GB

Software manual

Parameter setting software for vibration diagnostic electronics

VES004

Version 2.38 and higher

11687688 / 00 06 / 2025

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Licence information

ifm VES004 V2.37

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1 Preliminary note

1.1 Legal and copyright information

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1.2 Purpose of the document

The software manual describes the VES004 software for the efector octavis diagnostic electronics.

It includes information about the installation, the user interface, the configuration and the visualisation of the data.

For better understanding, use this manual along with the opened software.

1.3 Symbols used

✓	Requirement
▶	Instructions
▷	Reaction, result
[...]	Designation of keys, buttons or indications
→	Cross-reference
	Important note Non-compliance may result in malfunction or interference.
	Information Supplementary note

1.4 Warnings

Warnings indicate the possibility of personal injury and damage to property. This enables safe product handling. Warnings are graded as follows:



WARNING

Warning of serious personal injury

▷ If the warning is not observed, fatal and serious injuries are possible.



CAUTION

Warning of minor to moderate personal injury

▷ If the warning is not observed, minor to moderate injuries are possible.

ATTENTION

Warning of damage to property

▷ If the warning is not observed, damage to property is possible.

1.5 History of the instructions

What has changed in these instructions and when? An overview:

Date	Subject	Change
2016-05-26	Release V1.10	• Sensor VNB001 added • Sensor VNB211 added
2016-12-28	Release V1.20	• Transfer to editorial system • Evaluation unit VES150 added
2018-06-18	Release V1.40	• Evaluation unit VES151 added • Evaluation unit VES153 added • New features and functions: → Release notes
2019-11	Release V2.00	• System requirements revised • Document adapted to the new GUI • Evaluation units VSE003, VSE101, VSE152 added • Sensors VSM001 and VSM101 added • BLOB import VVB001 added • New features added • Minor corrections
2024-11	Release V2.37	• System requirements revised • Further evaluation units added: VSE9xx • New features added • New layout

2 Safety instructions

Please read the operating instructions of the diagnostic electronics and of the vibration sensor before using the software. The installation and connection of the diagnostic electronics and of the vibration sensor must comply with the applicable national and international standards.

Ensure that the VES004 software is suitable for your application without any restrictions.

If the instructions or the technical data are not adhered to, personal injury and/or damage to property can occur.

Operation of the software which is not in accordance with the intended use, incomplete installation or incorrect handling can seriously affect the safety of operators and machinery.

Responsibility lies with the person installing the software.

3 Intended use

The VES004 software is used to configure and display data of the VSE diagnostic electronics. The bearings and objects to be monitored are defined using the software and then transferred as a parameter set to the VSE diagnostic electronics.

4 Installation

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4.1 System requirements

The PC must meet the following requirements for installation.

- Hardware
  - IBM compatible
  - Min. dual-core processor
  - Min. 2 GB RAM
  - Min. Ethernet network card with 10/100 Mbits/s
  - Min. VGA graphics card with a resolution of min. 1024 x 768
- Software
  - Operating system:
    Microsoft Windows 7 SP1 / 8 / 8.1 / 10 / 11
    Microsoft Windows Server 2008 R2 SP1 / 2012 / 2012 R2 / 2016 / 2019 / 2022
  - The latest version of the software can be downloaded from www.ifm.com

4.2 Installing the VES004 software

To install the VES004 software:

To install the VES004 software no administrator rights are necessary.

▶ Unpack the downloaded ZIP file on a local data carrier

4.3 Installing the USB driver

✓ A USB adapter cable (e.g. E30136) is required to connect VNB type sensors to the parameter setting software.

✓ For VNB sensors on the USB interface of the PC, a separate driver is required.

To install the USB driver, administrator rights are necessary.

✓ The USB driver is part of the VES004 software package
Directory = Driver\VNBxxx\

✓ After connecting the sensor to a USB port of the PC, the Windows driver installation starts.

▶ Indicate the above-mentioned directory to the installation program.

▷ The driver is installed.

4.3.1 Troubleshooting

If the driver for a VNB device cannot be installed on a Windows computer and the following error messages are displayed:

- `A driver cannot load on this device`
  - `A security setting is preventing this driver from loading. You'll need to adjust your settings to load this driver.`
- `ifm VNBxxx Properties`
  - `Device status: Windows cannot load the device driver for this hardware. The driver may be corrupted or missing. (Code 39)`

Corrective measures

▶ Use the following workaround: A driver can't load on this device - Microsoft Support

4.4 Starting the parameter setting software

The VES004 software can be run directly from the unzipped installation folder.
To start the VES004 software:

▶ Open the installation folder

▶ Double click on "VES004.exe"

5 User interface

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This chapter describes the structure of the software's graphical user interface. The user interface is divided into several areas:

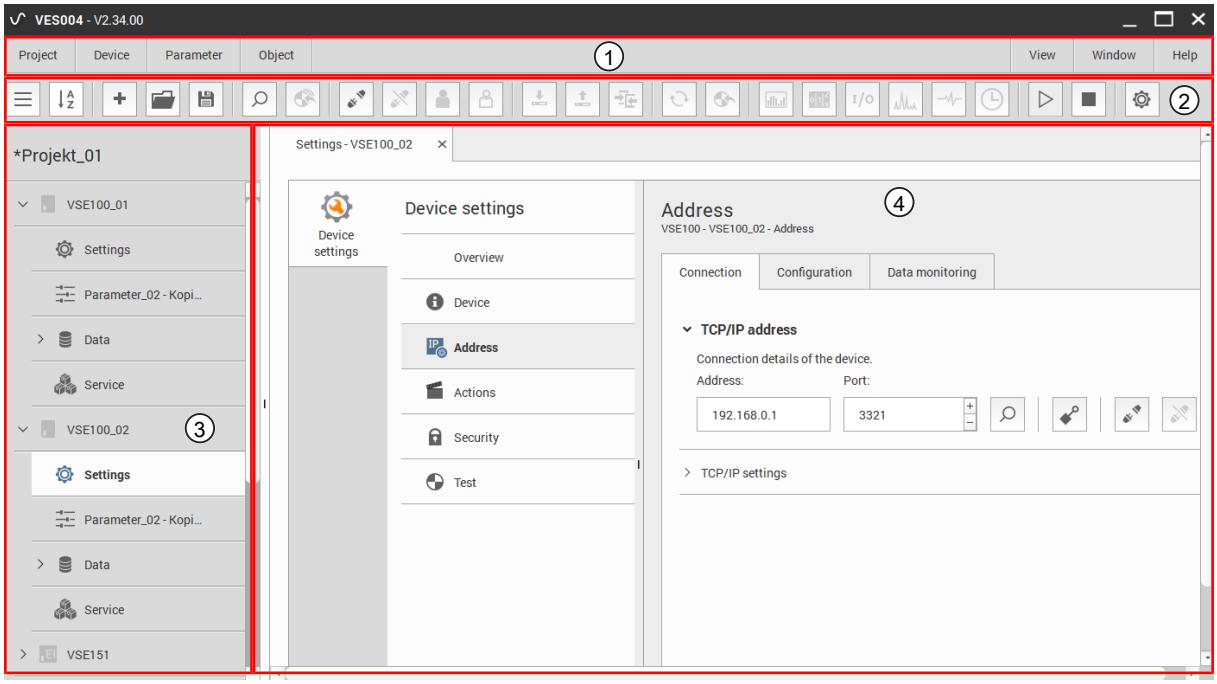


Fig. 1: User interface

1. Menu bar (→ 🗋 15)
2. Toolbar (→ 🗋 16)
3. Tree view (→ 🗋 16)
4. Detailed view (→ 🗋 17)

Additionally, a context menu can be used within the user interface. The context menu simplifies the use of the software.

- Context menu (→ 🗋 17)
- Context menu functions (→ 🗋 163)

5.1 Menu bar

The menu bar (1) (→ User interface 🗋 15) contains the main functions of the software, grouped in menus. Functions that are not available for a selected object are greyed out.

The menus are described in the following chapters, starting with the [project] menu: Menu: Project (→ 🗋 26)

5.2 Toolbar

The toolbar (2) (→ User interface 🗋 15) contains icons for frequently used functions.

In the following cases, the icons are greyed out:

- if they are not available for a selected element
- if they are not available in a given situation.

5.3 Tree view

The tree view (3) (→ User interface 🗋 15) contains the devices, parameters, settings, etc. that belong to a project. The elements are displayed in groups. You can select an element and open it in the detailed view by double clicking on it (→ Detailed view 🗋 17).

The top line of the tree view shows the name of the project.

In the screenshot above, the devices used were designated with their article number plus a consecutive number (assigned by the program), e.g. [VNB001_04]. The grouped display shows at a glance which settings and parameters belong to which device.

The [parameters] can be used multiple times: Several devices can use one parameter set. The parameters are listed repeatedly in the lower section of the tree view.

There are several methods to select the elements in the tree view:

- Selection in the tree view
- Context menu: Context menu (→ 🗋 17), Context menu functions (→ 🗋 163)
- [Object] menu: Menu: Object (→ 🗋 38)

Devices, data, groups and data groups can be moved in the project tree via drag & drop.

5.3.1 Multiple selection

Select several elements of the same type in the tree view to perform an identical action on all selected elements:

▶ Keep the [STRG]key pressed and click on every single of the elements you want to include.

▷ The clicked elements are selected.

or

▶ Press and hold the Shift key. Select a first element and a second element.

▷ All elements in the row from the first to the last element are selected.

▶ Click on an action in the context menu.

▷ The action is applied to all elements in the selection.

Possible actions for a multiple selection are, for example:

- [Connect]
- [Copy]
- [Export]
- [Delete]

5.3.2 Changing the width of the tree view

▶ Move the mouse pointer to the right boundary line of the tree view.

▷ The mouse pointer turns into a horizontal double arrow.

▶ Keep the left mouse button pressed and move the mouse horizontally.

▷ The boundary line follows the mouse pointer.

▶ Release the mouse button at the required position.

▷ The width of the tree view is now changed.

It is also possible to hide the tree view. In that case, the boundary line of the tree view is located at the left frame of the program window.

5.4 Detailed view

The detailed view (4) (→ User interface 🗋 15) occupies the largest part of the user interface. The detailed view shows the settings and information of the selected element. The settings can be edited in the detailed view.

To activate the [Parameters] changed in the parameter setting software:

▶ Upload the parameters to the device via Menu: Device > Write to device (→ 🗋 31).

To activate the [Device settings] (e.g. IP address, password) changed in parameter setting software:

▶ Upload the device settings to the device via the switching functions in the settings tabs, e.g.: via Menu: Device > Settings (→ 🗋 34).

As soon as an element is selected in the tree view (i.e. selected by a mouse click), its detailed view will be displayed.

The user interface can display several detailed views at the same time. All detailed views can be accessed via separate tabs. The tabs are displayed above the detailed view.

▶ To close a tab in the detailed view:
Either:

- Click on the "x" (at the right edge of the tab), or
- [STRG]+[F4]

▶ To open another tab in the detailed view:
In the tree view either:

- Double-click on the required settings
- Right-click on the required settings > [Open]

5.5 Context menu

Most elements have a context menu (1) from which functions can be selected:

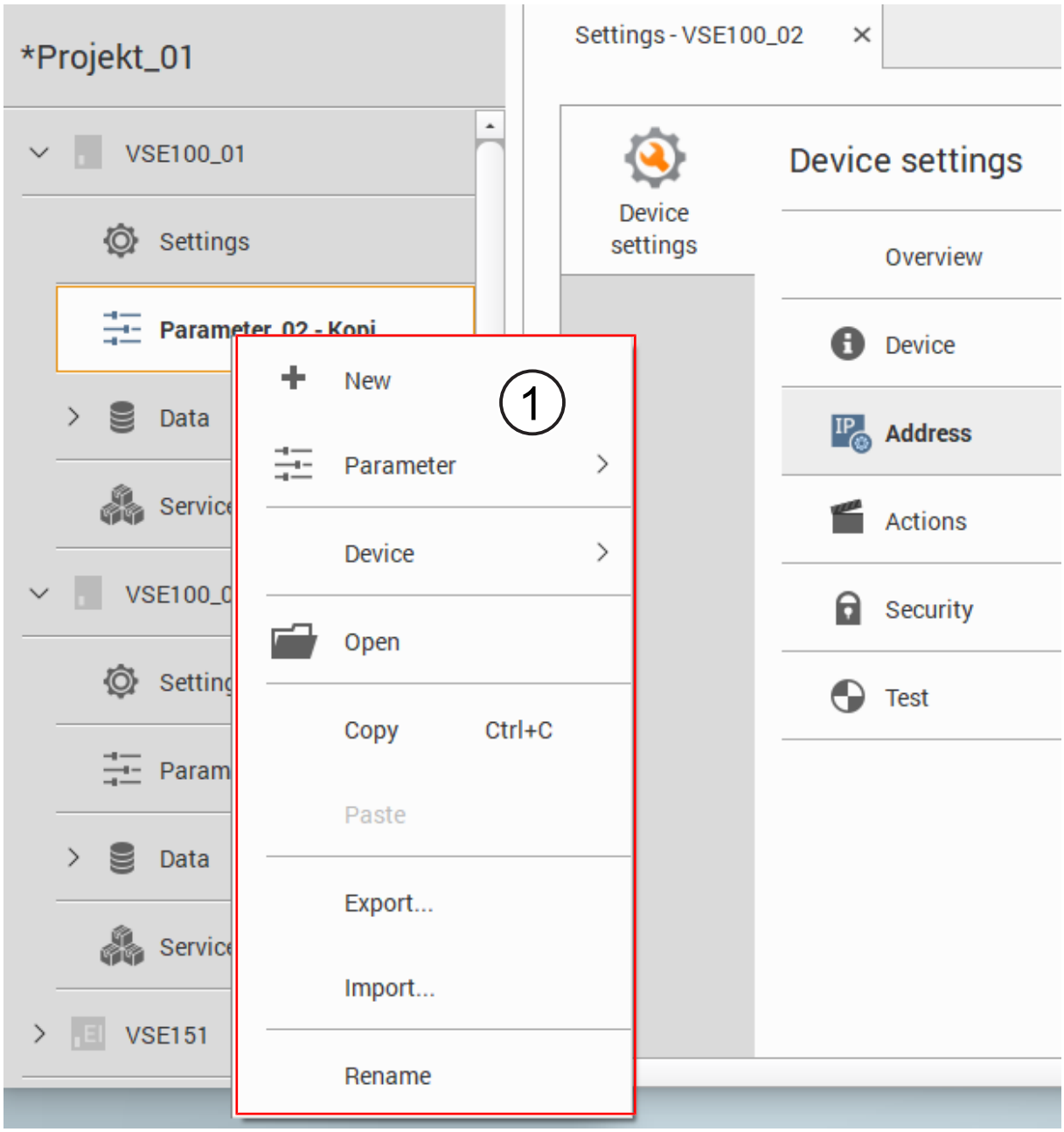


Fig. 2: Context menu

The context menu offers functions that are related to the selected element. For example, a new parameter can be created via the context menu of a parameter (1).

To open the context menu, click on the respective element with the 2nd (right) mouse button. (→ Context menu functions 🗋 163)

6 Connection (diagnostic electronics)

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This chapter describes how to establish an Ethernet connection between the VES004 parameter setting software and a diagnostic electronics.

6.1 IP address range network setting

The IP address range of device and PC must match according to the subnet mask.

Network station	Address	Address, network address	Address, station address
Subnet mask	255.255.255.0	255.255.255.	0
Consequence for IP address		must be equal	must be different
VSE diagnostic electronics	e.g. 192.168.0.1	192.168.0	e.g. 1
PC	e.g. 192.168.0.10	192.168.0	e.g. 10

6.2 Parameter factory setting

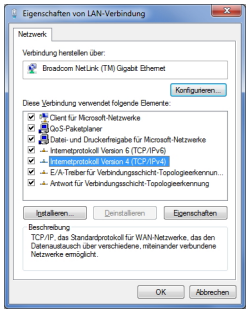
VSE diagnostic electronics - Parameters	Factory setting
Dynamic Host Configuration Protocol (DHCP)	Off
IP address / Port	192.168.0.1 : 3321
Subnet mask	255.255.255.0

6.3 Verifying and setting the IP address of the PC

Changes in the network settings of the PC require extended user rights.

In case of need, contact your system administrator.

▶ Activate the [Internet Protocol Properties Version 4 (TCP/IPv4)] Windows menu:
e.g. via [Start] > [System control] > [Network and Sharing Center] > [Change adapter settings] > [LAN connection] > (Right-click) > [Properties]



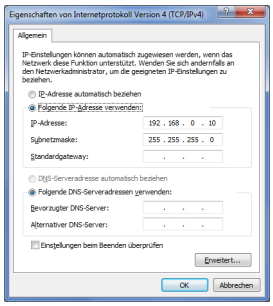
▶ [Properties] button

▶ Select the [Use the following IP address] menu item

▶ Verify and set the IP address, if necessary (here e.g. 192.168.0.10)

▶ Enter the subnet mask (255.255.255.0)

▶ Leave the default gateway blank



▶ Confirm the settings with [OK]

6.4 Connecting to the device

▶ Start the VES004 software on the PC

To establish a connection with a diagnostic electronics you must first create a new project or open an existing one (→ see below). On delivery, no project is set up.

6.4.1 Creating a new project

▶ Either:
Select [Project] > [New...]
Or:

Left-click on the (Create new project) icon
Or:
[Ctrl]+[N]

▶ Enter a name for the project

▶ Confirm by clicking on [OK]

▷ The new project is created and opened

Alternatively:

6.4.2 Opening an existing project

▶ Either:
Select [Project] > [Open...]
Or:

Left-click on the (Open project) icon
Or:
[Ctrl]+[O]

▶ Select the required project from the list

▶ Confirm by clicking on [OK]

▷ The selected project is opened

6.4.3 Creating a new device (VSE)

In the open project:

▶ Either:
Select [Device] > [New] > [Vibration monitor]
Or:
In the tree view: right-click in the empty field
Select [New] > [Vibration monitor]

▶ Select the VSE diagnostic electronics that is used

▷ The selected device appears in the tree view as [VSEnnn_#]

▶ After clicking on [Settings] below [VSEnnn_#]:

▷ The tab [VSEnnn_#] opens in the detailed view

▷ Under the headline [Address], the [Configuration] tab appears with the connection details of the device

▶ Enter the connection details of the diagnostic electronics in the [TCP/IP address] section. Factory setting:
IP address: 192.168.0.1
Port: 3321

▶ Either:
Select [Device] > [Connect]
Or:
In the tree view, right-click on [VSEnnn_#] > left-click on [Connect]
Or:
Left-click on the (Connect to the device) icon

▷ The software is connected to the diagnostic electronics

The [Address] element contains the following switching functions:

Icon	Description	Menu sequence (alternatively)
	Scan the network for connected devices	[Device] > [Scan Network]
	Connect the PC to the diagnostic electronics	[Device] > [Connect]
	Disconnect the PC from the diagnostic electronics	[Device] > [Disconnect]

7 Connection (vibration sensor)

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This chapter describes how to establish a USB connection between the VES004 parameter setting software and a VNB vibration monitor.

7.1 Installing the USB driver

✓ A USB adapter cable (e.g. E30136) is required to connect VNB type sensors to the parameter setting software.

✓ For VNB sensors on the USB interface of the PC, a separate driver is required.

To install the USB driver, administrator rights are necessary.

✓ The USB driver is part of the VES004 software package
Directory = Driver\VNBxxx\

✓ After connecting the sensor to a USB port of the PC, the Windows driver installation starts.

▶ Indicate the above-mentioned directory to the installation program.

▷ The driver is installed.

7.1.1 Troubleshooting

If the driver for a VNB device cannot be installed on a Windows computer and the following error messages are displayed:

- `A driver cannot load on this device`
  - `A security setting is preventing this driver from loading. You'll need to adjust your settings to load this driver.`
- `ifm VNBxxx Properties`
  - `Device status: Windows cannot load the device driver for this hardware. The driver may be corrupted or missing. (Code 39)`

Corrective measures

▶ Use the following workaround: A driver can't load on this device - Microsoft Support

7.2 Connecting to the device

▶ Start the VES004 software on the PC

To establish a connection with a sensor you must first create a new project or open an existing one (→ see below). On delivery, no project is set up.

7.2.1 Creating a new project

▶ Either:
Select [Project] > [New...]
Or:

Left-click on the (Create new project) icon
Or:
[Ctrl]+[N]

▶ Enter a name for the project

▶ Confirm by clicking on [OK]

▷ The new project is created and opened

Alternatively:

7.2.2 Opening an existing project

▶ Either:
Select [Project] > [Open...]
Or:

Left-click on the (Open project) icon
Or:
[Ctrl]+[O]

▶ Select the required project from the list

▶ Confirm by clicking on [OK]

▷ The selected project is opened

7.2.3 Creating a new device (VNB)

In the open project:

▶ Either:
Select [Device] > [New] > [Vibration monitor]
Or:
In the tree view: right-click in the empty field
Select [New] > [Vibration monitor]

▶ Select the VNB vibration monitor used

▷ The selected device appears in the tree view as [VNBnnn_#]

▶ After clicking on [Settings] below [VNBnnn_#]:

▷ The [VNBnnn_#] tab opens in the detailed view

▷ Under the headline [Address], the [Configuration] tab appears with the connection details of the device

▷ In the [Connection] section, the serial number of the last device detected appears

With a newly created vibration monitor, this field is still empty
In this case:

▶ Left-click on the (scan the USB ports for connected devices) icon to search and identify the vibration monitor

▶ Either:
In the [Found devices] window, add the required device to the project with a double-click
Or:
In the [Found devices] window, select the required device with a left-click

Add the selected device to the project with a left-click on the (update the project with the selected device) icon

▷ The read serial number of the device appears in the [Serial number] field

▶ Either:
Select [Device] menu > [Connect]
Or:
in the tree view, right-click on [Device] > left-click on [Connect]
Or:

Left-click on the icon  (connect to the device)

▷ The software is connected to the vibration monitor

▷ The [Serial number] field can no longer be changed and is greyed out

The [Address] element contains the following switching functions:

Icon	Description	Menu sequence (alternatively)
	Scan the USB ports for connected devices	[Device] > [Scan Network]
	Connect the PC to the vibration sensor	[Device] > [Connect]
	Disconnect the PC from the vibration sensor	[Device] > [Disconnect]

8 Menus

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This chapter describes the menus. The menus can be accessed via the menu bar (→ Menu bar 🗋 15).

The menu items within the menus are context-sensitive. Some menu items may be deactivated and greyed out depending on the selected element.

8.1 Menu: Project

This chapter describes the functions contained in the [Project] menu.

A project contains all connected devices, corresponding parameters and settings.

The [Project] menu can be accessed via the menu bar (→ Menu bar 🗋 15).

Only one project can be open at a time. Save the opened project before creating a new project or opening another project.

8.1.1 Menu: Project > New...

Creates a new project or overwrites an existing project.

▶ Either:
Select [Project] > [New...]
Or:
Left-click on the ✚ (create new project) icon

To create a new project:

▶ Enter a new project name
Confirm with [Ok]

▷ The new, empty project is created and opened

To overwrite an existing project:

▶ Select a project name from the list

▶ Acknowledge the confirmation prompt with [Ok]

▷ A new, empty project is created and opened under the selected name

8.1.2 Menu: Project > Open...

To open a project:

▶ Either:
Select [Project] > [Open...]
or:

Left-click on the (Open project) icon
Or:
[Ctrl]+[O]

▶ Select a project name from the list

▶ Confirm by clicking on [OK]

▷ The selected project is opened

The program automatically saves the projects and the associated parameters and data in the following directory:
`C:\Benutzer\Öffentlich\Öffentliche Dokumente\VES004`
`C:\Users\Public\Documents\VES004`

8.1.3 Menu: Project > Recent Projects

Lists the recently opened project in descending chronological order

To open a recent project:

▶ Select [Project] > [Recent Projects] > [Project name]

▶ Confirm by clicking on [OK]

▷ The selected project is opened

8.1.4 Menu: Project > Close

Closes the opened project.

To close the project and save the changes:

▶ Select [Project] > [Close]

▷ In case of unsaved project changes a confirmation prompt appears.

▶ Click on the [Yes] button

To close the project without saving the changes:

▶ Select [Project] > [Close]

▷ In case of unsaved project changes a confirmation prompt appears.

▶ Click on the [No] button

8.1.5 Menu: Project > Save

Saves the opened project.

▶ Either:
Select [Project] > [Save]
Or:

Left-click on the icon (save project)
Or:
[Ctrl]+[S]

▷ The project is saved under the current name.

The program automatically saves the projects and the associated parameters and data in the following directory:
`C:\Benutzer\Öffentlich\Öffentliche Dokumente\VES004`
`C:\Users\Public\Documents\VES004`

8.1.6 Menu: Project > Save as...

Saves the open project under a new name.
The location cannot be changed.

▶ Select [Project] > [Save as...]

▶ Enter a new project name

▶ Confirm by clicking on [OK]

▷ The project is saved under the new name.

▷ The project with the old name is kept with the setting last saved.

8.1.7 Menu: Project > Delete

Deletes the open project.

The “Delete the project” function also deletes all parameter sets, data and documents contained in the project.

▶ Select [Project] > [Delete]

To delete the open project:

▶ Acknowledge the confirmation prompt with [Yes]

▷ The current project and all related parameters, data and documents will be deleted

To not delete the opened project:

▶ Answer the confirmation prompt with [No]

▷ The current project and all corresponding parameters, data and documents will not be deleted.

8.1.8 Menu: Project > Start monitoring

Requirements:

- The VES software is connected to the device via
- The configuration was transferred to the device via
- Data is received

Restarts the current monitoring (→ Monitoring 148). The new measured values are displayed again in the selected graph.

Requirement:

- Monitoring stopped

▶ Either:
Select [Project] > [Start monitoring]
Or:
Click on the (start project data monitoring) icon

8.1.9 Menu: Project > Stop monitoring

Preset: Process data should be displayed in the program.
Requirements:

- The VES software is connected to the device via
- The configuration was transferred to the device via
- Data is received

Stop of the ongoing measurement in Monitoring (→ Monitoring 148), no new measured values are displayed.

Requirement:

- Monitoring in progress

▶ Either:
Select [Project] > [Stop monitoring]
Or:
Click on the (stop project data monitoring) icon

8.1.10 Menu: Project > Backup...

Creates a backup copy of the open project. Name and memory location are freely selectable.

▶ Select [Project] > [Backup...]

▶ Define the name of the backup and the memory location in the dialogue window

▶ Confirm with [Save]

8.1.11 Menu: Project > Restore...

Restores the backup copy of a project.

▶ Select [Project] > [Restore...]

▶ Select the name of the backup and the memory location in the dialogue window

▶ Confirm with [Open]

▶ Select a project name for the project list
(the project name valid at the time of the backup is indicated)

8.1.12 Menu: Project > Quit

Closes the project and quits the program.

Before quitting the program: Save the changes to the project!

▶ Either:
Select [Project] > [Quit]
Or:
[Alt]+[F4]

▷ In case of unsaved project changes a confirmation prompt appears.

▶ Confirm saving.

▷ The current project is saved and closed, and the program is quit.

8.2 Menu: Device

This chapter describes the functions contained in the [Device] menu.

The [Device] menu allows you to connect diagnostic systems and vibration sensors with the PC and set all device-specific functions.

The [Device] menu is active when a device is selected in the tree view (→ Tree view 16).

The [Device] menu can be accessed via the menu bar (→ Menu bar 15).

8.2.1 Menu: Device > New...

The selected device type cannot be changed at a later date.

The [Device] > [New] function creates a new or an additional device in the open project.

The created devices appear in the tree view.

In the tree view, the settings, parameters and data of the device are displayed in groups.

8.2.1.1 Supported devices

The program supports the following devices:

- VSE002 diagnostic electronics
- VSE003 diagnostic electronics
- VSE100 diagnostic electronics
- VSE101 diagnostic electronics
- VSE903 diagnostic electronics
- VYE004 diagnostic electronics
- VYE007 diagnostic electronics
- VSE150 diagnostic electronics (PROFINET IO)
- VSE950 diagnostic electronics (PROFINET IO)
- VYE113 diagnostic electronics (PROFINET IO)
- VSE151 diagnostic electronics (EtherNet/IP)
- VSE951 diagnostic electronics (EtherNet/IP)
- VSE114 diagnostic electronics (EtherNet/IP)
- VSE152 diagnostic electronics (EtherCAT)
- VSE153 diagnostic electronics (Modbus TCP)
- VSE163 diagnostic electronics (Modbus TCP)
- VSE953 diagnostic electronics (Modbus TCP)
- VSE963 diagnostic electronics (Modbus TCP)
- VYE115 diagnostic electronics (Modbus TCP)
- VYE117 diagnostic electronics (Modbus TCP)
- VNB001 vibration sensor
- VNB211 vibration sensor

8.2.2 Menu: Device > Connect

✓ The device (or group of devices) is selected in the tree view

✓ The device (or at least one device in the group) is electrically connected

✓ The connection settings of PC and device correspond to the requirements

▶ Click on [Device] > [Connect] to establish the connection to the selected device.

▷ After successful connection the program and the device exchange data.

8.2.3 Menu: Device > Disconnect

✓ The device (or group of devices) is selected in the tree view

✓ The device (or at least one device in the group) is connected to the program

▶ Click on [Device] > [Disconnect] to disconnect the selected device or all devices in the selected group.

▷ After successful disconnection there is no more data exchange between the program and the device.

8.2.4 Menu: Device > Login... (only VSE/VYE)

This only applies to VSE/VYE:

✓ In the tree view, the device is selected

✓ The VES software is connected to the device via

▶ Use the [Device] > [Login...] function to change the security level.

The access rights of the user can be restricted through the security levels: VSE > ... > [Security] > Tab [Access Rights] (→ 🗋 59)

The access rights in the respective security level can be adjusted: VSE > [VSEnnn_#] > Detail [Device settings] > [Security] (→ 🗋 57)

Depending on the configuration, a password may be required to change the security level. Default setting = no password.

The passwords of the security levels can be adjusted: VSE > ... > [Security] > Tab [Passwords] (→ 🗋 58)

8.2.5 Menu: Device > Logout (only VSE/VYE)

This only applies to VSE/VYE:

✓ In the tree view, the device is selected

✓ The VES software is connected to the device via

✓ The user is logged in

▶ Click on the [Device] > [Logout] function to set the security level to 0. The function is only available if one of the security levels 1...4 is active: VSE > [VSEnnn_#] > Detail [Device settings] > [Security] (→ 🗋 57)

8.2.6 Menu: Device > Write to device

✓ In the tree view, the device is selected

✓ The VES software is connected to the device via

▶ Click on the [Device] > [Write to device] function to upload the parameter set to the device.

To activate the **Parameters** changed in the parameter setting software:

▶ Upload the parameters to the device via Menu: Device > Write to device (→ 🗋 31).

To activate the **Device settings** (e.g. IP address, password) changed in parameter setting software:

▶ Upload the device settings to the device via the switching functions in the settings tabs, e.g.: via Menu: Device > Settings (→ 🗋 34)

8.2.7 Menu: Device > Read from device

✓ In the tree view, the device is selected

✓ The VES software is connected to the device via

▶ The [Device] > [Read from device] function downloads settings and parameters from the device.

8.2.8 Menu: Device > Compare with device...

✓ In the tree view, the device is selected

✓ The VES software is connected to the device via

▶ The [Device] > [Compare with device…] function compares the locally stored parameter set with the one of the device.

▷ Differences between the parameter sets will be indicated.

8.2.9 Menu: Device > Scan network...

✓ In the tree view, the device is selected.

▶ Click on the [Device] > [Scan network...] function to scan the local network for devices connected to it.

▷ The found devices are listed in a dialogue window under the [Found devices] tab, from where they can be added to the project via the icon.

This only applies to VSE/VYE:

Under the [Search network] tab, further networks can be searched via the IP address and the IP address of the current network can be changed.

8.2.10 Menu: Device > Parameter

Requirement:

- In the tree view, the device is selected

The [Parameter] submenu contains all functions required for parameter management.

8.2.10.1 Menu: Device > Parameter > Open

✓ In the tree view, the device is selected

▶ The [Device] > [Parameter] > [Open] function opens the parameters of the selected device.

▷ The parameters appear in the detailed view under a tab.

8.2.10.2 Menu: Device > Parameter > New

✓ In the tree view, the device is selected

▶ The [Device] > [Parameter] > [New] function creates a new parameter set.

▷ The program assigns this parameter set to the selected device.

8.2.10.3 Menu: Device > Parameter > Assign

✓ In the tree view, the device is selected

▶ The [Device] > [Parameter] > [Assign] > “Parameter set” function assigns the selected parameter set to a device.

8.2.10.4 Menu: Device > Parameter > Write to device

✓ In the tree view, the device is selected

✓ The VES software is connected to the device via

▶ The [Device] > [Parameter] > [Write to device] function uploads the parameter set to the device.

To activate the [Parameters] changed in the parameter setting software:

▶ Upload the parameters to the device via Menu: Device > Write to device (→ 🗋 31).

To activate the [Device settings] (e.g. IP address, password) changed in parameter setting software:

▶ Upload the device settings to the device via the switching functions in the settings tabs, e.g.: via Menu: Device > Settings (→ 🗋 34).

8.2.10.5 Menu: Device > Parameter > Read from device

✓ In the tree view, the device is selected

✓ The VES software is connected to the device via

▶ The [Device] > [Parameter] > [Read from device] function downloads settings and parameters from the device.

8.2.10.6 Menu: Device > Parameter > Compare with device

✓ In the tree view, the device is selected

✓ The VES software is connected to the device via

▶ The [Device] > [Parameter] > [Compare with device] function compares the locally stored parameter set with the one of the device.

▷ Differences between the parameter sets will be indicated.

8.2.11 Menu: Device > Settings

The [Settings] submenu contains all functions required for settings management.

8.2.11.1 Menu: Device > Settings > Open

✓ In the tree view, the device is selected

▶ The [Device] > [Settings] > [Open] function opens the settings of the selected device.

▷ The settings are displayed in the detailed view under a tab.

8.2.11.2 Menu: Device > Settings > Write IP settings to device (only VSE/VYE)

This only applies to VSE/VYE:

✓ In the tree view, the device is selected

✓ The VES software is connected to the device via

▶ The [Device] > [Settings] > [Write IP settings to device] function writes the current network settings to the device.

8.2.11.3 Menu: Device menu > Settings > Write access rights to device

✓ In the tree view, the device is selected

✓ The VES software is connected to the device via

✓ The user is logged in to the device via with a security level that is higher than the level that is to be changed

▶ The [Device] > [Settings] > [Write access rights to device] function uploads the set access rights to the device.

8.2.11.4 Menu: Device > Settings > Read access rights from device

✓ In the tree view, the device is selected

✓ The VES software is connected to the device via

✓ The user is logged in to the device via with a security level that is higher than the level that is to be changed

▶ The [Device] > [Settings] > [Read access rights from device] function downloads the access rights from the device.

8.2.12 Menu: Device > Actions

Requirements:

- In the tree view, the device is selected
- The VES software is connected to the device via

The [Actions] submenu contains administrative functions of the device.

8.2.12.1 Menu: Device > Actions > Write firmware to device (only VSE/VYE)

This only applies to VSE/VYE:

ATTENTION

Firmware update

▷ Data loss is possible

▶ Save parameters, settings and history before updating the firmware.

✓ In the tree view, the device is selected

✓ The VES software is connected to the device via

▶ The [Device] > [Actions] > [Write firmware to device] function writes a new firmware to the diagnostic electronics. The firmware file is selected from a file window.

ATTENTION

Interruption of voltage supply and connections

▷ Damage to the diagnostic electronics and repair by the manufacturer

▶ Always secure the voltage supply and connections between the PC and the diagnostic electronics while the firmware is being written to the device.

8.2.12.2 Menu: Device > Actions > Reboot (only VSE/VYE)

This only applies to VSE/VYE:

✓ In the tree view, the device is selected

✓ The VES software is connected to the device via

▶ The [Device] > [Actions] > [Reboot] function reboots the diagnostic electronics.

8.2.12.3 Menu: Device > Actions > Self-test

Applies only to type MEMS (VSA) sensors!

For IEPE sensors, only wire-break test!

✓ In the tree view, the device is selected

✓ The VES software is connected to the device via

▶ The [Device] > [Actions] > [Self-test] function carries out a self-test of the sensors connected to the dynamic inputs.

8.2.12.4 Menu: Device > Actions > Teach-in

✓ In the tree view, the device is selected

✓ The VES software is connected to the device via

▶ The [Device] > [Actions] > [Teach-in] function measures the characteristic values of connected sensors and determines the teach values of the configured objects.

8.2.12.5 Menu: Device > Actions > Set counter values

✓ In the tree view, the device is selected

✓ The VES software is connected to the device via

▶ Click on the icon.

