Software manual

Parameter setting software for vibration diagnostic electronics

VES004 V2.07 or higher

English

80288056 / 00 12 / 2019

Licence Information

57070

ifm VES004 V2.0

Internet: **www.ifm.com**

Support: info@ifm.com

→ **Licence Information** (→ p. 199)

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1 About this manual

Content

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1.1 Legal and copyright information

33117

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1.2 Purpose of the document

58177

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 Explanation of Symbols

34171

WARNING

Warning of serious personal injury.
Death or serious irreversible injuries may result.

CAUTION

Warning of personaly injury.
Slight reversible injuries may result.

NOTICE

Warning of damage to property

Important note
Non-compliance can result in malfunction or interference

Information
Supplementary note

► ... Request for action

> ... Reaction, result

→ ... "see"

abc Cross-reference

123 Decimal number
0x123 Hexadecimal number
0b010 Binary number

[...] Designation of pushbuttons, buttons or indications

1.4 History of the instructions

58178

What has been changed in this manual? An overview:

Date	Theme	Change
2016-05-26	Release V1.10	• Sensor VNB001 added • Sensor VNB211 added
2016-12-28	Release V1.20	• transfer to CMS • evaluation unit VES150 added
2018-06-18	Release V1.40	• VES151 evaluation unit added • VES153 evaluation unit added • New features and functions: → Release notes
2019-11	Release V2.00	▪ System requirements revised ▪ Document adapted to the new GUI ▪ Additions to evaluation units VSE003, VSE101, VSE152 ▪ Additions to VSM001 and VSM101 sensors ▪ Additions to BLOB import VVB001 ▪ Additions to new features ▪ Minor corrections

2 Safety instructions

26085

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 Functions and features

58180

The VES004 software serves to configure and display data of the VSE diagnostic electronics. The rolling element 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

Content

26049

4.1 System requirements

57212

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 graphic card with a resolution of min. 1024 x 768
- Software
  - Operating system:
    Microsoft Windows 7 SP1 / 8 / 8.1 / 10
    Microsoft Windows Server 2008 R2 SP1 / 2012 / 2012 R2 / 2016 / 2019

The latest version of the software can be downloaded from → www.ifm.com

4.2 Install the VES004 software

26048

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 Install the USB driver

57201

- For the connection of type VNB sensors to the parameter setting software a USB adapter cable (e.g. E30136) is necessary.
- For VNB sensors on the USB interface of the PC an own driver is necessary.

	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.

4.4 Start the parameter setting software

26102

The software VES004 is directly runnable in the unpacked installation folder.
To start the VES004 software:

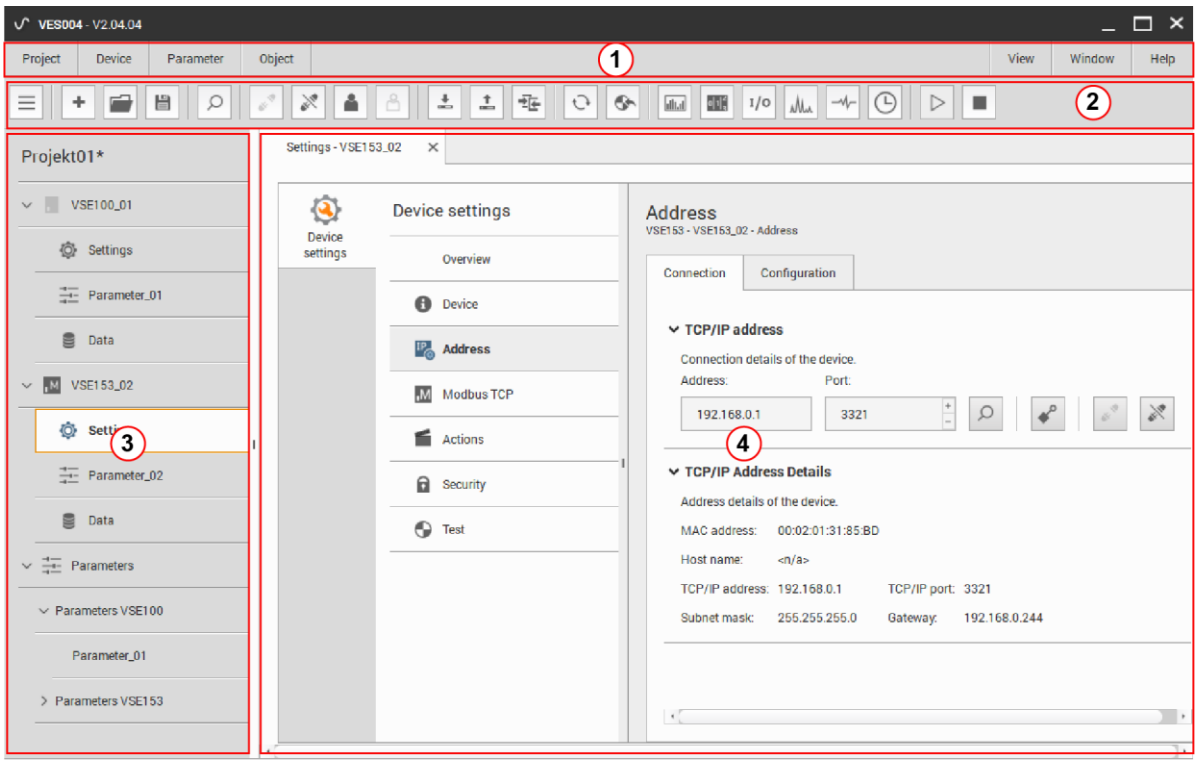
1. Open the installation folder
2. Double-click on "VES004.exe"

5 User interface

Content

26112

The chapter "User interface" describes the graphical user interface of the software.
The user interface is divided into several areas:



Legend:
(1) Menu bar; → chapter **Menu bar** (→ p. 15)
(2) Tool bar; → chapter **Tool bar** (→ p. 16)
(3) Tree view; → chapter **Tree view** (→ p. 16)
(4) Detailed view; → chapter **Detailed view** (→ p. 17)

Additionally, a context menu can be used within the user interface. The context menu simplifies the use of the software.
→ chapter **Context menu** (→ p. 18)
→ chapter **Context menu functions** (→ p. 194)

5.1 Menu bar

26066

The menu bar (1) contains the most important functions of the software grouped together 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
→ chapter **Menü [Projekt]**

5.2 Tool bar

26107

The tool bar contains frequently used functions as symbols.

In the following cases the symbols are shown greyed:

- if they are not available for the selected element
- if they are not available in the current situation.

5.3 Tree view

26109

The tree view (3) contains the devices, parameters, settings, etc. that belong to a project. The elements are displayed in groups. You can open the detailed view of the elements by double clicking on them (→ Chapter **Detailed view** (→ p. 17)).

The tree view begins in the upper row with the project name.

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
  → chapter **Context menu** (→ p. 18)
  → chapter **Context menu functions** (→ p. 194)
- [Object] menu
  → chapter **Menü [Objekt]**

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

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 left mouse button pressed and move the mouse horizontally.

> The boundary line follows the mouse pointer.

► Release the mouse button at the desired 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

26015

The detailed view (4) 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.

26015

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

► Upload parameters to the device with **[Device] Menu > [Write to Device]** (→ p. 33).

To activate the device settings changed in **device settings** (e.g. IP address, password):

► Upload the device settings to the device with the switching functions in the settings tabs, e.g.: with **Menü [Gerät] > [Einstellungen]**

As soon as an element is selected in the tree view (i.e. marked 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 are accessible via separate tabs. The tabs are displayed above the detailed view.

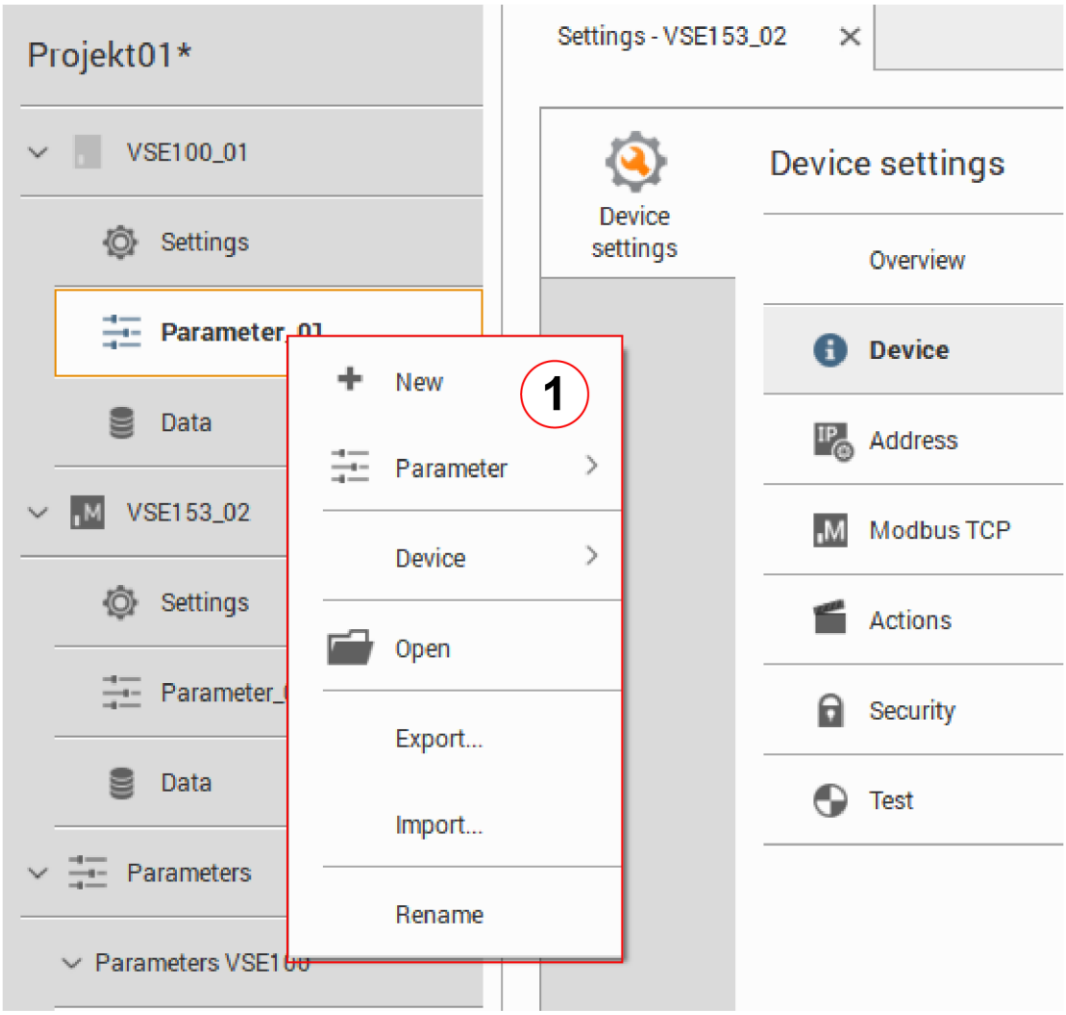
► To close a tab in the detailed view:
  • Click on the "x" (at the right edge of the tab)
  Or
  • [STRG]+[F4]

► To open a further tab in the detailed view:
  In the tree view:
  • Double-click on the required settings
  Or
  • Right-click on the required settings > [Open]

5.5 Context menu

25996

Most elements have a context menu ① from which functions can be selected.



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 onto the respective element with the 2nd (right) mouse button.
→ chapter **Context menu functions** (→ p. 194)

6 Connection (diagnostic electronics)

Content

25993

The chapter [Connection] describes how to create a connection between VES004 and a diagnostic electronics via Ethernet.

6.1 Network setting IP address range

26072

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 Factory setting parameters

26033

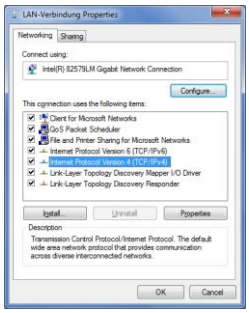
VSE diagnostic electronics - Parameters	Factory setting
Dynamic Host Configuration Protocol (DHCP)	off
IP-address / Port	192.168.0.1 : 3321
Subnet-mask	255.255.255.0

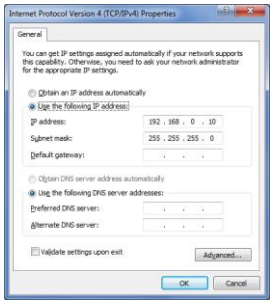
6.3 Verify and set the IP address of the PC

26114

Changes in the network settings of the PC require extended user rights.
In case of need, contact your system administrator.

- ► Activate the Windows menu [Internet Protocol Properties Version 4 (TCP/IPv4]:
  e.g. via [Start] > [System panel] > [Network and Sharing Center] > [Change adapter settings] > [Local Area Connection] > (right-click) > [Properties]
  (→ figure to the left)
- ► Button [Properties]
- ► Select the menu item [Use the following IP address]
- ► Verify and set the IP address, if necessary (here e.g. 192.168.0.10)
- ► Enter the subnet mask (255.255.255.0)
- ► Leave default gateway blank
  (→ figure to the right)
- ► Confirm the settings with [OK]





6.4 Connect to the device

Content

25991

Start the VES004 software on the PC

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

6.4.1 Create a new project

26007

► Choose either:
[Project] menu > [New...]
Or:

Left-click on the symbol [ ] (create new project)
Or:
[Strg]+[N]

► Enter a name for the project

► Confirm with [OK]

> The new project is created and opened.

Alternatively:

6.4.2 Open an existing project

26074

► Choose either:
[Project] menu > [Open...]
Or:

Left-click on the symbol [ ] (open project)
Or:
[Ctrl]+[O]

► Select the desired project from the list

► Confirm with [OK]

> The selected project is opened

6.4.3 Create a new device (VSE)

56635

In the open project:

► Choose either:
[Device] menu > [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 tab [Configuration] appears with the connection details of the device.

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

► Choose either:
[Device] menu > [Connect]
Or:
In the tree view, right-click on [VSEnnn_#] > left-click on [Connect]
Or:
Left-click on the symbol [ ] (connect the device)

> The software is connected to the diagnostic electronics

The element [Address] contains the following switching functions:

Symbol	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 monitor)

Content

25994

The chapter [Connection] describes how to create a connection between VES004 and a VNB vibration monitor via USB.

7.1 Install the USB driver

22014
26047

- For the connection of type VNB sensors to the parameter setting software a USB adapter cable (e.g. E30136) is necessary.
- For VNB sensors on the USB interface of the PC an own driver is necessary.

To install the USB driver administrator rights are necessary.

The USB driver is part of the VES004 software package:
directory = Driver\VNBxxx\ifm\

> 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.

7.2 Connect to the device

Content

25992

► 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 (→ below). On delivery no project is set up.

7.2.1 Create a new project

26008

► Choose either:
[Project] menu > [New...]
Or:

Left-click on the symbol [ ] (create new project)
Or:
[CTRL]+[N]

► Enter a name for the project

► Confirm with [OK]

> The new project is created and opened.

Alternatively:

7.2.2 Open an existing project

26075

► Choose either:
[Project] menu > [Open...]
Or:

Left-click on the symbol [ ] (open project)
Or:
[Strg]+[O]

► Select the desired project from the list

► Confirm with [OK]

> The selected project is opened

7.2.3 Create a new device (VNB)

56647

In the open project:

► Choose either:
[Device] menu > [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 tab [VNBnnn_#] opens in the detailed view

> Under the headline [Address] the tab [Configuration] appears with the connection details of the device.

> In the section [Connection] the serial number of the device last detected appears.

In case of a newly created vibration monitor this field is still empty.
In this case:

► Left-click on the symbol [ ](scan the USB ports for connected devices) to search and identify the vibration monitor.

► Choose either:
In the window [Found Devices], add the desired device to the project with a double-click.
Or:
In the window [Found Devices], select the desired device with a left-click.

Add the selected device to the project with a left-click on the symbol [ ] (update the project with the selected device).

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

► Choose either:
[Device] menu > [Connect]
Or:
In the tree view, right-click on [Device] > Left-click on [Connect]
Or:

Left-click on the symbol [ ] (connect the device)

> The software is connected to the vibration monitor

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

The element [Address] contains the following switching functions:

Symbol	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 monitor	[Device] > [Disconnect]

8 Menus

Content

26067

This chapter describes the menus. The menus can be reached via the **Menu bar** (→ p. 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 [Project] menu

Content

56661

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 reached via the **Menu bar** (→ p. 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 [Project] menu > [New...]

56876

Create a new project or Overwrite an existing project.

► Choose either:
[Project] menu > [New...]
Or:

Left-click on the symbol [ ] (create new project)

(a) Create a new project:

► Enter a new project name
Confirm with [OK]

> The new empty project is created and opened

(b) 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 [Project] menu > [Open...]

56912

Open a project:

► Either:
[Project] menu > [Open...]
or:

Left-click on the symbol [ ] (open project)
or:
[CTRL]+[O]

► Select a project name from the list

► Confirm with [Ok]

> The selected project is opened

56912

The program automatically stores the projects as well as the corresponding parameters and data in the following directory:
`C:\Users\Public\Documents\VES004`

8.1.3 [Project] menu > [Recent Projects]

25915

Lists the recently opened projects in reverse chronological order

Open a recent project:

► [Project] menu > [Recent Projects] > [Project name]

► Confirm with [OK]

> The selected project is opened

8.1.4 [Project] menu > [Close]

25910

Close the opened project.

(a) To close the project and save the changes:

► [Project] menu > [Close]

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

► Click [Yes].

(b) To close the project without saving the changes:

► [Project] menu > [Close]

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

► Click [No].

8.1.5 [Project] menu > [Save]

25919

Save the opened project.

► Either:
[Project] menu > [Save]
or:

Left-click on the symbol [ ] (save project)
or:
[CTRL]+[S]

> The project is saved under the current name.

25919

The program automatically stores the projects as well as the corresponding parameters and data in the following directory:
`C:\Users\Public\Documents\VES004`

8.1.6 [Project] menu > [Save as...]

25917

Save the opened project under a new name.
The memory location cannot be changed.

► [Project] menu > [Save as...]
► Enter a new project name
► Confirm with [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 [Project] menu > [Delete]

25911

Delete the opened project

> The function [ ] "Delete project" also deletes all parameter sets, data and documents contained in the project.

► [Project] menu > [Delete]

(a) To delete the opened project:
► Acknowledge the confirmation prompt with [Yes]
> The current project and all related parameters, data and documents will be deleted

(b) 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 [Project] menu > [Stop monitoring]

25921

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

- VES software is connected to the device via [ ]
- Configuration was transferred to the device via [ ]

Data is received

Stops the current monitoring measurement; new measurement values are no longer displayed.
→ chapter **Monitoring** (→ p. 177)

Requirement:

- Monitoring in progress

► Choose either:
Select menu [Project] > [Stop monitoring]
or:

Left-click on the symbol [ ] (Stop project data monitoring)

8.1.9 [Project] menu > [Start monitoring]

25920

Requirement:

- VES software is connected to the device via [ ]
- Configuration was transferred to the device via [ ]
- Data is received

Restarts the current monitoring. The new measurement values are displayed in the selected graph again.
→ chapter **Monitoring** (→ p. 177)

Requirement:

- Monitoring stopped

► Choose either:
Select menu [Project] > [Start monitoring]
or:

Left-click on the symbol [ ] (Start project data monitoring)

8.1.10 [Project] menu > [Save...]

25918

Create a backup copy of the opened project. Name and memory location are freely selectable.

► [Project] menu > [Save...]
► Define the name of the backup and the memory location in the dialogue window
► Acknowledge with [Save].

8.1.11 [Project] menu > [Restore...]

25916

Restore the backup copy of a project

► [Project] menu > [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 which was valid when the backup was created is indicated)

8.1.12 [Project] menu > [Quit]

25914

Close the project and quit the application

Before exit the application: save any changes to the project!

► Choose either:
[Project] menu > [Close]
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 [Device] menu

Content

56675

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** (→ p. 16).

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

8.2.1 [Device] menu > [New]

56788

The function [✚] "New device" creates a first new device in the opened 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.

[Device] Menu > [New] > [Vibration monitor]

58181

The program supports the following devices:

- Vibration monitor

and, connected to it:

- diagnostic unit VSE002...
- diagnostic unit VSE003...
- diagnostic unit VSE100...
- diagnostic unit VSE101...
- diagnostic unit VSE150 (PROFINET IO)
- diagnostic unit VSE151 (EtherNet/IP)
- diagnostic unit VSE152 (EtherCAT)
- diagnostic unit VSE153 (Modbus TCP)
- vibration sensor VNB001...
- vibration sensor VNB211...

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

[Device] menu > [New] > [Group]

56799

It can be useful to group different devices in a group.

[Device] menu > [New] > [Data group]

25872

It can be useful to group different data in a data group.

8.2.2 [Device] menu > [Connect]

25867

Prerequisite:
- in the tree view, the device (or the group of devices) is selected
- the device (or at least one device of the group) is connected
- the connection settings of PC and device correspond to the requirements

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

8.2.3 [Device] menu > [Disconnect]

25868

Prerequisite:
- in the tree view, the device (or the group of devices) is selected
- the device (or at least one device of the group) is connected to the program

The function [ ] "Disconnect" disconnects the selected device (or all devices of the selected group).

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

8.2.4 [Device] menu > [Login...] (VSE only)

25869

This applies only to VSEnnn:

Prerequisite:

- in the tree view, the device is selected
- VES software is connected to the device via [ ]

The function [ ] "Login..." changes the security level. The access rights of the user can be restricted through the security levels.
→ chapter **VSE > ... > [Security] > Tab [Access Rights]** (→ p. 71)
The access rights on the corresponding security level can be adapted
→ chapter **VSE > [VSEnnn_#] > Detail [Device Settings] > [Security]** (→ p. 70)

To change the security level a password may be required depending on the configuration. By default, no password is set. The passwords of the security levels can be adapted (→ chapter **VSE > ... > [Security] > Tab [Passwords]** (→ p. 70)).

8.2.5 Menu [Device] > [Logout] (only VSE)

25870

This applies only to VSEnnn:

Requirements:

- in the tree view, the device is selected
- VES software is connected to the device via [ ]
- the user is signed in

> The function [Logout] changes to security level 0. The function is only available if one of the security levels between 1 and 4 is active.
> → chapter **VSE > [VSEnnn_#] > Detail [Device Settings] > [Security]** (→ p. 70)

8.2.6 [Device] Menu > [Write to Device]

26062

Requirements:

- in the tree view, the device is selected
- VES software is connected to the device via [ ]

The function [ ] "Write to Device" uploads settings and parameters to the device.

26062

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

► Upload parameters to the device with **[Device] Menu > [Write to Device]** (→ p. 33).

