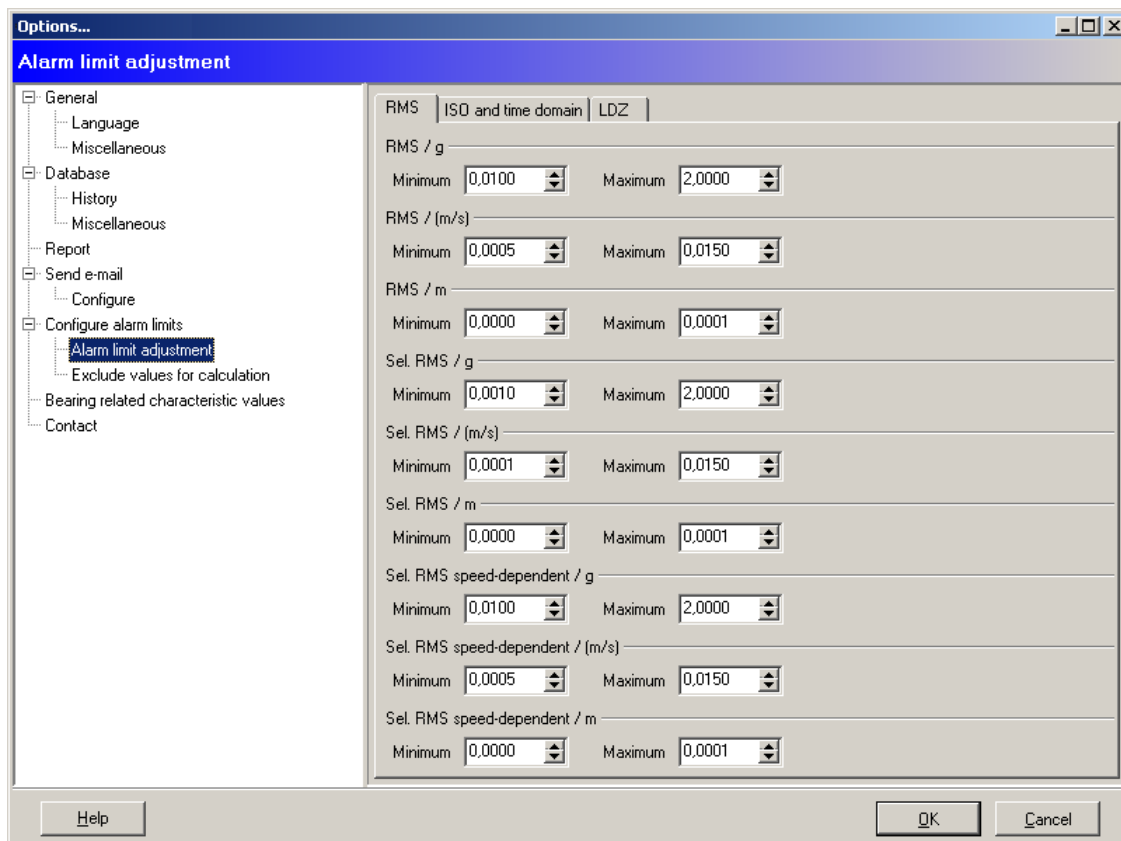
If you want to use SSL encryption, you must enter the host of the E-MailRelay tool in SMTP. For details refer to the section **Configure e-mailing in the Administrator software**^[247].

5.23.5 Configure alarm limits

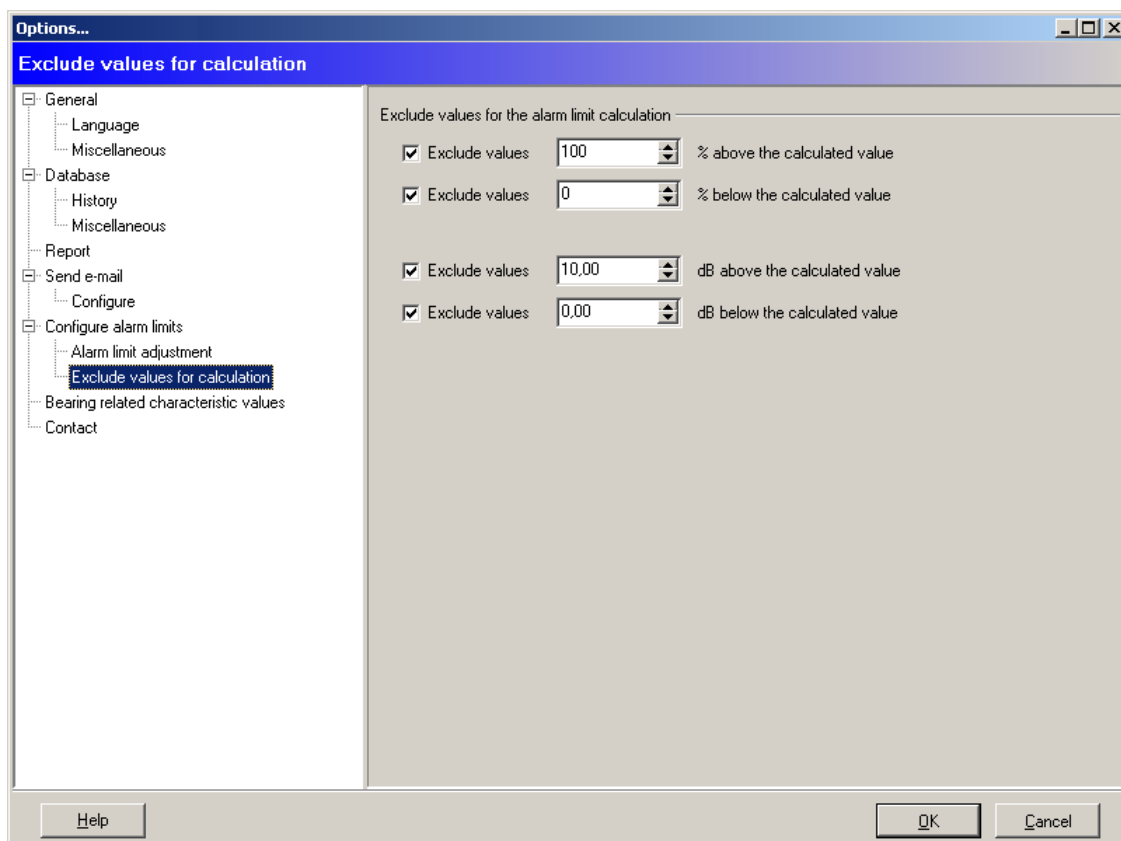
Enter the default values for the automatic adjustment of alarm limits^[127] here.

Enter minimum/maximum values

- Click the relevant tab to enter the minimum and maximum values for the available characteristic values.
- Enter the desired values.




Enter exclusion values



The maximum limits can be specified in the **Exclude alarm values** window. Characteristic values above or below these limits will subsequently not be taken into account.

-
- Click **Exclude alarm values**.
 - Enter the desired values in percent or in dB.

5.23.6 Bearing related characteristic values

In this dialog you can configure the defaults for bearing-related characteristic values. If you edit or create a bearing, you can automatically apply the defaults configured here (see "Generate bearing-related characteristic values"  107).

- Click on the **Dtect X1s** tab or **ProCheck** to select the device.
- Activate the kinematic frequencies you wish to monitor.
- Configure how many harmonics to include in the monitoring.

The following kinematic frequencies are available:

- Inner race ball pass frequency (BPFI)
- Outer race ball pass frequency (BPFO)
- Roller rotation frequency (BSF)
- 2 x Roller rotation frequency (BSF)
- Fundamental train rotation frequency (FTF)

5.24 Exit

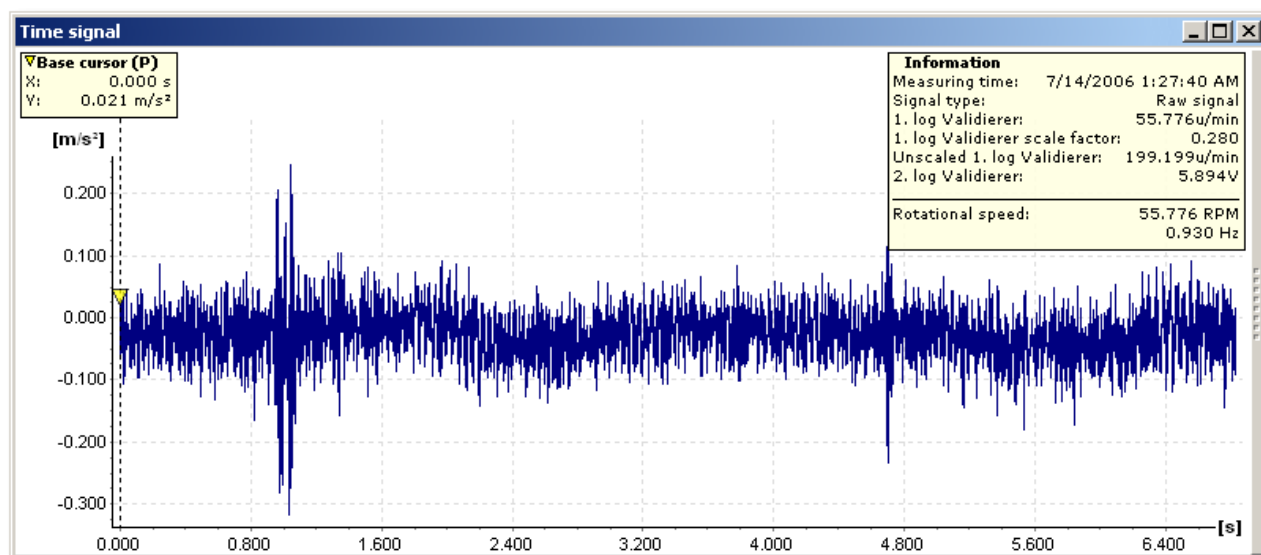
Click **File > Exit** to close the program.

6 The FAG Viewer

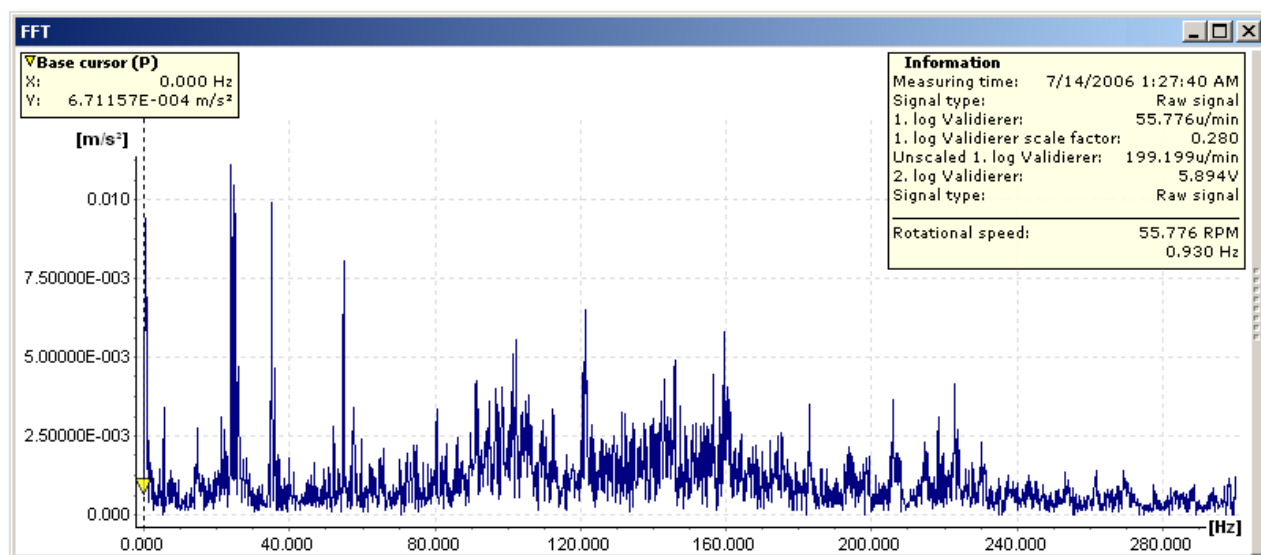
6.1 About this software

The FAG Viewer software displays the signals and characteristic values provided by the FAG hardware.

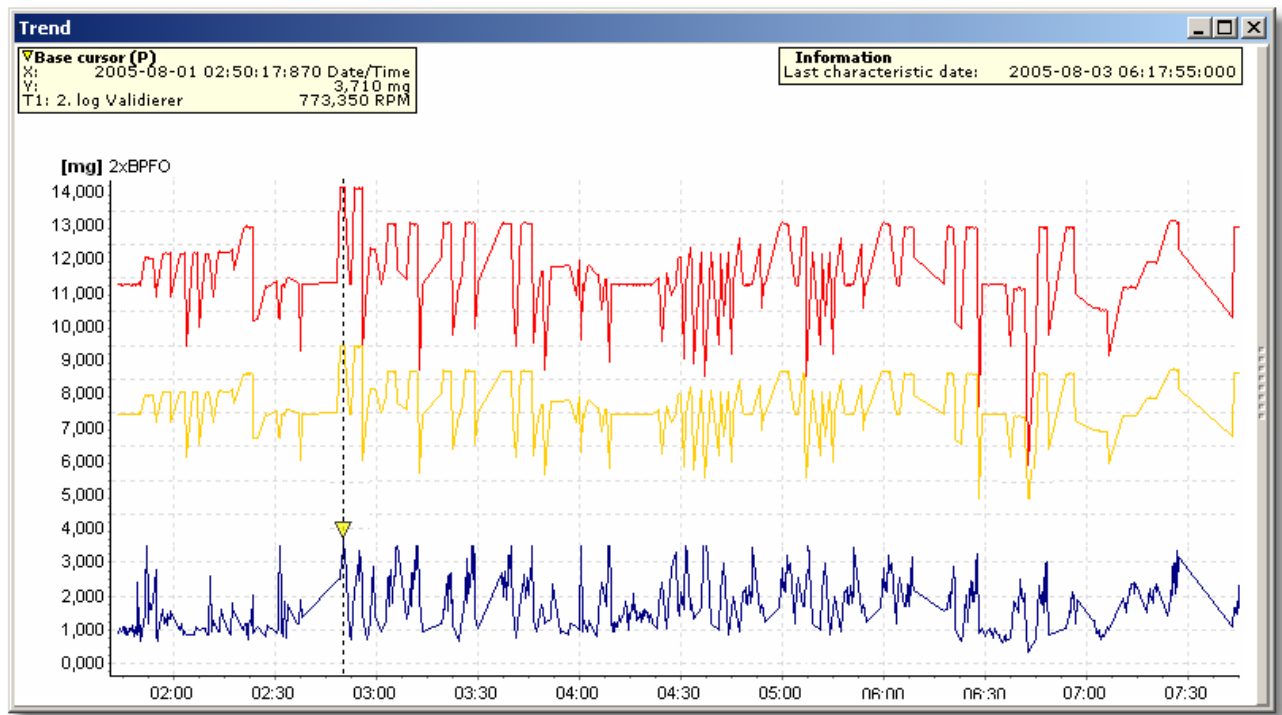
Time signals



Fast Fourier Transformations (FFTs)



Trend data



With the aid of the various navigation and cursor tools of the Viewer software you can change the display of the data and perform an error analysis^[198]. The aim of the analysis is to identify possible damage as exactly as possible so as to be able to perform repairs in good time and thus avoid downtimes.

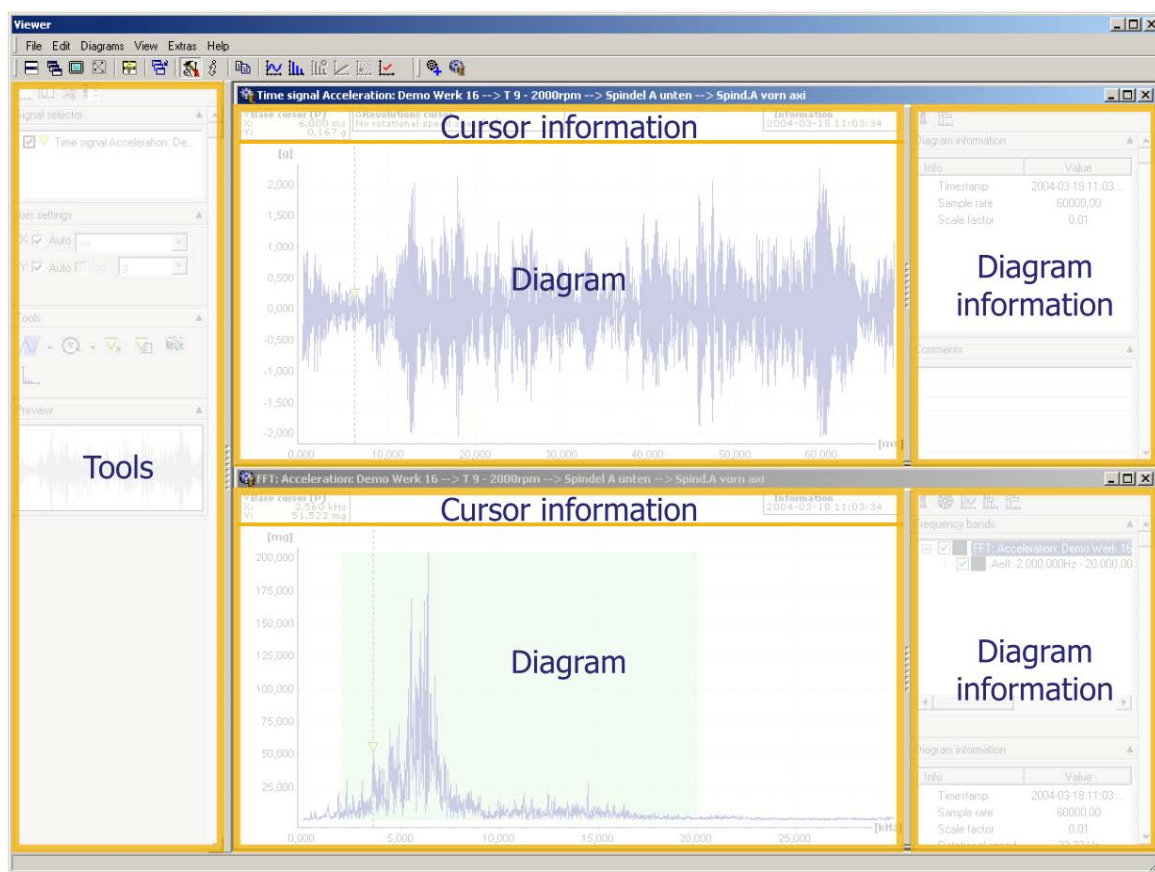
The following chapter explains the work interface^[156]. It goes on to provide more information about working with the Viewer software^[162].

6.2 The work interface

6.2.1 Work interface areas

- The toolbar^[157] contains various tools which can be used to arrange the diagrams and display/remove the tool area and diagram information bar as well as other tools which can be used to export measurement data, display the corresponding configuration for the data set selected and create a measurement report.
- You will find a range of navigation tools in the tools^[158] working area which can be used to modify the way in which the diagrams are presented and also find a number of different cursor tools for carrying out fault analyses. The choice of tools which can be used varies according to the type of diagrams displayed (FFTs, time signals or trend data).
- The main area of the work interface contains the diagram^[161] and the cursor and measuring information^[161] area, in which the corresponding values for the selected cursor are displayed.
- You will find additional information in the diagram information bar^[161] area (on measurement data for example) depending on the diagram type displayed. You can use the tools in this working area to do the following:
 - enter comments into the diagram
 - select frequency bands with FFTs in order to determine characteristic values for the fault analysis
 - determine the maximum, harmonic or sideband values from the diagram depending on the cursor type

The diagram information bar area for each diagram can be displayed or hidden as required and can be used to zoom in on the diagram area.



Areas of the Viewer software

6.2.2 Toolbar



You can use the **Tile windows horizontally** button to arrange open windows vertically above one another in the working area of the Viewer software.



You can use the **Cascade windows** button to arrange open windows so they overlap in the working area of the Viewer software.



You can use the **Full screen display of current diagram** button to fill the entire screen of the Viewer working area with the current diagram selected.



You can use the **Arrange minimized windows** button to arrange minimized windows horizontally from left to right in the working area of the Viewer software.



If the **Arrange diagrams automatically** button is activated the size of the diagram always adjusts automatically to fit the available working area (when the tool area is displayed or removed, for example).



You can view a list of the windows that are currently open and make your selection using the **Show list of all diagrams** button. The selected diagrams are arranged horizontally and the rest of the diagrams are minimized.



You can use the **Show toolbar** button to display/hide the tool bar in the working interface of the Viewer software.



You can display/remove the information bars of all open diagrams using the **Show diagrams information bars**.



You can open a list of the windows that are currently open using the **Paste selected diagrams to clipboard** button. From this list you can also select whether the accompanying information text should be copied together with the diagram and define the size of the diagram. The diagrams selected are copied together to the clipboard as one graphic object.



You can use the **Show time signals** button to only show the time signal windows. All other windows will be minimized.



You can use the **Show FFTs** to only show the FFT windows. All other windows will be minimized.



You can use the **Show alarm FFTs** to only show the FFT alarm windows. All other windows will be minimized.



You can click the **Show trend data** button to limit the diagram view to the trend data window. All other windows will be minimized.



The **Show load diagrams** button opens the complete view of the distribution diagram. All other windows will be minimized.



You can click the **Show collective data** button to limit the diagram view to the collective data.



The **Show all diagrams** button maximizes all diagram windows.



Press the **Search harmonics/sidebands** button to find harmonic frequencies and sidebands.



Press the **Add bearing** to add a bearing from the bearing database to the current spectrum.



The **ASCII export** button starts the ASCII export of the selected data.



The **Report** button generates a report for the selected data.

6.2.3 Tools

The **tools** area contains a range of adjustments which you can use to set the display area for the diagrams. A range of different individually tailored tools is available depending on the type of data set displayed (time signals, FFT or trend data). These tools can be used for example to do the following:

- display/remove signals within a series of signals when working with trend data,
- modify the scale of measuring ranges,
- integrate the velocity and displacement from the acceleration,
- modify the display of the measuring range to suit your individual requirements and
- navigate through a diagram easily using the navigation overview.

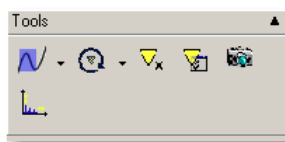
List of the tools available in conjunction with the corresponding diagram type

Tool	Time signal	FFT	Trend data
Automatic scale ¹⁶³	✓	✓	✓
Manual scaling ¹⁶³	✓	✓	✓
Logarithmic display of axes ¹⁶³	✓	✓	✓
Integration of y-axis ¹⁶³		✓	
Free zoom ¹⁶⁶	✓	✓	✓
Horizontal zoom ¹⁶⁶	✓	✓	✓
Vertical zoom ¹⁶⁶	✓	✓	✓
Keyboard zoom ¹⁶⁶	✓	✓	✓
Displaying the median ¹⁶⁴		✓	
Calculate Cepstrum ¹⁸²		✓	
Base cursor	✓	✓	✓
Measure cursor	✓		
Difference cursor	✓	✓	✓
RMS/AMV cursor	✓	✓	
Harmonics cursor	✓	✓	
Sideband cursor		✓	
HS cursor		✓	
Revolutions cursor	✓	✓	
Positioning of base cursor	✓	✓	✓
Modify cursor properties	✓	✓	✓
Copy to clipboard	✓	✓	✓
Modifying coordinates of axes	✓	✓	✓





Tool	Time signal	FFT	Trend data
Signal distribution			✓
Trend filtering			✓

Zoom tools

In order to optimize the display you can enlarge any part of the diagram using the various zoom tools. You can use one of the predefined zoom tools for this or define the zoom area numerically via a dialogue window.

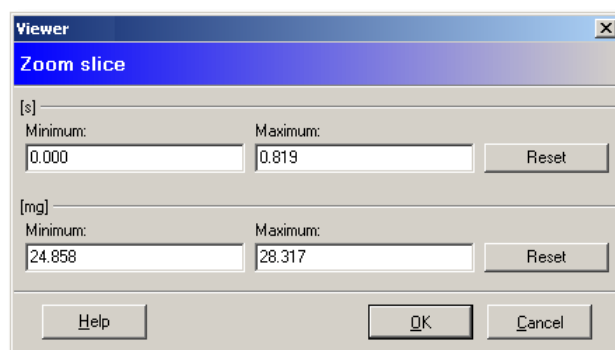


Zoom tools

Tool & symbol	Description
Free zoom 	You can use the Free zoom tool to enlarge any given rectangular area on the x- and y-axis within a diagram.
Horizontal zoom 	You can enlarge any part of a diagram in a horizontal direction using the Horizontal zoom tool. The range of values and scaling of the y-axis remain unchanged.
Vertical zoom 	You can enlarge an area inside a diagram in a vertical direction using the Vertical zoom tool. The range of values and scaling of the x-axis remain unchanged.
Keyboard zoom 	You can use the Keyboard zoom feature to enlarge an area of the diagram using the keyboard instead of the mouse.

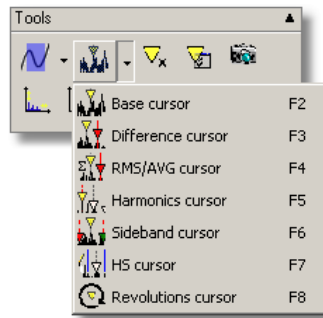
Specifying zoom selection in dialogue window

In addition to using the various zoom tools you can also specify the zoom selection via a dialogue window. To open the dialogue window which is currently active click on the zoom tool symbol.



Cursor tools

You can specify the values from a diagram to be used for an analysis with the cursor tools. Depending on the type of diagram which has been opened appropriate cursor tools are made available which can be used to obtain individual measuring and characteristic values directly from the diagram.



Information on the current cursor is displayed above the diagram. You can show/hide these value fields and the cursor by clicking on the cursor tool symbol that is currently active.

Tool & symbol		Description
Base cursor (FFT, time signals, Trend data)		You can use the base cursor to determine the measuring values on the x- and y-axis of a measuring point.
Measure cursor (Time signals)		The Measure cursor is used to calculate the differences, the effective value (root mean square) and the arithmetic mean value of two measuring values and the minimum/maximum value.
Difference cursor (FFT, time signals, Trend data)		You can use the difference cursor to calculate the difference between two measuring values.
RMS/AMV cursor (FFT, time signals)		You can calculate the effective value (root mean square) and the arithmetic mean between two measuring points using the RMS/AMV cursor.
Harmonics cursor (FFT)		You can use the harmonics cursor to determine measuring values at points in the diagram where harmonics (multiples of the basic frequency) are likely to occur.
Sideband cursor (FFT)		You can use the sideband cursor to determine additional measuring values in definable sidebands starting from the base cursor.
HS cursor (FFT)		The HS cursor (Harmonic with Sidebands) combines both cursor types described above which means that both the harmonics and their sidebands will be displayed.
Revolutions cursor (FFT, time signals)		The revolutions cursor marks the frequency that is assigned to a specific speed with a line.






A cursor can only be placed at a measuring point that exists. If you click on a position in the diagram where no measuring value exists the cursor automatically jumps to the nearest existing measuring point.

Additional tools

In addition to the zoom and cursor tools you can use a range of further tools to change the manner in which signals or cursors are displayed and transfer data to other programs via the clipboard.

Tool & symbol		Description
Positioning of base cursor		Places the base cursor at a point in the diagram specified via numeric input. The base cursor jumps to the measuring point nearest to the value entered.
Cursor properties		Opens the cursor properties dialogue window where you can change the properties of the cursor currently used.
Clipboard		Copies an image of the current diagram view into the clipboard (additional information 179).
Change diagram boundaries		Changes the display of minimum/maximum values for the x- and y-axis (additional information 179).

Tool & symbol		Description
Edit rotational speed		Changes the rotational speed information in an FFT or time signal (Further information 178).
Display signal distribution		Displays the distribution of one or multiple signals in relation to another signal (further information 180).
Trend filtering		Displays the trend progression of one or multiple signals depending on the filter criteria of one or both validators (further information 181).

6.2.4 Diagram display









The diagram area shows the FFT, time signals and trend data diagrams. You can specify the desired zoom area inside the diagrams and adjust the position of the cursor using the mouse or keyboard.

6.2.5 Cursor and measuring information

The **cursor information** for the Viewer software shows important values and measurement data that vary depending on the cursor tool used. Each item of cursor information contains either the value pairs for a measured value or calculated characteristic values that are obtained by combining different cursors within the diagram such as the difference cursor or RMS/AMV cursor. The cursor information can be displayed or removed for each diagram with **Ctrl+U**.

The **measuring information** of the Viewer software displays important measurement data about the active signal, dependent on the specific diagram type (e.g. measuring time, channel number, signal type and additional channels; in addition, for FFTs and time signal, the current rotational speed and rotational frequency). The measuring information is visible in the diagram and can be displayed or hidden with **CTRL+U**.

The table below shows the corresponding values displayed in the cursor information for the currently active cursor type:





Cursor type		Displayed cursor information				
	Base cursor	<div>▼ Base cursor (P)</div> <div>X: 0,000 kHz</div> <div>Y: 0,000 mg</div>				
	Measure cursor	<div>▼ Base cursor (P)</div> <div>X: 0.050 s</div> <div>Y: 43.488 mg</div>	<div>▲ Measure cursor</div> <div>X: 0.100 s</div> <div>Y: 27.466 mg</div>	<div>Δ Delta:</div> <div>X: 0.050 s</div> <div>Y: -16.022 mg</div> <div>Frequency: 19.841 Hz</div>	<div>Min/Max</div> <div>Min: 25.940 mg</div> <div>Max: 49.210 mg</div>	<div>RMS/AMV:</div> <div>RMS: 36.863 mg</div> <div>AMV: 35.941 mg</div>
	Difference cursor	<div>▼ Base cursor (P)</div> <div>X: 0,000 kHz</div> <div>Y: 0,000 mg</div>	<div>▲ Difference cursor</div> <div>X: 0,000 kHz</div> <div>Y: 0,000 mg</div>	<div>Δ Delta:</div> <div>X: 0,000 kHz</div> <div>Y: 0,000 mg</div>		
	RMS/AMV cursor	<div>▼ Base cursor (P)</div> <div>X: 0,000 kHz</div> <div>Y: 0,000 mg</div>	<div>▲ RMS/AMV cursor</div> <div>X: 0,000 kHz</div> <div>Y: 0,000 mg</div>	<div>Δ RMS/AMV:</div> <div>RMS: 0,000 mg</div> <div>AMV: 0,000 mg</div>		
	Harmonic cursor	<div>▼ Base cursor (P)</div> <div>X: 0,057 kHz</div> <div>Y: 29,279 mg</div>	<div>Δ Micro step:</div> <div>X: 0,057 kHz</div> <div>Sub index: 0</div>			
	Sideband cursor	<div>▼ Base cursor (P)</div> <div>X: 0,000 kHz</div> <div>Y: 0,000 mg</div>	<div>Δ Sideband delta:</div> <div>X: 0,000 kHz</div>			
	HS cursor	<div>▼ Base cursor (P)</div> <div>X: 0,000 kHz</div> <div>Y: 0,000 mg</div>	<div>Δ Sideband delta:</div> <div>X: 0,000 kHz</div>			
	Revolutions cursor	<div>▼ Base cursor (P)</div> <div>X: 0,000 kHz</div> <div>Y: 0,000 mg</div>	<div>Δ Revolutions cursor</div> <div>Delta x: 0,000 kHz</div> <div>Revolutions: 0,000 Rev./min.</div>			




6.2.6 The diagram information bar

You can find the diagram information bar in the right-hand column of the working area. This column contains additional information on the diagram currently selected and can be displayed or hidden as required.

The table below provides an overview of the corresponding information displayed with the active cursor type for FFT

diagrams in the diagram information bar:

Information displayed in the diagram information bar	 Base cursor	 Difference cursor	 RMS/AMV cursor	 Harmonics cursor
Diagram information	✓	✓	✓	✓
Comments	✓	✓	✓	✓
Frequency bands	✓	✓	✓	✓
Highest peaks	✓	✓	✓	✓
Harmonics				✓
Sidebands				
Kinematic frequencies	✓	✓	✓	✓

Information displayed in the diagram information bar	 Sideband cursor	 HS cursor	 Revolutions cursor
Diagram information	✓	✓	✓
Comments	✓	✓	✓
Frequency bands	✓	✓	✓
Highest peaks	✓	✓	✓
Harmonics		✓	
Sidebands	✓		
Kinematic frequencies	✓	✓	✓

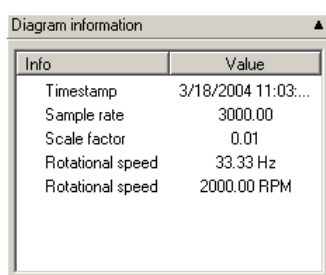
The measure cursor displays the same information as the difference and RMS/AMV cursor plus Min/Max.

Diagram information and comments for time signals and trend diagrams are displayed in the diagram information bar irrespective of the cursor type selected. Further information on the alarm values of the data set currently open is displayed in the trend diagrams.

Diagram information

This field contains general information about the measurement data including

- Information on the measuring procedure such as the lowpass or sampling frequency settings
- Further information included in the data sets.



6.3 Working with the FAG Viewer software

6.3.1 Displaying several diagrams simultaneously

You can open several diagrams in the FAG Viewer software simultaneously and arrange these in the working area according to your needs.

Select one of the following options from the **Diagrams** menu: **Tile horizontally**, **Cascade**, **Full screen**, **Arrange**

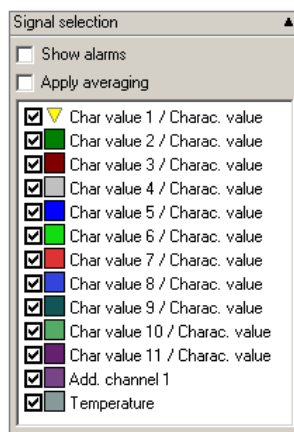
minimized windows or List....

→ The windows are rearranged accordingly.

6.3.2 Modifying the appearance of a diagram

Displaying and removing signals

When a new data set is opened the Viewer software simultaneously displays all signals contained in the data. The series of measurements included in the current dataset are listed in the **Signal selection** field. For each signal the program displays a checkbox, the colour of the measuring points and the name of the signal. For a more detailed view, you can click to select or deselect checkboxes to enable or disable individual signals in the detailed list. Note that at least one signal must always be activated. The field marked by the yellow triangle is the active cursor signal, on which the current cursor is set.



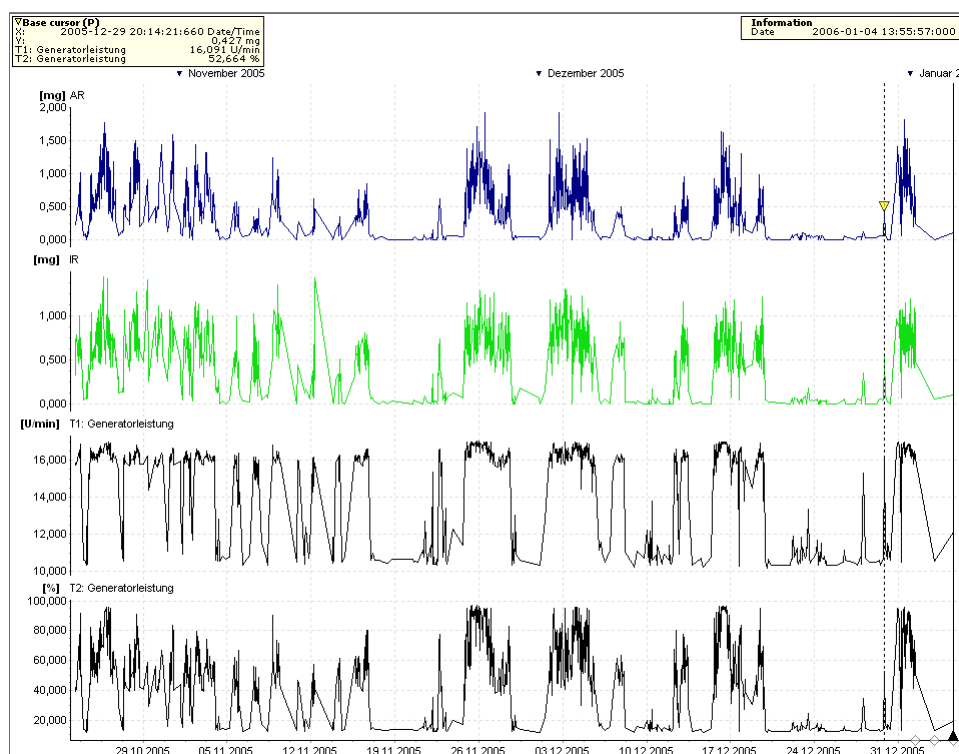
Signal display elements

A trend diagram loaded in the Viewer software can contain multiple signals (characteristic values and validators). For a clearer display of the diagram you can enable and disable individual signals in the list.