▷ The [Set counter values] window appears.

▶ Select counter.

▶ Set the counter value in the [New value] table column.

▶ Activate the checkbox in the [Write] table column.

▶ Click [Write counters].

▷ The counter values are written to the device.

8.2.13 Menu: Device > Reset (only VSE/VYE)

This only applies to VSE/VYE:

Requirements:

- In the tree view, the device is selected
- The VES software is connected to the device via

The [Reset] submenu offers several functions for resetting various device configurations.

8.2.13.1 Menu: Device > Reset > Counter

✓ In the tree view, the device is selected

✓ The VES software is connected to the device via

▶ The [Device] > [Reset] > [Counter] function resets the counters configured in the device to "0".

8.2.13.2 Menu: Device > Reset > History

✓ In the tree view, the device is selected

✓ The VES software is connected to the device via

▶ The [Device] > [Reset] > [History] function resets the internal history of the device. In addition, the device time is reset to the PC system time.

8.2.13.3 Menu: Device > Reset > Parameter

✓ In the tree view, the device is selected

✓ The VES software is connected to the device via

▶ The [Device] > [Reset] > [Parameter] function deletes the parameter set stored on the device.

8.2.13.4 Menu: Device > Reset > Security

✓ In the tree view, the device is selected

✓ The VES software is connected to the device via

▶ The [Device] > [Reset] > [Security] function resets the internal access rights of the device.

Resetting the internal access rights requires at least security level 1.

8.2.13.5 Menu: Device > Reset > Factory settings

✓ In the tree view, the device is selected

✓ The VES software is connected to the device via

▶ The [Device] > [Reset] > [Factory settings] function restores the factory setting of the device.

Restoring the factory settings requires security level 4.

The [Factory settings] function does not reset the IP settings.

8.2.13.6 Menu: Device > Reset > Reset passwords

✓ In the tree view, the device is selected

✓ The VES software is connected to the device via

▶ The [Device] > [Reset] > [Reset passwords] function resets the passwords of the device.

8.2.14 Menu: Device > Online data

Requirements:

- In the tree view, the device is selected
- The VES software is connected to the device via

The [Online data] submenu contains the monitoring of all measured data of the device. Depending on the device type, different monitoring data can be accessed (→ Monitoring types 🗋 148):

Only applicable to VSEnnn:

e.g. raw signal (time signal), processed data (e.g. frequency spectra or object values).

Only applicable to VNBnnn:

Data, I/O, history.

8.3 Menu: Parameter

This chapter describes the functions contained in the [Parameter] menu.

In the [Parameter] menu, parameters are created and uploaded or downloaded to the device.
The [Parameter] menu can be accessed via the menu bar (→ Menu bar 🗋 15).

8.3.1 Menu: Parameter > New

✓ In the tree view, [Device_#] or [Parameter_#] is selected.

▶ The [Parameter] > [New] function creates a new parameter set.

8.3.2 Menu: Parameter > Device

✓ In the tree view, the [Parameter_#] parameter set is selected.

▶ The [Parameter] > [Device] > [Assign] > “Parameter set” submenu assigns the selected parameter set to a device.

8.3.3 Menu: Parameter > Write to device

✓ In the tree view, the [Parameter_#] parameter set is selected.

✓ The VES software is connected to the device via

▶ The [Parameter] > [Write to device] function uploads the parameter set to the device.

To activate the [Parameters] changed in the parameter setting software:

▶ Upload the parameters to the device via Menu: Device > Write to device (→ 🗋 31).

To activate the [Device settings] (e.g. IP address, password) changed in parameter setting software:

▶ Upload the device settings to the device via the switching functions in the settings tabs, e.g.: via Menu: Device > Settings (→ 🗋 34).

8.3.4 Menu: Parameter > Read from device

✓ In the tree view, the device is selected

✓ The VES software is connected to the device via

▶ The [Parameter] > [Read from device] function downloads settings and parameters from the device to the parameter setting software.

8.4 Menu: Object

This chapter describes the functions contained in the [Object] menu.

The [Object] menu allows you to create and manage objects.
The [Object] menu can be accessed via the menu bar (→ Menu bar 🗋 15).

8.4.1 What are objects?

Objects are data and parameters that are to be displayed in the detailed view.

If selected in the tree view...	... what objects are involved?
(nothing) Group	Group or data group
VNBnnn_# VSEnnn_#	Device settings + parameters
Settings	Device settings
Parameter_#	General configuration
Data	Data group (in the tree view)

8.4.2 Menu: Object > New

✓ In the tree view, the [Data] of the device is selected.

▶ The [Object] > [New] function creates a new data group in the tree view.

✓ In the tree view, one group is selected.

▶ The [Object] > [New] function either creates

- a new group
- a new data group in the tree view

8.4.3 Menu: Object > Open

✓ In the tree view, either [Settings] or [Parameter_#] is selected.

▶ The [Object] > [Open] function opens an existing object in the detailed view.

8.4.4 Menu: Object > Update

✓ In the tree view, a history is selected.

▶ The [Object] > [Update] function updates the displayed history data.

8.4.5 Menu: Object > Copy

✓ Either of the following is selected in the tree view: [VNBnnn_#], [VSEnnn_#], [Parameter_#].

▶ The [Object] > [Copy] function copies objects from the tree view to the clipboard.

8.4.6 Menu: Object > Paste

✓ An object has been copied to the clipboard: Menu: Object > Copy (→ 🗋 39)

✓ An element is selected in the tree view to which the object can be copied from the clipboard.

▶ The [Object] > [Paste] function copies objects from the tree view to the clipboard.

8.4.7 Menu: Object > Export

✓ Either of the following is selected in the tree view: [VNBnnn_#], [VSEnnn_#], [Parameter_#], [Data]

▶ The [Object] > [Export] function exports objects from the tree view into a file:

Device file:	*.idev
Settings file:	*.iset
Parameters file:	*.ipar, *.xpar, *.xml
Data file:	*.idat, *.xml, *.csv, *.xlsx

8.4.8 Menu: Object > Import

✓ Either of the following is selected in the tree view: [VNBnnn_#], [VSEnnn_#], [Parameter_#], [Data]

▶ The [Object] > [Import] function imports objects from a file into the active project in the tree view:

Device file:	*.idev, *.o2pk
Settings file:	*.iset, *.o2st, *.o2pk
Parameters file:	*.ipar, *.xpar, *.o2pr, *.o2pk
Data file:	*.bin, *.idat, *.ohs, *.orc

8.4.9 Menu: Object > Rename

✓ Either of the following is selected in the tree view: [VNBnnn_#], [VSEnnn_#], [Parameter_#]

▶ To rename an object:
Either:
[Object] > [Rename] function
Or:
[F2] key

▷ The name of this object is selected for editing

▶ Change the object name

▶ Confirm the change with [ENTER] or cancel the change using [ESC].

8.4.10 Menu: Object > Delete

✓ Either of the following is selected in the tree view: [VNBnnn_#], [VSEnnn_#], [Parameter_#]

Assigned objects cannot be deleted.

▶ To delete the selected object:
Either:

[Object] > [Delete] function
or:
[DEL] key

▷ A confirmation prompt appears

▷ After [Yes]: the selected object is deleted from the tree structure

▷ After [No] or [ESC] key: the object is not deleted

8.5 Menu: View

This chapter describes the functions contained in the [View] menu.

The [View] menu allows you to manage the language and unit settings.
The [View] menu can be accessed via the menu bar (→ Menu bar 15).

8.5.1 Menu: View > Language

▶ The [Language] submenu allows you to switch the language of the user interface.

▷ After switching the language, all menu items are displayed in the selected language.

▷ A query appears asking whether the preset object names should also be displayed in the selected language.

▷ If [Yes]: all preset object names are displayed in the selected language.

▷ The previously manually changed object names remain unchanged.

8.5.2 Menu: View > Settings

The “Settings” function contains the following setting options:

8.5.2.1 Menu: View > Settings > Common tab

Section	Dialogue element	Display	Switching function
Common settings	Automatically open the last project used	Checkbox	Activate / deactivate
	Configurable projects location	Checkbox	Activate / deactivate

Section	Dialogue element	Display	Switching function
Common settings	Show status messages	Checkbox	Activate / deactivate
Color theme	Color theme	Selected colour theme: • Light • Dark	Selectable from list
Application scaling	Application scaling	Selected scaling for GUI: • Smaller • Normal (Default) • Larger	Select an option

8.5.2.2 Menu: View > Settings > Display units tab

Engineering units displayed for...

- Displacement | Velocity | Acceleration
- Frequency | Rotational speed

Section	Dialogue element	Display	Switching function
Engineering units	Metric 1	mm | mm/s | g	Option field
	Metric 2	mm | mm/s | mg	Option field
	Metric 3	mm | mm/s | m/s²	Option field
	Imperial 1	mil | in/s | g	Option field
	Imperial 2	mil | in/s | mg	Option field
	Imperial 3	mil | in/s | m/s²	Option field
Frequency and rotational speed	Hertz	Hz | rpm	Option field
	Cycles per minute	cpm | cpm	Option field

8.5.2.3 Menu: View > Settings > Default diagnostic view tab

To help visualise the effect of different settings, for example on a spectrum, it can be useful to define the scaling of a graph. This makes it easier, for example, to observe the evolution of the curve in the graph (larger, smaller, etc.).

Setting the scaling of a graph:

- [Default spectrum view]
- [Default raw data view]

Section	Dialogue element	Display	Switching function
Default spectrum view		Checkbox	Activate / deactivate
	X-axis max. frequency	Input fields: • H-FFT • Acceleration • Velocity • Displacement	Standard values: • 1,000.00 Hz • 10,000.00 Hz • 1,000.00 Hz • 1,000.00 Hz
	Y-axis max. amplitude	Input fields: • H-FFT • Acceleration • Velocity • Displacement	Standard values: • 250.00 mg • 2,000.00 mg • 5.00 mm/s • 250.00 mm
	Y-axis amplitude	Lists: • H-FFT • Acceleration • Velocity • Displacement	• Peak • RMS

Section	Dialogue element	Display	Switching function
Default spectrum view	Filter	List	• No filter • Lowpass 2,950 Hz • Bandpass 450...5,950 Hz • Highpass 1,200 Hz • Highpass 1,950 Hz • Highpass 5,000 Hz • Highpass 7,500 Hz • Highpass 10,000 Hz
	Start with default view	Checkbox	Activate / deactivate
Default raw data view		Checkbox	Activate / deactivate
	Y-axis max. amplitude	Input box	Default value: 5,000.00 mg
	Y-axis min. amplitude	Input box	Default value: -5,000.00 mg
	Start with default view	Checkbox	Activate / deactivate

8.5.2.4 Menu: View > Settings > Data monitoring tab

Section	Dialogue element	Display	Switching function
Auto-scaling default behaviour	Standard	Selected setting: • Damage and warning limits • Data values	Selectable from list
Display settings storage	Activate storing of monitoring display settings	Checkbox	Activate / deactivate
	Reset stored monitoring display settings to their corresponding default values	Selected setting: • All monitoring display settings • Online data monitoring only • Data recordings only	Selectable from list
Warning messages	Disable warning messages for fast object monitoring	Checkbox	Activate / deactivate
Bar graph display format	Display vertical bar graphs	Checkbox	Activate / deactivate
	Display warning and damage limits as lines only	Checkbox	Activate / deactivate
Data recordings	Record active monitoring objects only	Checkbox	Activate / deactivate
Raw data	Time display	Selected setting: • Date and time • Recording time	Selectable from list
	Measurement	Selected setting: • Frequency • Time	Selectable from list

Switching functions:

↻	Reset data monitoring to the standard settings

8.5.2.5 Menu: View > Settings > Project monitoring tab

Section	Dialogue element	Display	Switching function
Default behaviour	Standard	Selected setting: • On • Off	Selectable from list
Monitoring data	• Objects • Counter • Alarms • Inputs	Checkbox	Activate / deactivate
Fast objects	Enable project monitoring for fast diagnostic objects.	Checkbox	Activate / deactivate

8.5.2.6 Menu: View > Settings > Import tab

Section	Dialogue element	Display	Switching function
Options	Keep file names	Checkbox	Activate / deactivate
Legacy imports	Keep parameter names	Checkbox	Activate / deactivate
	Import weighting configuration in old format	Checkbox	Activate / deactivate

If Legacy imports is activated: Switches the previous parameter name conversion off and maintains the original names.

8.5.2.7 Menu: View > Settings > Data export tab

Section	Dialogue element	Display	Switching function
Decimal count (all formats)	Decimal count	Configured value	Increase / decrease value
Float number format (CSV, XML)	Decimal point	Selected setting: • Point • Comma	Selectable from list
	Digit grouping	Selected setting: • None • Comma • Point • Apostrophe	Selectable from list
Flags and time stamps (CSV, XML)	Human-readable flags	Checkbox	Activate / deactivate
	Human-readable time stamps	Checkbox	Activate / deactivate
	Date and time format	Selected setting	Selectable from list
	Display milliseconds (only supported for CSV and XML)	Checkbox	Activate / deactivate
	Export time stamps into raw data files	Checkbox	Activate / deactivate
Column separator (for CSV files)	Separator	Selected setting: • Semicolon • Comma • Tabulator	Selectable from list

NOTES

Element	Value	Meaning
Flags and time stamps (CSV, XML)	Deactivated	Value is displayed in a format optimised for computerised analysis
	Activated	Value is displayed in a human-readable format (several variants available)

8.5.2.8 Menu: View > Settings > Device tab

Settings for connecting to a device.

Section	Dialogue element	Display	Switching function
Actions	Perform parameter set comparison after connecting to a device.	Checkbox	Activate / deactivate
	Show login dialogue after connecting to a device.	Checkbox	Activate / deactivate
Device configuration	Read fieldbus network settings when connecting to the device	Checkbox	• Activate: Default setting. The IP settings (name, IP address, subnet mask, gateway) on the fieldbus side are read from the device and updated in the application. • Deactivate: The IP settings (name, IP address, subnet mask, gateway) on the fieldbus side are not read from the device. The IP settings stored in the application are written to the device.

8.5.2.9 Menu: View > Settings > VSExxx tab

Section	Dialogue element	Display	Switching function
Signal weightings	Activate signal weighting	Checkbox	Activate / deactivate
Custom filters	Activate custom filters	Checkbox	Activate / deactivate
Default network protocol for data monitoring - Standard firmware	• TCP (Standard) • UDP	Selected setting	Select an option
Default network protocol for data monitoring - AnReSa firmware	• TCP (Standard) • UDP	Selected setting	Select an option
	Use custom UDP ports	Checkbox	Activate / deactivate
	UDP port	Configured value	Increase / decrease value

As a rule, communication via UDP is faster than TCP.
UDP should be preferred in case of slow networks.

UDP is usually automatically blocked by firewalls.
In this case, have the communication be configured by the network administrator!

After switching the Ethernet protocol:

Manually disconnect the device (via), then re-establish the connection (via).

8.5.2.10 Menu: View > Settings > Diagnostics tab

Parameters for recording the self-diagnostics of the software.

Section	Dialogue element	Display	Switching function
Trace levels	Error messages	Checkbox	Activate / deactivate
	Warning messages	Checkbox	Activate / deactivate
	Information	Checkbox	Activate / deactivate
	Debug information	Checkbox	Activate / deactivate
Trace to file	Maximum file size	Configured value	Increase / decrease value
	Max. number of backup files	Configured value	Increase / decrease value
	Location	Configured path	---

[Debug information]:
On slow PCs, this function may lead to unreliable communication between the devices.

8.6 Menu: Window

This chapter describes the functions contained in the [Window] menu.

The [Window] menu allows you to change the layout and arrangement of the windows and tabs for the detailed view.
The [Window] menu can be accessed via the menu bar (→ Menu bar 🗋 15).

8.6.1 Menu: Window > Tile

Requirement:

- The setting is [Window] > [View] > [Multiple windows]

The [Tile] function arranges open windows side by side in the detailed view.

8.6.2 Menu: Window > Overlap

Requirement:

- The setting is [Window] > [View] > [Multiple windows]

The [Overlap] function arranges open windows in the detailed view so that they overlap.

8.6.3 Menu: Window > View

The [View] submenu allows you to set the detailed view. Options:

- [Multiple windows] = each selected object has its own window
  - All selected windows in the detailed view are visible at the same time
  - In case of multiple windows: either tile or overlapping
- [Tabs] = tabs for all selected objects
  - Only the content of the active tab is visible

8.6.4 Menu: Window > Close

Close the active window or the active tab in the detailed view.

8.6.5 Menu: Window > Close all

Close all windows and tabs in the detailed view.

8.6.6 Menu: Window > Window

The [Window] submenu lists all objects of the detailed view.

▶ Activate the required object.

▷ The active object appears as a window or a tab in the foreground.

8.7 Menu: Help

The [Help] menu contains the following functions:

- [MANUAL]: calls up the software manual
- [CONTACT]: ifm contact information
- [Licence information]: shows the licence information

9 Configuring VSEnnn

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▶ Observe the operating instructions of the diagnostic electronics and the sensors.

This chapter describes the configuration of the VSE diagnostic electronics using the VES004 software.

▶ To add a new device to a project: Menu: Device > New... (→ 🗋 30)

9.1 Limited number of write accesses

The internal device memory (EEPROM) only allows a limited number of write accesses (max. 1,000,000).

▷ Frequent writing will affect the lifetime of the device.

The following actions or settings have a significant impact on write accesses to the device memory (EEPROM):

- Each variant change leads to a write access to the EEPROM.
- Avoid frequent changes of variants as they reduce the lifetime of the device.
  As long as the variant is not changed, there is no write access to the EEPROM.
- Both the number and frequency of entries in the internal memory, in particular the entries regarding variant change and damage, result in a higher number of write accesses to the EEPROM (not every history entry causes a write cycle).
-
- Frequent changes to the base line increase the number of write accesses to the EEPROM (not every change to the base line causes an immediate write access).

The following actions or settings have an impact on the write accesses to the device memory, but are not considered critical during normal device use:

- Any reset of the internal memory causes write accesses to the EEPROM.
- Any writing of the parameter set causes write accesses to the EEPROM.
- Any restart of the device causes write accesses to the EEPROM.

9.2 VSE > [VSEnnn_#] > [Settings]

This chapter describes the functions contained in the [VSEnnn_#] device.

The [VSEnnn_#] device can be accessed via the Tree view (→ Tree view 16).

9.2.1 VSE > [VSEnnn_#] > Detail [Device settings]

The [Device settings] detail contains information and settings of the diagnostic electronics.

Display the device settings:

▶ In the tree view [VSEnnn_#] > [Settings] (double-click)

In the detailed view, the [Device settings] detail contains the following elements:

- Overview
- Device
- Address
- Only applies to VSE15n/VSE95n: fieldbus (name of the actual fieldbus)
- Actions
- Security
- Test

9.2.1.1 VSE > [VSEnnn_#] > Detail [Device settings] > [Overview]

The [Overview] shows the following information:

- Type (article number)
- Hardware version
- Serial number
- MAC address
- Firmware version
- Only applies to VSE15n/VSE95n: version of the core firmware
- Only applies to VSE15n/VSE95n: version of the industrial Ethernet stack firmware
- Parameter set used
- Device name

In the [Overview], you can enter a name for the device. The name will be shown in the tree view.

9.2.1.2 VSE > [VSEnnn_#] > Detail [Device settings] > [Device]

In this section, information about the diagnostic electronics and the current connection state is indicated. You can also update the firmware and assign a different parameter set.

The character chart can be changed to avoid the parameter set name being shown incorrectly (only applies to VES002, VSE100 for project import from VES003).

Section	Dialogue element	Display	Switching function
Diagnostic electronics	Type	Article number	---
	Version	Hardware version	
	Connect	State: busy / connected / not connected	
	Serial number	Hardware serial number	
	MAC address	IP hardware address	
	System mode	State: monitoring / set-up / not connected	
Write firmware to the device	Firmware version	Current firmware version	

Switching functions:

	Write firmware to the device.

9.2.1.3 VSE > [VSEnnn_#] > Detail [Device settings] > [Address]

The [Address] element contains the following sections:

VSE > ... > [Address] > Tab [Connection]

This section shows the connection and address details of the device.

Section	Dialogue element	Display	Switching function
TCP/IP address	Address	Current IP address Preset = 192.168.0.1	
	Port	Current port Preset = 3321	
TCP/IP address details	MAC address	Hardware address	---
	Host Name	Name of the host	
	TCP/IP address	Current IP address Preset = 192.168.0.1	
	TCP/IP port	Current port Preset = 3321	
	Subnet mask	Current subnet mask Preset = 255.255.255.0	
	Gateway	Current IP address of the gateway	

Switching functions:

	Search the network for connected devices
	Call up the connection wizard
	Connect to the device
	Disconnect from the device

VSE > ... > [Address] > Tab [Configuration]

In this section, the TCP/IP address can be configured and loaded to the device.

The wizard supports the assignment of the address.

Alternatively, the device can be identified manually and the address can be assigned manually.

Section	Dialogue element	Display	Switching function
Wizard	Button	Start address wizard	
Change TCP/IP settings via MAC address	Button	Write the TCP/IP settings of the device	
	MAC address	Hardware address of the device with the TCP/IP address to be changed	
TCP/IP settings	Option field	Either: • Static IP address • Obtain IP address via DHCP	
	Host Name	Name of the host	
	TCP/IP address	IP address Preset = 192.168.0.1	
	TCP/IP port	Port Preset = 3321	
	Subnet mask	Subnet mask Preset = 255.255.255.0	
	Gateway	IP address of the gateway	
Change TCP/IP settings via connected device	Button	Write the TCP/IP settings of the device	
	Option field	Either: • Static IP address • Obtain IP address via DHCP	
	Host Name	Name of the host	
	TCP/IP address	IP address Preset = 192.168.0.1	
	TCP/IP port	Port Preset = 3321	
	Subnet mask	Subnet mask Preset = 255.255.255.0	
	Gateway	IP address of the gateway	

Switching functions:

	Call up address wizard
	Transfer TCP/IP settings to the device

VSE > ... > [Address] > Tab [Data monitoring]

The network protocol for monitoring the data can be set in this section.

Section	Dialogue element	Display	Switching function
Network protocol for data monitoring	Option field	Selected setting: • TCP (Standard) • UDP	Select an option

9.2.1.4 VSE > [VSEnnn_#] > Detail [Device settings] > [Fieldbus]

In this context, [Fieldbus] represents the concrete fieldbus type of the selected device.

The [Fieldbus] element contains the following sections:

VSE > ... > Detail [Device settings] > [PROFINET IO]

Only applies to VSE150 / VSE950 / VYE113:

VSE > ... > [PROFINET IO] > Tab [Configuration]

In this section, PROFINET information about the diagnostics electronics is indicated (valid in the PROFINET network).

Section	Dialogue element	Display	Switching function
PROFINET IO configuration	Device name	Options: • Configured value • Value read from the device	Free text (usually provided by the host PLC)
	IP address	Options: • Configured value • Value read from the device	(usually provided by the host PLC)
	Subnet mask	Options: • Configured value • Value read from the device	(usually provided by the host PLC)
	Gateway	Options: • Configured value • Value read from the device	(usually provided by the host PLC)
	MAC address	Value read from the device	---

Switching functions:

	Write PROFINET IO configuration to the device
	Read PROFINET IO configuration from the device

VSE > ... > [PROFINET IO] > Tab [Information]

In this section, information about the current connection state is indicated (valid in the PROFINET network).

Section	Dialogue element	Display	Switching function
Information	Core firmware version	Value read from the device	---
	IE stack firmware version	Value read from the device	---
	State	Connected / initialised | ready (not connected) Value read from the device	---
	MAC address	Value read from the device	---
	MAC address IE1	Value read from the device	---
	MAC address IE2	Value read from the device	---
Communication diagnostics	Current queue level	Bus load (0...32) Value read from the device	---
	Queue overflow count	Value read from the device	---
	Checksum error counter	Value read from the device	---

VSE > ... > Detail [Device settings] > [EtherNet/IP]



Only applies to VSE151 / VSE951 / VYE114:

VSE > ... > [EtherNet/IP] > Tab [Configuration]

In this section, EtherNet/IP information about the diagnostic electronics is indicated (valid in the EtherNet/IP network).

Section	Dialogue element	Display	Switching function
EtherNet/IP configuration	Device name	Options: • Configured value • Value read from the device	Free text (usually provided by the host PLC)
	Enable DHCP	Checkbox	Activate / deactivate
	IP address	Options: • Configured value • Value read from the device	(usually provided by the host PLC)
	Subnet mask	Options: • Configured value • Value read from the device	(usually provided by the host PLC)
	Gateway	Options: • Configured value • Value read from the device	(usually provided by the host PLC)
	MAC address	Value read from the device	---

Switching functions:

	Write EtherNet/IP configuration to the device
	Read EtherNet/IP configuration from the device

VSE > ... > [EtherNet/IP] > Tab [Information]

In this section, information about the current connection state is indicated (valid in the EtherNet/IP network).

Section	Dialogue element	Display	Switching function
Information	Core firmware version	Value read from the device	---
	IE stack firmware version	Value read from the device	---
	State	Connected / initialised | ready (not connected) Value read from the device	---
Communication diagnostics	Current queue level	Bus load (0...32) Value read from the device	---
	Queue overflow count	Value read from the device	---
	Checksum error counter	Value read from the device	---

VSE > ... > Detail [Device settings] > [EtherCAT]



Only applies to VSE152:

VSE > ... > [EtherCAT] > Tab [Information]

In this section, information about the current connection state is indicated (valid in the EtherCAT network).

Section	Dialogue element	Display	Switching function
Information	Core firmware version	Value read from the device	---
	IE stack firmware version	Value read from the device	---
	State	Connected / initialised | ready (not connected) Value read from the device	---
Communication diagnostics	Current queue level	Bus load (0...32) Value read from the device	---

Section	Dialogue element	Display	Switching function
Communication diagnostics	Queue overflow count	Value read from the device	---
	Checksum error counter	Value read from the device	---

VSE > ... > Detail [Device settings] > [Modbus TCP]

Only applies to VSE153 / VSE163 / VSE953 / VSE963 / VYE115 / VYE117:

VSE > ... > [Modbus TCP] > Tab [Configuration]

In this section, Modbus TCP information about the diagnostic electronics is indicated (valid in the Modbus TCP network).

Section	Dialogue element	Display	Switching function
Modbus TCP configuration	Enable DHCP	Checkbox	Activate / deactivate
	Restart DHCP if at least one port lost the connection	Option field	Can be selected if DHCP has been activated.
	Restart DHCP only if both ports lost the connection	Option field	Can be selected if DHCP has been activated.
	IP address	Options: • Configured value • Value read from the device	(usually provided by the host PLC) Can only be changed if no DHCP is selected.
	Subnet mask	Options: • Configured value • Value read from the device	(usually provided by the host PLC) Can only be changed if no DHCP is selected.
	Gateway	Options: • Configured value • Value read from the device	(usually provided by the host PLC) Can only be changed if no DHCP is selected.
	Port	Options: • Configured value • Value read from the device	(usually provided by the host PLC)
	MAC address	Value read from the device	---

Switching functions:

	Write Modbus TCP configuration to the device
	Read Modbus TCP configuration from the device

VSE > ... > [Modbus TCP] > Tab [Information]

In this section, information about the current connection state is indicated (valid in the Modbus TCP network).

Section	Dialogue element	Display	Switching function
Information	Core firmware version	Value read from the device	---
	IE stack firmware version	Value read from the device	---
	State	Connected / initialised | ready (not connected) Value read from the device	---
Communication diagnostics	Current queue level	Bus load (0...32) Value read from the device	---

Section	Dialogue element	Display	Switching function
Communication diagnostics	Queue overflow count	Value read from the device	---
	Checksum error counter	Value read from the device	---

Fieldbus data

Input (PLC)

Source		Type	Size	Use
Analogue inputs (DC)				
	<input name>	Real	4 bytes	Value of the signal connected to the analogue input (IN1, IN2)
External inputs				
	<input name>	Real	4 bytes	Value of the external input (External_xx)
Objects				
Time domain				
<object name>				
	Value	Real	4 bytes	Object value in SI unit (m/s², m/s)
	State	Byte	1 byte	(Alarm) state of the object 0: OK 1: Warning 2: Damage 3: Inactive 4: Error (description: see Error)
	Error	Word	2 bytes	Error code for object state Hex0000: No error Hex0001: Internal fault Hex0002: Calculation error Hex0004: Rotational speed out of range Hex0008: Rotational speed not stable Hex0010: Invalid base line Hex0020: Invalid reference value (1) Hex0040: Invalid reference value (2) Hex0100: Deactivated by signal weighting Hex0200: Reference value out of range Hex1000: Warning Hex2000: Damage Hex8000: Object inactive (by variant)
	Rotational speed	Real	4 bytes	Trigger - rotational speed
	Reference value	Real	4 bytes	Trigger - reference value
	Warning	Real	4 bytes	Limits - warning (relative)
	Damage	Real	4 bytes	Limits - damage (relative)
	Base line	Real	4 bytes	Limits - base line in SI unit (m/s², m/s)
Frequency domain				
<object name>				
	Value	Real	4 bytes	Object value in SI unit (m/s², m/s, m)

Source		Type	Size	Use
	State	Byte	1 byte	(Alarm) state of the object 0: OK 1: Warning 2: Damage 3: Inactive 4: Error (description: see Error)
	Error	Word	2 bytes	Error code for object state Hex0000: No error Hex0001: Internal fault Hex0002: Calculation error Hex0004: Rotational speed out of range Hex0008: Rotational speed not stable Hex0010: Invalid base line Hex0020: Invalid reference value (1) Hex0040: Invalid reference value (2) Hex0100: Deactivated by signal weighting Hex0200: Reference value out of range Hex1000: Warning Hex2000: Damage Hex8000: Object inactive (by variant)
	Rotational speed	Real	4 bytes	Trigger - rotational speed
	Reference value	Real	4 bytes	Trigger - reference value
	Warning	Real	4 bytes	Limits - warning (relative)
	Damage	Real	4 bytes	Limits - damage (relative)
	Base line	Real	4 bytes	Limits - base line in SI unit (m/s², m/s, m)
Upper/Lower limit monitor				
<object name>				
	Value	Real	4 bytes	Object value in SI unit (m/s², m/s, m)
	State	Byte	1 byte	(Alarm) state of the object 0: OK 1: Warning 2: Damage 3: Inactive 4: Error (description: see Error)
	Error	Word	2 bytes	Error code for object state Hex0000: No error Hex0001: Internal fault Hex0002: Calculation error Hex0004: Rotational speed out of range Hex0008: Rotational speed not stable Hex0010: Invalid base line Hex0020: Invalid reference value (1) Hex0040: Invalid reference value (2) Hex0100: Deactivated by signal weighting Hex0200: Reference value out of range Hex1000: Warning Hex2000: Damage Hex8000: Object inactive (by variant)
	Rotational speed	Real	4 bytes	Trigger - rotational speed
	Reference value	Real	4 bytes	Trigger - reference value

Source		Type	Size	Use
	Warning	Real	4 bytes	Limits - warning (relative)
	Damage	Real	4 bytes	Limits - damage (relative)
Counter				
	<counter name>	DInt	4 bytes	Counter value (in seconds)
Alarms				
	<alarm name>	Byte	1 byte	Alarm state (0, 1)
General				
	Variant	Byte	1 byte	Current variant (0...31)
	System mode	Byte	1 byte	System mode: 0: Self-test 1: Supervise (normal monitoring) 2: Set-up (parameter setting) 3: Measure (spectrum, raw data) 4: Start-up (system booting)
	Self-test result	Byte	1 byte	Binary pattern 0: Sensors OK 1: Sensor 1 self-test failed 2: Sensor 2 self-test failed 4: Sensor 3 self-test failed 8: Sensor 4 self-test failed
	Current queue level	Byte	1 byte	Current level of the fieldbus communication
	Queue overflow count	DInt	4 bytes	Overflow counter of the fieldbus communication
	Checksum error counter	DInt	4 bytes	Checksum error counter of the fieldbus communication

Output (PLC)

External inputs		Type	size	Use
	<input name>	Real	4 bytes	Set value of the external input (External_xx)
Objects				
	<object name>			
	Base line	Real	4 bytes	Limits - set base line in SI unit (m/s², m/s, m) to adapt the limits
General				
	Version	Byte	1 byte	Set current variant (0...31)
	Do self-test	Byte	1 byte	Do self-test (≠ 0)
	Set time	DInt	4 bytes	Set time, format: • VSE150/VSE950: U32: 0x00ssmmhh • VSE151/VSE951: U32: 0x00hhmmss • VSE152: U32: 0x00hhmmss • VSE153/VSE953: U32: 0x00hhmmss • VSE163/VSE963: U32: 0x00hhmmss
	Set counter ID	Byte	1 byte	Set ID (1...32) of the counter to be written.
	Set counter value	DInt	4 bytes	Set value of the counter selected with the ID (in seconds)

9.2.1.5 VSE > [VSEnnn_#] > Detail [Device Settings] > [Actions]

Requirement:

- The VES software is connected to the device via

The [Actions] element contains the following sections:

VSE > ... > [Actions] > Tab [Manipulate device]

Section	Dialogue element		Switching function
Reboot	---		Reboot the device. The device is disconnected. After the reboot the software tries to re-establish the connection.
Execute self-test	---		Type VSA: Execute self-test of the dynamic inputs Type IEPE: Cable break detection
Execute teach-in	---		Start teach-in for the selected objects of the parameter set (can only be executed for objects with an activated auto-teach option)
Set counter values	---		Set counter values to a specific value.

VSE > ... > [Actions] > Tab [Change of variant]

You can use variants if you want to monitor certain objects only in defined machine states and this cannot be solved via triggers (→ VSE > [Parameter_#] > Detail [Variants] 91)

Section	Dialogue element	Display	Switching function
Manual activation	Active variant	Active variant	Selection of the active variant
Activated objects	ID	ID of the object	---
	Name	Name of the object	---
	Type	Type of the object	---
	Input	Input of the object	---

VSE > ... > [Actions] > Tab [Reset Device]

Here, various parameters can be deleted or reset to default values.

Section	Dialogue element		Switching function
Reset counter	---		Reset all counter values to ‘0’
Reset history	---		Reset the history of the device Synchronise the real-time clock of the device with the time of the operating system
Reset parameter	---		Delete parameter set
Reset security settings	---		This requires a higher security level than the one to be set! Reset all security settings to default values
Restore factory settings	---		To do so, security level 4 is required! Restore all factory settings The connection settings (TCP/IP address, port, subnet mask, gateway) are exempt from this.
Reset passwords	---		Reset all configured passwords, authorisation levels and access rights.

9.2.1.6 VSE > [VSEnnn_#] > Detail [Device settings] > [Security]

Requirements to change the security parameters:

- The VES software is connected to the device via

- The user is logged in to the device via

▶ Change password:
Log in with at least the security level which is to be changed.

▶ Change access rights:
Log in with a higher security level than that which is to be changed.

The [Security] element contains the following sections:

VSE > ... > [Security] > Tab [Passwords]

Under the [Passwords] tab, a 5-level password concept can be set up:

Levels 1...4 can be password-protected.

Level 0 cannot be protected and can always connect to the diagnostic electronics.

You can restrict the user rights (available functions) for levels 0...3 under the [Access rights] tab. Level 4 always has all permissions.

To enable the password protection:

1. First assign a password for level 4 and save it with .
2. Only then assign a password for each lower level, one after the other, and save them with . If you do not wish to further restrict the access rights of the lower levels, you do not need to assign a password to the lower levels.

▶ Change password:
Log in with at least the security level which is to be changed.

To be able to write the security settings to the device, the user must be logged in with security level 4.

Section	Dialogue element	Display	Switching function
Passwords	Password: Security level 4	New: Enter new password	
		Confirmation Repeat new password	
	...	...	...
	Password: Security level 1	New: Enter new password	
		Confirmation Repeat new password	
Connect / Login	Current:	Not connected Security level # (not logged in) Security level #	, , ,

Switching functions:

	Save new password
	Connect to the device
	Disconnect from the device
	Log in to the device; to do so, select security level
	Log out from the device, security level 0 becomes active

VSE > ... > [Security] > Tab [Access Rights]

For OPC servers, only the following rights can be changed:

- Write parameters
- Execute teach-in
- Change IP settings
- Reboot device
- Reset counter

As a general rule, no access rights can be changed for level 4.

▶ Change access rights:
Log in with a higher security level than that which is to be changed.