To activate the device settings changed in **device settings** (e.g. IP address, password):

► Upload the device settings to the device with the switching functions in the settings tabs, e.g.: with **Menü [Gerät] > [Einstellungen]**

8.2.7 [Device] menu > [Read from Device]

25881

Prerequisite:

- in the tree view, the device is selected
- VES software is connected to the device via [ ]

The function [ ] "Read from Device" reads settings and parameters from the device.

8.2.8 [Device] menu > [Compare with Device...]

25866

Prerequisite:

- in the tree view, the device is selected
- VES software is connected to the device via [ ]

The function [ ] "Compare with Device..." compares the locally stored parameter set with the one of the device. Differences between the parameter sets will be indicated.

8.2.9 [Device] menu > [Scan Network...]

25888

Prerequisite:

- in the tree view, the device is selected

The function [ ] "Scan Network..." scans the local network for connected devices. The found devices are listed in a dialogue window in the tab [Found Devices], from where they can be added to the project via the symbol [ ].

This applies only to VSEnnn:
In the tab [Search Networks], further networks can be searched via the IP address and the IP address of the current network can be changed.

8.2.10 [Device] menu > [Parameter]

Content

56810

Prerequisite:

- in the tree view, the device is selected

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

[Device] menu > [Parameter] > [Open]

25879

Prerequisite:

- in the tree view, the device is selected

The function [ ] "Open parameter" opens the parameters of the selected device.
The parameters appear in the detailed view under a tab.

[Device] menu > [Parameter] > [New]

25878

Prerequisite:

- in the tree view, the device is selected

The function [ ] "New parameter" creates a new parameter set.
The program assigns this parameter set to the selected device.

[Device] menu > [Parameter] > [Assign]

25876

Prerequisite:

- in the tree view, the device is selected

The function [Assign parameter] assigns the selected parameter set to a device.

[Device] Menu > [Parameter] >[Write to Device]

26064

Requirements:

- in the tree view, the device is selected
- VES software is connected to the device via [ ]

The function [ ] "Write to Device" uploads settings and parameters to the device.

26064

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

► Upload parameters to the device with **[Device] Menu > [Write to Device]** (→ p. 33).

To activate the device settings changed in **device settings** (e.g. IP address, password):

► Upload the device settings to the device with the switching functions in the settings tabs, e.g.: with **Menü [Gerät] > [Einstellungen]**

[Device] menu > [Parameter] > [Read from Device]

25880

Prerequisite:

- in the tree view, the device is selected
- VES software is connected to the device via [ ]

The function [ ] "Read from Device" reads settings and parameters from the device.

[Device] menu > [Parameter] > [Compare with Device]

25877

Prerequisite:

- in the tree view, the device is selected
- VES software is connected to the device via [ ]

The function [ ] "Compare with Device..." compares the locally stored parameter set with the one of the device. Differences between the parameter sets will be indicated.

8.2.11 [Device] menu > [Settings]

Content

56821

The submenu [Settings] covers all functions for the settings management.

[Device] menu > [Settings] > [Open]

25890

Prerequisite:

- in the tree view, the device is selected

The function [ ] "Open Settings" opens the settings of the selected device.
The settings are displayed in the detailed view under a tab.

[Device] menu > [Settings] > [Write IP Settings to Device] (VSE only)

25893

This applies only to VSEnnn:

Prerequisite:

- in the tree view, the device is selected
- VES software is connected to the device via [ ]

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

[Device] menu > [Settings] > [Write Access Rights to Device]

25892

Prerequisite:

- in the tree view, the device is selected
- 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 function [ ] "Write Access Rights to Device" writes the configured access rights to the device.

[Device] menu > [Settings] > [Read Access Rights from Device]

25891

Prerequisite:

- in the tree view, the device is selected
- 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 function [ ] "Read Access Rights from Device" reads the access rights from the device.

8.2.12 [Device] menu > [Actions]

Content

56832

Prerequisite:

- in the tree view, the device is selected
- VES software is connected to the device via [ ]

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

[Device] menu > [Actions] > [Write Firmware to Device] (VSE only)

25865

This applies only to VSEnnn:

> Beforehand, save parameters, settings and history!
> Otherwise the data will be lost during the update of the firmware.

The function [ ] "Write Firmware to Device" writes a new firmware to the diagnostic electronics.
The firmware file is selected from a file window.

> ► Always secure the voltage supply and connections between the PC and the diagnostic electronics while the firmware is being written to the device.
> > Otherwise the diagnostic electronics may be damaged and may have to be returned to the manufacturer.

[Device] menu > [Actions] > [Reboot] (VSE only)

25862

This applies only to VSEnnn:

The function [ ] "Reboot" reboots the diagnostic electronics.

[Device] menu > [Actions] > [Self-test]

25863

Applies only to type MEMS (VSA) sensors!
For IEPE sensors only wire-break test!

The function [ ] "Self-test" carries out a self-test of the sensors connected to the dynamic inputs.

[Device] menu > [Actions] > [Teach-in]

25864

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

8.2.13 [Device] menu > [Reset] (VSE only)

Content

56843

This applies only to VSEnnn:

Prerequisite:

- in the tree view, the device is selected
- VES software is connected to the device via [ ]

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

[Device] menu > [Reset] > [Counter]

25883

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

[Device] menu > [Reset] > [History]

25885

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

[Device] menu > [Reset] > [Parameter]

25886

The function [ ] "Reset Parameter" deletes the parameter set stored on the device.

[Device] menu > [Reset] > [Security]

25887

The function [ ] "Reset Security" resets the internal access rights of the device.

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

[Device] menu > [Reset] > [Factory Settings]

25884

The function [ ] "Factory Settings" restores the factory setting of the device.

Restoring to the factory settings requires security level 4. The function [Factory Settings] does not reset the IP settings.

8.2.14 [Device] menu > [Online Data]

56776

Prerequisite:

- in the tree view, the device is selected
- VES software is connected to the device via [ ]

The submenu [Online Data] comprises the monitoring of all measured data of the device. Depending on the device type different monitoring data can be accessed (→ chapter **Monitoring types**):

This applies only to VSEnnn:
e.g. raw signal (time signal), processed data (e.g. frequency spectra or object values)

This applies only to VNBnnn:
data, I/O, history

8.3 [Parameter] menu

Content

56698

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

In the [Parameter] menu, parameters are created or written to/read from the device.
The [Parameter] menu can be reached via the **Menu bar (→ p. 15).**

8.3.1 [Parameter] menu > [New]

25907

Prerequisite:

- in the tree view, one of the following options is selected:
  [Device_#],
  [Parameter_#]

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

8.3.2 [Parameter] menu > [Device]

56764

Prerequisite:

- in the tree view, the parameter set [Parameter_#)] is selected

The submenu [Device] > [Assign] assigns the selected set of parameters to a device.

8.3.3 [Parameter] Menu > [Write to Device]

26065

Requirements:

- in the tree view, the parameter set [Parameter_#)] is selected
- VES software is connected to the device via [ ]

The function [ ] "Write parameters to Device" uploads the parameter set to the device.

26065

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

► Upload parameters to the device with **[Device] Menu > [Write to Device]** (→ p. 33).

To activate the device settings changed in **device settings** (e.g. IP address, password):

► Upload the device settings to the device with the switching functions in the settings tabs, e.g.: with **Menü [Gerät] > [Einstellungen]**

8.3.4 [Parameter] menu > [Read from Device]

25908

Prerequisite:

- in the tree view, the device is selected
- VES software is connected to the device via [ ]

The function [] "Read Parameters from Device" reads settings and parameters from the device to the parameter setting software.

8.4 [Object] menu

Content

56709

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 reached via the **Menu bar (→ p. 15).**

8.4.1 What are objects?

26328

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

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

8.4.2 [Object] menu > [New]

25902

Prerequisite:

- in the tree view, the [Data] of the device is selected

The function [+] [New Object] creates a new datagroup in the tree view.

Prerequisite:

- in the tree view, a group is selected

The function [+] [New Object] creates a new object in the tree view alternatively
• a new group
• a new datagroup

8.4.3 [Object] menu > [Open]

25903

Prerequisite:

- in the tree view, one of the following options is selected:
  [Settings],
  [Parameter_#]

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

8.4.4 [Object] menu > [Import]

25901

Prerequisite:

- in the tree view, one of the following options is selected:
  [VNBnnn_#],
  [VSEnnn_#],
  [Parameter_#],
  [Data]

The function "Import Object" imports objects from a file into the active project in the tree view:

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

8.4.5 [Object] menu > [Export]

25900

Prerequisite:

- in the tree view, one of the following options is selected:
  [VNBnnn_#],
  [VSEnnn_#],
  [Parameter_#],
  [Data]

The function "Export Object" exports objects from the tree view into a file:

Device file:	*.idev
Settings file:	*.iset
Parameters file:	*.ipar, *.xpar

8.4.6 [Object] menu > [Rename]

25904

Prerequisite:

- in the tree view, one of the following options is selected:
  [VNBnnn_#],
  [VSEnnn_#],
  [Parameter_#]

► To rename an object:
Choose either:
Function "Rename Object"
Or:
Key [F2]

> The name of this object is selected for editing

► Change the object name

► Confirm the change with [ENTER]
Or:
Cancel the change with [ESC]

8.4.7 [Object] menu > [Delete]

25899

Prerequisite:

- in the tree view, one of the following options is selected:
  [VNBnnn_#],
  [VSEnnn_#],
  [Parameter_#]

	Assigned objects cannot be deleted.

► To delete the selected object:
Choose either:

Function [] "Delete Object"
Or:
Key [DEL]

> The confirmation prompt appears

► After [Yes]: the selected object is deleted from the tree structure
After [No] or key [ESC]: the object is not deleted

8.5 [View] menu

Content

56731

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

In the [View] menu you can manage the language and unit settings.
The [View] menu can be reached via the **Menu bar** (→ p. 15).

8.5.1 [View] menu > [Language]

25923

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

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

> The query appears whether the preset object names are to be displayed in the selected language as well.

> If [Yes]: all preset object names are displayed in the selected language.
The previously manually changed object names remain unchanged.

8.5.2 [View] menu > [Settings]

Content

25924

The function [⚙] "Settings" contains the following setting options:

[View] Menu > [Settings] > Tab [Common]

58182

Section	Dialogue element	Display	Switching function
Common settings	Automatically open the last opened project	Checkbox	activate / deactivate
Colour theme	Colour theme	selected colour scheme: ▪ Light ▪ Dark	selectable from list
Application scaling	Application scaling	selected scaling for GUI: ▪ Smaller ▪ Normal (Default) ▪ Bigger	Select an option

[View] menu > [Settings] > Tab [Display units]

25926

Engineering units displayed for...
- distance | speed | acceleration
- frequency | rotational speed

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

[View] Menu > [Settings] > Tab [Monitoring]

26059

Section	Dialogue element	Display	Switching function
Auto-scaling default behavior	Standard	selected setting: • Damage and warning limits • Data values	selectable from list

Section	Dialogue element	Display	Switching function
Display settings storage	Activate storage of the data display settings	checkbox	activate/deactivate
	Reset stored monitoring display settings to their corresponding default values	selected setting: • all display settings • only online monitoring • only data recordings	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

Switching functions:

	Reset data display to the standard settings

[View] Menu > [Settings] > Tab [Project monitoring]

26058

Section	Dialogue element	Display	Switching function
Standard behaviour	Standard	selected setting: • on • off	selectable from list
Data to be displayed	• Objects • Counters • Alarms • Inputs	checkbox	activate/deactivate
Fast objects	Enable project monitoring for fast diagnosis objects	checkbox	activate/deactivate

Menu [View] > [Settings] > Tab [Import]

58183

Section	Dialogue element	Display	Switching function
Legacy import	Keep parameter names	Checkbox	activate / deactivate

In case of activated Legacy import: switches the previous parameter name conversion off and maintains the original names.

[View] menu > [Settings] > Tab [Data export]

25925

Section	Dialogue element	Display	Switching function
Decimal count (all formats)	Decimal count	configured value	increase / reduce value
Float number format (CSV, XML)	Decimal point	selected setting: • dot • comma	selectable from list

Section	Dialogue element	Display	Switching function
	Digit grouping	selected setting: • none • comma • 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
Column separator (for CSV files)	Separator	selected setting: • semicolon • comma • tabulator	selectable from list

REMARKS

Element	Value	Description
Flag and time stamp:	deactivated	value is displayed in a form optimised for computer-aided evaluation
	activated	value is displayed in a form readable for humans (several versions available)

[View] Menu > [Settings] > Tab [VSExxx]

26061

Section	Dialogue element	Display	Switching function
Signal weighting	Activate signal weighting	checkbox	activate/deactivate
Custom filters	Activate custom filters	checkbox	activate/deactivate
Ethernet protocol for data monitoring	• TCP (standard)	selected setting	select an option
	• UDP		select an option

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).

[View] Menu > [Settings] > Tab [Diagnostics]

26060

Parameters for recording the self-diagnostics of the software.

Section	Dialogue element	Display	Switching function
Level of the diagnostic information	Error Messages	checkbox	activate/deactivate
	Warning Messages	checkbox	activate/deactivate
	Information Messages	checkbox	activate/deactivate
	Debug information	checkbox	activate/deactivate
Trace to file	Maximum file size	configured value	increase / reduce value
	Max. number of backup files	configured value	increase / reduce value

Section	Dialogue element	Display	Switching function
	Storage folder	configured path	---

Note on [Debug information]:
This function may lead to unreliable communication between the devices on slow PCs.

8.6 [Window] menu

Content

56742

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 reached via the **Menu bar** (→ p. 15).

8.6.1 [Window] menu > [Tile]

25931

Prerequisite:

- setting: [Window] > [View] > [Several Windows]

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

8.6.2 [Window] menu > [Overlap]

25930

Prerequisite:

- setting: [Window] > [View] > [Several Windows]

The function "Overlap Windows" arranges opened windows in the detailed view so that they overlap.

8.6.3 [Window] menu > [View]

25932

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

- [Several Windows]
  = for each selected object an own window
  • all selected windows in the detailed view are visible at the same time
  • if several windows: either side by side or overlapping
- [Tabs]
  = tabs for all selected objects
  • only the content of the active tab is visible

8.6.4 [Window] menu > [Close]

25929

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

8.6.5 [Window] menu > [Close All]

25928

Close all windows and tabs in the detailed view.

8.6.6 [Window] menu > [Window]

25933

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

► Activate the desired objects.

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

8.7 [Help] menu

58184

The [Help] menu includes the following functions:

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

9 Configure VSEnnn

Content

26327

For the type VSE diagnostic electronics, the following elements are available.

Add new device to a project: → chapter **Menü [Gerät] > [Neu...]**

9.1 VSE > Device [VSEnnn_#] > [Settings]

Content

56854

This chapter describes the functions contained in the device [VSEnnn_#].
The device [VSEnnn_#] can be reached via the **Tree view** (→ p. 16).

9.1.1 VSE > [VSEnnn_#] > Detail [Device Settings]

Content

22191

The detail [Device Settings] 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 detail [Device Settings] contains the following elements:

- Overview
- Device
- Address
- This applies only to VSE15n: Fieldbus (name of the actual fieldbus)
- Actions
- Safety
- Test

VSE > [VSEnnn_#] > Detail [Device Settings] > [Overview]

58185

The [Overview] shows the following information:

- Type (article number)
- Hardware version
- Serial number
- MAC address
- Firmware version
- This applies only to VSE15n: version of the core firmware
- This applies only to VSE15n: 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.

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

26320

The element [Device] contains the following sections:

VSE > ... > [Device] > Tab [Configuration]

26208

This section holds information about the diagnostic electronics and the current connection status. You can also update the firmware and assign a different parameter set.

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

Section	Dialogue element	Display	Switching function
Diagnostic electronics	Type	Article number	---
	Version	Hardware version	
	Connection	Status: busy / connected / not connected	
	Serial number	Hardware serial number	
	MAC address	IP hardware address	
	System mode	Status: monitoring / set-up / not connected	
Write firmware to device	Firmware version	Current firmware version	
Language / character chart	Character chart	inly for VES002, VSE100 if project import from VES003	Select from list box

Switching functions:

	Write firmware to device

VSE > [VSEnnn_#] > Detail [Device Settings] > [Address]

26319

The element [Address] contains the following sections:

VSE > ... > [Address] > tab [Connection]

58186

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:

	scan the network for connected devices
	Calling up the connection assistant
	Connect the device
	Disconnect the device

	Transfer the TCP/IP settings to the device

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

26191

In this section, the TCP/IP address can be configured and loaded to the device.
The assistant supports the assignment of the address.
Alternatively, the address of the device can be changed manually.

Section	Dialogue element	Display	Switching function
Assistant	Button	Starting the address assistant	
Changing the TCP/IP settings via the 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	options: • Static IP address • Get 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	
Changing TCP/IP settings via the connected device	Button	Write the TCP/IP settings of the device.	
	Option field	options: • Static IP address • Get 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 assistant

	Transfer the TCP/IP settings to the device

- Static IP address:
  The TCP/IP address and the other network-specific parameters (port, subnet mask and gateway) are permanently stored in the device.
  The TCP/IP address together with the port must be unique within the network! Otherwise, the participants cannot communicate with each other in the network.
- Dynamic Host Configuration Protocol, dynamic IP address DHCP
  If the IP address is to be handled dynamically by a DHCP server, only the name (host name) and TCP/IP port need to be specified in the diagnostic electronics. The DHCP server must also be configured! This configuration does not allow direct communication (point-to-point) with a PC/notebook.

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

Content

26321

In this context, [Fieldbus] represents the concrete fieldbus type of the selected device.
The element [Fieldbus] contains the following sections:

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

26259

This applies only to VSE150:

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

26220

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

Section	Dialogue element	Display	Switching function
PROFINET IO configuration	Device Name	Choose either: • configured value • value read by the device	free text (usually provided by the host PLC)
	IP address	Choose either: • configured value • value read by the device	(usually provided by the host PLC)
	Subnet mask	Choose either: • configured value • value read by the device	(usually provided by the host PLC)
	Gateway	Choose either: • configured value • value read by the device	(usually provided by the host PLC)
	MAC address	value read by the device	---

Switching functions:

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

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

26219

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

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

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

26257

Only applies to VSE151:

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

26214

This section shows EtherNet/IP information about the diagnostic electronics (valid in the EtherNet/IP network).

Section	Dialogue element	Display	Switching function
EtherNet/IP configuration	Device name	Options: • configured value • value read by the device	free text (usually provided by the host PLC)
	Enable DHCP	Checkbox	activate / deactivate
	IP address	Options: • configured value • value that is read by the device	(usually provided by the host PLC)
	Subnet mask	Options: • configured value • value read by the device	(usually provided by the host PLC)
	Gateway	as option: • configured value • value read by the device	(usually provided by the host PLC)
	MAC Address	value read by the device	---

Switching functions:

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

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

26213

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

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

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

58187

Only applies to VSE152:

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

58189

This section gives information about the current connection status (valid in the EtherCAT network).

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

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

26258

Only applies to VSE153:

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

26217

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	IP address	as option: • configured value • value read by the device	(usually provided by the host PLC)
	Subnet mask	as option: • configured value • value read by the device	(usually provided by the host PLC)
	Gateway	as option: • configured value • value read by the device	(usually provided by the host PLC)
	Port	as option: • configured value • value read by the device	(usually provided by the host PLC)
	MAC address	value read by the device	---

Switching functions:

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

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

26216

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

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

Fieldbus data

54596

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 alarm 2: damage alarm 3: inactive 4: error (description: see Error)
	Error	Word	2 bytes	Error code for object state Hex0000: no error Hex0001: internal error Hex0002: calculation error Hex0004: speed out of range Hex0008: speed unstable 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 alarm Hex2000: damage alarm Hex8000: object inactive (by variant)
	Rotational speed	Real	4 bytes	Trigger - rotational speed
	Reference value	Real	4 bytes	Trigger - reference value
	Warning alarm	Real	4 bytes	Limits - warning alarm (relative)
	Damage alarm	Real	4 bytes	Limits - damage alarm (relative)
	Base line	Real	4 bytes	Limits - base line in SI unit (m/s², m/s)
Frequency domain				
<object name>				

Input (PLC)				
	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 alarm 2: damage alarm 3: inactive 4: error (description: see Error)
	Error	Word	2 bytes	Error code for object state Hex0000: no error Hex0001: internal error Hex0002: calculation error Hex0004: speed out of range Hex0008: speed unstable 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 alarm Hex2000: damage alarm Hex8000: object inactive (by variant)
	Rotational speed	Real	4 bytes	Trigger - rotational speed
	Reference value	Real	4 bytes	Trigger - reference value
	Warning alarm	Real	4 bytes	Limits - warning alarm (relative)
	Damage alarm	Real	4 bytes	Limits - damage alarm (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 alarm 2: damage alarm 3: inactive 4: error (description: see Error)

Input (PLC)				
	Error	Word	2 bytes	Error code for object state Hex0000: no error Hex0001: internal error Hex0002: calculation error Hex0004: speed out of range Hex0008: speed unstable 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 alarm Hex2000: damage alarm Hex8000: object inactive (by variant)
	Rotational speed	Real	4 bytes	Trigger - rotational speed
	Reference value	Real	4 bytes	Trigger - reference value
	Warning alarm	Real	4 bytes	Limits - warning alarm (relative)
	Damage alarm	Real	4 bytes	Limits - damage alarm (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 bit 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 counter	DInt	4 bytes	Overflow counter of the fieldbus communication

Input (PLC)				
	Checksum error counter	DInt	4 bytes	Checksum error counter of the fieldbus communication

Output (PLC)				
External inputs				
	<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				
	Variant	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, always UTC, format: - VSE150: U32: 0x00ssmmhh - VSE151: U32: 0x00hhmmss - VSE152: U32: 0x00hhmmss - VSE153: U32: 0x00hhmmss
	Set counter ID	Byte	1 byte	Set ID (1...32) of the counter
	Set counter value	DInt	4 bytes	Set value of the counter selected with the ID (in seconds)

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

Content

26318

Prerequisite:

- VES software is connected to the device via [ ]

The element [Actions] contains the following sections:

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

26192

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: Wire-break detection
Carry out teach-in	---		Start teach-in for the selected objects of the parameter set (only possible for objects with activated 'auto-teach' option).
Set counter values	---		Set counter values to a certain value.

VSE > ... > [Actions] > Tab [Variant Switching]

26193

You can use variants if you want to monitor certain objects only in defined machine states and where this cannot be solved via triggers.
(→ chapter **VSE > [Parameter_#] > Detail [Variants]** (→ p. 110))

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]

26190

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

Section	Dialogue element		Switching function
Reset the counter	---		Set 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 parameters	---		Delete parameter set

Section	Dialogue element		Switching function
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! Restoring all factory settings The connection settings (TCP/IP address, port, subnet mask, gateway) are exempt from this.
Resetting passwords	---		Reset all configured passwords, authorisation levels and access rights.