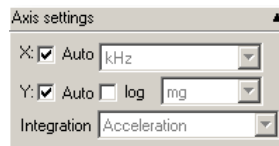
Time signals always contain a single signal that you cannot hide. You can display more than one signal in the FFT diagram. The options **"Show alarms"** and **"Averaging"**, however, are only available in Trend.

1. Click on the **checkbox** in front of the signal.

→ This signal will be displayed or removed.



Axis settings



Automatic scale

The **Automatic scale** option sets the scaling of the diagram axes to the next 1000 scale (10^3). Based on the base unit of the diagram for measuring values < 1 this automatically selects the next smaller unit (e.g. g \rightarrow mg or m \rightarrow mm) and, inversely, for values > 1000 the next greater unit (e.g. ms \rightarrow s or Hz \rightarrow kHz).

1. Click the "**Auto**" checkbox to activate it.

→ The scaling of the diagram will be adjusted automatically.

Manual scaling of axes

If you disable the **Automatic scale** option, you can select one of the preset, equivalent units for axis scaling. The available scaling units depend on the type of diagram (e.g. Hz or kHz with FFTs for frequencies, g, mg, m/s² or mm/s² for acceleration values, "orders" for order spectrums, rotations for angular signals, s or ms for time signals, etc.). The scaling for the axes can be set independently of one another, i.e. you can specify any desired unit for the x- and y-axes individually.

1. Click the "**Auto**" checkbox to deactivate it.

2. Select one of the units provided in the **X unit** field.

3. Select one of the units provided in the **Y unit** field.

→ The axes are scaled independently of one another and can be modified according to the settings that are selected.

Logarithmic scaling of the y-axis

It may be possible under certain conditions to present signals more clearly using a logarithmic scale if they do not contain zero values or negative values. You can therefore switch over to logarithmic scaling in the diagram.

1. Click on the **Log** checkbox to activate the logarithmic scaling of the y-axis.

→ The scaling of the diagram will be modified according to the settings selected.



This option is deactivated if the measuring data cannot be presented logarithmically (if it contains values smaller than or equal to zero, for example).

Displaying y-axis integrations

You have a number of display options for the integration of signals in FFT diagrams that contain an acceleration signal, for example:

- No integration: Acceleration
- Velocity
- Displacement

1. In the **Integration** field, select the **Acceleration** option to not integrate the signal.

2. In the **Integration** field, select the **Velocity** option to display the first integration of the signal.

3. In the **Integration** field, select the **Path** option to display the second integration of the signal.

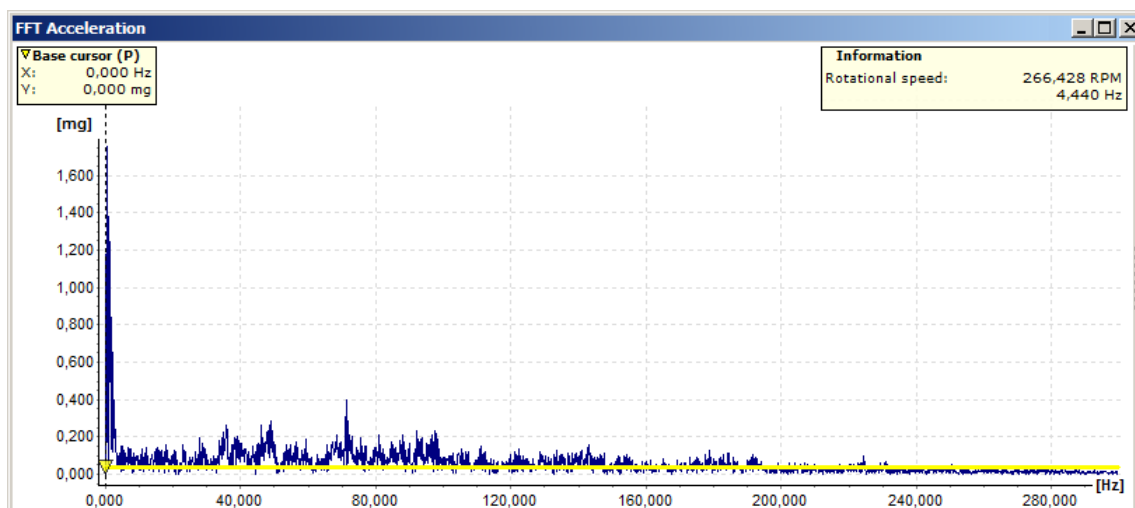
→ The scaling and display of the diagram will be modified based on the selected settings.



- Once you have selected the integration option for the y-axis you can also modify the scaling of the axes here (automatic, manual or logarithmic) and display any desired part of the diagram using the zoom tools.
- No integration is possible in order spectrums.

Displaying the median

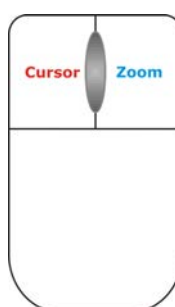
You can display the median in FFT diagrams. Click **Median** in the **Edit** menu. The median is displayed as a yellow line:



6.3.3 Using the mouse to control the cursor or zoom function

General

- You can position the various cursors by left-clicking the mouse.
- You can adjust the zoom selection setting by right-clicking the mouse.
- You can use the mouse wheel to zoom and scroll in a diagram.



Mouse control

Zooming with the mouse wheel

If you have a computer mouse with a mouse wheel, you can use it to zoom in and out of diagrams. The zoom area changes in steps of 10%.

- Click on the diagram whose zoom area you wish to change.
- Scroll the mouse wheel away from you to zoom in on the diagram.


Or:

- Scroll the mouse wheel towards you to zoom out of the diagram.

Scrolling the zoom area with the mouse wheel

- Click the **mouse wheel** in a zoomed area and hold it down
- while moving the mouse left or right.

Using the mouse to highlight a zoom area

- Select one of the zoom tools  from the selection list.
 - Mark a zoom area in the diagram using the **right-hand mouse button**.
- Your selection is displayed in the diagram.

Resetting the zoom

- Right-click on the diagram if you wish to return to the previous zoom selection.


Or:

- If you wish to return to the full view of the diagram hold the **Shift button** down and **right-click** on the diagram

Copying a zoom area to other diagrams (synchronous zooming)

You can automatically copy the zoom area of one diagram to all diagrams of the same type and base unit. Proceed as follows:

If you have multiple records open in the Viewer software,

- select the Zoom tool  and
- click on the diagram type whose zoom area you wish to change.
- Press the **Alt key** and use the **right mouse button** to drag out the area.

The zoom area of all other diagrams of the same type and base unit are modified.

Resetting synchronous zooming

- Hold down the **Alt key** and then **right-click** on the diagram to return to the previous zoom area.

Or:

- To reset all diagrams modified with synchronous zooming, press **CTRL+Alt+Space**.

6.3.4 Zoom tools

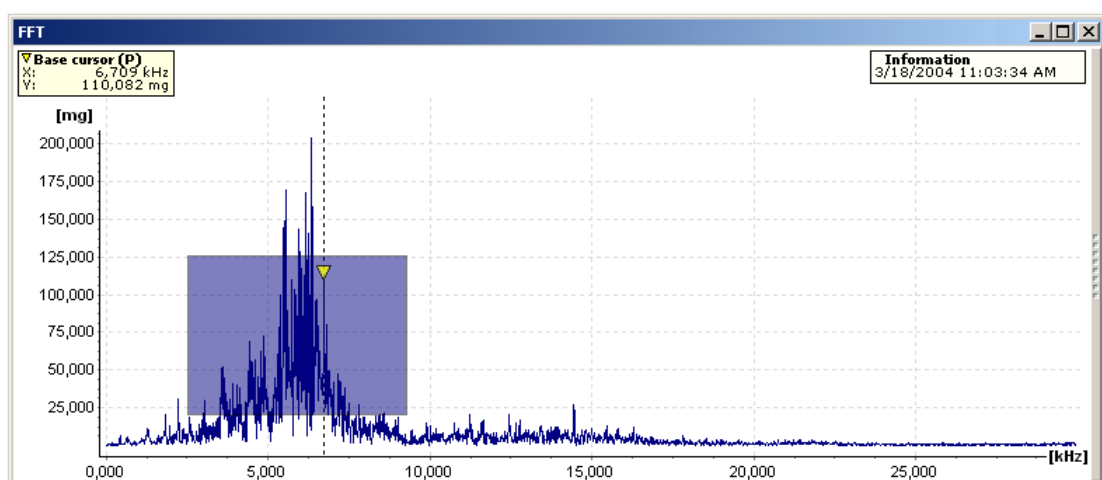
1. Select one of the zoom tools from the selection list.
2. Mark a zoom area in the diagram using the **right-hand mouse button**.
→ Your selection is displayed in the diagram.
3. Right-click on the diagram if you wish to return to the previous zoom selection.
4. If you wish to return to the full view of the diagram hold the **Shift button** down and **right-click** on the diagram.

Free zoom

You can use the **Free zoom** tool to enlarge any chosen rectangular area within a diagram:

1. Select the **Free zoom** tool from the zoom tool selection list using the mouse or press the **F9** button.
2. While holding down the right-hand mouse button, drag the mouse across the section of the diagram you wish to enlarge.

→ The zoom selection is now marked dark blue in the diagram.



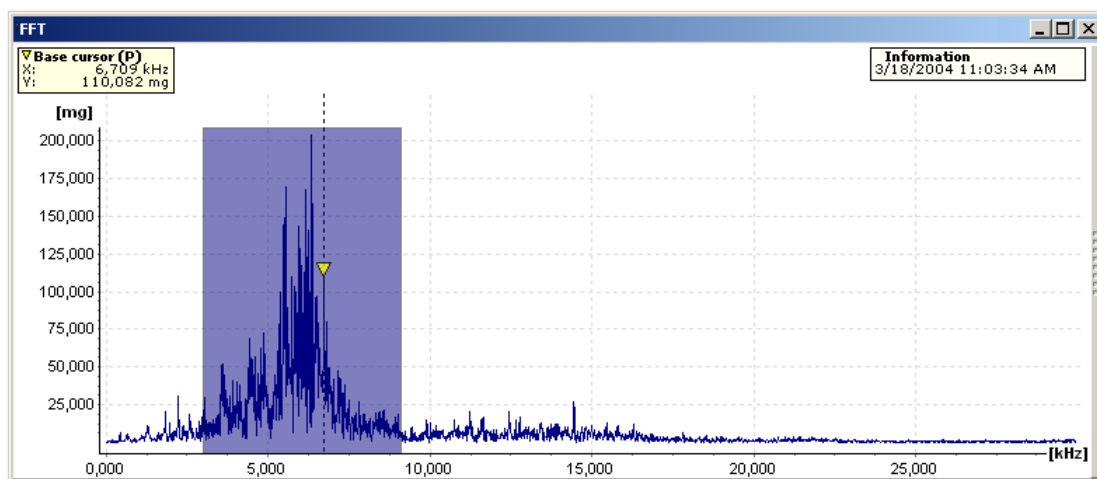
3. Release the right-hand mouse button.
→ Your highlighted zoom selection is displayed in the diagram.
 4. Right-click once again on the diagram if you wish to return to the previous zoom selection.
- or
5. To return to the full view of the diagram hold the Shift button down and right-click on the diagram.

Horizontal zoom

You can enlarge any part of a diagram in a horizontal direction using the **Horizontal zoom** tool. The range of values and scaling of the y-axis remain unchanged:

1. Select the **Horizontal zoom** tool from the zoom tool selection list using the mouse or press the **F10** button.
2. Keeping the right-hand mouse button pressed down, drag the mouse across the horizontal section of the diagram you wish to enlarge.

→ The zoom selection is now marked dark blue in the diagram.



3. Release the right-hand mouse button.

→ Your highlighted zoom selection is displayed in the diagram.

4. Right-click once again on the diagram if you wish to return to the previous zoom selection.

or

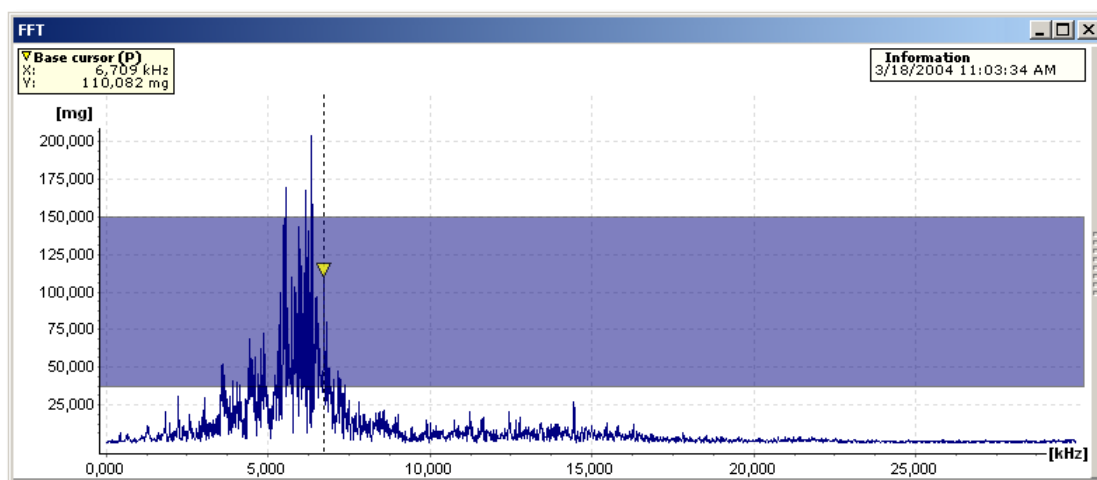
5. To return to the full view of the diagram hold the Shift button down and right-click on the diagram.

Vertical zoom

You can enlarge an area inside a diagram in a vertical direction using the **Vertical zoom** tool. The range of values and scaling of the x-axis remain unchanged:

1. Select the **Vertical zoom** tool from the zoom tool selection list using the mouse or press the **F11** button.
2. Keeping the right-hand mouse button pressed down, drag the mouse across the vertical section of the diagram you wish to enlarge.

→ The zoom selection is now marked dark blue in the diagram.



3. Release the right-hand mouse button.

→ Your highlighted zoom selection is displayed in the diagram.

4. Right-click once again on the diagram if you wish to return to the previous zoom selection.

or

5. To return to the full view of the diagram hold the Shift button down and right-click on the diagram.

Keyboard zoom

You can use the **keyboard zoom** feature to enlarge an area of the diagram using the keyboard instead of the mouse.

1. Select the **Keyboard zoom** tool from the zoom tool selection list using the mouse or press the **F12** button.
2. Use the **Ctrl+Q** and **Ctrl+W** buttons to shift the start of the zoom selection.
3. Use the **Ctrl+A** and **Ctrl+S** buttons to shift the end of the zoom selection.
4. Use the **Ctrl+Y** and **Ctrl+X** buttons to shift the highlighted zoom selection to the right or the left.
5. You can enlarge a section of the diagram by pressing **Ctrl+Enter** (zoom in).
6. You can reduce a section of the diagram by pressing **Ctrl+Backspace** (zoom out).
7. You can return to the full view of the diagram by pressing **Ctrl+space bar**.

Defining the zoom selection by inputting values

1. Click the left-hand mouse button on the current zoom tool.

→ The zoom selection dialogue window opens and shows the current settings for the boundary values.

The image shows a software dialog box titled 'Viewer' with a sub-tab 'Zoom slice'. It contains two sections for defining zoom boundaries. The first section is for the '[s]' axis, with 'Minimum:' set to '0.000' and 'Maximum:' set to '0.819'. The second section is for the '[mg]' axis, with 'Minimum:' set to '24.858' and 'Maximum:' set to '28.317'. Each section has a 'Reset' button. At the bottom of the dialog are 'Help', 'OK', and 'Cancel' buttons.

2. Enter a minimum and maximum for the X axis in the appropriate field.

3. Then enter a minimum and maximum for the Y axis in the appropriate field.

4. Click **OK**.

→ The diagram displays your defined zoom selection.

Click on **Reset** if you want to reset your settings.

6.3.5 Cursor tools



A cursor can be positioned in the diagram by clicking near a measuring value or moved by dragging the dotted vertical line along the diagram axis keeping the mouse button pressed down.

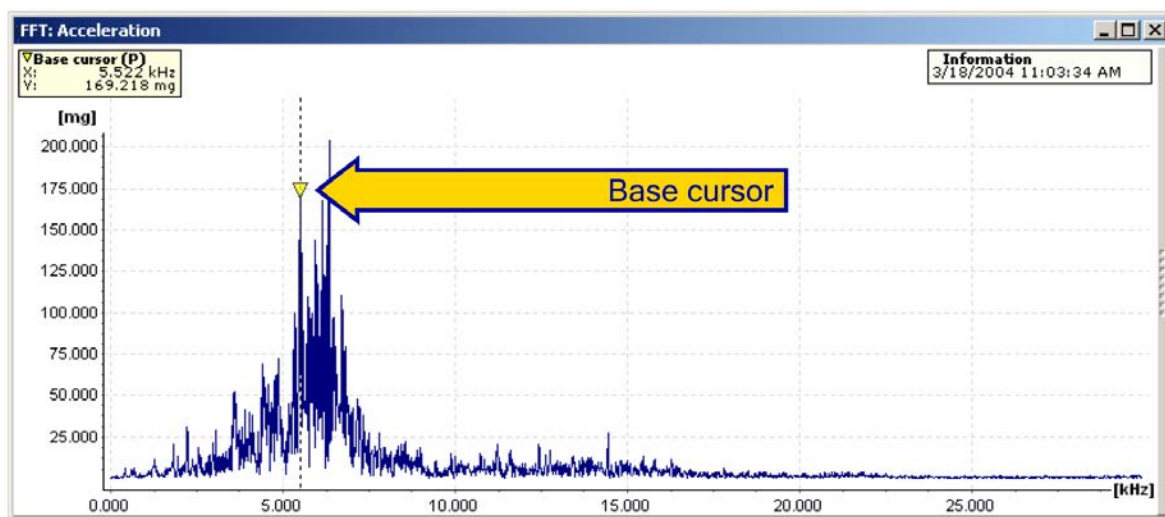
Sliding cursors are always represented by a dotted vertical line whereas fixed cursors or automatically calculated data displays are represented by a continuous vertical line.

Base cursor



You can use the **base cursor** to determine the measuring values on the x- and y-axis of a measuring point.

To do this, place a base cursor at any desired measuring point in the diagram. The corresponding measuring values are displayed in the cursor information.



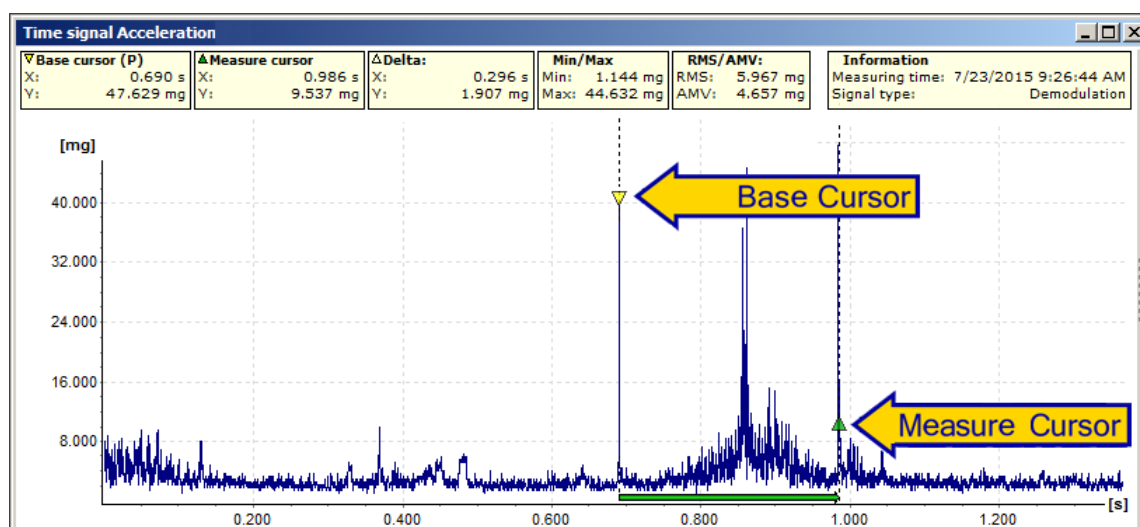
1. Select the **base cursor** option from the cursor selection list or press the **F2** button.
 2. Position the base cursor by **left-clicking the mouse** near a measuring point in the diagram.
- The base cursor jumps to the nearest measuring point in the diagram. The current position in the diagram is represented by a vertical dotted line. The measuring values for this measuring point are displayed in the cursor information above the diagram.

Measure cursor



The **Measure cursor** is used to calculate the difference, the effective value (root mean square) and the arithmetic mean value (AMV) of two measuring values in the time signal diagram. Min/Max display the minimum and maximum measuring values within the selected range.

To do this, place the base cursor and an additional measure cursor at the desired measuring point in the diagram. The distance between the cursors is indicated by a coloured bar directly above the X-axis. The two cursor measuring values and the resulting differences, min/max and RMS/AMV values are displayed in the cursor information.



1. Select the **Measure cursor** option from the cursor selection list or press the **F3** button.
- The base cursor and the measure cursor are displayed in the diagram; these are connected by a coloured bar that runs along and slightly above the X-axis.
2. You can place the base cursor at any desired measuring point in the diagram by **left-clicking**.
 3. You can position the measure cursor at any desired measuring point in the diagram by **left-clicking** while holding down the **shift key**.
- The measuring values of the base cursor, the measure cursor and the difference delta with frequency, minimum/maximum values and the arithmetic and RMS mean value for the specified range are displayed in the cursor information above the diagram

Calculate spectrum

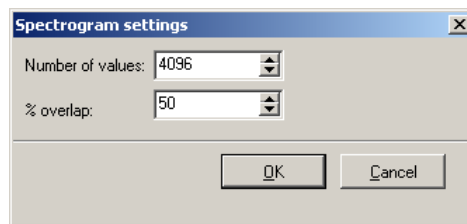
If you select the measure cursor in the time signal, another preview is displayed on the toolbar. The spectrum from the time signal is shown and refreshed in real time in "FFT preview". You can create a spectrum based on the time signal or a spectrum based on defined values of the time signal.

Spectrum from time signal

1. Select the measuring range as described above.
2. Double-click on the **FFT preview**.
→ The spectrogram is displayed in the "Calculated FFT" diagram.

Spectrum based on time signal values

1. In the **Edit** menu, click on **Create spectrogram from time signal**.



2. Enter the **Number of values** used to calculate the spectrum. *The default "Number of values" corresponds to the maximum possible number.*



The number of values specified is automatically increased to the next power of two for the calculation.

Example: To create a spectrum of 1000 measuring values, the value is automatically changed to 1024 values for the calculation. The calculated FFT then contains 512 measuring values.

3. Enter the **% overlap**.
4. Click **OK**.
→ The spectrogram is displayed in the "Calculated FFT" diagram.

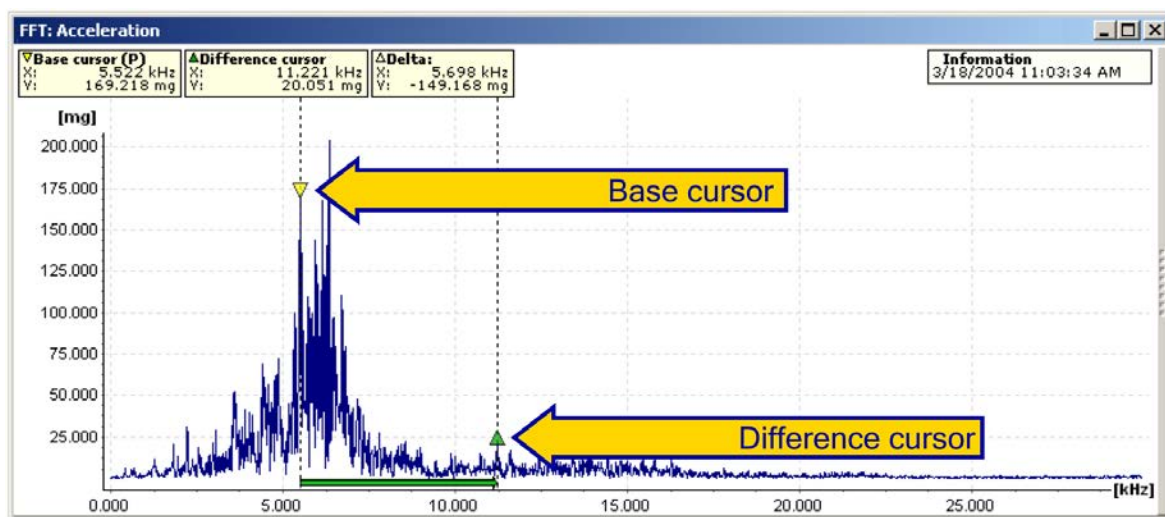
You can configure the display in the **FFT settings tool section** with **Display mode** (see Waterfall charts  189).

Difference cursor



You can use the **difference cursor** to calculate the difference between two measuring values.

To do this, place the base cursor and an additional difference cursor at any measuring point in the diagram. The distance between the cursors is indicated by a coloured bar directly above the X-axis. Both measuring values obtained with the cursors and the resulting differential values are displayed in the cursor information.



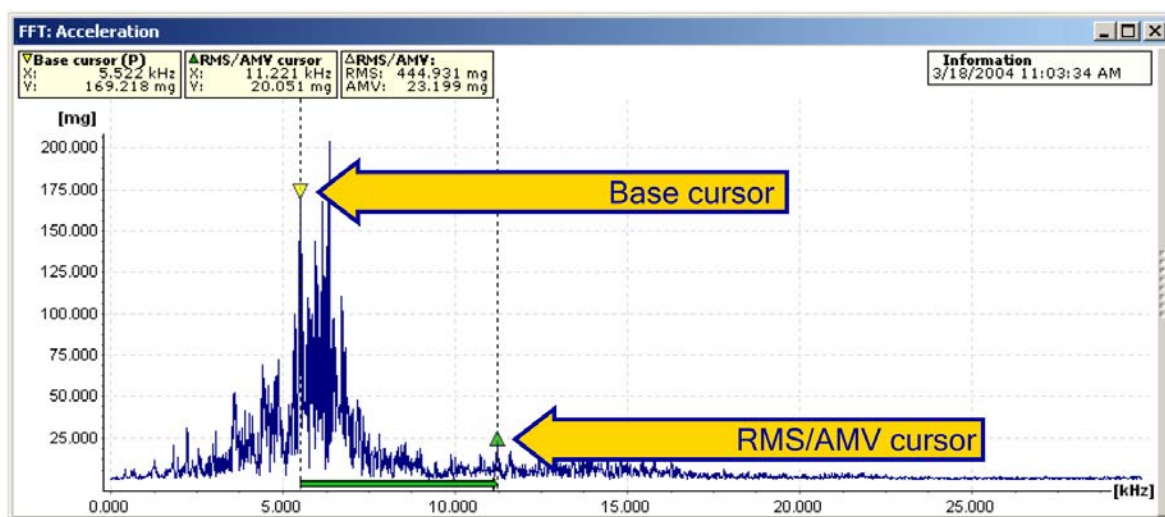
4. Select the **difference cursor** option from the cursor selection list or press the **F3** button.
 - The base cursor and the difference cursor are displayed in the diagram, these are connected by a coloured bar that runs along and slightly above the X-axis.
5. You can place the base cursor at any desired measuring point in the diagram by **left-clicking**.
6. You can position the difference cursor at any measuring point in the diagram by **left-clicking** while holding down the **shift key**.
 - The cursor information above the diagram displays the measuring values for the base cursor and difference cursor as well as the delta value.

RMS/AMV cursor



You can calculate the effective value (root mean square) and the arithmetic mean between two measuring points using the **RMS/AMV cursor**.

To do this, place the base cursor and an additional mean value cursor at any measuring point in the diagram. The distance between the cursors is indicated by a coloured bar directly above the X-axis. Both measuring values obtained with the cursors and the resulting mean values are displayed in the cursor information.



1. Select the **RMS/AMV cursor** option from the cursor selection list or press the **F4** button.
 - The base cursor and the averaging cursor are displayed in the diagram, these are connected by a coloured bar that runs along the X-axis and slightly above it.
2. You can place the base cursor at any measuring point in the diagram by left-clicking.
3. You can position the RMS/AMV cursor at any measuring point in the diagram by left-clicking while holding down the **shift key**.
 - The measuring values of the base cursor, the averaging cursor as well as the arithmetic and RMS value for the area

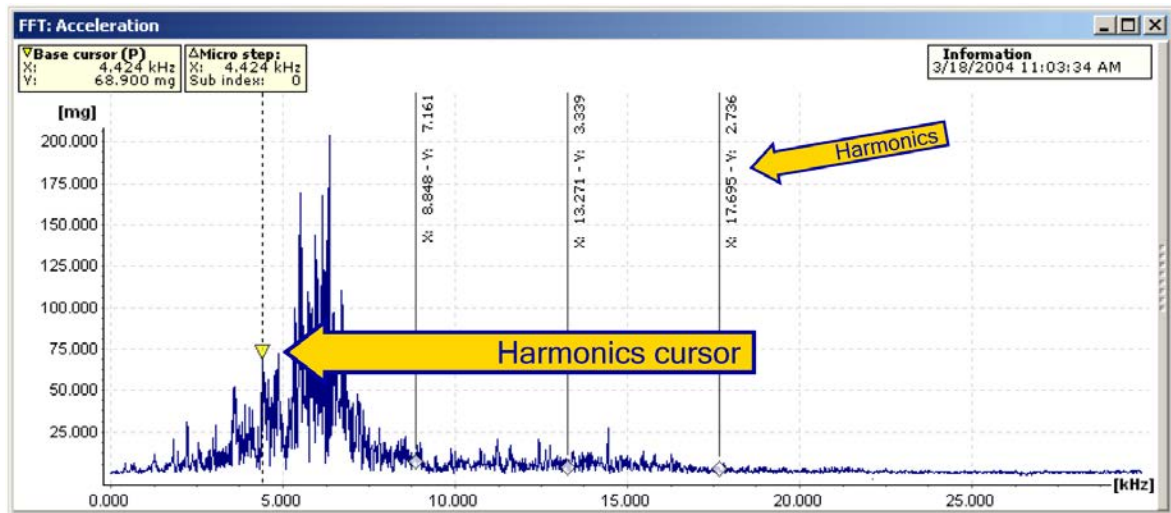
specified are displayed in the cursor information above the diagram

Harmonics cursor



You can use the **harmonics cursor** to determine whether harmonics are present in the diagram (integer multiple of a vibration).

To do this, place the base cursor at any measuring point in the diagram. The harmonics are displayed in each case as drawn-through vertical lines. The corresponding measuring values are displayed at the upper end of the vertical lines, and the measuring values for the base cursor are displayed in the cursor information.



1. Select the **harmonics cursor** option from the cursor selection list or press the **F5** button.

→ The base cursor and vertical lines are displayed at the harmonic of the basic frequency.

2. You can shift the base cursor to any desired measuring point in the diagram using the left mouse button.

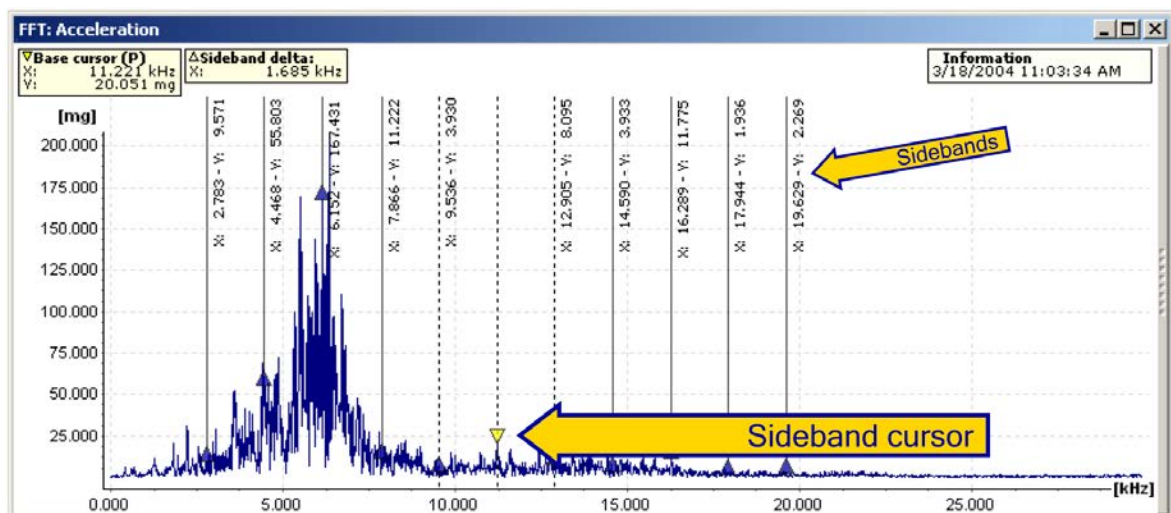
→ When the position of the harmonics cursor is changed the harmonics are automatically shifted. The cursor information above the diagram displays the measuring values for the base cursor and the micro steps that were set. The measuring values of the harmonics are each displayed as vertical text next to the corresponding vertical line.

Sideband cursor



You can use the **sideband cursor** to determine additional measuring values in definable sidebands starting from the base cursor.

To do this, first place the base cursor at any measuring point in the diagram. You can then shift the nearest sideband to another measuring point in the diagram. All other sidebands that are displayed are simultaneously adjusted.

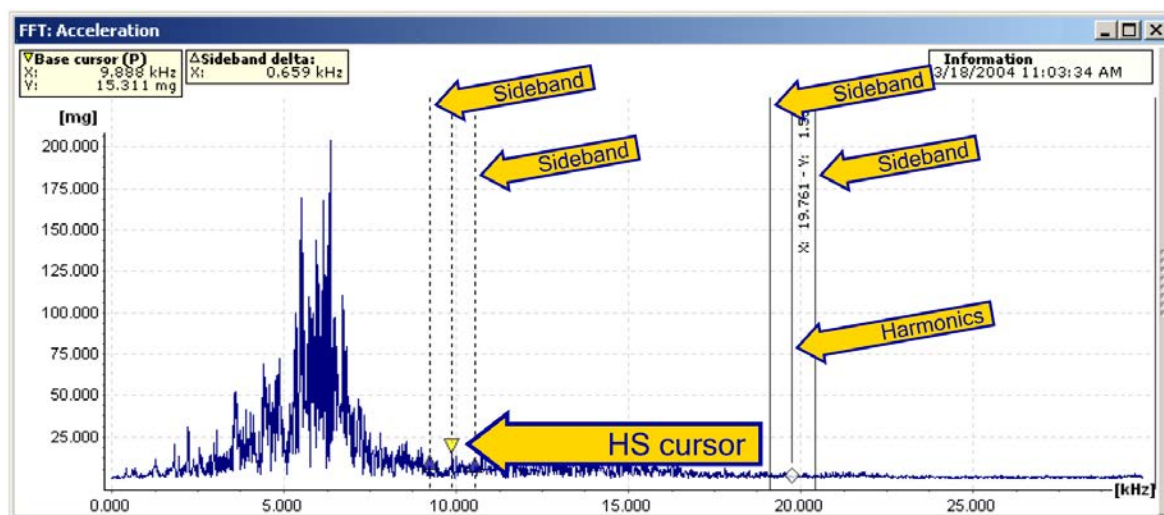


1. Select the **sideband cursor** option from the cursor selection list or press the **F6** button.
→ The base cursor and vertical lines are displayed at the sidebands of the frequency.
2. You can use the left mouse button to shift the base cursor to any measuring point in the diagram and also modify the position of the sidebands.
→ The cursor information above the diagram displays the measuring values for the base cursor as well as the differential delta of the sideband frequencies. The measuring values of the sidebands are each displayed vertically as text next to the corresponding vertical line.