For levels 3...0 the following applies:

- If an access right changes from [allowed] to [not allowed] (= ✗), the access right for all lower levels will change to [not allowed] and can no longer be changed there (= ✗)
- If an access right changes from [not allowed] to [allowed] (= ✓), the access right in the next lower level changes to [not allowed], but can be changed (= ✗)
  For all lower levels, the access rights remains [not allowed] and cannot be changed (= ✗)

Section	Dialogue element	Display	Switching function
Access rights	Read parameters: Write parameters: Execute teach-in: Read data: Read spectrum: Read history: Delete history: Modify dyn. inputs: Read ext. inputs: Write ext. inputs: Test (OUT/LED): Switch variants: Change IP settings: Reboot device: Reset counter	Current access rights for: • OPC server • Level 4 • Level 3 • Level 2 • Level 1 • Level 0	✓ = allowed, cannot be changed ✓ = allowed, can be changed ✗ = not allowed, can be changed ✗ = not allowed, cannot be changed
Connect / Login	Current:	Not connected Security level # (not logged in) Security level #	, , , , ,

Switching functions:

	Write access rights to device
	Read access rights from device
	Connect to the device
	Disconnect from the device

	Log in to the device; to do so, select security level
	Log out from the device

9.2.1.7 VSE > [VSEnnn_#] > Detail [Device settings] > [Test]

Used to test the outputs and LEDs of the diagnostic electronics.

Requirement:

- The VES software is connected to the device via

▶ If [Outputs] or [LEDs] is selected, a confirmation prompt appears whether the device is to be switched to test mode.

▷ After selecting [Yes], the test mode for outputs and LEDs is activated.

To terminate the test mode:

▶ Deactivate the test of the outputs AND

▶ Deactivate the test of the LEDs

▷ A confirmation message appears

▷ After selecting [OK], the test mode is terminated and the device returns to the monitoring mode.

The [Test] element contains the following sections:

VSE > ... > [Test] > Tab [Outputs]

Only the functions available in the connected device are offered for testing. Measurements that are active during testing will be ignored.

Section	Dialogue element	Display	Switching function
Outputs	OUT 1	Digital: 0 / 1 Analogue: 0...22 mA	Specify manually either digital status or analogue output value
	OUT 2	0 / 1	Specify manually the digital status
Digital I/Os (only with VES100)	I/O #	0 / 1	Specify manually the digital status

VSE > ... > [Test] > Tab [LEDs]

Section	Dialogue element	Display	Switching function
LEDs	Sensor #	Green Yellow Red OFF	Specify manually the digital status
	System	Green Yellow Red OFF	Specify manually the digital status

9.3 VSE > [VSEnnn_#] > [Parameter_#]

This chapter describes the parameters contained in the [Parameter_#] object.

The [Parameter_#] object is assigned to the [VSEnnn_#] object.

The [Parameter_#] object can be accessed via the tree view.

In the detailed view, information and settings of the diagnostic electronics are displayed under the [Parameter_#] tab.

To display the parameter set:

▶ In the tree view, double-click on the required parameter set: [Parameter_#].

▷ The following information is displayed in the detailed view under the [Parameter_#] tab:

- General configuration
- Inputs
- Trigger
- Signal weighting (only if activated)
- Custom filters (only if activated)
- Objects
- Variants
- Counter
- History
- Alarms
- Fieldbus settings (depending on the device, e.g. PROFINET IO, Modbus TCP,...)

9.3.1 VSE > [Parameter_#] > Detail [Common configuration]

The [Common configuration] detail contains the following elements:

- Overview
- Supported devices
- Documentation
- Device info
- Assigned devices

9.3.1.1 VSE > ... > Detail [Common configuration] > [Overview]

The [Overview] element includes information and documentation of the device and the parameter set:

Section	Dialogue element	Display	Switching function
Information	Created:	Date of creation	---
	Changed:	Date of the last change	---
Parameter set	Name:	Current name, e.g.: "Parameter_01"	Overwrite the preset name
	Read and write name together with parameter set	• ☑ Option activated • ☐ Option deactivated	Activate / deactivate

In the detailed view, a different name can be assigned to the parameter set. The name will be shown in the tree view.

9.3.1.2 VSE > ... Detail [Common Configuration] > [Supported Devices]

On the basis of the parameters and functions used in the parameter set, the requirements on the device (firmware version) are determined. The device type of the diagnostic electronics was already selected when creating the parameter set.

The [Supported devices] element contains the following sections:

VSE > ... > [Supported devices] > Tab [Configuration]

Section	Dialogue element	Display	Switching function
Supported device types	Device type:	e.g. "efector octavis diagnostic electronics VSE002"	---
Supported firmware versions	Minimum required:	Version number	---
	Maximum supported:	Version number	---

The [Supported device type] indicates for which type of diagnostic electronics the parameter set was created.

The entries for the supported firmware versions are determined automatically based on the parameter set. On the basis of the objects created and functions used, the minimum required and maximum supported firmware version is determined and displayed.

9.3.1.3 VSE > ... > Detail [Common configuration] > [Documentation]

The documentation is used to describe the application. The entries are also saved in the diagnostic electronics.
If several devices share the same parameter set, it is advisable to not use any application-specific information.

The [Documentation] element contains the following sections:

VSE > ... > [Documentation] > Tab [Application]

In this section the application can be described. The information refers to the company and the machine / installation on which the diagnostic electronics is installed. The fields are free-text fields.

Section	Dialogue element	Display	Switching function
Application	Company:	Free text	---
	Address:	Free text	---
	City:	Free text	---
	Site:	Free text	---
	Machine:	Free text	---

VSE > ... > [Documentation] > Tab [Description]

The description contains a creation date and the date of the last parameter change. The author of the parameter set and a free text description can be added.

Section	Dialogue element	Display	Switching function
Description	Created by:	Free text	Max. 100 characters
	Creation date:	Date of creation	Later / earlier date
	Last change:	Date of the last change	Automatic
	Description	Free text	Max. 100 characters

9.3.1.4 VSE > ... > Detail [Common configuration] > [Device information]

The [Device information] element contains a summary or overview of the diagnostic electronics' input and output configuration. It also provides an overview of the dependencies between the triggers and objects defined in the parameter set.

The [Device information] element contains the following sections:

VSE > ... > [Device information] > Tab [Outputs]

Displays the outputs of the diagnostic electronics with an overview of the most important configured parameters.

Section	Dialogue element	Display	Switching function
Outputs	OUT 1	Usage, information	⚙
	OUT 2	Usage, information	

Switching function:

⚙	Configure the selected object

VSE > ... > [Device information] > Tab [Digital I/Os]

Only applies to VSE002 / VSE003 / VSE100 / VSE101 / VSE903 / VYE004:

Displays the digital I/Os of the diagnostic electronics with an overview of the most important configured parameters.

Section	Dialogue element	Display	Switching function
Digital I/Os	I/O 1	Usage, information	⚙
	I/O 2	Usage, information	
	I/O 3	Usage, information	
	I/O 4	Usage, information	
	I/O 5	Usage, information	
	I/O 6	Usage, information	
	I/O 7	Usage, information	
	I/O 8	Usage, information	

Switching function:

⚙	Configure the selected object

VSE > ... [Device information] > Tab [Trigger dependencies]

Displays the dependencies of the available triggers as well as their dependence on the configured objects.

Section	Dialogue element	Display	Switching function
Trigger dependencies	Name	Name of the trigger	⚙
	Type	Parameter type	
	Use	Use of the parameters	
	Source	Name of the object	

Switching function:

⚙	Configure the selected object

VSE > ... > [Device information] > Tab [Object dependencies]

Displays the dependencies of the available objects as well as their dependence on the configured triggers.

Section	Dialogue element	Display	Switching function
Object dependencies	Name	Name of the object	⚙

Section	Dialogue element	Display	Switching function
Object dependencies	Type	Parameter type	⚙
	Use	Use of the parameters	
	Source	Name of the trigger	

Switching function:

⚙	Configure the selected object

9.3.1.5 VSE > ... > Detail [Common configuration] > [Assigned devices]

Several devices can share one parameter set. This means that you only need to maintain one parameter set if you have several identical machines and installations. A changed parameter set can be written to several devices at the same time.

The [Assigned devices] element contains the following sections:

VSE > ... > [Assigned devices] > Tab [Devices]

Displays all devices assigned to the parameter set.

Section	Dialogue element	Display	Switching function
Assigned devices	No.	Consecutive number in the list	---
	Name	Configured name of the device	
	Type	Article number of the device	
	Firmware	Read firmware version	
	TCP/IP address	Configured TCP/IP address and port	
	MAC address	Read MAC address of the device	
	Serial no.	Read serial number of the device	

9.3.2 VSE > [Parameter_#] > Detail [Inputs]

In addition to the analogue and sensor inputs, the [Inputs] element also contains the virtual inputs (external inputs) that use the Ethernet interface as a signal source. The sensor inputs are referred to as [Dynamic Inputs] because they allow analysis of the dynamic component (AC) of the signal in the time and frequency domain.

9.3.2.1 VSE > ... > Detail [Inputs] > [Overview]

The [Overview] detailed view indicates the following parameter set information:

Section	Dialogue element	Display	Switching function
Dynamic inputs (AC)	ID	Consecutive number of the sensor on the diagnostic electronics	---
	Name	Configured name of the sensor	
	Type	Sensor type	
	Scale	Configured scaling of the sensor	
	Filter	Configured filter setting of the sensor	
Analogue inputs (DC)	ID	Consecutive number of the analogue input on the diagnostic electronics	---
	Name	Configured name of the input	

Section	Dialogue element	Display	Switching function
Analogue inputs (DC)	Type	Signal type of the sensor	---
	Reference	Signal value range	
	Value	Value range of the signal	
External inputs	ID	Consecutive number of the external input on the diagnostic electronics	---
	Name	Configured name of the input	
	Initial value	Initialisation value	
	Unit	Configured unit	

This view only displays an overview.

▶ To configure the parameters: double-click in the required row! (→ following pages)

9.3.2.2 VSE > ... > Detail [Inputs] > [Dynamic inputs (AC)]

The dynamic inputs of the diagnostic electronics are used to monitor connected signals with regard to their dynamic components in the time and frequency domain. A common example for the evaluation of a dynamic signal on the diagnostic electronics is vibration monitoring.

From hardware version "AI" (version "V0.6.0") and higher in combination with firmware version 0.10.x, the dynamic inputs also allow monitoring of the signal exclusively with regard to the DC component.

The various sensor types differ in the following aspects:

- The monitoring of dynamic (AC) signals
- The monitoring of static (DC) signals
- The measuring principle

The overview shows the following information and functions:

Section	Dialogue element	Display	Switching function
---	ID	Consecutive number of the sensor on the diagnostic electronics	
	Name	Configured name of the sensor	
	Type	Sensor type	
	Scale	Configured scaling of the sensor	
	Filter	Configured filter setting of the sensor	
Periodic self-test	Checkbox	• ☑ Option activated • ☐ Option deactivated	
	Time interval	Hours and minutes	Increase or decrease values

Switching functions:

	Enable the selected dynamic input
	Disable the selected dynamic input
	Configure the selected object
☐ / ☑	Activate/deactivate periodic self-test and set the time interval. Recommended for ifm acceleration sensors (VSAxxx) or as cable break detection for IEPE sensors. The self-test is performed automatically by the VSE according to the configured time interval. The LEDs on the VSE display the results of the self-test. If required, it is also possible to define an alarm in the parameter set.

VSE > ... > Detail [Inputs] > [Dynamic inputs (AC)] > [Sensor #]

Up to 4 dynamic inputs can be defined. Each dynamic input that has been defined appears as a separate element in the tree view with the preset name [Sensor #].

Before a dynamic input can be used it must be activated.

▶ Enable the dynamic input with the  switch.

The [Sensor #] element contains the following sections:

Identification

Section	Dialogue element	Display	Switching function
Identification	Name	Configured name for the sensor	---
	Type	Sensor type selected from list	Selection list

Configuration

The display in the [Configuration] section depends on the selected input type.

Please refer to the data sheet of the sensor for the scaling and the unit.

Type	Note	Scaling / Sensitivity	Unit
VSA001/2/4/5/6/7/8	Fixed specification	25	g
VSA003	Fixed specification	17.5	g
VSA101	Fixed specification	3.3	g
VSA201	Fixed specification	250	g
VSA202/3/4/5	Fixed specification	150	g
VSP01A/VSP02A	---	100	mV/g
IEPE	Up to hardware version "AI" of the diagnostic electronics only permitted as "Sensor 1"	Free	mV/g V/g mV/(m/s²)
IEPEx10	No longer supported for hardware version "AI" and higher of the diagnostic electronics	Free	mV/g V/g mV/(m/s²)
VSM102	Separate setting for each axis in the [Wiring] section.	Free	mV/g
VSM101/3/4	Separate setting for each axis in the [Wiring] section.	Free	mV/g
DC current	• Supported for hardware version "AI" and higher of the diagnostic electronics and firmware version 0.10.0 and higher • Specification: Filter = unfiltered	Free	Free
Other sensor	---	Free According to formula	Free

The filter is especially useful for monitoring according to ISO 10816 in the time domain (= object type "v-RMS (time domain)").

For these objects, the filter needs to be configured based on the rotational speed:

Rotational speed	Filter	Note
---	No filter	---
120...600 min^{-1}	2 Hz highpass	---
> 600 min^{-1}	10 Hz highpass	Supported for hardware version "AI" and higher of the diagnostic electronics and firmware version 0.6.0 and higher

▶ Setting the signal wiring of the multi-axis vibration sensors in the wiring section (only with VSM001 / VSM101):

Section	Dialogue element	Display	Switching function
Cabling	X-axis (brown) is connected to	Input of the diagnostic electronics for the sensor output of the X-axis value	Selection list
	Y-axis (grey) is connected to	Input of the diagnostic electronics for the sensor output of the Y-axis value	Selection list
	Z-axis (white) is connected to: (only with VSM101)	Input of the diagnostic electronics for the sensor output of the Z-axis value	Selection list
	Scale	Scaling / Sensitivity	Input box

If sensor type = direct current (DC current signal)

Section	Dialogue element	Display	Switching function
Configuration	Filter	Unfiltered	---
	Unit	rpm	Free text
	Scale	According to data sheet / formula	Increase / decrease value
	Offset	According to data sheet / formula	Increase / decrease value
Lower reference point	Current	4.00 mA	---
	Value	0.00 rpm	Increase / decrease value
Upper reference point	Current	20.00 mA	---
	Value	10000.00 rpm	Increase / decrease value

Formula for scaling:

$$\frac{(v_{max} - v_{min})\ 5\ mA}{(i_{max} - i_{min})\ \sqrt{2}}$$

Fig. 3: Formula for scaling (DC sensor)

V_{min} Minimum measured value
V_{max} Maximum measured value
i_{min} Minimum current signal
i_{max} Maximum current signal

Formula for offset:

$$\frac{(i_{max} - 10\ mA)\ v_{min} - (i_{min} - 10\ mA)\ v_{max}}{i_{max} - i_{min}}$$

Fig. 4: Formula for scaling (DC sensor)

V_{min} Minimum measured value
V_{max} Maximum measured value
i_{min} Minimum current signal
i_{max} Maximum current signal

Scaling + offset example

External temperature sensor with the following values:

- Current signal of 4…20 mA
- Measuring range of -20...100 °C

The scaling and offset to be entered are calculated as follows:

Scaling =	$\frac{(100\,°C - (-20\,°C))\ 5\ mA}{(20\ mA - 4\ mA)\ \sqrt{2}} = 26{,}517\,°C$
Offset =	$\frac{(20\ mA - 10\ mA)(-20\,°C) - (4\ mA - 10\ mA)\ 100°C}{20\ mA - 4\ mA} = 25\,°C$

If sensor type = other sensor (AC current signal)

Section	Dialogue element	Display	Switching function
Configuration	Filter	• Unfiltered • Highpass 2 Hz • Highpass 10 Hz	Selection list
	Unit		Free text
	Scale	According to formula → Sensor type = DC current signal	Increase / decrease value

Scaling example

External sensor with the following values:

- Current signal of 4…20 mA
- Measuring range of 0...2.5 bar

Using a resistor (250 Ω) connected in parallel, an input current of 2...10 mA is obtained for the dynamic input of the diagnostic electronics.

The scaling to be entered is calculated as follows:

Scaling =	$\frac{(2{,}5\ bar - 0\ bar)\ 5\ mA}{(10\ mA - 2\ mA)\ \sqrt{2}} = 1{,}1\ bar$

Self-test

For VSAnnn / VSMnnn type sensors, a periodic self-test can be activated. The function of the measuring cell is actively tested by the diagnostic electronics. It is possible to define an interval at which the diagnostic electronics will automatically carry out the test (1 minute minimum).

The interval is always valid for all sensors.

The interval cannot be set separately for each sensor.

Definition of self-test for VSP and IEPE sensors: possible for firmware version 0.11.0.and higher These sensors do not allow active testing of the measuring cells. It is only verified that the wiring is intact (wire break detection).

A negative self-test is indicated by a flashing LED of the corresponding sensor on the housing of the diagnostic electronics. In addition, the result can be provided as an alarm and signalled at an output.

▶ Activate or deactivate the self-test individually for each sensor.

▶ Configure the periodic self-test on the configuration page of the dynamic inputs (AC) for all sensors with activated self-test.

Section	Dialogue element	Display	Switching function
Periodic self-test	Time interval	0 h 0 min	Increase / decrease value

9.3.2.3 VSE > ... > Detail [Inputs] > [Analogue inputs (DC)]

The analogue inputs of the diagnostic electronics are used to read and monitor process values. The two analogue inputs can be used as triggers for monitoring, as a source for counters or they can be monitored with regard to the analogue value. The signal that is present at the analogue input can be a current or a pulse signal. Only in the case of VSE100 / VSE101 diagnostic electronics, it can also be a voltage signal.

The analogue inputs are distinguished by their signals (analogue or pulse) and use (triggers, counters or objects).

Up to 2 analogue inputs can be defined. Each analogue input that has been defined appears as a separate element in the tree view with the preset name [IN #]:

Section	Dialogue element	Display	Switching function
---	ID	Consecutive number of the input on the diagnostic electronics	
	Name	Configured name of the input	
	Type	Signal type of the input	
	Reference	Signal value range according to input type	
	Value	Value range of the signal according to input type	

Switching functions:

	Enable the selected analogue input
	Disable the selected analogue input
	Configure the selected object

VSE > ... > Detail [Inputs] > [Analogue inputs (DC)] > [IN #]



Before an analogue input can be used it must be enabled.

▶ Enable the analogue input with the  switch.

The [IN #] element contains the following sections:

VSE > ... > [Analogue inputs (DC)] > [IN #] > Section [Configuration]

Section	Dialogue element	Display	Switching function
Identification	Name	Configured name for the input	---
	Type	Input type from list (→ below)	Selection list

The [Identification] section of the analogue inputs serves to describe the sensor connected to the diagnostic electronics. The name should clearly identify the sensor. Typically, this would be a name that describes the signal (e.g. motor speed). The type is used to select the signal type (→ Analogue input type) of the connected sensor.

Depending on the type that is selected, further information needs to be entered in the [Configuration] section. The display in the [Configuration] section depends on the selected input type.

Default settings:

Input type	Reference	Value
Analogue - current	4...20 mA	0…10000 rpm
Analogue - voltage (only visible for VSE100 / VSE101)	0...10 V	0…10000 rpm

Input type	Reference	Value
Counter - totaliser	1 min, 0 s	---
Digital - pulse	1 pulse / revolution	rpm
Digital - PWM	10...90 %	0…10000 rpm
Digital - VE113A	10...90 %	0...100 % red
Digital - level	---	0 rpm / 10000 rpm

VSE > ... > [Analogue inputs (DC)] > [IN #] > Section [Configuration]

The [Configuration] section describes the scaling and engineering unit of the signal.

The following applies to the engineering unit:

▶ Refer to the data sheet of the connected sensor
or:
Identify the signal, e.g. "min^{-1}" or "rpm" for rotational speed.

The other parameters scale the signal.

The displayed parameters and data depend on ...

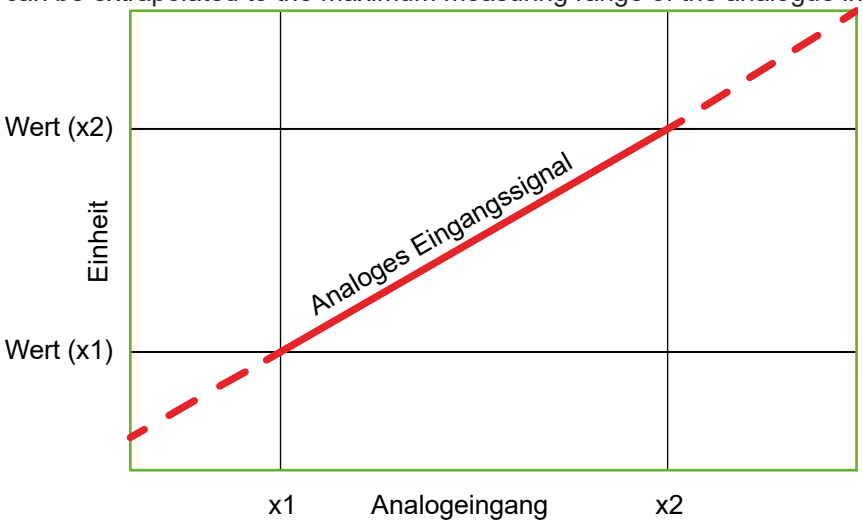
- The configured input type
- The configured unit

Section	Dialogue element	Display	Switching function
Unit	Unit	Configured unit, e.g. rpm	Free text
Lower reference point	Current	4.00 mA	Increase / decrease value
	Voltage	0.00 V	Increase / decrease value
	PWM	10 %	Increase / decrease value
	Value	0.00 rpm	Increase / decrease value
Upper reference point	Current	20.00 mA	Increase / decrease value
	Voltage	10.00 V	Increase / decrease value
	PWM	90 %	Increase / decrease value
	Value	10000.00 rpm	Increase / decrease value
Interval	Counting interval	1 min 0 s 0 ms	Increase / decrease values
Pulses	Pulses per revolution	1	Increase / decrease value
Low level	Low level	0.00 rpm	Increase / decrease value
High level	High level	10000.00 rpm	Increase / decrease value

Configurable input types

- Analogue - current
  Analogue - voltage
  Digital - PWM
  Digital - VE113A:

With these types, the signal is defined via 2 reference points. If required, the resulting straight line can be extrapolated to the maximum measuring range of the analogue input.



- Counter - totaliser:
  The interval must only be indicated here if used for the monitoring of pulses per time interval. If used for pulse counting, the interval is not relevant.
- Digital - pulse:
  With this type, the number of pulses the signal delivers per revolution must be indicated.

If a rotational speed signal of more than one pulse per revolution is provided:
The pulses must be equidistant to each other to determine the correct rotational speed!

- Digital - level:
  With this type, values are assigned to the 2 digital states (low/OFF and high/ON). The value corresponding to the input state is processed further in the trigger or object (lower/upper limit monitor).

9.3.2.4 VSE > ... > Detail [Inputs] > [External inputs]

External inputs are virtual extensions of the analogue inputs. The value of the external input is transmitted digitally via the TCP/IP interface of the diagnostic electronics. This can be done via the OPC interface, for example (→ ifm OPC server, → chapter Change of variant via OPC (→ 🗋 94)).

This allows transmission of process values when they are monitored and stored as objects. External inputs can also be used as a source for a trigger, e.g. to provide rotational speeds for frequency-selective monitoring in case of a speed-variable operation.

Each external input that has been created appears as a separate element in the detailed view and in the tree view with the preset name [Extern_#].

▶ To create an external input:
In the tree in the detailed view, select [External inputs]
Right-click in the empty white area in the detailed view
Click on [New external input ...]

▷ A new row with preset values appears in the detailed view.

Section	Dialogue element	Display	Switching function
External inputs	ID	01	Can be assigned to any free ID (01...24)
	Name	External_#	# changes according to the assigned ID
	Initial value	0 rpm	⚙
	Unit	rpm	

Switching functions:

	Configure the selected object
	Delete the selected object

VSE > ... > [External inputs] > [External_#] > [Configuration]

The external input [External_#] can be set in the [Configuration] tab of the detailed view.

The [External_#] object contains the following sections:

Section	Dialogue element	Display	Switching function
Identification	Name	External_#	---

To change the name:

▶ Select the entry in the tree of the detailed view (by double-clicking or with [F2])

▶ Overwrite the name

Section	Dialogue element	Display	Switching function
Configuration	Unit	rpm	Free text
	Initial value	0.00 rpm	Increase / decrease value

The unit of the external input corresponds to the unit of the variable sent via the interface, e.g. "min^{-1}" or "rpm", if the external input is used as a source for the rotational speed.

The initial value is used as long as the initial value is not changed via the interface after initialisation (reboot) of the diagnostic electronics.

9.3.3 VSE > [Parameter_#] > Detail [Trigger]

The triggers are used to control, i.e. start and stop object calculations and counters. Each object can have up to 2 different triggers assigned to it. The condition defined in a trigger controls the calculation / the counter.

9.3.3.1 VSE > ... > Detail [Trigger] > [Overview]

The [Overview] detailed view shows the following information about the trigger:

Section	Dialogue element	Display	Switching function
Trigger	ID	01	Can be assigned to any free ID (01...24)
	Name	Selected trigger type *)	
	Source	According to trigger type	
	Type	Trigger type	
	Range / Value	Configured trigger range or trigger value	

*) The name should be informative and indicate the source and the working range. Examples: "CON_1480 rpm" or "Motorspeed_600...1500 rpm"

Switching functions:

	Configure the selected object
	Delete the selected object

9.3.3.2 Trigger types

The trigger types differ in their source. The following trigger types are available:

Analogue input trigger

- Requirement:
  - At least one analogue input must be defined
- Source:
  - One of the two analogue inputs of the diagnostic electronics
- Use of the trigger condition:
  - Frequency-selective monitoring in case of a speed-variable operation (as rotational speed signal)
  - Analogue runtime counter
  - As reference value

Dynamic input trigger

- Requirement:
  - The type of at least one dynamic input must be defined as "direct current"
- Source:
  - One of the dynamic inputs configured as analogue input (DC)
- Use of the trigger condition:
  - Frequency-selective monitoring in case of a speed-variable operation (as rotational speed signal)
  - Analogue runtime counter
  - As reference value

External input trigger

- Requirement:
  - At least one external input must be defined
- Source:
  - One of the configured external inputs
- Use of the trigger condition:
  - Frequency-selective monitoring in case of a speed-variable operation (as rotational speed signal)
  - Analogue runtime counter
  - As reference value

Constant speed trigger

- Value of the trigger:
  - Corresponds to the constant rotational speed of the machine/installation
- Use of the trigger condition:
  - Frequency-selective monitoring

9.3.3.3 Creating triggers

▶ Select [Trigger] in the tree of the detailed view

▶ Right-click in the empty area of the detailed view

▶ In the context menu: click on [New trigger] > required trigger type

▷ A new row with preset values appears in the detailed view.

9.3.3.4 VSE > ... > Detail [Triggers] > [Configuration]

The configuration element for [Trigger] > [Analogue input] contains the following sections:

VSE > ... > Detail [Triggers] > [Configuration] > Section [Identification]

The Identification section contains the name and the type of the trigger.

Section	Dialogue element	Display	Switching function
Identification	Name:	Analogue	Free text
	Type:	Selected trigger type	---

The name can be changed. It is advisable to use a name which clearly identifies the trigger (e.g. "Motor speed_600...1500 rpm").

VSE > ... > Detail [Triggers] > [Configuration] > Section [Configuration]

The [Configuration] section contains the source, use and condition of the trigger.

The [Use as rotational speed signal] checkbox defines the operating principle of the trigger:

- Activated = use of the trigger as rotational speed signal for an object for frequency-selective monitoring
- Deactivated = use as trigger of the reference value

If used to control a "Analogue runtime" counter, the checkbox is of no importance.

A constant speed trigger cannot be used as a reference value but only for frequency-selective monitoring.

For triggers of external or analogue inputs, a "working range" is defined in the trigger condition. If the measured value of the selected source is within the working range, the condition is met. To ensure good repeatability of the measurements, it is advisable to define a small working range. For constant speed triggers, the constant rotational speed of the machine must be entered.

Section	Dialogue element	Display	Switching function
Signal	Source:	Selected	Selectable from list
	Use as rotational speed signal	Checkbox	Activate / deactivate
Working range	From:	Configured lower value (e.g. rotational speed)	Increase / decrease value
	To:	Configured upper value (e.g. rotational speed)	Increase / decrease value
Constant speed	Rotational speed:	Configured rotational speed	Increase / decrease value

9.3.4 VSE > [Parameter_#] > Detail [Signal weighting]

The user can set the signal weighting.

The [Signal weighting] detailed view is only displayed if signal weighting is activated in the settings.

▶ For this purpose, first activate signal weighting using the following menu path: View > Settings > VSExxx tab. (→ Menu: View > Settings > VSExxx tab 🗋 44)

▷ After that, signal weighting will be listed in the [Overview] detailed view (if applicable).

9.3.4.1 VSE > ... > Detail [Signal weighting] > Overview

The [Overview] shows the signal weightings with their configured properties:

Section	Dialogue element	Display	Switching function
Signal weightings	ID	01	
	Name	Filter name	

Switching functions:

	Configure the selected object
	Delete the selected object

9.3.4.2 VSE > ... > Detail [Signal weighting] > Weighting_#

The detailed view displays the properties of the selected signal weighting:

Section	Dialogue element	Display	Switching function
Identification	Name	Specified name	Change name
Assigned objects	ID	01	
	Object	Filter name	
	Trigger type	Set trigger type	
	Trigger	Trigger	

Switching functions:

	Configure the selected object

9.3.4.3 VSE > ... > Detail [Signal weighting] > Create new signal weighting

▶ Select [Signal weighting] in the tree of the detailed view.

▶ Right-click in the empty area of the detailed view.

▶ In the context menu: click on [New signal weighting].

▷ A new signal weighting appears in the overview.

9.3.4.4 VSE > ... > Detail [Signal weighting] > Context menu

▶ Right-click on one of the displayed signal weightings.

▷ The context menu is displayed.

Switching functions:

Copy the selected signal weighting
Rename the selected signal weighting
Delete the selected signal weighting

▶ Right-click in the empty area of the detailed view.

▷ The context menu is displayed.

Switching functions:

Paste a previously copied signal weighting
Insert a new signal weighting

9.3.5 VSE > [Parameter_#] > Detail [Custom filters]

The user can create custom filters (user-defined), for example, band-stop filters or filters with settings that are different from the predefined filters.

The [Custom filters] detailed view is only displayed if the [Custom filters] option is activated in the settings.

▶ For this purpose, first activate the custom filters using the following menu path: View > Settings > VSExxx tab. (→ Menu: View > Settings > VSExxx tab 44)

▷ After that, the custom filters will be listed in the [Overview] detailed view (if applicable).

9.3.5.1 VSE > ... > Detail [Custom filters] > Overview

The [Overview] displays the custom filters with their configured properties:

Section	Dialogue element	Display	Switching function
Custom filters	ID	01	
	Name	Filter name	
	Sample rate	Set value	
	Section	Time domain / frequency domain	
	Assigned objects	Assigned time domain object	

Switching functions:

	Import filter from CSV file
	Import filter from clipboard
	Configure selected filter
	Delete selected filter

9.3.5.2 VSE > ... > Detail [Custom filters] > Import custom filters

Custom filters can be imported from a CSV file, the clipboard or an already existing parameter set.

▶ To import filters:
Select [Custom filters] in the detailed view tree
Right-click in the empty area of the detailed view

▶ Click on one of the following menu items in the context menu:
[Import filter from file...
Import filter from clipboard...
Import filter from other parameter set...]

▷ The [Filter information] window appears

▶ Enter the name of the filter

▶ Select sampling rate

▶ Check filter characteristics and filter coefficients (cannot be changed in this window)

Section	Dialogue element	Display	Switching function
Name	Name	Set name or suggested name	Input box
Sample rate	Sample rate	Selected setting: • 25 k data sample/s (time domain) • 50 k data sample/s (frequency domain)	Selectable from list
Filter characteristics	Chart	Filter characteristics	---
Filter coefficients	Table	Filter coefficients	---

▶ Import filter with [Import]

9.3.5.3 VSE > ... > Detail [Custom filters] > Format of filter configuration

The formats for the CSV file and the data in the clipboard are identical:

```
[Name[...];<Name>;]
[(Samplerate|Sample rate)[...];<sample rate in samples per seconds>;]
[Coefficients[...];<list of coefficients>]
```

Element	Tag
Name of the filter	Name:;
Sampling rate	Samplerate:;
Filter coefficients	Coefficients:;

- The `Name` and `Samplerate` elements are optional.
- Values are suggested in the import window and have to be adapted, if required: VSE > ... > Detail [Custom filters] > Import custom filters (→ 🗋 76)
- 1...111 coefficients are allowed.
- A coefficient must be an integer value in the range of -32768...32767 (including limits).
- Supported sample rates are 25000 and 50000 data samples per second.
- The first column must begin with the corresponding keyword; it may, however, contain further characters (such as "`samplerate (samples/second);`").
- Upper/lower case is ignored.

Valid variants are for example:

(Copy to an editor, save as CSV file and import in VES004 for testing.)

A) Complete details:

```
Name:;FilterA25;
Samplerate (samples/second):;25000;
Coefficients:;1;0;0;0;0;0;0;1;2;3;4;6;9;12;16;20;26;32;38;46;55;65;76;88;102;116;1
32;149;167;186;206;227;249;271;294;318;342;367;391;416;440;463;486;509;530;550;569
;586;601;615;627;637;645;650;654;655;654;650;645;637;627;615;601;586;569;550;530;5
09;486;463;440;416;391;367;342;318;294;271;249;227;206;186;167;149;132;116;102;88;
76;65;55;46;38;32;26;20;16;12;9;6;4;3;2;1;0;0;0;0;0;0;0
```

B) Coefficients only:

```
1;0;0;0;0;0;0;1;2;3;4;6;9;12;16;20;26;32;38;46;55;65;76;88;102;116;132;149;167;186
;206;227;249;271;294;318;342;367;391;416;440;463;486;509;530;550;569;586;601;615;6
27;637;645;650;654;655;654;650;645;637;627;615;601;586;569;550;530;509;486;463;440
;416;391;367;342;318;294;271;249;227;206;186;167;149;132;116;102;88;76;65;55;46;38
;32;26;20;16;12;9;6;4;3;2;1;0;0;0;0;0;0;0
```

C) Not the whole number of coefficients:

```
Name:;Filter5C;
Samplerate:;25000;
Coefficients:;1;2;3;4;5
```

D) No name defined:

```
Samplerate;25000;
Coefficients:;1;2;3;4;5
```

9.3.5.4 VSE > ... > Detail [Custom filters] > Tabs

A created filter has the following tabs and sections:

VSE > ... > Detail [Custom filters] > ... > Tab [Configuration]

▶ Change the name of the filter in the [Identification] section.

Section	Dialogue element	Display	Switching function
Identification	Name	Preset name	Input box
Assigned objects	Assigned objects	Assigned time domain object	Selectable from list

VSE > ... > Detail [Custom filters] > ... > Tab [Properties]

The [Properties] tab displays information about the filter configuration. The configuration cannot be changed in this view.

Section	Dialogue element	Display	Switching function
Sample rate	Sample rate	Set value	---
Filter characteristics	Chart	Filter characteristics	---
Filter coefficients	Table	Filter coefficients	---

9.3.5.5 VSE > ... > Detail [Custom filters] > Context menu

▶ Right-click on one of the displayed filters

▷ The context menu is displayed.

Switching functions:

	Export filter to CSV file
	Export filter to clipboard
	Rename selected filter
	Delete selected filter

9.3.6 VSE > [Parameter_#] > Detail [Objects]

Objects are used to calculate and monitor characteristic values. The characteristic values can be calculated for the signals of the inputs (dynamic, analogue and/or external inputs).

Predefined object types are offered to facilitate the configuration of monitoring tasks for the corresponding machine.

To create an object:

▶ Right-click in the empty area of the detailed view.

▷ The context menu is displayed.

▶ Select one of the listed objects via [New object >].

or

▶ Use one of the buttons to create an object:

	Edit the selected object via the wizard
	Create a new object via the wizard (object type = any, but no bearing)
	Create a new object via the wizard (object type = bearing)
	Create 2 new objects via the CREST preparation wizard (object type 1 = a-Peak (time domain) and object type 2 = a-RMS (time domain))
	Configure the selected object
	Delete the selected object

9.3.6.1 VSE > ... > Detail [Objects] > Object types

There are preconfigured object types for the most common monitoring tasks which can be configured using a wizard:

- Unbalance
- Bearing
- a-RMS (frequency domain)
- v-RMS (frequency domain)
- d-RMS (frequency domain)
- Others
- a-RMS (time domain)
- v-RMS (time domain)
- a-peak (time domain)
- Upper limit monitor
- Lower limit monitor

RMS = root mean square

VSE > ... > Object types > [Unbalance]

Unbalance occurs on all rotating shafts. It is caused by unevenly distributed mass around the shaft. An increased unbalance affects the bearings of the shaft and leads to wear.