VSE > [VSEnnn_#] > Detail [Device Settings] > [Security]

Content

26322

Requirements to change the security parameters:

- VES software is connected to the device via [ ]
- user is logged in via [ ]

► Change password:

log in to the device via [ ] with at least the security level which is to be changed.

► Change access rights:

log in to the device via [ ] with a higher security level than that which is to be changed.

The element [Security] contains the following sections:

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

26222

Under the tab [Passwords] 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 to 3 under the tab [Access Rights].
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 to the device via [ ] 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 password	
	...	...	...
	Password: security level	New: enter new password	
		Confirmation: repeat password	
Connect / log in	Current status:	Not connected Security level # (not logged in] Security level #	, , ,

Switching functions:

	save new password

	connect the device
	disconnect the device
	log in to the device, to do so select security level
	disconnect the device

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

26221

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

- Write parameters
- Carry out teach-in
- Change IP settings
- Reboot the device
- Reset the counter

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

► Change access rights:

log in to the device via [ ] 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 at the next lower level will change to [not allowed], but it can be changed (=)
  for all lower levels, the access right stays [not allowed] and cannot be changed (=)

Section	Dialogue element	Display	Switching function
Access Rights	Read parameters:	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, can be changed
	Write parameters:		
	Carry out teach-in:		
	Read data:		
	Read spectrum:		
	Read history:		
	Delete history:		
	Adapt dyn. inputs:		
	Read external inputs:		
	Write external inputs:		
	Test (OUT/LED):		
	Changing variants:		
	Changing IP settings:		
	Rebooting the device:		
	Resetting the counter		
Connecting / signing in	Current status:	not connected Security level # (not logged in) Security level #	, , , , ,

Switching functions:

	Write access rights to device
	Read access rights from device
	connect the device
	disconnect the device
	sign in to the device. To do so, select security level
	sign off from the device

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

26323

Prerequisite:

- VES software is connected to the device via [ ]

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

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

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

To terminate the test mode:

► Deactivate [Test Outputs] AND

► Deactivate [Test LEDs]

> A confirmation message appears

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

The element [ ] "Device Test" contains the following sections:

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

26226

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 (VES100 only)	I/O #	0 / 1	specify manually the digital status

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

26225

Section	Dialogue element	Display	Switching function
LEDs	Sensor #	green yellow red OUT	specify manually the digital status

Section	Dialogue element	Display	Switching function
	System	green yellow red OUT	specify manually the digital status

9.2 VSE > device [VSEnnn_#] > [Parameter_#]

Content

56865

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

The object [Parameter_#] is assigned to the object [VSEnnn_#].
The object [Parameter] can be reached via the **Tree view** (→ p. 16).

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

► Display the parameter set:
In the tree view, double-click on the desired parameter set: [Parameter_#]

The following information is displayed in the detailed view under the [Parameter_#] tab:
Common Configuration
- Inputs
- Triggers
- Objects
- Variants
- Counters
- History
- Alarms

9.2.1 VSE > [Parameter_#] > Detail [Common Configuration]

Content

26294

The detail [Common Configuration] includes the following elements:

- Overview
- supported devices
- Documentation
- Device information
- assigned devices

VSE > ... > Detail [Common Configuration] > [Overview]

58190

The element [Overview] 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 modification	---
Parameter set	Name:	current name, e.g.: "Parameter_01"	overwrite the preset name

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

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

26250

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 octavis diagnostic electronics was already selected when creating the parameter set.

The element [Supported Devices] contains the following sections:

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

26224

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

The [Supported Device Types] indicate 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.

VSE > ... > Detail [Common Configuration] > [Documentation]

26249

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 element [Documentation] contains the following sections:

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

26209

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

Section	Dialogue element	Display	Switching function
Application	Company:	free text	---
	Address:	free text	---
	City:	free text	---
	Location:	free text	---
	Machine:	free text	---

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

26210

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
	Date of creation:	date of creation	date later / earlier
	Last change:	date of the last modification	automatic
	Description	free text	max. 100 characters

VSE > ... > Detail [Common Configuration] > [Device Information]

Content

26248

The element [Device Information] contains a summary or overview of the configuration of the inputs and outputs of the diagnostic electronics. Here you will also find an overview of the dependencies between the triggers and objects defined in the parameter set.

The element [Device Information] contains the following sections:

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

26206

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	use, information	⚙
	OUT 2	use, information	

Switching functions:

⚙	configure the selected object

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

22239

This applies only to VSE100 / VSE101:

Indicates the digital I/Os of the diagnostic unit 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	use, information	
	I/O 3	use, information	
	I/O 4	use, information	
	I/O 5	use, information	
	I/O 6	use, information	
	I/O 7	use, information	
	I/O 8	use, information	

Switching functions:

⚙	configure the selected object

VSE > ... > [Device Information] > Tab [Trigger Dependencies]

56923

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 functions:

	configure the selected object

VSE > ... > [Device Information] > Tab [Object Dependencies]

56934

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	
	Type	parameter type	
	Use	use of the parameters	
	Source	name of the trigger	

Switching functions:

	configure the selected object

VSE > ... > Detail [Common Configuration] > [Assigned Devices]

26247

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 element [Assigned Devices] contains the following sections:

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

26196

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 n.	read serial number of the device	

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

Content

56945

In addition to the analogue and sensor inputs, the element [Inputs] also shows 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.

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

58191

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

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	
	Scaling	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	
	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 shows only an overview.

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

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

26265

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") 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 different sensor types differ in the following aspects:

• monitoring of dynamic (AC) signals

- monitoring of static (DC) signals
- 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	
	Scaling	configured scaling of the sensors	
	Filter	configured filter setting of the sensor	

Switching functions:

	activate dynamic input
	deactivate dynamic input
	configure the selected object

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

Content

26266

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 default name [Sensor #].

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

► Dynamic inputs are activated with the [] button.

The element [Sensor #] contains the following sections:

VSE > ... > [Dynamic Inputs (AC)] > [Sensor #] > Tab [Configuration]

22255

Section	Dialogue element	Display	Switching function
Identification	Name	configured name for the sensor	---
	Type	sensor type selected from list	selection list

The display in the configuration section depends on the selected sensor type.
Please refer to the data sheet for the scaling and the unit of the sensor.

Type	Note	Scaling / Sensitivity	Unit
VSA001/2/4/5/6	fixed specification	25	g
VSA003	fixed specification	17.5	g
VSA101	fixed specification	3.3	g
VSA201	fixed specification	250	g
VSP01A/VSP02A/VSP001	---	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)
VSM001	Separate setting for each axis in the section [Wiring].	free	mV/g
VSM101	Separate setting for each axis in the section [Wiring].	free	mV/g
direct current	• supported for hardware version "AI" and higher of the diagnostic electronics and for firmware version 0.10.0 and higher • Default: 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
120...600 min^{-1}	2 Hz high pass	---
> 600 min^{-1}	10 Hz high pass	supported from hardware version "AI" of the diagnostic electronics and firmware version 0.6.0

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

Section	Dialogue element	Display	Switching function
Wiring	X-axis (brown) is connected to	Input of the diagnostic unit for the sensor output of the X-axis value	Selection list
	Y-axis (grey) is connected to	Input of the diagnostic unit for the sensor output of the Y-axis value	Selection list
	Z-axis (white) is connected with: (only with VSM101)	Input of the diagnostic unit for the sensor output of the Z-axis value	Selection list
	Scaling	Scaling / sensitivity	Input field

If sensor type = DC current signal

26043

Section	Dialogue element	Display	Switching function
Configuration	Filter	unfiltered	---
	Unit	rpm	free text
	Scaling	according to data sheet / formula	increase / reduce value
	Offset	according to data sheet / formula	increase / reduce value
Lower reference point	Current	4.00 mA	---
	Value	0.00 rpm	increase / reduce value
Upper reference point	Current	20.00 mA	---
	Value	10000.00 rpm	increase / reduce value

Formula for scaling:

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

Legend:
v_{min} smallest measured value
v_{max} largest measured value
i_{min} smallest current signal
i_{max} largest current signal

Formula for offset:

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

Legend:
v_{min} smallest measured value
v_{max} largest measured value
i_{min} smallest current signal
i_{max} largest current signal

Example scaling + offset

26028

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)

26044

Section	Dialogue element	Display	Switching function
Configuration	Filter	• unfiltered • highpass 2 Hz • highpass 10 Hz	selection list
	Unit		free text
	Scaling	according to formula → sensor type DC current signal	increase / reduce value

Example scaling

26027

External sensor with the following values:
- current signal of 4…20 mA
- measuring range 0…2.5 bar

Using a resistance (250 Ω) connected in parallel you will receive an input current for the dynamic input of the diagnostic electronics of 2...10 mA.
The scaling to be entered is calculated as follows:

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

VSE > ... > [Dynamic Inputs (AC)] > [Sensor #] > Tab [Self-test]

26212

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

The interval is always valid for all sensors.
The interval cannot be set separately for each sensor.

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

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.

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

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

22259

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 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 with the 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 default 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:

	activate selected analogue input
	deactivate selected analogue input
	configure the selected object

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

26264

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

► Analogue inputs are activated with the [] button.

The element [IN #] contains the following sections:

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

26195

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

The section [Identification] 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 types) of the connected sensor.

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

Default settings:

Input type	Reference	Value
Analogue - Current	4...20 mA	0...10000 rpm

Input type	Reference	Value
Analogue - Voltage (only visible for VSE100 / VSE101)	0...10 V	0...10000 rpm
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 % rot
Digital - Level	---	0 rpm / 10000 rpm

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

26194

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

For the engineering unit the following applies:

► See in the data sheet of the connected sensor
Or:
Identify the signal, e.g. "min-1" for rotational speed.

The other parameters scale the signal.

The displayed parameters and data depend on ...
- the configured input type
- the configured unit

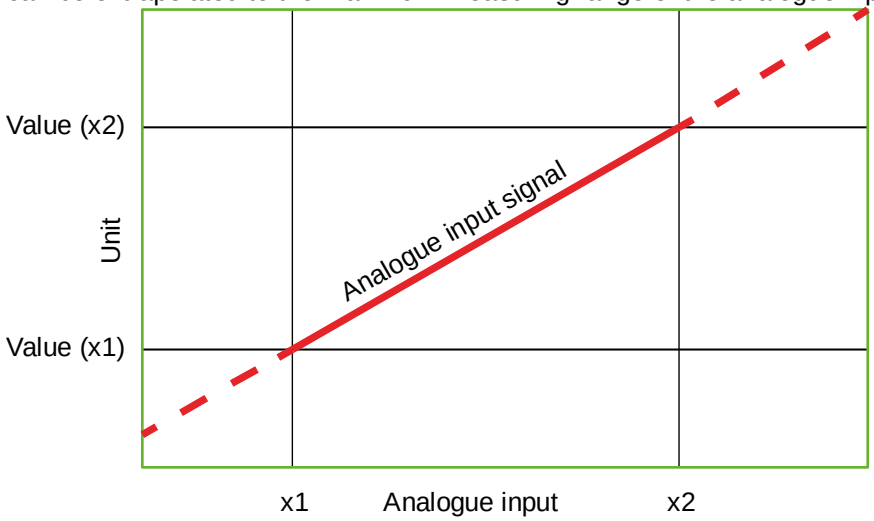
Section	Dialogue element	Display	Switching function
Unit	Unit	configured unit, e.g. rpm	free text
Lower reference point	Current	4.00 mA	increase / reduce value
	Voltage	0.00 V	increase / reduce value
	PWM	10 %	increase / reduce value
	Value	0.00 rpm	increase / reduce value
Upper reference point	Current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

Configured input types

25990

- Analogue - Current
  Analogue - Voltage
  Digital - PWM
  Digital - VE113A:
  With these types the signal is set up using 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 monitoring of pulses per time interval.
  If used for pulse counting, the interval is not relevant.
- Digital - Pulse:
  For 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:
  If this type is selected, 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).

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

26267

External inputs are a virtual extension of the analogue inputs. The value for the external input is transmitted digitally via the TCP/IP interface of the diagnostic electronics. This can for example be done via the OPC interface (→ ifm OPC server, → chapter **Variant switching via OPC** (→ p. 114)).

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 default name [External_#].

► 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 ...]

> In the detailed view a new line appears with the preset values.

Section	Dialogue element	Display	Switching function
External inputs	ID	01	can be assigned to any free ID (01...24)
	Name	Extern_#	# 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]

26215

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

The object [External_#] contains the following sections:

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

Change name:

► highlight 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 / reduce 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.

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

Content

26314

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.

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

58192

The detailed view [Overview] contains 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

Trigger types

26110

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

Analogue input trigger

25983

- Prerequisite:
  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 a rotational speed signal)
  - runtime counter, analogue
  - as a reference value

Dynamic input trigger

26018

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

External input trigger

26032

- Prerequisite:
  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 a rotational speed signal)
  - runtime counter, analogue
  - as a reference value

Constant speed trigger

25995

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

Creating a trigger

22591

► Highlight [Triggers] 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.

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

26278

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

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

26280

The section [Identification] 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]

26279

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

The checkbox [Use as rotational speed signal] defines the operating principle of the trigger:
- activated = trigger as rotational speed signal for an object for frequency-selective monitoring
- deactivated = as trigger of the reference value

If used to control a counter "Runtime - analogue" 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 measurement 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 / reduce value
	To:	configured upper value (e.g. rotational speed)	increase / reduce value
Constant speed	Rotational speed::	configured rotational speed	increase / reduce value

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

Content

26293

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

► To do so, activate the custom filters in **[View] Menu > [Settings] > Tab [VSExxx]** (→ p. 49).

> After that, the custom filters will be listed in the detailed view [Overview] (if there are any).

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

58193

The [Overview] shows 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 range	
	assigned objects	assigned time domain object	

Switching functions:

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

VSE > ... > Detail [Custom filters] > import user defined filters

26243

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

► Import filters:
Highlight [Custom filters] in the tree of the detailed view.
Right-click in the empty area of the detailed view

► Click on one of the following menu points 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 field
Sample rate	Sample rate	selected setting: • 25 k data sample/s (time domain) • 50 k data sample/s (frequency range)	selectable from list
Filter characteristics	Chart	Filter characteristics	---
filter coefficients	table	filter coefficients	---

► Import filter with [Import]