HS cursor



The **HS cursor (Harmonic with Sidebands)** combines both cursor types described above. This means that the measuring values of the harmonics and their sidebands will be displayed.



1. Select the **HS cursor** option from the cursor selection list or press the **F7** button.
→ The base cursor and vertical lines are displayed at each harmonic of the base cursor frequency as well as its sidebands.
2. You can use the left mouse button to shift the base cursor to any measuring point in the diagram and also modify the position of the sidebands.
→ The cursor information above the diagram displays the measuring values for the base cursor as well as the differential delta of the sideband frequencies. The measuring values of the harmonics are each displayed as vertical text next to the corresponding vertical line.

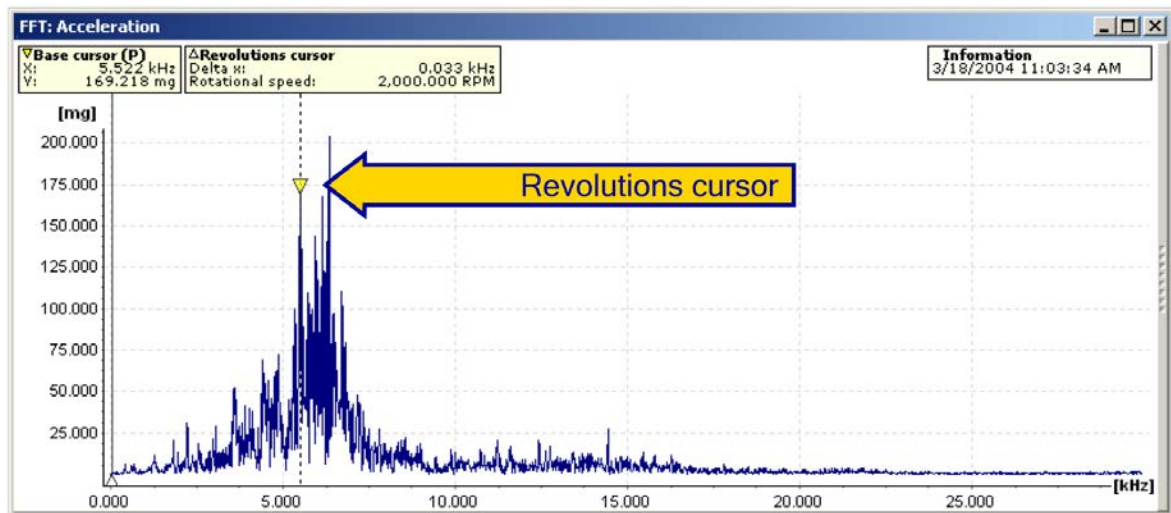
Revolutions cursor



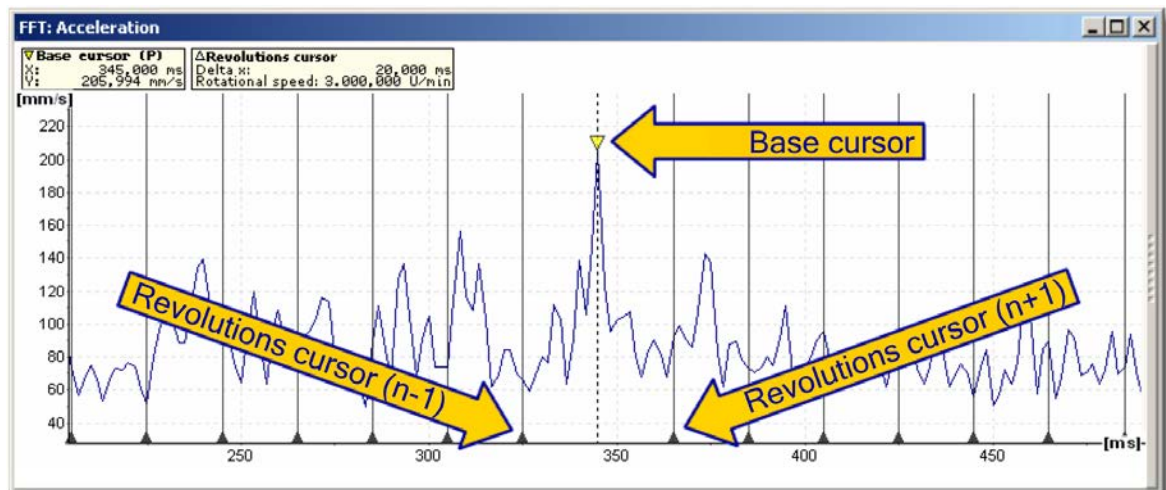
The **revolutions cursor** marks the frequency that is assigned to a specific speed with a line. The revolutions value is calculated as follows:

$$\text{Revolutions } n \left[\frac{\text{rev.}}{\text{min}} \right] = 60 * \text{frequency } f [\text{Hz}]$$

1. Select the **revolutions cursor** option from the cursor selection list or press the **F8** button.
→ The "revolutions cursor" dialogue opens.
2. Activate or deactivate the options for the cursor settings in the "revolutions cursor" dialogue.
3. Enter any desired speed in the **rpm** field and click **OK**. The revolutions cursor is displayed differently, depending on the type of diagram (FFT or time signal):
→ In an FFT diagram, a single revolutions cursor is displayed at the point previously specified for the speed in the dialogue. The cursor information above the diagram shows the base cursor value as well as the speed setting.



→ For a time signal a speed field with a series of revolutions cursors is displayed. In this case the individual lines correspond to an additional revolution before or after the current position of the base cursor. If you move the base cursor or position it at another measuring point, the speed field moves automatically with it.



6.3.6 Positioning of base cursor



You can position the base cursor at a point in the diagram defined via numeric input in the base cursor positioning dialogue box. The base cursor jumps to the measuring point nearest to this position.

1. Click on  in the toolbar.

→ The "Base cursor position" dialogue is displayed.

2. Select the **Move cursor to the nearest sample at** option and enter any desired value inside the diagram area in the

input field.

or

3. Select the **Move base cursor to measure point index** option and enter an index value for the corresponding measuring value in the input field.

4. Click **OK**.

→ The base cursor is now positioned at the position you entered numerically.

6.3.7 Modify cursor properties



Using the cursor properties dialogue, you can change the properties of the cursor currently selected.

1. Click on  in the toolbar.

→ A dialogue showing the currently selected properties of the cursor tool will open.

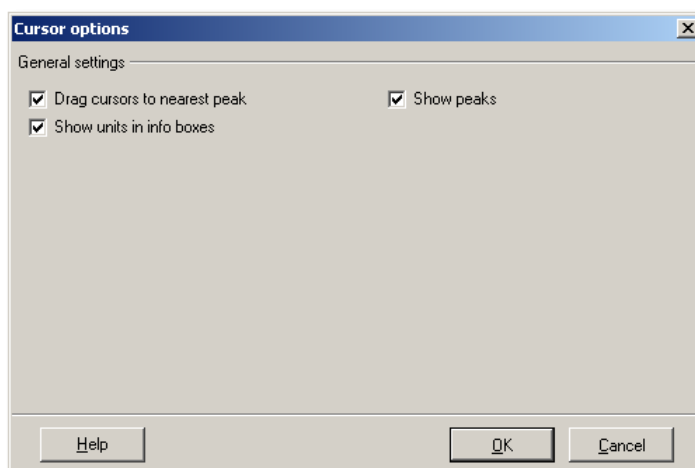
2. Activate or deactivate the relevant fields in the dialogue window and pick one of the values in the selection boxes or enter the respective value in the input fields provided.

3. Click **OK**.

→ The cursor properties are applied and saved.

General cursor properties

You can modify the general cursor options described below. These properties apply to all available cursor types. To do this, activate or deactivate the corresponding checkboxes in the dialogue window.



Drag cursors to nearest peak

Switched on: the cursor jumps to the maximum value which is nearest the mouse pointer. If no maximum value can be found immediately near the mouse, the cursor remains in its previous position.

Switched off: the cursor jumps precisely to the measuring point in the diagram which is nearest the mouse pointer.

Show peaks

Switched on: In addition to the vertical lines current symbols are used to label measuring values at the characteristic points of the various cursors in the diagram.

Switched off: the symbols that identify measuring values at characteristic points are removed. The vertical lines will still be displayed.

Displaying units in information boxes

This option is only relevant for the cursor information display which must also be switched on.

Switched on: Numerical values and units for the current cursor are displayed in the information boxes at cursor information.

Switched off: Only the numerical values for the current cursor are displayed in the information boxes at cursor information.

Modifying the properties of the base cursor

When using the base cursor you can only modify the general cursor options described above. To do this, activate or deactivate the corresponding checkboxes in the dialogue window.

Editing the measure cursor properties

When using the base cursor you can only modify the general cursor options described above. To do this, activate or

deactivate the corresponding checkboxes in the dialogue window.

Modifying the properties of the difference cursor

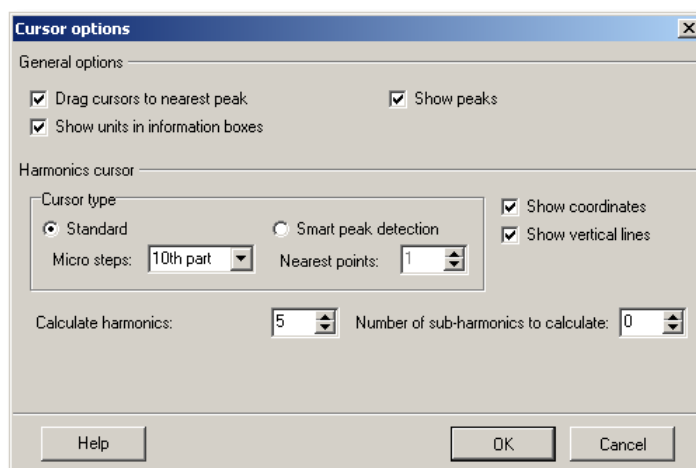
When using the difference cursor you can only modify the general cursor options described in Modify cursor properties. To do this, activate or deactivate the corresponding checkboxes in the dialogue window.

Modifying the properties of the RMS/AMV cursor

Similarly, when using the RMS/AMV cursor you can only modify the general cursor options described in Modify the cursor properties. To do this, activate or deactivate the corresponding checkboxes in the dialogue window.

Editing the properties of the harmonics cursor

In addition to the general cursor options described in Modify the cursor properties you can also modify the additional options for the harmonics cursor (described below). To do this, activate or deactivate the appropriate fields in the dialogue window or select the respective value from the selection boxes.



Standard cursor type

The harmonics are precisely calculated for the current cursor. The indicators for the harmonics are set so they locate the **nearest measuring value** for the harmonics calculated.

Micro steps

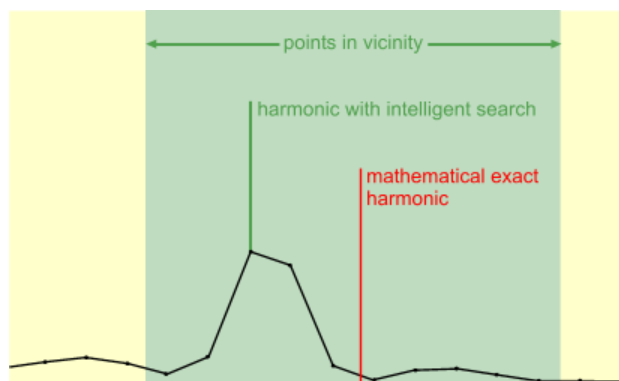
Micro steps are necessary to allow the basic frequency to be more precisely defined. In this selection box you can enter the increment between two measured points that will be used to specify the basic frequency and also calculate the harmonic.

Cursor type: automatic peak determination

The harmonics are precisely calculated for the current cursor. The indicators for the harmonics are set so they locate the **nearest maximum value** for the harmonics calculated.

Nearest points

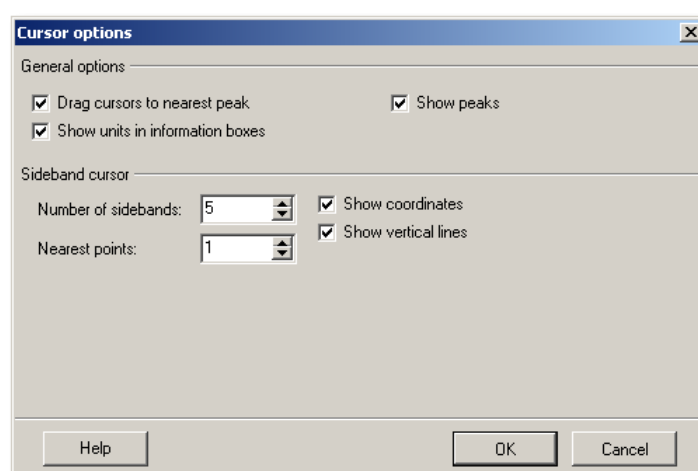
The Viewer software calculates the precise mathematical values of the harmonics. The intelligent cursor analyses the number of nearest points specified in this field (measuring points in the diagram in both directions) for maximum values and positions the indicator for the harmonic at the nearest maximum value.



Harmonics to calculate	In this field you can enter the number of harmonics that must be calculated in each case.
Sub-harmonics to calculate	In this field you can enter the number of sub-harmonics that must be calculated in each case.
Show coordinates	<p>Switched on: The coordinates (value pairs) of the harmonics are displayed in the diagram.</p> <p>Switched off: The coordinates (value pairs) of the harmonics are removed from the diagram.</p>
Show vertical lines	<p>Switched on: The harmonics are identified in the diagram using the cursor symbol and a vertical line.</p> <p>Switched off: The harmonics are identified using only the corresponding cursor symbol.</p>

Modifying the properties of the sideband cursor

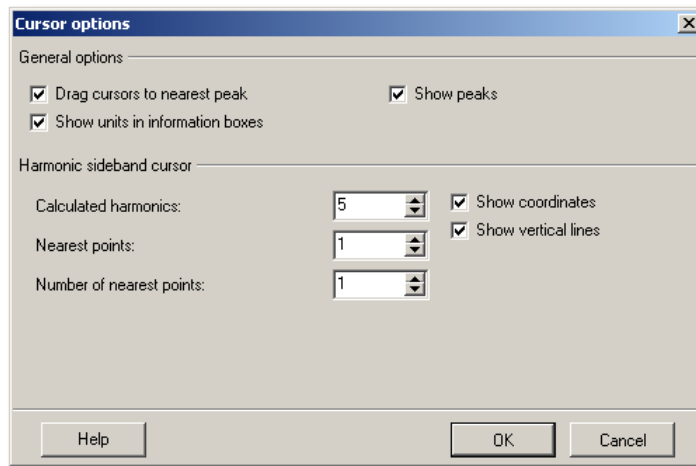
In addition to the general cursor options described in "Modify the cursor properties" you can also modify additional options of the sideband cursor (described below). To do this, activate or deactivate the appropriate fields in the dialogue window or select the respective value from the selection boxes.



Number of sidebands	In this field you can enter the number of sidebands that must be calculated for the current cursor in each case.
Nearest points	The Viewer software calculates the precise mathematic values of the sidebands. The number of nearest points specified in this field (existing measuring points in the diagram) are then analysed for maximum values and the sideband marker is positioned at the nearest maximum value.
Show coordinates	<p>Switched on: The measuring values of the respective sidebands on the x- and y-axes are displayed at the vertical lines.</p> <p>Switched off: The measuring values of the sidebands are removed from the display.</p>
Show vertical lines	<p>Switched on: The harmonics are identified in the diagram using the cursor symbol and a vertical line.</p> <p>Switched off: The harmonics are identified using only the corresponding cursor symbol.</p>

Editing the HS cursor properties

In addition to the general cursor options described in "Modify the cursor properties" you can also modify the options for the HS cursor (described below). To do this, activate or deactivate the appropriate fields in the dialogue window or select the respective value from the selection boxes.



Calculated harmonic
Nearest points

In this field you can enter the number of harmonics that must be calculated in each case.

Each harmonic is determined precisely using a mathematical formula. You can enter the number of nearest points to the left and right of the harmonic identified to be analysed for maximum values. The highest value in each case is then labeled as a harmonic and displayed.

Number of nearest points

Each sideband is also determined precisely using a mathematical formula. You can enter the number of nearest points to the left and right of the sideband identified to be analysed for maximum values. The highest value in each case is then labeled as a sideband and displayed.

Show coordinates

Switched on: The measuring value for each harmonic and sideband on the x- and y-axes is displayed at the vertical line.

Switched off: The measuring values of the harmonics and sidebands are removed from the display.

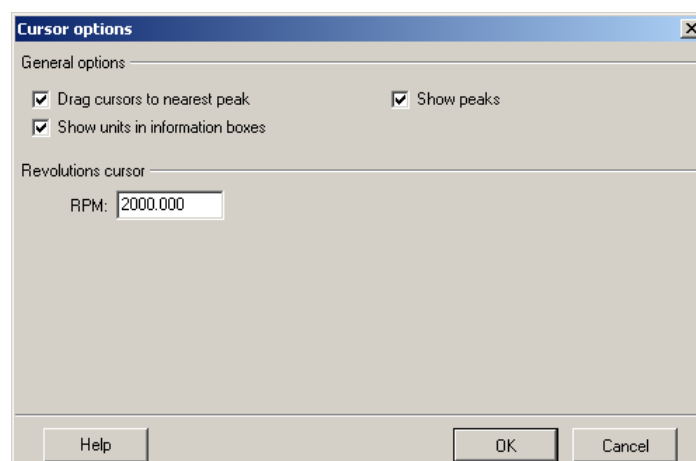
Show vertical lines

Switched on: The harmonics and sidebands are identified in the diagram using the cursor symbol and a vertical line.

Switched off: The harmonics and sidebands are identified using only the corresponding cursor symbol.

Modifying the properties of the revolutions cursor

In addition to the general cursor options described in "Modify the cursor properties" you can also modify the additional option for the revolutions cursor – this is described below. To do this, activate or deactivate the appropriate fields in the dialogue window or enter the appropriate value in the input field.



RPM

Enter a rotational speed [rpm] in the input field. The Viewer software uses this value to calculate the corresponding frequency and positions the revolutions cursor at the appropriate location in the diagram.

6.3.8 Other tools

Copying a diagram as a graphic to the clipboard



You can use this tool to copy the current diagram view to the clipboard.

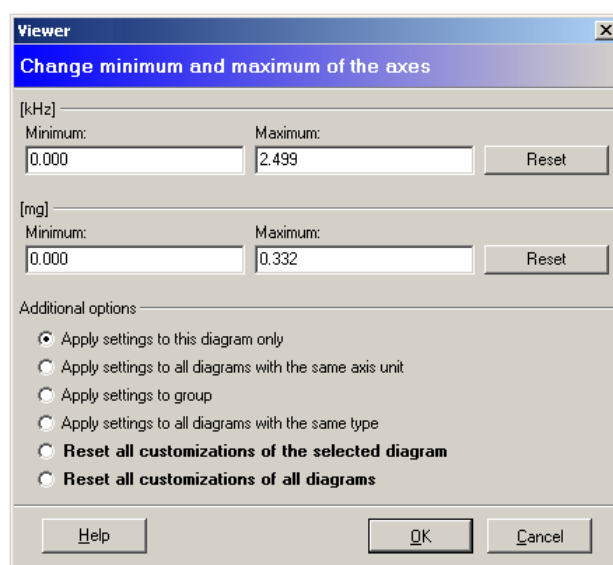
1. Click on the **Copy diagram to clipboard** symbol.
2. Switch to the application in which you would like to insert the image.
3. Select the **Paste** option from the **Edit** menu for the application or use the shortcut **Ctrl+V**

Change diagram boundaries



You can use this tool to change the minimum/maximum values displayed on the x- and y-axis.

1. Click on the **Change diagram boundaries** symbol.
- The "Modify maximum values" dialog is displayed.



2. Enter a new minimum/maximum value for the X and/or Y axis in the appropriate boxes. Click **Reset** to restore values automatically calculated by the Viewer software.
3. Select an additional option:
 - **Apply settings to the selected signal only:** Only the diagram activated in the signal selection (see "Displaying and removing signals" [163]) is changed.
 - **Apply settings to all diagrams with the same axis unit in the active window:** The signal axis limits of the active selected window are changed.
 - **Apply settings to group:** All diagrams belonging to the same configuration as the selected signal are changed.
 - **Apply settings to all diagrams with the same type:** All diagrams of the same type – e.g. "time signals" – are changed.
 - **Reset all customizations of the selected diagram:** The user settings for all diagrams of the active window are reset to the values automatically calculated by the Viewer software.
 - **Reset all customizations of all diagrams:** The settings for all diagrams in all windows are reset to the values automatically calculated by the Viewer software.
4. Click **OK**.

→ The diagram (and other diagrams if relevant) is displayed with the chosen settings applied.

Or:

 - Click on **Cancel** to discard the changes.

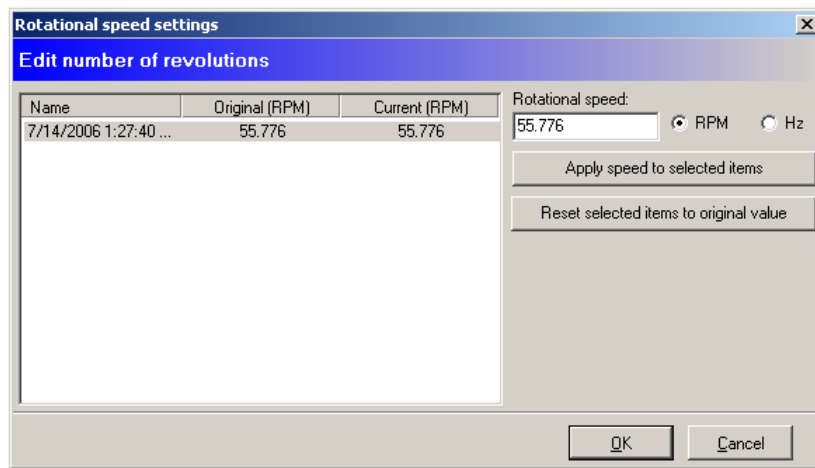
Edit rotational speed



Use this tool to change the rotational speed information in an FFT or time signal.

1. Click on the **Edit rotational speed** symbol.

→ The "Edit rotational speed" dialog is displayed.



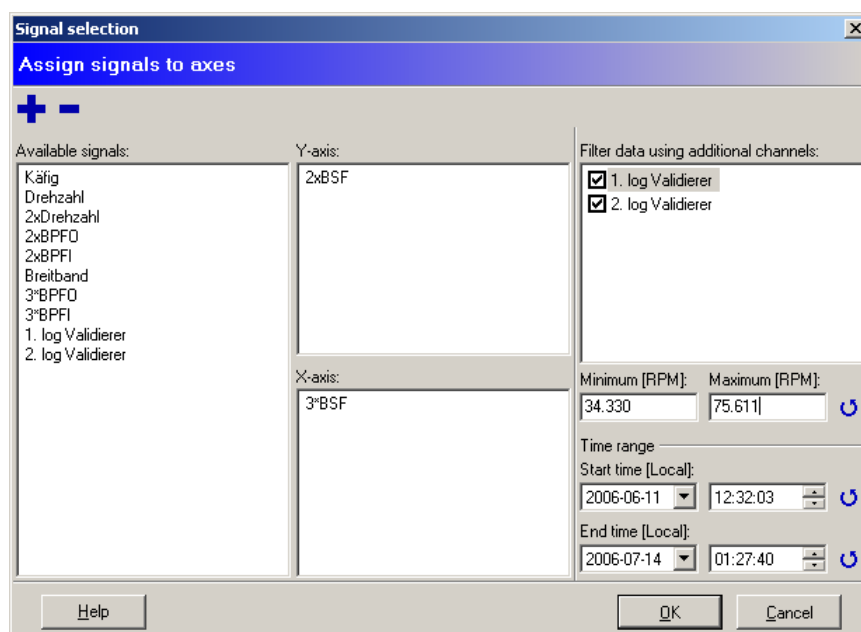
2. Click on the signal whose rotational speed you wish to change. If there are multiple signals, you can right-click to select or deselect them all.
3. Enter the appropriate speed in the **Rotational speed** box and select the unit (rpm or Hz). The rotational speed is automatically converted when you change the unit.
4. Click **Apply rotational speed to selection** to allocate the new speed to the selected signals.
5. Click **Reset select to defaults** to undo the change of speed.
6. Click **OK** to apply the changes or **Cancel** to discard them.

Display signal distribution



This tool allows you to display the distribution of signals in a trend diagram. To do so, select a reference signal for the X axis. You can then display the distribution of the other signals in relation to the reference signal by selecting it for the Y axis.

1. Click on the **Show distribution of signal** icon.
- The **Assign signals to axes** dialog is displayed.



2. Drag the desired reference signal out of the list of available signals into the X axis field. Alternatively, you can click on the reference point and then on **+** to add it to the X axis.
3. Drag one or more signals onto the Y axis field to display their distribution in relation to the reference signal.
4. To remove a signal, just drag it out of the respective field back into the list of available signals. Alternatively, you can click on the signal and then on **-** to remove it.

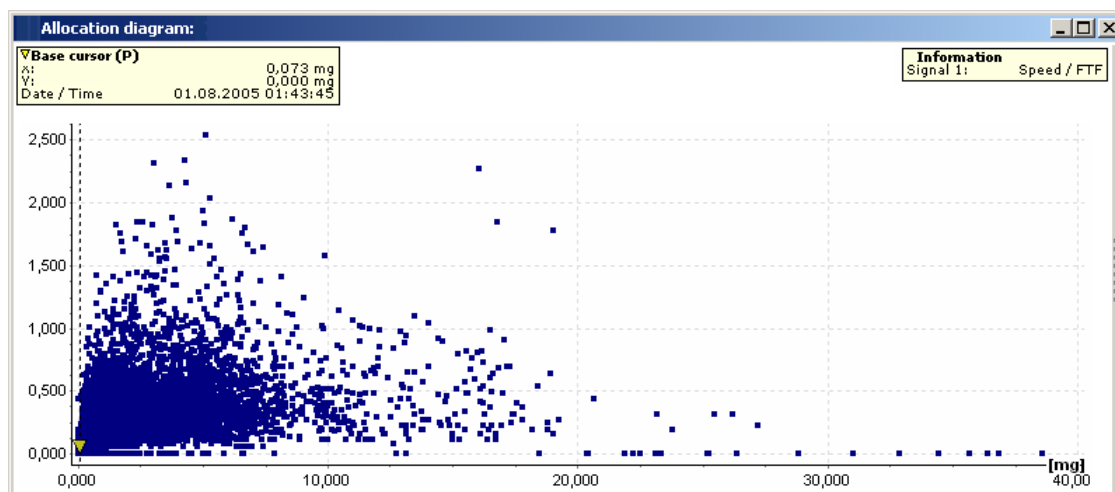
If you have enabled validation in the device configuration (see Configuration Manager → section "Additional channels" [103]), you can use the limits defined there as filter conditions.

5. To do so, select the appropriate validator in **Filter options** and specify a minimum and maximum. Alternatively, you can call the threshold values defined in the validation directly by clicking **V1L1-V2L2** (V1/2 = validator 1 and 2, L1/L2 = limit 1 and 2). The respective value is then copied straight to the appropriate field in the filter options.

6. Click **OK**.

7. The signal distribution is displayed in the preview. To display the whole diagram, click **Display loaded diagrams** .

→ The diagram is then displayed with the selected settings. If you have selected multiple signals for the Y axis, the various distributions are displayed separately.



Trend filtering



Displays the trend progression of one or multiple signals depending on the filter criteria of one or both validators.

1. Click on the **Trend filtering** symbol.

→ The **Signal selection** window is shown.

Signal selection

Assign signals to axes

Available signals:

- Käfig
- Drehzahl
- 2xDrehzahl
- 2xBPFD
- 2xBPFI
- Breitband
- 3*BPFD
- 3*BPFI
- 1. log Validierer
- 2. log Validierer

Y-axis:

2xBSF

X-axis:

3*BSF

Filter data using additional channels:

- ☒ 1. log Validierer
- ☒ 2. log Validierer

Minimum [RPM]: 34.330 Maximum [RPM]: 75.611

Time range

Start time [Local]: 2006-06-11 12:32:03

End time [Local]: 2006-07-14 01:27:40


Buttons: Help, OK, Cancel

2. Drag the desired signals out of the list of available signals into the Y axis field. Alternatively, you can click on one or multiple signals and then on **+** to add them to the Y axis.

3. To remove a signal, just drag it out of the respective field back into the list of available signals. Alternatively, you can click on the signal and then on **-** to remove it.

If you have enabled validation in the device configuration (see Configuration Manager → section "Additional channels" ¹⁰³), you can use the limits defined there as filter conditions.

4. To do so, select the appropriate validator in **Filters** and specify a minimum and a maximum. Alternatively, you can call the threshold values defined in the validation directly by clicking **V1L1-V2L2** (V1/2 = validator 1 and 2, L1/L2 = limit 1 and 2). The respective value is then copied straight to the appropriate field in the filter options.
5. Define the start and the end time.
6. Click **OK**.

7. The filtered trend diagram is displayed in the preview. To display the whole diagram, click **Show trend data**  .
→ The diagram is then displayed with the selected settings.

Add bearing



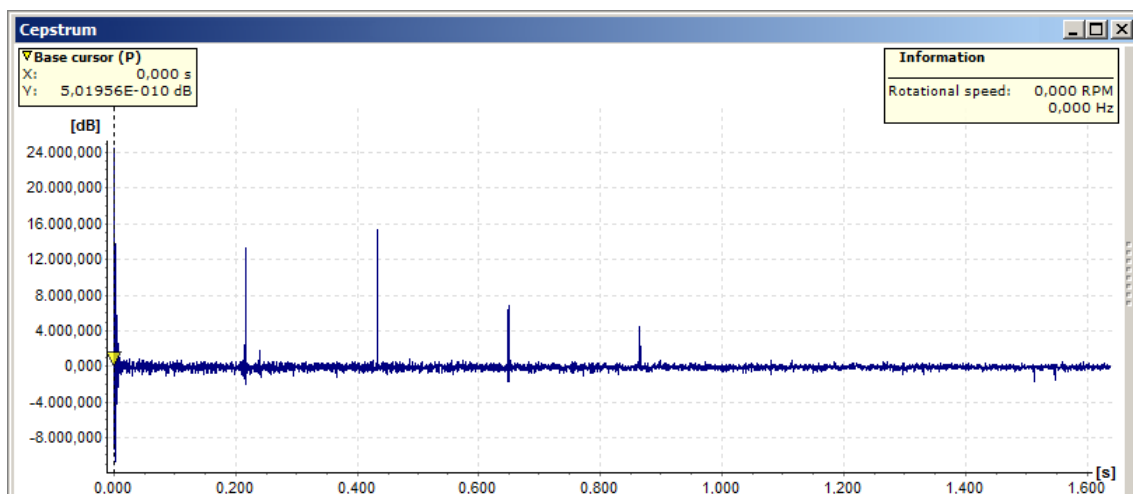
This tool adds a bearing to the current spectrum from the bearing database.

1. Click on the **Add bearing** icon.
2. Select a bearing (see Configuration Manager → section "Bearing database" ¹⁴²).
3. Enter the rotational speed conversion rate.

→ The characteristic bearing values are displayed in the Kinematic frequencies ¹⁸³ box on the diagram information bar.

Calculate cepstrum

In the FFT diagram you can calculate the cepstrum and thus identify periodic changes more easily. To do so, click **Calculate cepstrum from spectrum...** in the **Edit** menu. This calls up another dialog box with the calculated cepstrum:



6.3.9 Using the diagram information bar

Displaying the diagram information bar

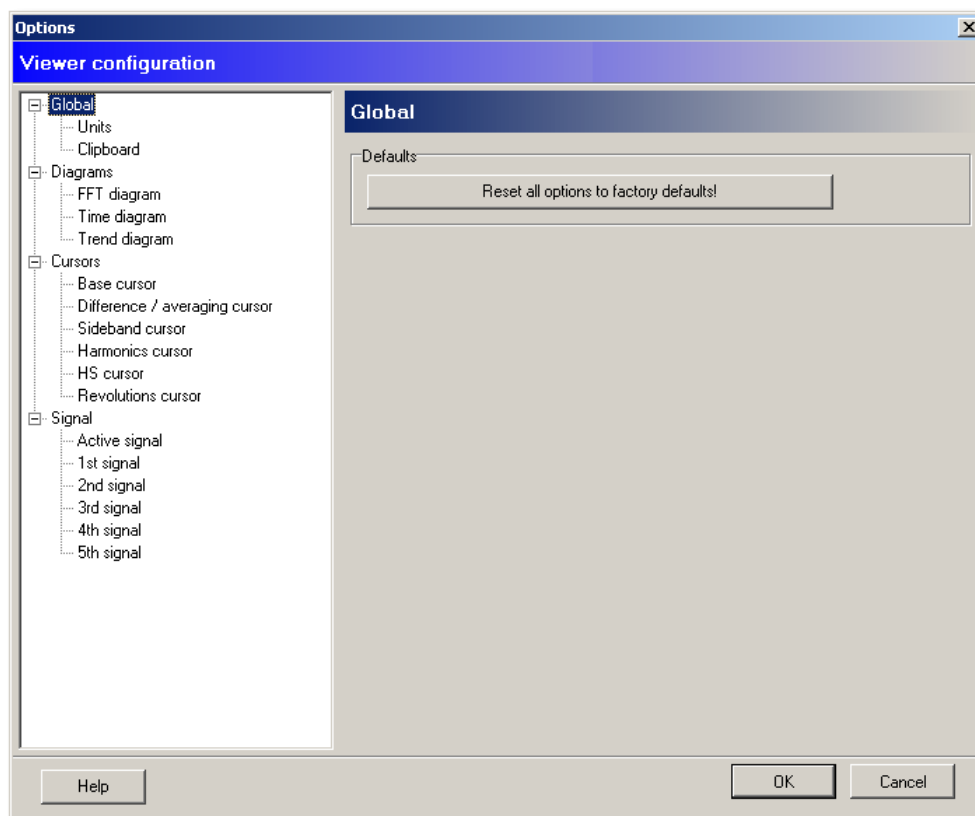
The diagram information bar contains additional information on the diagram displayed and outputs the relevant characteristic measuring values in tabular form depending on the cursor selected. There are a number of ways in which the diagram information bar can be displayed.

Adjusting the default setting for the diagram information bar display via the Viewer options

The default setting for the diagram information bar display can be adjusted with the options. The settings can be configured individually for each diagram type (FFT, time signal or trend data). This default setting is used when new diagrams are opened.

1. Click on the **Extras** menu.
2. Select the **Options** menu item.

→ The options dialog opens.



3. Select the **Diagrams** heading in the left-hand column. Open the navigation menu by clicking the mouse on the "+" symbol.
4. Select the desired diagram type (FFT diagram, time signal diagram or trend diagram) you want to change the setting for.
 - The options for the selected diagram type are displayed in the right-hand field.
5. Activate the **Show diagram info bar at startup** checkbox in the **Diagram information bar** field.
 - The changes are applied the next time this diagram type is opened.