The [Unbalance] object monitors the rotational frequency of the machine

The frequency-selective monitoring filters out noise signals caused by auxiliary equipment, support or feed movements. To calculate the unbalance, the rotational speed of the shaft must be configured as a trigger.

Application:

- Fans
- Motors
- Spindles (especially during acceleration), etc.

VSE > ... > Object types > [Bearing]

Bearings are a central component in machines of any type. With progressing wear, each bearing develops its own damage frequencies. The damage frequencies of a bearing depend on the bearing geometry (defined by bearing type and manufacturer) and yet are unique for each bearing.

The [Bearing] object monitors the damage frequencies of a rolling element bearing

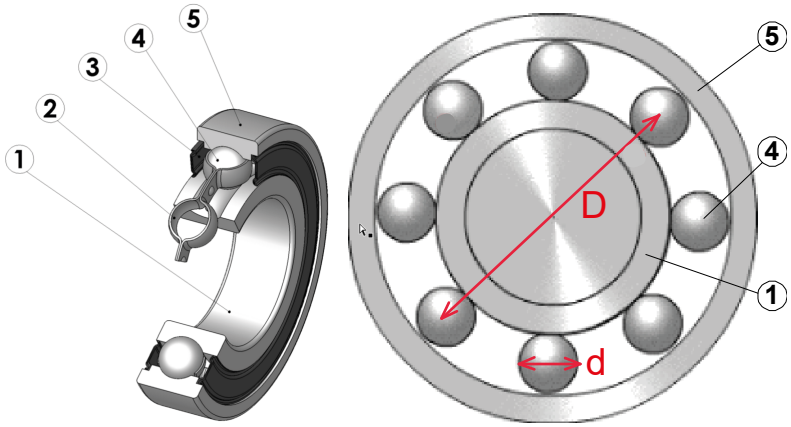


Fig. 5: Bearing

1	InnerRace
2	Cage
3	Seal washer
4	Rolling
5	OuterRace
D	Pitch circle diameter
d	Rolling element diameter

▶ Select damage frequencies from the integrated rolling element bearing database

or:

▶ Request damage frequencies from the manufacturer and enter them manually

or:

▶ Use the rolling element bearing calculator to calculate the damage frequencies based on the geometry and enter them manually

The damage frequencies must always be calculated and entered as a frequency factor for a shaft speed of 1 Hz or 60 min^{-1}. The actual calculation of the damage frequency is done by multiplying the frequency factor by the rotational frequency of the shaft determined by the trigger (= rotational speed / 60).

VSE > ... > Object types > [a-RMS], [v-RMS], [d-RMS] (Frequency domain)

RMS = root mean square

- a-RMS (frequency domain) calculates the effective value of the acceleration
- v-RMS (frequency domain) calculates the effective value of the velocity
- d-RMS (frequency domain) calculates the effective value of the displacement

...in a user-defined frequency band.

Application:

- Measurements in accordance with ISO 10816 and other applicable standards
- Loose machine parts
- Alignment errors
- Motor faults (problems on rotor bars and stator laminations, eccentricity, etc.)

These object types are calculated in the frequency domain and, thus, in sequence in the multiplex mode. This may result in a "dead time" during monitoring.

For permanent monitoring, select the "v-RMS (time domain)" object type!

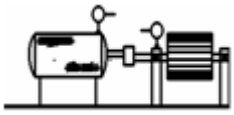
VSE > ... > Object types > [Other]

A large number of machine components have been analysed to determine their specific vibration behaviour in the event of damage. The damage frequencies resulting from the examinations can be configured in an object optimised for this task.

Frequency-selective monitoring
Object can be freely configured

In the object the damage frequencies are specified as frequency factor. The actual calculation of the damage frequency is done by multiplying the frequency factor by the rotational frequency of the shaft determined by the trigger (= rotational speed / 60).

Application:

	Soft foot Loose fitting	FFT: 1,0 • f_n, 2,0 • f_n, 3,0 • f_n
	Meshing, discrete tooth error Meshing, excessive transverse forces	FFT and H-FFT: 1,0 • f_n FFT: number of teeth • f n
	Slide bearing, unstable lubricating film Slide bearing, wear	FFT: 0,42...0,48 • f_n FFT: 1,0 • f_n, 2,0 • f_n, 3,0 • f_n
	Pump, eccentric pump impeller Pump, cavitation	FFT: number of blades • f_n FFT: 1,0 • f_n, 2,0...n • f_n
	Coupling, misalignment	FFT: 2,0 • f_n

Legend: f_n = rotational frequency (= rotational speed / 60) of the shaft

VSE > ... > Object types > [a-RMS], [v-RMS] (Time domain)

RMS = root mean square

- a-RMS (time domain) monitors the effective value of the acceleration
- v-RMS (time domain) monitors the effective value of the velocity

...in a frequency domain adjustable via filters.

The frequency domain is defined via the filter of the dynamic input ([Configuration] → tab) and the filter of the object.

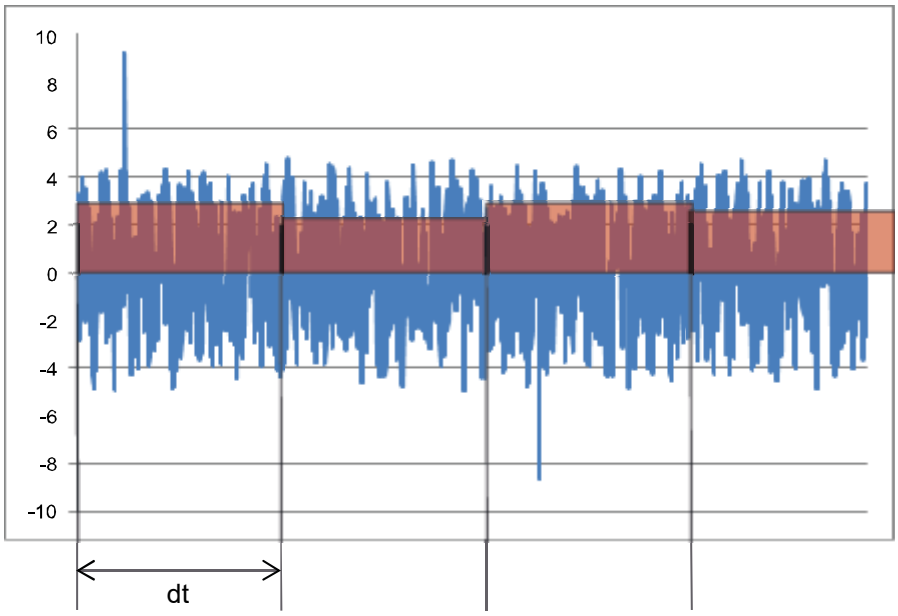


Fig. 6: Legend: dt = measurement time, measurement period

Application:

- Measurements in accordance with ISO 10816 and other applicable standards (v-RMS)
- Loose machine parts (v-RMS)
- Alignment errors (v-RMS)
- Chatter vibrations, resonances (a-RMS)

VSE > ... > Object types > [a-Peak (time domain)]

The filtering of the time signal is done by means of the filter for the dynamic input ([Configuration] → tab) and the filter for the object. For most applications, however, only the filter of the object is decisive.

[a-Peak (time domain)] measures the maximum amplitude on a dynamic input within the set measurement time

Different applications are possible thanks to signal filtering. Due to the very short measurement time (adjustable between 0.64 ms and 1.3 s), this object type is especially suited for machine protection (e.g. in crash situations).

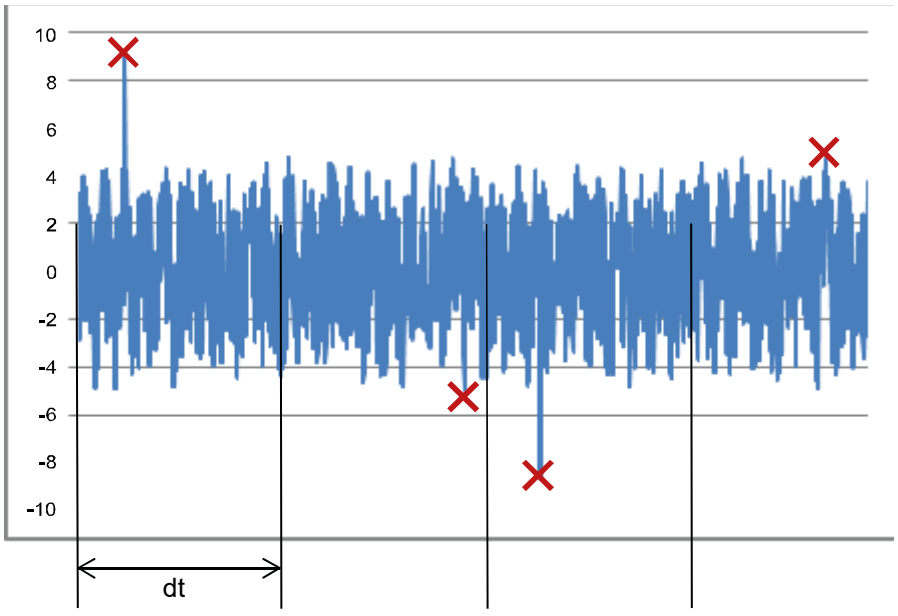


Fig. 7: Legend: dt = measurement time, measurement period

Application:

- Spindle crash on machine tools (lowpass)
- Cavitation of a pump (highpass)
- Metal-on-metal friction, e.g. bearing damage (highpass)

VSE > ... > Object types > [Upper limit monitor], [Lower limit monitor]

[Upper limit monitor], [Lower limit monitor] to monitor analogue signals (DC signals)

The signal source can be either an analogue or external input.

With hardware version "AI" (version V0.6.0) and higher in combination with firmware version 10.x, it is also possible to monitor an analogue value at one of the dynamic inputs.

9.3.6.2 VSE > ... > Detail [Objects] > Object types > Tabs

A created object has the following tabs and sections:

Depending on the type of object, some of the following sections are not visible or greyed out.
Display the greyed out sections via ⚙ (Advanced settings).

VSE > ... > Detail [Objects] > ... > Tab [Configuration]

▶ In the [Configuration] section, select the input for calculating the characteristic value to be monitored in the object.

Section	Dialogue element	Display	Switching function
Identification	Name	Preset name according to input and object type	Free text
	Type	Selected object type	---
Input		Configured input	Selectable from list

Switching functions:

⚙	Display / edit the advanced settings

VSE > ... > Detail [Objects] > ... > Tab [Subobjects]

Belongs to the following objects:

- Unbalance
- Bearing
- Others

Subobjects indicate the damage frequencies for frequency-selective monitoring. The damage frequency is calculated by multiplying the frequency factor indicated in the subobject by the rotational frequency defined by the rotational speed trigger:

```
Schadensfrequenz [Hz] = Ordnungszahl • (Drehzahl [min-1]) / 60)
```

For monitoring, the measured amplitudes of all subobjects are added up to an object value.

The frequency window is a tolerance range that compensates for any inaccuracies in the determination of the rotational speed or the bearing type. Indication of the frequency window: either in per cent of the damage frequency or as an absolute value in Hertz. For highest diagnostic quality: select the smallest possible frequency window.

The sum of the subobjects (RSS = Root Sum Square) is used to determine the energy (rms) over defined frequency bands in the FFT. This improves the comparability of object values with more than one frequency band.

In addition, the total RSS energy cannot be greater than the total FFT energy, whereas the standard "sum" method could exceed the total FFT energy.

Section	Dialogue element	Display / Description	Switching function
Subobjects	Name	Inner race, outer race, rolling elements	
	Range number	Configured value	
	Frequency window	Configured value	
Evaluation	Peak	Monitors the maximum peak	Activate / deactivate
	RMS	Calculates the effective value within the indicated frequency domain	Activate / deactivate
Sum of the subobjects	Use root sum square (RSS)	• Activates the subobject root sum square summation (= square root of the sum of the squares). • If deactivated, the subobjects will be summed up.	Activate / deactivate

Switching functions:

	Browse bearing database
	Display / edit the advanced settings
	Modify the selected subobject
	Add a new subobject
	Delete the selected subobject

VSE > ... > Detail [Objects] > ... > Tab [Frequency window]

Belongs to the following objects:

- v-RMS (frequency)

The [Frequency Window] tab appears in the position of the [Subobjects] tab.

The frequency window describes a monitoring range of the frequency.
Indication of the frequency window: as an absolute value in Hertz

Section	Dialogue element	Display	Switching function
Monitoring window	From	Configured value [Hz]	Increase / decrease value
	To	Configured value [Hz]	Increase / decrease value

Switching functions:

	Display / edit the advanced settings

VSE > ... > Detail [Objects] > ... > Tab [Processing] (Frequency domain)

Belongs to the following objects:

- Unbalance
- Bearing
- Others
- a-RMS (frequency domain)
- v-RMS (frequency domain)

- d-RMS (frequency domain)

Section	Dialogue element	Display	Switching function
Analysing method	FFT / HFFT	Method for the frequency analysis	Activate / deactivate
Unit	Acceleration	Value in [mg]	Activate / deactivate
	Velocity	Value in [mm/s]	Activate / deactivate
	Displacement	Value in [mm]	Activate / deactivate
Filter	Filter	Configured value	Selectable from list
Resolution	Resolution	Configured value	Selectable from list

Switching functions:

⚙	Display / edit the advanced settings

Section [Analysis method]

The analysis method indicates in which frequency spectrum the monitoring will be carried out. You can choose between:

- FFT spectrum (Fast Fourier Transformation)
- Enveloped spectrum (H-FFT)

FFT is typically used for harmonic signals (e.g. unbalance) and H-FFT for periodic signals (e.g. bearings).

The unbalance, a-, v- and d-RMS (frequency domain) object types always monitor the FFT spectrum, while the bearing object type always monitors the H-FFT spectrum. The analysis method cannot be changed in these cases.

Section [Unit]

The unit determines how the signal is to be evaluated:

- As acceleration (a) in [mg]
- Velocity (v) in [mm/s]
- Displacement (d) in [mm]

The velocity, and even more the displacement, are only useful units for low frequencies.

For the H-FFT method of analysis (as in the case of the bearing object type), the signal can only be evaluated as acceleration.

For the a-,v- and d-RMS (frequency domain) types, the unit is predetermined by the type.

Section [Filter]

A filter can be selected for the calculation of the H-FFT spectrum. The basic bandpass setting of 450…5950 Hz can be used in most applications.

For the monitoring of slow rotating bearings (< 120 min^{-1}), a 5000 Hz highpass is preferable.

▶ For gear diagnosis please ensure that the mesh frequency (number of teeth • rotational frequency) is not filtered out.

Section [Resolution]

The resolution is the distance between 2 calculated frequencies in the spectrum. It is indirectly proportional to the measurement time (measurement time = 1/resolution). The frequency resolution also serves to distinguish the damage frequency from any interfering frequencies.

VSE > ... > Detail [Objects] > ... > Tab [Processing] (Time domain)

Belongs to the following objects:

- a-RMS (time domain)
- v-RMS (time domain)
- a-peak (time domain)

Section	Dialogue element	Display	Switching function
Filter	Filter	Configured value	Selectable from list
	Input	Configured value	---
Measurement time		Configured value	Selectable from list

Section [Filter]

In the time domain, filtering of the signal plays an important role. In addition to the filter selected in the object, the filter of the dynamic input which is also active ([Configuration] → tab) is displayed.

For [v-RMS (time domain)] type objects, 2 filter combinations according to ISO10816 are common:

- 2 Hz dynamic input, 975 Hz lowpass in the object:
  machines / installations with a rotational speed between 120...600 min^{-1}
- 10 Hz dynamic input, 975 Hz lowpass in the object:
  machines / installations with a rotational speed greater than 600 min^{-1}

For [a-Peak (time domain)] type objects, usually only the filter of the object is decisive:

- No filter: general monitoring
- 975 Hz lowpass: crash monitoring
- 3750 Hz (or higher) highpass:
  metal-on-metal friction, bearings, cavitation of pumps, ...

Section [Measurement time]

Define the measurement time in accordance with the required response time. For monitoring without averaging and response delay, the measurement time corresponds, in the extreme case, to the alarm time in case of damage.

In case of very short measurement times (< 40.96 ms), ensure that the response times of the alarm output and the input are fast enough for the alarm evaluation (e.g. on a PLC).

VSE > ... > Detail [Objects] > ... > Tab [Trigger]

Section	Dialogue element	Display	Switching function
Reference value	Reference value	Checkbox	Activate / deactivate
	Trigger	Configured reference trigger	Selectable from list
	Monitoring independent of the trigger state		Activate / deactivate
	Signal weightings	Configured signal weighting	Selectable from list
Rotational speed	Trigger	Configured trigger	Selectable from list
	Disable rotational speed instability check		Activate / deactivate
	Signal weightings	Configured signal weighting	Selectable from list
Gear ratio	Object speed	Configured value	Increase / decrease value
	Measured speed	Measured value	---

Switching functions:

	Display / edit the advanced settings

Section [Rotational speed]

With objects for frequency-selective monitoring, the rotational speed trigger is used to calculate the damage frequency.

Only the following triggers can be used as a rotational speed input:

- Constant triggers
- Triggers for which the [Use as rotational speed signal] checkbox is not active ([Configuration] → tab).

If the rotational speed fluctuates by more than 5% during the measurement of an object, then the measurement result is ignored. If there are considerable changes in speed, precise frequency-selective monitoring is not possible. If you still wish to use the measured value, you can prevent it from being dropped via the [Disable rotational speed instability check] checkbox. If there is a transmission ratio between the speed of the trigger and that of the object to be monitored, this must be indicated.

In the case of objects that are used for monitoring a frequency domain (a-, v-, d-RMS (frequency domain)) and objects in the time domain, the rotational speed trigger can only be used for monitoring control. Monitoring is only active if the value of the trigger is within its working range. For these objects only triggers for which the [Use as rotational speed] checkbox is active ([Configuration] → tab) can be used as rotational speed triggers.

The [signal weighting] can be used to amplify the object value for different rotational speeds or reference values within the working range. The desired effect is different alarm limits within the working range.

Section [Reference value]

The reference value trigger controls the monitoring. It must be enabled via the [Reference value] checkbox. Monitoring is only active if the value of the trigger is within its working range.

Only the following triggers can be used as a rotational speed input:

- Triggers for which the [Use as rotational speed] checkbox is not active ([Configuration] → tab).

The [Monitoring independent of the trigger state] checkbox deactivates the monitoring control. The reference value is then purely informative and included in the history recordings or used for signal weighting.

The [signal weighting] can be used to amplify the object value for different rotational speeds or reference values within the working range. The desired effect is different alarm limits within the working range.

VSE > ... > Detail [Objects] > ... > Tab [Limits]

Section	Dialogue element	Display	Switching function
View	• Absolute • Relative	Option field	Select an option
Base line	Base line	Configured value	Increase / decrease value
	Auto teach	Checkbox	Activate / deactivate
	Rotational speed	Configured value	Increase / decrease value
	Reference value	Configured value	Increase / decrease value
Limits	Damage	Configured value	Increase / decrease value
	Warning	Configured value	Increase / decrease value

Switching functions:

	Display / edit the advanced settings

Section [View]

Belongs to the following objects:

- Others
- All objects > [Advanced settings].

The limits are decisive for the alarm function:

- For view = absolute:
  - The base line is set to “1”
  - The values for the 2 alarm thresholds (warning, damage) are absolute values in the engineering unit selected for the object
- For view = relative:
  - The limits / alarm thresholds are a multiple of the base line

For all other object types the following applies: view = absolute

Section [Base line]

Belongs to the following objects:

- Others
- All objects > [Advanced settings].

In case of a relative view, the base line represents the value of the object in the "good" condition. The base line is the basis for a later output of a warning or damage alarm.

Activate the [Auto teach] checkbox if the base line is to be determined through a manually started measurement by the diagnostic electronics. However, we recommend that you do not configure the base line until about 3 weeks after setup of the diagnostic electronics based on the data that has been collected in the internal memory.

The rotational speed and reference values are only relevant in case of signal weighting. The use of signal weightings should be avoided by means of small operating ranges of the triggers ([Configuration] → tab), if possible.

Section [Limits]

The limits are decisive for the alarm function.

In the normal case (view = absolute), the following applies: the values for the 2 alarm thresholds (warning, damage) are absolute values in the engineering unit selected for the object.

VSE > ... > Detail [Objects] > ... > Tab [Averaging]

Section	Dialogue element	Display	Switching function
Averaging	Averaging	Configured value	Selectable from list
	Trigger becomes active	Checkbox	Activate / deactivate
	Change of variant	Checkbox	Activate / deactivate
Response delay	Response delay	Configured value	Increase / decrease value Is automatically set to 0 and deactivated when the alarm signalling is deactivated.
Alarm signalling	Deactivate alarm signalling	Checkbox	Activate / deactivate When using the VSE in combination with moneo, alarm signalling in VSE can be disabled, as moneo takes over limit monitoring.

Switching functions:

⚙	Display / edit the advanced settings

Section [Averaging]

Short-time events in the measurement signal such as brief shocks can be suppressed by averaging the signal. The averaging is indicated as a weighting factor of the measured value.

For objects in the time domain or the monitoring of frequency domains (a-, v-, d-RMS (frequency domain)) we recommend to set the averaging value to 1/1 in order to monitor the actual value of the measurement.

The [Trigger becomes active] and [Change of variant] checkboxes determine how the averaging function is to be continued in these cases. If one of the checkboxes is activated, the last object value is set to "0" for the calculation of the new value in order to start a new calculation.

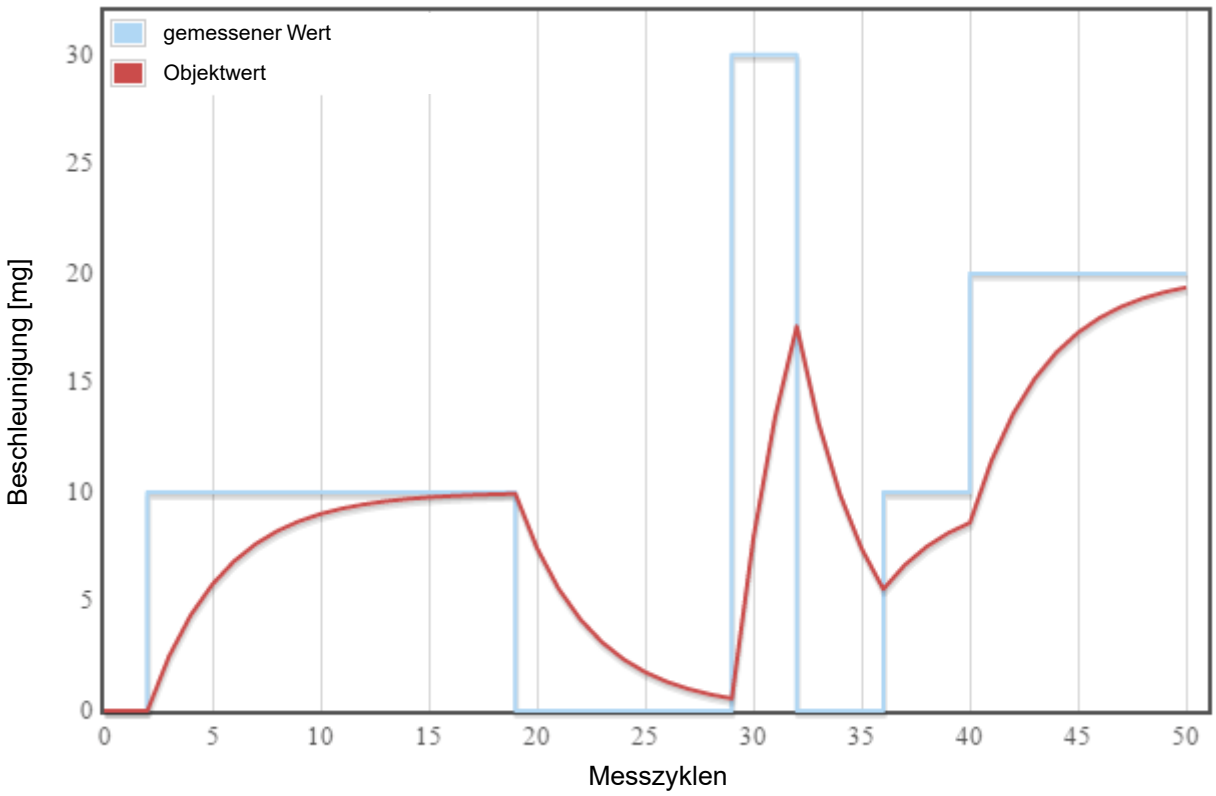
Averaging example

Last object value = 3.8 mm/s, measured value = 7.1 mm/s, averaging = 1/8

The new object value is:

Object value = last object value • (1-averaging) + measured value • averaging
Object value = 3.8 mm/s • (1-1/8) + 7.1 mm/s • 1/8
Object value = 4.2 mm/s

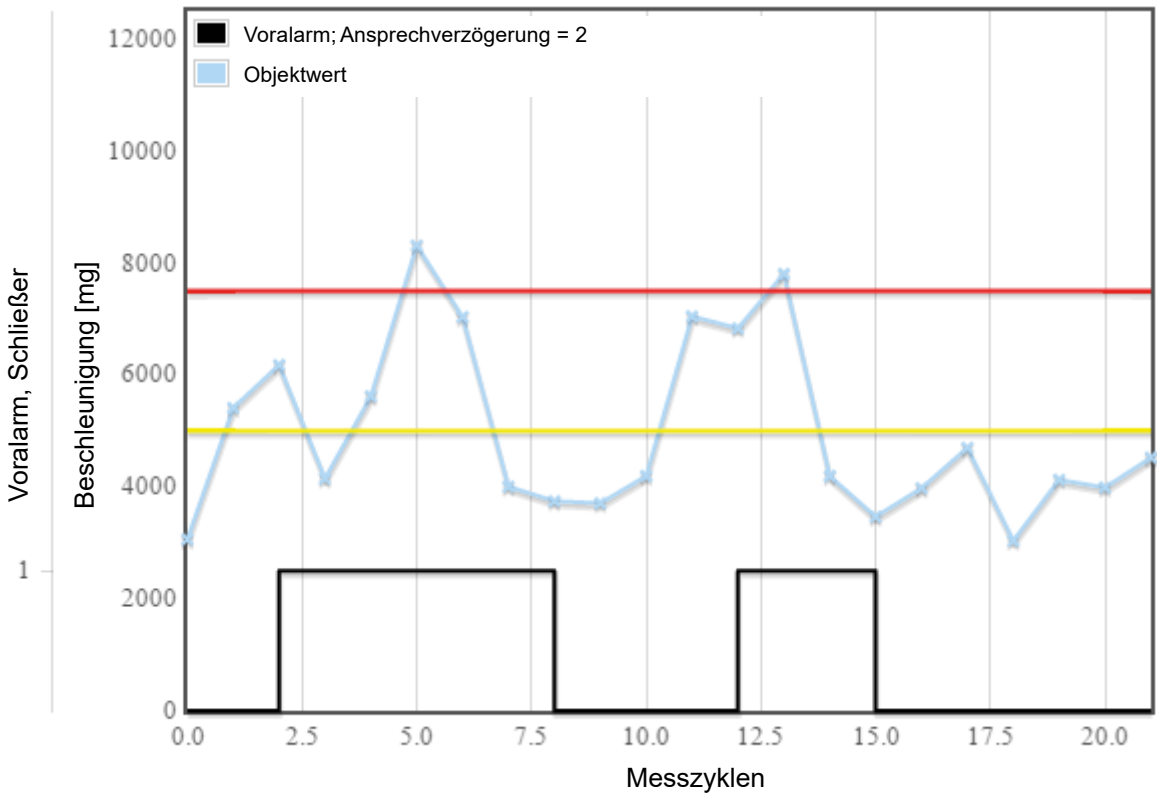
The following diagram shows how the object value approaches a constant measured value. The averaging value determines how quickly the 2 values approach each other.



Section [Response delay]

The response delay ensures the reliability of the diagnostics by acting as a counter. The alarm state only changes after the object value has exceeded or fallen below the limit x times (x = value of the response delay) in succession. The value of the response delay is indicated in measurement cycles of the object. The response delay thus has a great impact on the response time of the alarm.

The following diagram shows the alarm condition of the damage alarm at a response delay of 2:



For example, during crash monitoring of a spindle in order to protect the machine, the response delay must be set to "1" to obtain the fastest possible crash alarm.

9.3.6.3 Objects for determining the CREST factor

The CREST factor represents the ratio between peak values and the effective value (RMS).

The CREST factor indicates the extent to which peaks occur within a waveform. A CREST factor of 1 means there are no peaks, as is the case with direct current, for example.

Although VES004 does not directly support the calculation of CREST factors, it provides a wizard to create a peak object and an RMS object.

Both objects use:

- the same input
- the same measurement time
- the same pre-processing filters
- the same trigger
- the same averaging

The objects must be time domain objects and are named by the wizard as `CF_SExx_a_Peak_Time_xx` and `CF_SExx_a_RMS_Time_xx`.

To launch the wizard, at least one of these two objects must already exist; otherwise, an error message will be displayed.

Both objects must have identical history configurations, if the CREST factor is to be calculated based on history values.

9.3.7 VSE > [Parameter_#] > Detail [Variants]

You can use variants if you want to monitor certain objects only in defined machine states and this cannot be solved via triggers. Under certain circumstances, this can considerably improve the diagnostic quality.

An example of such an application is the monitoring of bearings on a machine tool. During the machining of the workpieces, different kinds of vibrations can occur on the machine, which can lead to a false diagnosis of a bearing.

For this reason, a specific state on the machine should be defined (spindle position, spindle speed, tool) for the monitoring of bearings – the so-called reference run. The reference run allows monitoring of the bearings at regular intervals.

In this case, rolling element bearing monitoring would be an own variant differing from common monitoring during normal operation.

9.3.7.1 VSE > [Parameter_#] > Detail [Variants] > Operating principle

The objects defined in the parameter set can be assigned to any number of variants. Switching of the active variant in the diagnostic electronics is then done either:

- Manually
- Via the ifm OPC server (→ Change of variant via OPC 🗋 94) or
- With the VSE100 / VSE101 via the digital I/Os. Only the objects that are active in the current variant will be calculated and evaluated.

9.3.7.2 VSE > ... > Detail [Variants] > Tab [Configuration]

Objects are assigned to the variants. The objects can be activated/deactivated in the different variants as required.

▶ Activate / deactivate all objects for variant #: mouse click on the variant #

▶ Activate / deactivate an object for all variants: mouse click on the corresponding object

The applied method of activation may restrict the number of possible variants ([Activation] → tab or change of variant without the digital I/Os of the VSE100 / VSE101).

9.3.7.3 VSE > ... > Detail [Variants] > Tab [Activation] (only VSE100 / VSE101)

Only applies to VSE100/VSE101:

Here, only configure the method of activation of a variant if the activation is to be carried out via digital signals directly on the diagnostic electronics.

If the activation of a variant is done manually or via the ifm OPC server (→ Change of variant via OPC 🗋 94), no further configuration is necessary.

If the activation of the variants is done via the digital I/Os of the diagnostic electronics, two different methods are available:

- Active variant defined by state of one I/O
- Active variant defined by state of several I/Os (as binary computed value)

Section	Dialogue element	Switching function
Activation mode	• Active variant defined by state of one I/O • Active variant defined by state of several I/Os (as binary computed value)	Select an option

Section	Dialogue element		Switching function
Activation	Digital I/O	• ✗ IO # (not used) • ✓ IO # variant input	Checkbox Activate / deactivate
	High	Variant #	Selectable from list
	Low	Variant #	Selectable from list
	ST	Self-test	Checkbox Activate / deactivate

Active variant defined by state of one I/O

With this method of activation of variants, a particular variant is assigned to a state of an I/O of the diagnostic electronics. When the I/O is in the defined state, the variant is active.

Switching between more than 2 variants requires more than one I/O. In this case the following applies:

- The state "1 (High)" of the I/Os that has the highest number determines the active variant
- If all I/Os are "0 (Low)", it is also the variant assigned to the I/O with the highest number that is active.

Accordingly, with this method, a maximum of 9 different variants can be activated using the 8 I/Os of the VSE100 / VSE101.

Example 1:

Configuration for the activation of variants.

Digital I/O	High	Low	ST
✓ I/O 1	Variant 1	Variant 0	
✓ I/O 2	Variant 2	---	
✓ I/O 3	---	---	
✓ I/O 4	---	---	
✓ I/O 5	Variant 3	---	
✗ I/O 6 (not used)	---	---	
✗ I/O 7 (not used)	---	---	
✗ I/O 8 (not used)	---	---	

In this example all of the 4 selected variants can be switched. The following table shows which I/O states will activate which variants.

Active variant	I/O 1	I/O 2	I/O 5
Variant 0	0 (Low)	0 (Low)	0 (Low)
Variant 1	1 (High)	0 (Low)	0 (Low)
Variant 2	Not relevant	1 (High)	0 (Low)
Variant 3	Not relevant	Not relevant	1 (High)

- If all I/Os are "0 (Low)", then variant 0 will be active. No I/O with a higher number has a different variant selected for the state "0 (Low)".
- If at least one I/O is "1 (High)", then the active variant will be determined by the I/O with the highest number. The state of the I/Os with a lower number is not relevant.

Example 2:

Configuration for the activation of variants:

Digital I/O	High	Low	ST
✓ I/O 1	Variant 1	Variant 0	
✓ I/O 2	Variant 3	Variant 2	
✗ I/O 3 (not used)	---	---	
✗ I/O 4 (not used)	---	---	
✗ I/O 5 (not used)	---	---	
✗ I/O 6 (not used)	---	---	
✗ I/O 7 (not used)	---	---	
✗ I/O 8 (not used)	---	---	

In this example only 3 of the selected variants can be switched. The following table shows which I/O states will activate which variants.

Active variant	I/O 1	I/O 2
Variant 0	Cannot be activated	
Variant 1	1 (High)	0 (Low)
Variant 2	0 (Low)	0 (Low)
Variant 3	Not relevant	1 (High)

- If both I/Os are "0 (Low)", then the variant configured at the input with the higher number (in this case I/O 2) will be active.
- If I/O 2 is "1 (High)", then the variant 3 configured for this case will be active irrespective of the state of I/O 1.

Active variant defined by state of several I/Os (as binary computed value)

With this method of variant activation, an I/O of the VSE100 / VSE101 diagnostic electronics will be assigned to a certain value. The selectable values are predefined according to a binary coding. If the state of the I/O is "0 (OFF)", it will always have the value "0". If the state of the I/O is "1 (ON)", it will have the value that corresponds to its assignment. The sum of all values determines the active variant.

Example:

Bit no.	2	1	0	Active variant
Bit value	4 (=2^2)	2 (=2^1)	1 (=2^0)	
Used input	**I/O 4**	**I/O 3**	**I/O 1**	
State of input	0	0	0	Variant 0
State of input	0	0	1	Variant 1
State of input	0	1	0	Variant 2
State of input	0	1	1	Variant 3
State of input	1	1	0	Variant 6
State of input	1	1	1	Variant 7

Manual change of variant via the VES004 software

Requirement:

- The connection to the diagnostic electronics must be established.
- The I/Os of the VSE100 / VSE101 must not be used for the variant selection.

The current variant can be changed in the device settings of the diagnostic electronics under [Actions] under the [Change of variant] tab.

The assignment of objects to variants can be changed on the parameter page [Variants] > [Configuration] tab as required. By default, all objects are always active in all variants.

Change of variant via OPC

Requirement: The I/Os of the VSE100 / VSE101 must not be used for the variant selection.

The current variant is an OPC item with write and read permission on the ifm OPC server.

The path (item ID) for the current variant is:

`ifm.VSE.<NameDesGeräts>.DeviceInformation.ActualVariant`

"NameOfDevice" corresponds to the name of the connection in the configurator of the ifm OPC server.

9.3.8 VSE > [Parameter_#] > Detail [Counters]

The VSE diagnostic electronics has 32 internal counters (firmware 0.6.x and higher).

Depending on the event for starting the counter, we distinguish between the following counter types:

- Object state
- Analogue runtime
- Digital runtime (only visible with VSE100 / VSE101)
- VSE uptime
- Sum

9.3.8.1 VSE > [Parameter_#] > Detail [Counters] > Overview

The counters overview page shows the counters configured in the parameter set and their most important parameters:

- ID
- Name
- Type
- Source

▶ Right-click into the area of the detailed view to create a counter.

Switching functions:

	Go to the configuration page of the selected counter
	Set counter values
	Delete the selected counter

9.3.8.2 VSE > ... > Detail [Counters] > [Set Counter Values]

Define a start value for the selected counter.