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

26244

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 elements `Name` and `Samplerate` are optional.
- Values are suggested in the import window and have to be adapted, if required. (→ **VSE > ... > Detail [Custom filters] > import user defined filters** (→ p. 91)
- 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) Only 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;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
```

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

Content

26246

A created filter has the following tabs and sections:

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

26242

► Change the name of the filter in the range [Identification].

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]

26241

The tab [Properties] gives 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	Curve	filter characteristics	---
Filter coefficients	Table	filter coefficients	---

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

26245

► Right-click 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

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

Content

58194

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.

Creating 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:

	process the selected object via the wizard
	create a new object via the wizard (object type = any, but no rolling element bearing)
	create a new object via the wizard (object type = rolling element bearing)
	configure the selected object
	delete the selected object

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

Content

26276

Preconfigured object types for the most frequent monitoring tasks are offered which can be parameterised using a wizard:

- Unbalance
- Rolling element bearing
- a-RMS (frequency range)
- v-RMS (frequency range)
- d-RMS (frequency range)
- 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]

26289

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

[Unbalance] 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.

Applications:

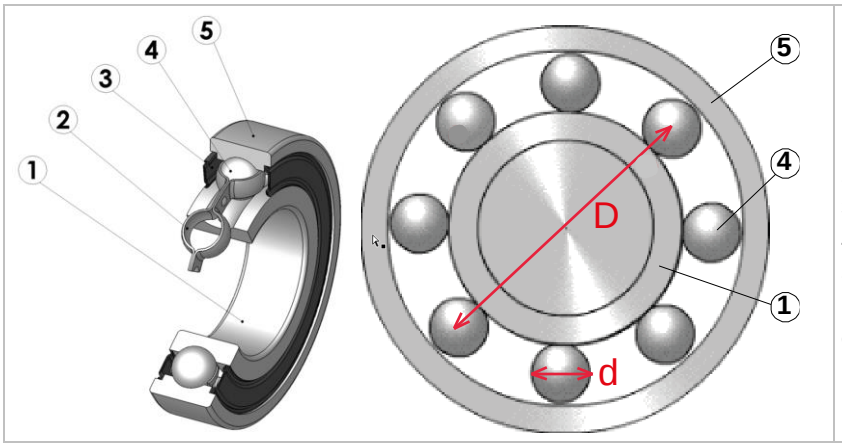
- Fans
- Motors
- Spindles (especially during acceleration), etc.

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

26287

Rolling element bearings are an important part in machines of any type. In case of progressing wear, individual damage frequencies result for each rolling element bearing. The damage frequencies of a rolling element bearing depend on the bearing geometry (defined via bearing type and manufacturer) and are unique for each bearing.

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



Legend:
1 = inner race
2 = cage
3 = seal
4 = rolling element
5 = outer race
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:

► Calculate the damage frequencies by means of the geometry using the rolling element bearing calculator 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 range)

26286

RMS = root mean square

- a-RMS (frequency range) calculates the RMS of the acceleration,
- v-RMS (frequency range) calculates the RMS of the vibration velocity
- d-RMS (frequency range) calculates the RMS of the vibration displacement

in a user-defined frequency band.

Applications:

- Measurements to ISO10816 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 range and, thus, in sequence in the multiplex mode. This may result in a "dead time" during monitoring.
For permanent monitoring select the object type "v-RMS (time domain)"!

VSE > ... > Object types > [Others]

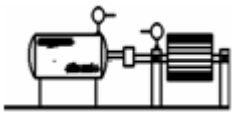
26288

There is multitude of machine components which were examined for their specific vibration in case 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).

Applications:

	soft foot loose fitting	FFT: 1.0 • f_n, 2.0 • f_n, 3.0 • f_n
	meshing, discrete tooth fault meshing, too high 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)

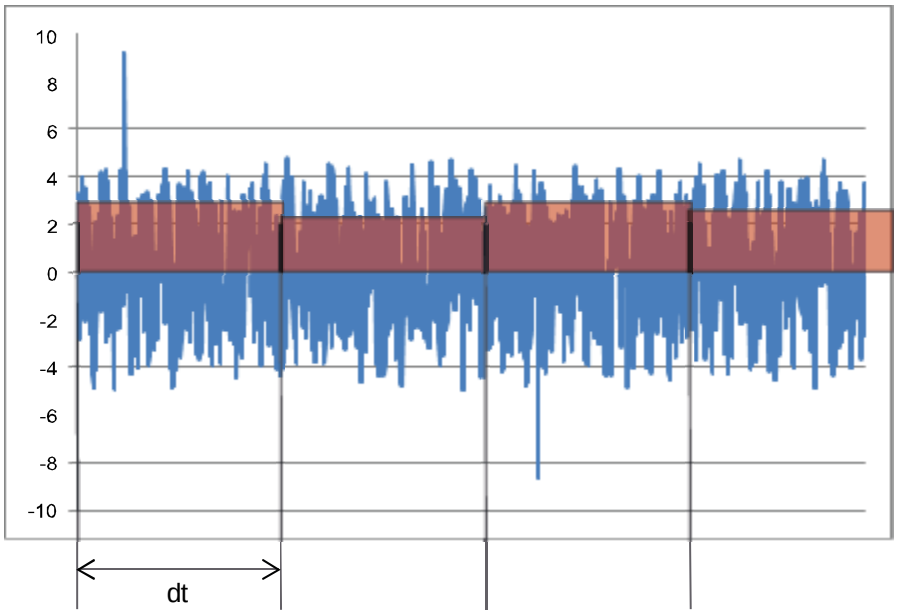
26285

RMS = root mean square

- a-RMS (time domain) monitors the RMS of the acceleration,
- v-RMS (time domain) monitors the RMS of the vibration velocity

in a frequency range adjustable via filters.

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



Legend: dt = measurement time, measurement period

Applications:

- Measurements to ISO 10816 and other applicable standards (v-RMS)
- Loose machine parts (v-RMS)

- Alignment errors (v-RMS)
- Chatter vibrations, resonances (a-RMS)

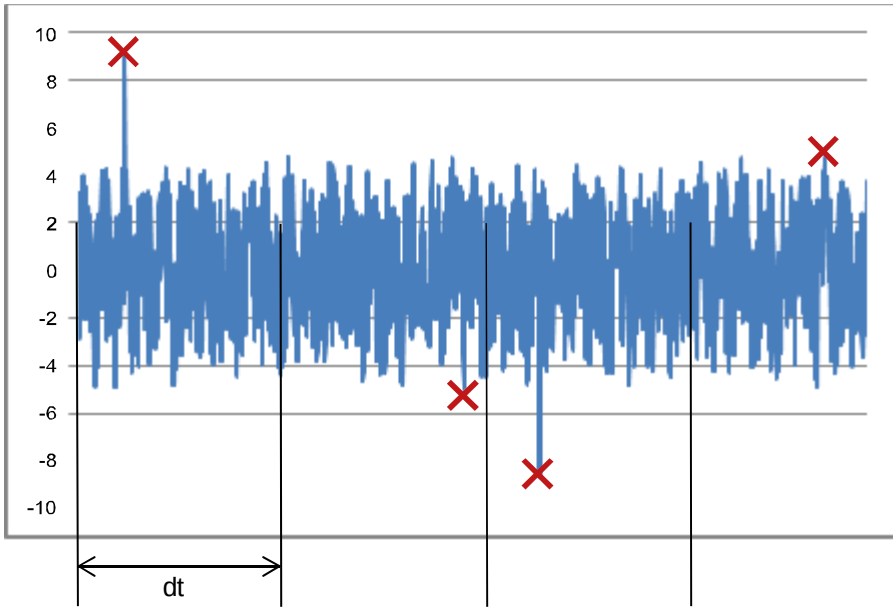
VSE > ... > Object types > [a-Peak (time domain)]

26284

> The filtering of the time signal is done by means of the filter for the dynamic input (→ tab [Configuration]) and 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 and 1.3 s), this object type is especially suited for machine protection (e.g. in crash situations).



Legend: dt = measurement time, measurement period

Applications:
- 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]

26290

[Upper Limit Monitor], [Lower Limit Monitor] monitor analogue signals (DC signals)

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

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

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

Content

26277

A created object features the following tabs and sections:

Depending on the type of object, some of the following sections are not visible or greyed out.
Show the sections greyed out with [⚙] (Extended settings).

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

26269

► In the section [Configuration] 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	---
Configuration	Input	configured input	selectable from list
Assigned object	Assigned object	assigned time domain object	selectable from list

Switching functions:

⚙	show / edit the extended settings in an own window

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

26274

belongs to the following objects:
- Unbalance
- Rolling element 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 speed trigger:

damage frequency [Hz] = frequency factor × (rotational speed [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 the highest possible diagnostic quality: set the frequency window as small as possible!

Section	Dialogue element	Display	Switching function
Subobjects	Name	inner race, outer race, rolling element	
	Frequency factor	configured value	
	Frequency window	configured value	
Evaluation	Peak	monitors the maximum peak	activate / deactivate
	RMS	calculates the effective value within the indicated frequency range	activate / deactivate

Switching functions:

	scan the bearing database
	show / edit the extended settings in an own window
	edit the selected suboject
	add new subobject
	delete selected subobject

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

26270

belongs to the following objects:
- v-RMS (frequency)

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

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 range	From	configured value [Hz]	increase / reduce value
	To	configured value [Hz]	increase / reduce value

Switching functions:

	show / edit the extended settings in an own window

VSE > ... > Detail [Objects] > ... > Tab [Processing] (frequency range)

26272

belongs to the following objects:
- Unbalance
- Rolling element bearing
- Others
- a-RMS (frequency range)
- v-RMS (frequency range)
- d-RMS (frequency range)

Section	Dialogue element	Display	Switching function
Analysis method	FFT / HFFT	method for the frequency analysis	activate / deactivate
Unit	Acceleration	value in [mg]	activate / deactivate
	Vibration velocity	value in [mm/s]	activate / deactivate
	Vibration displacement	value in [mm]	activate / deactivate
Filter	Filter	configured value	selectable from list
Resolution	Resolution	configured value	selectable from list

Switching functions:

⚙	show / edit the extended settings in an own window

Section [Analysis Method]

26087

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. rolling element bearings.)

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

Section [Unit]

26098

The unit determines how the signal is to be evaluated:
- as acceleration (a) in [mg],
- vibration velocity (v) in [mm/s] or
- vibration displacement (d) in [mm].

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

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

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

Section [Filter]

26090

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 rolling element 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]:

26095

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)

26273

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	Input:	configured value	selectable from list

Switching functions:

⚙	show / edit the extended settings in an own window

Section [Filter]

26091

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 (→ tab [Configuration]) is displayed.

For objects of type [v-RMS (time domain)], 2 filter combinations according to ISO 10816 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 type [a-Peak (time domain)] 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, rolling element bearings, cavitation of pumps,...

Section [Measurement Time]

26093

Define the measurement time in accordance with the desired 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 periods (< 40.96 ms), ensure that the response time of the alarm output and the input is fast enough for the alarm evaluation (e.g. on a PLC).

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

26275

Section	Dialogue element	Display	Switching function
Reference value	Reference value	checkbox	activate / deactivate
	Trigger	configured reference trigger	selectable from list
	Monitoring independent of the state of the trigger		activate / deactivate
Rotational speed	Trigger	configured trigger	selectable from list
	Switch off the rotational speed stability check		activate / deactivate
Transmission ratio	Object speed	configured value	increase / reduce value
	Measured speed	measured value	---

Switching functions:

⚙	show / edit the extended settings in an own window

Section [Rotational Speed]

26097

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 speed input:
- constant triggers
- triggers for which the checkbox [Use as rotational speed signal] is active (→ tab [Configuration]).

If the 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 measurement value, you can prevent it from being discarding via the checkbox [Deactivate speed stability check]. 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 of a frequency range (a-, v-, d-RMS (frequency domain)) and objects in the time domain, the speed trigger can only be used for monitoring control. Only if the value of the trigger is inside its working range will the monitoring be active. For these objects only triggers for which the checkbox [Use as rotational speed] is active (→ tab [Configuration]) can be used as speed triggers.

Section [Reference value]

26094

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

Only the following triggers can be used as a speed input:
- triggers for which the checkbox [Use as rotational speed] is not active (→ tab [Configuration]).

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

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

26271

Section	Dialogue element	Display	Switching function
View	• absolute • relative	option field	select option
Base Line (teach value)	Base line (teach value)	configured value	increase / reduce value

Section	Dialogue element	Display	Switching function
	Auto teach	checkbox	activate / deactivate
	Rotational speed	configured value	increase / reduce value
	Reference value	configured value	increase / reduce value
Limits	Damage alarm	configured value	increase / reduce value
	Warning alarm	configured value	increase / reduce value

Switching functions:

⚙	show / edit the extended settings in an own window

Section [View]

26099

belongs to the following objects:
- Others
- All objects > [Extended settings].

The limits are decisive for the alarm function:

- for view = absolute:
  the teach value is set to "1"
  the values for the 2 alarm thresholds (warning alarm, damage alarm) are absolute values in the engineering unit selected for the object
- for view = relative:
  the limit values / alarm thresholds are a multiple of the teach value

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

Section [Base Line] (teach value)

26089

belongs to the following objects:
- Others
- All objects > [Extended settings].

In case of a relative view, the base line (teach value) 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 checkbox [Auto teach] if the base line is to be determined through a manually started measurement by the diagnostic electronics. However, we recommend to configure the base line (teach value) only 3 weeks after setup of the diagnostic electronics based on the data that has been collected in the history memory.

The 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 (→ tab [Configuration]), if possible.

Section [Limits]

26092

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 alarm, damage alarm) are absolute values in the engineering unit selected for the object

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

26268

Section	Dialogue element	Display	Switching function
Averaging	Averaging	configured value	selectable from list
	Trigger becomes active	checkbox	activate / deactivate
	Variant Switching	checkbox	activate / deactivate
Response delay	Response delay	configured value	increase / reduce value

Switching functions:

	show / edit the extended settings in an own window

Section [Averaging]

26088

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 measurement value.

For objects in the time domain or monitoring of frequency ranges (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 checkboxes [Trigger becomes active] and [Variant Switching] determine how the averaging 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. The option [Variant Switching] includes all system mode changes of the diagnostic electronics (write parameters, spectrum monitoring, self-test).

Example averaging

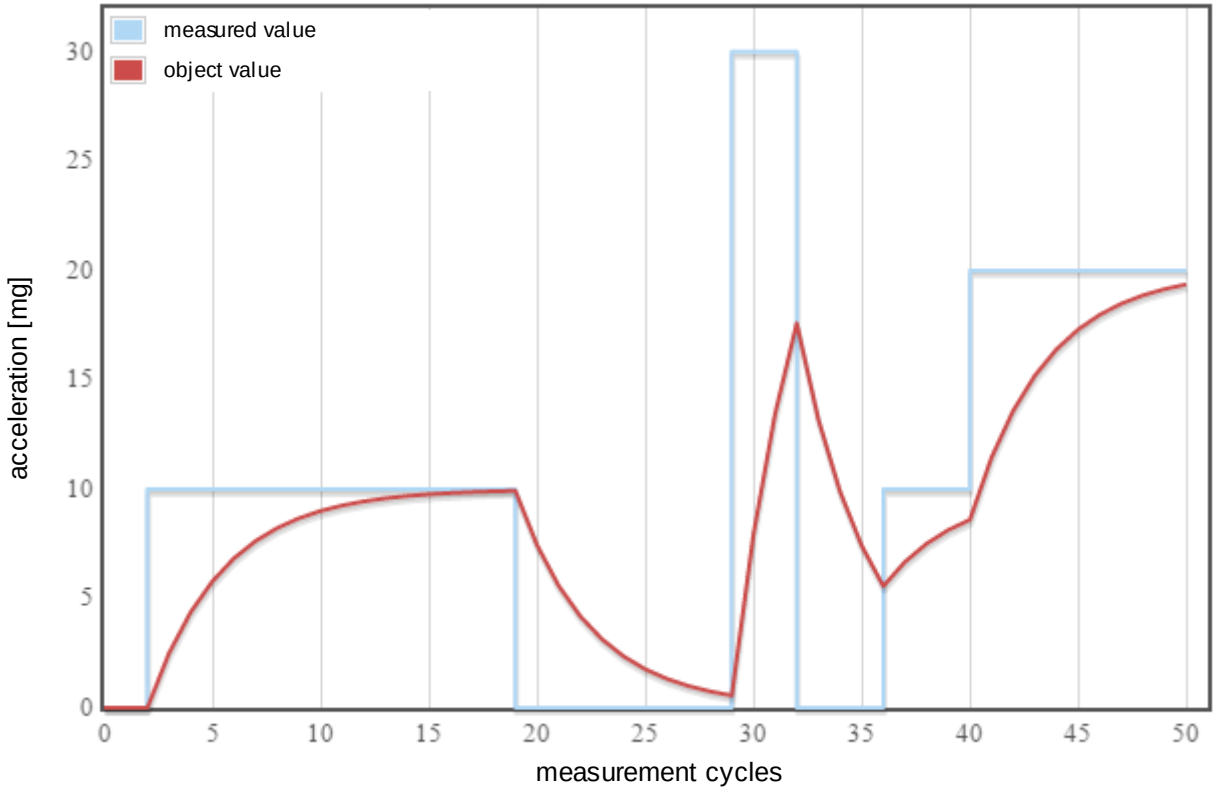
25859

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

The new object value is:

Object value = last object value • (1-averaging) + measurement 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 fast the two values approach.

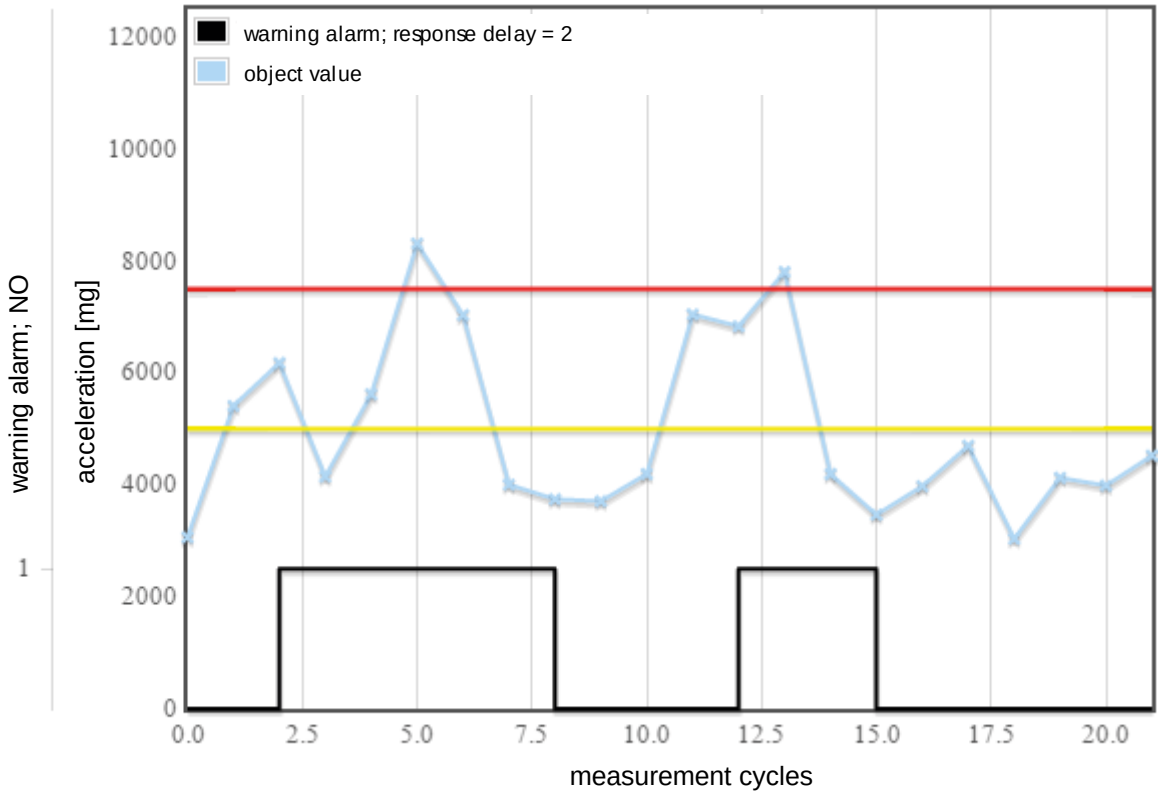


Section [Response delay]

26096

The response delay ensures the reliability of the diagnostics by functioning like 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 state of the warning alarm at a response delay of 2:



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

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

Content

26315

You can use variants if you want to monitor certain objects only in defined machine states and where 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 rolling element bearings on a machine tool. During the machining of the workpieces, different kinds of vibrations can occur in the machine, which can lead to a false diagnosis of a rolling element bearing.

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

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

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

56967

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

- manually,
- via the ifm OPC server (→ chapter **Variant switching via OPC** (→ p. 114)) 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.

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

22319

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

► 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 variant switching without the digital I/Os of the VSE100 / VSE101).

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

Content

22320

This applies only 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 (→ Chapter **Variant switching via OPC** (→ p. 114)), no further configuration is required.

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

- Active variant determined by the state of one I/O
- Active variant determined by the state of several I/Os (as a dual value)

Section	Dialogue element		Switching function
Activation mode	• Active variant determined by the state of one I/O • Active variant determined by the state of several I/Os (as a dual value)		Select an option
Activation	Digital I/O	✗ IO # (not in use) ✓ IO # variant input	Checkbox activate / deactivate
	High	Variant #	selectable from list
	Low	Variant #	selectable from list
	ST	Self-test	Checkbox activate / deactivate

Active variant determined by the state of one I/O

22321

With this method of activation, 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/Os. 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 101 different variants can be activated using the 8 I/Os of the VSE100 / VSE101.

Example 1:

26025

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:

26026

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	

Digital I/O	High	Low	ST
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.

Aktive 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 determined by the state of several I/Os (as a dual value)

22324

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

26024

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 variant switching via the VES004 software

56978

Precondition:

- This requires a connection to the diagnostic electronics.
- 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] in the [Variant switching] tab.

The assignment of objects to variants can be changed on the parameter page [Variants] > Tab [Configuration] as required. By default, all objects are always active in all variants.

Variant switching via OPC

26113

Prerequisite:

- 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.<NameOfDevice>.DeviceInformation.ActualVariant
```

"NameOfDevice" corresponds to the name of the connection in the configurator of the ifm OPC server.

9.2.7 VSE > [Parameter_#] > Detail [Counter]

Content

26295

The octavis VSE unit has 32 internal counters (from firmware 0.6.x). Depending on the event to start the counter we differentiate the following counter types:

- Object state
- Runtime, analogue
- Runtime, digital (only visible for VSE100 / VSE101)
- Runtime VSE
- Totaliser

VSE > [Parameter_#] > Detail [Counters] > Overview

26317

The overview page of the counters shows the counters that are configured in the parameter set together with 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 configurati→ p. of the selected counter
	Set counter values
	Delete the selected counter

VSE > ... > Detail [Counters] > [Set Counter Values]

26283

Prerequisite:

- VES software is connected to the device via [ ]

Define a start value for the selected counter.

► Click [ ].
> The [Write Counters] window appears.
► Select counter.
► Set counter value in table column [New Value].
► Activate checkbox in table column [Write].
► Click [Write Counters].
> Counter values are written to the device.

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

26255

Section [Identification]:
• The name of the counter object cannot be changed.
• The counter type results when the counter is created; it cannot be changed.

Section [Configuration]:
• Indicate source or event to activate the counter.
• Depending on the selected counter type only the following sources are allowed:

Counter type	Object	Event
Object state	any	state that will initiate the counter
Runtime, analogue	trigger refers to an analogue or external input	---
Runtime, digital (only visible for VSE100 / VSE101)	an I/O which is still free	state that will initiate the counter
Runtime, VSE	The counter starts automatically as soon as the diagnostic unit has been switched on.	
Totaliser	an analogue input 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

VSE > ... > Detail [Counters] > Tab [Alarming]

26254

- Define a limit for the counter.
- Counters cannot be used directly in the creation of an alarm.
- Alarms are summarized in "alarm groups".
- The alarm group can be selected as a source later in the alarm configuration.

Section	Dialogue element	Display	Switching function
Alarming	Limit	Either: • number of pulses or • duration in seconds	increase / reduce value
	Alarm group	configured alarm group	selectable from list

VSE > ... > Detail [Counters] > Tab [Reset] (only VSE100 VSE101)

22339

This applies only 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 the counter	I/O 1	usage of the input	activate / deactivate
	...	...	...
	I/O 8	use of the input	activate / deactivate

VSE > ... > Detail [Counters] > [Object state]

26251

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:
  - when the object is inactive,
  - when the speed fluctuation is too high
  - when the speed or reference value is outside the working range
  - when the base line (teach value) is invalid.
- Warning alarm: An object is in the warning alarm mode if the measurement value, taking into account the response delay, exceeds the limit.
- Damage alarm: An object is in the damage alarm mode if the measurement value, taking into account the response delay, exceeds the limit.

VSE > ... > Detail [Counters] > [Runtime]

22341

A runtime counter (also: operating hours counter) counts the time in which an analogue or digital (only VSE100 / VSE101) input is in a particular area or state. The following types of runtime counters are differentiated by means of the source:

- 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 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 for VSE100 / VSE101): a digital input of the diagnostic electronics activates the counter. If the input is in the corresponding state, the time is counted.

VSE > ... > Detail [Counters] > [Totaliser]

26253

Totalisers count the pulses at an analogue input of the diagnostic electronics.

Prerequisite:
• an analogue input is defined as [Counter – Totaliser]

9.2.8 VSE > [Parameter_#] > Detail [History]

26301

The octavis diagnostic electronic VSE has an integrated history function with real-time clock. In the history memory the device records the following data:
• object values together with their triggers and limits
• the current counter values
• time stamps on the events

The real-time clock is battery buffered.

History 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	from 0.9.0	600 000

VSE > ... > Detail [History] > Real-time clock

26261

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 aligns 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.

VSE > ... > Detail [History] > Recording of the measured values

26262

The history memory is a ring memory (FIFO, "first in first out"). If the history memory is full, a small portion of the oldest values is deleted to free up memory space.

The recording 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 recorded in the history memory together with the corresponding time stamp.
- Depending on the selected options (see chapter "Parameters"), further measurements such as the trigger values or the mean value of the interval measurement are written to the history memory.
- The selectable options depend on the firmware of the diagnostic electronics (see chapter "Parameters" The "additional values" are stored together with the time stamp of the highest value. The interval for the history memory can be determined individually for each object.

Using the additional options, the measured values can also be recorded independently of the set interval of the object. A description for these options is available in the parameters of the history.

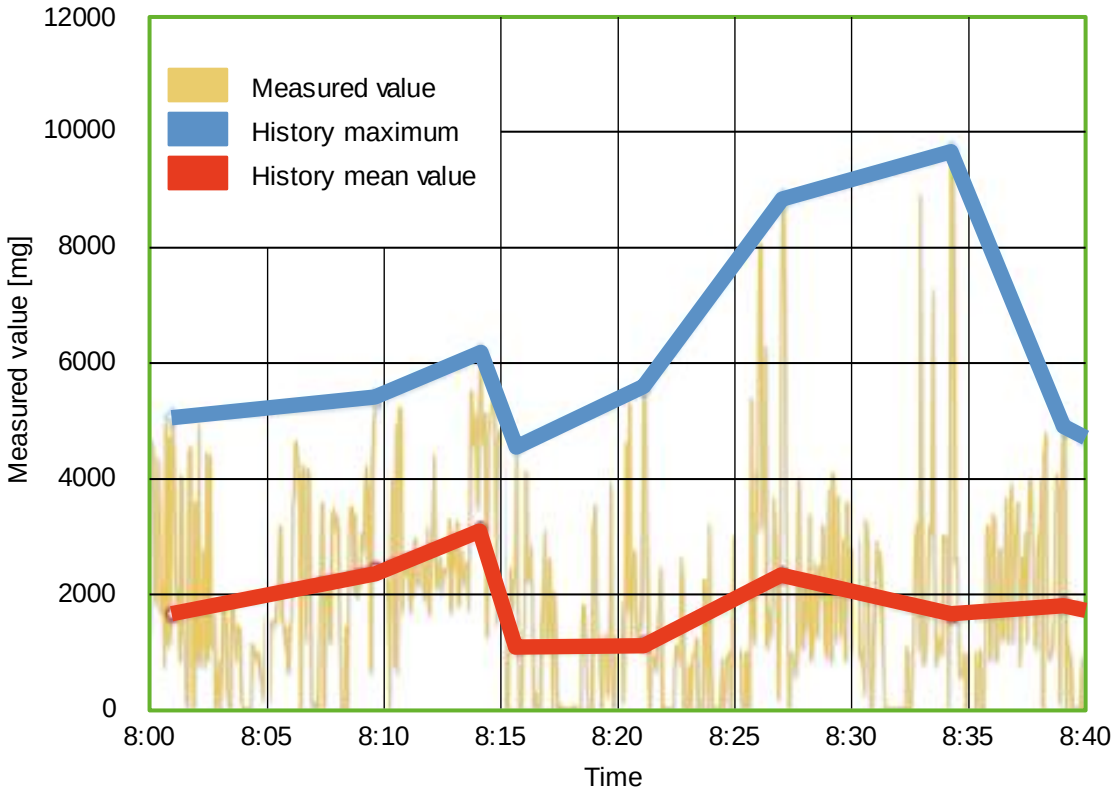


Diagram: History of the measured values (example)

VSE > ... > Detail [History] > Parameters

26260

Detail [History]:
Using the symbol at the top right in the detail window, you can activate/deactivate the entire history memory. If the history memory is active, the history settings can be made for the objects configured in the parameter set.

Switching functions:

	Switch: the history memory is deactivated. Parameters cannot be configured.
	Switch: the history 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.

Further values can be recorded individually for each object via additional checkboxes. 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: the highest value measured during the interval is recorded
Rot.	--	☐ Option not activated ▬ Option partly activated ☑ Option fully activated	Rotational speed: additionally records the value of the trigger for the rotational speed at the time of the highest measured value
Ref.	--	☐ Option not activated ▬ Option partly activated ☑ Option fully activated	Reference value / reference: additionally records the value of the trigger for the reference value at the time of the highest measured value
Av.	--	☐ Option not activated ▬ Option partly activated ☑ Option fully activated	Average value (from firmware 0.5.19): records the measurement values of the object (including the other selected options) when the mean value is changed without taking into account the interval. The interval is restarted after changing the mean value.
Var.	--	☐ Option not activated ▬ Option partly activated ☑ Option fully activated	Variant switching (from firmware 0.5.19): 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 partly activated ☑ Option fully activated	Damage alarm [Rot.] (from firmware 0.7.11): records the measurement values of the object (including the other selected options) when the object is in the state "Damage alarm" (measurement value above upper limit value, response delay taken into account). Subsequently, the interval is restarted.