Displaying the diagram information bar with the mouse

1. Click the mouse on the slim grey bar to the right of the diagram display.
 - The diagram information bar appears.
2. Once the diagram information bar is displayed, click on the narrow grey bar to the left of the diagram display.
 - The diagram information bar is hidden.

Displaying the diagram information bar with the keyboard

1. Use the keyboard shortcut Ctrl+I to display the diagram information bar.
 - The diagram information bar appears.

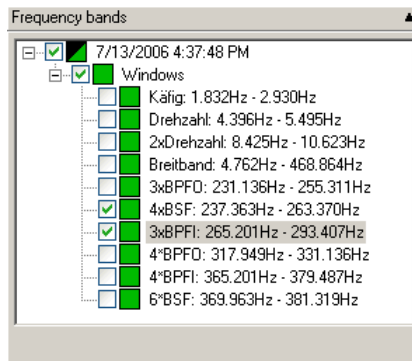
Displaying frequency bands

The diagram data in an FFT diagram contain important frequency bands from which characteristic values may be determined. The frequency bands which are defined by the higher-level application are highlighted in colour in the diagram. These frequency bands cannot be edited in the Viewer software but can be displayed or hidden as required. Frequency bands are only displayed in FFTs.

Double-click on a frequency band to zoom in. If **Select characteristic value in trend diagram** is enabled, clicking on a frequency band automatically selects the appropriate signal in the trend diagram.

Frequency bands are only displayed in FFTs.

1. To activate or deactivate a frequency band in an FFT diagram click the checkbox ☒ in front of the preferred frequency band in the list.
 - The frequency bands selected are displayed in the diagram as coloured fields



You can switch the display of all frequency bands in an FFT diagram on or off via the context menu in the frequency band information window.


1. Right-click the mouse at any desired point in the frequency band window in the diagram information bar.
2. Click **Select all** in the context menu to display all available frequency bands.

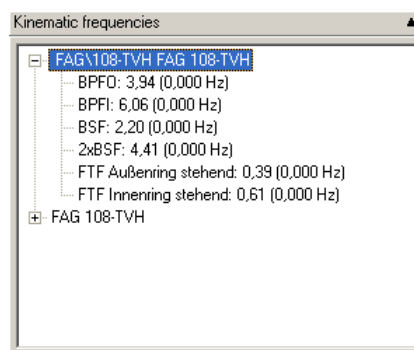
Or:

3. Click **Remove all** in the context menu to remove all available frequency bands from the diagram.

→ The frequency bands are displayed or removed depending on the setting.


Kinematic frequencies

If you have added one or multiple bearings to a spectrum from the bearings database using the Add bearing  tool, the characteristic bearing data are displayed in the **Kinematic frequencies** box.



The following information is displayed:

- Manufacturer / Bearing designation
- BPFO: Outer race frequency
- BPFI: Inner race frequency
- BSF / 2xBSF: Single and double roller frequency
- FTF fixed outer race: Fundamental train frequency at fixed outer race
- FTF fixed inner race: Fundamental train frequency at fixed inner race

If a rotational speed is available for the spectrum (see Other Tools → Add bearing ), the Viewer software can also display the bearing frequencies in the spectrum.

1. Check the **Bearing frequencies** checkbox to do so.
2. Click on the bearing frequency in the **Kinematic frequencies** box to display in the spectrum.

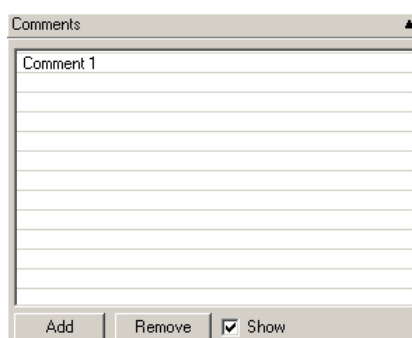
→ The selected frequency is displayed in the spectrum. The bearing frequencies multiplied by the current rotational speed are displayed in parentheses in the **Kinematic frequencies** box.

Inserting comments into the diagram

You can assign comments to individual measuring points in the diagram. The comments in the diagram are presented at the corresponding measuring point in an information field if the display field is activated.

You can move the comment dialog by left-clicking on the dialog and dragging it to the desired position.

1. Select the preferred measuring point using the **base cursor**.
2. Click the **Add** button in the **Comments** field in the right-hand section of the information area.



3. Enter a comment for the measuring point selected at the line provided for this in the table.

- The comment is displayed in the diagram next to the appropriate measuring point and can be moved by left-clicking and dragging it.
- To change the allocation of the comment to the measuring point (shift on the X axis), click on the black triangle for the comment and drag it to the appropriate measuring point.
- When you select a comment in the list, it is displayed on a coloured background in the diagram.
- Hover the mouse over a comment in the list of comments to display the comment details in a tooltip at the mouse position.

Displaying maximum values

The **Highest peaks** box shows the highest measuring values on the Y axis of the diagram. You can define the number of maximum values displayed via the selection box. You can use the checkbox provided to display the maximum values in the diagram view.

Index	X: Hz	Y: m/s ²
1	24,029	0,011
2	24,908	0,010
3	35,165	9,93244E-003
4	0,440	9,39993E-003
5	0,293	9,01423E-003
6	25,055	8,74032E-003
7	0,586	8,07504E-003
8	54,945	8,05660E-003
9	24,176	6,53528E-003
10	121,319	6,50711E-003

Number of peaks: 10 ☐ Show

1. If you wish to modify the number of maximum values displayed, click the **Number of maximum values** radio button in the **Highest peaks** box.
2. Check the **Mark peaks** checkbox to display the corresponding maximum values in the diagram.

Displaying the measuring values of harmonics


If the **Harmonics cursor** is selected, this diagram information area is displayed. The table shows the measuring values that most closely correspond to the harmonic.

X: Hz	Y: m/s ²
0.000	6.71157E-004
0.000	6.71157E-004
0.000	6.71157E-004
0.000	6.71157E-004
0.000	6.71157E-004

The **Harmonics** table displays the measuring values for each harmonics value calculated.

Modifying the settings for the harmonics cursor

You can modify the settings used to calculate the harmonics via the harmonics cursor properties.

1. To modify the settings click on the **Cursor properties** symbol in the "Navigation and Tools" field .
2. Modify the settings in the cursor properties dialogue field.

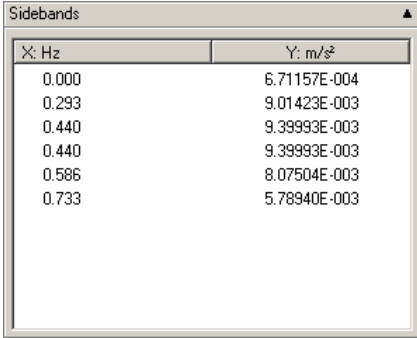
Copying measuring values for the harmonics using the clipboard

You can transfer measuring values for the harmonics to other applications using the clipboard.

1. Highlight each measuring value you wish to transfer to another application in the table or right-click on the table and choose the **Select all** menu item from the context menu.
2. To copy the measuring values you have selected to the clipboard, **right-click** on the table. Pick the **Copy selected values to the clipboard** menu item from the context menu.
3. Switch to the other application and click the paste symbol or select the **Paste** menu item from the **Edit** menu.

Displaying the measuring values of sidebands

If the sideband cursor or HS cursor is selected this field is displayed in the information area and contains the measuring values that most closely correspond to the defined sidebands.




X: Hz	Y: m/s²
0.000	6.71157E-004
0.293	9.01423E-003
0.440	9.39993E-003
0.440	9.39993E-003
0.586	8.07504E-003
0.733	5.78940E-003

The **Sidebands** table displays the measuring values for the relevant sidebands calculated.

Modifying the settings for the sideband cursor

You can modify the settings used to calculate the sidebands via the sideband cursor properties.

1. To modify the settings click on the **Cursor properties** symbol in the "Navigation and Tools" field .
2. Modify the settings in the **cursor properties** dialogue field.

Copying measuring values for the sidebands via the clipboard

You can transfer measuring values for the sidebands to other applications via the clipboard.

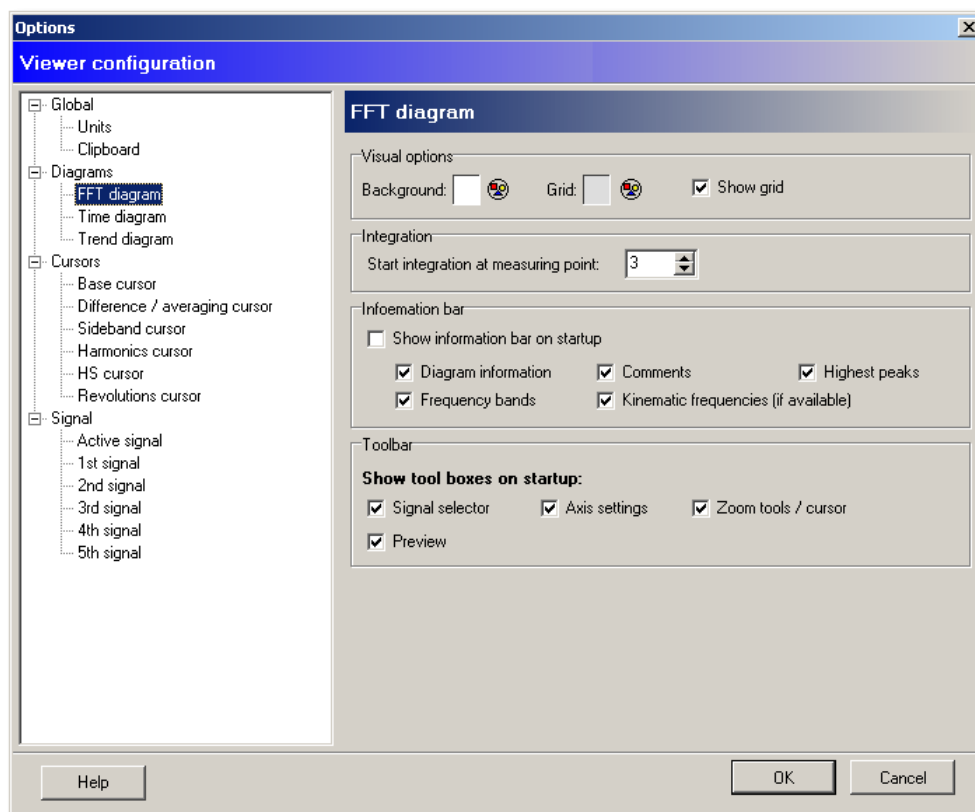
1. Highlight each measuring value you wish to transfer to another application in the table or right-click on the table and choose the **Select all** menu item from the context menu.
2. To copy the measuring values you have selected to the clipboard, **right-click** on the table. Pick the **Copy selected values to the clipboard** menu item from the context menu.
3. Switch to the other application and click the paste symbol or select the **Paste** menu item from the **Edit** menu.

Hiding the diagram information bar

Adjusting the default setting for removing the diagram information bar from the display via the Viewer options

The default setting for the diagram information bar display can be adjusted with the options. The adjustments can be made for each diagram type individually (FFT, time signal or trend data diagrams). This default setting is used when new diagrams are opened.

1. Click on the **Extras** menu.
 2. Select the **Options** menu item.
- The options dialog opens.



1. Select the **Diagrams** heading in the left-hand column. Open the navigation menu by clicking the mouse on the "+" symbol.
2. Select the desired diagram type (FFT, time signal diagram or trend) you want to change the setting for.
→ The options for the selected diagram type are displayed in the right-hand field.
3. Deactivate the **Display right diagram information bar at start up** checkbox in the **Diagram information bar** field.
→ The changes are applied the next time this diagram type is opened.

Hiding the diagram information bar with the mouse

1. Click on the narrow grey bar to the left of the diagram information bar.
→ The diagram information bar is hidden.

Removing the diagram information bar using the keyboard

1. Use the keyboard shortcut **Ctrl+I** to hide the diagram information bar in the display.
→ The diagram information bar is hidden.

6.3.10 Exporting diagrams and information

In the Viewer software you can copy diagrams to the clipboard or save them in JPG or BMP format. The exported diagrams contain the cursor and measuring information and, optionally, an information text with the title of the diagram. The diagram information bar is not exported. You can edit the diagram dimensions and other options in the Program settings [194]. You can also copy the measuring values and the entire contents of the diagram information bar of a diagram to the clipboard to insert them in another application.

- Edit the diagram settings and then continue as follows.

Copy current diagram to clipboard

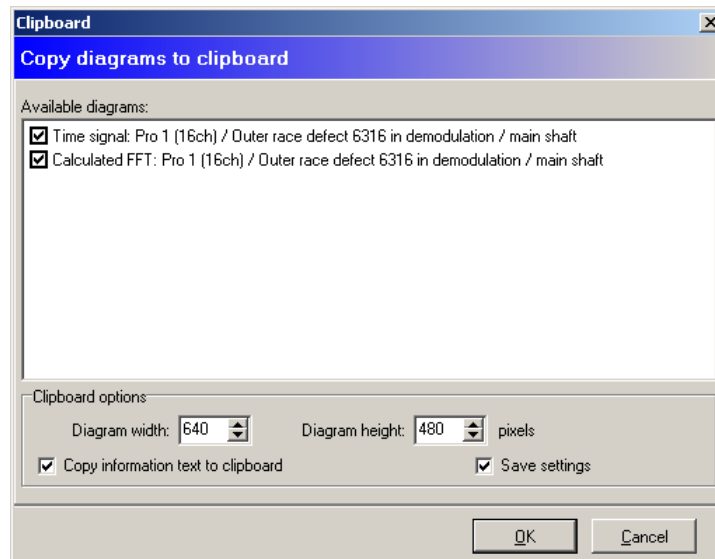
- Select a diagram by clicking on the diagram window.
- Click **Copy current diagram to clipboard** in the **Edit** menu.
- Switch to the application in which you would like to insert the diagram.
- Select the **Paste** option from the **Edit** menu for the application or use the shortcut **Ctrl+V**.


Copying selected diagrams to clipboard

- Click **Select and copy diagrams to clipboard** in the **Edit** menu.

Or:

- Click on  in the toolbar.



- Select the diagrams to copy by ticking the checkbox next to the available diagrams.
- If you edit the clipboard options, click "Save settings" to apply the changes in the program settings .
- Click **OK**.
- Switch to the application in which you would like to insert the diagram.
- Select the **Paste** option from the **Edit** menu for the application or use the shortcut **Ctrl+V**.

Save current diagram as image...

- Select a diagram by clicking on the diagram window.
- Click **Save current diagram as image** in the **Edit** menu.
- Select the directory to save to,
- enter a file name and
- select the file type **JPG** (JPEG format) or **BMP** (Windows bitmap format).
- Click on **Save**.

Copy diagram information to clipboard

You can copy all diagram information of the selected diagram to the clipboard.

- Select a diagram by clicking on the diagram window.
- Click **Copy diagram information to clipboard** in the **Edit** menu.
- Switch to the application in which you would like to insert the diagram information.
- Select the **Paste** option from the **Edit** menu for the application or use the shortcut **Ctrl+V**.

Copying measuring values to the clipboard

You can copy the measuring values of a diagram to the clipboard.

- Select a diagram by clicking on the diagram window.
- Press **CTRL+E**.
- Switch to the application in which you would like to insert the measuring values.
- Select the **Paste** option from the **Edit** menu for the application or use the shortcut **Ctrl+V**.

6.3.11 ASCII export




The ASCII export only works with Dtect X1s data.

During the ASCII export, a separate file is generated consisting of a header segment and a data segment for each existing data type. The header segment contains the measurement configuration data. The information is saved in the Windows INI file format. The measuring data is contained in the data segment. The file names are made up of the name of the measuring data and the file extension. The file extensions are assigned automatically according to data types. The file extensions and assignment to the corresponding data type are shown in the table below.

File extension	Data type
.X1AscActTime	Time signal
.X1AscActFFT	FFT
.X1AscAlarmFFT	Alarm FFT
.X1AscCharacteristics	Characteristic value data
.X1AscAlarms	Alarm data


Manual export

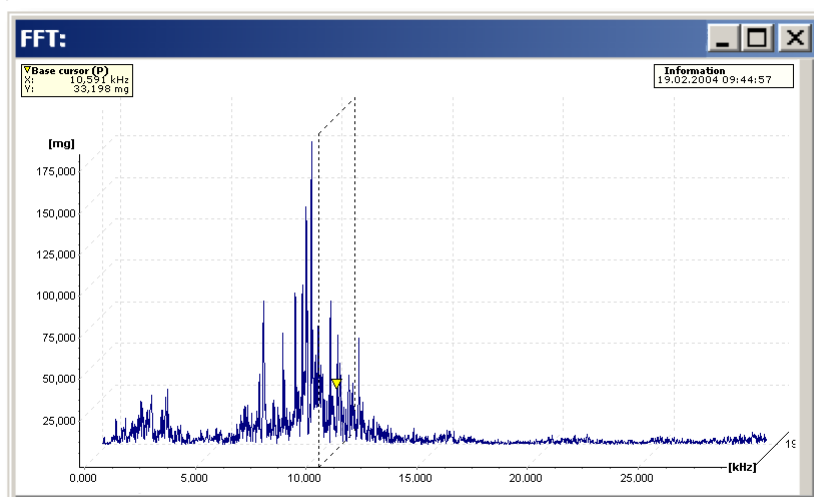
Using manual export, only the dataset of the currently selected diagram will be exported.

- Select a diagram.
- Click on  in the toolbar.
- Select the path to be used for the export of files in the "Select export directory" dialogue box which subsequently opens.
- Click **OK** to close the dialogue box.

The selected dataset is now exported using the path you selected.

6.3.12 Waterfall charts

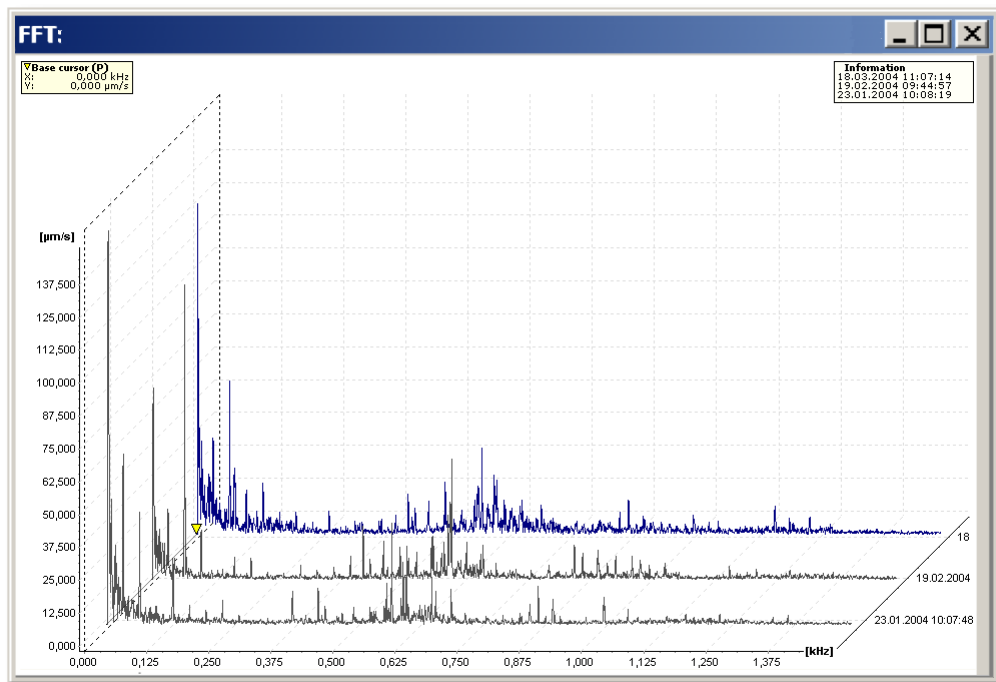
FFTs and order spectrums can be displayed as three-dimensional waterfall charts. For this type of display, the same tools  are available as for the two-dimensional display. If you have selected multiple datasets, the corresponding FFTs are also displayed in a window.



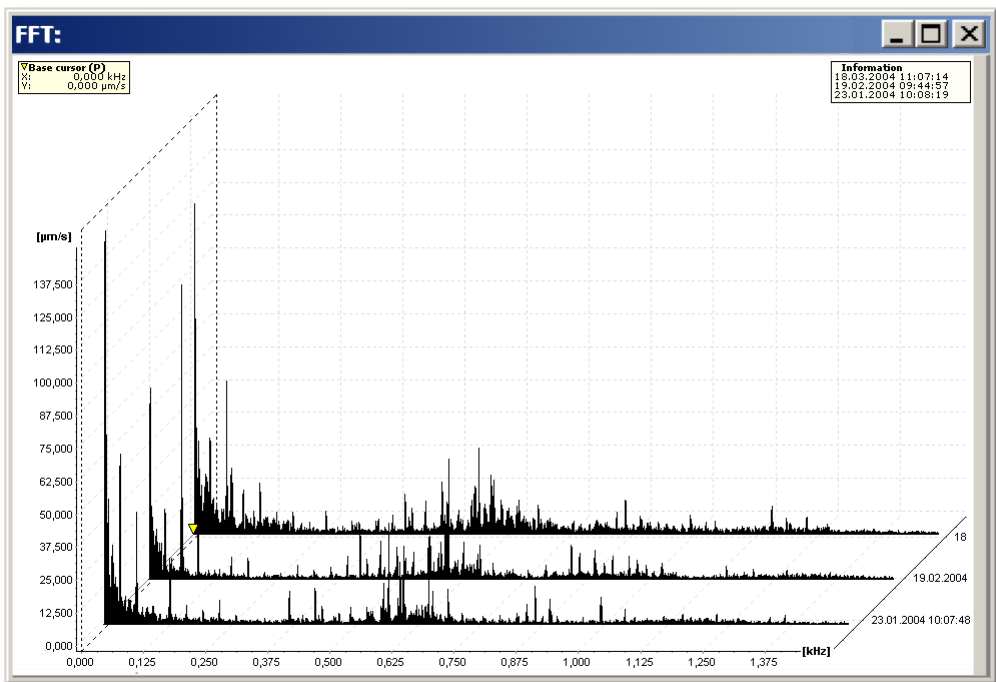
You can configure the display under **FFT settings** with **Display mode**.

Display mode

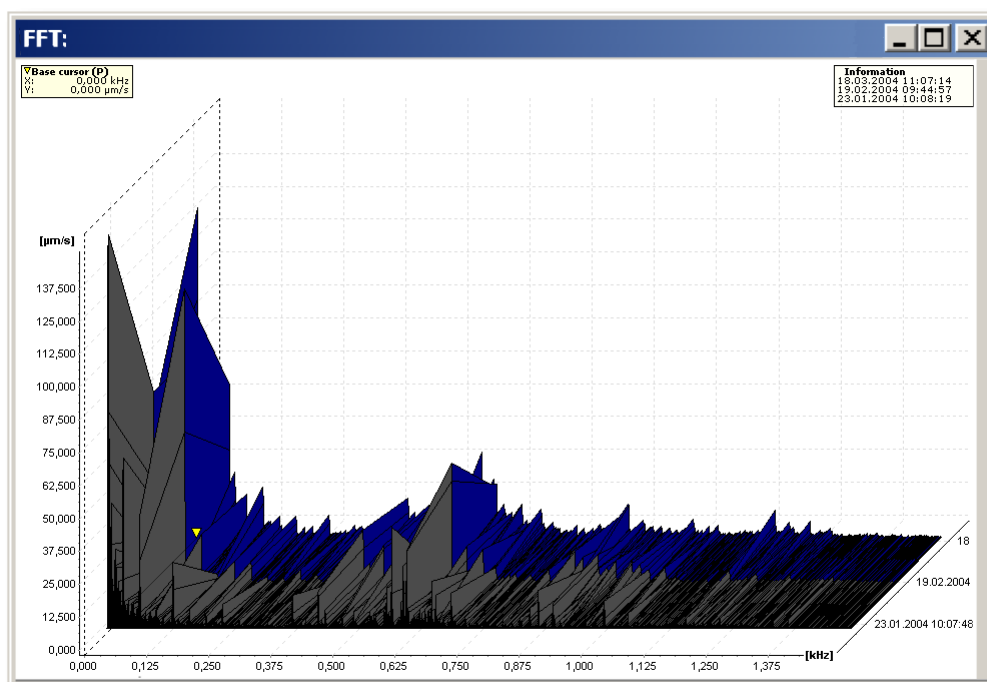
- **2D stacked (only in case of multiple diagrams):** The diagrams are displayed two-dimensionally with separate axes on top of each other.
- **2D stacked (only in case of several diagrams):** The diagrams are displayed in a diagram with the same axes.
- **3D Wireframe:** The diagrams are displayed spatially behind each other, sorted by date (the "oldest" value at the front). The order of the curves can be changed by pressing CTRL+F.



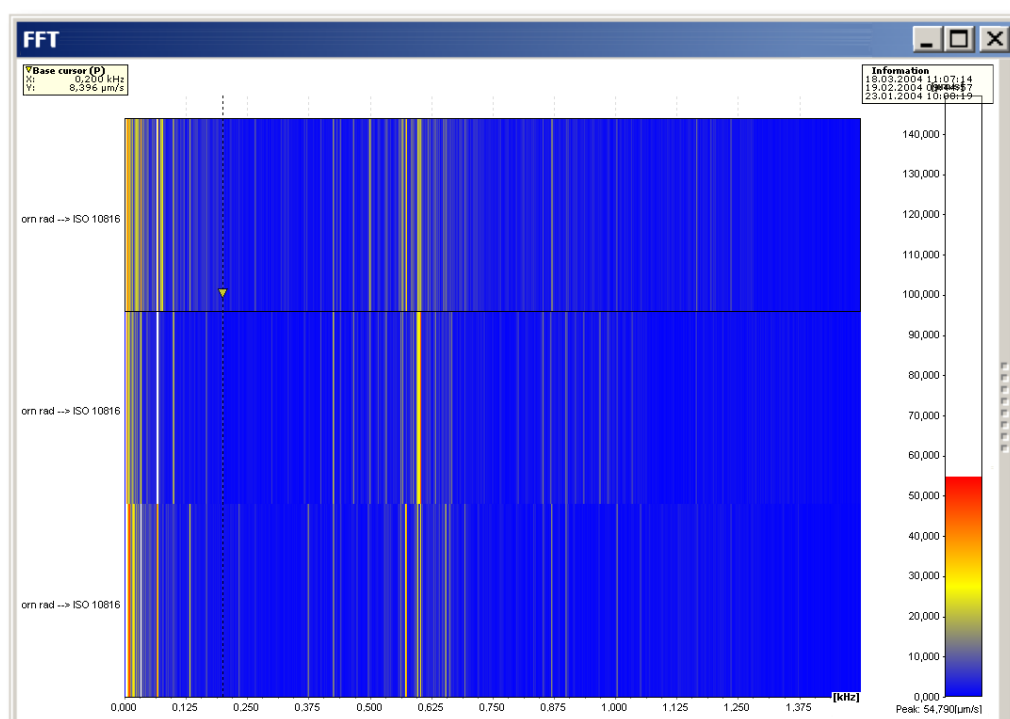
- **3D Area:** The surfaces under the signal curves are displayed in a completed fashion. The order of the curves can be changed by pressing CTRL+F.



- **3D Mountains:** For this type of display, the surfaces under the signal curves are displayed in a completed fashion. In addition, the peaks between the individual diagrams are connected by planes. The order of the curves can be changed by pressing CTRL+F.



- **Sonogram:** For this type of display, the diagrams are displayed as coloured surfaces on top of each other in which the signal values are indicated as a colour value. This type of display is especially well-suited for comparing a large number of measurements across a long timeframe. Here, the sonogram makes it easy to recognize whether a machine is running at a decreasing speed in a resonance range. If the speed is dropping, the peaks of the FFT will normally be smaller; in the resonance range they will be larger.



The assignment of colours to signal values can be changed in the colour scale on the right-hand side of the window. Click and hold down the mouse button in the colour scale and drag the coloured bar up or down. The diagram is updated in real time. In this way you can quickly distinguish relevant areas for your analysis.

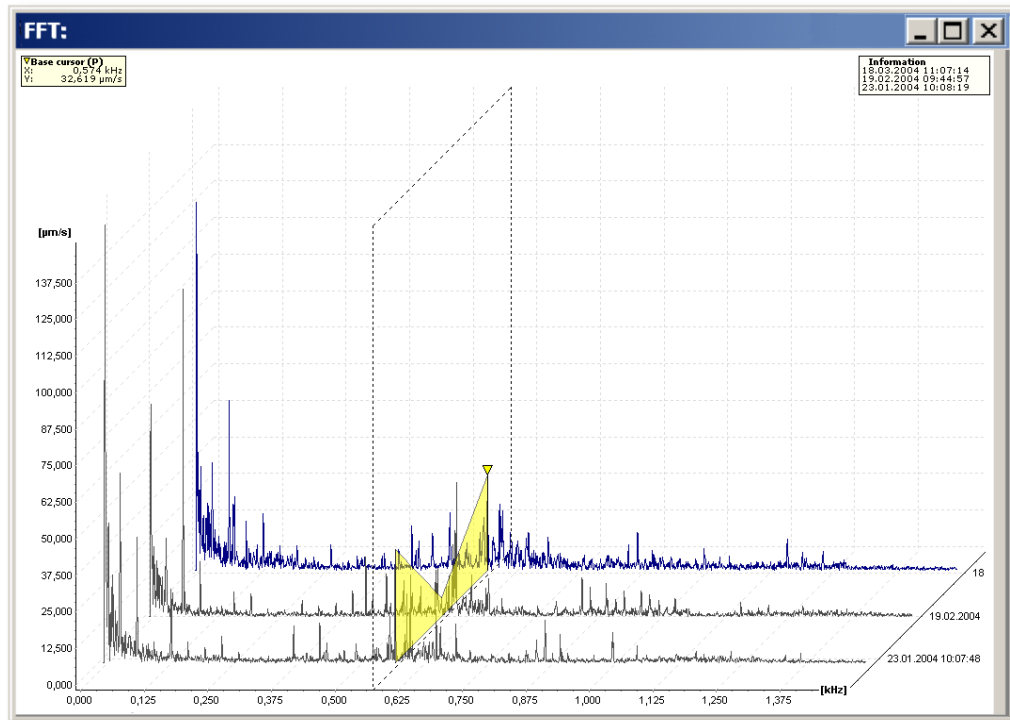
Using zoom and cursor tools

In the waterfall diagram you have the same zoom and cursor tools as for two-dimensional diagrams (for more on this,

see Zoom tools [166]/cursor tools [168]). If multiple diagrams are displayed, you can select the signal you would like to edit with the cursor tool in the **Signal selector**.



Click the preferred signal. The signal you have chosen is highlighted by the cursor signal (yellow triangle). As soon as you have positioned the basis cursor on a diagram value, the corresponding values are connected in the other diagrams by a transparent yellow plane.



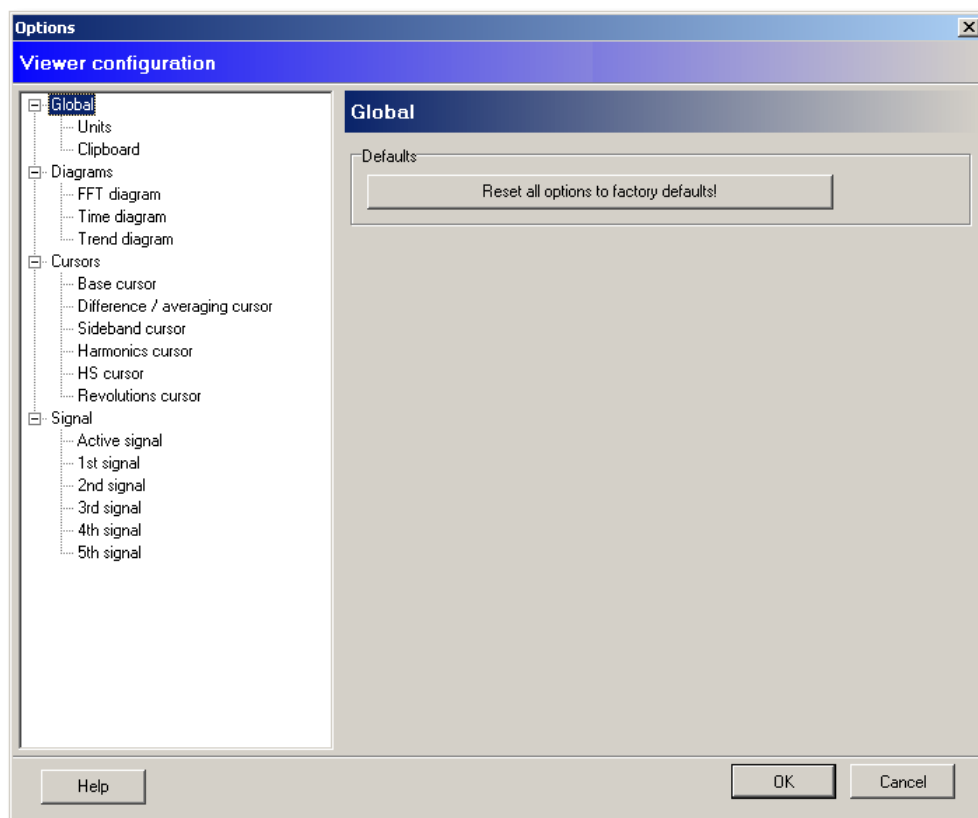
6.3.13 Program settings

To edit the program settings for the Viewer software, click **Options** in the **Extras** menu.

Modifying the global settings

You can restore the factory settings for the Viewer software using the **Global** dialogue window (status following initial installation of the software).

- Click on **Reset all options to factory settings!**
 - and confirm again with **OK**.
- The settings are reset.

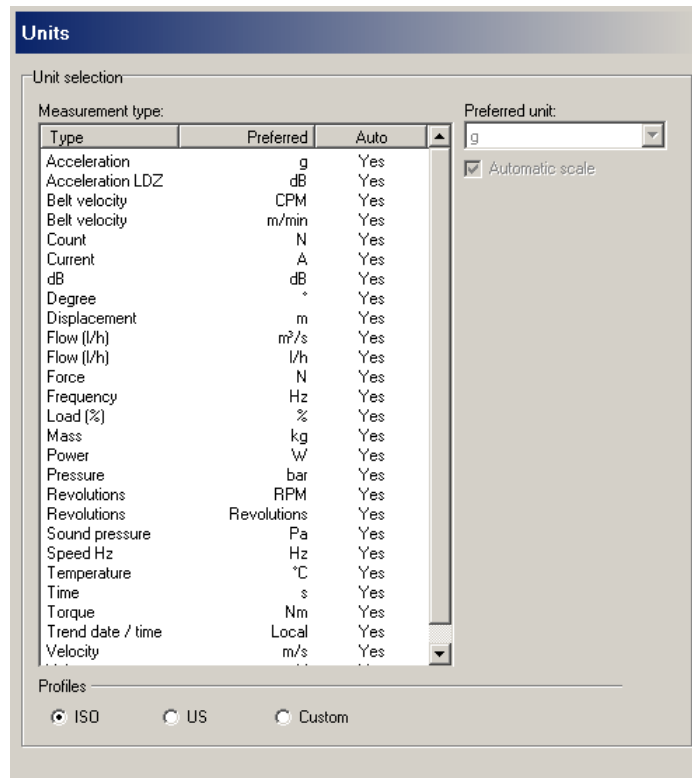


Units

In the **Measurement units** dialogue window, you can specify the options for scaling units used in the diagrams.

You can find an overview of all Measurement types used in **Unit selection**. The preferred unit and scaling information are also displayed. The preferred unit cannot be changed when using ISO and US units. Scaling is enabled by default in these profiles.