✓ The VES software is connected to the device via 

▶ Click on the  icon.

▷ The [Set counter values] window appears.

▶ Select counter.

▶ Set the counter value in the [New value] table column.

▶ Activate the checkbox in the [Write] table column.

▶ Click [Write counters].

▷ The counter values are written to the device.

9.3.8.3 VSE > ... > Detail [Counters] > Tab [Configuration]

[Identification] section:

- The name of the counter object can be changed.
- The counter type is determined when the counter is created; it cannot be changed.

[Configuration] section:

- Indicate the source or event to activate the counter.
- Depending on the selected counter type, only the following sources are permitted:

Counter type	Object	Event
Object state	Any	State that will initiate the counter
Analogue runtime	Trigger refers to an analogue or external input	---
Digital runtime (only visible with VSE100 / VSE101)	An I/O which is still free	State that will initiate the counter
VSE uptime	The counter starts automatically as soon as the diagnostic unit has been switched on	
Sum	An analogue input that is defined as [Counter – totaliser]	---

Section	Dialogue element	Display	Switching function
Identification	Name	Name of the counter object	---
	Type	Counter type	---
Configuration	Object	Assigned object	Selectable from list
	State	State of the object or the input	Selectable from list
	I/O	Configured digital input	Selectable from list
	Trigger	Trigger of the assigned object	Selectable from list
	Source	Configured input	Selectable from list

9.3.8.4 VSE > ... > Detail [Counters] > Tab [Alarming]

- Define a limit for the counter.
- Counters cannot be used directly in the creation of an alarm.
- Alarms are combined to so-called “alarm groups”.
- Later in the alarm configuration, the alarm group can be selected as a source.

Section	Dialogue element	Display	Switching function
Alarming	Limit	Options: • Number of pulses • Duration in seconds	Increase / decrease value
	Alarm group	Configured alarm group	Selectable from list

9.3.8.5 VSE > ... > Detail [Counters] > Tab [Reset] (only VSE100 VSE101)

Only applies to VSE100/VSE101:

Indicate the digital input I/O # that is to be used to reset the counter to the value "0". I/Os that are already used otherwise (variant switching, counter input) are not available for this (greyed out in the list).

Section	Dialogue element	Display	Switching function
Reset counter	I/O 1	Use of the input	Activate / deactivate
	...	...	...
	I/O 8	Use of the input	Activate / deactivate

9.3.8.6 VSE > ... > Detail [Counters] > [Object state]

State counters count the length of time an object has been in a defined state. Any object can be chosen as a source. The selectable states are:

- Active: an object can only be deactivated through the use of variants.
- Valid: in the following cases, the measuring result of an object is invalid:
  - If the object is inactive
  - If the rotational speed fluctuation is too high
  - If the rotational speed or reference value is outside the working range
  - If the base line is invalid
- Warning: an object is in the warning mode if the measured value, taking into account the response delay, exceeds the corresponding limit.
- Damage: an object is in the damage mode if the measured value, taking into account the response delay, exceeds the corresponding limit.

9.3.8.7 VSE > ... > Detail [Counters] > [Runtime]

A runtime counter (also: operating hours counter) counts the time in which an analogue or digital (only VSE100 / VSE101) input is in a particular range or state. Based on the source, the following types of runtime counters are distinguished:

- Analogue runtime counter: The counter is activated by a trigger that refers to an analogue or external input. If the value for the corresponding input is within the working range defined in the trigger, the time will be counted.

▶ With hardware version "AI" (version V0.6.0) and higher in combination with firmware version 10.x, it is also possible to monitor an analogue value at one of the dynamic inputs.

- VSE/VYE runtime counter: The counter is activated by the voltage supply of the diagnostic electronics. If the diagnostic electronics is supplied with voltage, the time will be counted.
- Digital runtime counter (only visible with VSE100 / VSE101): A digital input of the diagnostic electronics activates the counter. If the input is in the corresponding state, the time is counted.

9.3.8.8 VSE > ... > Detail [Counters] > [Totaliser]

Totalisator counters count the pulses at an analogue input of the diagnostic electronics.

Requirement:

- An analogue input is defined as [Counter – Totaliser]

9.3.9 VSE > [Parameter_#] > Detail [History]

The VSE diagnostic electronics has an internal memory with a real-time clock.

The device stores the following data in this internal memory:

- Object values including their triggers and limits
- Current counting states
- Time stamps for the events

The real-time clock is battery-buffered.

Internal memory:

Device hardware version	Version	Firmware	Number of memory values
Up to < AI	1.5	Up to 0.7.x	30 000
From AI	1.6	0.9.0 or higher	600 000

9.3.9.1 VSE > ... > Detail [History] > Real-time clock

When disconnected, the real-time clock of the diagnostic electronics is battery buffered.

The time must be set once during commissioning by resetting the device history. This synchronises the time of the diagnostic electronics with the "Universal Time Coordinated" (UTC, formerly "Greenwich Mean Time" GMT) of the computer. The "Universal Time Coordinated" is determined from the time and time zone set in the operating system.

9.3.9.2 VSE > ... > Detail [History] > Storage of the measured values

The internal memory is a ring memory (FIFO, "first in first out"). If the internal memory is full, a small portion of the oldest values is deleted to free up memory space.

The storage of the measured values is usually determined by an interval specified in the parameters.

- At the end of the interval, the maximum measured value that occurred during the interval is stored in the internal memory together with the corresponding time stamp.
- Depending on the options that may have been selected (see “Parameters” chapter), the measured values of the triggers and the average of the measured values determined over the interval are also written to the internal memory.
- The selectable options depend on the firmware of the diagnostic electronics (see the "Parameters" chapter). The “additional values” are also stored together with the time stamp of the maximum value. The interval for the internal memory can be determined individually for each object.

Using the additional options, the measured values can also be stored independently of the set interval of the object. A description for these options is available in the parameters of the history.

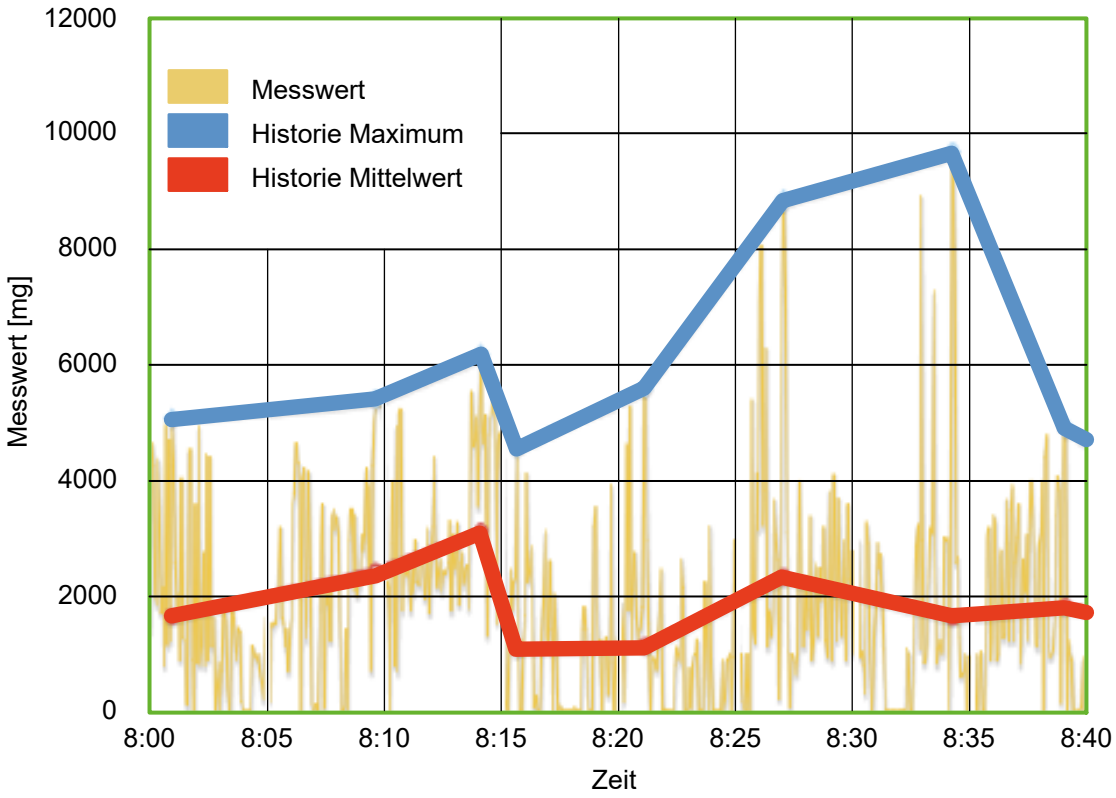


Fig. 8: Diagram: History of the measured values (example)

9.3.9.3 VSE > ... > Detail [History] > Parameters

[History] detail:

Using the icon at the top right in the detail window, you can activate / deactivate the entire internal memory. If the history memory is active, the history settings can be made for the objects configured in the parameter set.

Switching functions:

	Switch: Internal memory is deactivated Parameters cannot be configured
	Switch: Internal memory is activated Parameters can be configured

Objects can also be activated/deactivated individually. If an object is active, the highest value measured within the set interval is recorded.

The other checkboxes, which can be selected individually for each object, are options for saving additional values. If a setting is made for the diagnostic electronics or a sensor, then the set value will automatically be adopted for all subordinated objects.

Section	Dialogue element	Display / switching function	Description
Object	VSE...	Diagnostic unit	
	Sensor	Configured sensor	
	SE01_...	Configured object	
Interval	--	0 h: 01 min ... 1092 h: 15 min	Measurement duration: Measurement duration between 2 history entries
Rot.	--	•  Option not activated •  Option partially activated •  Option fully activated	Rotational speed: Saves the maximum value of a rotational speed trigger in the last interval and its time

Section	Dialogue element	Display / switching function	Description
Ref.	--	• ☐ Option not activated • ▬ Option partially activated • ☑ Option fully activated	Reference value / reference: Saves the maximum value of a reference object in the last interval and its time
Av.	--	• ☐ Option not activated • ▬ Option partially activated • ☑ Option fully activated	Average (firmware 0.5.19 and higher): Saves the average of the object during the interval
Var.	--	• ☐ Option not activated • ▬ Option partially activated • ☑ Option fully activated	Change of variant (firmware 0.5.19 and higher): records the measurement values of the object (including the other selected options) when the variant is changed without taking into account the interval. The interval is restarted after variant switching.
Dmg.	--	• ☐ Option not activated • ▬ Option partially activated • ☑ Option fully activated	Damage (firmware 0.7.11 and higher): Saves the measured values of the object (including the other selected options) when the object is in the "Damage" state (measured value above upper limit, response delay taken into account). Subsequently, the interval is restarted.
Recording options	Maximum one entry per second	• ☐ Option not activated • ☑ Option activated	Protection of the history memory chip The [Change of variant] and [Damage] options can generate history entries at very short intervals (well below 1 second) that would eventually destroy the memory.
Estimated recording time	--	Maximum time period that can be stored in the history	Indication of the possible recording time for older and current firmware version If [Change of variant] or/and [Damage] is activated in an object, only the maximum time is displayed.

9.3.10 VSE > [Parameter_#] > Detail [Alarms]

Alarms (warning and/or damage) can be set to signal limits which are exceeded during monitoring of the objects or counters. The alarm function is also used to signal a measured value as an analogue signal.

9.3.10.1 VSE > [Parameter_#] > Detail [Alarms] > Overview

The alarms overview page shows the alarms configured in the parameter set and their most important parameters.

▶ Right-click into the white area of the detailed view to create an alarm.

Switching functions:

⚙	Go to the configuration page of the selected alarm
🗑	Delete the selected alarm

9.3.10.2 VSE > ... > Detail [Alarms] > Alarm types

Alarms are distinguished based on the source and the signal. One analogue alarm and several digital alarms are available.

The sources (objects, counters and self-test) can be combined as required.

Each alarm requires an own output of the diagnostic electronics. If all outputs are configured / used, no further alarm can be configured.

Some device types provide virtual outputs for alarms.

VSE > ... > Detail [Alarms] > Alarm types > [Analogue]

The “Analogue alarm” is used to convert a measured value into an analogue signal.

The measured values of the objects serve as the source.
If several objects are selected as source for the alarm, then...

- The units of the measured values must match
- Only the maximum measured value is converted into the corresponding analogue value

Only the analogue output OUT1 is used as the output channel for the analogue alarm.
The output signal may be as follows:

- 4...20 mA (all diagnostic units)
- 0...10 V (only VES100)

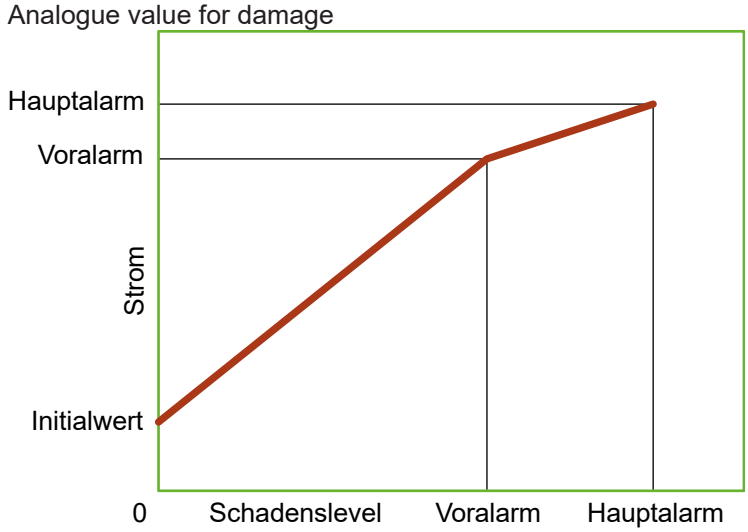
▶ When selecting the values, distinguish between the different units of the objects:

- Acceleration
- Velocity
- Displacement
- Unit(s) of the upper/lower limit monitors

and the unitless damage level (relative to the base line or limit).
The selected values have a direct effect on the objects which can be selected as an alarm source (→ [Source] tab).

The value selection also determines which parameters must be used for scaling:

- For values with a unit, the signal is defined by two points:
  4 mA = x and 20 mA = y (or: 0 V = x and 10 V = y)
  x and y are values in the selected unit.
- If the damage level is to be signalled in relation to the base line, the signal will also be scaled via the above-mentioned points.
  Difference: the values x and y are unitless.
- If the damage level is to be signalled in relation to the limits, the signal must be scaled using three points:
  - Initial analogue value
  - Analogue value for warning
  - Analogue value for damage



Procedure of the diagnostic electronics when calculating the analogue value:

- For each object selected as a source, the theoretical current output is calculated according to the upper chart.
- The maximum current of all objects is provided.
- If an analogue current signal display is selected, the minimum current can be limited to 4 mA. Without this option, the scaling of the signal is extended to 0…20 mA linear.

▶ As an option, the evaluation of the self-test result can also be activated for the alarm.

VSE > ... > Detail [Alarms] > [Analogue] > Tab [Configuration]

Section	Dialogue element	Display	Switching function
Identification	Name	Configured name of the selected output	--
	Type	Configured type of the selected output	--
	Output	Selected analogue output	Only OUT1 is permitted
Configuration	Signal	Configured signal: • Current 4...20 mA • Voltage 0...10 V (only visible with VSE100 / VSE101)	Selectable from list
	Values	Configured value type	Selectable from list
Scale	Initial value	Configured start value at damage level = 0	Increase / decrease value
	Warning	The configured value is exceeded = warning alarm (yellow)	Increase / decrease value
	Damage	The configured value is exceeded = damage (red)	Increase / decrease value
	• Lowest = 4 mA • Lowest = 2 V	Activate / deactivate checkbox (depending on [Configuration] > [Signal])	

VSE > ... > Detail [Alarms] > [Analogue] > Tab [Source]

▶ Select the objects for visualisation in this alarm.

Depending on the selected value type for signalling, not all objects can be selected. The units must match.

Section	Dialogue element	Display	Switching function
Alarm source	Table	Configured objects	✓ Evaluate the object ✗ Do not evaluate the object

VSE > ... > Detail [Alarms] > [Analogue] > Tab [Self-test]

In case of a failed self-test at the dynamic inputs, a defined current (either 2 mA or 22 mA) can be provided at the analogue output. A value of 2 mA is only recommended if a minimum current of 4 mA has been specified in the configuration.

The source of the self-test alarm is not defined in the alarm itself.
The settings for the self-test are made under "Dynamic inputs".

Section	Dialogue element	Display	Switching function
Self-test	--	• Force current of 2 mA • Force current of 22 mA	Option field

VSE > ... > Detail [Alarms] > Alarm types > [Warning alarm]

The “Warning” alarm type analyses all objects with regard to the lower limit (warning), taking into account the response delay.

The analysis is based on a logical OR function, so when the measured value of any object is above the lower limit and the condition of the response delay is met, then the alarm will also be active.

▶ As an option, the evaluation of the self-test result can also be activated for the alarm.

VSE > ... > [Warning alarm] > Tab [Configuration]

Section	Dialogue element	Display	Switching function
Identification	Name	Configured name of the selected output	--
	Type	Configured type of the selected output	--
	Output	Selected digital output	Selectable from list
Configuration	Switch	Configured signal: • Normally closed • Normally open	Selectable from list
	Keep signal for a minimum of 150 ms *)	Checkbox	Activate / deactivate

*) for firmware versions older than V0.11.6: min. 50 ms

VSE > ... > [Warning alarm] > Tab [Source]

The objects for the visualisation in this alarm are predefined:
The warnings of all configured objects are linked with OR.

Section	Dialogue element	Display	Switching function
Alarm source - Objects	Table	Configured objects	✓ Evaluate the object ✗ Do not evaluate the object

VSE > ... > [Warning alarm] > Tab [Self-test]

In the event of a failed self-test at the dynamic inputs, a flashing output signal with a frequency of 1 Hz can be activated as an option.

The source of the self-test alarm is not defined in the alarm itself.
The settings for the self-test are made under "Dynamic inputs".

Section	Dialogue element	Display	Switching function
Self-test	Switch output with a frequency of 1 Hz	Checkbox	Activate / deactivate

VSE > ... > Detail [Alarms] > Alarm types > [Damage]

The “Damage” alarm type analyses all objects with regard to the upper limit value (damage), taking into account the response delay.

The analysis is based on a logical OR function, so when the measured value of an object exceeds the upper limit and the condition of the response delay is met, then the alarm will also be active.

▶ As an option, the evaluation of the self-test result can also be activated for the alarm.

VSE > ... > [Damage] > Tab [Configuration]

Section	Dialogue element	Display	Switching function
Identification	Name	Configured name of the selected output	--

Section	Dialogue element	Display	Switching function
Identification	Type	Configured type of the selected output	--
	Output	Selected digital output	Selectable from list
Configuration	Switch	Configured signal: • Normally closed • Normally open	Selectable from list
	Keep signal for a minimum of 150 ms *)	Checkbox	Activate / deactivate

*) for firmware versions older than V0.11.6: min. 50 ms

VSE > ... > [Damage] > Tab [Source]

The objects for the visualisation in this alarm are predefined:
The damage alarms of all configured objects are linked with OR.

Section	Dialogue element	Display	Switching function
Alarm source - Objects	Table	Configured objects	✓ Evaluate the object ✗ Do not evaluate the object

VSE > ... > [Damage] > Tab [Self-test]

In the event of a failed self-test at the dynamic inputs, a flashing output signal with a frequency of 1 Hz can be activated as an option.

The source of the self-test alarm is not defined in the alarm itself.
The settings for the self-test are made under "Dynamic inputs".

Section	Dialogue element	Display	Switching function
Self-test	Switch output with a frequency of 1 Hz	Checkbox	Activate / deactivate

VSE > ... > Detail [Alarms] > Alarm types > [Custom]

The “Custom” alarm type allows you to combine the alarm states (warning, damage) of different sources (objects, counters, self-test) as required (via AND and OR logics).

VSE > ... > [Custom] > Tab [Configuration]

Section	Dialogue element	Display	Switching function
Identification	Name	Configured name of the selected output	--
	Type	Configured type of the selected output	--
	Output	Selected digital output	Selectable from list
Configuration	Switch	Configured signal: • Normally closed • Normally open	Selectable from list
	Keep signal for a minimum of 150 ms *)	Checkbox	Activate / deactivate

*) for firmware versions older than V0.11.6: min. 50 ms

VSE > ... > [Custom] > Tab [Source]

Select the objects and alarm groups for the visualisation in this alarm.

Section	Dialogue element	Display	Switching function
Alarm source - Objects	Table	Configured objects	✓ Evaluate the object ✗ Do not evaluate the object

VSE > ... > [Custom] > Tab [Self-test]

In the event of a failed self-test at the dynamic inputs, a flashing output signal with a frequency of 1 Hz can be activated as an option.

The source of the self-test alarm is not defined in the alarm itself.
The settings for the self-test are made under "Dynamic inputs".

Section	Dialogue element	Display	Switching function
Self-test	Switch output with a frequency of 1 Hz	Checkbox	Activate / deactivate

VSE > ... > Detail [Alarms] > Alarm types > [Counter]

A counter alarm allows you to select the different Alarm groups (→ VSE > ... > Detail [Counters] > Tab [Alarming] 95) of the counters as a source. The analysis of the selected groups is based on a logical OR function, so when a limit is exceeded in one of the selected groups, the alarm will be active.

As an option, the evaluation of the self-test result can also be activated for the alarm.

VSE > ... > [Counter] > Tab [Configuration]

Section	Dialogue element	Display	Switching function
Identification	Name	Configured name of the selected output	--
	Type	Configured type of the selected output	--
	Output	Selected digital output	Selectable from list
Configuration	Switch	Configured signal: • Normally closed • Normally open	Selectable from list
	Keep signal for a minimum of 150 ms *)	Checkbox	Activate / deactivate

*) for firmware versions older than V0.11.6: min. 50 ms

VSE > ... > [Counter] > Tab [Source]

The source of a counter alarm is a combination of the different alarm groups of the counters (→ VSE > ... > Detail [Counters] > Tab [Alarming] 95).

The alarm is triggered if a counter assigned to this group exceeds its limit in at least one selected alarm group.

Section	Dialogue element	Display	Switching function
Alarm source	Alarm group #	Checkbox	Activate / deactivate

VSE > ... > [Counter] > Tab [Self-test]

In the event of a failed self-test at the dynamic inputs, a flashing output signal with a frequency of 1 Hz can be activated as an option.

The source of the self-test alarm is not defined in the alarm itself.
The settings for the self-test are made under "Dynamic inputs".

Section	Dialogue element	Display	Switching function
Self-test	Switch output with a frequency of 1 Hz	Checkbox	Activate / deactivate

VSE > ... > Detail [Alarms] > Alarm types > [Self-test]

The self-test alarm signals the self-test results. A self-test is only possible for type VSAxxx sensors and can be executed automatically in a fixed interval. If a sensor or cable is defective, the self-test will fail and the alarm will be active.

The source of the self-test alarm is not defined in the alarm itself.
The settings for the self-test are made under "Dynamic inputs".

As of firmware version 0.11.x and higher, a wire-break test can be defined for VSP / IEPE sensors (→ Menu: Device > Actions 34).

VSE > ... > [Self-test] > Tab [Configuration]

Section	Dialogue element	Display	Switching function
Identification	Name	Configured name of the selected output	--
	Type	Configured type of the selected output	--
	Output	Selected digital output	Selectable from list
Configuration	Switch	Configured signal: • Normally closed • Normally open	Selectable from list
	Keep signal for a minimum of 150 ms *)	Checkbox	Activate / deactivate
Option	Switch output with a frequency of 1 Hz	Checkbox	Activate / deactivate

*) for firmware versions older than V0.11.6: min. 50 ms

9.3.11 VSE > [Parameter_#] > Detail [PROFINET IO]

Only applies to VSE150 / VSE950 / VYE113:

9.3.11.1 VSE > [Parameter_#] > Detail [PROFINET IO] > Tab [Configuration]

This view shows:

- The mode for the GSD file
- The currently configured process image
- Export functions for the process image

Section	Dialogue element	Display	Switching function
Mode	• Standard mode for GSD file • Expert mode for GSD file	Option field	Select an option
Process image	Input	Current value: … elements (… bytes)	---
	Output	Current value: ... elements (… bytes)	---
	Total	Current value: ... elements (… bytes)	---

Section	Dialogue element	Display	Switching function
Process image	Admin. data	Current value: ... bytes	---
	Free	Current value: ... bytes	---
Export details about the process image	---	---	
Export General Station Description (GSD) file	---	---	

Switching functions:

	Export a detailed description of the contents (data points) of the configured PROFINET IO process image as a PDF file
	Export the certified PROFINET IO General Station Description (GSD) file for the VSE150 diagnostic electronics to a directory to be specified In the expert mode: Create a user-defined (non-certified) GSD file

9.3.11.2 VSE > [Parameter_#] > Detail [PROFINET IO] > Tab [Update rates]

The update rates of the device, e.g. for inputs and outputs, are defined in this view.

Dialogue element	Display	Switching function
Update rate for input values	Set value	Set the value. A setting of 0 ms means that the timing is ignored.
Update rate for output values		
Minimal allowed update rate for output parameters "External Inputs"		

9.3.11.3 VSE > [Parameter_#] > Detail [PROFINET IO] > Tab [PROFINET IO protocol settings]

Setting the VSE value visualisation on the transport protocol:

Section	Dialogue element	Display	Switching function
Value representation	Byte order	• Little Endian • Big Endian	---
	Value representation	• Floating point values • Integer values	---
	Factor for acceleration values (integer values only)	Numerical value	---
	Unit for acceleration values	• mg • m/s²	---
	Factor for velocity values (integer values only)	Numerical value	---
	Unit for velocity values	• mm/s • in/s • m/s	---
	Factor for displacement values (integer values only)	Numerical value	---
	Unit for displacement values	• mm • mil • m	---
	Factor for other values (integer values only)	Numerical value	---

9.3.11.4 VSE > [Parameter_#] > Detail [PROFINET IO] > Tab [Input]

The terms "input" and "output" are from the fieldbus master's point of view.

This view is used for the input configuration of the process image.

▶ Select the "Source" in the left window.

Add the selected element to the process image via .
OR:
Activate the checkbox in front of "Source" in the left window.

▷ The selected elements appear as "Content" in the right window.

▷ The offset address, depending on the data length (number of bytes) of the selected elements, is indicated in the left column.

▶ If required, remove the element selected in the process image from the process image:

- With
- With
- Deactivate the checkbox in front of the "Source" in the left window.

▶ If required:
In the process image, use 'drag and drop' (touch with the mouse pointer and move the mouse vertically) to move the selected element to another position in the list.

Section	Dialogue element	Display	Switching function
Process image	Input	Current value: ... elements (… bytes)	---
	Output	Current value: … elements (… bytes)	---
	Total	Current value: ... elements (… bytes)	---
	Admin. data	Current value: … bytes	---
	Free	Current value: … bytes	---

Switching functions:

	Remove the element selected in the process image from the process image
	Add the element selected in the [Source] to the process image
	Toggle the offset display mode: • Offset (0, 4, 5, 7, ...) | Content • Offset (0…3, 4, 5…6, 7…10, ...) | Content • Content
	Toggle the level of detail: • One separate line for each byte • One separate line for each parameter
	Remove the selected element from the process image

9.3.11.5 VSE > [Parameter_#] > Detail [PROFINET IO] > Tab [Output]

The terms "input" and "output" are from the fieldbus master's point of view.

This view is used for the output configuration of the process image.

▶ Select the "Source" in the left window.

Add the selected element to the process image via .
OR:
Activate the checkbox in front of “Source” in the left window.

▷ The selected elements appear as "Content" in the right window.

▷ The offset address, depending on the data length (number of bytes) of the selected elements, is indicated in the left column.

▶ If required, remove the element selected in the process image from the process image:

- With
- With
- Deactivate the checkbox in front of the "Source" in the left window.

▶ If required:
In the process image, use ‘drag and drop’ (touch with the mouse pointer and move the mouse vertically) to move the selected element to another position in the list.

Section	Dialogue element	Display	Switching function
Process image	Input	Current value: ... elements (… bytes)	---
	Output	Current value: … elements (… bytes)	---
	Total	Current value: ... elements (… bytes)	---
	Admin. data	Current value: … bytes	---
	Free	Current value: … bytes	---

Switching functions:

	Remove the element selected in the process image from the process image
	Add the element selected in the [Source] to the process image
	Toggle the offset display mode: • Offset (0, 4, 5, 7, ...) | Content • Offset (0…3, 4, 5…6, 7…10, ...) | Content • Content
	Toggle the level of detail: • One separate line for each byte • One separate line for each parameter
	Remove the selected element from the process image

9.3.11.6 VSE > [Parameter_#] > Detail [PROFINET IO] > Tab [Summary]

The terms "input" and "output" are from the fieldbus master’s/client’s point of view.

Display of the parameters selected for communication with the fieldbus master:

- Offset (absolute)
- Offset (relative)
- Source type
- Source Input ID
- Source name

- Data point
- Unit
- Type
- Size (number of bytes)
- Direction
- Factor

Switching functions:

	Toggle the level of detail: • In ascending order according to the offset (absolute) • As above, with additional details about group and module • Grouped according to inputs and outputs, in ascending order according to the offset
	Export a detailed description of the contents (data points) of the configured PROFINET IO process image as a PDF file

9.3.12 VSE > [Parameter_#] > Detail [EtherNet/IP]

Only applies to VSE151 / VSE951 / VYE114:

9.3.12.1 VSE > [Parameter_#] > Detail [EtherNet/IP] > Tab [Configuration]

This view shows the currently configured process image and offers export functions.

Section	Dialogue element	Display	Switching function
Mode	• Item placement not aligned, no UDT support	Option field	Select an option
	• Item placement aligned, UDT support	Option field	
Process image	Input	Current value: … elements (… bytes)	---
	Output	Current value: … elements (… bytes)	---
	Total	Current value: … elements (… bytes)	---
	Admin. data	Current value: (... bytes)	---
	Free	Current value: … bytes	---
Export details about the process image	---	---	
Export Electronic Data Sheet (EDS) file	---	---	
Export Logix Designer © file containing user-defined data types	--	--	

Switching functions:

	Export a detailed description of the contents (data points) of the configured EtherNet/IP process image.
	Export the certified EtherNet/IP Electronic Data Sheet (EDS) file for the VSE151/VSE951 diagnostic electronics.

	Export a Logix Designer © file containing user-defined data types. Only available if the [Item placement aligned, UDT support] option is selected.

9.3.12.2 VSE > [Parameter_#] > Detail [EtherNet/IP] > Tab [Update rates]

The update rates of the device, e.g. for inputs and outputs, are defined in this view.

Dialogue element	Display	Switching function
Update rate for input values	Set value	Set the value. A setting of 0 ms means that the timing is ignored.
Update rate for output values		
Minimal allowed update rate for output parameters "External Inputs"		

9.3.12.3 VSE > [Parameter_#] > Detail [EtherNet/IP] > Tab [EtherNet/IP protocol settings]

▶ Set how VSE values shall be represented on the EtherNet/IP transportation protocol.

Dialogue element	Display	Switching function
Byte order	Selected setting: • Little Endian • Big Endian	Select an option
Value representation	Selected setting: • Floating point values • Integer values	Select an option
Factor for acceleration values	Configured value	Increase / decrease value
Unit for acceleration values	Selected setting: • mg • m/s²	Select an option
Factor for velocity values	Configured value	Increase / decrease value
Unit for velocity values	Selected setting: • mm/s • in/s • m/s	Select an option
Factor for displacement values	Configured value	Increase / decrease value
Unit for displacement values	Selected setting: • mm • mil • m	Select an option
Factor for other values	Configured value	Increase / decrease value

9.3.12.4 VSE > [Parameter_#] > Detail [EtherNet/IP] > Tab [Input]

The terms "input" and "output" are from the fieldbus master’s point of view.

This view is used for the input configuration of the process image.

▶ Select the "Source" in the left window.

Add the selected element to the process image via ➡.
OR:
Activate the checkbox in front of “Source” in the left window.

▷ The selected elements appear as "Content" in the right window.

▷ The offset address, depending on the data length (number of bytes) of the selected elements, is indicated in the left column.

▶ If required, remove the element selected in the process image from the process image:

- With
- With
- Deactivate the checkbox in front of the "Source" in the left window.

▶ If required:
In the process image, use ‘drag and drop’ (touch with the mouse pointer and move the mouse vertically) to move the selected element to another position in the list.

Section	Dialogue element	Display	Switching function
Process image	Input	Current value: ... elements (… bytes)	---
	Output	Current value: … elements (… bytes)	---
	Total	Current value: ... elements (… bytes)	---
	Admin. data	Current value: … bytes	---
	Free	Current value: … bytes	---

Switching functions:

	Remove the element selected in the process image from the process image
	Add the element selected in the [Source] to the process image
	Toggle the offset display mode: • Offset (0, 4, 5, 7, ...) | Content • Offset (0…3, 4, 5…6, 7…10, ...) | Content • Content
	Toggle the level of detail: • One separate line for each byte • One separate line for each parameter
	Remove the selected element from the process image

9.3.12.5 VSE > [Parameter_#] > Detail [EtherNet/IP] > Tab [Output]

The terms "input" and "output" are from the fieldbus master’s point of view.

This view is used for the output configuration of the process image.

▶ Select the "Source" in the left window.

Add the selected element to the process image via .
OR:
Activate the checkbox in front of “Source” in the left window.

▷ The selected elements appear as "Content" in the right window.

▷ The offset address, depending on the data length (number of bytes) of the selected elements, is indicated in the left column.

▶ If required, remove the element selected in the process image from the process image:
  • With
  • With
  • Deactivate the checkbox in front of the "Source" in the left window.

▶ If required:
In the process image, use ‘drag and drop’ (touch with the mouse pointer and move the mouse vertically) to move the selected element to another position in the list.

Section	Dialogue element	Display	Switching function
Process image	Input	Current value: ... elements (… bytes)	---
	Output	Current value: … elements (… bytes)	---
	Total	Current value: ... elements (… bytes)	---
	Admin. data	Current value: … bytes	---
	Free	Current value: … bytes	---

Switching functions:

	Remove the element selected in the process image from the process image
	Add the element selected in the [Source] to the process image
	Toggle the offset display mode: • Offset (0, 4, 5, 7, ...) | Content • Offset (0…3, 4, 5…6, 7…10, ...) | Content • Content
	Toggle the level of detail: • One separate line for each byte • One separate line for each parameter
	Remove the selected element from the process image

9.3.12.6 VSE > [Parameter_#] > Detail [EtherNet/IP] > Tab [Summary]

The terms "input" and "output" are from the fieldbus master’s point of view.

Display of the parameters selected for communication with the fieldbus master:

- "Assembly"
- Assembly ID
- Assembly size
- Offset (relative)
- Source type
- Source name
- Data point
- Unit
- Data type
- Data size (number of bytes)
- Direction of data

Switching functions:

	Toggle the level of detail: • Grouped by assembly • As above, with additional details about Assembly ID and Assembly size
	Export a detailed description of the contents (data points) of the configured EtherNet/IP process image as a CSV, HTML or PDF file.

9.3.13 VSE > [Parameter_#] > Detail [EtherCAT]

Only applies to VSE152:

9.3.13.1 VSE > [Parameter_#] > Detail [EtherCAT] > Tab [Configuration]

This view shows the currently configured process image and offers export functions.

Section	Dialogue element	Display	Switching function
Process image	Input	Current value: ... elements (… bytes)	---
	Output	Current value: ... elements (… bytes)	---
	Total	Current value: ... elements (… bytes)	---
	Free	Current value: ... bytes	---
Export details about the process image	---	---	
Export EtherCAT Slave Information (ESI) file	---	---	

Switching functions:

	Export a detailed description of the contents (data points) of the configured EtherCAT process image.
	Export the EtherCAT Slave Information (ESI) file for the VSE152 diagnostic electronics.

9.3.13.2 VSE > [Parameter_#] > Detail [EtherCAT] > Tab [Update rates]

The update rates of the device, e.g. for inputs and outputs, are defined in this view.

Dialogue element	Display	Switching function
Update rate for input values	Set value	Set the value. A setting of 0 ms means that the timing is ignored.
Update rate for output values		
Minimal allowed update rate for output parameters "External Inputs"		

9.3.13.3 VSE > [Parameter_#] > Detail [EtherCAT] > Tab [EtherCAT protocol settings]

Setting the VSE value visualisation on the transport protocol:

Section	Dialogue element	Display	Switching function
Value representation	Byte order	• Little Endian • Big Endian	---

Section	Dialogue element	Display	Switching function
Value representation	Value representation	• Floating point values • Integer values	---
	Factor for acceleration values (integer values only)	Numerical value	---
	Factor for velocity values (integer values only)	Numerical value	---
	Factor for displacement values (integer values only)	Numerical value	---
	Factor for other values (integer values only)	Numerical value	---

9.3.13.4 VSE > [Parameter_#] > Detail [EtherCAT] > Tab [Input]

The terms "input" and "output" are from the fieldbus master's point of view.