Section	Dialogue element	Display / Switching function	Description
Record options	Maximum one entry per second	☐ Option not activated ☑ Option fully activated	Protection of the history memory chip The options [Variant Switching] and [Damage Alarm] 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 versions If [Variant switching] or/and [Damage Alarm] is activated in an object, only the maximum time is displayed.

9.2.9 VSE > [Parameter_#] > Detail [Alarms]

Content

26291

Alarms can be set to signal limits (warning alarm and/or damage alarm) which are exceeded during monitoring of the objects or counters.

VSE > [Parameter_#] > Detail [Alarms] > Overview

26292

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 configurati→ p. of the selected alarm
	delete the selected alarm

VSE > ... > Detail [Alarms] > Alarm types

Content

26234

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 desired.

Each alarm requires an own output of the diagnostic electronics. If all outputs are configured / used, no further alarm can be configured.

VSE > ... > Detail [Alarms] > Alarm types > [Analogue]

Content

26235

The "Analogue alarm" is used to convert a measured value into an analogue signal.

The measured values of the objects serve as a source.If several objects are selected as source for the alarm, then

- the units of the measured values must match
- only the highest measured value is converted into the corresponding analogue value.

Only the analogue output OUT1 serves as an output channel for the analogue alarm.The output signal may be as follows:

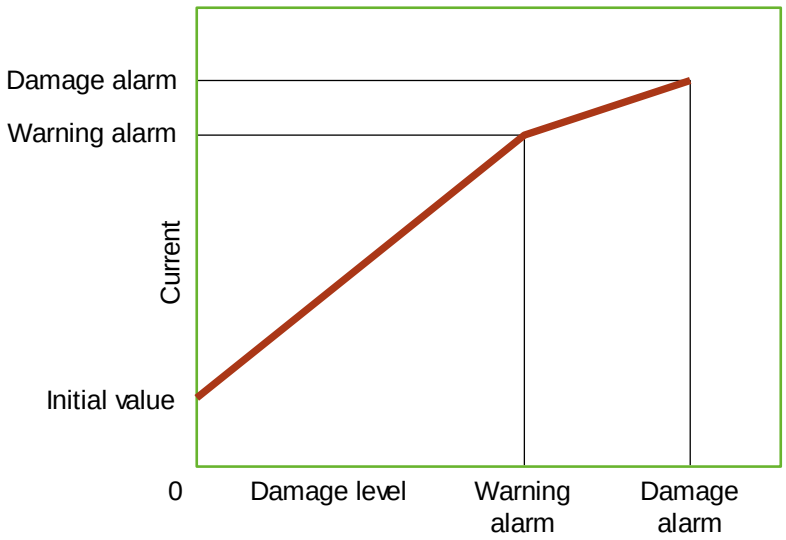
- 4...20 mA (all diagnostic units)
- 0...10 V (only VES100)

► When selecting the values, differentiate between the different units of the objects:
- acceleration,
- vibration velocity,
- vibration displacement,
- unit(s) of the upper/lower limit monitor

and the unitless damage level (relative to the base line (teach value) or limit value).
The selected values have a direct effect on the objects which can be selected as an alarm source (→ tab [Source]).

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 relative to the base line (teach value), 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 relative to the limit values, the signal must be scaled using three points:
  - initial analogue
  - analogue value for warning alarm
  - analogue value for damage alarm



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.

► In addition, the evaluation of the self-test result can be activated for the alarm.

VSE > ... > Detail [Alarms] > [Analogue] > Tab [Configuration]

26231

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 permissible
Configuration	Signal	configured signal: • current 4...20 mA • voltage 0...10 V (only visible for VSE100 / VSE101)	selectable from list
	Values	configured value type	selectable from list
Scaling	Initial value	configured start value at damage level = 0	increase / reduce value
	Warning alarm	the configured value is exceeded = warning alarm (yellow)	increase / reduce value
	Damage alarm	the configured value is exceeded = damage alarm (red)	increase / reduce value
	• minimum = 4 mA • minimum = 2 V	checkbox (depending from [Configuration] > [Signal])	activate / deactivate

VSE > ... > Detail [Alarms] > [Analogue] > Tab [Source]

26233

► 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 object ✗ do not evaluate object

VSE > ... > Detail [Alarms] > [Analogue] > Tab [Self-test]

26232

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]

26240

The alarm type [Warning alarm] analyses all objects with regard to the lower limit value (warning alarm), 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 value and the condition of the response delay is met, then the alarm will also be active.

► In addition, the evaluation of the self-test result can be activated for the alarm.

VSE > ... > [Prealarm] > Tab [Configuration]

26218

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]

26230

The objects for the visualisation in this alarm are predefined:
The warning alarms of all configured objects are linked with OR

Section	Dialogue element	Display	Switching function
Alarm source - objects	Table	configured objects	✓ evaluate object ✗ do not evaluate object

VSE > ... > [Warning alarm] > Tab [Self-test]

26229

For failed self-tests of 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 alarm]

26238

The alarm type [Damage alarm] analyses all objects with regard to the upper limit value (warning alarm), 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 value and the condition of the response delay is met, then the alarm will also be active.

► In addition, the evaluation of the self-test result can be activated for the alarm.

VSE > ... > [Warning alarm] > Tab [Configuration]

26228

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 > ... > [Damage alarm] > Tab [Source]

26203

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 object ✗ do not evaluate object

VSE > ... > [Damage alarm] > Tab [Self-test]

26202

For failed self-tests of 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 alarm]

26237

The alarm type [Custom alarm] allows you to combine the alarm states (warning alarm, damage alarm) of different sources (objects, counters, self-test) as desired (via AND and OR logics).

VSE > ... > [User defined] > Tab [Configuration]

26227

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

Section	Dialogue element	Display	Switching function
	Keep signal for a minimum of 150 ms *)	checkbox	activate / deactivate

*) for firmware versions older than V0.11.6: min. 50 ms

VSE > ... > [Custom alarm] > Tab [Source]

26201

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 object ✗ do not evaluate object

VSE > ... > [Custom alarm] > Tab [Self-test]

26200

For failed self-tests of 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]

26236

A counter alarm allows you to select the different alarm groups (→ chapter **VSE > ... > Detail [Counters] > Tab [Alarming]** (→ p. 117)) 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.

In addition, the evaluation of the self-test result can be activated for the alarm.

VSE > ... > [Counter] > Tab [Configuration]

26197

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]

26199

The source of a counter alarm is a combination of different alarm groups of the counters
→ chapter **VSE > ... > Detail [Counters] > Tab [Alarming]** (→ p. 117)
The alarm is triggered if in at least one selected alarm group a counter assigned to this group exceeds its limit value.

Section	Dialogue element	Display	Switching function
Alarm source	Alarm group #	checkbox	activate / deactivate

VSE > ... > [Counter] > Tab [Self-test]

26198

For failed self-tests of 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]

26239

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".

From firmware version 0.11.x it is possible to define a wire-break test for VSP and IEPE sensors (→ chapter **[Device] menu > [Actions]**).

VSE > ... > [Self-test] > Tab [Configuration]

26223

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

9.2.10 VSE > [Parameter_#] > Detail [PROFINET IO]

Content

26309

This applies only to VSE150:

VSE > [Parameter_#] > Detail [PROFINET IO] > Tab [Configuration]

26312

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	Option field	Select an option
	• Expert mode for GSD file	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 General Station Description (GSD) file	---	---	

Switching functions:

	Export of a detailed description of the contents (data points) of the configured PROFINET IO process image as a PDF file
	Export of 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-certificated) GSD file

VSE > [Parameter_#] > Detail [PROFINET IO] > Tab [PROFINET IO protocol settings]

58195

Setting the VSE value visualisation on the transport protocol:

Section	Dialogue element	Display	Switching function
Visualisation of values	Byte order	• Little-Endian • Big-Endian	---
	Visualisation of values	• Floating point values • Integer values	---
	Factor for acceleration values (only integer values)	Numerical value	---
	Factor for speed values (only integer values)	Numerical value	---
	Factor for vibration displacement values (only integer values)	Numerical value	---
	Factor for other values (only integer values)	Numerical value	---

VSE > [Parameter_#] > Detail [PROFINET IO] > Tab [Input]

26311

The terms "input" and "output" are from the point of view of the fieldbus master.

In this view, the process image output configuration can be done.

26311

► Select the "Source" in the left window (select).

Add the selected element to the process image via [ ].
OR:
In the left window, activate the checkbox at the "Source".

> 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.

► Remove the element selected in the process image from the process image:

• with [ ]

• with [ ]

• in the left window, deactivate the checkbox at the "Source".

► If required:
In the process image, move the selected element to another position in the list by drag and drop.

26311

Section	Dialogue element	Display	Switching function
Process image	Input	current value: … elements (… bytes)	---
	Output	current value: … elements (… bytes)	---
	Total	current value: … elements (… bytes)	---

Section	Dialogue element	Display	Switching function
	Admin. data	current value: … bytes	---
	Free	current value: … bytes	---

26311

Switching functions:

	Remove the element selected in the process image from the process image via [ ].
	Add the element selected in the [Source] to the process image via [ ].
	Switching the display mode: • offset (0, 4, 5, 7, ...) | contents • offset (0..3, 4, 5..6, 7..10, ...) | contents • contents
	Switching the detailed view: • one line for each byte • one line for each parameter
	Remove the selected element from the process image.

VSE > [Parameter_#] > Detail [PROFINET IO] > Tab [Output]

26310

The terms "input" and "output" are from the point of view of the fieldbus master.

In this view, the output of the process image can be configured.

26310

► Select the "Source" in the left window (select).

Add the selected element to the process image via [ ].
OR:
In the left window, activate the checkbox at the "Source".

> 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.

► Remove the element selected in the process image from the process image:

• with [ ]
• with [ ]
• in the left window, deactivate the checkbox at the "Source".

► If required:
In the process image, move the selected element to another position in the list by drag and drop.

26310

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	---

Section	Dialogue element	Display	Switching function
	Free	current value: … bytes	---

26310

Switching functions:

	Remove the element selected in the process image from the process image via [ ].
	Add the element selected in the [Source] to the process image via [ ].
	Switching the display mode: • offset (0, 4, 5, 7, ...) | contents • offset (0..3, 4, 5..6, 7..10, ...) | contents • contents
	Switching the detailed view: • one line for each byte • one line for each parameter
	Remove the selected element from the process image.

VSE > [Parameter_#] > Detail [PROFINET IO] > Tab [Summary]

26313

The terms "input" and "output" are from the point of view of the fieldbus master.

Display of the parameters selected for communication with the fieldbus master:
- group "slot no."
- module name/ID/size
- offset (absolute)
- offset (relative)
- source type
- source name
- data point
- unit
- data type
- data size (number of bytes)
- direction of data

Switching functions:

	Switching the detailed view: • grouped according to slots, in ascending order according to the offset • as above, with additional details about group and module • grouped according to inputs and outputs, in ascending order according to the offset
	Export of a detailed description of the contents (data points) of the configured PROFINET IO process image as a PDF file

9.2.11 VSE > [Parameter_#] > Detail [EtherNet/IP]

Content

26296

Only applies to VSE151:

VSE > [Parameter_#] > Detail [EtherNet/IP] > Tab [Configuration]

26299

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 electronic data sheet (EDS)	---	---	

Switching functions:

	Export of a detailed description of the contents (data points) of the configured EtherNet/IP process image.
	Export certified EtherNet/IP electronic data sheet file for the VSE151 diagnostic electronics.

VSE > [Parameter_#] > Detail [EtherNet/IP] > Tab [Input]

25269
26298

The terms "input" and "output" are from the point of view of the fieldbus master.

In this view, the process image output configuration can be done.

26298

► Select the "Source" in the left window (select).

Add the selected element to the process image via [ ].
OR:
In the left window, activate the checkbox at the "Source".

> 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.

► Remove the element selected in the process image from the process image:

- with [ ]
- with [ ]
- in the left window, deactivate the checkbox at the "Source".

► If required:
In the process image, move the selected element to another position in the list by drag and drop.

26298

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	---

26298

Switching functions:

	Remove the element selected in the process image from the process image via [ ].
	Add the element selected in the [Source] to the process image via [ ].
	Switching the display mode: • offset (0, 4, 5, 7, ...) | contents • offset (0..3, 4, 5..6, 7..10, ...) | contents • contents
	Switching the detailed view: • one line for each byte • one line for each parameter
	Remove the selected element from the process image.

VSE > [Parameter_#] > Detail [EtherNet/IP] > Tab [Output]

25270
26297

The terms "input" and "output" are from the point of view of the fieldbus master.

In this view, the output of the process image can be configured.

26297

► Select the "Source" in the left window (select).

Add the selected element to the process image via [ ].
OR:
In the left window, activate the checkbox at the "Source".

> 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.

► Remove the element selected in the process image from the process image:

• with [ ]

• with [ ]
• in the left window, deactivate the checkbox at the "Source".

► If required:
In the process image, move the selected element to another position in the list by drag and drop.

26297

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	---

26297

Switching functions:

	Remove the element selected in the process image from the process image via [ ].
	Add the element selected in the [Source] to the process image via [ ].
	Switching the display mode: • offset (0, 4, 5, 7, ...) | contents • offset (0..3, 4, 5..6, 7..10, ...) | contents • contents
	Switching the detailed view: • one line for each byte • one line for each parameter
	Remove the selected element from the process image.

VSE > [Parameter_#] > Detail [EtherNet/IP] > Tab [Summary]

26300

The terms "input" and "output" are from the point of view of the fieldbus master.

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:

	Switching the detailed view: • grouped by assembly • as above, with additional details about assembly ID and assembly size
	Export of a detailed description of the contents (data points) of the configured EtherNet/IP process image as a CSV, HTML or PDF file.

9.2.12 VSE > [Parameter_#] > Detail [EtherCAT]

Content

58197

Only applies to VSE152:

VSE > [Parameter_#] > Detail [EtherCAT] > Tab [Configuration]

58198

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 of 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.

VSE > [Parameter_#] > Detail [EtherCAT] > Tab [EtherCAT protocol settings]

58196

Setting the VSE value visualisation on the transport protocol:

Section	Dialogue element	Display	Switching function
Visualisation of values	Byte order	• Little-Endian • Big-Endian	---
	Visualisation of values	• Floating point values • Integer values	---
	Factor for acceleration values (only integer values)	Numerical value	---
	Factor for speed values (only integer values)	Numerical value	---

Section	Dialogue element	Display	Switching function
	Factor for vibration displacement values (only integer values)	Numerical value	---
	Factor for other values (only integer values)	Numerical value	---

VSE > [Parameter_#] > Detail [EtherCAT] > Tab [Input]

25275

The terms "input" and "output" are from the point of view of the fieldbus master.

In this view, the process image output configuration can be done.

58199

► Select the "Source" in the left window (select).

Add the selected element to the process image via [ ].
OR:
In the left window, activate the checkbox at the "Source".

> 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.

► Remove the element selected in the process image from the process image:

- with [ ]
- with [ ]
- in the left window, deactivate the checkbox at the "Source".

► If required:
In the process image, move the selected element to another position in the list by drag and drop.

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	---

58199

Switching functions:

	Remove the element selected in the process image from the process image via [ ].
	Add the element selected in the [Source] to the process image via [ ].
	Switching the display mode: • offset (0, 4, 5, 7, ...) | contents • offset (0..3, 4, 5..6, 7..10, ...) | contents • contents
	Switching the detailed view: • one line for each byte • one line for each parameter
	Remove the selected element from the process image.

VSE > [Parameter_#] > Detail [EtherCAT] > Tab [Output]

25276

The terms "input" and "output" are from the point of view of the fieldbus master.

In this view, the output of the process image can be configured.

58200

► Select the "Source" in the left window (select).

Add the selected element to the process image via [ ].
OR:
In the left window, activate the checkbox at the "Source".

> 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.

► Remove the element selected in the process image from the process image:

- with [ ]
- with [ ]
- in the left window, deactivate the checkbox at the "Source".

► If required:
In the process image, move the selected element to another position in the list by drag and drop.

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	---

58200

Switching functions:

	Remove the element selected in the process image from the process image via [ ].
	Add the element selected in the [Source] to the process image via [ ].
	Switching the display mode: • offset (0, 4, 5, 7, ...) | contents • offset (0..3, 4, 5..6, 7..10, ...) | contents • contents
	Switching the detailed view: • one line for each byte • one line for each parameter
	Remove the selected element from the process image.

VSE > [Parameter_#] > Detail [EtherCAT] > Tab [Summary]

58201

The terms "input" and "output" are from the point of view of the fieldbus master.

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:

	Switching the detailed view.
	Export of a detailed description of the contents (data points) of the configured EtherCAT process image as a CSV, HTML or PDF file.

9.2.13 VSE > [Parameter_#] > Detail [Modbus TCP]

Content

26303

Only applies to VSE153:

VSE > [Parameter_#] > Detail [Modbus TCP] > Tab [Configuration]

26306

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 of a detailed description of the contents (data points) of the configured Modbus TCP process image as a CSV, HTML or PDF file.

VSE > [Parameter_#] > Detail [Modbus TCP] > Tab [Input]

26305

The terms "input" and "output" are from the point of view of the fieldbus master.

In this view, the process image output configuration can be done.

26305

► Select the "Source" in the left window (select).

Add the selected element to the process image via [ ].
OR:
In the left window, activate the checkbox at the "Source".

> 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.

► Remove the element selected in the process image from the process image:

- with [ ]
- with [ ]
- in the left window, deactivate the checkbox at the "Source".

► If required:
In the process image, move the selected element to another position in the list by drag and drop.

26305

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	---

26305

Switching functions:

←	Remove the element selected in the process image from the process image via [←].
→	Add the element selected in the [Source] to the process image via [→].
🗑	Remove the selected element from the process image.

VSE > [Parameter_#] > Detail [Modbus TCP] > Tab [Output]

26304

The terms "input" and "output" are from the point of view of the fieldbus master.

In this view, the output of the process image can be configured.

26304

► Select the "Source" in the left window (select).

Add the selected element to the process image via [→].
OR:
In the left window, activate the checkbox at the "Source".

> 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.

► Remove the element selected in the process image from the process image:

- with [←]
- with [🗑]
- in the left window, deactivate the checkbox at the "Source".

► If required:
In the process image, move the selected element to another position in the list by drag and drop.

26304

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	---

Section	Dialogue element	Display	Switching function
	Free	current value: … bytes	---

26304

Switching functions:

	Remove the element selected in the process image from the process image via [ ].
	Add the element selected in the [Source] to the process image via [ ].
	Remove the selected element from the process image.

VSE > [Parameter_#] > Detail [Modbus TCP] > Tab [Summary]

26307

The terms "input" and "output" are from the point of view of the fieldbus master.

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 of a detailed description of the contents (data points) of the configured Modbus TCP process image as a CSV, HTML or PDF file.

10 Configure VNB001

Content

25988

Read the operating instructions of the vibration sensor prior to installation.

This chapter describes the configuration and the monitoring of the vibration sensor VNB001 using the software VES004.

Add a new device to a project (→ chapter **[Device] menu > [New]**).

10.1 Establish a connection to the VNB sensor

26020

Connect the device to the USB interface of the PC/laptop

► If not yet done: Install VNB-USB driver (→ chapter **Install the USB driver**).

Choose either:

► In the tree view, right-click on [VNB001_#]

► In the context menu: [Scan Network...]

► In the window [Found Devices] select the desired device with a left-click

► Use the symbol + [Update the project with the selected device] 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 detailed view [Address] > [Configuration] with symbol [Scan Network]

► In the window [Found Devices] select the desired device with a left-click

► Use the symbol + [Update the project with the selected device] to add the selected device to the project

► In the detailed view [Address] > [Configuration] with symbol [Connect the device]

10.2 VNB001 > Object [VNB001_#] > Detail [Device Settings]

Content

26151

This chapter describes the functions contained in the object [VNB001_#].
The object [VNB001_#] can be reached via the **Tree view** (→ p. 16).

To open the [Settings] menu:

► Highlight the device in the tree view.

► Options:
Menu [Device] > [Settings] > [Open]
or:
Double-click on [VNB001_#] > [Settings]

> The detailed view is shown.

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

- Overview
- Device
- Address
- Actions

The information of the detail [Device Settings] is only available if a connection between VNB sensor and the parameter setting software VES004 is or had been established.

The functions of the detail [Device Settings] are only available if a connection between VNB sensor and the parameter setting software VES004 is or had been established.

10.2.1 VNB001 > ... > [Device Settings] > Detail [Overview]

58202

The [Overview] shows the following information:

Section	Dialogue element	Display	Switching function
Vibration sensors	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.

10.2.2 VNB001 > ... > [Device Settings] > Detail [Device]

26117

The information and functions of the element [Device] are only available if a connection between the VNB sensor and the parameter setting software VES004 has been established.

► Connect VNB sensor to PC/laptop.
(→ chapter **[Device] menu > [Connect]** (→ p. 32)

VNB001 > ... > Detail [Device] > Tab [Configuration]

26140

Section	Dialogue element	Display	Switching function
Vibration sensor	Type	configured device	--
	Version	hardware version read in the device	
	Connection	Status of the connection between software and device	
	Serial number	serial number read in the device	
Write firmware to device	Firmware version	firmware version read in the device	

Switching functions:

Prerequisite:

- VES software is connected to the device via [ ]

	Write firmware to device	► Activate the button. > A dialogue window appears. ► Select file with new firmware and confirm with [OK]. > Software updates the firmware of the device.

10.2.3 VNB001 > ... > [Device Settings] > Detail [Address]

26116

The information and functions of the element [Address] are only available if a connection between the VNB sensor and the parameter setting software VES004 is established.

► Connect VNB sensor to PC/laptop.
(→ chapter **[Device] menu > [Connect]** (→ p. 32)

VNB001 > ... > Detail [Address] > Tab [Configuration]

26131

Section	Dialogue element	Display	Switching function
Connection	Serial number	serial number read in the device	

Switching functions:

scan the USB ports for connected devices	► Activate the button. > A dialogue window with the available devices appears. ► Select the desired device. ► Use the symbol [Update the project with the selected device] to add the selected device to the project > The device is assigned to the opened project. > The section [Connection] displays information about the assigned device.
connect the device	► Activate the button. > The software connects to the assigned device. > The tree view shows the connection status.
disconnect the device	► Activate the button. > The software is disconnected from the device. > The tree view shows the connection status.

10.2.4 VNB001 > ... > [Device Settings] > Detail [Actions]

22407

The information and functions of the element [Actions] are only available if a connection between the VNS sensor and the parameter setting software VES004 has been established.

► Connect VNB sensor to PC/laptop.
(→ chapter **[Device] menu > [Connect]** (→ p. 32)

VNB001 > ... > Detail [Actions] > Tab [Manipulate Device]

26129

Section	Dialogue element	Display	Switching function
Reboot	---	---	
Execute self-test	---	---	

Switching functions:

Reboot the device	► Activate the button. > The confirmation message appears. ► Start the process with [Yes] OR Abort the process with [No] > If [Yes]: The device reboots.