If you select "Custom" you can select the preferred unit depending on the measurement type and choose whether to scale this measurement type automatically.



1. Select the units profile.
- To set the preferred unit or automatic scaling,
2. select the "Custom" profile and
 3. edit the settings for separate measurement types.
 4. Click on **OK** to apply these settings.

Clipboard

You can select the options for transferring the diagrams to the clipboard in the **Clipboard** dialogue window.

1. Select the preferred dimensions for the diagram display in the **Diagram width** and **Diagram height** fields.
2. Activate the **Copy information text to clipboard** checkbox if you also wish the diagram title to be copied with the graphic.
3. Click on **OK** to apply these settings.

Modifying the diagram settings

In the **Diagrams** dialog you can specify whether new diagram windows are automatically displayed horizontally in the Viewer software.

1. You can specify whether diagrams belonging to the same data set should be identified using colour in the **Diagram grouping** field.
2. If required, activate the **Tile diagrams horizontally, if a new diagram is displayed** checkbox.
 - If this option is activated the software arranges the diagram windows horizontally (below one another) and the new diagram is opened at the lowest position in the diagram window.
 - If this option is deactivated, new diagram windows are cascaded.
3. Tick the **Calculate spectrum 'on-the-fly' if there is no spectrum available in database** checkbox in order to create a spectrum during the loading process.
4. Click on **OK** to apply these settings.

FFT diagram

You can select the various FFT diagram display options in the **FFT diagram** dialogue window.

1. You can specify the background colour for the FFT diagram in the **Visual options** field. You can also define here whether you wish the grid to be displayed in the background and also its colour.
2. In the **Integration** field you can specify the measuring point in the diagram from which the integration should be performed.

3. In the **Information bar** field you can specify what information (cf. Using the diagram information bar^[182]) to display when a new diagram is opened.
4. In the **Toolbar** field you can specify whether **Signal selection**, **Preview**, **Axis settings**, **FFT settings** and **Zoom tools** should be displayed when you open a new diagram.
5. Click on **OK** to apply these settings.

Time signal diagram

In the dialog window **Time signal diagram**, you can define certain options for displaying a time signal diagram.

1. The section **Display options** allows you to adjust the background colour of the time signal diagram. You can also define here whether you wish the grid to be displayed in the background and also its colour.
2. In the **Information bar** field you can specify whether **diagram information** and **comments** should be displayed when a new diagram is opened.
3. In the **Toolbar** field you can specify whether **Signal selection**, **Preview**, **Axis settings** and **Zoom tools** should be displayed when you open a new diagram.
4. Click on **OK** to apply these settings.

Trend diagram

In addition to the display settings already presented with the **FFT diagram** and the diagram information bar option the settings for the trend display and smoothing can also be specified in the Trend diagram^[194] dialogue window.

1. The section **Display options** allows you to adjust the background colour of the time signal diagram. You can also define here whether you wish the grid to be displayed in the background and also its colour.
2. In the **Trend display settings** field you can specify whether each characteristic value should be displayed in a separate diagram (**Stacked view**) or whether all characteristic values should be displayed in one diagram (**Overlapped view**).
3. You can specify which function and which period length should be used to carry out the smoothing calculation in the **Smoothing** field.
4. In the **Information bar** field you can specify whether **diagram information** and **comments** should be displayed when a new diagram is opened.
5. In the **Toolbar** field you can specify whether **Signal selection**, **Axis settings** and **Zoom tools** should be displayed when you open a new diagram.
6. In **Trend limitation for loading** you can configure the maximum number of recent trends and records to load.
7. Click on **OK** to apply these settings.

Modifying the cursor options

You can modify how each individual cursor is displayed in the dialogue windows for the various cursors.

1. Select the cursor you wish to modify from the list of cursors on the left.
2. Select the preferred cursor shape for the cursor specified above from the **Symbol** drop-down menu.
3. Select the symbol and **colour** to be used for the cursor as well as the colour for vertical cursor **line**.
4. Because the differential and averaging cursors work in pairs, you can also modify the appearance of the second cursor in this field accordingly.
5. Click on **OK** to apply these settings.

Modifying the signal settings

You can select measurement data display options in the signal dialogue windows.

1. If fewer than 50 measuring points are displayed in the diagram window, each measuring point can be made clearly visible as a dot. If greater than 50 measuring points are displayed in the diagram window, the display of individual measuring points is automatically deactivated and only the diagram of the function and not the measuring points remains visible.
2. Click on **OK** to apply these settings.

Active signal / 1st–5th signal

Under the signal options you can modify the display of the individual signals.

1. Select a **line type** for the signal from the drop-down menu.
2. Specify a **line width** for the signal in pixels from the field provided.
3. Click on the palette to select a **colour** for the signal.
4. Click on **OK** to apply these settings.



You can also apply these settings for additional signals.

6.4 Keyboard shortcuts

Cursor selection

Key	Function
F2	Activating the base cursor
F3	Activating the difference cursor
F4	Activating the RMS/AMV cursor
F5	Activating the harmonics cursor
F6	Activating the sideband cursor
F7	Activating the HS cursor (Harmonic with sideband)
F8	Activating the revolutions cursor

Move cursor

Key	Function
Cursor left	Moves the basic cursor left to the next measuring point
Cursor right	Moves the basic cursor right to the next measuring point
Cursor up	Moves the extended cursor left to the next measuring point
Cursor down	Moves the extended cursor right to the next measuring point
CTRL + cursor left	Moves the basic cursor to the first measuring point in the diagram
CTRL + cursor right	Moves the basic cursor to the last measuring point in the diagram
CTRL + cursor up	Moves the extended cursor to the first measuring point in the diagram
CTRL + cursor down	Moves the extended cursor to the last measuring point in the diagram
ALT + cursor left	Moves the basic cursor 10 measuring points to the left
ALT + cursor right	Moves the basic cursor 10 measuring points to the right
ALT + cursor up	Moves the extended cursor 10 measuring points to the left
ALT + cursor down	Moves the extended cursor 10 measuring points to the right
CTRL + K	Moves the cursor one micro step left (only for harmonics cursor if standard detection is enabled)
CTRL + L	Moves the cursor one micro step right (only for harmonics cursor if standard detection is enabled)
CTRL + D	Hides or shows the cursor
CTRL + P	Opens the dialog for numeric cursor positioning
CTRL + O	Opens the cursor options dialog

Zoom selection

Key	Function
F9	Activates free mouse zoom
F10	Activates horizontal mouse zoom
F11	Activates vertical mouse zoom
F12	Activates keyboard zoom

Keyboard zoom

Key	Function
CTRL + Q	Moves the start of the zoom area left
CTRL + W	Moves the start of the zoom area right
CTRL + A	Moves the end of the zoom area left
CTRL + S	Moves the end of the zoom area right
CTRL + Y	Moves the set zoom area left
CTRL + X	Moves the set zoom area right
CTRL + Enter	Displays the set zoom area
CTRL + Backspace	Displays the previous zoom area
CTRL + Space	Displays the whole diagram
CTRL + Z	Opens the dialog for numeric zoom area input

Diagram scrolling

Key	Function
CTRL + B	Moves the diagram display left
CTRL + N	Moves the diagram display right
CTRL + J	Moves the diagram display up
CTRL + M	Moves the diagram display down

Trend diagram

Key	Function
CTRL + H	Calls another record from the trend display
CTRL + G	Toggle axis view between "cascaded" and "tiled".

Other keyboard shortcuts

Key	Function
CTRL + R	Reset comment position
CTRL + U	Show/hide right info box at top edge of diagram.
CTRL + T	Show/hide toolbar
CTRL + I	Shows/hides the diagram information bar on the right edge of the diagram
CTRL + C	Copies a screenshot of the diagram to the clipboard

6.5 Carrying out a fault analysis

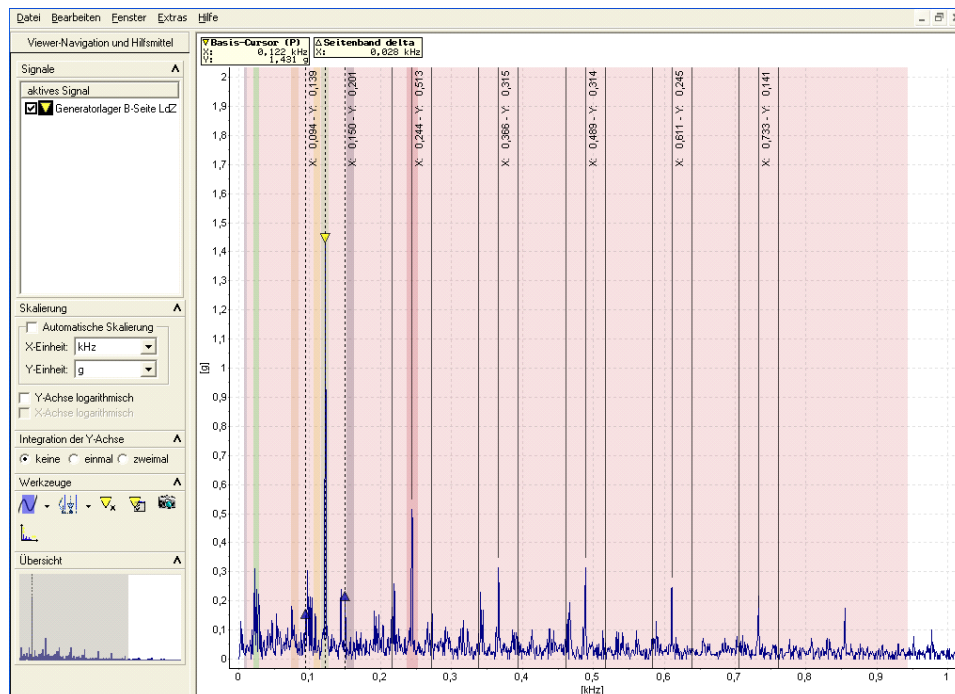
Principle of vibration analysis

Damage in machine components can be identified at an early stage by observing characteristic patterns in machine vibration frequency spectrums. Damage in the outer ring of a anti-friction bearing, for example, is characterized for example by increased amplitudes in the demodulation curve of the frequency spectrum for the characteristic frequency produced when rollers pass over a damaged part of the outer race (outer race overrun frequency) and for integer multiples of this frequency. The frequencies that characterize a damaged anti-friction bearing, i.e. the outer race, inner race, roller or cage frequencies, depend on the bearing geometry and are proportional to the speed.

In order to detect damage in the anti-friction bearing at an early stage, a vibration monitoring device must generate the demodulation curve of the frequency spectrum using the vibration signal and monitor amplitudes inside this spectrum for selected narrow-band frequency bands. At variable machine speed, frequency bands must be monitored speed dependent.

Fault analysis using defective inner race as an example

A vibration sensor monitors the acceleration that occurs at the bearing of a generator shaft. If the sensor sends a conspicuous signal the measurement data is analysed in more detail.

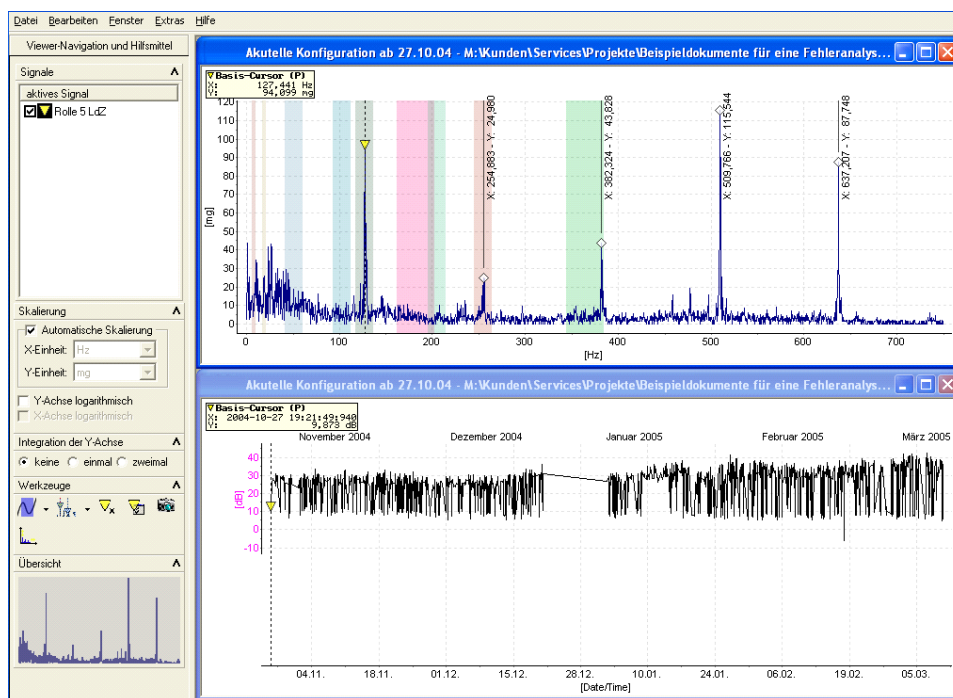


The spectrum and time signal of the demodulation curve at the bearing clearly show the frequency pattern of a defective inner race (harmonic with sidebands). The extent of the damage in an inner race can normally be established by determining how far the corresponding damage frequency is also evident in the raw signal.

Due to the clarity of the frequency pattern in the demodulation curve and the height of the amplitudes, it must be assumed in this case that the damage is advanced. The bearing was replaced at the next available opportunity.

Fault analysis case study using defective outer race as example

In the example that follows, both roller bearings are monitored by vibration sensors. A suspicious signal was received from the sensor on one side of the roller and a detailed analysis of the measurement data was subsequently carried out.



Fault analysis case study using defective outer race as example

The FFT diagram shows the typical pattern of outer race damage (harmonic of outer race damage frequency). Further, a noticeable rise in the trend progression of the demodulation curve is evident which indicates that the damage is progressive. In this case the relevant bearing should therefore be replaced at the earliest possible opportunity.

Fault analysis case study using imbalance as an example

Two vibration sensors monitor the accelerations present at the drive and output shaft of a generator coupling.



Fault analysis case study using imbalance as an example

Extremely powerful vibrations were registered at a specific speed frequency on the A side (upper FFT in Viewer) and the B side (lower FFT in Viewer). The corresponding speed for the revolutions cursor has been set in both diagrams.

The cause of the powerful vibrations in this case was an imbalance in the generator or generator coupling. The generator rotor was therefore rebalanced before damage to the components occurred.

7 The Remote Server

About the Remote Server

The Remote Server acts as a central monitoring point for several devices. It collects measuring data and messages sent by the connected devices as a result of specific events. Possible events in the device are the expiry of a timer, the existence of an alarm and overflow of the characteristic value memory.



Communication is always initiated by the devices, i.e. the Remote Server deals with incoming connection requests, receives the transmitted data and writes it into XML files on the local hard drive.

Data Link^[208] is responsible for transferring files from Remote Server to the CM database^[33]. It monitors the data directory on the Remote Server and transfers newly added files promptly to the database. The data can then be evaluated and visualized in the Configuration Manager^[34] or Viewer.

The Remote Server can establish connections via serial interfaces, modem/GSM modem or via a TCP/IP network and process these at the same time which means it can receive data simultaneously via the various communication channels selected. Further, the Remote Server logs communication, i.e. incoming connections, the event that led to the connection being established, alarm status and measuring data transmitted as well as interaction with the user.

The Remote Server supports two operating modes:

- In run mode messages and data are received from the connected devices.
- Idle mode Remote Server is inactive and can be configured.



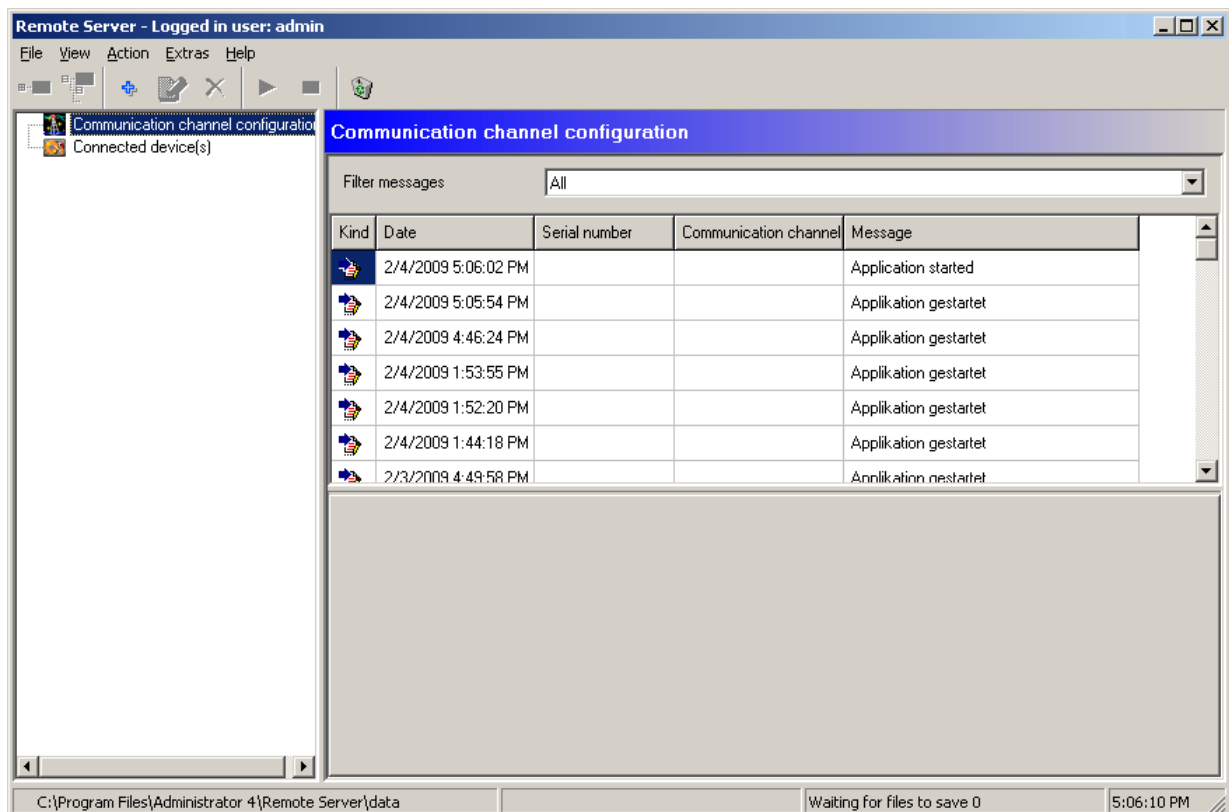
If the Remote Server is in run mode, a manual connection with devices cannot be established. The Remote Server must first be placed in Idle^[204] mode.

- To start the program, click **Start > Programs > FAG > Administrator > Remote Server**.



- *If you invoke the program from the command line with the `/start_remote_server` parameter, the program automatically starts up in run mode. Otherwise, you have to start run mode manually.*
- *Once the program has launched, the program icon is displayed in the taskbar information area. If you minimise the program window, you can maximise it again by double-clicking this icon.*

- If you have enabled the user management^[206], log in^[206] with your user name. The Remote Server is started.



The program window of the Remote Server is divided into three sections:

- Click the toolbar (directly below the menu bar) to call up the most important functions.
- The configured communication channels ^[202] as well as the file directories used by the Remote Server for the storage of data is displayed using a tree view similar to the standard Windows Explorer format in the left-hand section of the program window.
- On the right, Remote Server displays messages ^[205] for the channel currently selected or the connected device and displays information about both in the messages window.



You can only edit the configuration if

- *the program is not in rune mode and*
- *if the corresponding rights have been assigned for your user account (see "User management" ^[140]).*

Devices must be configured for remote operation before data can be received. This is carried out in three steps:

1. Configuration of communication ^[71];
2. Configuration of remote operation in the device configuration ^[71];
3. Configuration of monitoring configuration options ^[73].

You can then configure the relevant communication channels ^[202] in the Remote Server to receive data.

7.1 Configure communication channels

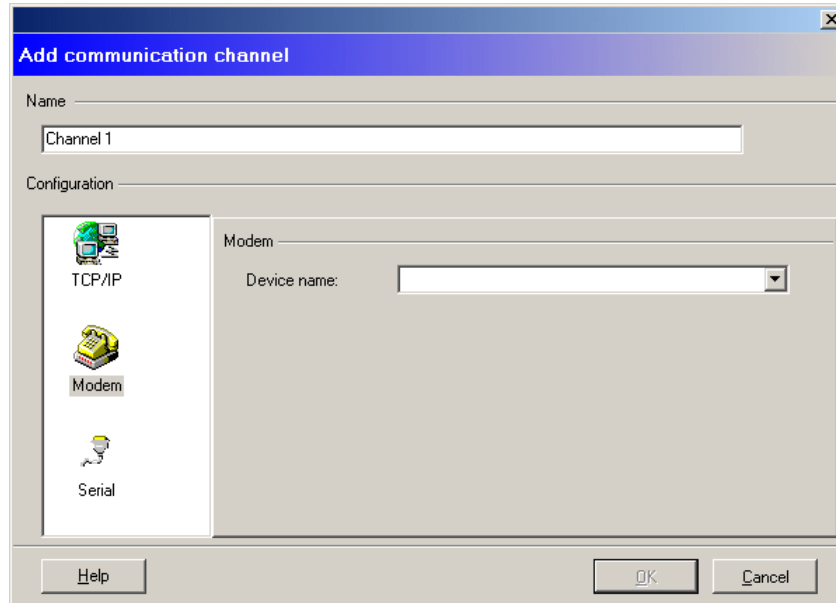


The Remote Server only accesses correctly installed and configured devices for the various communication channels. You should therefore ensure that the necessary hardware (modems or network cards, for example) has been properly set up on your system.

Add communication channel

- Click on  in the toolbar.
- Or:

- Click **Add communication channel** in the **Action** menu.



You can set up a direct serial connection as follows:

- Click **Serial**.
- Select the serial interface for connecting the device to the Remote Server at **Port name**.
- Select the baud rate to be used for communication between the Remote Server and the device from the "**Baud rate**" list box. Make sure that the same baud rate for the Remote Server and the connected device is set.
- Enter a designation for the communication channel in the **Name** input field and click **OK**.

Set up a TCP/IP network connection as follows:

- Click **TCP/IP**.
- Enter the number of the port via which the Remote Server is to accept incoming connections at **Port**. The port number must correspond to the number you specified in the communication settings for the device when configuring the COM Server for the Socket Client.
- Enter a designation for the communication channel in the **Name** input field and click **OK**.

You can set up a modem connection as follows:

You can use a landline or GSM mobile radio modem on the Remote Server.


- Click **Modem**.
- Select the preferred modem from the list of **device names**.
- Enter a designation for the communication channel in the **Name** input field and click **OK**.



- *Mobile radio modems can only be used, however, if no PIN is required to accept incoming calls.*
- *If a TAPI driver is not available from the manufacturer of the GSM modem, install a standard 9600 baud modem driver instead. For details on setting up a modem please refer to the Windows documentation.*

Edit communication channel

You can edit an existing communication channel as follows:



- Stop the Remote Server if required.
- Click the corresponding entry in the **Communication channel** configuration list.
- Click on  in the toolbar.

Or:

- Click **Edit communication channel** in the **Action** menu.

Delete communication channel

You can delete an existing communication channel as follows:

- Stop  the Remote Server if required.
- Click the corresponding entry in the **Communication channel** configuration list.
- Click on  in the toolbar.

Or:

- Click **Delete communication channel** in the **Action** menu.

7.2 Data directory

Select the directory in which you want the Remote Server to save the files.



The data directory

- is in the program directory of the Administrator software by default, in "Remote Server > Data".
- *must match the import directory configured in Data Link.*

Select data directory

- Click **File > Change data directory**.
- Select a data directory.
- Click **OK**.

7.3 Start/stop run mode



You can easily see the operating state of the program even if the program window is minimised. The program icon in the taskbar information area changes colour depending on the state of the program: the red square symbolises idle mode and the green arrow run mode. These icons are also found in the program toolbar to start and stop run mode.

Start Remote Server (run mode)

The Remote Server must be started once configuration is complete in order to activate the remote monitoring.

- Click on  in the toolbar.

Or:

- Click **Start server** in the **Action** menu.

Once the Remote Server has started the "Online Monitoring" window which contains the activated "Messages" tab is displayed. All Remote Server operations are logged in this tab. The following messages in particular are displayed here:

- start and stop of Remote Server,
- when connections were accepted by devices,
- reason for the remote message - i.e. which event in the device triggered the remote message,
- which data were transferred,
- error messages and irregularities that interfere with remote operation.



To start the run mode the user currently logged in must have the required access rights (see "User management" ^{14b}). After entering run mode the current user is logged off.

Stop Remote Server (idle mode)

You can stop the Remote Server as follows:

- Click on  in the toolbar.

Or:

- Click **Stop server** in the **Action** menu.



To stop the run mode the user currently logged in must have the required access rights (see "User management" [140]).

7.4 Messages

Display messages

The Remote Server loads existing messages and displays them in a list in the message window. The following information is also displayed in the message window:

- The corresponding settings if a communication channel is selected in the tree view,
- the serial number of the corresponding device when a connected device is clicked.

Communication channel configuration				
Filter messages		All		
Kind	Date	Serial number	Communication channel	Message
	2/4/2009 5:06:02 PM			Application started
	2/4/2009 5:05:54 PM			Applikation gestartet
	2/4/2009 4:46:24 PM			Applikation gestartet
	2/4/2009 1:53:55 PM			Applikation gestartet
	2/4/2009 1:52:20 PM			Applikation gestartet
	2/4/2009 1:44:18 PM			Applikation gestartet
	2/3/2009 4:49:58 PM			Applikation gestartet

The existing messages displayed in the Remote Server message window are always the messages for the communication channel or device currently selected:

Display messages for communication channels

- To display existing messages for all communication channels click the **Communication channel configuration** root element in the tree view.
- To display messages for one communication channel only click the corresponding channel in the tree view.

Show messages for connected devices

- To display all existing messages for all connected devices, click the **Connected device(s)** root element in the tree view.
- To display messages for one device only, click the corresponding device in the tree view.

Filter messages

You can filter messages and display them by specific channels or directories:

You can select the following options in **Filter messages**

- **All messages**, to display all messages;
- **Progress**, to display status messages only;


- **Error**, to display error messages only.



Please note that only the messages currently displayed are filtered. For example, if you select a channel in the tree view, the message window only displays messages for this channel and it therefore follows that only these messages are filtered!

Clear messages

You can use this function to delete all accumulated messages.

- Click on  in the toolbar.
- Or:
- Click **Clear messages** in the **Action** menu.

7.5 User management

About user management in the Remote Server

The Remote Server does not have its own user management system and can be used without permissions. However, you can use the users created in a CM database to control use of the Remote Server and of the Configuration Manager.

The Remote Server creates a local copy of the selected user database. If you edit the permissions in the original database – e.g. create new users or edit permissions – you must therefore update the user management in the Remote Server (see "Reload user" ^[206]).

Selecting a user database

- Click **Select user database** from the **Extras** menu and select the appropriate CM database (see also "The database" ^[33]).

Log in as / switch user

You can log in with another user name as follows:

- Click **Change user** in the **Extra** menu.

Select a log-in name from the list of users created in the user management ^[140], enter the password and click **OK**.

Log off as user

- Click **Logout user** in the **Extra** menu.

Refresh user

- Click **Refresh user** in the **Extras** menu to synchronize the user management with the original database.

7.6 Change language

The Administrator software can be displayed in German, English and Chinese. If you select a different language, the software restarts automatically.

You can change the language as follows:

- Click **Change language** in the **Extras** menu.

- Select the preferred language for the program and click **OK**.
- Click **Yes** to close the program.

The program is started in the newly selected language.

7.7 Close

To close the program click **File > Close**.



You can only close the program when it is not in run mode. To stop the run mode the user currently logged in must have the required access rights (see "User management" ^{14b}).

8 Data Link

About Data Link

Data Link imports the files saved by the Remote Server^[20] in a CM database^[33]. To do so, enter a directory for Data Link to monitor. This import directory is read at program start-up and after each data import. If there aren't any new data to import, Data Link checks the directory once a minute.

In addition, the program can

- export data in ASCII format, and
- send e-mails automatically to a specified address as soon as new data have been imported.

To activate automatic e-mailing, you must configure Data Link accordingly (see "Configure e-mailing"^[21]).

Data Link has two operating states:

- Run mode fills the selected database with data from the Remote Server and sends e-mails, providing the corresponding settings have been made.
- In idle mode, Data Link is inactive and can be configured.

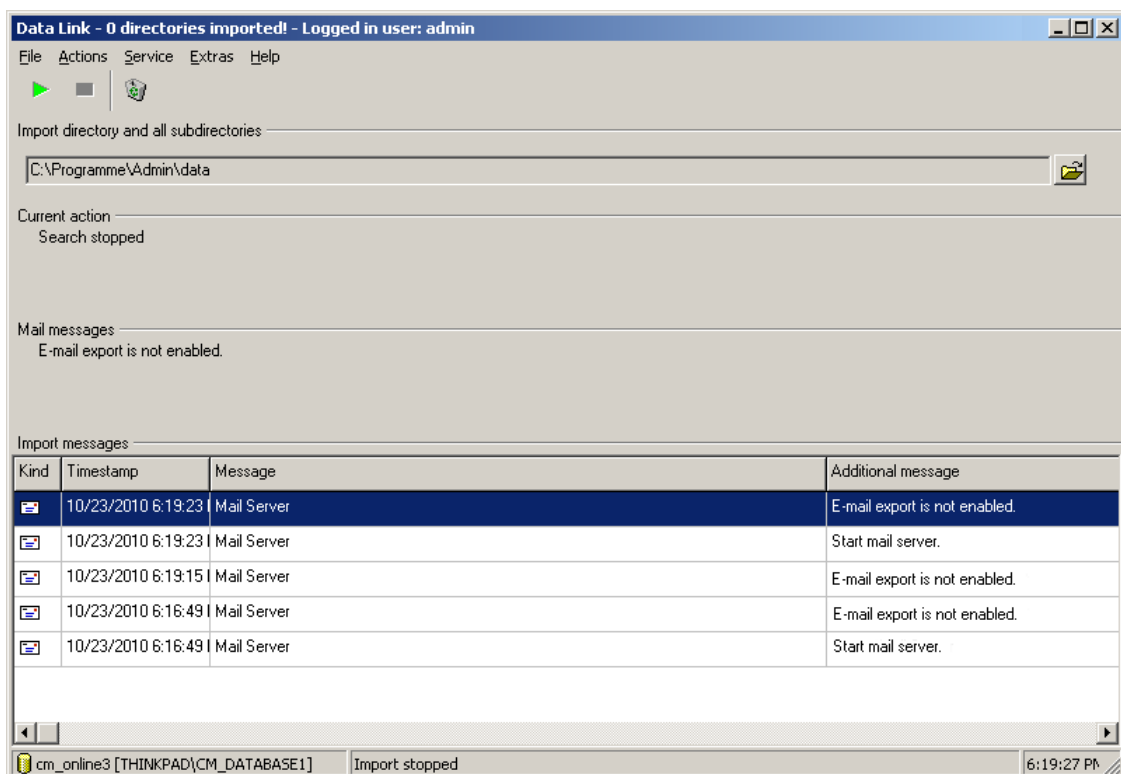
Start Data Link as follows

- Click **Start > Programs > FAG > Administrator > Data Link**.

Data Link connects with the last database used. If you installed a database during software installation, the program automatically connects to this database when you start the program for the first time. The program uses the default user name and the default password. Further information can be found in "Change CM database"^[35].





- *If you invoke the program from the command line with the `/start_import` parameter, the program automatically starts up in run mode. Otherwise, you have to start run mode manually.*
- *Once the program has launched, the program icon is displayed in the taskbar information area. If you minimise the program window, you can maximise it again by double-clicking this icon.*




The Data Link program window is divided into the following sections:

- Click the **toolbar** (directly below the menu bar) to call up the most important functions.
- Below you can define the import directory monitored by Data Link **Define import directory**.

- **Current action** displays the action currently being performed in run mode and the current state of Data Link.
- The section **Import messages** displays import events. These messages are also saved in the program's log directory . Call up the context menu to copy the messages to the clipboard and paste them in a text editor. Click  on the toolbar to delete the list of messages.



You can only edit the configuration if


- *the program is not in run mode and*
- *if the corresponding rights have been assigned for your user account (see "User management" .*

8.1 Working with directories




If you add a directory containing data that cannot be imported by Data Link (e.g. program directories), this data is moved into a separate directory and Data Link outputs an appropriate message. You should therefore make sure that the directories you add only contain data that can be imported by Data Link!

Select import directory

- Click  in the Import directory section.
- Select an import directory and
- click **OK**.



The import directory

- *is in the program directory of the Administrator software by default, in "data\[version_number] \app_standard\remote_data".*
- *must match the data directory  specified in the Remote Server.*

8.2 Change CM database

Select the database:

- Click on **File > Open database**.

Or:

- Click **File > Database history** to select a database from the list of recently opened databases.

The subsequent procedure is described in "Select database .



The selected database is displayed on the status bar.

8.3 Start/stop run mode



You can easily see the operating state of the program even if the program window is minimised. The program icon in the taskbar information area changes colour depending on the state of the program: the red square symbolises idle mode and the green arrow run mode. These icons are also found in the program toolbar to start and stop run mode.

Start run mode

Proceed as follows to put Data Link into run mode:

- Click on  in the toolbar.

Or:

- Click **Start** in the **Action** menu.
- Data Link enters run mode.



To start the run mode the user currently logged in must have the required access rights (see "User management" ¹⁴⁰). After entering run mode the current user is logged off.

Stop run mode

If you wish to change the Data Link configuration, you must first stop run mode. To do this proceed as follows:

- Click on  in the toolbar.

Or:

- Click **Stop** in the **Action** menu.

Data Link enters idle mode.



To stop the run mode the user currently logged in must have the required access rights (see "User management" ¹⁴⁰).

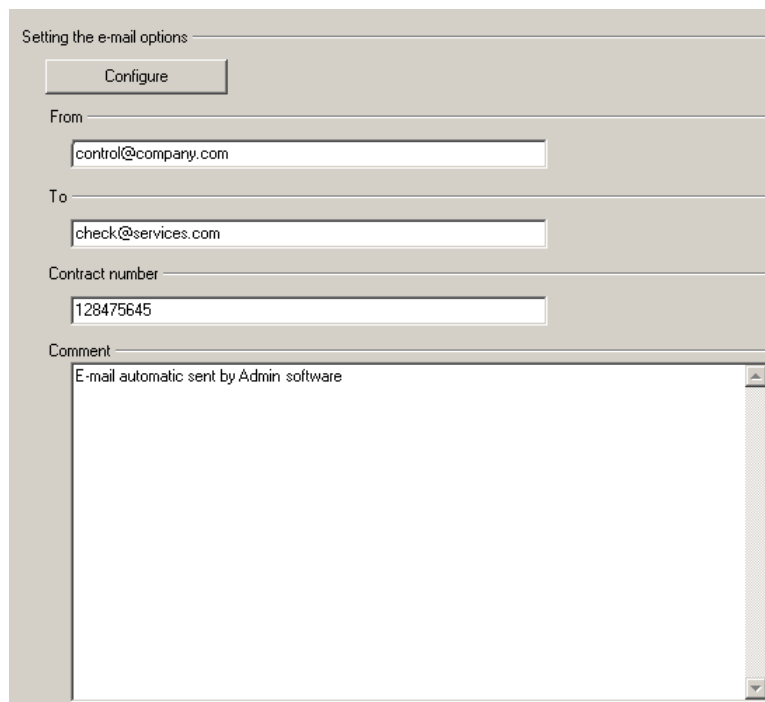
8.4 Configure automatic e-mailing

If you want Data Link to send an e-mail automatically as soon as data are imported from the import directory, you must configure and activate automatic e-mailing. You can also configure whether to send an e-mail only in the event of an alarm or, optionally, with the imported alarm data.