This view is used for the input configuration of the process image.

▶ Select the "Source" in the left window.

Add the selected element to the process image via → .
OR:
Activate the checkbox in front of "Source" in the left window.

▷ The selected elements appear as "Content" in the right window.

▷ The register number is indicated in the left column, depending on the data length (number of bytes) of the selected elements. A register number corresponds to 1...2 bytes.

▶ If required, remove the element selected in the process image from the process image:

• with ←
• with 🗑
• Activate the checkbox in front of "Source" in the left window.

▶ If required:
In the process image, use 'drag and drop' (touch with the mouse pointer and move the mouse vertically) to move the selected element to another position in the list.

Section	Dialogue element	Display	Switching function
Process image	Input	Current value: ... elements (… bytes)	---
	Output	Current value: ... elements (… bytes)	---
	Total	Current value: ... elements (… bytes)	---
	Free	Current value: ... bytes	---

Switching functions:

←	Remove the element selected in the process image from the process image
→	Add the element selected in the [Source] to the process image
	Toggle the offset display mode: • Offset (0, 4, 5, 7, ...) | Content • Offset (0…3, 4, 5…6, 7…10, ...) | Content • Content

	Toggle the level of detail: • One separate line for each byte • One separate line for each parameter
	Remove the selected element from the process image

9.3.13.5 VSE > [Parameter_#] > Detail [EtherCAT] > Tab [Output]

The terms "input" and "output" are from the fieldbus master's point of view.

This view is used for the output configuration of the process image.

▶ Select the "Source" in the left window.

Add the selected element to the process image via .
OR:
Activate the checkbox in front of "Source" in the left window.

▷ The selected elements appear as "Content" in the right window.

▷ The register number is indicated in the left column, depending on the data length (number of bytes) of the selected elements. A register number corresponds to 1...2 bytes.

▶ If required, remove the element selected in the process image from the process image:

• with
• with
• Activate the checkbox in front of "Source" in the left window.

▶ If required:
In the process image, use 'drag and drop' (touch with the mouse pointer and move the mouse vertically) to move the selected element to another position in the list.

Section	Dialogue element	Display	Switching function
Process image	Input	Current value: ... elements (… bytes)	---
	Output	Current value: ... elements (… bytes)	---
	Total	Current value: ... elements (… bytes)	---
	Free	Current value: ... bytes	---

Switching functions:

	Remove the element selected in the process image from the process image
	Add the element selected in the [Source] to the process image
	Toggle the offset display mode: • Offset (0, 4, 5, 7, ...) | Content • Offset (0…3, 4, 5…6, 7…10, ...) | Content • Content
	Toggle the level of detail: • One separate line for each byte • One separate line for each parameter
	Remove the selected element from the process image

9.3.13.6 VSE > [Parameter_#] > Detail [EtherCAT] > Tab [Summary]

The terms "input" and "output" are from the fieldbus master's point of view.

Display of the parameters selected for communication with the fieldbus master:

- Variable name
- Offset (relative)
- Source type
- Source name
- Data point
- Unit
- Type
- Size
- Direction

Switching functions:

	Toggle the level of detail.
	Export a detailed description of the contents (data points) of the configured EtherCAT process image as a CSV, HTML or PDF file.

9.3.14 VSE > [Parameter_#] > Detail [Modbus TCP]

Only applies to VSE153 / VSE163 / VSE953 / VSE963 / VYE115 / VYE117:

9.3.14.1 VSE > [Parameter_#] > Detail [Modbus TCP] > Tab [Configuration]

This view shows the currently configured process image and offers an export function.

Section	Dialogue element	Display	Switching function
Process image	Input	Current value: ... elements (… bytes)	---
	Output	Current value: ... elements (… bytes)	---
	Total	Current value: ... elements (… bytes)	---
	Admin. data	Current value: ... bytes	---
	Free	Current value: ... bytes	---
Export details about the process image	---	---	

Switching functions:

	Export a detailed description of the contents (data points) of the configured Modbus TCP process image as a CSV, HTML or PDF file

9.3.14.2 VSE > [Parameter_#] > Detail [Modbus TCP] > Tab [Update rates]

The update rates of the device, e.g. for inputs and outputs, are defined in this view.

Dialogue element	Display	Switching function
Update rate for input values	Set value	Set the value. A setting of 0 ms means that the timing is ignored.
Update rate for output values		
Minimal allowed update rate for output parameters "External Inputs"		

9.3.14.3 VSE > [Parameter_#] > Detail [Modbus TCP] > Tab [Modbus TCP protocol settings]

▶ Set how VSE values shall be represented on the Modbus TCP transportation protocol.

Dialogue element	Display	Switching function
Byte order	Selected setting: • Little Endian • Big Endian	Select an option
Value representation	Selected setting: • Floating point values • Integer values	Select an option
Factor for acceleration values	Configured value	Increase / decrease value
Unit for acceleration values	Selected setting: • mg • m/s²	Select an option
Factor for velocity values	Configured value	Increase / decrease value
Unit for velocity values	Selected setting: • mm/s • in/s • m/s	Select an option
Factor for displacement values	Configured value	Increase / decrease value
Unit for displacement values	Selected setting: • mm • mil • m	Select an option
Factor for other values	Configured value	Increase / decrease value

9.3.14.4 VSE > [Parameter_#] > Detail [Modbus TCP] > Tab [Input]

The terms "input" and "output" are from the fieldbus master’s point of view.

This view is used for the input configuration of the process image.

▶ Select the "Source" in the left window.

Add the selected element to the process image via ➡ .
OR:
Activate the checkbox in front of “Source” in the left window.

▷ The selected elements appear as "Content" in the right window.

▷ The register number is indicated in the left column, depending on the data length (number of bytes) of the selected elements. A register number corresponds to 1...2 bytes.

▶ If required, remove the element selected in the process image from the process image:
- with ⬅
- with 🗑
- Activate the checkbox in front of “Source” in the left window.

▶ If required:
In the process image, use ‘drag and drop’ (touch with the mouse pointer and move the mouse vertically) to move the selected element to another position in the list.

Section	Dialogue element	Display	Switching function
Process image	Input	Current value: ... elements (… bytes)	---
	Output	Current value: … elements (… bytes)	---
	Total	Current value: ... elements (… bytes)	---
	Admin. data	Current value: … bytes	---
	Free	Current value: … bytes	---

Switching functions:

⬅	Remove the element selected in the process image from the process image
➡	Add the element selected in the [Source] to the process image
🗑	Remove the selected element from the process image

9.3.14.5 VSE > [Parameter_#] > Detail [Modbus TCP] > Tab [Output]

The terms "input" and "output" are from the fieldbus master’s point of view.

This view is used for the output configuration of the process image.

▶ Select the "Source" in the left window.

Add the selected element to the process image via ➡ .
OR:
Activate the checkbox in front of “Source” in the left window.

▷ The selected elements appear as "Content" in the right window.

▷ The register number is indicated in the left column, depending on the data length (number of bytes) of the selected elements. A register number corresponds to 1...2 bytes.

▶ If required, remove the element selected in the process image from the process image:
- with ⬅
- with 🗑
- Activate the checkbox in front of “Source” in the left window.

▶ If required:
In the process image, use ‘drag and drop’ (touch with the mouse pointer and move the mouse vertically) to move the selected element to another position in the list.

Section	Dialogue element	Display	Switching function
Process image	Input	Current value: ... elements (… bytes)	---
	Output	Current value: … elements (… bytes)	---

Section	Dialogue element	Display	Switching function
Process image	Total	Current value: ... elements (… bytes)	---
	Admin. data	Current value: … bytes	---
	Free	Current value: … bytes	---

Switching functions:

	Remove the element selected in the process image from the process image
	Add the element selected in the [Source] to the process image
	Remove the selected element from the process image

9.3.14.6 VSE > [Parameter_#] > Detail [Modbus TCP] > Tab [Summary]

The terms "input" and "output" are from the fieldbus master's point of view.

Display of the parameters selected for communication with the fieldbus master:

- Register number
- Number of elements
- Source type
- Source name
- Data point
- Unit
- Data type
- Data size (number of bytes)
- Direction of data

Switching functions:

	Export a detailed description of the contents (data points) of the configured Modbus TCP process image as a CSV, HTML or PDF file

9.4 VSE > [VSEnnn_#] > [Data]

The [Data] object is located in the tree view below the device and contains the corresponding measured data.

The measured data can be grouped, renamed, deleted, imported and exported: Recording and displaying measured data (→ 🗋 154)

9.5 VSE > [VSEnnn_#] > [Service]

This function can be used to import `ISERV` files that were created with customer-specific software.

10 Configuring VYEnnn

▶ Observe the operating instructions of the diagnostic electronics and the sensors.

Configure the VYE diagnostic electronics in the same way as VSE diagnostic electronics using the VES004 software: Configuring VSEnnn (→ 47)

11 Configuring VNB001

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▶ Read the operating instructions of the vibration sensor prior to installation.

This chapter describes the configuration and monitoring of the VNB001 vibration sensor using the VES004 software.

▶ To add a new device to a project: Menu: Device > New... (→ 30)

11.1 Establishing a connection to the VNB sensor

▶ Connect the device to the USB interface of the PC/laptop

▶ If not yet done: install the VNB USB driver (→ Installing the USB driver 13)

Options:

▶ In the tree view, right-click on [VNB001_#]

▶ In the context menu: [Scan network]

▶ In the [Found devices] window, select the required device with a left-click

▶ Use the [Update the project with the selected device] icon to add the selected device to the project

▶ In the tree view, right-click on [VNB001_#]

▶ In the context menu: [Connect]

Or:

▶ In the tree view, double-click on [VNB001_#] > [Settings]

▶ In the [Address] > [Configuration] detailed view with the [Scan Network] icon

▶ In the [Found devices] window, select the required device with a left-click

▶ Use the [Update the project with the selected device] icon to add the selected device to the project

▶ In the [Address] > [Configuration] detailed view with the [Connect to device] icon

11.2 VNB001 > [VNB001_#] > [Settings]

This chapter describes the functions contained in the [VNB001_#] object.
The [VNB001_#] object can be accessed via the tree view (→ Tree view 16).

To open the [Settings] menu:

▶ Select the device in the tree view.

▶ Either:
[Device] > [Settings] > [Open]
or:
Double-click on [VNB001_#] > [Settings]

▷ The detailed view is displayed.

In the detailed view, the [Device settings] detail contains the following elements:

- Overview
- Device
- Address
- Actions

The information of the [Device settings] detail is only available if a connection between the VNB sensor and the VES004 parameter setting software is or had been established.

The functions of the [Device Settings] detail are only available if a connection between the VNB sensor and the VES004 parameter setting software is established.

11.2.1 VNB001 > ... > [Device settings] > Detail [Overview]

The [Overview] shows the following information:

Section	Dialogue element	Display	Switching function
Vibration sensor	Type	Configured device	---
	Version	Hardware version read in the device	
	Serial number	Serial number read in the device	
Firmware	Version	Firmware version read in the device	---
Parameter set	Parameter set	Configured parameter set	---
Device	Name	Configured device name	Changing the device name in the input field. The name will be shown in the tree view.

11.2.2 VNB001 > ... > [Device settings] > Detail [Device]

The information and functions of the [Device] element are only available if a connection between the VNB sensor and the VES004 parameter setting software is established.

▶ Connect the VNB sensor to the PC/laptop (→ Menu: Device > Connect 30).

11.2.2.1 VNB001 > ... > Detail [Device] > Tab [Configuration]

Section	Dialogue element	Display	Switching function
Vibration sensor	Type	Configured device	--
	Version	Hardware version read in the device	

Section	Dialogue element	Display	Switching function
Vibration sensor	Connect	State of the connection between software and device	--
	Serial number	Serial number read in the device	
Write firmware to the device	Firmware version	Firmware version read in the device	

Switching functions:

Requirement:

- The VES software is connected to the device via

	Write firmware to the device	▶ Activate the button. ▷ A dialogue window appears. ▶ Select file with new firmware and confirm with [OK]. ▷ The software updates the firmware of the device.

11.2.3 VNB001 > ... > [Device settings] > Detail [Address]

The information and functions of the [Address] element are only available if a connection between the VNB sensor and the VES004 parameter setting software has been established.

▶ Connect the VNB sensor to the PC/laptop (→ Menu: Device > Connect 30).

Section	Dialogue element	Display	Switching function
Connect	Serial number	Serial number read in the device	

Switching functions:

	Search the USB ports for connected devices	▶ Activate the button. ▷ A dialogue window with the available devices appears. ▶ Select the required device. ▶ Use the [Update the project with the selected device] icon to add the selected device to the project ▷ The device is assigned to the opened project. ▷ The [Connection] section displays information about the assigned device.
	Connect to the device	▶ Activate the button. ▷ The software connects to the assigned device. ▷ The tree view shows the connection state.
	Disconnect from the device	▶ Activate the button. ▷ The software disconnects from the device. ▷ The tree view shows the connection state.

11.2.4 VNB001 > ... > [Device settings] > Detail [Actions]

The information and functions of the [Actions] element are only available if a connection between the VNB sensor and the VES004 parameter setting software has been established.

▶ Connect the VNB sensor to the PC/laptop (→ Menu: Device > Connect 30).

11.2.4.1 VNB001 > ... > Detail [Actions] > Tab [Manipulate device]

Section	Dialogue element	Display	Switching function
Reboot	---	---	
Execute self-test	---	---	

Switching functions:

	Reboot device	▶ Activate the button. ▷ A confirmation message appears. ▶ Start the process with [Yes]. OR ▶ Abort the process with [No]. ▷ If [Yes]: The device restarts.
	Perform a self-test on the device	▶ Activate the button. ▷ The device carries out a self-test. ▷ A message window with the result of the self-test appears. ▶ Close the message window with [OK].

11.2.4.2 VNB001 > ... > Detail [Actions] > Tab [Reset device]

Section	Dialogue element	Display	Switching function
Reset history	---	---	
Reset parameter	---	---	
Restore factory settings	---	---	

Switching functions:

	Reset history	▶ Activate the button. ▷ A confirmation message appears. ▶ Start the process with [Yes]. OR: ▶ Abort the process with [No]. ▷ If [Yes]: The software deletes the history of the device.
	Reset parameter	▶ Activate the button. ▷ A confirmation message appears. ▶ Start the process with [Yes]. OR: ▶ Abort the process with [No]. ▷ If [Yes]: The software resets all parameters to their preset values.
	Restore factory settings	▶ Activate the button. ▷ The factory settings of the device are restored.

11.3 VNB001 > Object [VNB001_#] > [Parameter_#]

The [Parameter_#] tab contains all information and configuration and monitoring options of the parameter set assigned to the vibration sensor.

To open the [Parameter_#] tab:

▶ Select the required sensor in the tree view.

▶ Either:
[Device] > [Parameter] > [Open]
or:
Double-click on [VNB001_#] > [Parameter_#]

▷ The detailed view shows the [Parameter_#] tab

It is always the parameter set currently assigned to the device which is opened. (→ Menu: Device > Parameter 🗋 32)

To open any parameter set:

▶ Double-click on [Parameters] > [VNB001] > [Parameter_#] in the tree view.

▷ The detailed view shows the tab of the selected parameter set.

11.3.1 VNB001 > ... > [Parameter_#] > Detail [Common configuration]

The [Common configuration] element contains information and documentation of the current parameter set about the device settings.

11.3.1.1 VNB001 > ... > [Parameter_#] > Detail [Overview]

The [Overview] detailed view displays the following information:

Section	Dialogue element	Display	Possible values
Information	Created	Date on which the data set was created	--
	Changed	Date on which the data set was last changed	--
Parameter set	Name	Designation of the parameter set	Freely selectable
Device display	Display unit	Unit in which the values are displayed	Metric [mm/s] Imperial [in/s]
	Velocity values	Acceleration values	RMS = effective value Peak = peak value

11.3.1.2 VNB001 > ... > [Parameter_#] > ... > Detail [Supported devices]

The [Supported devices] element provides information on the devices that can be used here.

VNB001 > ... > Detail [Supported devices] > Tab [Configuration]

Section	Dialogue element	Display	Description
Supported device types	Device type	Configured sensor	Corresponds to the device selection
Supported firmware versions	Minimum required	Firmware version	Indication acc. to VES004
	Maximum supported	Firmware version	Indication acc. to VES004

11.3.1.3 VNB001 > ... > [Parameter_#] > ... > Detail [Documentation]

The [Documentation] element provides information on the sensor's location and parameter setting date.

The description contains a creation date and the date of the last parameter change. The author of the parameter set and a free text description can be added.

Section	Dialogue element	Display	Description
Application	Company	Free text	Max. 100 characters
	Address		
	City		
	Location		
	Machine		
Description	Created by:	Free text	Max. 100 characters
	Creation date:	Date of creation	Later / earlier date
	Last change:	Date of the last change	Automatic
	Description	Free text	Max. 100 characters

11.3.1.4 VNB001 > ... > [Parameter_#] > ... > Detail [Device information]

The [Device information] element provides information on the configuration of alarms and objects as well as on the navigation path of the device display.

VNB001 > ... > Detail [Device information] > Tab [Outputs]

Section	Dialogue element	Display	Switching function
Outputs	OUT 1	Use and information about the alarm configuration	⚙
	OUT 2	Use and information about the alarm configuration	

Switching functions:

⚙	Go to the configuration page of the selected alarm (only active if at least one output is used for alarms)

VNB001 > ... > Detail [Device information] > Tab [Object dependencies]

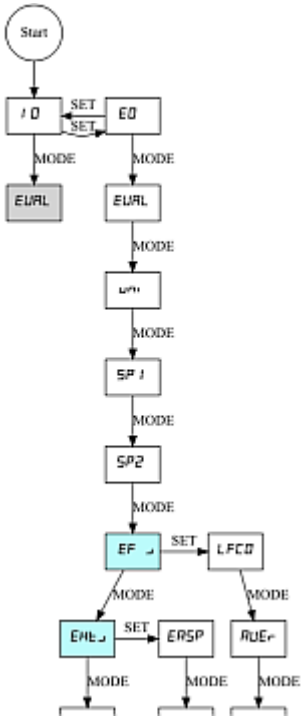
Section	Dialogue element	Display	Switching function
Object dependencies	Name	Name of the object	⚙
	Type	Parameter type	
	Use	Use of the parameters	
	Source	Name of the trigger	

Switching functions:

⚙	Configure selected object or selected input (only active if at least one object is defined)

VNB001 > ... > Detail [Device information] > Tab [Device menu]

Visualises the menu of the target device (here: a part of the menu)



11.3.1.5 VNB001 > ... > [Parameter_#] > ... > Detail [Assigned devices]

Several devices can share one parameter set. This means that you only need to maintain one parameter set if you have several identical machines and installations. A changed parameter set can be written to several devices at the same time.

The [Assigned devices] element contains the following sections:

VNB001 > ... > Detail [Assigned devices] > Tab [Devices]

Displays all devices assigned to the parameter set.

Section	Dialogue element	Display	Switching function
Assigned devices	No.	Consecutive number in the list	---
	Name	Configured name of the device	
	Type	Article number of the device	
	Firmware	Read firmware version	
	Serial no.	Read serial number of the device	

11.3.2 VNB001 > ... > [Parameter_#] > Detail [Inputs]

The program differentiates between the following inputs:

- Dynamic inputs (AC)
- Analogue inputs (DC)

Section	Dialogue element	Display	Switching function
Dynamic inputs (AC)	Name	Internal (not editable)	⚙ (after right-click)
	Type	Internal sensor (not editable)	
	Filter	Configured filter	
Analogue inputs (DC)	Name	IN 1 (not editable)	⚙ (after right-click)
	Type	Analogue - current (not editable)	
	Reference	4...20 mA (not editable)	

Section	Dialogue element	Display	Switching function
Analogue inputs (DC)	Value	Configured value	⚙ (after right-click)

Switching functions:

⚙	Go to the configuration page of the selected input

11.3.2.1 VNB001 > ... > [Parameter_#] > ... > Detail [Dynamic inputs (AC)] > [Internal]

The configured filter is applied prior to the actual evaluation of the signal. The scaling and unit define the level (height) of the measured amplitudes.

Section	Dialogue element	Display	Switching function
Identification	Name	Internal	Not editable
	Type	Internal sensor	Not editable
Configuration	Filter	Highpass 2 Hz / 10 Hz	Selectable from list
	Unit	g	Not editable
	Scale	25.00 g	Not editable

11.3.2.2 VNB001 > ... > [Parameter_#] > ... > Detail [Analogue inputs (DC)] > [IN 1]

The signal is defined as a linear function between the two reference points 0 mA and 20 mA.

Section	Dialogue element	Display	Switching function
Identification	Name	IN 1	Not editable
	Type	Analogue - current	Not editable
Configuration	Unit	Configured unit	Free text
	Lower reference point	Configured assignment to 4 mA	Increase / decrease value
	Upper reference point	Configured assignment to 20 mA	Increase / decrease value

11.3.3 VNB001 > ... > [Parameter_#] > Detail [Objects]

Displays the existing objects.

With the VNB001, the following objects are not editable:

Object type	Description
v-RMS (time domain)	Monitors the velocity in a configurable frequency domain. The frequency domain is defined via the filter of the dynamic input and the filter of the object. RMS = root mean square Application: • Measurements in accordance with ISO 10816 and other applicable standards (v-RMS) • Loose machine parts (v-RMS) • Alignment errors (v-RMS)
Upper limit monitor	Monitors analogue signals (DC signals) The signal source can be an analogue input.

Section / column	Dialogue element	Display	Switching function
Name	--	• VNB_v_RMS_Time_U1 • IN1_UpperLimit_EP1	⚙
Type	--	• v-RMS (time domain) • Upper limit monitor	
Input	--	• Internal (internal sensor) • IN 1 (analogue - current, 4...20 mA)	

Switching functions:

⚙	Go to the configuration page of the selected object

11.3.3.1 VNB001 > ... > Detail [Objects] > [VNB_v_RMS_Time_U1] > Tab [Configuration]

The configured object will monitor the indicator based on the current signal of the chosen input.

Section	Dialogue element	Display	Switching function
Identification	Name	VNB_v_RMS_Time_U1	Not editable
	Type	v-RMS (time domain)	Not editable
Configuration	Input	Internal (internal sensor)	Not editable

11.3.3.2 VNB001 > ... > Detail [Objects] > [VNB_v_RMS_Time_U1] > Tab [Processing]

Section	Dialogue element	Display	Switching function
Filter	Type	Configured filter type → [Inputs] > [Dynamic inputs] > [Internal]	Not editable
	From	0 Hz	Not editable
	To	1000 Hz	Not editable
Limits	Warning	Configured value	Increase / decrease value
	Damage	Configured value	Increase / decrease value
Processing	Averaging	Configured value	Increase / decrease value
	Measurement time	0.250 s	Not editable

11.3.3.3 VNB001 > ... > Detail [Objects] > [IN1_UpperLimit_EP1] > Tab [Configuration]

The configured object will monitor the indicator based on the current signal of the chosen input.

Section	Dialogue element	Display	Switching function
Identification	Name	IN1_UpperLimit_EP1	Not editable
	Type	Upper limit monitor	Not editable
Configuration	Input	IN 1 (Analogue - current, 4...20mA)	Not editable

11.3.3.4 VNB001 > ... > Detail [Objects] > [IN1_UpperLimit_EP1] > Tab [Processing]

The hysteresis is the difference between the setpoint and reset point of the alarm.

Section	Dialogue element	Display	Switching function
Limits	Warning	Configured value	Increase / decrease value
	Hysteresis	Configured value	Increase / decrease value

Section	Dialogue element	Display	Switching function
Limits	Damage	Configured value	Increase / decrease value
	Hysteresis	Configured value	Increase / decrease value
Processing	Measurement time	0.500 s	Not editable

11.3.4 VNB001 > ... > [Parameter_#] > Detail [History]

It is not possible to configure anything here.

Section	Dialogue element	Display / switching function	Description
Object	VNB001	Sensor / input type / input	Not editable
Interval	--	0 h : 05 min : 00 s	Measurement duration: the highest value measured during the interval is stored
Av.	--	☐ Option not activated ▬ Option partly activated ☑ Option fully activated	Average (firmware 0.5.19 and higher): Saves the measured values of the object (incl. the other selected options)
Estimated recording time	--	Maximum time period that can be stored in the history	Indication of the possible recording time

The vibration sensor has an internal memory with battery buffered real-time clock. The device stores the following data in this internal memory:

- Object values and limits
- Time stamps for the events

The internal memory contains approx. 300,000 values.

11.3.4.1 VNB001 > ... > Detail [History] > Real-time clock

When disconnected, the real-time clock of the sensor is battery buffered.

The time must be set once during commissioning by resetting the device history. This synchronises the time of the diagnostic electronics with the "Universal Time Coordinated" (UTC, formerly "Greenwich Mean Time" GMT) of the computer. The "Universal Time Coordinated" is determined from the time and time zone set in the operating system.

11.3.4.2 VNB001 > ... > Detail [History] > Storage of the measured values

The internal memory is a ring memory (FIFO, "first in first out"). If the internal memory is full, a small portion of the oldest values is deleted to free up memory space.

The storage of the measured values is usually determined by an interval specified in the parameters.

- At the end of the interval, the maximum measured value that occurred during the interval is stored in the internal memory together with the corresponding time stamp.
- Depending on the options that may have been selected (see ”Parameters” chapter), the average of the measured values determined over the interval is also written to the internal memory.

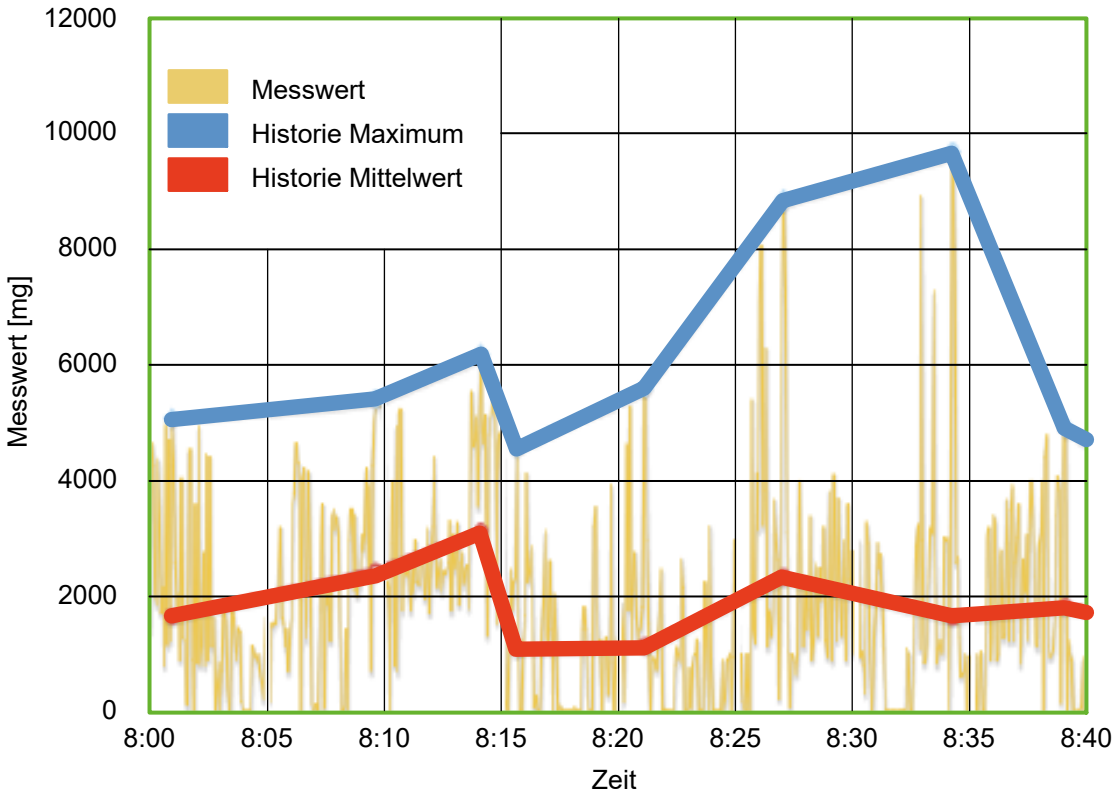


Fig. 9: Diagram: History of the measured values (example)

11.3.5 VNB001 > ... > [Parameter_#] > Detail [Alarms]

Displays the existing alarms.

Switching functions:

⚙	Go to the configuration page of the selected alarm

11.3.5.1 VNB001 > ... > Detail [Alarms] > [OUT1_Warning] > Tab [Configuration]

Configure the warning alarm (via the context menu):

Analogue as an analogue alarm	▶ Right-click on [OUT1_Warning] > [Switch to analogue alarm]
Digital as a warning alarm	▶ Right-click on [OUT1_Analogue] > [Switch to digital alarm]

Section	Dialogue element	Display	Switching function
Identification	Name	Configured name of the selected output	Not editable
	Type	Configured type of the selected output	Not editable
	Output	Assigned digital output	Not editable
Switching output (Only for digital alarm.)	Switch	Configured signal: • Normally closed • Normally open	Selectable from list
	Switch-on delay	Configured time	Increase / decrease value
	Switch-off delay	Configured time	Increase / decrease value

Section	Dialogue element	Display	Switching function
Signalling (Only for analogue alarm.)	Signal	Configured signal type, e.g. current - 4...20 mA	Selectable from list
	Values	Configured size, e.g. velocity	Selectable from list
Scale (Only for analogue alarm)	Value at 4 mA	Configured value	Increase / decrease value
	Value at 20 mA	Configured value	Increase / decrease value

11.3.5.2 VNB001 > ... > Detail [Alarms] > [OUT1_Warning] > Tab [Source]

The objects for the visualisation in this alarm are predefined:
The warnings of all configured objects are linked with OR.

Section	Dialogue element	Display	Switching function
Alarm source - Objects	Table	Configured objects	✓ Evaluate the object ✗ Do not evaluate the object

11.3.5.3 VNB001 > ... > Detail [Alarms] > [OUT2_Damage] > Tab [Configuration]

Section	Dialogue element	Display	Switching function
Identification	Name	Configured name of the selected output	Not editable
	Type	Configured type of the selected output	Not editable
	Output	Assigned digital output	Not editable
Configuration	Switch	Configured signal: • Normally closed • Normally open	Selectable from list
	Switch-on delay	Configured time	Increase / decrease value
	Switch-off delay	Configured time	Increase / decrease value

11.3.5.4 VNB001 > ... > Detail [Alarms] > [OUT2_Damage] > Tab [Source]

The objects for the visualisation in this alarm are predefined:
The warnings of all configured objects are linked with OR.

Section	Dialogue element	Display	Switching function
Alarm source - Objects	Table	Configured objects	✓ Evaluate the object ✗ Do not evaluate the object

11.4 VNB001 > [VNB001_#] > [Data]

The [Data] object is located in the tree view below the device and contains the corresponding measured data.

The measured data can be grouped, renamed, deleted, imported and exported: Recording and displaying measured data (→ 🗋 154)

12 Configuring VNB211

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Read the operating instructions of the vibration sensor prior to installation.

The parameters of the VNB211 vibration sensor can be read and written with the VES004 software.

The factory settings for the VNB211 are:

- v-RMS 10...1000 Hz according to ISO10816
- a-Peak 10....6000 Hz.

The software can be used to define a parameter set that is different from the factory settings.

This chapter describes the configuration and monitoring of the VNB211 vibration sensor using the VES004 software.

▶ To add a new device to a project: → Chapter Creating a new device (VNB) (→ 23)

12.1 Establishing a connection to the VNB sensor

▶ Connect the device to the USB interface of the PC/laptop

▶ If not yet done: install the VNB USB driver (→ Installing the USB driver 22)

Options:

▶ In the tree view, right-click on [VNB211_#]

▶ In the context menu: [Scan network]

▶ In the [Found devices] window, select the required device with a left-click

▶ Use the [Update the project with the selected device] icon to add the selected device to the project

▶ In the tree view, right-click on [VNB211_#]

▶ In the context menu: [Connect]

Or:

▶ In the tree view, double-click on [VNB211_#] > [Settings]

▶ In the [Address] > [Configuration] detailed view with the [Scan network] icon

▶ In the [Found devices] window, select the required device with a left-click

▶ Use the [Update the project with the selected device] icon to add the selected device to the project

▶ In the [Address] > [Configuration] detailed view with the [Connect to device] icon

12.2 VNB211 > [VNB211_#] > Detail [Device settings]

This chapter describes the functions contained in the [VNB211_#]object.

The [VNB211_#] object can be accessed via the Tree view (→ Tree view 16).

To open the [Settings] menu:

▶ Select the device in the tree view.

▶ Either:
[Device] > [Settings] > [Open]
or:
Double-click on [VNB211_#] > [Settings]

▷ The detailed view shows the following information and configuration options:

- Overview
- Device
- Address
- Actions

The information of the [Device settings] detail is only available if a connection between the VNB sensor and the VES004 parameter setting software is or had been established.

The functions of the [Device Settings] detail are only available if a connection between the VNB sensor and the VES004 parameter setting software is established.

▶ Connect the VNB sensor to the PC/laptop. (→ Establishing a connection to the VNB sensor 133)

12.2.1 VNB211 > ... > [Device settings] > Detail [Overview]

The [Overview] shows the following information:

Section	Dialogue element	Display	Switching function
Vibration sensor	Type	Configured device	---
	Version	Hardware version read in the device	
	Serial number	Serial number read in the device	
Firmware	Version	Firmware version read in the device	---
Parameter set	Parameter set	Configured parameter set	---
Device	Name	Configured device name	Changing the device name in the input field. The name will be shown in the tree view.

12.2.2 VNB211 > ... > [Device settings] > Detail [Device]

12.2.2.1 VNB211 > ... > Detail [Device] > Tab [Configuration]

Section	Dialogue element	Display	Switching function
Vibration sensor	Type	Configured device	--
	Version	Hardware version read in the device	
	Connect	State of the connection between software and device	
	Serial number	Serial number read in the device	
Write firmware to the device	Firmware version	Firmware version read in the device	

Switching functions:

Requirement:

- The VES software is connected to the device via

	Write firmware to the device	▶ Activate the button. ▷ A dialogue window appears. ▶ Select file with new firmware and confirm with [OK]. ▷ The software updates the firmware of the device.

12.2.3 VNB211 > ... > [Device settings] > Detail [Address]

The information and functions of the [Address] element are only available if a connection between the VNB sensor and the VES004 parameter setting software has been established.

▶ Connect the VNB sensor to the PC/laptop. (→ Establishing a connection to the VNB sensor 🗋 133)

12.2.3.1 VNB211 > ... > Detail [Address] > Tab [Configuration]

Section	Dialogue element	Display	Switching function
Connect	Serial number	Serial number read in the device	, ,

Switching functions:

	Search the USB ports for connected devices	▶ Activate the button. ▷ A dialogue window with the available devices appears. ▶ Select the required device. ▶ Use the + [Update the project with the selected device] icon to add the selected device to the project ▷ The device is assigned to the opened project. ▷ The [Connection] section displays information about the assigned device.
	Connect to the device	▶ Activate the button. ▷ The software connects to the assigned device. ▷ The tree view shows the connection state.
	Disconnect from the device	▶ Activate the button. ▷ The software disconnects from the device. ▷ The tree view shows the connection state.

12.2.4 VNB211 > ... > [Device settings] > Detail [Actions]

The information and functions of the [Actions] element are only available if a connection between the VNB sensor and the VES004 parameter setting software has been established.

▶ Connect the VNB sensor to the PC/laptop. (→ Establishing a connection to the VNB sensor 🗋 133)

12.2.4.1 VNB211 > ... > Detail [Actions] > Tab [Manipulate device]

Section	Dialogue element	Display	Switching function
Reboot	---	---	
Execute self-test	---	---	

Switching functions:

	Reboot device	▶ Activate the button. ▷ A confirmation message appears. ▶ Start the process with [Yes] OR abort the process with [No]. ▷ If [Yes]: The device restarts.
	Perform a self-test on the device	▶ Activate the button. ▷ The device carries out a self-test. ▷ A message window with the result of the self-test appears. ▶ Close the message window with [OK].