	Execute self-test in 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].

VNB001 > ... > Detail [Actions] > Tab [Reset Device]

26130

Section	Dialogue element	Display	Switching function
Reset history	---	---	
Reset parameters	---	---	
Restore factory settings	---	---	

Switching functions:

	Reset history	► Activate the button. > The 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. > The 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.

10.3 VNB001 > Object [VNB001_#] > [Parameter_#]

Content

26150

The tab [Parameter_#] contains all information and configuration and monitoring options of the parameter set assigned to the vibration sensor.

To open the tab [Parameter_#]:

► In the tree view, select the desired sensor.

► Choose either:
[Device] menu > [Parameter] > [Open]
Or:
Double-click on [VNB001_#] > [Parameter_#]

> The detailed view shows the tab [Parameter_#]

It is always the parameter set currently assigned to the device which is opened (→ chapter **[Parameter] menu > [Device]**)

To open any parameter set:

► In the tree view, double-click on [Parameters] > [VNB001] > [Parameter_#]

> The detailed view shows the tab of the selected parameter set.

10.3.1 VNB001 > ... > [Parameter_#] > Detail [Common Configuration]

Content

26125

The element [Common Configuration] contains information and documentation of the current parameter set about the device settings.

VNB001 > ... > [Parameter_#] > Detail [Overview]

58203

The detailed view [Overview] 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 changed last	--
Parameter set	Name	designation of the parameter set	freely selectable
Display of the device	Display unit	unit in which the values are displayed	Metric [mm/s] Imperial [in/s]
	Speed values	Acceleration values	RMS = effective value Peak = peak value

VNB001 > ... > [Parameter_#] > ... > Detail [Supported Devices]

26123

The element [Supported Devices] offers information about the devices used here.

VNB001 > ... > Detail [Supported Devices] > Tab [Configuration]

26149

Section	Dialogue element	Display	Description
Supported device types	Type of unit	configured sensor	corresponds to the selected device
Supported firmware versions	Min. required	firmware version	indication acc. to VES004
	Max. supported	firmware version	indication acc. to VES004

VNB001 > ... > [Parameter_#] > ... > Detail [Documentation]

26121

The element [Documentation] offers information about location and parameter setting data of the sensor.

VNB001 > ... > Detail [Documentation] > Tab [Application]

26141

Section	Dialogue element	Display	Description
Application	Company	free text	max. 100 characters
	Address		
	City		
	Location		
	Machine		

VNB001 > ... > Detail [Documentation] > Tab [Description]

26142

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
	Date of creation:	date of creation	date later / earlier
	Last change:	date of the last modification	automatic
	Description	free text	max. 100 characters

VNB001 > ... > [Parameter_#] > ... > Detail [Device Information]

26120

The element [Device Information] offers information about the configuration of the alarms and objects as well as about the navigation of path of the device display.

VNB001 > ... > Detail [Device Information] > Tab [Outputs]

26139

Section	Dialogue element	Display	Switching function
Outputs	OUT 1	use and information about alarm configuration	⚙
	OUT 2	use and information about alarm configuration	

Switching functions:

⚙	go to the configurati→ p. of the selected alarm (only active if at least one output is used for alarms)

VNB001 > ... > Detail [Device Information] > Tab [Object Dependencies]

26138

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	

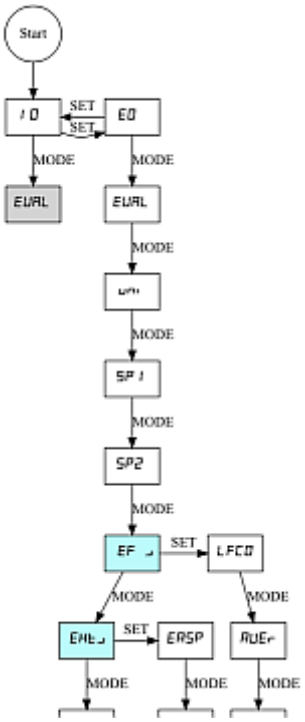
Switching functions:

⚙	configure selected object or input (only active if at least one object is defined)

VNB001 > ... > Detail [Device Information] > Tab [Device Menu]

26137

Visualises the menu of the target device (here: detail)



VNB001 > ... > [Parameter_#] > ... > Detail [Assigned Devices]

26119

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 element [Assigned Devices] contains the following sections:

VNB001 > ... > Detail [Assigned Devices] > Tab [Devices]

26136

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	

10.3.2 VNB001 > ... > [Parameter_#] > Detail [Inputs]

26127

The program differentiates between the following inputs:
- Dynamic inputs (AC)
- Analogue inputs (DC)

Section	Dialogue element	Display	Switching function
Dynamic inputs (AC)	Name	internal (fixed)	 (after right-click)
	Type	internal sensor (fixed)	
	Filter	configured filter	
Analogue inputs (DC)	Name	IN 1 (fixed)	 (after right-click)
	Type	analogue - current (fixed)	
	Reference	4...20 mA (fixed)	
	Value	configured value	

Switching functions:

	go to the configurati→ p. of the selected input

VNB001 > ... > [Parameter_#] > ... > Detail [Dynamic Inputs (AC)] > [Internal]

26122

The configured filter is applied prior to the actual evaluation of the signal. Scaling and unit define the height of the measured amplitudes.

Section	Dialogue element	Display	Switching function
Identification	Name	internal	fixed
	Type	internal sensor	fixed
Configuration	Filter	highpass 2 Hz / 10 Hz	selectable from list
	Unit	g	fixed
	Scaling	25,00 g	fixed

VNB001 > ... > [Parameter_#] > ... > Detail [Analogue Inputs (DC)] > [IN 1]

26118

The signal is defined using the two reference points as a linear function between 0 and 20 mA.

Section	Dialogue element	Display	Switching function
Identification	Name	IN 1	fixed
	Type	Analogue - Current	fixed
Configuration	Unit	configured unit	free text
	Lower reference point	configured assignment to 4 mA	increase / reduce value
	Upper reference point	configured assignment to 20 mA	increase / reduce value

10.3.3 VNB001 > ... > [Parameter_#] > Detail [Objects]

Content

26128

Displays the existing objects.

For the VNB001 the following objects are firmly set

Object type	Description
v-RMS (time domain)	Monitors the vibration velocity in a configurable frequency range. The frequency range is defined via the filter of the dynamic input and the filter of the object. RMS = root mean square Applications: • 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	--	• SE01_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 configurati→ p. of the selected object

VNB001 > ... > Detail [Objects] > [SE01_v_RMS_Time_U1] > Tab [Configuration]

26147

The configured object monitors the indicator on the basis of the current signal of the selected input.

Section	Dialogue element	Display	Switching function
Identification	Name	SE01_v_RMS_Time_U1	fixed
	Type	v-RMS (time domain)	fixed
Configuration	Input	Internal (internal sensor)	fixed

VNB001 > ... > Detail [Objects] > [SE01_v_RMS_Time_U1] > Tab [Processing]

26148

Section	Dialogue element	Display	Switching function
Filter	Type	configured filter type → [Inputs] > [Dynamic Input > [Internal]	fixed
	From	0 Hz	fixed

Section	Dialogue element	Display	Switching function
	To	1000 Hz	fixed
Limits	Warning alarm	configured value	increase / reduce value
	Damage alarm	configured value	increase / reduce value
Processing	Averaging	configured value	increase / reduce value
	Measurement time	0.250 s	fixed

VNB001 > ... > Detail [Objects] > [IN1_UpperLimit_EP1] > Tab [Configuration]

26145

The configured object monitors the indicator on the basis of the current signal of the selected input.

Section	Dialogue element	Display	Switching function
Identification	Name	IN1_UpperLimit_EP1	fixed
	Type	upper limit monitor	fixed
Configuration	Input	IN 1 (Analogue - current, 4...20mA)	fixed

VNB001 > ... > Detail [Objects] > [IN1_UpperLimit_EP1] > Tab [Processing]

26146

The hysteresis is the difference between the set and the reset point of the alarm.

Section	Dialogue element	Display	Switching function
Limits	Warning alarm	configured value	increase / reduce value
	Hysteresis	configured value	increase / reduce value
	Damage alarm	configured value	increase / reduce value
	Hysteresis	configured value	increase / reduce value
Processing	Measurement time	0.500 s	fixed

10.3.4 VNB001 > ... > [Parameter_#] > Detail [History]

26126

Nothing can be configured here.

Section	Dialogue element	Display / Switching function	Description
Object	VNB001	sensor / input type / input	fixed
Interval	--	0 h : 05 min : 00 s	measurement duration: the highest value measured during the interval is recorded
Av.	--	☐ Option not activated ▬ Option partly activated ☑ Option fully activated	average value (from firmware 0.5.19): stores 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 integrated history function with battery buffered real-time clock. In the history memory the device records the following data:

- object values and limits
- timestamps on the events

The history memory comprises approx. 300,000 values.

VNB001 > ... > Detail [History] > Real-time clock

26143

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 aligns 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.

VNB001 > ... > Detail [History] > Recording the measured values

26144

The history memory is a ring memory (FIFO, "first in first out"). If the history memory is full, a small portion of the oldest values is deleted to free up memory space.

The recording 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 recorded in the history memory together with the corresponding time stamp.
- Depending on the selected options (→ chapter "Parameters"), the mean value of the interval measurement is written to the history memory.

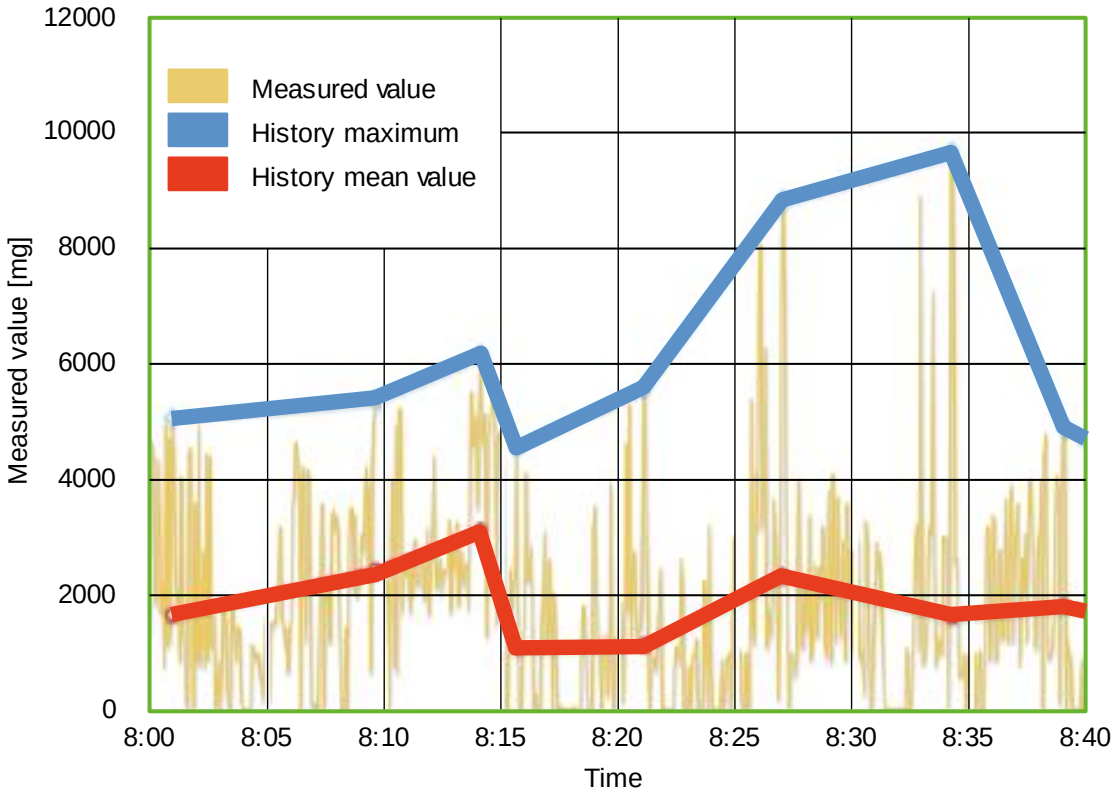


Diagram: History of the measured values (example)

10.3.5 VNB001 > ... > [Parameter_#] > Detail [Alarms]

26124

Displays the existing alarms.

Switching functions:

⚙	go to the configurati→ p. of the selected alarm

VNB001 > ... > Detail [Alarms] > [OUT1_Warning] > Tab [Configuration]

26132

Configure the warning alarm (via the context menu):

• analogue as an analogue alarm or	► Right-click on [OUT1_Warning] > [Switch to analogue alarm]
• digital as a warning alarm	► Right-click on [OUT1_Analog] > [Umschalten auf Digitalalarm]

Section	Dialogue element	Display	Switching function
Identification	Name	configured name of the selected output	fixed
	Type	configured type of the selected output	fixed
	Output	assigned digital output	fixed
Switching output (Only with digital alarm.)	Switch	configured signal: • normally closed • normally open	selectable from list
	Switch-on delay	configured time	increase / reduce value
	Switch-off delay	configured time	increase / reduce value
Signal (only with analogue alarm.)	Signal	configured signal type, e.g. current - 4...20 mA	selectable from list
	Values	configured size, e.g. vibration velocity	selectable from list
Scale (only with analogue alarm)	Value at 4 mA	configured value	increase / reduce value
	Value at 20 mA	configured value	increase / reduce value

VNB001 > ... > Detail [Alarms] > [OUT1_Warning] > Tab [Source]

26133

The objects for the visualisation in this alarm are predefined:
the warning alarms of all configured objects are linked with OR

Section	Dialogue element	Display	Switching function
Alarm source - objects	Table	configured objects	✓ evaluate object ✗ do not evaluate object

VNB001 > ... > Detail [Alarms] > [OUT2_Damage] > Tab [Configuration]

26134

Section	Dialogue element	Display	Switching function
Identification	Name	configured name of the selected output	fixed
	Type	configured type of the selected output	fixed
	Output	assigned digital output	fixed
Configuration	Switch	configured signal: • normally closed • normally open	selectable from list
	Switch-on delay	configured time	increase / reduce value
	Switch-off delay	configured time	increase / reduce value

VNB001 > ... > Detail [Alarms] > [OUT2_Damage] > Tab [Source]

26135

The objects for the visualisation in this alarm are predefined:
the warning alarms of all configured objects are linked with OR

Section	Dialogue element	Display	Switching function
Alarm source - objects	Table	configured objects	✓ evaluate object ✗ do not evaluate object

11 Configure VNB211

Content

25989

Read the operating instructions of the vibration sensor prior to installation

The parameters of the vibration sensor VNB211 can be read and written with the VES004 software.

For the VNB211 the factory setting is:
- v-RMS 10...1000 Hz to ISO10816
- a-Peak 10....6000 Hz.

Via the software a parameter set can be defined which has nothing to do with the factory setting.

This chapter describes the configuration and the monitoring of the VNB211 vibration sensor by means of the VES004 software.

Add a new device to a project: → chapter **Create a new device (VNB)**

11.1 Establish a connection to the VNB sensor

26021

► Connect the device to the USB interface of the PC/laptop
► If not yet done: Install the VNB-USB driver (→ chapter **Install the USB driver**)

Choose either:

► In the tree view, right-click on [VNB211_#]
► In the context menu: [Scan Network...]
► In the window [Found Devices] select the desired device with a left-click
► Use the symbol [Update the project with the selected device] 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 detailed view [Address] > [Configuration] with symbol [Scan Network
► In the window [Found Devices] select the desired device with a left-click
► Use the symbol [Update the project with the selected device] to add the selected device to the project
► In the detailed view [Address] > [Configuration] with symbol [Connect the device]

11.2 VNB211 > Object [VNB211_#] > Detail [Device Settings]

Content

26188

This chapter describes the functions contained in the object [VNB211_#].

The object [VNB211_#] can be reached via the **Tree view** (→ p. 16).

To open the [Settings] menu:

► In the tree view, select the device.

► as option:
Menu [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 detail [Device Settings] is only available if a connection between VNB sensor and the parameter setting software VES004 is or had been established.

The functions of the detail [Device Settings] are only available if a connection between VNB sensor and the parameter setting software VES004 is or had been established.

► Connect VNB sensor to PC/laptop
(→ chapter **Establish a connection to the VNB sensor** (→ p. 159)).

11.2.1 VNB211 > ... > [Device Settings] > Detail [Device]

58204

The [Overview] shows the following information:

Section	Dialogue element	Display	Switching function
Vibration sensors	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 VNB211 > ... > [Device Settings] > Detail [Device]

26154

VNB211 > ... > Detail [Device] > Tab [Configuration]

22460

Section	Dialogue element	Display	Switching function
Vibration sensors	Type	configured device	--
	Version	hardware version read in the device	
	Connection	status 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:

Precondition:

- VES software is connected to the device via [ ]

	Write firmware to device	► Activate the button. > A dialogue window appears. ► Select file with new firmware and confirm with [OK]. > Software updates the firmware of the device.

11.2.3 VNB211 > ... > [Device Settings] > Detail [Address]

26153

The information and functions of the element [Address] are only available if a connection between the VNB sensor and the parameter setting software VES004 is established.

► Connect VNB sensor to PC/laptop
(→ chapter **Establish a connection to the VNB sensor** (→ p. 159))

VNB211 > ... > Detail [Address] > Tab [Configuration]

26168

Section	Dialogue element	Display	Switching function
Connection	Serial number	serial number read in the device	

Switching functions:

scan the USB ports for connected devices	► Activate the button. > A dialogue window with the available devices appears. ► Select the desired device. ► Use the symbol + [Update the project with the selected device] to add the selected device to the project > The device is assigned to the opened project. > The section [Connection] displays information about the assigned device
connect the device	► Activate the button. > The software connects to the assigned device. > The tree view shows the connection status.
disconnect the device	► Activate the button. > The software is disconnected from the device. > The tree view shows the connection status.

11.2.4 VNB211 > ... > [Device Settings] > Detail [Actions]

26152

The information and functions of the element [Actions] are only available if a connection between the VNS sensor and the parameter setting software VES004 is established.

► Connect VNB sensor to PC/laptop
(→ chapter **Establish a connection to the VNB sensor** (→ p. 159)).

VNB211 > ... > Detail [Actions] > Tab [Manipulate Device]

26166

Section	Dialogue element	Display	Switching function
Reboot	---	---	
Execute self-test	---	---	

Switching functions:

	Reboot the device	► Activate the button. > The confirmation message appears. ► Start the process with [Yes] OR Abort the process with [No] > If [Yes]: The device reboots.
	Execute self-test in 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].

VNB211 > ... > Detail [Actions] > Tab [Reset Device]

26167

Section	Dialogue element	Display	Switching function
Reset history	---	---	
Reset parameters	---	---	
Restore factory settings	---	---	

Switching functions:

	Reset history	► Activate the button. > The 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. > The 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.

11.3 VNB211 > Object [VNB211_#] > [Parameter_#]

Content

26187

The tab [Parameter_#] contains all information and configuration and monitoring options of the parameter set assigned to the vibration sensor.

To open the tab [Parameters_#]:

► In the tree view, select the desired sensor.

► Choose either:
[Device] menu > [Parameter] > [Open]
Or:
Double-click on [VNB211_#] > [Parameter_#]

> The detailed view shows the tab [Parameter_#]

It is always the parameter set currently assigned to the device which is opened (→ chapter **[Parameter] menu > [Device]**)

To open any parameter set:

► In the tree view double-click on [Parameter] > [VNB211] > [Parameter_#]

> The detailed view shows the tab of the selected parameter set.

11.3.1 VNB211 > ... > [Parameter_#] > Detail [Common Configuration]

Content

26162

The element [Common Configuration] contains information and documentation of the current parameter set about the device settings.

VNB211 > ... > [Parameter_#] > Detail [Overview]

58205

The detailed view [Overview] 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 changed last	--
Parameter set	Name	designation of the parameter set	freely selectable
Display of the device	Display of the unit	unit in which the values are displayed	• metric [mm/s] • Imperial [in/s]

VNB211 > ... > [Parameter_#] > ... > Detail [Supported Devices]

22470
26160

The element [Supported Devices] offers information about the devices used here.

VNB211 > ... > Detail [Supported Devices] > Tab [Configuration]

22471
26183

Section	Dialogue element	Display	Description
Supported device types	Type of unit	configured sensor	corresponds to the selected device
Supported firmware versions	Min. required	firmware version	indication acc. to VES004
	Max. supported	firmware version	indication acc. to VES004

VNB211 > ... > [Parameter_#] > ... > Detail [Documentation]

22472
26158

The element [Documentation] offers information about location and parameter setting data of the sensor.

VNB211 > ... > Detail [Documentation] > Tab [Application]

22473
26176

Section	Dialogue element	Display	Description
Application	Company	free text	max. 100 characters
	Address		
	City		
	Location		
	Machine		

VNB211 > ... > Detail [Documentation] > Tab [Description]

22474
26177

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
	Date of creation:	date of creation	date later / earlier
	Last change:	date of the last modification	automatic
	Description	free text	max. 100 characters

VNB211 > ... > [Parameter_#] > ... > Detail [Device Information]

22475
26157

The element [Device Information] offers information about the configuration of the alarms and objects as well as about the navigation of path of the device display.