Configure e-mailing

You can configure the dispatch of e-mails as follows:

- Click **Options** in the **Extras** menu.
- Select **Send e-mail**.
- Click **Configure**.



- The "Configure" button opens the "E-mail options settings" dialog box where you can select and configure the method used to send e-mails.
- Please enter a valid e-mail address in the input box labelled "From" as the mail account to use for sending.
- The e-mail address of the recipient is entered in the "To" input field.
- Please enter the number of your service contract at "Contract number", if applicable.

- You can also enter a custom text "Comment" input box to append to the e-mails created.
- Click **Configure** to set the protocol for the program to send e-mails.

Configure e-mailing

The program supports sending e-mails via **Microsoft Outlook**, **MAPI** or **SMTP**. To obtain the correct settings consult your network administrator.

- Select the transfer method.

If you are using the SMTP protocol, you must enter either the name or IP address of the e-mail server in "host". Optionally you can enter a user name and password for SMTP authentication. If you are using the TLS encryption protocol (SMTP via SSL), you must also configure the TLS port. In "Timeout" you can define a time range after which to automatically stop trying to make a connection.

- To test the connection to the mail server, click **Test connection**.
- Click **OK** to save the settings.



The Administrator software uses the separate E-MailRelay tool²³⁷ for SSL encryption. You can find this tool on the program CD.

If you want to use SSL encryption, you must enter the host of the E-MailRelay tool in SMTP. For details refer to the section **Configure e-mailing in the Administrator software**²⁴⁴.

Configure automatic e-mailing

You can configure automatic e-mailing as follows:

- Select **Automatic**.
- To activate the automatic e-mailing, select the **Automatically in remote service** option. As soon as the Data Link imports a directory, it sends an e-mail to the chosen recipient.
- In addition, you can limit e-mails to alarm events. To do so, select the **Only on alarms** option. Data Link now only sends an e-mail if the data in the imported directory contain an alarm.
- Select the **Send data** option to attach the file that triggered sending the e-mail.

- Click **OK** to save the settings.

8.5 Enable automatic data export (ASCII)

During the automatic export of data, all data sets added to the database are also exported to the specified directory.

ASCII export for Dtect X1s data

During the ASCII export for Dtect X1s data, a separate file is generated consisting of a header segment and a data segment for each existing data type. The header segment contains the measurement configuration data. The information is saved in the Windows INI file format. The measuring data is contained in the data segment. The file names are made up of the name of the measuring data and the file extension. The file extensions are assigned automatically according to data types. The file extensions and assignment to the corresponding data type are shown in the table below.

File extension	Data type
.X1AscActTime	Time signal
.X1AscActFFT	FFT
.X1AscAlarmFFT	Alarm FFT
.X1AscCharacteristics	Characteristic value data
.X1AscAlarms	Alarm data

ASCII export for ProCheck data

The ASCII export for ProCheck data creates a directory with a global unique identifier (GUID) for each export. This directory (e.g. {9ECEF3AA-1C3D-4137-9F44-EF56BD1A0281}) contains device information, configurations and measuring data in XML format.

Enable automatic ASCII export as follows

- Click **Options** in the **Extras** menu and then **Export**.
- Check the **Enable automatic ASCII export** checkbox and select the target directory in **Export path**.

Once new data are delivered by the remote server, they are automatically saved to the selected directory in ASCII format.

8.6 Change user

You can log in with another user name as follows:

- Click **Change user** in the **Extra** menu.

The screenshot shows a 'Login dialog' window. It contains a 'Database login' field with the text 'demo_online0 [P05055319\CM_DATABASE]' and a 'Change database' button. Below this is a 'User' dropdown menu currently showing 'admin'. There is a 'Password' field and a 'Change password...' button. At the bottom are 'OK' and 'Cancel' buttons.

Select a log-in name from the list of users created in the user management ^[140], enter the password and click **OK**.

8.7 Program settings

You can open the general program settings configuration window via the **Tools > Options** menu item.



To change the settings the user currently logged in must have the required access rights (see "User management" ^[140]).

A tree view is displayed on the left-hand side of the window and shows a range of configuration options arranged in groups. You can expand the view and configuration options by clicking the symbols in front of the groups. Information on the individual configuration options is provided or input masks are displayed on the right-hand side of the window.

General


The Administrator software can be displayed in German, English and Chinese. If you select a different language, the software restarts automatically.

Limit daily runtime

You can use the runtime limit to define up to three time ranges in which the component should be active. Outside of the defined time ranges the software component is inactive and the message "Process sleeping" is displayed in the overview. The option "All day long" is selected by default.

Activate automatic user login

Whenever you start the software, the program prompts you for your user name and password. You can skip this step by configuring an auto-login for automatic user login.

- Select a user to log in automatically and enter the password.
- Click on the check mark  to check the user data.

Next time you launch the software, you will be automatically logged in with the configured user data.

Database

You can configure the database history and display information about the selected database here.

History

If this option is selected a list of all databases opened to date is displayed on the right. The entries in this list are the one used to open databases from the **File > Open database** menu. You can also use this option to delete entries in this list for clarity of overview.

To delete an alarm list entry:

- Select one or (by holding the CTRL key down) multiple items from the list and
- press the **Delete item** button to start the deletion operation.

Miscellaneous

The following information about the CM database being used is displayed:

- Name of the database server
- Name of the database
- Used memory
- Free memory

The ratio of free to used memory is also presented as a diagram.



The free memory display and the diagram can only return plausible information if the database and database server are on the same system.

Export

The automatic export of data in ASCII format is configured and activated in this window. Further information is described in "Configure automatic ASCII export" ^[210].

Send e-mail

The automatic export of data via e-mail is configured and activated in this window. Further information is described in "Configure e-mailing" ^[210].

Contact

Our address, telephone and fax number as well as our e-mail and Internet address are provided here.

8.8 Use Application Guard

By default, the FAG Administrator software is delivered with Application Guard. Application Guard automatically monitors in the background whether a running program component of the FAG Administrator software is working properly. For example, if a program does not respond for 10 minutes, Application Guard restarts it. This function is particularly useful for programs that are permanently in run mode, for example Data Link or Email Link.

The following options are available:

- **Start Application Guard** Select the option **Application Guard** in **Extras > Application Guard**.
- **Check Application Guard:** Select the option **Check Application Guard** in **Extras > Application Guard**.
- **Stop Application Guard** Select the option **Stop Application Guard** in **Extras > Application Guard**.



Application Guard uses port 11111. Please make sure that this port is open in the computer's firewall. If necessary, ask your system administrator.

8.9 Close

To close the program click **File > Close**.



You can only close the program when it is not in run mode. To stop the run mode the user currently logged in must have the required access rights (see "User management" ^{14b}).

9 Email Link

About Email Link

You can use Email Link to receive and manage e-mails centrally, for example e-mails sent from Data Link^[208], Configuration Manager^[34] or Administrator. The data contained in the e-mails is written into the selected CM database. You can use a Microsoft Outlook account or a POP3 account on a mail server. To obtain the correct settings, please consult your network administrator.

Email Link has two operating states:

- Run mode checks the specified e-mail account at regular time intervals.
- In idle mode, Email Link is inactive and can be configured.



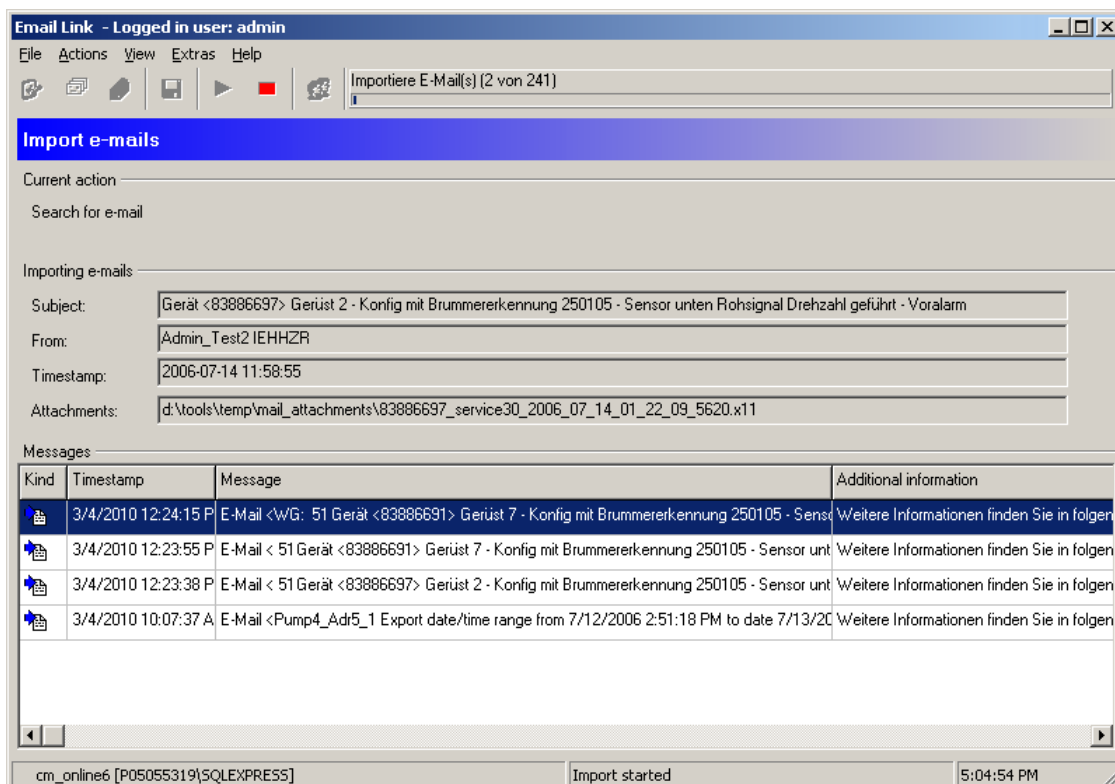
You can use the runtime limit to define up to three time ranges in which the program should be active in run mode. Outside of the defined time ranges it is inactive and the message "Process sleeping" is displayed. This function is found in "Options" in the "Extras" menu.

- To start the program, click **Start > Programs > FAGEmail Link > Administrator > .**

Data Link connects with the last database used. If you installed a database during software installation, the program automatically connects to this database when you start the program for the first time. The program uses the default user name and the default password. Further information can be found in "Change CM database"^[35].





- *If you invoke the program from the command line with the /start_import parameter, the program automatically starts up in run mode. Otherwise, you have to start run mode manually.*
- *Once the program has launched, the program icon is displayed in the taskbar information area. If you minimise the program window, you can maximise it again by double-clicking this icon.*



The Email Link program window is divided into the following sections:

- Click the **toolbar** (directly below the menu bar) to call up the most important functions. If you import data from the received e-mails, a progress bar is displayed on the right of the toolbar.
- **Import view** is displayed when you launch the program. The current status of Email Link and other information

about data import are displayed here. Import events are logged in "Messages". These messages are also saved in the program's log directory^[246]. To clear the list of messages, click **Clear messages** in the **Actions** menu.

- **Configuration view**  displays the available Receive options^[217]. You can configure e-mail receipt and test the transfer channel here.
- The e-mails received are displayed in a list in the Email Link **mailbox** .



You can only edit the configuration if

- *the program is not in rune mode and*
- *if the corresponding rights have been assigned for your user account (see "User management"^[140]).*

Log file for data import

The Administrator software logs information about import processes in separate log files.

- Click **Show import logs** in the **Action** menu.

Provides an overview of all import processes.


Import logs

Import filter


All logs

Mark all read

























Help



Click this icon in the table to see more import informations.






Click this icon to open the import log file.

No.	Read	Stat	Ver	Start date	Details	Message	Dev	Im	Devices	Igno	Devi	Measuring	Impo	Igno	Filen
1			4.x	1/31/2012 3:54:00 PM		Import terminated: 1/31/2012 3:54:02 PM 1	0	0		0		0	0	0	
2			4.x	1/31/2012 3:12:48 PM		Import terminated: 1/31/2012 3:12:55 PM 7	1	1	'Check 2 (16ch)' [11117707]	0	6	0	6	0	
3			4.x	1/31/2012 2:58:14 PM		Import terminated: 1/31/2012 2:58:20 PM 6	1	1	'Check 2 (16ch)' [11117707]	0	6	0	6	0	
4			4.x	1/31/2012 2:14:47 PM		Import terminated: 1/31/2012 2:15:02 PM 14	2	2	'Check 1 (16ch)' [11035761], ...	0	6	6	0	0	
5			4.x	9/20/2011 4:08:46 PM		Import terminated: 9/20/2011 4:09:14 PM 27	2	2	'2ch device Example of an outer	0	0	0	0	0	
6			4.x	9/2/2011 11:47:14 AM		Import terminated: 9/2/2011 11:47:25 AM 11	1	1	'Check 1 (16ch)' [11035761]	0	0	0	0	0	

Close

Using the import filter you can filter processes by "All logs", "Successful imports" and "Not successful imports". The following information is displayed:

Field name	Meaning
Read	Import message already read can be ticked. Press the "Mark all as read" button to select all messages. You can automatically delete these messages when you close the import log.
Status	<div> <div>The import status is displayed with the following icons:</div> <div>  Import was successful, all data were imported. </div> <div>  Import was successful, but not all data were imported or the timestamp of the data was changed. </div> <div>  Import failed, no data were imported. </div> </div>
Version	The Version field contains information about the Administrator software version of the imported data.
Start date	The Start date field contains information about the day and time the import was started.
Details	Click this icon to display further details about the import process.
Message	The Message field contains information about the day and time and how long the import took.
Devices (imported, ignored)	This field contains the number, name and serial number of the device data to import. It also displays the number of devices imported and ignored.
Measuring data (imported, ignored)	This field contains the number of measuring data to import. It also displays the number of measuring data imported and ignored.
File	Click this icon to display the import log file in a text editor.

9.1 Define receive settings

Change to the configuration view to set the receipt options:

- Click on  in the toolbar.

Or:

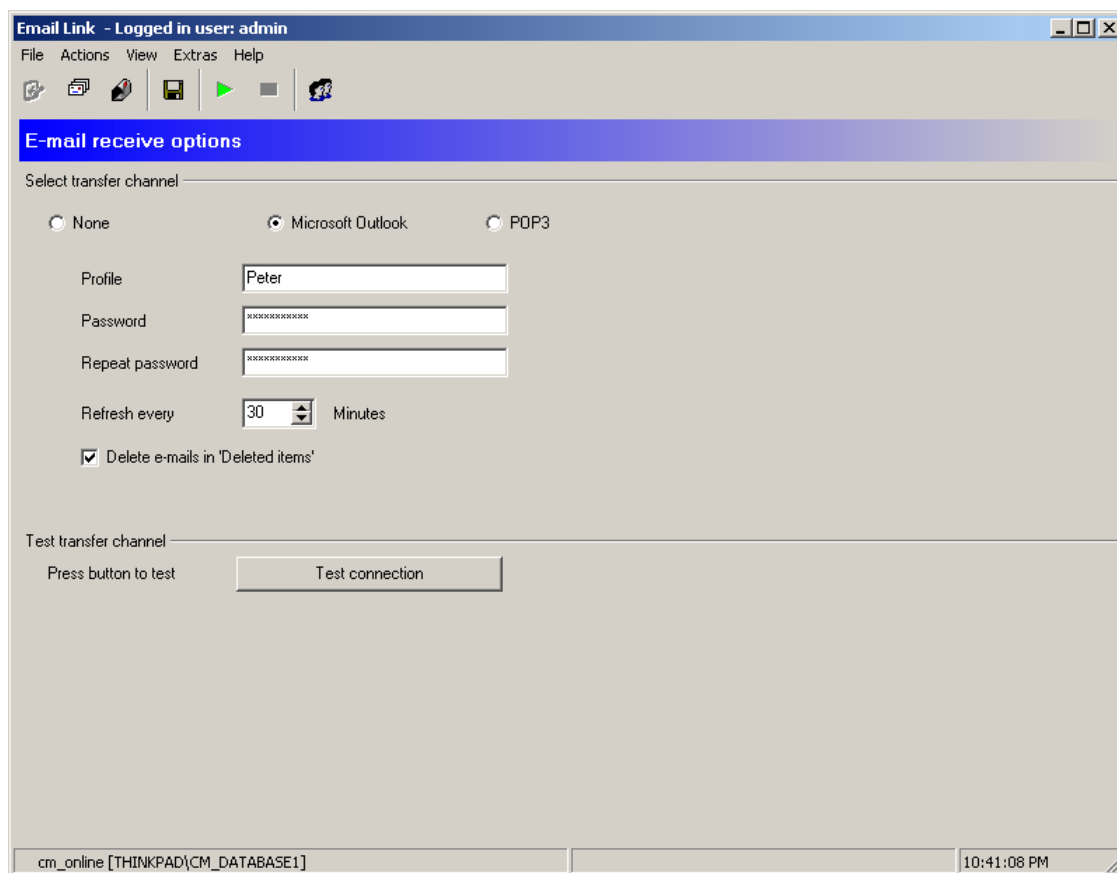
- Click **Configuration** in the **View** menu.

You can now specify the protocol used to receive e-mails. The program supports the **Microsoft Outlook** and **POP3** protocols. Both transfer modes download e-mails from the mail server. If Email Link has imported e-mails or if you have manually deleted e-mails in the mailbox, they are deleted from the POP3 server. In Microsoft Outlook, in contrast, they are moved to "Deleted Objects" and must be deleted manually. To obtain the correct settings consult your network administrator.

- Select the transfer mode:

Microsoft Outlook transfer mode

- Click "Microsoft Outlook" in transfer mode.



The screenshot shows the 'Email Link' application window with the title 'Email Link - Logged in user: admin'. The menu bar includes 'File', 'Actions', 'View', 'Extras', and 'Help'. The toolbar contains several icons. The 'E-mail receive options' dialog is open, featuring a 'Select transfer channel' section with three radio buttons: 'None', 'Microsoft Outlook' (selected), and 'POP3'. Below this are input fields for 'Profile' (containing 'Peter'), 'Password' (masked with 'XXXXXXXXXX'), and 'Repeat password' (masked with 'XXXXXXXXXX'). A 'Refresh every' section has a spinner box set to '30' and the unit 'Minutes'. A checkbox labeled 'Delete e-mails in 'Deleted items'' is checked. At the bottom, there is a 'Test transfer channel' section with a 'Press button to test' label and a 'Test connection' button. The status bar at the bottom shows 'cm_online [THINKPAD\CM_DATABASE1]' and the time '10:41:08 PM'.

- Enter the MS Outlook **profile** from which to receive e-mails.
- Enter your password for MS Outlook in **Password**.
- Confirm the password in **Repeat password**.
- Select the interval at which to retrieve e-mails from the mail server in **Refresh every x minutes**.
- If you are using a Microsoft Outlook account, the E-mail link can delete the E-mails in Outlook's "Deleted Objects" folder after downloading them. Check the **Delete E-mails in 'Deleted Objects'** checkbox to do so.



Please note the following:

- Outlook always uses the current Outlook user profile of your system.
- If you have defined a default profile in Outlook, the default profile is always used regardless of which profile you specify in Email Link. So if you wish to use a profile in Email Link, there must not be a default profile defined on the local computer!
- Only local e-mails can be retrieved from the main Outlook e-mail folder (subfolders are not read).
- The following message may be displayed in run mode: "A program is trying to access e-mail addresses you have stored in Outlook. Do you want to allow this?". In this case you can allow access for a certain time. If this is not sufficient, please contact Microsoft Support.

To save the configuration,

- click on  in the toolbar.

Or:

- Click **Save configuration** in the **Configuration** menu.

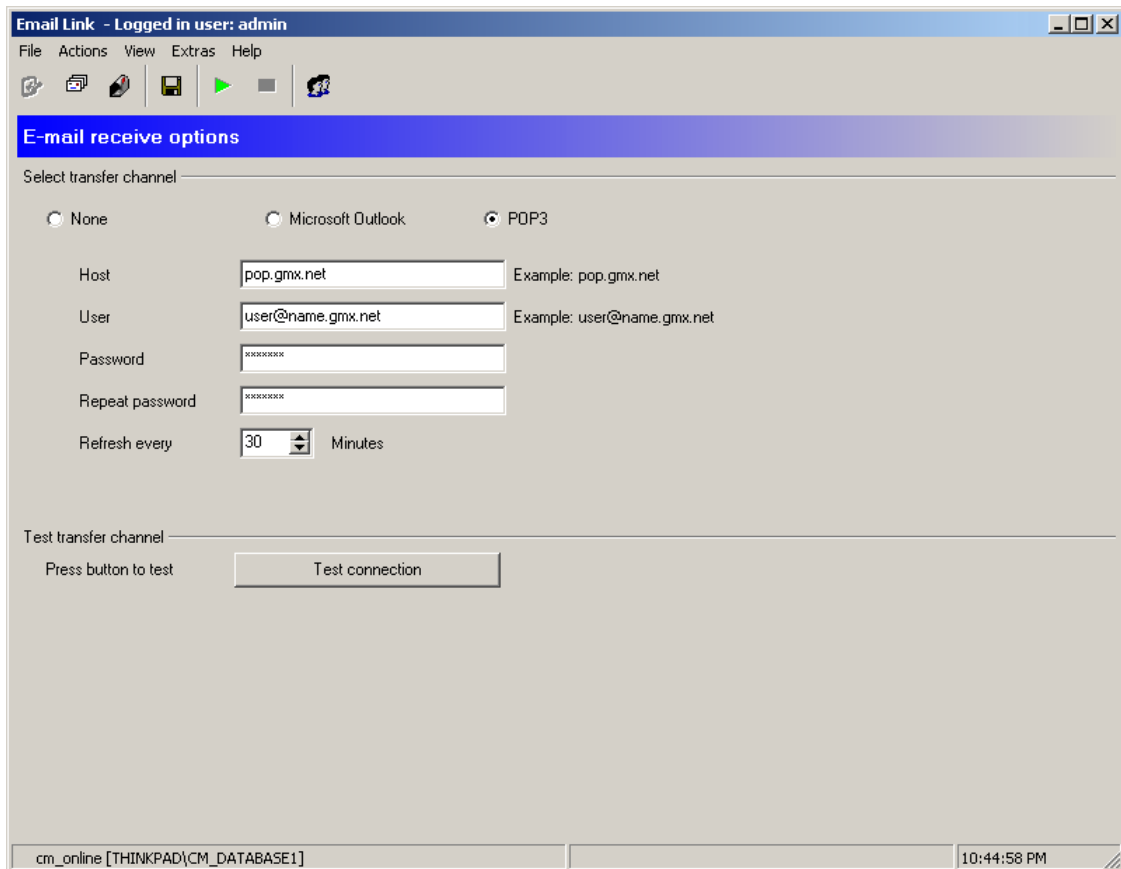


You can only save the configuration if the corresponding rights have been assigned in your user account (see "User management" ^[140]).

- Click **Test connection** to check the connection to the mail server.

POP3 transfer mode

- Click in the "POP3" transfer mode.



The screenshot shows the 'Email Link' application window. The title bar reads 'Email Link - Logged in user: admin'. The menu bar includes 'File', 'Actions', 'View', 'Extras', and 'Help'. The toolbar contains icons for file operations and a 'Test connection' button. The main area is titled 'E-mail receive options' and features a 'Select transfer channel' section with three radio buttons: 'None', 'Microsoft Outlook', and 'POP3'. The 'POP3' option is selected. Below this, there are input fields for 'Host' (pop.gmx.net), 'User' (user@name.gmx.net), 'Password' (masked with 'xxxxxxx'), and 'Repeat password' (masked with 'xxxxxxx'). An example for each field is provided to the right. A 'Refresh every' section shows a spinner set to '30' and the unit 'Minutes'. At the bottom, there is a 'Test transfer channel' section with a 'Test connection' button. The status bar at the bottom left shows 'cm_online [THINKPAD\CM_DATABASE1]' and the bottom right shows the time '10:44:58 PM'.

- Enter the server name or the IP address of the mail server in **Host**.
- Enter the **user name**.
- Enter your password in **Password**.
- Confirm the password in **Repeat password**.
- Select the interval at which to retrieve e-mails from the mail server in **Refresh every x minutes**.

To save the configuration,

- click on  in the toolbar.

Or:

- Click **Save configuration** in the **Configuration** menu.



You can only save the configuration if the corresponding rights have been assigned in your user account (see "User administration" ^[14b]).

- Click **Test connection** to check the connection to the mail server.

9.2 Change CM database

Select the database:

- Click on **File > Open database**.

Or:

- Click **File > Database history** to select a database from the list of recently opened databases.

The subsequent procedure is described in "Select database" ^[34].



The selected database is displayed on the status bar.

9.3 Start/stop run mode



You can easily see the operating state of the program even if the program window is minimised. The program icon in the taskbar information area changes colour depending on the state of the program: the red square symbolises idle mode and the green arrow run mode. These icons are also found in the program toolbar to start and stop run mode.

Start receiving e-mails (Run mode)

In run mode, Email Link monitors the selected mailbox at the intervals specified in the settings and downloads new e-mails. The data contained in the e-mails are automatically imported into the CM database.

Proceed as follows to start run mode:

- Click on  in the toolbar.

Or:

- Click **Start receiving e-mails** in the **Actions** menu.

Email Link enters run mode and switches to import view.

Import view displays the import process with a progress bar on the toolbar. The e-mail whose data are currently being imported is displayed in "Importing e-mails". Further information about the import process is displayed in "Messages".



To start the run mode the user currently logged in must have the required access rights (see "User management" ^[14b]). After entering run mode the current user is logged off.

Stop receiving e-mails (idle mode)

Proceed as follows to change the Email Link configuration or stop run mode:

- Click on  in the toolbar.

Or:

- Click **Stop receiving e-mails** in the **Actions** menu.

Email Link enters idle mode.



To stop the run mode the user currently logged in must have the required access rights (see "User management" [140]).

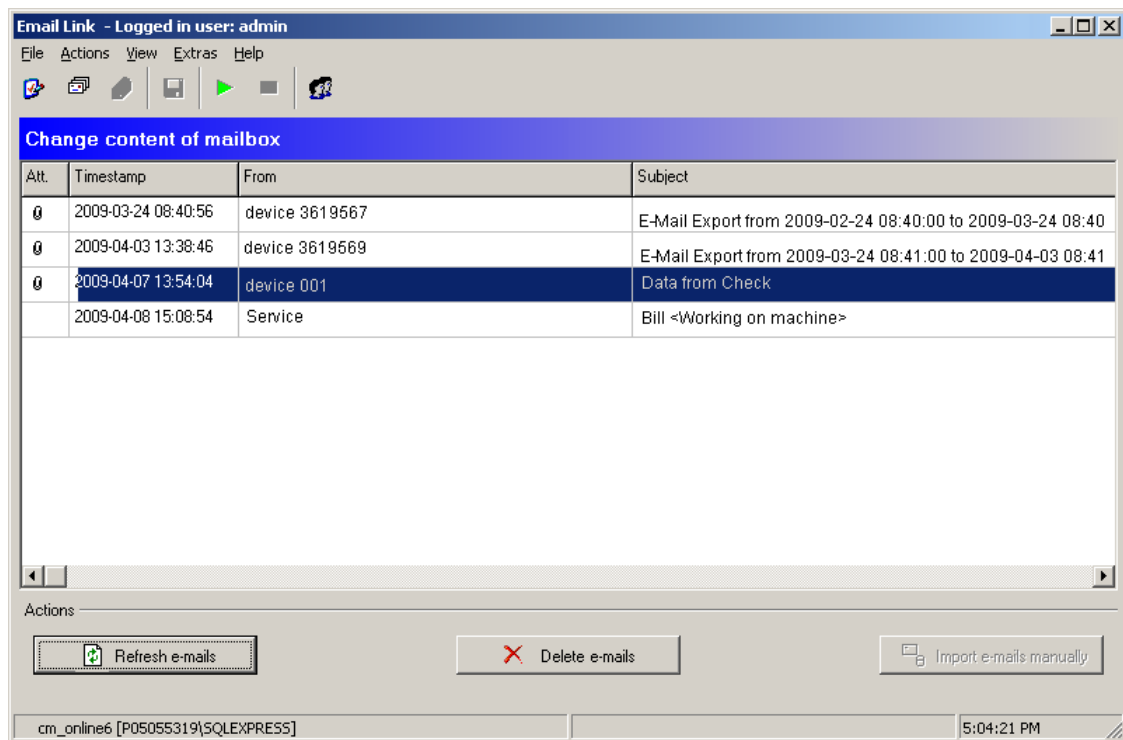
9.4 Manage e-mails in mailbox

To display downloaded e-mails, you must switch to the mailbox:

- Click on  in the toolbar.

Or:

- Click on **Mailbox** in the **View** menu.



In addition to receiving and importing e-mails automatically, you can also download [219] and import [220] e-mails (run mode) [219] manually in mailbox view. You can also delete [221] e-mails from the mailbox.

Refresh e-mails

Proceed as follows to download e-mails manually:

- Switch to the mailbox [220].
- Click **Refresh e-mails**.

The e-mails are now downloaded and displayed in the mailbox (for further information about importing data, refer to "Import e-mails" [220]).

Import e-mails



You can only import e-mails manually if

- automatic import (run mode) is not active and
- the e-mails contain data from Data Link [208], Configurations Manager [31] or Administrator (as of version 3.x). The e-mails are displayed in blue font with an icon.

- Switch to the mailbox [220].
- Select the e-mails with data from the list of received e-mails. Use the Shift or CTRL key to select several e-mails.
- Click **Import e-mails manually**.

Or:

- Click **Import e-mails manually** in the **Actions** menu.

Email Link switches to import view and imports the data in the selected e-mails.



*You can also activate manual import in import view. To do so, click **Import e-mails manually** in the **Actions** menu. Email Link imports the e-mail data in the Email Link mailbox.*

Delete e-mails



You can only delete e-mails manually if automatic import (run mode) is not active.

- Switch to the mailbox^[220].
- Select the e-mails from the list of received e-mails. Use the Shift or CTRL key to select several e-mails.
- Click **Delete e-mails**.

Or:

- Click **Delete e-mails** in the **Actions** menu to delete the selected e-mails.

The e-mails are removed from the Email Link mailbox and deleted from the mail server.



- If you are using a Microsoft Outlook account, the e-mails are stored in Outlook's "Deleted Objects" folder. To delete these e-mails completely, tick the checkbox **Delete e-mails in 'Deleted Objects'** (see Configure receive options^[217]).*
- You can also delete e-mails in import view. Click **Delete e-mails** in the **Actions** menu. Email Link deletes all e-mails in its mailbox.*

9.5 Change user

You can log in with another user name as follows:

- Click **Change user** in the **Extra** menu.

Select a log-in name from the list of users created in the user management^[140], enter the password and click **OK**.

9.6 Program settings

You can open the general program settings configuration window via the **Tools > Options** menu item.



To change the settings the user currently logged in must have the required access rights (see "User management"^[140]).

A tree view is displayed on the left-hand side of the window and shows a range of configuration options arranged in groups. You can expand the view and configuration options by clicking the symbols in front of the groups.

Information on the individual configuration options is provided or input masks are displayed on the right-hand side of the

window.

General


The Administrator software can be displayed in German, English and Chinese. If you select a different language, the software restarts automatically.

Limit daily runtime

You can use the runtime limit to define up to three time ranges in which the component should be active. Outside of the defined time ranges the software component is inactive and the message "Process sleeping" is displayed in the overview. The option "All day long" is selected by default.

Activate automatic user login

Whenever you start the software, the program prompts you for your user name and password. You can skip this step by configuring an auto-login for automatic user login.

- Select a user to log in automatically and enter the password.
- Click on the check mark  to check the user data.

Next time you launch the software, you will be automatically logged in with the configured user data.

Database

You can configure the database history and display information about the selected database here.

History

If this option is selected a list of all databases opened to date is displayed on the right. The entries in this list are the one used to open databases from the **File > Open database** menu. You can also use this option to delete entries in this list for clarity of overview.

To delete an alarm list entry:

- Select one or (by holding the CTRL key down) multiple items from the list and
- press the **Delete item** button to start the deletion operation.

Miscellaneous

The following information about the CM database being used is displayed:

- Name of the database server
- Name of the database
- Used memory
- Free memory

The ratio of free to used memory is also presented as a diagram.



The free memory display and the diagram can only return plausible information if the database and database server are on the same system.

Contact

Our address, telephone and fax number as well as our e-mail and Internet address are provided here.

9.7 Use Application Guard

By default, the FAG Administrator software is delivered with Application Guard. Application Guard automatically monitors in the background whether a running program component of the FAG Administrator software is working properly. For example, if a program does not respond for 10 minutes, Application Guard restarts it. This function is particularly useful for programs that are permanently in run mode, for example Data Link or Email Link.

The following options are available:

- **Start Application Guard** Select the option **Application Guard** in **Extras > Application Guard**.
- **Check Application Guard:** Select the option **Check Application Guard** in **Extras > Application Guard**.
- **Stop Application Guard** Select the option **Stop Application Guard** in **Extras > Application Guard**.



Application Guard uses port 11111. Please make sure that this port is open in the computer's firewall. If necessary, ask your system administrator.

9.8 Close

To close the program click **File > Close**.



You can only close the program when it is not in run mode. To stop the run mode the user currently logged in must have the required access rights (see "User management" ^{14b}).

10 The Notify Link

About Notify Link

Notify Link checks at intervals whether there are any new export data or non-response alarms in the CM database. The condition is that automatic e-mailing of data and alarms is activated in Configuration Manager (see "Advanced settings" [67]). If there are any export data or non-response alarms, Notify Link sends them by e-mail straight away.

To activate automatic e-mailing, you must configure Notify Link accordingly (see "Configure e-mailing" [226]). In the options [229] you can also define time slots in which to query the database.



If you are using MS SQL Server 2005, you receive a capacity warning e-mail if the database is nearing maximum capacity. For this purpose, you must indicate the global e-mail recipient in the Notify Link options [229].

Notify Link has two operating states:

- In run mode, it checks the selected CM database and sends e-mails as soon as there are any export data and non-response alarms.
- In Idle mode Notify Link is inactive and can be configured.



You can use the runtime limit to define up to three time ranges in which the program should be active in run mode. Outside of the defined time ranges it is inactive and the message "Process sleeping" is displayed. This function is found in "Options" in the "Extras" menu.

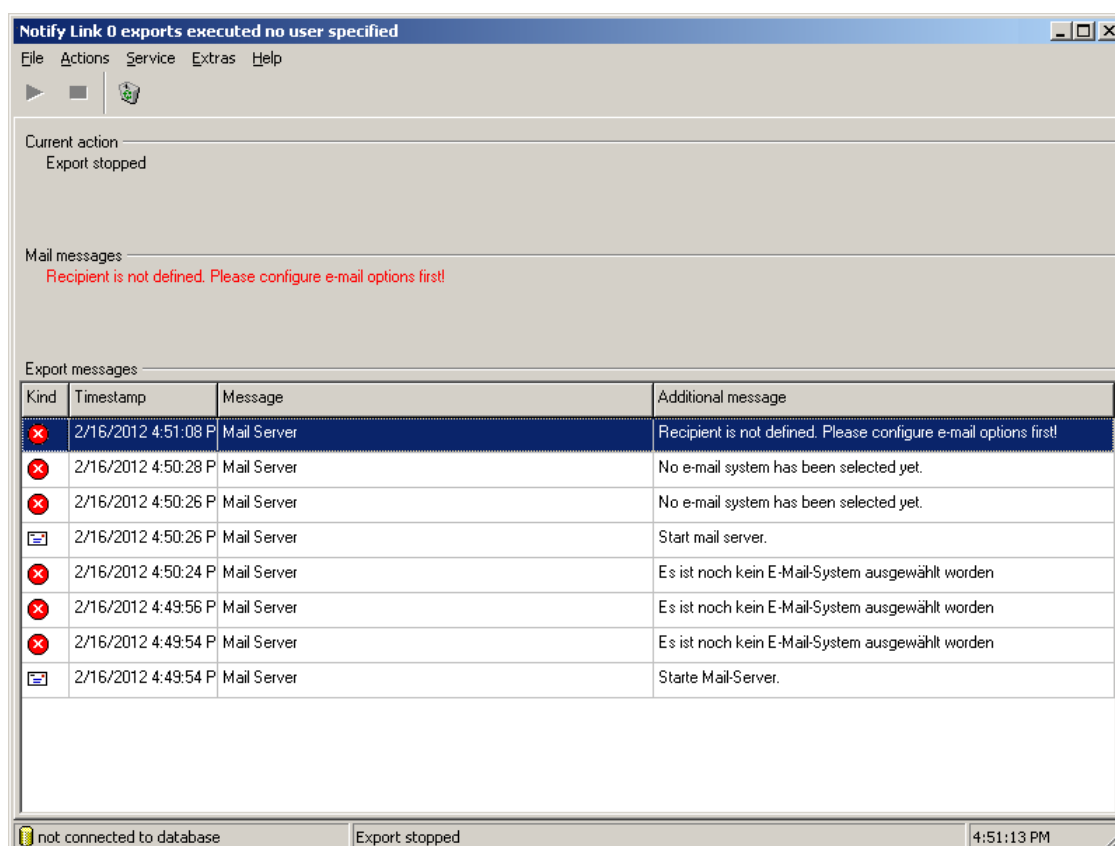
Start the Notify Link as follows:

- Click **Start > Programs > FAG > Administrator > Notify Link**.