12.2.4.2 VNB211 > ... > Detail [Actions] > Tab [Reset device]

Section	Dialogue element	Display	Switching function
Reset history	---	---	
Reset parameter	---	---	
Restore factory settings	---	---	

Switching functions:

	Reset history	▶ Activate the button. ▷ A confirmation message appears. ▶ Start the process with [Yes] OR: Abort the process with [No]. ▷ If [YES]: The software deletes the history of the device.
	Reset parameters	▶ Activate the button. ▷ A confirmation message appears. ▶ Start the process with [Yes] OR: Abort the process with [No]. ▷ If [YES]: The software resets all parameters to their default values.
	Restore factory settings	▶ Activate the button. ▷ The factory settings of the device are restored.

12.3 VNB211 > [VNB211_#] > [Parameter_#]

The [Parameter_#] tab contains all information and configuration and monitoring options of the parameter set assigned to the vibration sensor.

To open the [Parameter_#] tab:

▶ Select the required sensor in the tree view.

▶ Either:
[Device] > [Parameters] > [Open]
or:
Double-click on [VNB211_#] > [Parameter_#]

▷ The detailed view shows the [Parameter_#] tab

It is always the parameter set currently assigned to the device which is opened. (→ Menu: Parameter > Device 🗋 37)

To open any parameter set:

▶ Double-click on [Parameters] > [VNB211] > [Parameter_#] in the tree view

▷ The detailed view shows the tab of the selected parameter set.

12.3.1 VNB211 > ... > [Parameter_#] > Detail [Common configuration]

The [Common configuration] element contains information and documentation of the current parameter set about the device settings.

12.3.1.1 VNB211 > ... > [Parameter_#] > Detail [Overview]

The [Overview] detailed view shows the following information:

Section	Dialogue element	Display	Possible values
Information	Created	Date on which the data set was created	--
	Changed	Date on which the data set was last changed	--
Parameter set	Name	Designation of the parameter set	Freely selectable
Device display	Unit display	Unit in which the values are displayed	• Metric [mm/s] • Imperial [in/s]

12.3.1.2 VNB211 > ... > [Parameter_#] > ... > Detail [Supported devices]

The [Supported devices] element provides information on the devices that can be used here.

VNB211 > ... > Detail [Supported devices] > Tab [Configuration]

Section	Dialogue element	Display	Description
Supported device types	Device type	Configured sensor	Corresponds to the device selection
Supported firmware versions	Minimum required	Firmware version	Indication acc. to VES004
	Maximum supported	Firmware version	Indication acc. to VES004

12.3.1.3 VNB211 > ... > [Parameter_#] > ... > Detail [Documentation]

The [Documentation] element provides information on the sensor's location and parameter setting date.

VNB211 > ... > Detail [Documentation] > Tab [Application]

Section	Dialogue element	Display	Description
Application	Company	Free text	Max. 100 characters
	Address		
	City		
	Location		
	Machine		

VNB211 > ... > Detail [Documentation] > Tab [Description]

The description contains a creation date and the date of the last parameter change. The author of the parameter set and a free text description can be added.

Section	Dialogue element	Display	Switching function
Description	Created by:	Free text	Max. 100 characters
	Creation date:	Date of creation	Later / earlier date
	Last change:	Date of the last change	Automatic
	Description	Free text	Max. 100 characters

12.3.1.4 VNB211 > ... > [Parameter_#] > ... > Detail [Device information]

The [Device information] element provides information on the configuration of alarms and objects as well as on the navigation path of the device display.

VNB211 > ... > Detail [Device information] > Tab [Outputs]

Section	Dialogue element	Display	Switching function
Outputs	OUT 1	Use and information about the alarm configuration	⚙
	OUT 2	Use and information about the alarm configuration	

Switching functions:

⚙	Go to the configuration page of the selected alarm (only active if at least one output is used for alarms)

VNB211 > ... > Detail [Device information] > Tab [Object dependencies]

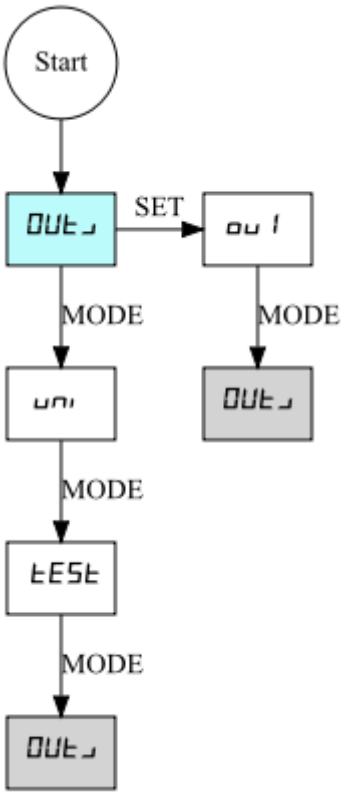
Section	Dialogue element	Display	Switching function
Object dependencies	Name	Name of the object	⚙
	Type	Parameter type	
	Use	Use of the parameters	
	Source	Name of the trigger	

Switching functions:

⚙	Configure selected object or selected input (only active if at least one object is defined)

VNB211 > ... > Detail [Device information] > Tab [Device menu]

Visualises the menu of the target device (here: example (with factory settings))



The visualisation of the device menu depends on the ...

- Defined inputs
- Defined objects
- Defined alarms

12.3.1.5 VNB211 > ... > [Parameter_#] > ... > Detail [Assigned devices]

Several devices can share one parameter set. This means that you only need to maintain one parameter set if you have several identical machines and installations. A changed parameter set can be written to several devices at the same time.

The [Assigned devices] element contains the following sections:

VNB211 > ... > Detail [Assigned devices] > Tab [Devices]

Displays all devices assigned to the parameter set.

Section	Dialogue element	Display	Switching function
Assigned devices	No.	Consecutive number in the list	---
	Name	Configured name of the device	
	Type	Article number of the device	
	Firmware	Read firmware version	
	Serial no.	Read serial number of the device	

12.3.2 VNB211 > ... > [Parameter_#] > Detail [Inputs]

12.3.2.1 VNB211 > ... > [Parameter_#] > ... > Detail [Overview]

In an empty parameter set (factory setting) of the VNB211 no input is defined.
The user must activate / add these inputs in accordance with the project.

The program differentiates between the following inputs:

- Dynamic inputs (AC)
- Analogue inputs (DC)

Section	Dialogue element	Display	Switching function
Dynamic inputs (AC)	Name	Configured name	⚙ (after right-click)
	Type	Internal sensor (not editable)	
	Filter	Configured filter	
Analogue inputs (DC)	Name	Configured name	⚙ (after right-click)
	Type	Analogue - current (not editable)	
	Reference	4...20 mA (not editable)	
	Value	Configured value range	

Switching functions:

⚙	Go to the configuration page of the selected input

12.3.2.2 VNB211 > ... > [Parameter_#] > ... > Detail [Dynamic inputs (AC)]

Section	Dialogue element	Display	Switching function
Dynamic inputs (AC)	Name	Configured name	∿, ⚙, 🗑
	Type	Internal sensor (not editable)	
	Filter	Configured filter	

Switching functions:

∿	Add new dynamic input
⚙	Go to the configuration page of the selected input
🗑	Delete the selected dynamic input

VNB211 > ... > [Parameter_#] > ... > Detail [Dynamic inputs (AC)] > [Internal]

The configured filter is applied prior to the actual evaluation of the signal. The scaling and unit define the level (height) of the measured amplitudes.

Section	Dialogue element	Display	Switching function
Identification	Name	Internal	Not editable
	Type	Internal sensor	Not editable
Configuration	Filter	Highpass 2 Hz / 10 Hz	Selectable from list
	Unit	g	Not editable
	Scale	25.00 g	Not editable

12.3.2.3 VNB211 > ... > [Parameter_#] > ... > Detail [Analogue inputs (DC)]

Section	Dialogue element	Display	Switching function
Analogue inputs (DC)	Name	Configured name	
	Type	Analogue - current (not editable)	
	Reference	4...20 mA (not editable)	
	Value	Configured value range	

Switching functions:

	Add new analogue input
	Go to the configuration page of the selected input
	Delete the selected dynamic input

VNB211 > ... > [Parameter_#] > ... > Detail [Analogue inputs (DC)] > [IN 1]

The signal is defined as a linear function between the two reference points 0 mA and 20 mA.

Section	Dialogue element	Display	Switching function
Identification	Name	Free text	--
	Type	Analogue - current	Not editable
Configuration	Unit	Configured unit	Free text
	Lower reference point	Configured assignment to 4 mA	Increase / decrease value
	Upper reference point	Configured assignment to 20 mA	Increase / decrease value

12.3.3 VNB211 > ... > [Parameter_#] > Detail [Objects] > [Overview]

The detailed view shows the configured objects.

Section	Dialogue element	Display	Switching function
Overview	UI	UI entry within the menu on the hardware device	
	Name	Configured name	
	Type	Configured object type	
	Input	Configured input	

Switching functions:

	Add a new object of the "a-RMS (time domain)" type
	Add a new object of the "v-RMS (time domain)" type
	Add a new object of the "a-Peak (time domain)" type
	Add a new object of the "Upper limit monitor" type
	Add a new object of the "Lower limit monitor" type
	Go to the configuration page of the selected object
	Delete the selected object from the list

12.3.3.1 VNB211 > ... > Detail [Objects] > Object types

Preconfigured object types for the following monitoring tasks are offered which can be configured using a wizard:

Name of the object type	Menu item on the device	Note
a-RMS (time domain)	U1 / U2	Max. 2 entries possible
v-RMS (time domain)	U1 / U2	
a-peak (time domain)	U1 / U2	
Upper limit monitor	EP1 / EP2	Max. 2 entries possible
Lower limit monitor	EP1 / EP2	

RMS = root mean square

VNB211 > ... > Object types > [a-RMS], [v-RMS] (Time domain)

- a-RMS (time domain) monitors the acceleration,
- v-RMS (time domain) monitors the velocity

...in a configurable frequency domain.

The frequency domain is defined via the filter of the dynamic input ([Configuration] → tab) and the filter of the object.

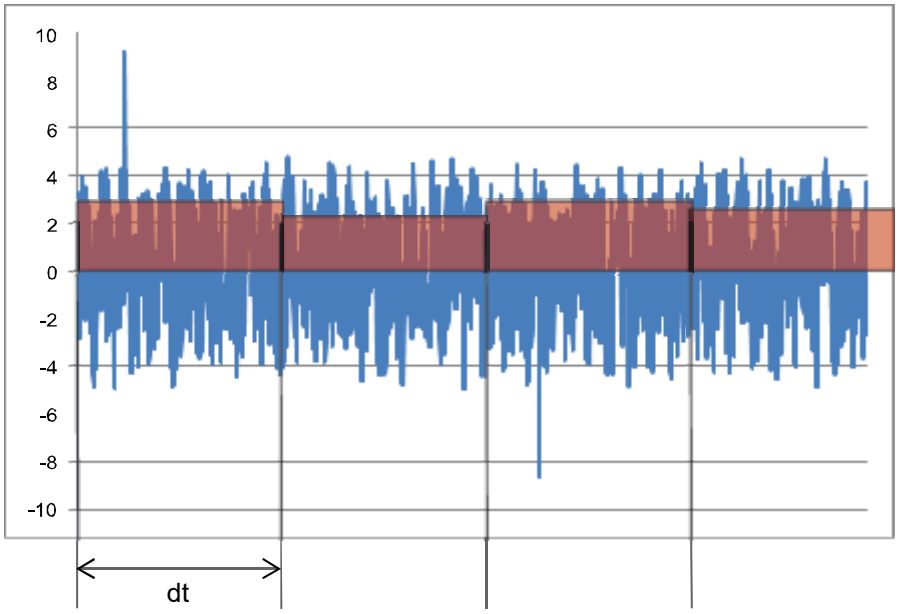


Fig. 10: a-RMS, v-RMS time domain

dt Measurement time, measurement period

Application:

- Measurements in accordance with ISO 10816 and other applicable standards (v-RMS)
- Loose machine parts (v-RMS)
- Alignment errors (v-RMS)
- Chatter vibrations, resonances (a-RMS)

VNB211 > ... > Object types > [a-Peak (time domain)]

The filtering of the time signal is done by means of the filter for the dynamic input ([Configuration] → tab) and the filter for the object.

[a-peak (time domain)] measures the maximum amplitude on a dynamic input within the set measurement time.

Different applications are possible thanks to signal filtering. Due to the very short measurement time (adjustable between 1 and 1.3 s), this object type is also suited for machine protection (e.g. in crash situations).

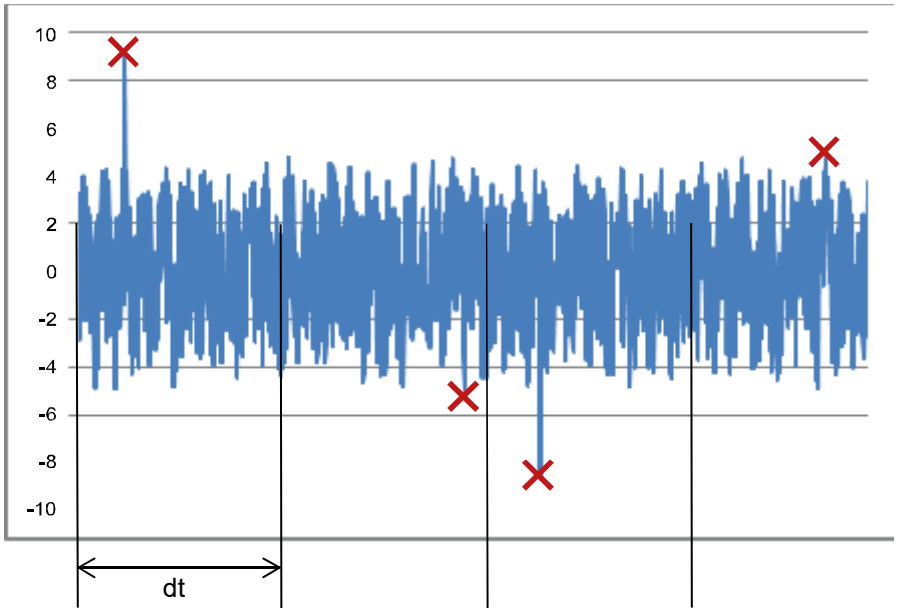


Fig. 11: a-peak time domain

dt Measurement time, measurement period

Application:

- Crash (lowpass)
- Cavitation of a pump (highpass)
- Metal-on-metal friction, e.g. bearing damage (highpass)

VNB211 > ... > Object types > [Upper limit monitor], [Lower limit monitor]

[Upper limit monitor], [Lower limit monitor] to monitor analogue signals (DC signals)

The signal source can only be the analogue input IN 1.

VNB211 > ... > Detail [Objects] > ... > Tab [Configuration]

Under the [Configuration] tab, only the preset [Name] can be changed. All other fields are not editable.

Section	Dialogue element	Display	Switching function
Identification	Name	Preset name according to input and object type	Free text
	Type	Selected object type	Not editable
	Menu item on the device	Short form of the type (digit # can be derived from the [Object types] table)	Not editable
Configuration	Input	Preset input: For a-RMS, v-RMS, a-Peak: Internal (Internal sensor) For upper limit, lower limit: IN 1 (analogue, current, 4...20 mA)	Not editable

VNB211 > ... > Detail [Objects] > ... > Tab [Processing]

Section	Dialogue element	Display	Switching function
Filter Only for a-RMS, v-RMS, a-Peak	Type	• Lowpass • Highpass • Bandpass	Selectable from list
	From	Configured lower cut-off frequency	Dependant on filter type: Increase / decrease value or: not editable
	To	Configured upper cut-off frequency	Dependant on filter type: Increase / decrease value or: not editable
Limits	Warning	Configured value	Increase / decrease value
	Hysteresis Only for upper limit / lower limit	Configured value	Increase / decrease value
	Damage	Configured value	Increase / decrease value
	Hysteresis Only for upper limit / lower limit	Configured value	Increase / decrease value
Processing Only for a-RMS, v-RMS, a-Peak	Averaging	Configured value	Increase / decrease value
Processing	Measurement time	Configured value	Increase / decrease value

12.3.4 VNB211 > ... > [Parameter_#] > Detail [History]

The VNB211 vibration sensor has an internal memory with battery buffered real-time clock. The device stores the following data in this internal memory:

- Object values and limits
- Time stamps for the events

The internal memory contains approx. 300,000 values.

[History] detail:
Using the icon at the top right in the detail window, you can activate/deactivate the entire internal memory. If the internal memory is active, the history settings can be made for the objects configured in the parameter set.

Switching functions:

	Switch: Internal memory is deactivated Parameters cannot be configured
	Switch: Internal memory is activated Parameters can be configured

In addition to the entire internal memory, each object can also be activated/deactivated individually. If an object is active, the highest value measured within the set interval is stored.

With the [Av.] checkbox, which can be selected individually for each object, additional values can be optionally stored. If a setting is made for the diagnostic electronics or a sensor, then the set value will automatically be adopted for all subordinated objects.

Section	Dialogue element	Display / switching function	Description
Object	VNB211	Sensor / input type / input	Not editable

Section	Dialogue element	Display / switching function	Description
Interval	--	0 h : 05 min : 00 s	Measurement duration: the highest value measured during the interval is stored
Av.	--	☐ Option not activated ▬ Option partly activated ☑ Option fully activated	Average: Saves the average over the interval
Estimated recording time	--	Maximum time period that can be stored in the history	Indication of the possible recording time

12.3.4.1 VNB211 > ... > Detail [History] > Real-time clock

When disconnected, the real-time clock of the sensor is battery buffered.

The time must be set once during commissioning by resetting the device history. This synchronises the time of the diagnostic electronics with the "Universal Time Coordinated" (UTC, formerly "Greenwich Mean Time" GMT) of the computer. The "Universal Time Coordinated" is determined from the time and time zone set in the operating system.

12.3.4.2 VNB211 > ... > Detail [History] > Storage of the measured values

The internal memory is a ring memory (FIFO, "first in first out"). If the internal memory is full, a small portion of the oldest values is deleted to free up memory space.

The storage of the measured values is usually determined by an interval specified in the parameters.

- At the end of the interval, the maximum measured value that occurred during the interval is stored in the internal memory together with the corresponding time stamp.
- Depending on the options that may have been selected (see ”Parameters” chapter), the average of the measured values determined over the interval is also written to the internal memory.

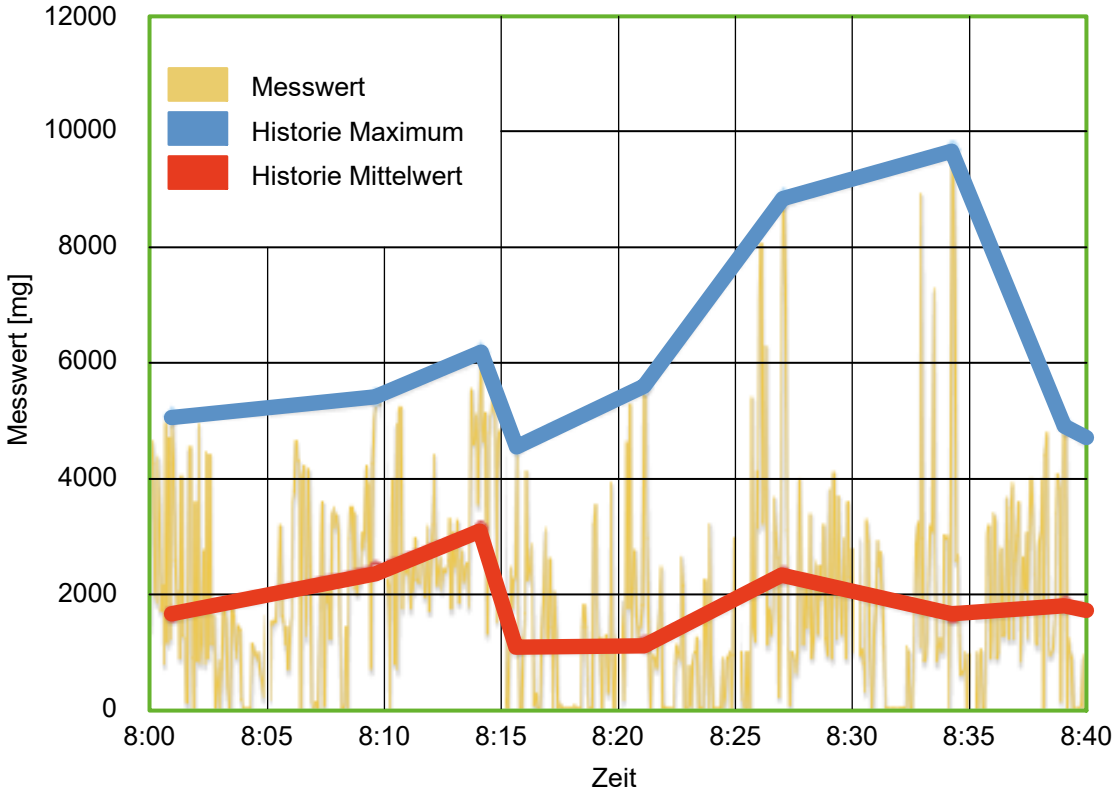


Fig. 12: Diagram: History of the measured values (example)

12.3.5 VNB211 > ... > [Parameter_#] > Detail [Alarms] > [Overview]

Displays the existing alarms.

A maximum of two of the following alarm types can be defined:

- Analogue alarm
- Warning
- Damage
- Custom alarm

Switching functions:

	Add a new alarm of the "Analogue alarm" type
	Add a new alarm of the "Warning" type
	Add a new alarm of the "Damage" type
	Add a new alarm of the "Custom alarm" type
	Go to the configuration page of the selected alarm
	Delete the selected object from the list

12.3.5.1 VNB211 > ... > Detail [Alarms] > Alarm type > Tab [Configuration]

Section	Dialogue element	Display	Switching function
Identification	Name	Configured name of the selected output	Not editable
	Type	Configured type of the selected output	Not editable
	Output	Assigned digital output	Selectable from list
Switching output (only for digital alarm)	Switch	Configured signal: • Normally closed • Normally open	Selectable from list
	Switch-on delay	Configured time	Increase / decrease value
	Switch-off delay	Configured time	Increase / decrease value
Signalling (only for analogue alarm)	Signal	Configured signal: • Current - 4...20 mA	Selectable from list
	Values	Configured value type	Selectable from list
Scaling (only for analogue alarm)	Value at 4 mA	Configured value	Increase / decrease value
	Value at 20 mA	Configured value	Increase / decrease value

12.3.5.2 VNB211 > ... > Detail [Alarms] > Alarm type > Tab [Source]

▶ Select the objects for visualisation in this alarm. For an analogue alarms, the units must match.

Section	Dialogue element	Display	Switching function
Alarm source	Table	Configured objects	✓ Evaluate the object ✗ Do not evaluate the object

12.4 VNB211 > [VNB211_#] > [Data]

The [Data] object is located in the tree view below the device and contains the corresponding measured data.

The measured data can be grouped, renamed, deleted, imported and exported: Recording and displaying measured data (→ 🗋 154)

13 Monitoring

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We understand "monitoring” to mean the recording of measured data.

13.1 Monitoring types

13.1.1 Measured data (overview)

The diagnostic electronics and the sensors provide a range of measured data:

- The raw signal (time signal)
- Processed data (e.g. frequency spectra or object values)

The following types of measured data are available:

Icon	Monitoring type	Resulting from these measured data
	Data monitoring	Display the object values using different diagram types (→ Data monitoring 🗋 149). All objects or subobjects can be selected as a source and added to the diagram.
	Counter monitoring (only VSE/VYE, except for VYE007)	Display the current states of the configured counters All counters configured in the diagnostic electronics can be selected as a source and added to the diagram.
I/O	I/O monitoring	Display the current states of the inputs and outputs All inputs and outputs of the device can be selected as a source and added to the diagram. A direct current signal on the dynamic input also works here.
	Spectrum monitoring (all VSE/VYE devices, except for VYE007; min VNB hardware version AD, firmware version 1.3.0)	Display the frequency spectra (FFT / H-FFT) Only dynamic inputs of the diagnostic electronics can be selected as a source and added to the diagram. Only one dynamic input per diagnostic electronics can be selected.
	Raw data monitoring (only VSE/VYE; min VNB hardware version AD, firmware version 1.3.0)	Display the raw data of a dynamic input (time signal) Only dynamic inputs of the diagnostic electronics can be selected as a source and added to the diagram. Only one dynamic input per diagnostic electronics can be selected.
	History monitoring	Read and display the internal memory All objects configured in the device can be selected as a source and added to the diagram. The prerequisite is that the object is activated in the history and that there are least 2 measured values in the internal memory.

13.1.2 Data monitoring

In the data monitoring section, you can view the current measured values of the objects and subobjects. The object values and the alarm limits provide a clear overview of the current machine state. The underlying vibration information is stored in the parameter set (objects) of the diagnostic electronics and only the current measurement result for this monitoring is shown.

Example:

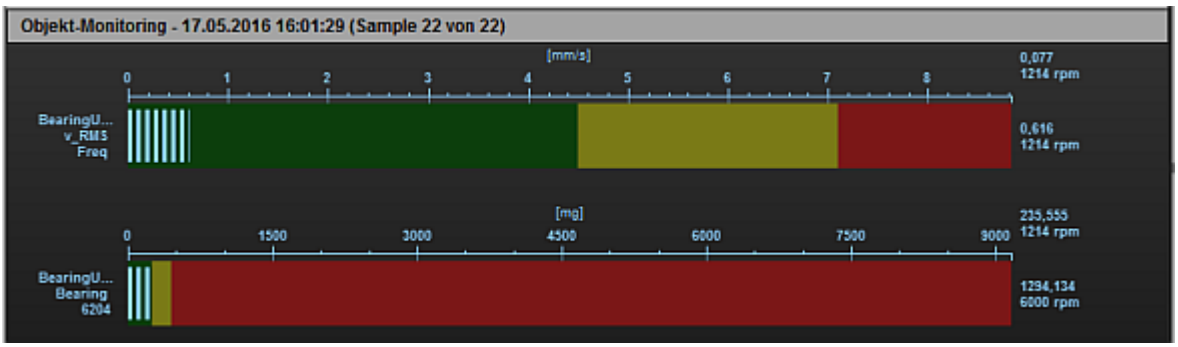


Fig. 13: Data monitoring

Switching functions:

The following special switching functions are available:

	Switch to object level value view
	Switch to subobject result value view

13.1.3 Counter monitoring

In the counter monitoring section, you can view the current state of the counters configured in the diagnostic electronics. It also indicates the time stamp and, provided that a limit has been defined, the alarm state.

Switching functions:

	Set counter values

13.1.4 I/O monitoring

In the I/O monitoring section, you can view the current state of the analogue inputs and outputs.

Parameter	Display
Digital inputs and outputs	Current state (On / Off)
Analogue inputs	Computed value according to the set scaling
Analogue outputs	Analogue measured value

Switching functions:

No special switching functions available.

13.1.5 Spectrum monitoring

In the spectrum monitoring section, you can view the data based on the frequency analysis. You can choose between the standard FFT or a H-FFT spectrum. The spectral view allows creation of a detailed analysis based on the occurring frequencies. The software offers tools for frequency factor, harmonics and sideband analysis.



The monitoring of objects is inactive during spectrum monitoring.

The alarm states keep their last values as long as the monitoring is active.

Example:

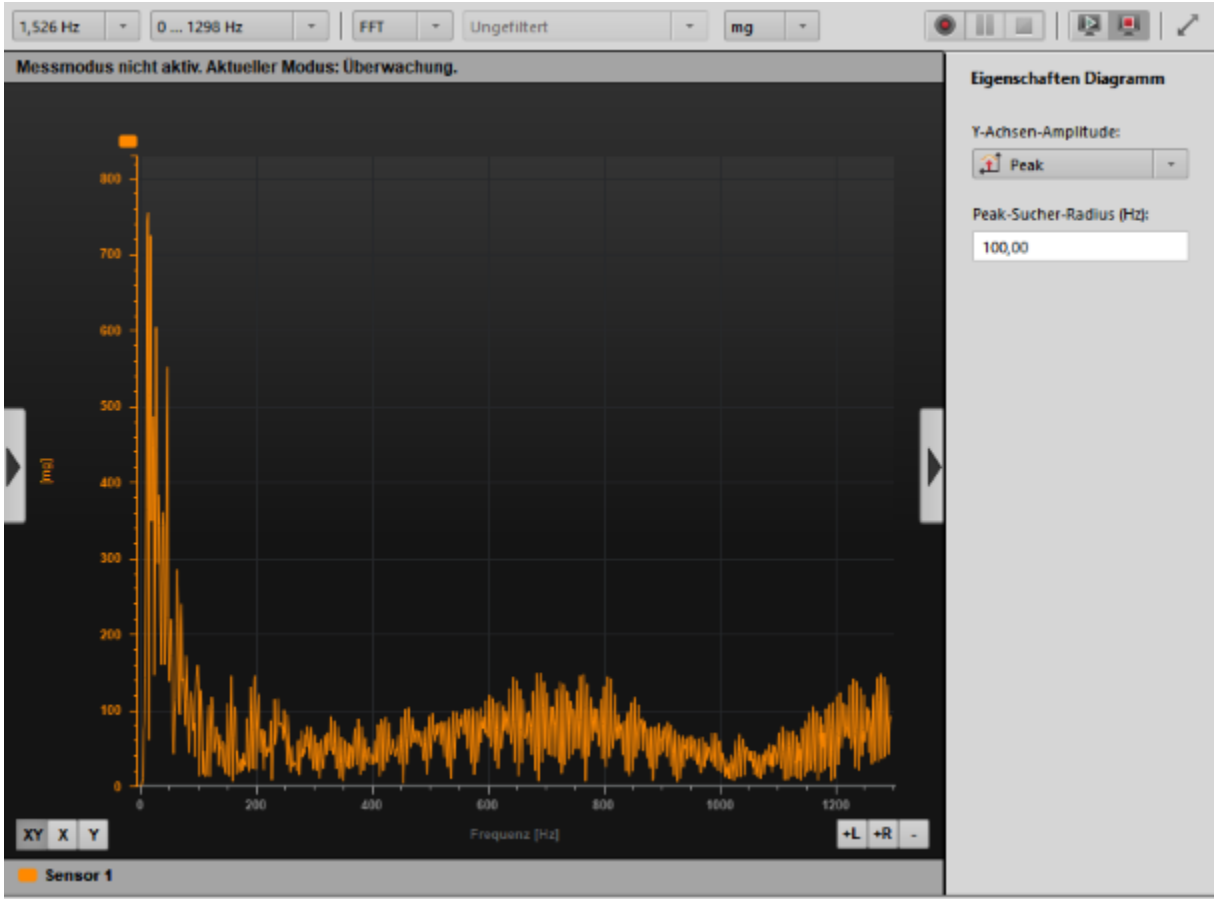


Fig. 14: Spectrum monitoring

Switching functions:

Section	Meaning	Value
1. Selection field	Frequency resolution for spectrum calculation	24.414 Hz ... 0.191 Hz
2. Selection field	Frequency band. Indicates which frequency domain is shown. 850 values per spectrum (850 • resolution = frequency domain)	
3. Selection field	Type of analysis	FFT H-FFT
4. Selection field	Type of filtering for H-FFT	
5. Selection field	Unit of the y-axis for FFT analysis	mm mm/s mg

13.1.6 Raw data monitoring

The raw data of the dynamic input are shown in the monitoring of the time signal. These are the unfiltered data obtained directly after the analogue-digital conversion.

The raw data can be played back as sound (live and recording).

The monitoring of objects is inactive during time signal monitoring.
The alarm states keep their last values as long as the monitoring is active.

Example:

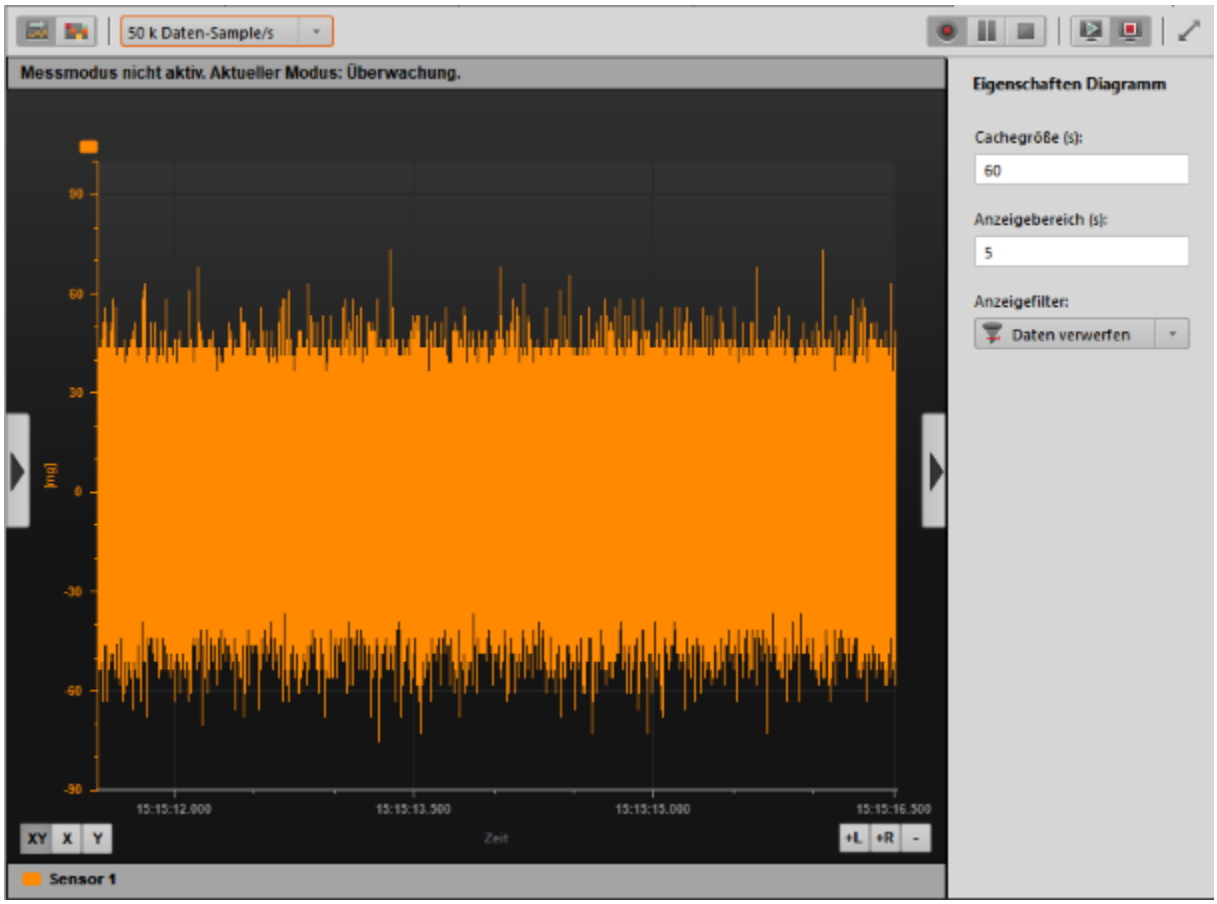


Fig. 15: Raw data monitoring

Switching functions:

The following special switching functions are available:

1.	Selection field	Sampling rate in 1,000 samples per second	50 k data sample/s 100 k data sample/s
2.	/	Audio output on/off	

13.1.7 History monitoring

The history reads and displays the internal memory of the diagnostic electronics. Only those objects with a measured value in the internal memory are shown. The history helps to visualise the development of measurements prior to a damage message (sudden or progressive rise).