VNB211 > ... > Detail [Device Information] > Tab [Outputs]

22476
26174

Section	Dialogue element	Display	Switching function
Outputs	OUT 1	use and information about alarm configuration	⚙
	OUT 2	use and information about alarm configuration	

Switching functions:

⚙	go to the configurati→ p. of the selected alarm (only active if at least one output is used for alarms)

VNB211 > ... > Detail [Device Information] > Tab [Object Dependencies]

22477
26173

Section	Dialogue element	Display	Switching function
Object dependencies	Name	name of the object	⚙
	Type	parameter type	

Section	Dialogue element	Display	Switching function
	Use	use of the parameters	
	Source	name of the trigger	

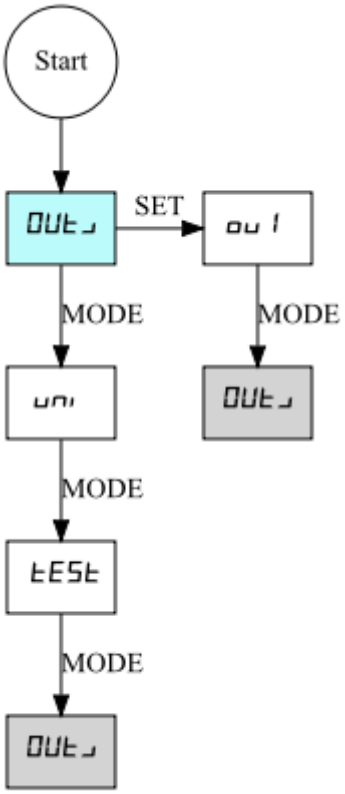
Switching functions:

⚙	configure selected object or input (only active if at least one object is defined)

VNB211 > ... > Detail [Device Information] > Tab [Device Menu]

26172

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

VNB211 > ... > [Parameter_#] > ... > Detail [Assigned Devices]

22479
26156

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 element [Assigned Devices] contains the following sections:

VNB211 > ... > Detail [Assigned Devices] > Tab [Devices]

22480
26171

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 VNB211 > ... > [Parameter_#] > Detail [Inputs]

26164

VNB211 > ... > [Parameter_#] > ... > Detail [Overview]

58206

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 (fixed)	
	Filter	configured filter	
Analogue inputs (DC)	Name	configured name	 (after right-click)
	Type	analogue - current (fixed)	
	Reference	4...20 mA (fixed)	
	Value	configured value range	

Switching functions:

	go to the configurati→ p. of the selected input

VNB211 > ... > [Parameter_#] > ... > Detail [Dynamic Inputs (AC)]

58207

Section	Dialogue element	Display	Switching function
Dynamic inputs (AC)	Name	configured name	
	Type	internal sensor (fixed)	
	Filter	configured filter	

Switching functions:

	add a new dynamic input

	go to the configurati→ p. of the selected input
	delete the selected dynamic input

VNB211 > ... > [Parameter_#] > ... > Detail [Dynamic Inputs (AC)] > [Internal]

22484
26159

The configured filter is applied prior to the actual evaluation of the signal. Scaling and unit define the height of the measured amplitudes.

Section	Dialogue element	Display	Switching function
Identification	Name	internal	fixed
	Type	internal sensor	fixed
Configuration	Filter	highpass 2 Hz / 10 Hz	selectable from list
	Unit	g	fixed
	Scaling	25,00 g	fixed

VNB211 > ... > [Parameter_#] > ... > Detail [Analogue Inputs (DC)]

58208

Section	Dialogue element	Display	Switching function
Analogue inputs (DC)	Name	configured name	, ,
	Type	analogue - current (fixed)	
	Reference	4...20 mA (fixed)	
	Value	configured value range	

Switching functions:

	add a new analogue input
	go to the configurati→ p. of the selected input
	delete the selected dynamic input

VNB211 > ... > [Parameter_#] > ... > Detail [Analogue Inputs (DC)] > [IN 1]

26155

The signal is defined using the two reference points as a linear function between 0 and 20 mA.

Section	Dialogue element	Display	Switching function
Identification	Name	free text	--
	Type	analogue - current	fixed
Configuration	Unit	configured unit	free text
	Lower reference point	configured assignment to 4 mA	increase / reduce value
	Upper reference point	configured assignment to 20 mA	increase / reduce value

11.3.3 VNB211 > ... > [Parameter_#] > Detail [Objects] > [Overview]

Content

26165

The detailed view shows the configured objects.

Section	Dialogue element	Display	Switching function
Overview	UI	Menu entry on the device	
	Name	configured name	
	Type	configured object type	
	Input	configured input	

Switching functions:

	add a new object of type "a-RMS (time domain)"
	add a new object of type "v-RMS (time domain)"
	add a new object of type "a-Peak (time domain)"
	add a new object of type "Upper limit monitor"
	add a new object of type "Lower limit monitor"
	go to the configurati→ p. of the selected object
	delete selected object from the list

VNB211 > ... > Detail [Objects] > Object types

Content

26182

Preconfigured object types for the following monitoring tasks are offered which can be configured using a wizard:

Name objekt 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

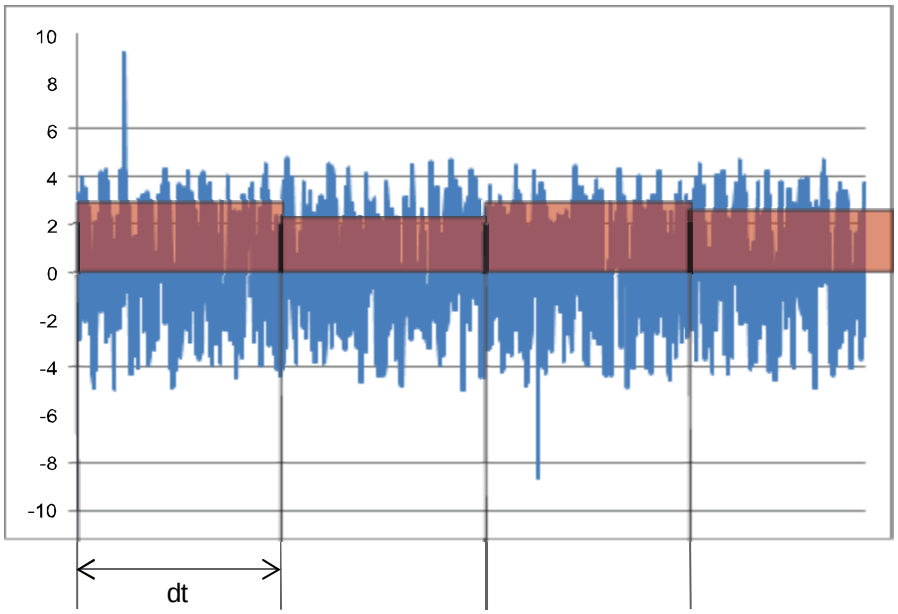
VNB211 > ... > Object types > [a-RMS], [v-RMS] (time domain)

26185

- a-RMS (time domain) monitors the acceleration,
- v-RMS (time domain) monitors the vibration velocity

... in a configurable frequency range.

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



Legend: dt = measurement time, measurement period

Applications:

- Measurements to ISO 10816 and other applicable standards (v-RMS)
- Loose machine parts (v-RMS)

- Alignment errors (v-RMS)
- Chatter vibrations, resonances (a-RMS)

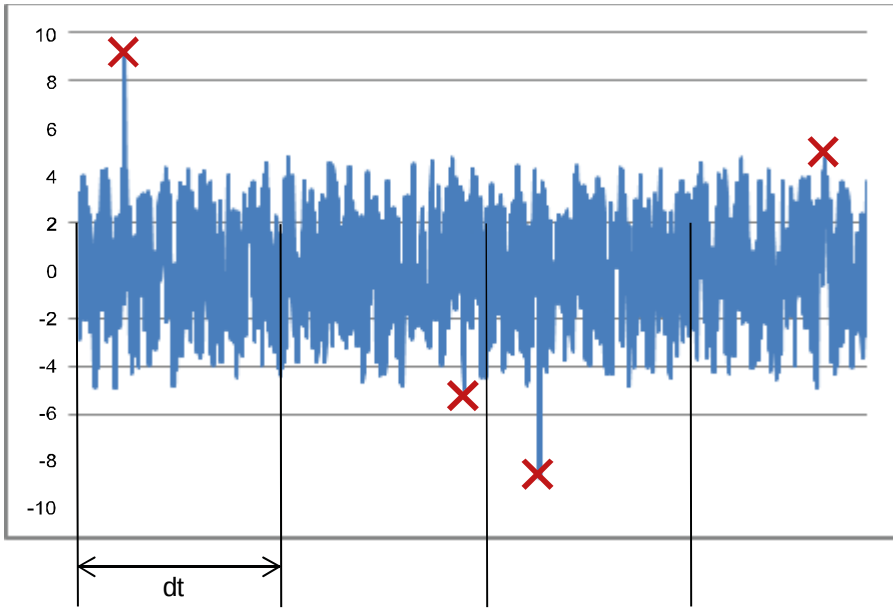
VNB211 > ... > Object types > [a-Peak (time domain)]

26184

The filtering of the time signal is done by means of the filter for the dynamic input → tab [Configuration]) and 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).



Legend: dt = measurement time, measurement period

Applications:
- Crash (lowpass)
- Cavitation on a pump (highpass)
- Metal-on-metal friction, e.g. bearing damage (highpass)

VNB211 > ... > Object types > [Upper Limit Monitor], [Lower Limit Monitor]

26186

[Upper Limit Monitor], [Lower Limit Monitor] monitor analogue signals (DC signals)

The signal source can only be the analogue input IN 1.

VNB211 > ... > Detail [Objects] > ... > Tab [Configuration]

26180

Under the tab [Configuration] only the preset [Name] can be changed. All other fields are fixed.

Section	Dialogue element	Display	Switching function
Identification	Name	preset name according to input and object type	free text
	Type	selected object type	fixed

Section	Dialogue element	Display	Switching function
	Menu item on the device	short form of the type (figure # results from the table [Object types])	fixed
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)	fixed

VNB211 > ... > Detail [Objects] > ... > Tab [Processing]

26181

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 limit frequency	depending on the filter type: increase / reduce value or: fixed
	To	configured upper limit frequency	depending on the filter type: increase / reduce value or: fixed
Limits	Warning alarm	configured value	increase / reduce value
	Hysteresis only for upper limit / lower limit	configured value	increase / reduce value
	Damage alarm	configured value	increase / reduce value
	Hysteresis only for upper limit / lower limit	configured value	increase / reduce value
Processing only for a-RMS, v-RMS, a-Peak	Averaging	configured value	increase / reduce value
Processing	Measurement time	configured value	increase / reduce value

11.3.4 VNB211 > ... > [Parameter_#] > Detail [History]

Content

26163

The octavis vibration sensor VNB211 has an integrated history function with battery buffered real-time clock. In the history memory the device records the following data:

- object values and limits
- timestamps on the events

The history memory comprises approx. 300,000 values.

Detail [History]:
Using the symbol at the top right in the detail window, you can activate/deactivate the entire history memory. If the history memory is active, the history settings can be made for the objects configured in the parameter set.

Switching functions:

	Switch: the history memory is deactivated. Parameters cannot be configured.
	Switch: the history 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.

With the checkbox [Av.] which can be selected individually for each object, additional values can be stored optionally. 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	fixed
Interval	--	0 h : 05 min : 00 s	measurement duration: the highest value measured during the interval is recorded
Av.	--	Option not activated Option partly activated Option fully activated	mean average records the mean value of the interval measurement
Estimated recording time	--	maximum time period that can be stored in the history	indication of the possible recording time

VNB211 > ... > Detail [History] > Real-time clock

22500
26178

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 aligns 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.

VNB211 > ... > Detail [History] > Recording of the measured values

22502
26179

The history memory is a ring memory (FIFO, "first in first out"). If the history memory is full, a small portion of the oldest values is deleted to free up memory space.

The recording 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 recorded in the history memory together with the corresponding time stamp.
- Depending on the selected options (→ chapter "Parameters"), the mean value of the interval measurement is written to the history memory.

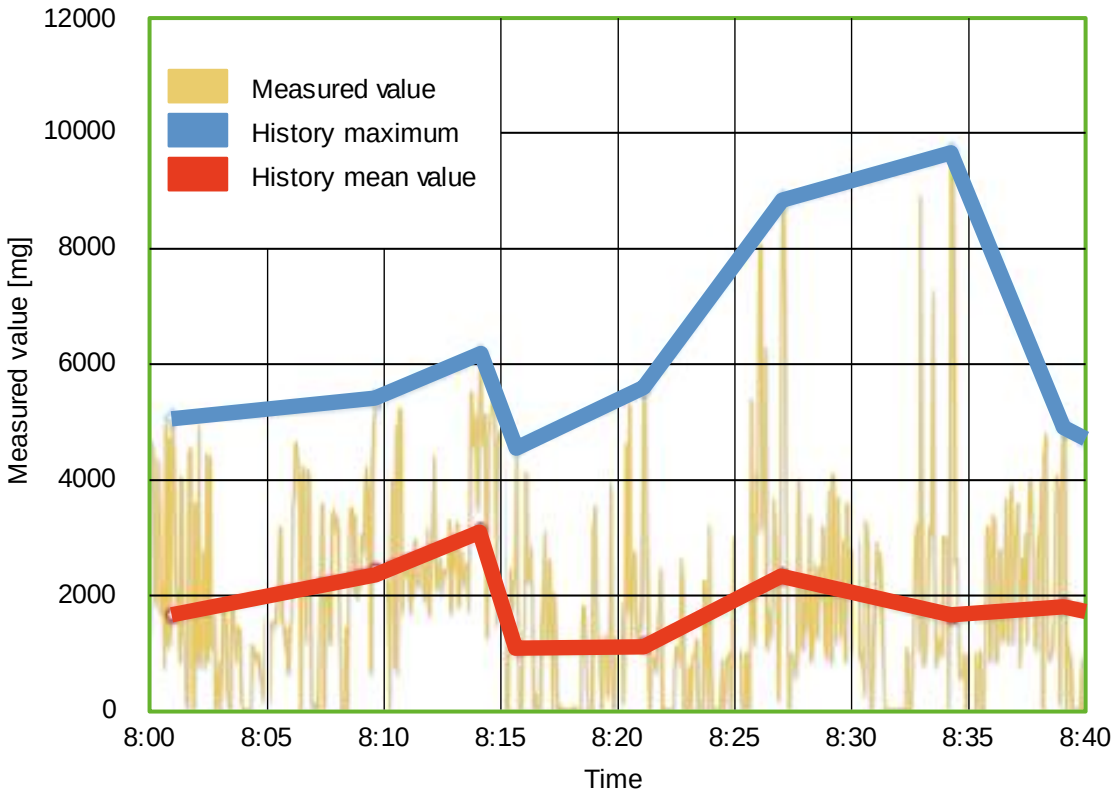


Diagram: History of the measured values (example)

11.3.5 VNB211 > ... > [Parameter_#] > Detail [Alarms] > [Overview]

26161

Displays the existing alarms.

Maximum two of the following alarm types can be defined:

- analogue alarm
- warning alarm
- damage alarm
- user-defined alarm

Switching functions:

	add a new alarm of the "analogue alarm" type
	add a new alarm of the "warning alarm" type
	add a new alarm of the "damage alarm" type

	add a new alarm of the "use-defined alarm" type
	go to the configurati→ p. of the selected alarm
	delete selected object from the list

VNB211 > ... > Detail [Alarms] > Alarm type > Tab [Configuration]

26169

Section	Dialogue element	Display	Switching function
Identification	Name	configured name of the selected output	fixed
	Type	configured type of the selected output	fixed
	Output	assigned digital output	selectable from list
Switching output (only with digital alarm)	Switch	configured signal: • normally closed • normally open	selectable from list
	Switch-on delay	configured time	increase / reduce value
	Switch-off delay	configured time	increase / reduce value
Signalling (only with analogue alarm)	Signal	configured signal: • current 4 - 20 mA	selectable from list
	Values	configured value type	selectable from list
Scale (only with analogue alarm)	Value at 4 mA	configured value	increase / reduce value
	Value at 20 mA	configured value	increase / reduce value

VNB211 > ... > Detail [Alarms] > Alarm type > Tab [Source]

26170

Select the objects for visualisation in this alarm.
For an analogue alarm the units must match.

Section	Dialogue element	Display	Switching function
Alarm source	Table	configured objects	✓ evaluate object ✗ do not evaluate object

12 Monitoring

Content

26070

By "monitoring", we understand the detection of measured data.

12.1 Monitoring types

Content

26071

12.1.1 Measured data (overview)

26068

The diagnostic electronics and the sensors offer a number of different measurement 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 object values using different diagram types (→ chapter **Data monitoring** (→ p. 178) All objects or subobjects can be selected as a source and added to the diagram.
	Counter monitoring (only VSE)	Display the current states of the configured counters (→ chapter **Counter monitoring** (→ p. 179) 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 (→ chapter **I/O monitoring** (→ p. 179) All inputs and outputs of the device can be selected as a source and added to the diagram. Also a DC signal on the dynamic input functions in this case.
	Spectrum monitoring (all VSE; VNB min hardware version AD, firmware version 1.3.0)	Display frequency spectra (FFT / H-FFT) (→ chapter **Spectrum monitoring** (→ p. 180) Only dynamic inputs of the diagnostic electronics can be selected as a source and added to the diagram. Only one dynamic input per diagnostic electronic can be selected.
	Raw data monitoring (all VSE; VNB min hardware version AD, firmware version 1.3.0)	Display raw data of a dynamic input (time signal) (→ chapter **Rohdaten-Monitoring**) Only dynamic inputs of the diagnostic electronics can be selected as a source and added to the diagram. Only one dynamic input per diagnostic electronic can be selected.
	History monitoring	Read and display the history memory (→ chapter **History monitoring** (→ p. 182) 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 measurement values in the history memory.

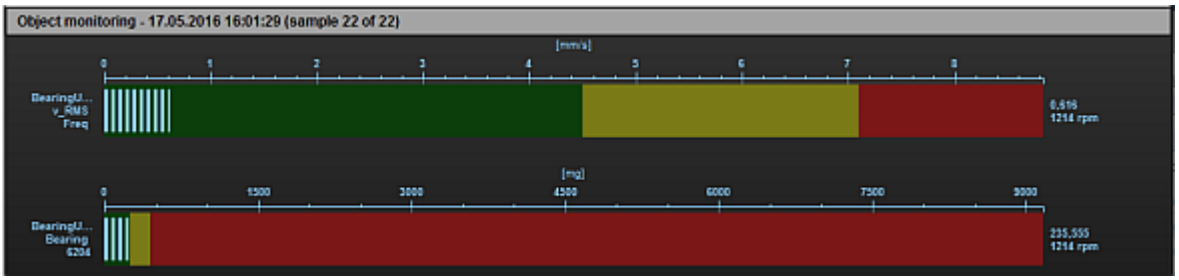
12.1.2 Data monitoring

26012

In the data monitoring section, you can view the current measurement 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:



Switching functions:

The following special switching functions are available:

	change to the object level view
	change to the subobject view

12.1.3 Counter monitoring

26004

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

12.1.4 I/O monitoring

26042

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	calculated value corresponding to the set scaling
Analogue outputs	analogue measured value

Switching functions:

No special switching functions available.

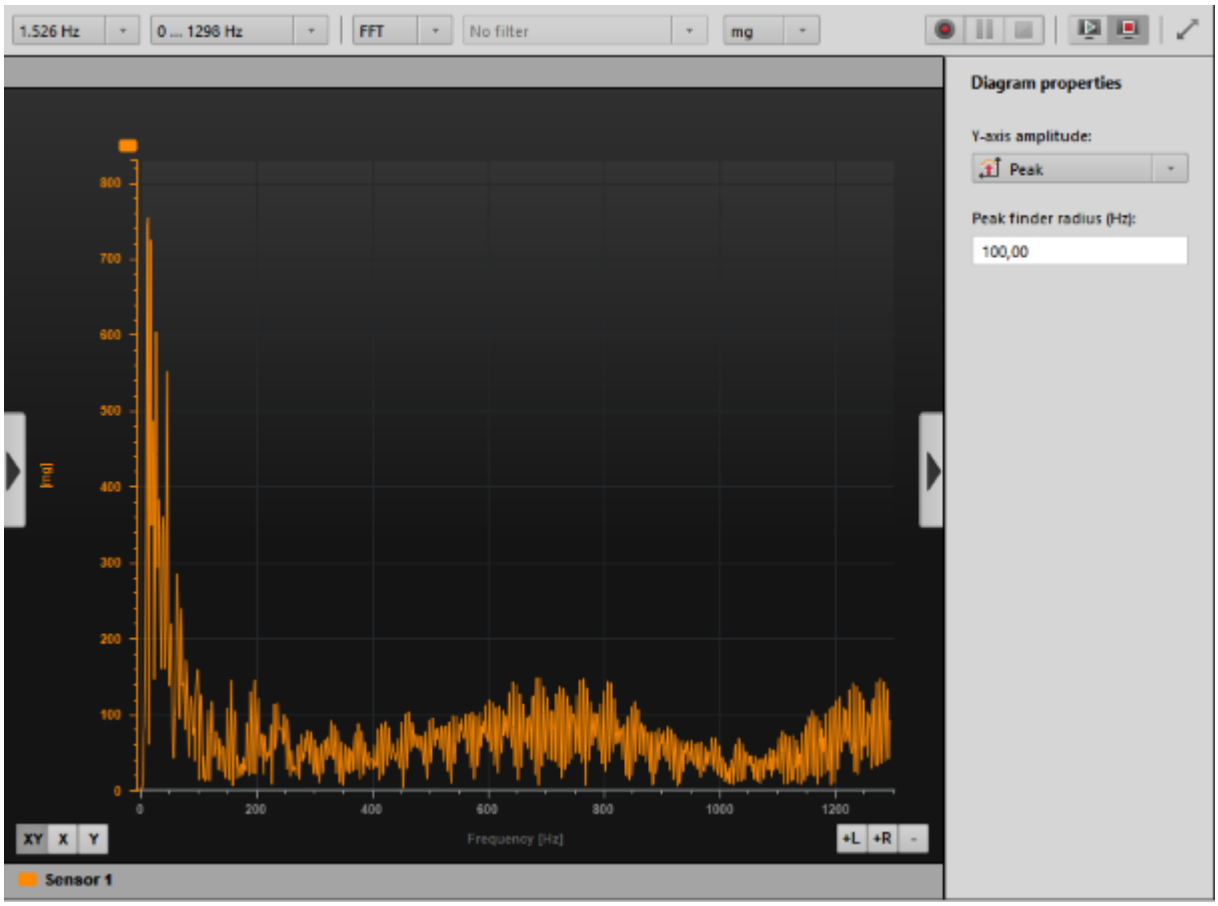
12.1.5 Spectrum monitoring

26100

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:



Switching functions:

Section	Significance	Value
1. Selection field	frequency resolution for spectrum calculation	24.414 Hz ... 0.191 Hz
2. Selection field	Frequency band. Indicates which frequency range is shown. 850 values per spectrum (850 • resolution = frequency range)	
3. Selection field	Type of analysis	FFT H-FFT
4. Selection field	Type of filtering for H-FFT	

Section	Significance	Value
5. Selection field	Unit of the y axis for FFT analysis	mm mm/s mg