Data Link connects with the last database used. If you installed a database during software installation, the program automatically connects to this database when you start the program for the first time. The program uses the default user name and the default password. Further information can be found in "Change CM database" [35].



- *If you invoke the program from the command line with the `/start_export` parameter, the program automatically starts up in run mode. Otherwise, you have to start run mode manually.*
- *Once the program has launched, the program icon is displayed in the taskbar information area. If you minimise the program window, you can maximise it again by double-clicking this icon.*



The Notify Link program window is divided into the following sections:

- Click the **toolbar** (directly below the menu bar) to call up the most important functions.
- **Current action** displays the action currently being performed in run mode and the current state of Notify Link.
- **Export messages** displays the events. The meanings of the individual symbols are next to each message:

Icon	Meaning
	Information about the state of the mail server (e.g. Mail export is enabled).
	Information about the current action (e.g. process sleeping).
	E-mail send error messages (e.g. undefined recipient).



You can only edit the configuration if

- the program is not in run mode and
- if the corresponding rights have been assigned for your user account (see "User management" ^{14b)}).

10.1 Change CM database

Select the database:

- Click on **File > Open database**.

Or:

- Click **File > Database history** to select a database from the list of recently opened databases.

The subsequent procedure is described in "Select database" ³⁴⁾.



The selected database is displayed on the status bar.

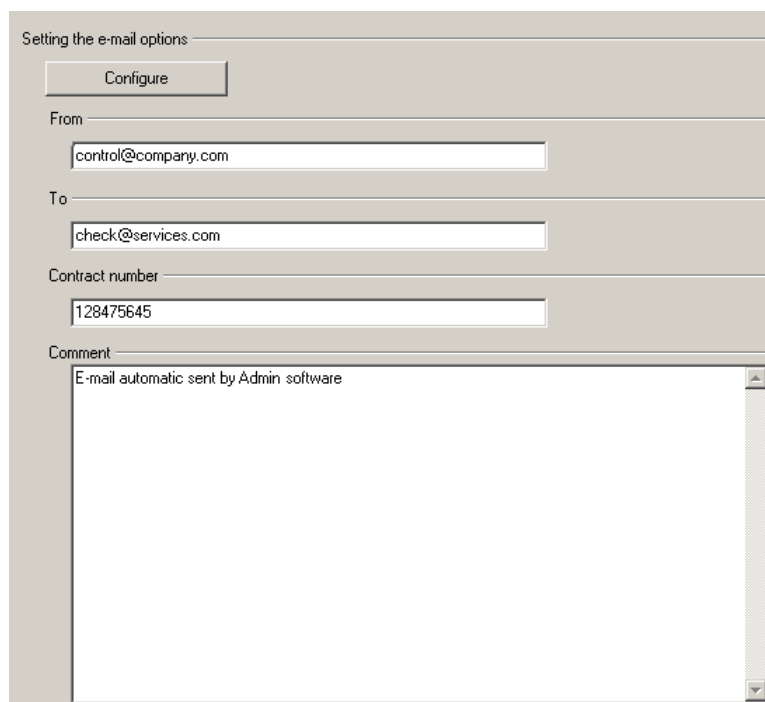
10.2 Configure automatic e-mailing

If you want Notify Link to send an e-mail automatically as soon as data are exported by the device or a non-response alarm is triggered, you must configure and activate automatic e-mailing.

Configure e-mailing

You can configure the dispatch of e-mails as follows:

- Click **Options** in the **Extras** menu.
- Select **Send e-mail**.
- Click **Configure**.



Setting the e-mail options

Configure

From
control@company.com

To
check@services.com

Contract number
128475645

Comment
E-mail automatic sent by Admin software

- The "Configure" button opens the "E-mail options settings" dialog box where you can select and configure the method used to send e-mails.
- Please enter a valid e-mail address in the input box labelled "From" as the mail account to use for sending.
- The e-mail address of the recipient is entered in the "To" input field.
- Please enter the number of your service contract at "Contract number", if applicable.
- You can also enter a custom text "Comment" input box to append to the e-mails created.
- Click **Configure** to set the protocol for the program to send e-mails.

Configure e-mailing

The program supports sending e-mails via **Microsoft Outlook**, **MAPI** or **SMTP**. To obtain the correct settings consult your network administrator.

- Select the transfer method.

If you are using the SMTP protocol, you must enter either the name or IP address of the e-mail server in "host". Optionally you can enter a user name and password for SMTP authentication. If you are using the TLS encryption protocol (SMTP via SSL), you must also configure the TLS port. In "Timeout" you can define a time range after which to automatically stop trying to make a connection.

- To test the connection to the mail server, click **Test connection**.
- Click **OK** to save the settings.



The Administrator software uses the separate E-MailRelay tool^[237] for SSL encryption. You can find this tool on the program CD.

If you want to use SSL encryption, you must enter the host of the E-MailRelay tool in SMTP. For details refer to the section **Configure e-mailing in the Administrator software**^[244].

Automatic e-mails

Notify Link sends the data at the defined intervals, e.g. every 24 hours. In order to ensure that alarms are not only reported during this time-frame, by default ingoing alarms are sent automatically e-mailed immediately. This ensures constant monitoring and you can react to an alarm without delay.

You can also deactivate this setting. This makes sense, for example if you only want to check a system once a day. Deactivate automatic e-mails as follows:

- Click **Options** in the **Extras** menu.
- Select **Send e-mail**.
- Click **Automatic**. You can deactivate e-mailing of ingoing alarms here:

10.3 Start/stop run mode



You can easily see the operating state of the program even if the program window is minimised. The program icon in the taskbar information area changes colour depending on the state of the program: the red square symbolises idle mode and the green arrow run mode. These icons are also found in the program toolbar to start and stop run mode.

Start run mode

Proceed as follows to put Notify Link into run mode:

- Click on  in the toolbar.

Or:

- Click **Start** in the **Action** menu.

Notify Link enters run mode.



To start the run mode the user currently logged in must have the required access rights (see "User management" ¹⁴⁰). After entering run mode the current user is logged off.

Stop run mode

If you wish to change the Notify Link configuration, you must first stop run mode. To do this proceed as follows:

- Click on  in the toolbar.

Or:

- Click **Stop** in the **Action** menu.

Notify Link enters idle mode.

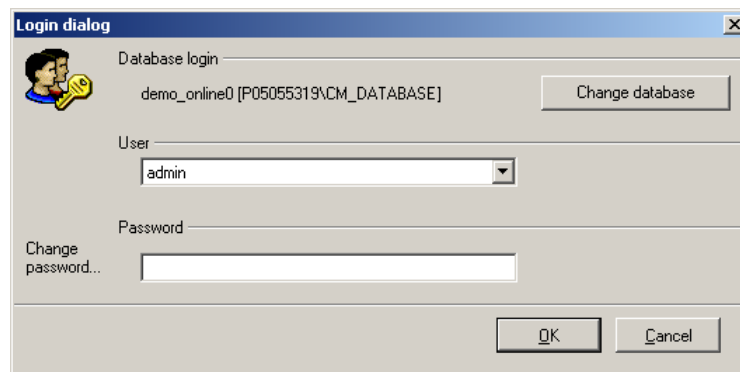


To stop the run mode the user currently logged in must have the required access rights (see "User management" ¹⁴⁰).

10.4 Change user

You can log in with another user name as follows:

- Click **Change user** in the **Extra** menu.



Select a log-in name from the list of users created in the user management ¹⁴⁰, enter the password and click **OK**.

10.5 Program settings

You can open the general program settings configuration window via the **Tools > Options** menu item.



To change the settings the user currently logged in must have the required access rights (see "User management" ^[146]).

A tree view is displayed on the left-hand side of the window and shows a range of configuration options arranged in groups. You can expand the view and configuration options by clicking the symbols in front of the groups.

Information on the individual configuration options is provided or input masks are displayed on the right-hand side of the window.

General


The Administrator software can be displayed in German, English and Chinese. If you select a different language, the software restarts automatically.

Limit daily runtime

You can use the runtime limit to define up to three time ranges in which the component should be active. Outside of the defined time ranges the software component is inactive and the message "Process sleeping" is displayed in the overview. The option "All day long" is selected by default.

Activate automatic user login

Whenever you start the software, the program prompts you for your user name and password. You can skip this step by configuring an auto-login for automatic user login.

- Select a user to log in automatically and enter the password.
- Click on the check mark  to check the user data.

Next time you launch the software, you will be automatically logged in with the configured user data.

Database

You can configure the database history and display information about the selected database here.

History

If this option is selected a list of all databases opened to date is displayed on the right. The entries in this list are the one used to open databases from the **File > Open database** menu. You can also use this option to delete entries in this list for clarity of overview.

To delete an alarm list entry:

- Select one or (by holding the CTRL key down) multiple items from the list and
- press the **Delete item** button to start the deletion operation.

Miscellaneous

The following information about the CM database being used is displayed:

- Name of the database server
- Name of the database
- Used memory
- Free memory

The ratio of free to used memory is also presented as a diagram.



The free memory display and the diagram can only return plausible information if the database and database server are on the same system.

Send e-mail

The automatic export of data and alarms by e-mail is configured in this window. Further information is described in "Configure e-mailing" ^[226].

Contact

Our address, telephone and fax number as well as our e-mail and Internet address are provided here.

10.6 Use Application Guard

By default, the FAG Administrator software is delivered with Application Guard. Application Guard automatically monitors in the background whether a running program component of the FAG Administrator software is working properly. For example, if a program does not respond for 10 minutes, Application Guard restarts it. This function is particularly useful for programs that are permanently in run mode, for example Data Link or Email Link.

The following options are available:

- **Start Application Guard** Select the option **Application Guard** in **Extras > Application Guard**.
- **Check Application Guard:** Select the option **Check Application Guard** in **Extras > Application Guard**.
- **Stop Application Guard** Select the option **Stop Application Guard** in **Extras > Application Guard**.



Application Guard uses port 11111. Please make sure that this port is open in the computer's firewall. If necessary, ask your system administrator.

10.7 Close

To close the program click **File > Close**.



You can only close the program when it is not in run mode. To stop the run mode the user currently logged in must have the required access rights (see "User management" ^{14b}).

11 Transfer Link

About Transfer Link

Transfer Link synchronises Remote Server and Data Link over the Internet, i.e. via a directory in the Cloud. The mechanism is as follows:

- On the Remote Server side – in **write mode**– it synchronised the local data directory of the Remote Server with the directory in the Cloud. Once the Remote Server is finished writing the data, it removes the * protection from the local directory. Then, Transfer Link synchronises this local directory with the directory in the Cloud. Only when all data have been written and a complete list of contents created does Transfer Link unlock the folder in the Cloud and delete the data in the local directory of the Remote Server.
- In **read mode**, Transfer Link synchronises the unlocked directory in the Cloud with the local data directory on the Data Link side. After synchronising, the data are deleted in the directory in the Cloud.

To use Cloud synchronisation, you must configure Transfer Link appropriately (see "Configure transfer tasks" ²³²).



Transfer Link is included, but is not automatically installed in the default installation. The installation is described in section "Installing other components" ²⁰.

Transfer Link has two operating states:

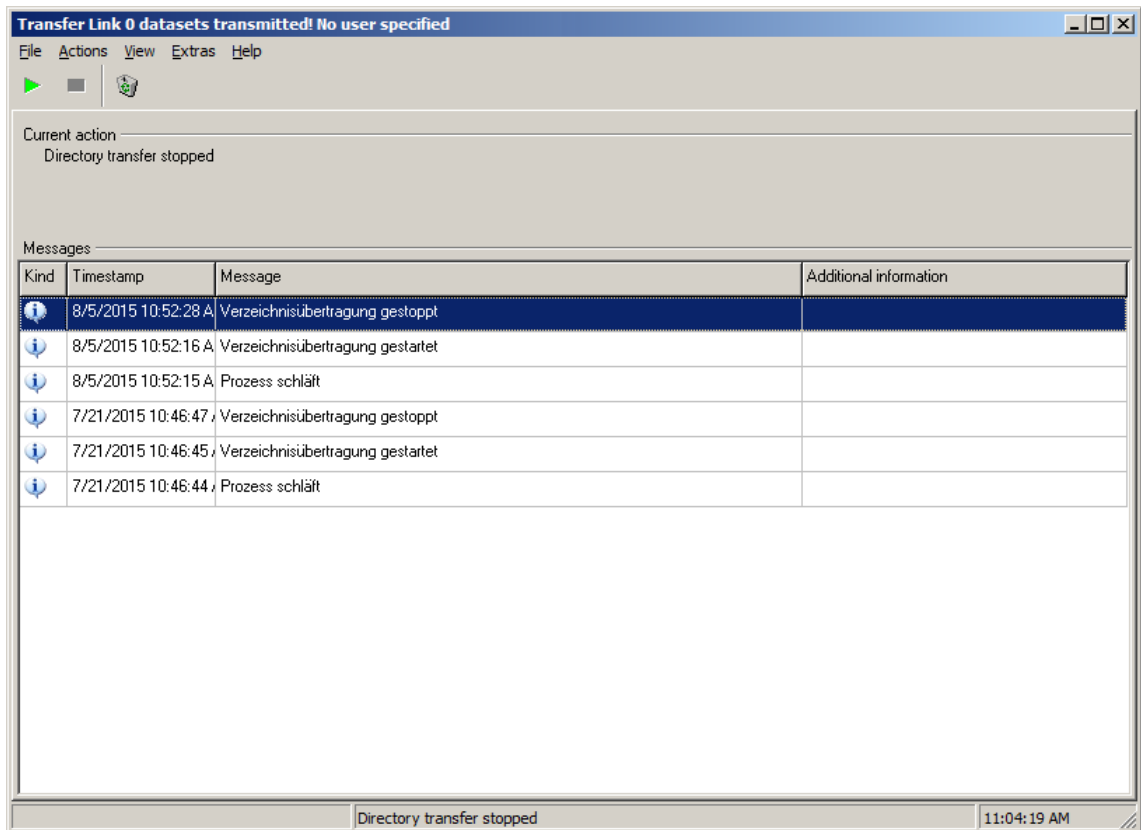
- In Run mode, Transfer Link performs the list of transfer tasks in order. Depending on the configuration, these may be tasks in read mode and in write mode.
- In Idle mode, Transfer Link is inactive and can be configured.

Start Transfer Link as follows


- Click **Start > Programs > FAG > Administrator> Transfer Link**.





- *If you invoke the program from the command line with the /start parameter, the program automatically starts up in run mode. Otherwise, you have to start run mode manually.*
- *Once the program has launched, the program icon is displayed in the taskbar information area. If you minimise the program window, you can maximise it again by double-clicking this icon.*



The Transfer Link program window is divided into the following sections:

- Click the **toolbar** (directly below the menu bar) to call up the most important functions.
- **Current action** displays the action currently being performed in run mode and the current state of Transfer Link.
- The **Transfer status** view is displayed when you launch the program. **Transfer messages** displays the events. These messages are also saved in the program's log directory^[246]. Call up the context menu to copy the messages to the clipboard and paste them in a text editor. Click  on the toolbar to delete the list of messages.

The meanings of the individual icons are:

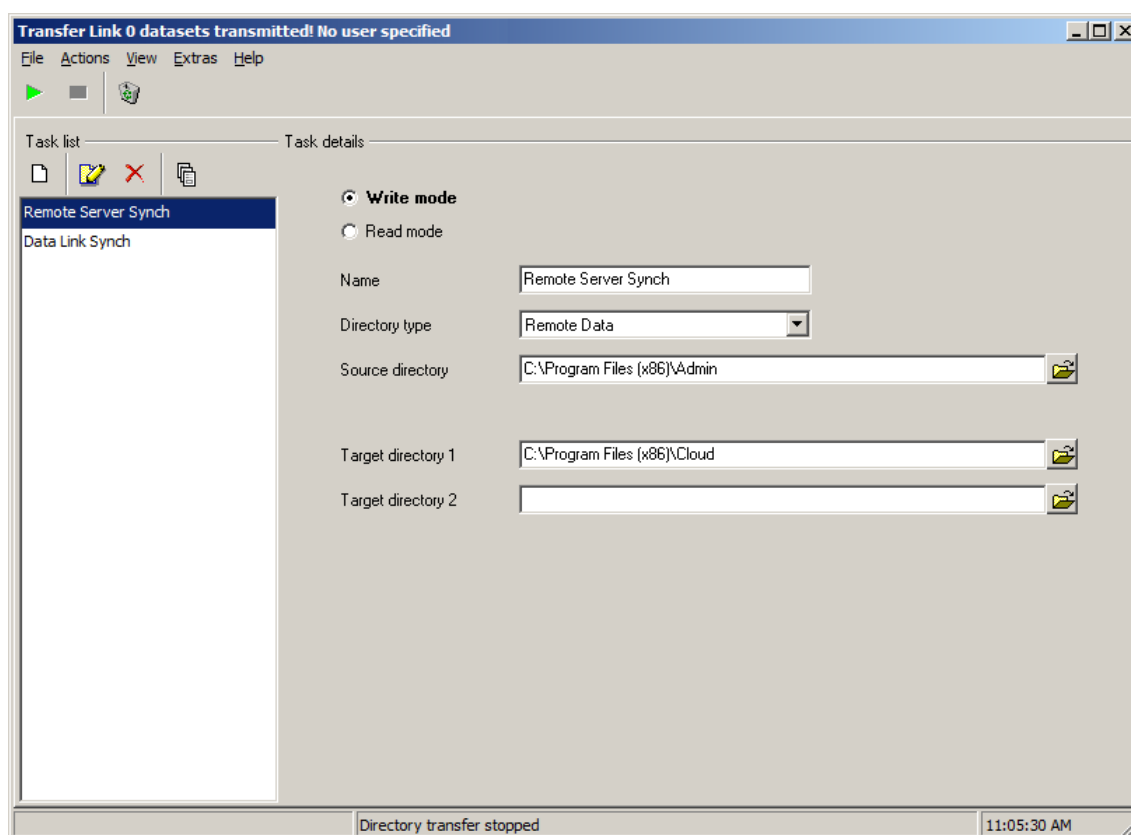
Icon	Meaning
	Information about the current action (e.g. process sleeping).
	Transfer task error messages.

- Select **View > Configuration** to configure new transfer tasks^[232] and manage existing tasks.

11.1 Configure transfer tasks

Switch to configuration view to configure transfer tasks:

- Click **Configuration** in the **View** menu.



The following options are available:

Task list

This section contains the current list of transfer tasks and the available actions:

- : Click here to create a new task.
- : Click here to edit the selected task or to save a task that you have just created or edited.
- : Click here to delete the selected task.
- : Click here to display an overview of all tasks and their details.
- **List entries:** Click on a list entry:
 - to edit this task.
 - to view the configuration details of the task.
 - to delete the task.

Task details

This section displays the configuration details of the selected task. If you click or create a new task you can configure the task here:

- **Write mode:** Activate this option if you want this task to synchronise the local data directory of the remote server with a directory in the Cloud.
- **Read mode:** Activate this option if you want this task to synchronise the directory in the Cloud with the local data directory monitored by Data Link.
- **Name:** Enter the name of the task here. This name is displayed on the left of the task list.
- **Directory type:** Select the directory type **Remote Data**, both in **Write mode** and in **Read mode**. This selection ensures that the specific data structure is also copied over during synchronisation.
- **Source directory:**
 - **Write mode:** Enter the local data directory of the remote server whose data you wish to write to the directory in the Cloud.
 - **Read mode:** Enter the directory in the Cloud whose data you wish to write to the data directory monitored by Data Link.
- **Target directory:**
 - **Write mode:** Enter the directory in the Cloud to which you wish to write the data from the data directory of the remote server. If you specify two or more directories here, the data are written to both of these directories.
 - **Read mode:** Enter the local data directory to which you wish to write the data from the Cloud and which you wish



Data Link to monitor. If you specify two or more directories here, the data are written to both of these directories.



*You can edit the number of possible target directories in the menu in **Extras > Options** in the **General > Miscellaneous** section.*



Create a task in write mode

Configure a new task in write mode as follows:

- Click  on the toolbar.
- Activate the option **Write mode** in **Task details**.
- Enter a name for the task and select the **Remote Data** option for **Directory type**.
- Enter the local data directory of the remote server in **Source directory**.
- Enter the directory in the Cloud to which you wish to write the data from the **source directory** in **Target directory**.
- Click  on the toolbar to save the task.




Create task in read mode

Configure a new task in read mode as follows:

- Click  on the toolbar.
- Activate the option **Read mode** in **Task details**.
- Enter a name for the task and select the **Remote Data** option for **Directory type**.
- Enter the directory in the Cloud whose data you wish to write the local **Target directory** in **Source directory**.
- Enter the local data directory to which you wish to write the data from the **Cloud** in **Target directory**. This is also the directory monitored by Data Link.
- Click  on the toolbar to save the task.



Edit task

Edit an existing task as follows:

- Stop  Transfer Link if necessary.
- Click on the appropriate entry in the **Task list**.
- Click on  in the toolbar.
- Edit the **Task details** on the right and then click  again to save your changes.

Delete task

Delete a task as follows:

- Stop  Transfer Link if necessary.
- Click on the appropriate entry in the **Task list**.
- Click on  in the toolbar.



You can only edit transfer tasks when Transfer Link is in idle mode.

11.2 Start/stop run mode



You can easily see the operating state of the program even if the program window is minimised. The program icon in the taskbar information area changes colour depending on the state of the program: the red square symbolises idle mode and the green arrow run mode. These icons are also found in the program toolbar to start and stop run mode.

Start run mode

Proceed as follows to put Transfer Link in run mode:

- Click on  in the toolbar.

Or:

- Click **Start** in the **Action** menu.

Transfer Link enters run mode.

Stop run mode

If you wish to change the Transfer Link configuration, you must first stop run mode. To do this proceed as follows:

- Click on  in the toolbar.

Or:

- Click **Stop** in the **Action** menu.

Transfer Link enters idle mode.

11.3 Program settings

You can open the general program settings configuration window via the **Tools > Options** menu item.

A tree view is displayed on the left-hand side of the window and shows a range of configuration options arranged in groups. You can expand the view and configuration options by clicking the symbols in front of the groups.

Information on the individual configuration options is provided or input masks are displayed on the right-hand side of the window.

General

Language

The Administrator software can be displayed in German, English and Chinese. If you select a different language, the software restarts automatically.

Miscellaneous

- **Write every message to the log file:** Activate this option to write all messages to the log file. By default, only faults are written to the log file.
- **Number of target directories:** Specify here how many target directories are available when you configure a transfer task ²³².

Contact

Our address, telephone and fax number as well as our e-mail and Internet address are provided here.

11.4 Use Application Guard

By default, the FAG Administrator software is delivered with Application Guard. Application Guard automatically monitors in the background whether a running program component of the FAG Administrator software is working properly. For example, if a program does not respond for 10 minutes, Application Guard restarts it. This function is particularly useful for programs that are permanently in run mode, for example Data Link or Email Link.

The following options are available:

- **Start Application Guard** Select the option **Application Guard** in **Extras > Application Guard**.
- **Check Application Guard:** Select the option **Check Application Guard** in **Extras > Application Guard**.
- **Stop Application Guard** Select the option **Stop Application Guard** in **Extras > Application Guard**.



Application Guard uses port 11111. Please make sure that this port is open in the computer's firewall. If necessary, ask your system administrator.

11.5 Close

To close the program click **File > Close**.



You can only close the program when it is not in run mode.

12 The E-MailRelay tool

About E-MailRelay Tool

Since 2014, various e-mail providers have stopped accepting unencrypted e-mails. With the aid of the E-MailRelay tool you can forward the unencrypted e-mails sent by the FAG Administrator software with encryption. The E-MailRelay tool acts as an e-mail server.

Install the E-MailRelay tool and configure all settings as described. Finally, configure e-mailing in the FAG Administrator software.

12.1 Install and configure the E-MailRelay tool

12.1.1 User rights and write access

To install and run the E-MailRelay tool you need special access rights. In the event of problems with the security rules of your system, please contact your system administrator.

User rights:

To install the E-MailRelay tool you need administrator rights on your system.

Tip: Install the tool with administrator rights and then switch back to a normal user.

Write access:

The tool saves settings and log files while it is running. You therefore need write access to the following directory:

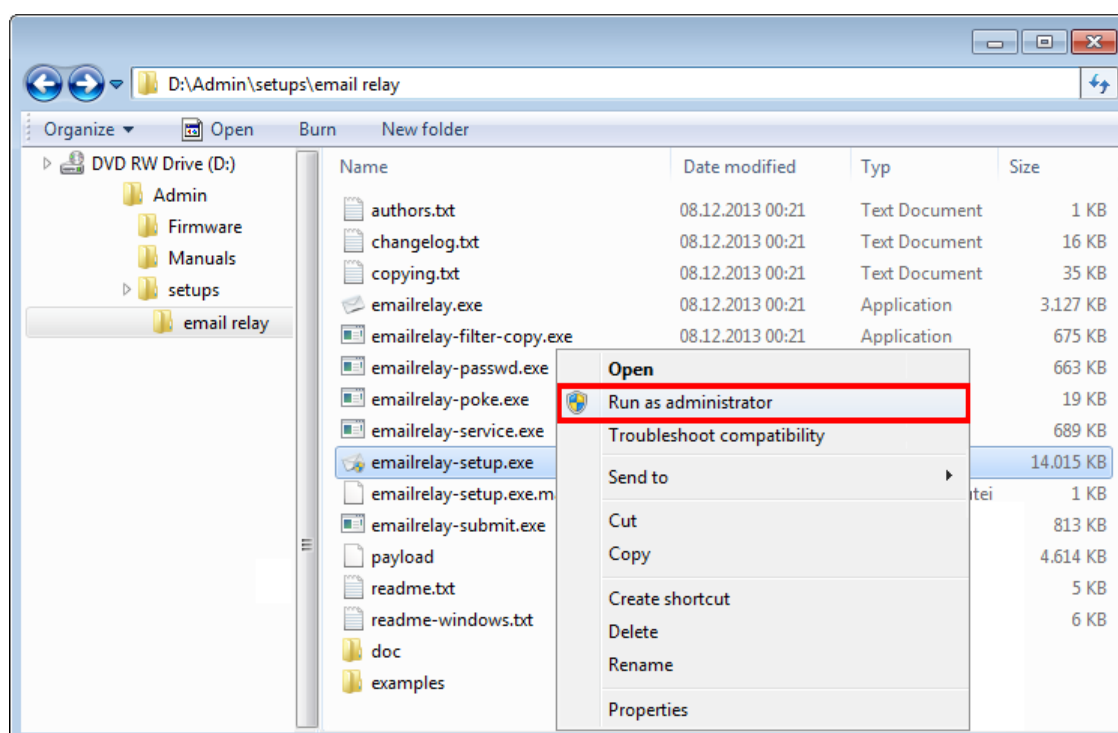
- c:\Program Files\

12.1.2 Installation

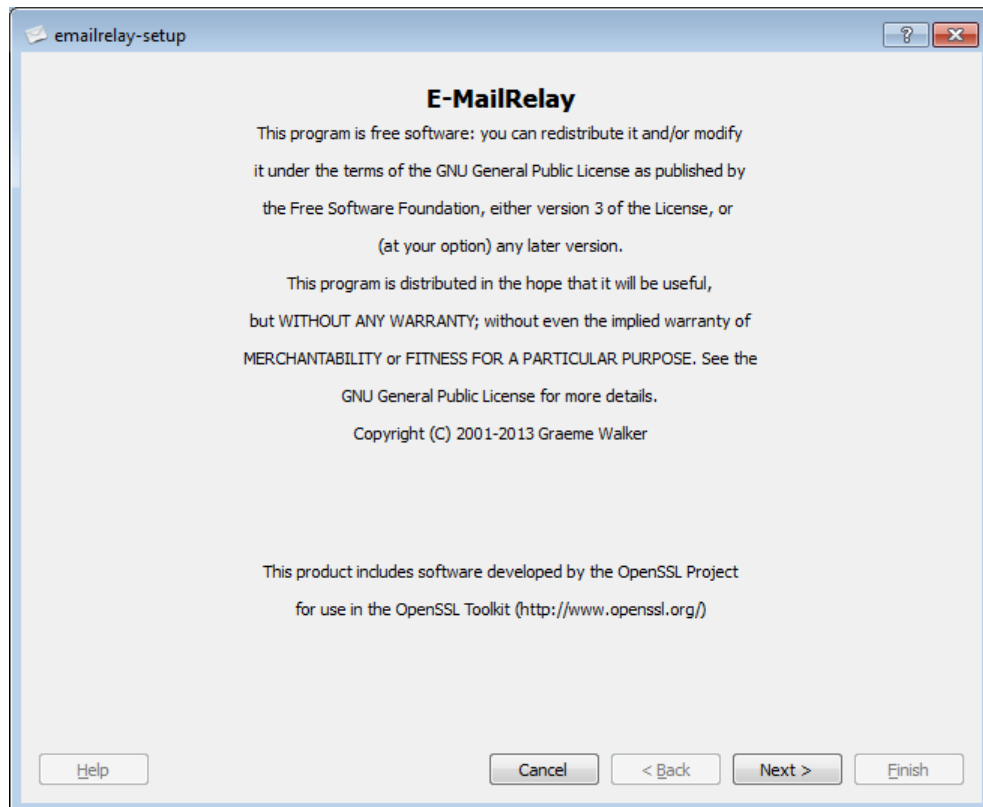
The installation file for the E-MailRelay tool is included on the CD-ROM enclosed. Alternatively, you can download the tool from the following link: <http://emailrelay.sourceforge.net/>.

Please note: The E-MailRelay tool is only available in English.

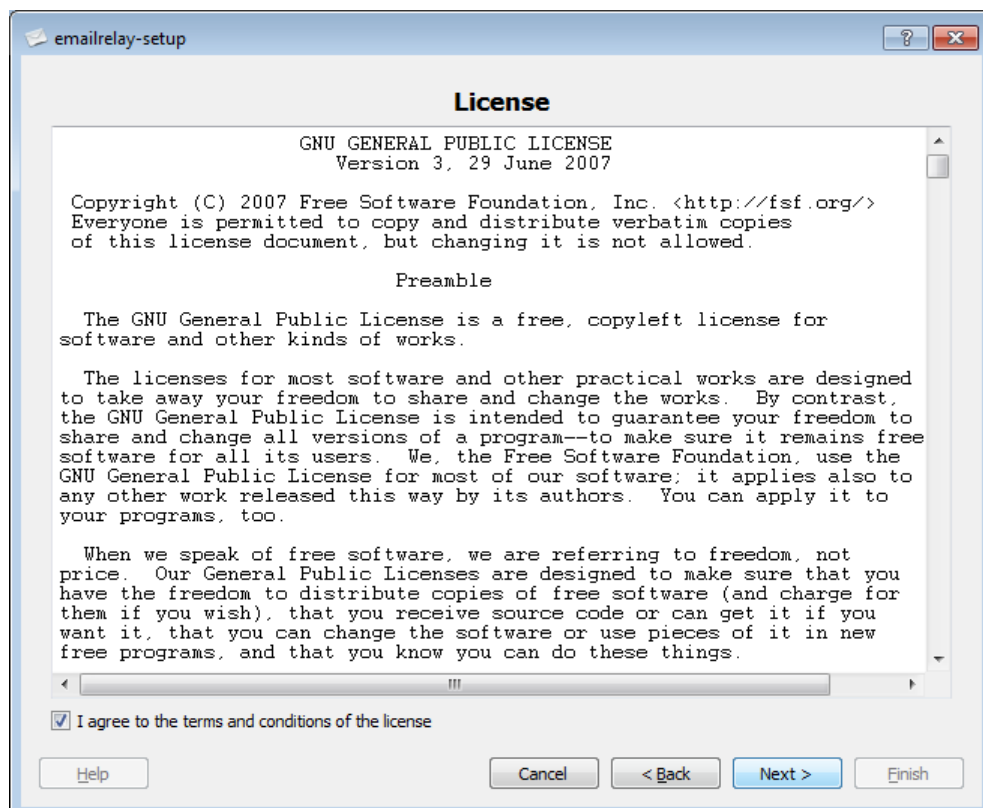
- Open the directory „E-MailRelay“.
- Right-click on the file **emailrelay-service.exe** and select **Run as Administrator** from the context menu.



A wizard guides you through the steps of the installation:



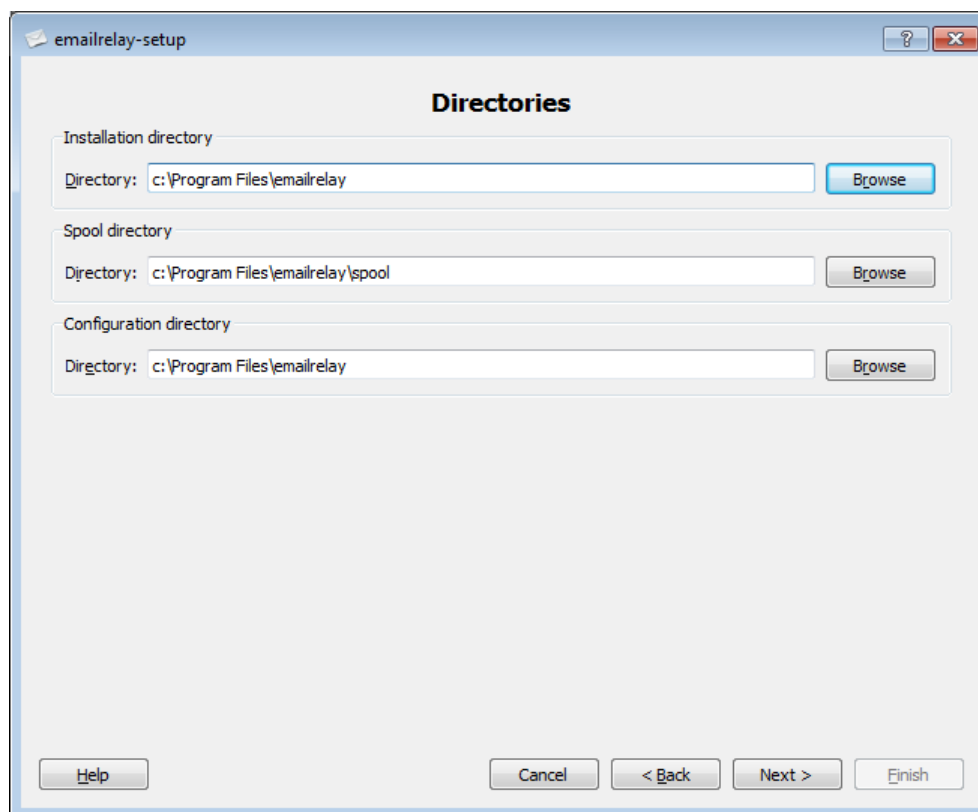
- Click on **Next**.