Example:

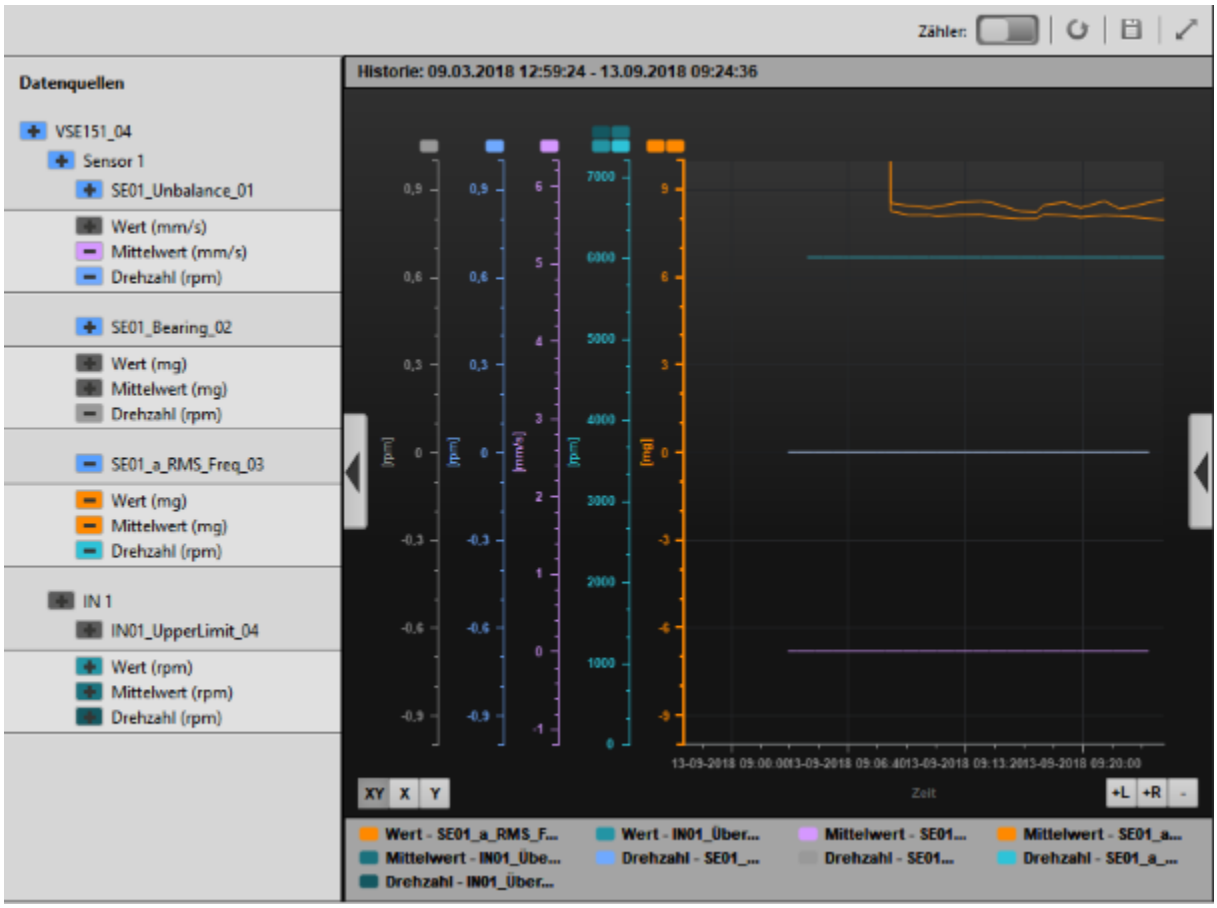


Fig. 16: History monitoring

Switching functions:

The following special switching functions are available:

	Save history Memory location = Project tree view > [Device_#] > [Data] > [History tt.mm.jjjj hh:mm:ss]

13.2 Recording and displaying measured data

Requirement:

- The VES software is connected to the device via

There are several methods to select a monitoring type:

- Toolbar (→ Toolbar 🗋 16)
- Menu bar (→ Menu bar 🗋 15)
- Context menu (→ Context menu 🗋 17): right-click on the device in the tree view (→ see also chapter Context menu functions (→ Context menu functions 🗋 163)

▶ Select the monitoring type.

▷ The monitoring is displayed in the Detailed view (→ Detailed view 🗋 17).

▷ The program starts the data transfer.

13.2.1 Switching functions (monitoring)

The following switching functions are available for almost all monitoring types.

13.2.1.1 Project data monitoring

Icon	Meaning	Requirement
▶	Start project data monitoring	Monitoring stopped
■	Stop project data monitoring	Monitoring in progress

13.2.1.2 Toolbar above the data monitoring

Icon	Meaning	Description
	Switch to the bar graph view	The bar graph consists of a progress bar, an axis and the displayed limits, where applicable. The axis can be scaled and formatted as required. Values with the same engineering unit can be displayed on the same axis.
	Switch to the table view	A table can consist of several rows. Each row shows the corresponding name of the visualised value, the current value together with the time stamp and - if applicable - the current alarm state.
	Switch to the moving window data view (y-t-graph (moving))	The y-t graph consists of a time axis (x-axis) and one or several y-axes. The axes have several properties that can be changed in the corresponding dialogue window (e.g. scaling, colour,...). Values with the same engineering unit can be displayed on the same axis. The time axis has a fixed time span. Older measured values will therefore be outside the window and will no longer be displayed.
	Switch to the unlimited data monitoring (y-t-graph (unlimited data))	The y-t graph consists of a time axis (x-axis) and one or several y-axes. The axes have several properties that can be changed in the corresponding dialogue window (e.g. scaling, colour,...). Values with the same engineering unit can be displayed on the same axis. The starting point of the time axis is fixed as "0 point". As a result, the data is progressively condensed by newer measured values, ensuring a joint display within the same diagram.
	Start data recording	Starts the recording of the current monitoring.

Icon	Meaning	Description
	Pause data recording	Pauses the recording of the current monitoring.
	Stop data recording	Stops the recording of the current monitoring.
	Start data monitoring	Restarts the current monitoring. The new measured values are displayed again in the selected graph.
	Stop data monitoring	Stops the ongoing measurement in Monitoring, no new measured values are displayed.
	Show history together with the counter	
	Reload history	Update of the history data without having to close and reopen the history window.
	Save history	
	Toggle full screen mode [F11]	Changes to the full screen mode (or: [F11]) or change back to the normal screen mode
/	Switch audio output on/off	Only for raw data

13.2.1.3 Switching functions within data monitoring

Icon	Meaning
	Selection of the data sources
	Display of the properties
XY	Activate the zoom mode for the x- and y-axes
X	Activate the zoom mode for the x-axis
Y	Activate the zoom mode for the y-axis
+L	Add vertical coordinate axis on the left side
+R	Add vertical coordinate axis on the right side
-	Delete selected coordinate axis

With active zoom: display of the icon next to the zoom buttons.

To undo the zoom:

- ▶ Right-click on the data monitoring
- ▶ In the context menu: click [Undo zoom]

13.2.2 Recording and saving measured data

▶ Select the requested monitoring type, e.g. raw data monitoring, in the toolbar.

▷ New [Monitoring] window opens.

▷ The program starts the data transfer.

▶ If the data transfer does not start automatically:

Start the data monitoring in the [Monitoring] window on the right with .

▶ If required, adapt the representation via the monitoring switching functions (→ Switching functions (monitoring) 🗋 154).

▶ Start the data recording with .

▷ With each recording cycle, "samples recorded" is increased by 1.

▶ Wait for the recording of the required signals.

▶ Stop the data recording with .

▶ Confirm the query "Do you wish to save this recording?" with [Yes].

▷ The stored monitoring data sets appear in the tree view under [Data].
The name of the data set results from...
- Monitoring type
- Recording date
- Recording time

▷ The program saves each monitoring data set as an individual `*.idat` file.

The program automatically saves the projects and the associated parameters and data in the following directory:
`C:\Benutzer\Öffentlich\Öffentliche Dokumente\VES004`
`C:\Users\Public\Documents\VES004`

▶ Stop the data monitoring display with .
If the data recording has not yet been stopped, it continues in the background.

13.2.3 Renaming measured data recordings

✓ The names of the data recordings are indicated in the tree view of the project under [Data].

▶ If required: To change the name of the data recording:

▶ Right-click on the name to be changed.

▶ Click [Rename] in the context menu.

▶ Change the name.

▶ Accept the change with [ENTER].

▶ Do not change the name of the `*.idat` file!
Otherwise, the program will no longer be able to find or activate the data set.

13.2.4 Exporting measured data

The measured data recorded in the project are listed in the tree view under [Data].

▶ Right-click on the name of the measured data recording to be exported.

▶ Click on [Export...] in the context menu.

▷ The [Save as...] window is displayed.

▶ If required, adapt the file names and the directory location.
Permissible data types:
`*.idat` (preset)
`*.xml`
`*.xlsx`
`*.csv`
`*.wav` (only for raw data)

▶ Export the recording as selected file type with [Save].

13.2.5 Saving measured data as spectrum data

The measured data recorded in the project are listed in the tree view under [Data].

▶ Right-click on the name of the measured data recording to be exported.

▶ Click [Export as spectrum data] in the context menu.

▷ The measured data recording is stored as spectrum data within the current project.

13.2.6 Importing measured data

Import the measured data exported from a project into another project as follows:

▶ In the tree view, right-click on [Data] or the name of the [Data group].

▶ Click on [Import...] in the context menu.

▷ The [Data import] window appears.

▶ Select directory.

▶ Enter file name.

▶ Select file type:

File type	Description
`*.idat`	VES004 data
`*.xdat`	Xdat raw data
`*.bin`	VVB001 binary data
`*.raw26`	float26 raw data (for VWV devices)
`*.avro`	moneo raw data
`*.orc`	VSE003 data
`*.ohs`	VES003 history

Version VES004 V2.34 or higher: The file format of the xdat files has changed.
xdat files from VES004 V2.32 and V2.33 are incompatible and cannot be imported and read.

▶ Import the measured data into the project with [Open].

▷ The program saves the data set under its original name. The name assigned during the export of the data set is not relevant.

If an exported *.idat file is reimported into the same project, the program recognises that the data set is identical.
The export file name is not relevant.

The program will offer the following alternatives:

▶ Overwrite the existing data set
The original data set name is retained in the process

▶ Import the data set in addition to the original data set
The original data set name is retained in the process
A counting number "(1)" is added to the copy of the data set

13.2.7 Importing an IO-Link BLOB

- In VES004, data can be imported as IO-Link BLOB.
- The recorded raw data block of a device with IO-Link interface is called BLOB (Binary Large Object).
- BLOBs have the extension *.bin
- Each recording (BLOB) of a VVB001 or VVB3xx IO-Link vibration sensor contains 4 seconds of raw data with a sampling rate of 25 kHz
- The following raw data functionalities are available for the BLOB in VES004:
  - Import of the .bin file
  - Playing back a recording
  - Export to csv, xml, xlsx, wav
  - Audio playback
  - Calculation of a spectrum from a raw data recording

Import recorded raw data of a vibration sensor with IO-Link interface (e.g. VVB001 or VVB3xx) into a project as follows:

▶ In the tree view, right-click on [Data] or the name of the [Data group].

▶ Click on [Import...] in the context menu.

▷ The [Open] window appears.

▶ Select the directory location and the file. Data type for BLOB: * `.bin`

▶ Import the measured data into the project with [Open].

▷ The program stores the data set with the device article number as a prefix, e.g. `VVB001` or `VVB3xx`.

13.2.8 Spectrum monitoring of raw data

To post-process recorded raw data and display them in spectrum monitoring:

▶ In the tree view, right-click on the raw data record under [Data].

▶ Click [Spectrum] in the context menu.

▷ The raw data record is shown in the spectrum monitoring window.

13.2.9 Evaluating measured data

13.2.9.1 Example: Bearing damage

Requirement:

- The sensor (e.g. VSA001) is defined as [Dynamic input]
- A trigger is defined for the rotational speed range to be examined
- An object is defined for bearing monitoring
- Subobjects are configured according to the bearing data
- Appropriate limits are configured

The spectrum provides a detailed display:

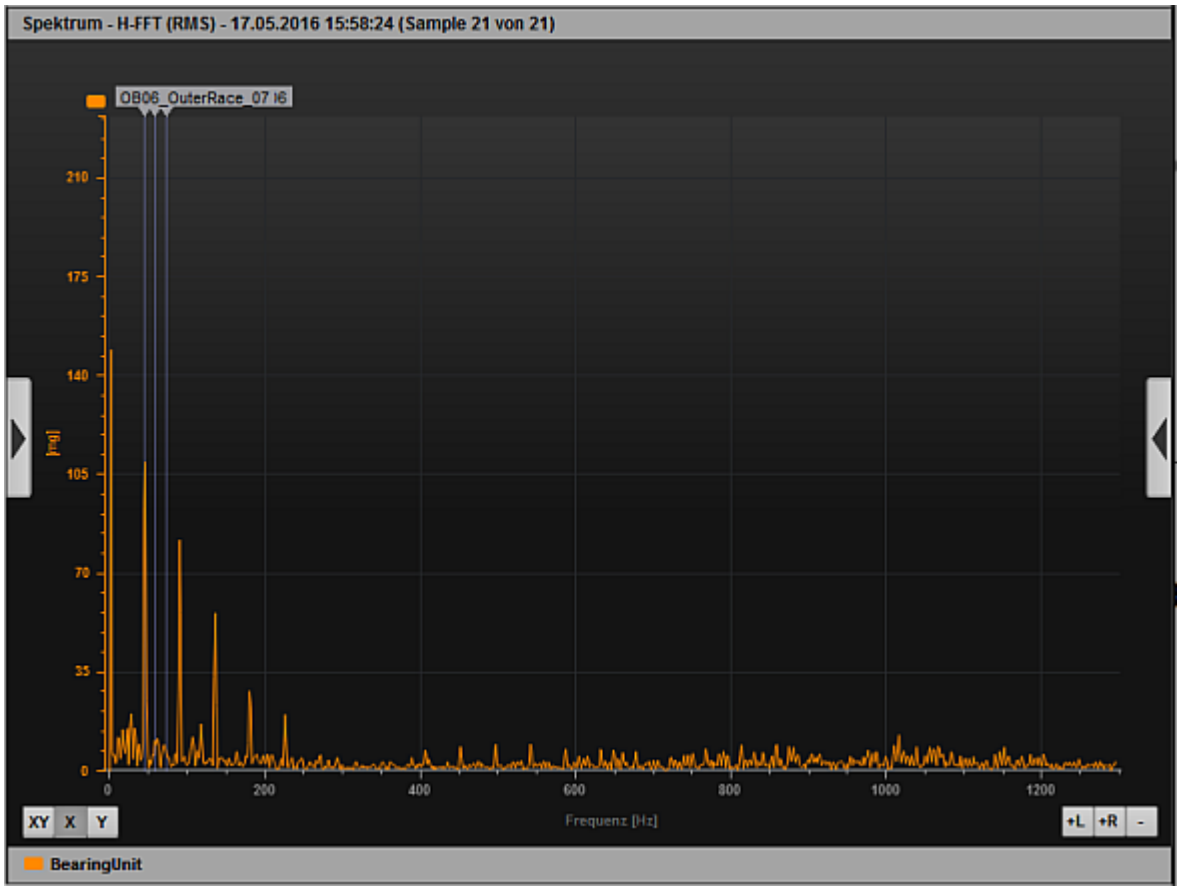


Fig. 17: View: Measured data - bearing damage (full screen)

▶ Select x-axis zooming by clicking on [X].

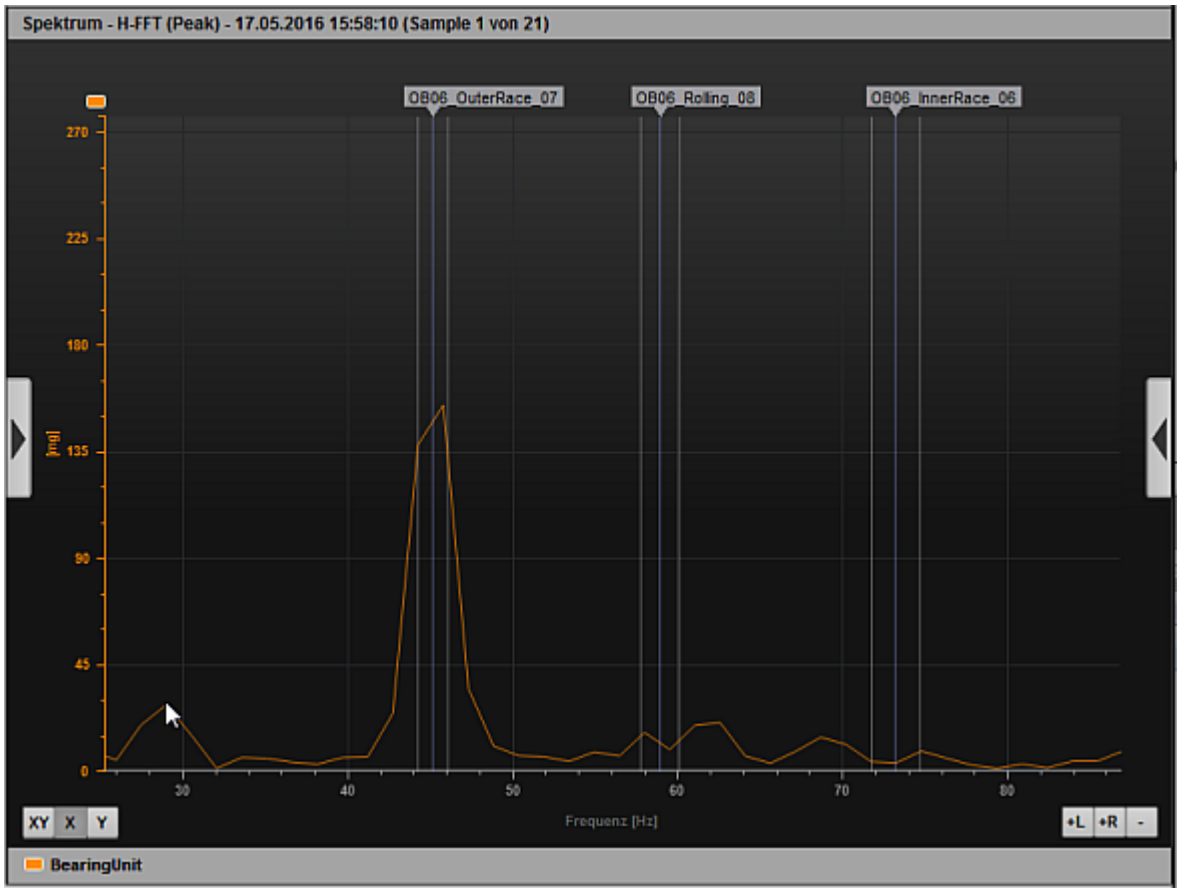
▶ Right-click on the graph legend (here: BearingUnit).

▶ Activate the following settings in the context menu (if not already done):

- [Subobjects] > [All]
- [Frequency window]

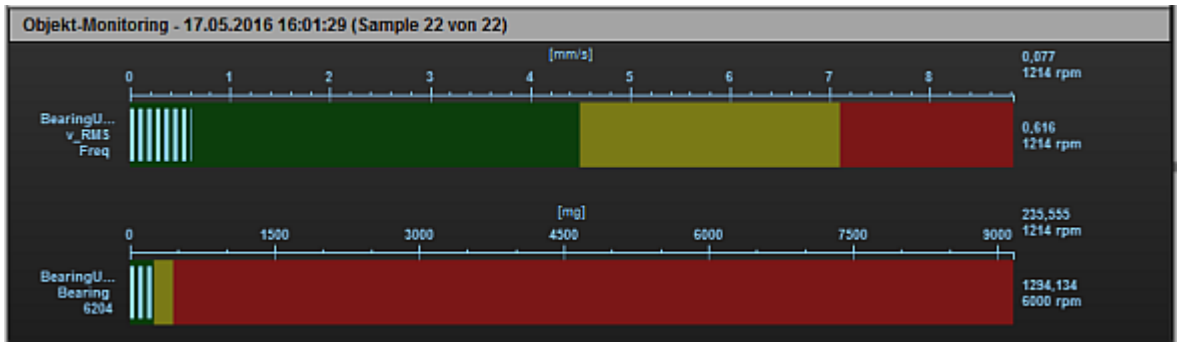
▶ Use the left mouse button to open the smallest possible window
Here: about 45 Hz around the first peak after the 0 Hz mark

The extract of the measured data is displayed:



The view clearly shows an imminent damage at the outer race of the bearing.
Inner race and rolling element are free from damage.

For an even quicker overview, the bar display can be used:



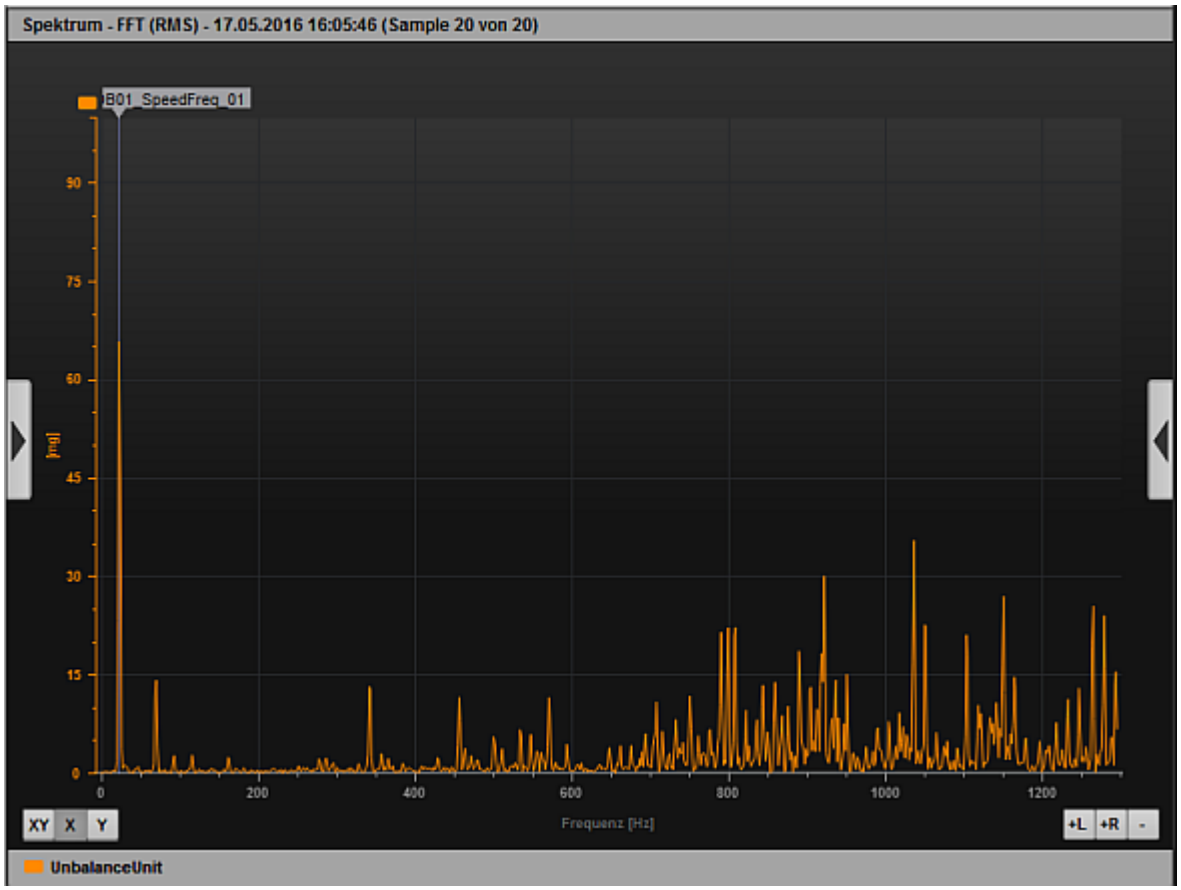
The lower bar shows: a bearing warning is about to be issued.

13.2.9.2 Example: Unbalance

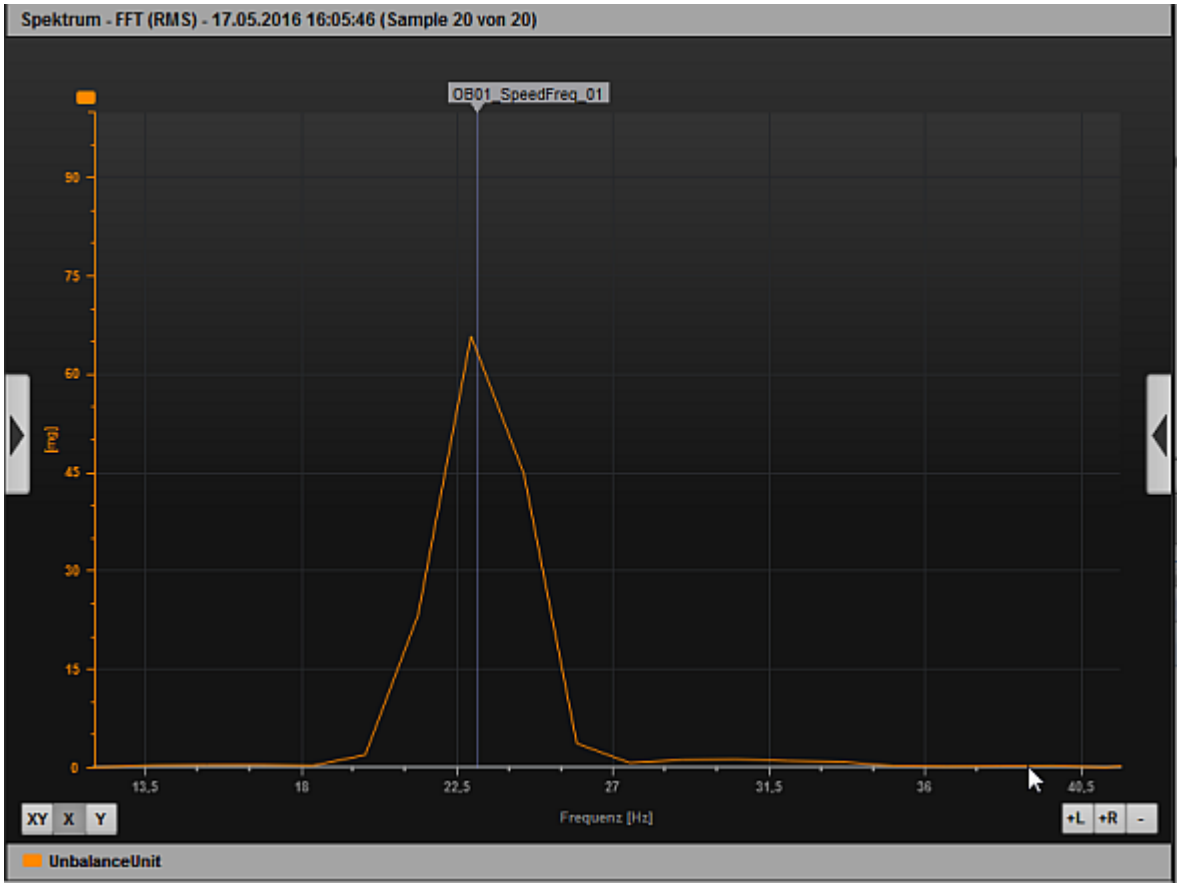
Requirement:

- The sensor (e.g. VSA001) is defined as [Dynamic input]
- A trigger is defined for the rotational speed range to be examined
- An object is defined for bearing monitoring
- Subobjects are configured according to the bearing data
- Appropriate limits are configured

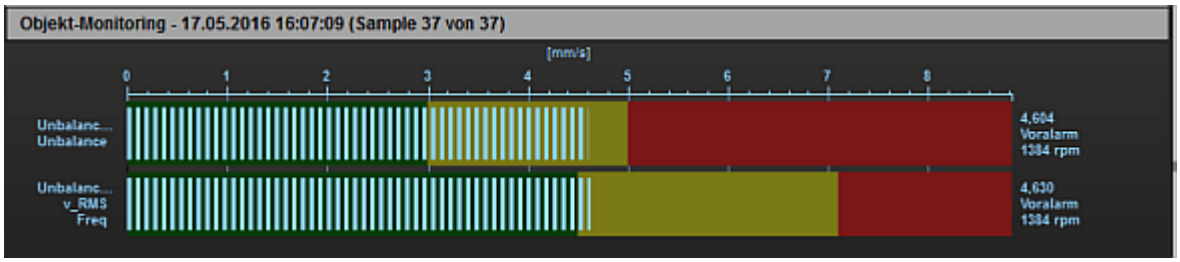
The peak in the spectrum only shows that there is a damage:



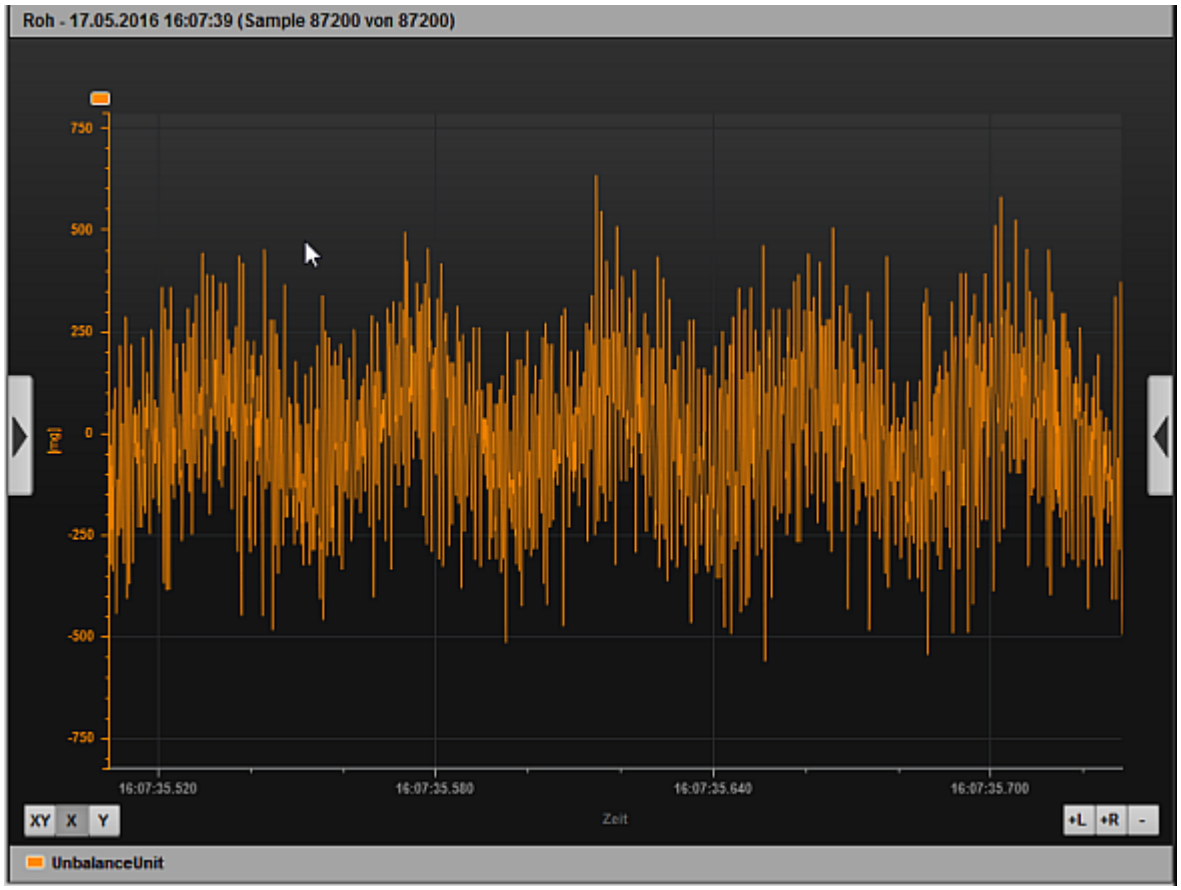
This is how it looks after zooming the x-axis:



The bar graph shows that the unbalance is clearly in the warning alarm range:



In the raw data view, the sine wave of the unbalance can be clearly seen after zooming the x-axis:



13.3 Context menu functions

13.3.1 Context menu – data sources

Function	Description
Remove bar	Removes the bar of the selected object from the diagram.
Remove line	Removes the line of the selected object from the diagram.
Remove row	Removes the row of the selected object from the diagram.
Add to new axis	Adds the selected object to the diagram. A new y-axis with the unit of the object is created.
Add to existing axis	Adds the selected object to the diagram. The object is assigned to an existing y-axis with the corresponding unit.
Add to table	Adds the selected object to the table.

13.3.2 Context menu – diagram area

Function	Description
Add axis	Adds a value axis (y-axis) to the current diagram.
Display filter	Filters the data to be displayed in the diagram. Especially the time signal monitoring does not allow representation of all measured values. The display data can represent an average of x measured values or ignore x values. The value x depends on the CPU load.
Print	The currently displayed diagram can be directly printed. You can choose between original (full colour), printer-friendly (white background) and black & white.
Properties	Opens the Properties window.
Go to	Goes to the beginning or end of the measured values in the diagram.
Copy	The currently displayed diagram can be copied directly to the clipboard. You can choose between original (full colour), printer-friendly (white background) and black & white.
Add label	Adds a label.
Show legend	Shows/hides the legend.
Undo zoom	Resets the zoom so that all measured values are displayed again.
Remove row	Removes the row of the selected object from the diagram.
Zoom mode	The zoom mode is used to select the axis to be used for the zoom. The zoom can only be activated for x, y or both axes.

13.3.3 Context menu – diagram axes

Function	Description
Absolute scaling	The scaling of an axis can be absolute (in the engineering unit of the object) or relative (in relation to the base line).
Delete axis	Removes the selected axis from the diagram.
Properties	Opens the Properties window.

13.3.4 Context menu – diagram data line

Function	Description
Properties	Opens the Properties window.
Go to	Goes to the beginning or end of the measured values in the diagram.
Harmonics	After activation of the harmonics, a frequency can be selected in the spectrum that will be used as a base frequency for the harmonics display. The selected frequency is determined by the highest amplitude in the indicated peak finder radius. The peak finder radius can be set in the diagram properties.

Function	Description
Remove line	Removes the line of the selected object from the diagram.
Measurement cursor	Shows a crosshair to facilitate reading of the measured values. When moving the mouse pointer, the crosshair always moves along the selected line. The position of the crosshair is shown at the top of the diagram.
Measurement lines	Shows two measurement lines to facilitate reading of the measured values and distance measurement. Drag&drop the measurement lines at the top using the mouse. The positions of the measurement lines and their distance on the selected line are indicated at the top of the diagram.
Peak finder	Shows a measurement line to facilitate reading of the measured values. Drag&drop the measurement line at the top using the mouse. The position of the measurement line is determined by the highest value within the indicated peak finder radius. The peak finder radius can be set in the diagram properties.
Sidebands	After activation of the sidebands, 2 frequencies must be determined. First the base frequency and then (to the right or left of the base frequency) one of the first sidebands. The respective position is determined by the highest value within the indicated peak finder radius. The peak finder radius can be set in the diagram properties.
Subobjects	Shows markers for the subobjects in the frequency spectrum. The position corresponds to the damage frequency determined on the basis of the current rotational speed.
Frequency window	Shows the frequency window of the subobjects when hovering over it with the mouse.
Waterfall	Several spectra are arranged staggered, one behind the other (three-dimensional diagram).

13.4 Properties

13.4.1 Diagram area properties

Property	Description
Display range [s]	Determines the display range in the time axis (x-axis) in seconds.
Display filter	Filters the data to be displayed in the diagram. Especially the time signal monitoring does not allow representation of all measured values. The display data can represent an average of x measured values or ignore x values. The value x depends on the CPU load.
Cache size [s]	Describes the buffer for the visualisation in seconds.
Peak finder radius in [Hz] or [CPM]	The width of the search zone (radius) in which the highest value is searched. The peak finder radius is used for the harmonics, the sidebands and the peak finder.
y-axis amplitude	Indicates whether the measured values in the spectrum are shown as peak or as effective value (RMS). The conversion factor for a single frequency is root(2), peak = RMS * root(2).

13.4.2 Axis properties

Property	Description
Absolute scaling	The scaling of an axis can be absolute (in the engineering unit of the object) or relative (in relation to the base line).
Auto scaling	The value axis (y-axis) is automatically scaled based on the measured values.
Date-time format	Determines how the date and time are displayed on the time axis (x-axis).
Colour	The colour of the axis can be modified.
Show grid	Auxiliary lines are shown as a grid in the diagram.
Show ticks	The division of the axis is shown or hidden.
Label	A label can be created for the axis.
Upper scale	End of the scale (if not scaled automatically).
Lower scale	Beginning of the scale (if not scaled automatically).
x-axis scaling	For analysis, the frequency axis (x-axis) can be converted during monitoring. In addition to the normal frequency unit, the x-axis can also be shown relative to a rotational speed. The rotational speed can be obtained from an analogue input or entered manually. This conversion makes it easy to detect whether peaks in the spectrum are multiples of a given rotational speed. Displaying the spectrum in relation to the rotational speed is also called frequency factor analysis.

13.4.3 Data line properties

Property	Description
Colour	The colour of the data line can be modified.
Averaging	The measured values in spectrum monitoring can be averaged for representation purposes to avoid fluctuations.
Name	The name of the selected object that is shown in the legend.
Symbol	Symbols can be displayed for the data points.
Symbol size	The size of the symbols for the data points can be changed.
Type	The line type can be changed (straight, dotted, thick, thin,...).

13.5 Importing raw VWV data

Wireless VWV sensors can transmit raw data to a computer using a gateway.

The raw data file has the format `RAW26` and can be imported in VES004: Importing measured data (→ 🗋 157)

13.6 Importing raw moneo data

Raw data can be exported from moneo.

The raw data file has the format `AVRO` and can be imported in VES004: Importing measured data (→ 🗋 157)

14 Appendix

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14.1.1 ifm VES004 V2.37

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END OF TERMS AND CONDITIONS

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