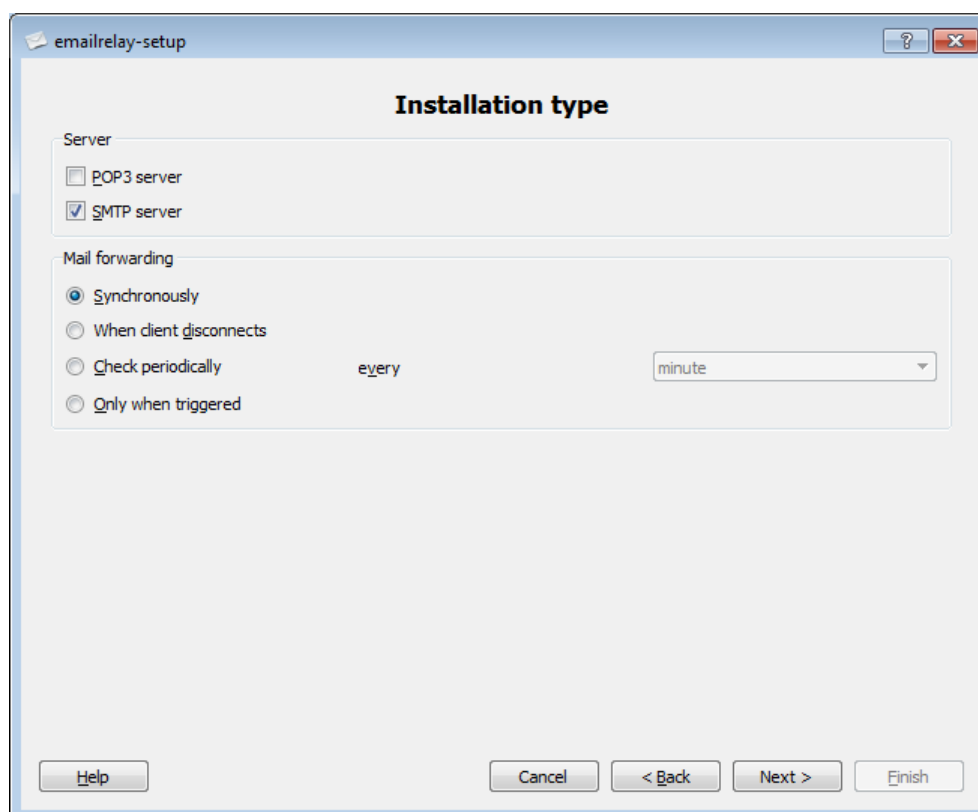
- Agree to the licence terms by ticking the **I agree to the terms and conditions of the licence** checkbox.
- Click on **Next**.

Please enter the following directory paths in the next step:

- Installation directory: c:\Program Files\emailrelay
- Spool directory: c:\Program Files\emailrelay\spool
- Configuration directory: c:\Program Files\emailrelay



- Click on **Next**.



- Select **SMTP server** and **Synchronously** for synchronous message forwarding.
- Click on **Next**.

emailrelay-setup

SMTP server

Local server

Port: 25

☒ Require authentication

Authentication mechanism: CRAM-MD5

Account

Name:

Password:

Exemptions

IP address:

Help Cancel < Back Next > Finish

- Enter port **25** for the local server.
- Click on **Next**.

The next step requires further information about your e-mail account. In order to send e-mails to your e-mail address, it is necessary to enter your login data and server settings. Please contact your provider for this information.

emailrelay-setup

SMTP client

Remote server

Hostname: smtp.1und1.de Port: 587

☒ Allow TLS/SSL encryption

☒ Supply authentication

Authentication mechanism: LOGIN

Account

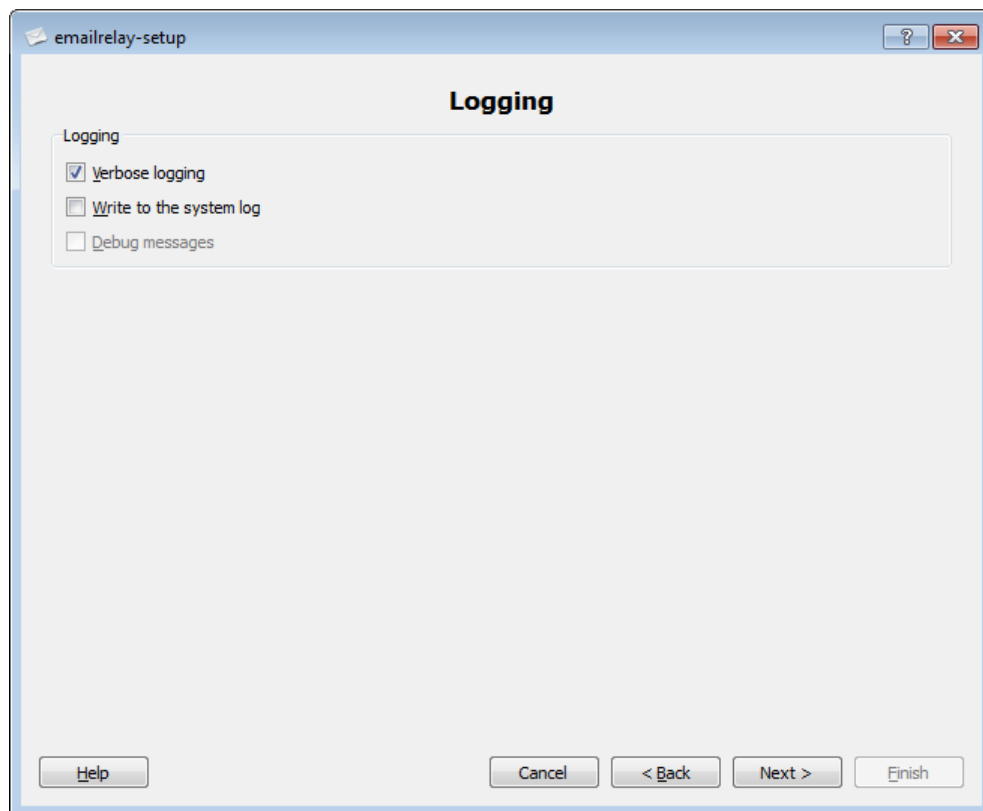
Name: user@provider.com

Password: ••••••••

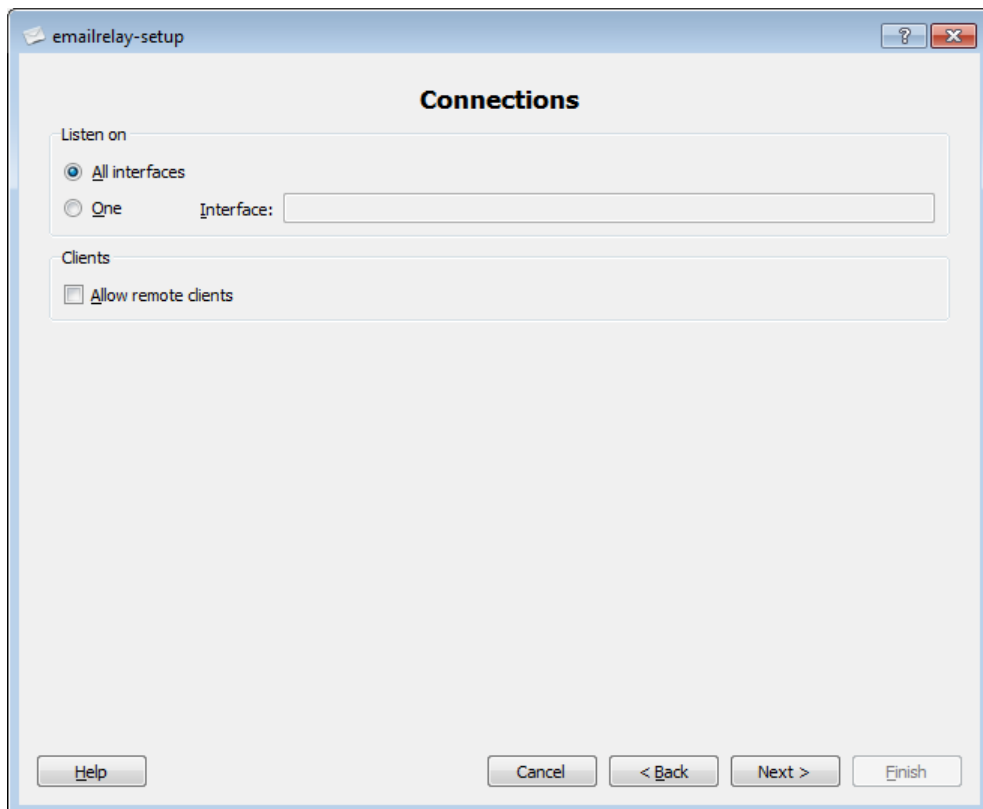
Help Cancel < Back Next > Finish

- Enter the **Host name** (server address) and **Port**.
- Activate **Allow TLS/SSL encryption**.

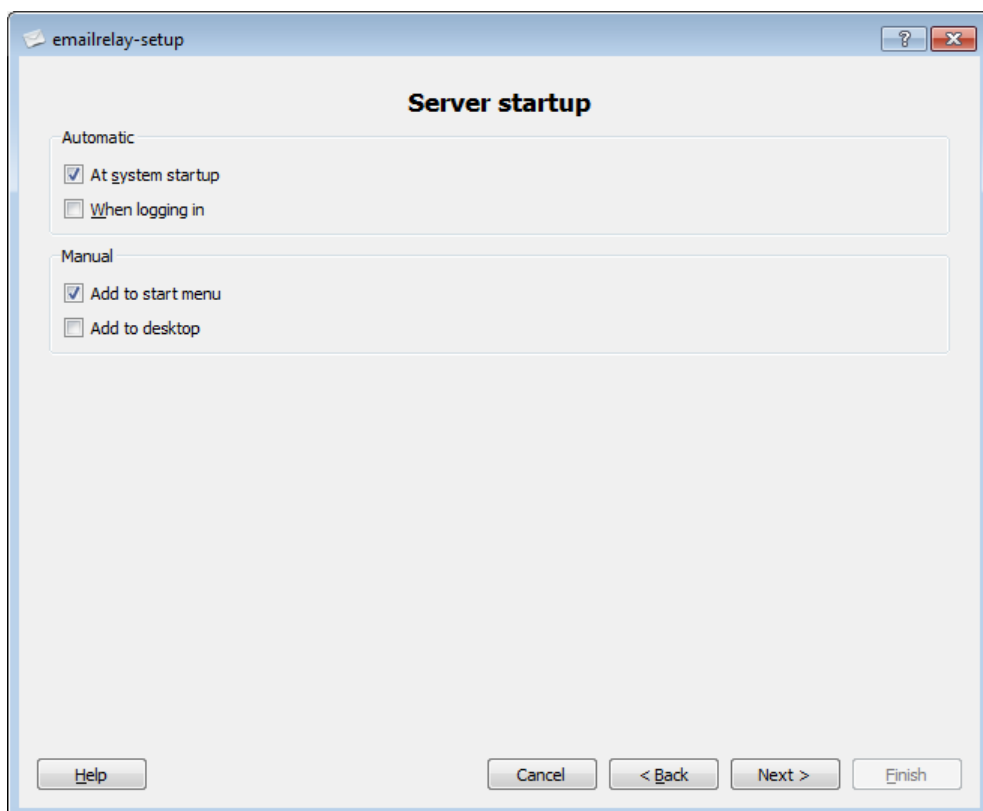
- Activate **Supply authentication**.
- Select **Login** as the authentication method.
- Enter your e-mail address as the **user name** in the Name box.
- Enter the **Password** that you chose when you set up your e-mail address.
- Click on **Next**.



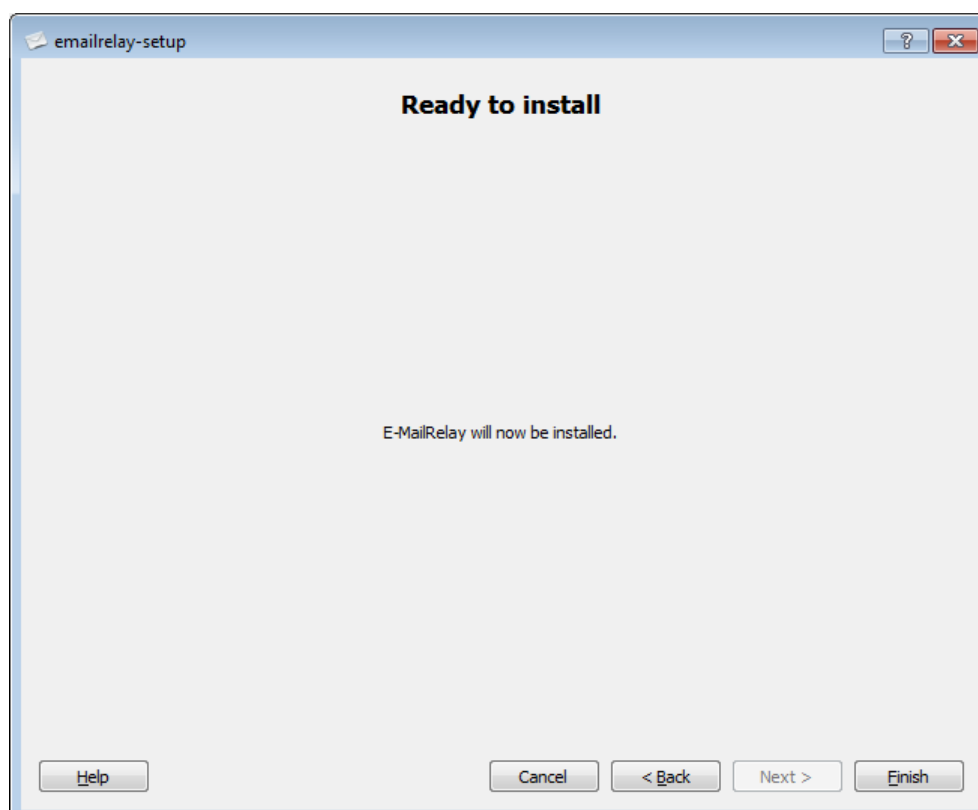
- Untick the **Write to the system log** checkbox.
- Select **Verbose logging** to allow detailed data log files.
- Click on **Next**.



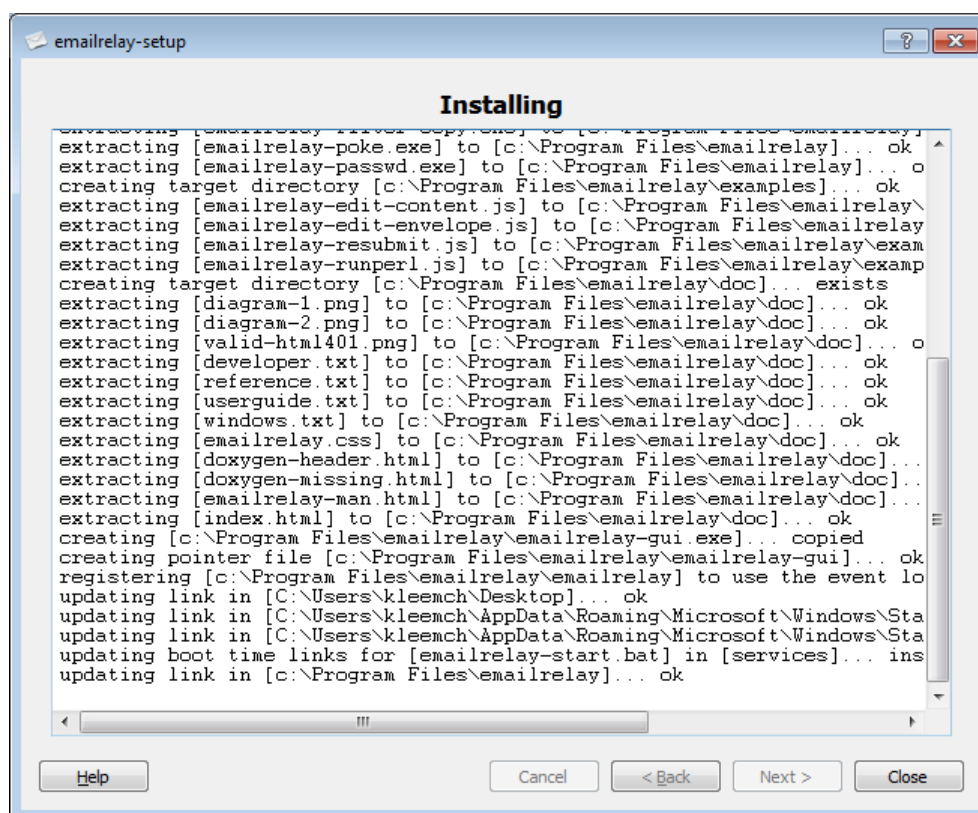
- Select **All interfaces** to monitor all of the computer's network cards and IP addresses.
- Click on **Next**.



- Select **At system startup** to activate the E-MailRelay tool at system start-up.
- Click **Next**.



- Click **Finish** to launch the installation.



Wait until the installation is finished. Then

- click on **Close** to close the Setup Wizard.

12.2 Start the E-MailRelay tool

Next time you start up the system, the E-MailRelay tool also starts.

To start the E-MailRelay tool right away after installation,

- click  **E-MailRelay** in the **Start menu**.

Once the program has launched, the program icon is displayed in the taskbar information area:

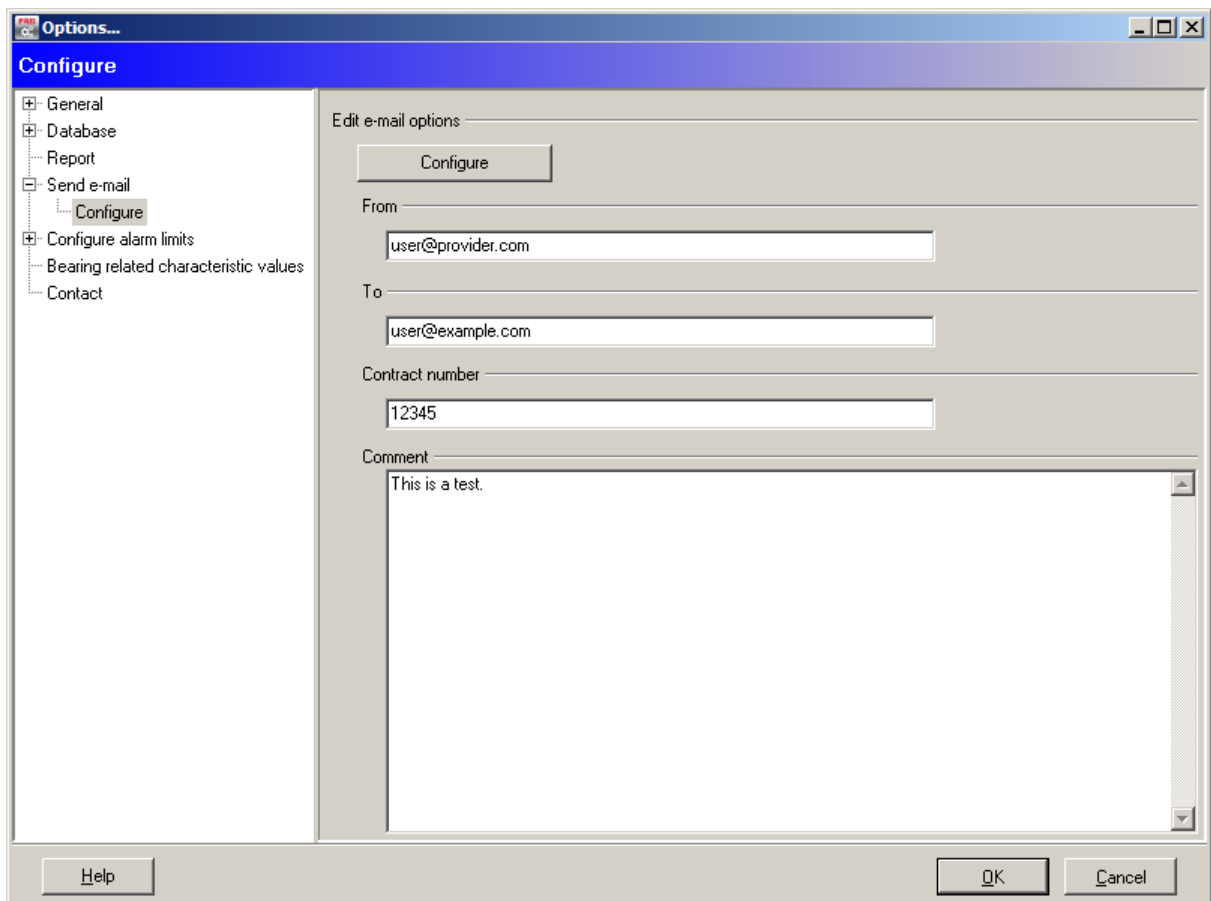


12.3 Configure e-mailing in the Administrator software

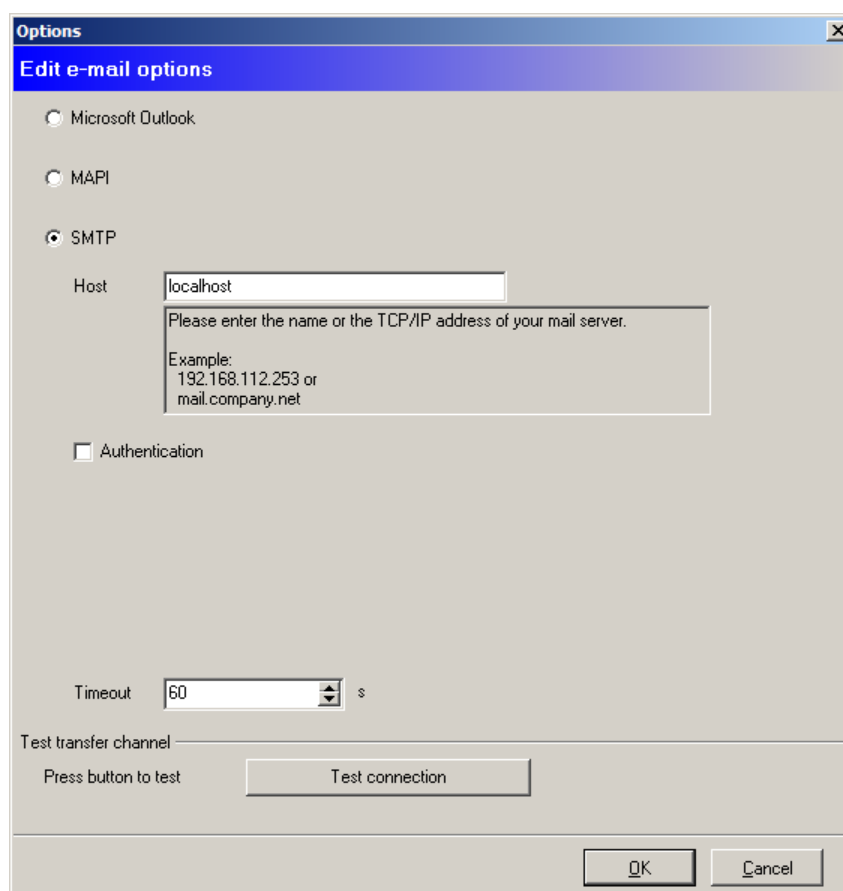
In order to be able to use the E-MailRelay tool you must configure the following settings in each Administrator software tool that sends e-mails.

Configure e-mailing as follows:

- Launch the FAG Administrator Configuration Manager as follows:
- Click **Options** in the **Extras** menu.
- Select **Send e-mail**.
- Click **Configure**.



- The "Configure" button opens the "E-mail options settings" dialog box where you can select and configure the method used to send e-mails.
- Please enter a valid e-mail address in the input box labelled "From" as the mail account to use for sending.
- The e-mail address of the recipient is entered in the "To" input field.
- Please enter the number of your service contract at "Contract number", if applicable.
- You can also enter a custom text "Comment" input box to append to the e-mails created.
- Click **Configure** to set the protocol for the program to send e-mails.



- Select the **SMTP** transfer method.
- Enter the name of the e-mail server in "Host": **localhost**.
- In "Timeout" you can define a time range after which to automatically stop trying to make a connection.
- To test the connection to the mail server, click **Test connection**.
- Click **OK** to save the settings.
- Press **OK** to close the options dialog.

If necessary, repeat the above steps in other FAG Administrator software components that send e-mails (e.g. Data Link and/or Notify Link).

13 Questions and answers

This chapter provides you with assistance when solving problems that arise in conjunction with the device and Administrator software. If your problem is not described here or if the help does not lead to the desired result, please contact our support (cf. Contact ²⁵⁰⁷). Have the following information ready when you are talking to support:

- Serial number
- Firmware version
- Version of the Administrator software
- Operating system used (which service pack?)
- Are you using a multiplexer?
- Communication path (serial, modem, TCP/IP)
- Log files

Log files and log directory

The Administrator software logs information about system messages, database actions and import/export processes in separate log files.

For support purposes you can automatically assort these log files in Configuration Manager and send them to our Support ²⁵⁰⁷.

Assort log files

- Click **Assort log files** in the **Extras** menu.
- Select the data to save for support purposes.



If you select "data files", the file size may be too big to e-mail the log files.

- Define the start date from which to assort the files and
- select a directory to save to.
- Click **OK**.



Depending on the version of Windows installed on your system, the log directory is at the following default location:

- *Windows 7, Windows 8: In the "Common Application Data" directory, e.g. c:\Program Data \Condition Monitoring\Administrator\logs.*

Open log folder

- Click **Open log folder** in the **Extras** menu.

The log directory is displayed in Windows Explorer. You can open log files in a text editor.

A number of frequently occurring problems and possible solutions are described below.

A connection could not be established with the Dtect X1s device

Direct serial connection

- Is the Dtect X1s switched on?
- Is the serial cable connected to the Dtect X1s device and is the COM port selected in the Configuration Manager?
- Is the same baud rate selected in the configuration manager and the Dtect X1s device? You can select this when establishing the connection. If you no longer know the baud rate setting for the Dtect X1s you can reset it to 9600 baud by performing a total system reset (switch on Dtect X1s with all three buttons on the device pressed and wait until "system reset" appears in the Dtect X1s display). Once the connection has been established you can adjust the transfer speed by right-clicking the device in the tree and selecting Baud rate.
- Does the PC and the cable used support hardware handshake (RTS/CTS)? If you are using a serial cable with only three connected lines (earth, RX and TX), the handshake lines are open. Use a cable that also connects the RTS and CTS lines as a minimum requirement. For more information, refer to the technical appendix. Cables with RTS and CTS jumpers in the plug must not be used. If it is not possible to use RTS and CTS, please contact Support.

Connection via modem

- Are you using the correct cable between the Dtect X1s and the modem? For more information, refer to the technical appendix.
- Has the modem been detected by the Dtect X1s? Once the Dtect X1s device is switched on it searches for a connected modem. If the **No modem found** message appears in the Dtect X1s Display, the modem was not detected. Check whether the modem is switched on and also make sure that the serial cable between the Dtect X1s device and modem is connected correctly. Some modems do not detect the baud rate automatically. The baud rate in this case must be the same as the Dtect X1s.
- Is the modem initialization string correct? Select the required Dtect X1s device from the tree in the configuration manager and click the **Device settings** tab on the right. The AT command set (initialization procedure) may vary depending on the manufacturer. Refer to the manual supplied with the modem to find out the correct AT commands.

Connection via GSM modem

- Is **GSM modem** entered as the communication path? To check this, click the Dtect X1s device in the Configuration Manager tree, select the device settings and make sure the **Dtect X1s device communicates via GSM modem** option is selected.
- Is the correct PIN entered in the Dtect X1s? The corresponding PIN for the SIM card used must be entered in the device settings for the Dtect X1s device in the Administrator software.

Connection using TCP/IP via a COM server

- Is the same baud rate set in the Dtect X1s and the COM server?
- Has an IP address been entered in the COM server?
- Are you using dynamic IP addresses? Fixed IP addresses are a mandatory requirement for the COM server and Remote Server PC. You should therefore deactivate the dynamic assignment of IP addresses on both sides (DHCP or Bootp) and set the IP address manually.
- Is the port number correct? When the connection is established, the port number set at the COM server must correspond to the number in the Administrator software.
- Have the serial data format and hardware handshake been configured correctly? The Dtect X1s data format is 1-8-1 (1 start bit, 8 data bits and 1 stop bit). The hardware handshake or RTS/CTS must be activated.
- Has the correct gateway been entered in the COM server? If the COM server and PC are located in different sub-networks, the IP address of the gateway must be entered in the COM server, otherwise it will not be possible to establish a TCP/IP connection.
- Are you using the correct network cable? You will need a cross-over cable if you wish to test the connection by connecting a PC or laptop computer directly to the COM server using a network cable. You will require a normal CAT5 network cable if both are connected to a hub or a switch.

All connection paths

- Is the remote server running? When the Remote Server is running the button or menu for establishing the connection is greyed out and a manual connection with the Dtect X1s cannot be established. Switch the Remote Server off to establish a manual connection.
- Is the Dtect X1s set for remote operation? Even if you have switched off the Remote Server the Dtect X1s may still attempt to establish a connection with it. At this point it is not possible to establish a connection manually between the Administrator software and the Dtect X1s. Wait for a short time before trying again.
- Are the firmware and Administrator versions compatible? The FAG Administrator version 4.10.2 is compatible with Dtect X1 / Dtect X1s devices as of version 3.x and with ProCheck devices as of version 1.1.6.4.

No data is being sent from the Dtect X1s to the PC although the Remote Server was started.

- Is the equipment communicating properly in general? If you cannot connect manually to the Dtect X1s device the remote connection will also not work. Further assistance is provided under "Connection could not be established with the Dtect X1s^[246]".
- Have you specified a remote socket for the data connection with the Dtect X1s? Open the overview of remote sockets via the **Remote -> Configuration** menu. A socket must be specified for each connection path between the Dtect X1s and the PC. If this is not the case, add a socket (see "Set up communication with device"^[47]). Select the data connection in this case (serial, modem, TCP/IP, etc.) to be used by the Dtect X1s device to transfer data.
- Are the communication settings in the Dtect X1s correct? The correct telephone number of the Remote Server must be specified at the modem. If a COM server is used, the correct IP address and port number of the Remote Server must be entered in the COM server.
- Have the correct remote triggers been specified? The circumstances under which the Dtect X1s should establish a connection with the Remote Server can be specified in the **Remote** tab in the monitoring configuration. The settings in **Device calls at** are called remote triggers.
- Has the maximum number of repeat attempts been reached? The number of times a Dtect X1s device attempts to call

if a connection is not working can be specified in the device configuration in **Max. connection retries** on the "Global settings" ^[63] tab. If this number is reached for a specific remote trigger, this trigger will no longer be able to start a remote connection build-up process. If another trigger initiates a connection build-up process which is successful or a manual connection with the Dtect X1s is established, the repetition counters are reset.

- Is the Dtect X1s device included in the active database? The Remote Server can only accept calls from devices that appear in the tree, in the configuration manager. If your Dtect X1s is not in the tree insert it using the configuration manager (see "Register a new device" ^[59]).

A sensor type is not displayed in the sensor list

If a sensor is not displayed in the list of available sensor types, this may be because the firmware and software version are not compatible.

Please update:

- the Administrator software and all of its components (see "Update Administrator software" ^[21])
- the database (see "Update database" ^[42])
- the firmware of your Dtect X1s or ProCheck device (see "Update firmware" in the device manual).



The sensor types "Particle counter", "Viscometer" or "Water sensor" are available as of the following versions:

- Administrator software version 4.6.0.x
- ProCheck firmware version 2.0.4.x
- Dtect X1s firmware version 3.6.0.x.

A connected sensor is not working

- Are the sensor and cable in working order? If you connected active sensors (ICP) via a multiplexer, the LEDs for all channels to which sensors are connected should light up green (or orange). If the LED lights up red, the connecting cable or sensor is defective.
- Is the earth and shield correctly connected? The cable contains one or two signal lines and one or two shields, depending on the sensor used. Care must be taken to ensure that ground loops are avoided. If a shield is connected to the sensor casing it must not be connected to the Dtect X1s input.

No measuring data is displayed although the equipment is communicating properly

- Is the validation being complied with? If the validation is outside the specified range during measurement, no measuring data will be stored and measurements will be discarded. It will not be possible to read out data as no measuring data will be available for this monitoring configuration and therefore no data will be displayed.
- Did overloading occur during the measurement? If **Overload** is displayed by the Dtect X1s during the measurement, the measurement was overranged and will be discarded. If this condition is permanent, the amplifier setting must be modified under **General information** in the monitoring configuration. If this is set to **Automatic**, it may be possible to eliminate the overloading by adjusting the settings manually. If overloading occurs when a manual amplifier setting is used, the next lower setting should be used.

Database

- The license for the database supplied limits the size of the database to 2 GB for legal reasons. If you require more space you will have to obtain a corresponding Microsoft SQL Server license.















No e-mails are sent or received



- Are the e-mail settings OK and has all the necessary information been entered? Please check the e-mailing settings. You can find them in the software options in **Send e-mail > Configure** and in Email Link in the **Configuration view** ^[217].
- Is the network/Internet connection available? Please make sure that there is a connection to the network and Internet.
- In DataLink, NotifyLink and Configurations Manager you can also stop and restart the mail server. This function is found in the **Service menu > Mail server maintenance**.

View messages for e-mailing

All information about e-mail sending is logged in Konfigurations-Manager, in Data Link and in Notify Link.

- Click **Show mail server results** in the **Service** menu.

Results of e-mail delivery							
Filter			All results		Mark all read		
No.	Read	Sent	Send date	Error message	Recipient	Subject	Detailed
1			14.02.2012 09:29:56		control@company.com	"Check 1 (16ch): Manueller E-Mail-Export"	
2			14.02.2012 09:26:03		control@company.com	"Check 1 (16ch): Manueller E-Mail-Export"	
3			14.02.2012 09:23:00		control@company.com	"Check 1 (16ch): Manueller E-Mail-Export"	
4			10.02.2012 08:38:16		control@company.com	"Exportiere Anlage: Application"	
5			31.01.2012 14:51:26		control@company.com	"Exportiere Anlage: Application"	
6			31.01.2012 14:50:47		control@company.com	"Check 1 (16ch): Manueller E-Mail-Export"	
7			2011-09-16 14:24:41		control@company.com	"Check 1 (16ch): Manueller E-Mail-Export"	
Close							

You can filter the messages by "All results", "Only sent results" and "Unsent results". If an e-mail was sent successfully, a latter icon  is displayed; an exclamation mark  indicates an unsent e-mail. The send date, recipient and subject of the e-mail are also displayed. In the event of an error, a detailed error message is displayed.

If there are any e-mails in "Unsent results" that could not be sent, for example because the e-mail settings were not correct, you can automatically correct and resend them.

- Click **Mail server maintenance**> **Send not sent e-mails again** in the **Service** menu.

Microsoft Outlook message when receiving e-mails

- If you have selected **MS Outlook as the transfer mode in the** Email Link software component , the following message may be displayed in run mode: "A program is trying to access e-mail addresses you have stored in Outlook. Do you want to allow this?". In this case you can allow access for a certain time. If this is not sufficient, please contact Microsoft Support.

E-mails not retrieved properly through Microsoft Outlook

If you have selected Microsoft Outlook as the transfer mode in the Email Link software component, please note the following:

- Outlook always falls back on the current Outlook user profile of your system.
- If you have defined a default profile in Outlook, the default profile defined in Outlook is always used regardless of which profile you specify in Email Link. So if you wish to use a profile in Email Link, there must not be a default profile defined on the local computer!
- Only local e-mails can be retrieved from the main Outlook e-mail folder (subfolders are not read).

14 Contact

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