12.1.6 Raw data monitoring

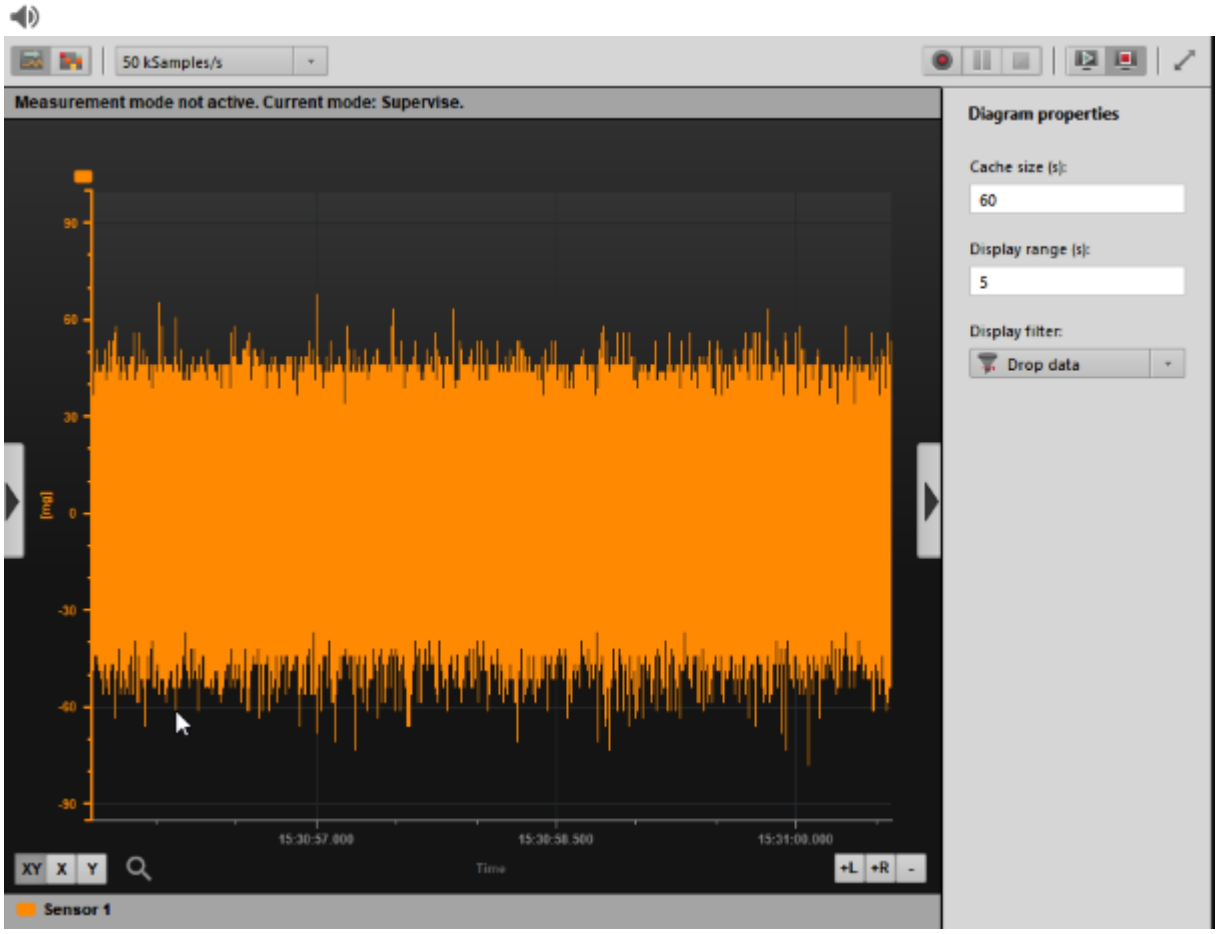
58209

The raw data of the dynamic input are shown in the monitoring of the time signal. This is 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:



Switching functions:

The following special switching functions are available:

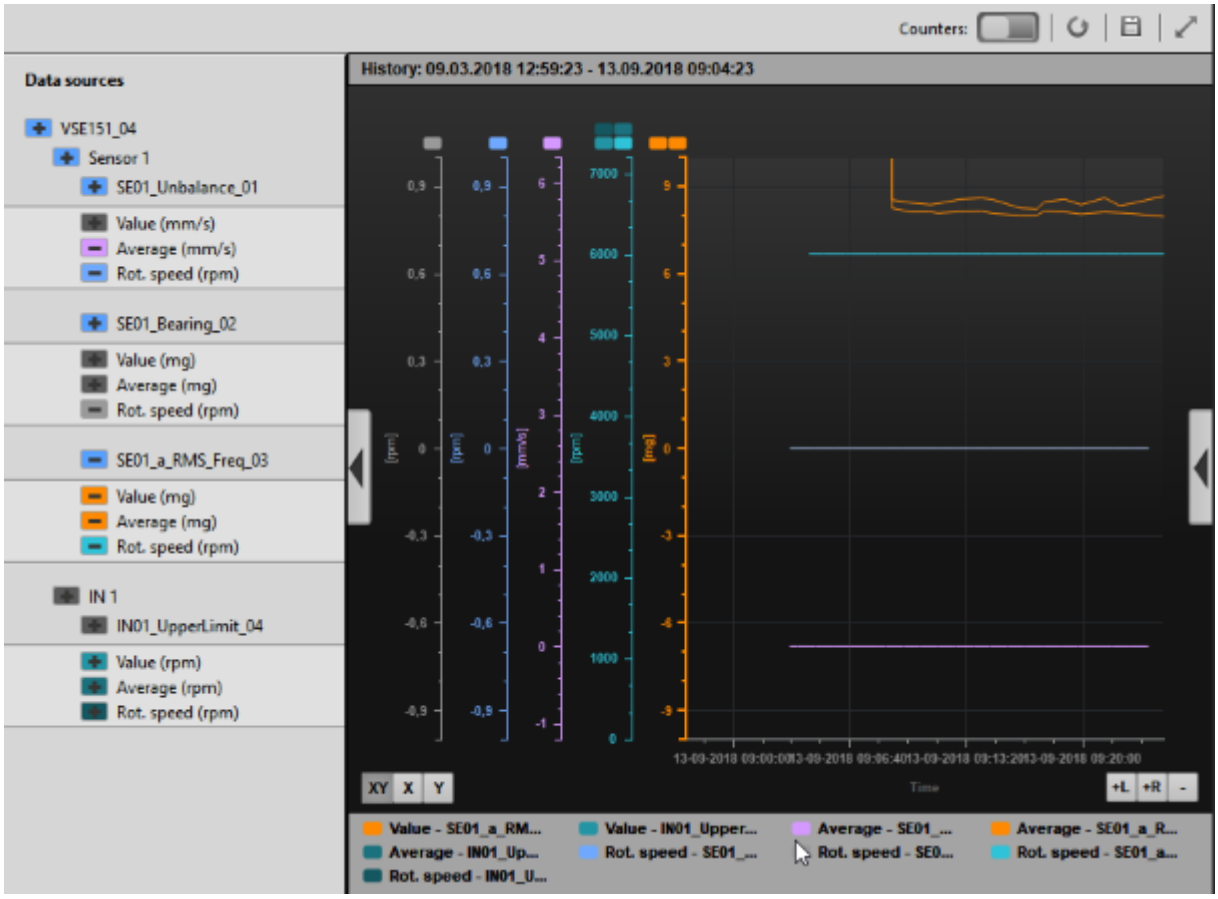
1.	Selection field	Sampling rate in 1,000 samples per second	50 k data sample/s 100 k data sample/s
2.	/	Audio output on/off	

12.1.7 History monitoring

26040

The history reads and displays the internal memory of the diagnostic electronics. Only those objects with a measurement value in the history memory are shown. The history helps to visualise the development of measurements prior to a damage message (sudden or progressive rise).

Example:



Switching functions:

The following special switching functions are available:

	Save history Memory location = project tree view > [Device_#] > [Data] > [History dd.mm.yyyy hh:mm:ss]

12.2 Record and display measured data

Content

26080

Prerequisite:

- VES software is connected to the device via [ ]

There are several methods to select a monitoring type:

- **Tool bar** (→ p. 16)
- **Menu bar** (→ p. 15)
- **Context menu** (→ p. 18) via right-click on the device in the tree view
  (→ also chapter **Context menu functions (→ p. 194)**

► Select the monitoring type

> The monitoring is displayed in the **Detailed view** (→ p. 17).

> The program starts the data transfer.

12.2.1 Switching functions (Monitoring)

26103

The following switching functions are available for almost all monitoring types.

Project data monitoring

26079

Symbol	Description	Prerequisite
▶	Start project data monitoring	Monitoring stopped
■	Stop project data monitoring	Monitoring in progress

Tool bar above the data display

58210

	Change to the bar graph view The bar graph consists of a progress bar, an axis and the displayed limit values, where applicable. The axis can be scaled and formatted as required. Values with the same engineering unit can be displayed on the same axis.
	Change 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.
	Change to the moving data display (y-t-graph (continuous) 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 measurements will therefore be outside the window and will no longer be displayed.

	Change to the unlimited data display ((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 measurement values, ensuring a joint display within the same diagram.
	Start data recording Start the recording of the current monitoring
	Pause data recording Pause the recording of the current monitoring
	Stop data recording Stop the recording of the current monitoring
	Start data monitoring Restart the current monitoring. The new measurement values are displayed again in the selected graph
	Stop data monitoring Stops the current monitoring measurement; new measurement values are no longer 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
	Switch full screen mode [F11] Change to the full screen mode (or: [F11]) or change back to the normal screen mode
/	Switch on/off audio output Only for raw data

Switching functions within the data display

26086

	Selection of the data sources
	Display of the properties
XY	Activate the zoom mode for the x- and y-axes The zoom mode activates the zoom for a selected axis.
X	Activate the zoom mode for the x-axis The zoom mode activates the zoom for a selected axis.
Y	Activate the zoom mode for the y-axis The zoom mode activates the zoom for a selected 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 display

► In the context menu: click [Undo Zoom]

12.2.2 Record and save measured data

26081

► Select the requested monitoring type, e.g. raw data monitoring, in the tool bar.

> New window [Monitoring] opens.

> The program starts the data transfer.

► If the data transfer does not start automatically:

Start data monitoring in the [Monitoring] window via [ ] on the right.

► If necessary, adapt the representation via the monitoring switching functions.
→ chapter **Switching functions (Monitoring)** (→ p. 183)

► Start data recording via [ ].

> With each recording cycle, "Samples recorded" is increased by 1.

► Wait for the recording of the required signals.

► Stop data recording via [ ].

► Confirm the query "Do you wish to save this data 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.

26081

The program automatically stores the projects as well as the corresponding parameters and data in the following directory:
`C:\Users\Public\Documents\VES004`

► Stop data monitoring display via [ ].
If the data recording has not yet been stopped, it continues in the background.

12.2.3 Rename measured data recordings

26082

> The names of the data recordings are indicated in the tree view of the project under [Data].

► If required: 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 not be able any more to find or activate the data set.

12.2.4 Export measured data

26031

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.

> Window [Save as...] is displayed.

► If necessary, 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].

12.2.5 Import measured data

26045

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.

> Window [Open] is displayed.

► Select the directory location and the file.
Permissible data types:
`*.idat` (VES004 data) (preset)
`*.ohs` (VES003 history)
`*.orc` (VES003 data)

► 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 not affected
- import the data set to be imported in addition to the original data set
the original data set name is not affected
the copy of the data set is supplemented by the counting number "(1)"

12.2.6 Importing IO-Link BLOB

58211

- 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 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 in csv, xml, xlsx, wav
  - Audio playback
  - Calculation of a spectrum from a raw data recording

Importing recorded raw data of a vibration sensor with IO-Link interface (e.g. VVB001) as follows into a project:

► In the tree view, right-click on [Data] or the name of the [Data group].
► Click on [Import...] in the context menu.
> [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 record with the device article number as a prefix, e.g. `VVB001`.

12.2.7 Spectrum monitoring of raw data

26101

Post-process recorded raw data and display in spectrum monitoring:

► Right-click on the raw data record in the tree view below [Data].
► Click [Spectrum] in the context menu.
> The raw data record is shown in the window of spectrum monitoring.

12.2.8 Evaluate measured data

Content

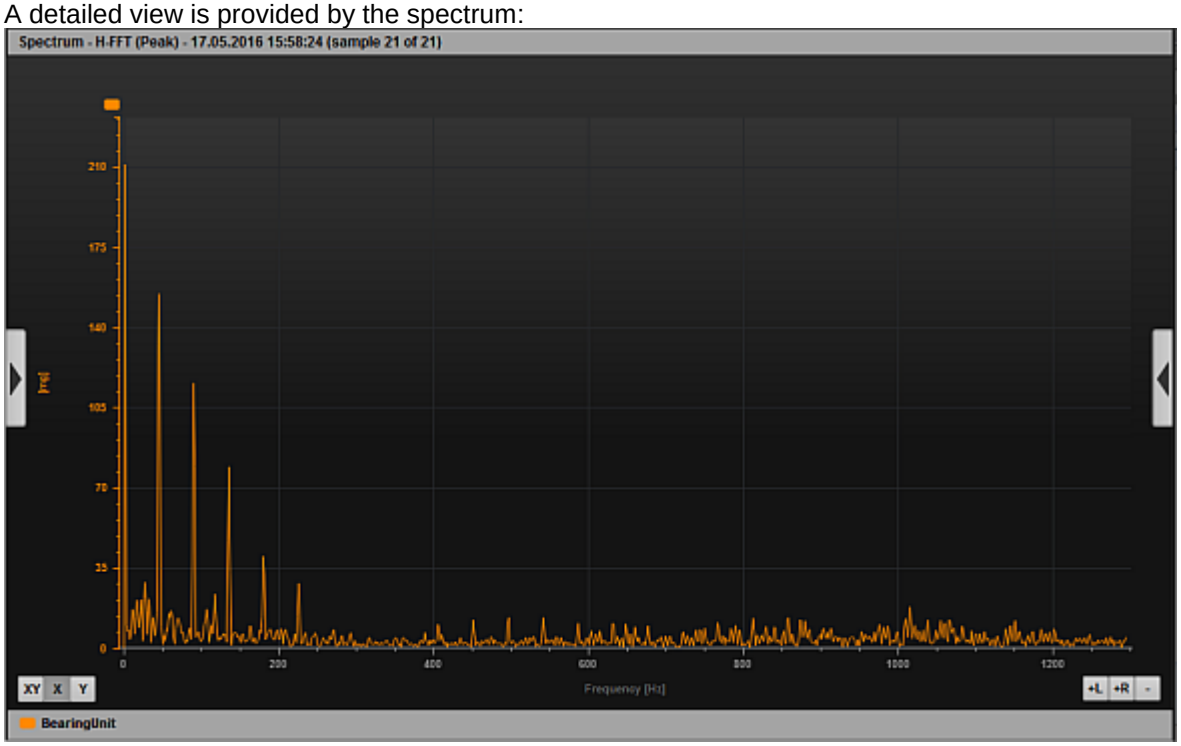
26023

Example: Bearing damage

26029

Prerequisite:
- sensor (e.g. VSA001) defined as [Dynamic input]
- trigger defined for the rotational speed range to be examined
- object defined for bearing monitoring, including:
- subobjects configured according to the bearing data
- appropriate limit values configured

A detailed view is provided by the spectrum:



View: Measured data bearing damage (full screen)

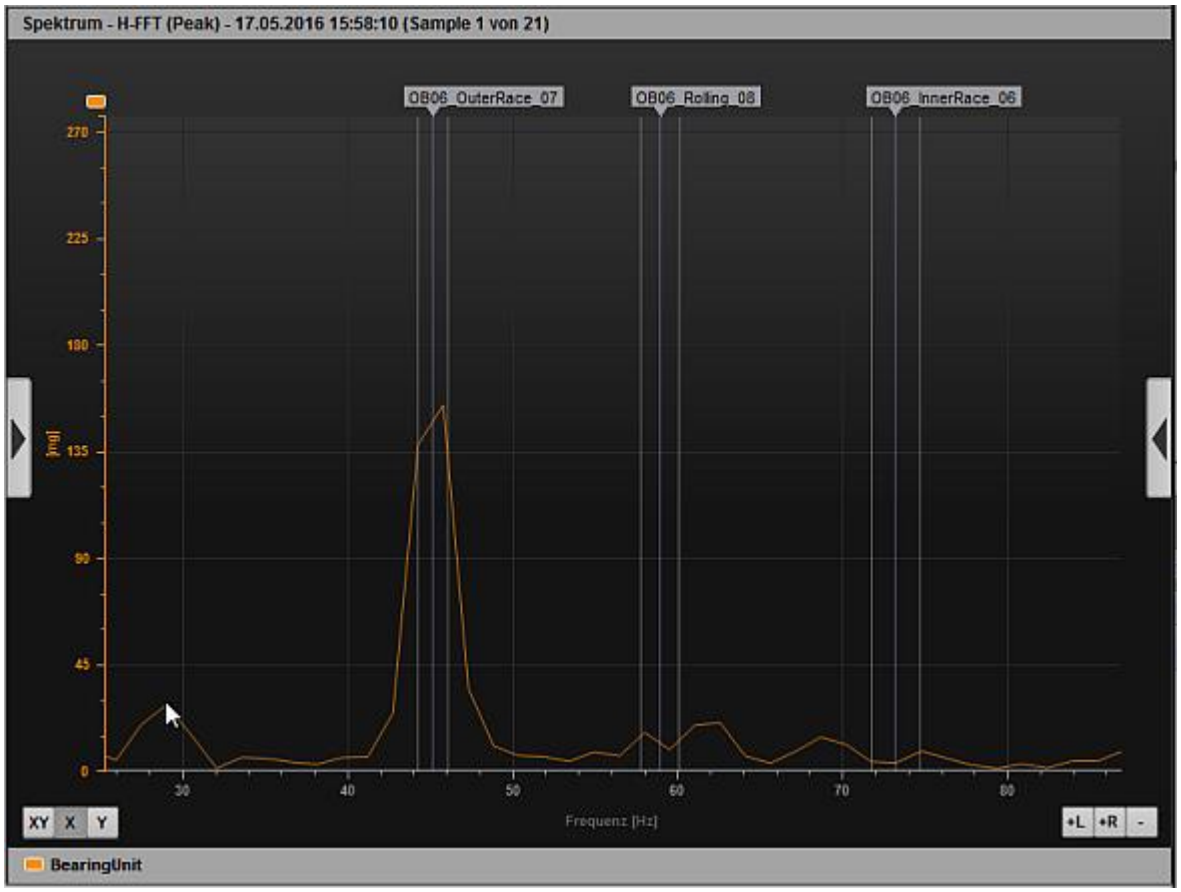
► Select X axis zooming by clicking on [X].

► Right-click on the graph legend (here: BearingUnit).

► Activate the following settings in the context menu (if necessary):
- [Subobjects] > [All]
- [Frequency window]

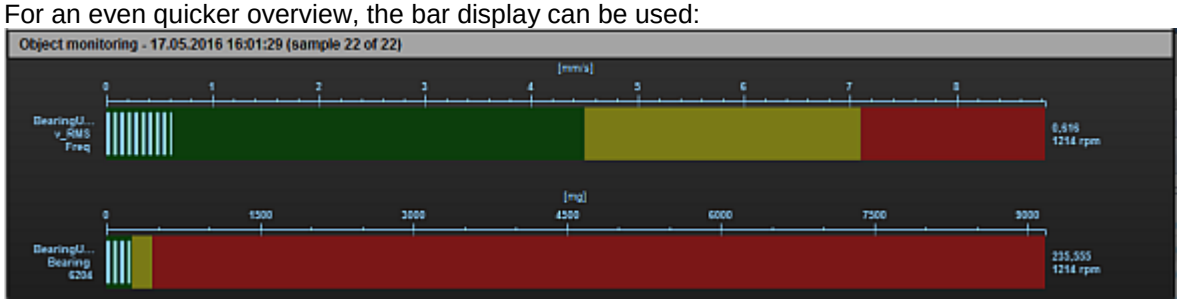
► Use the left mouse button to open window that is to be as small as possible
here: about 45 Hz around the first peak after the 0 Hz mark

> 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:



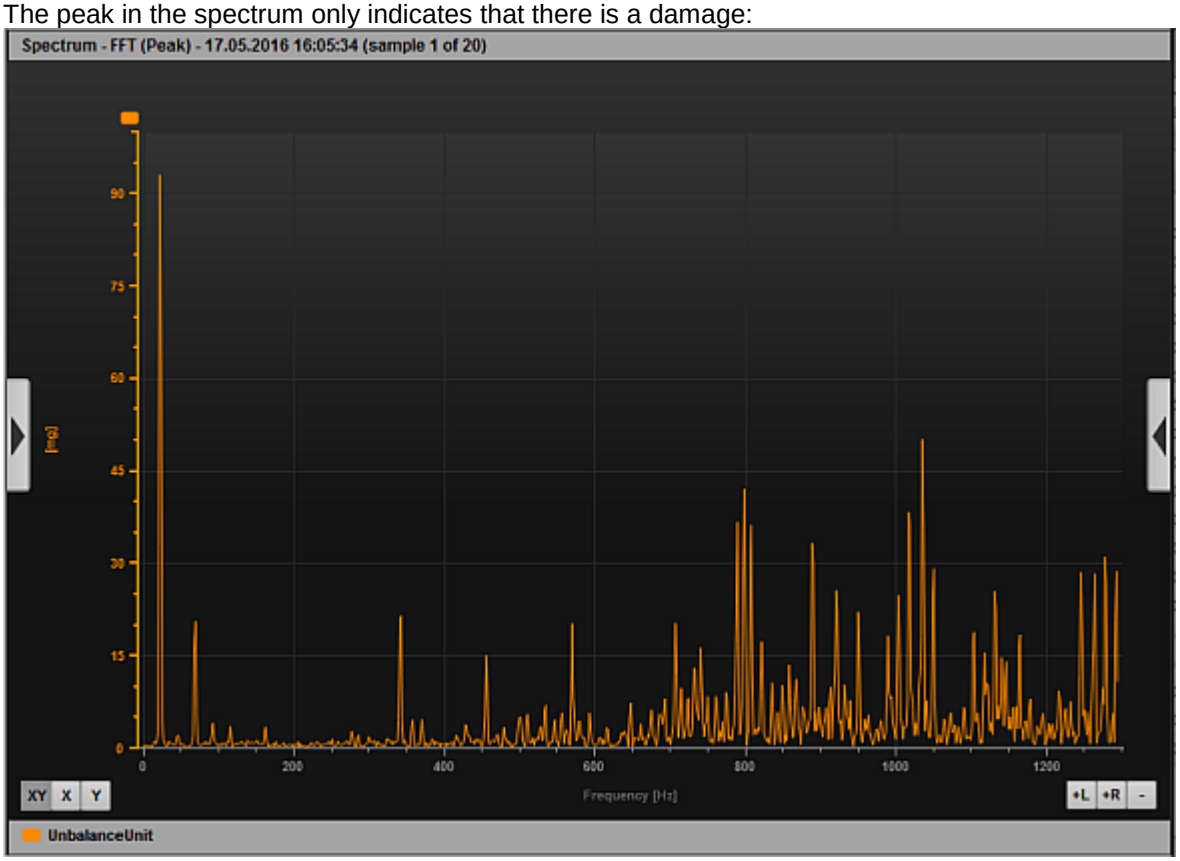
> The lower bar shows that the bearing is close to the warning alarm.

Example: Unbalance

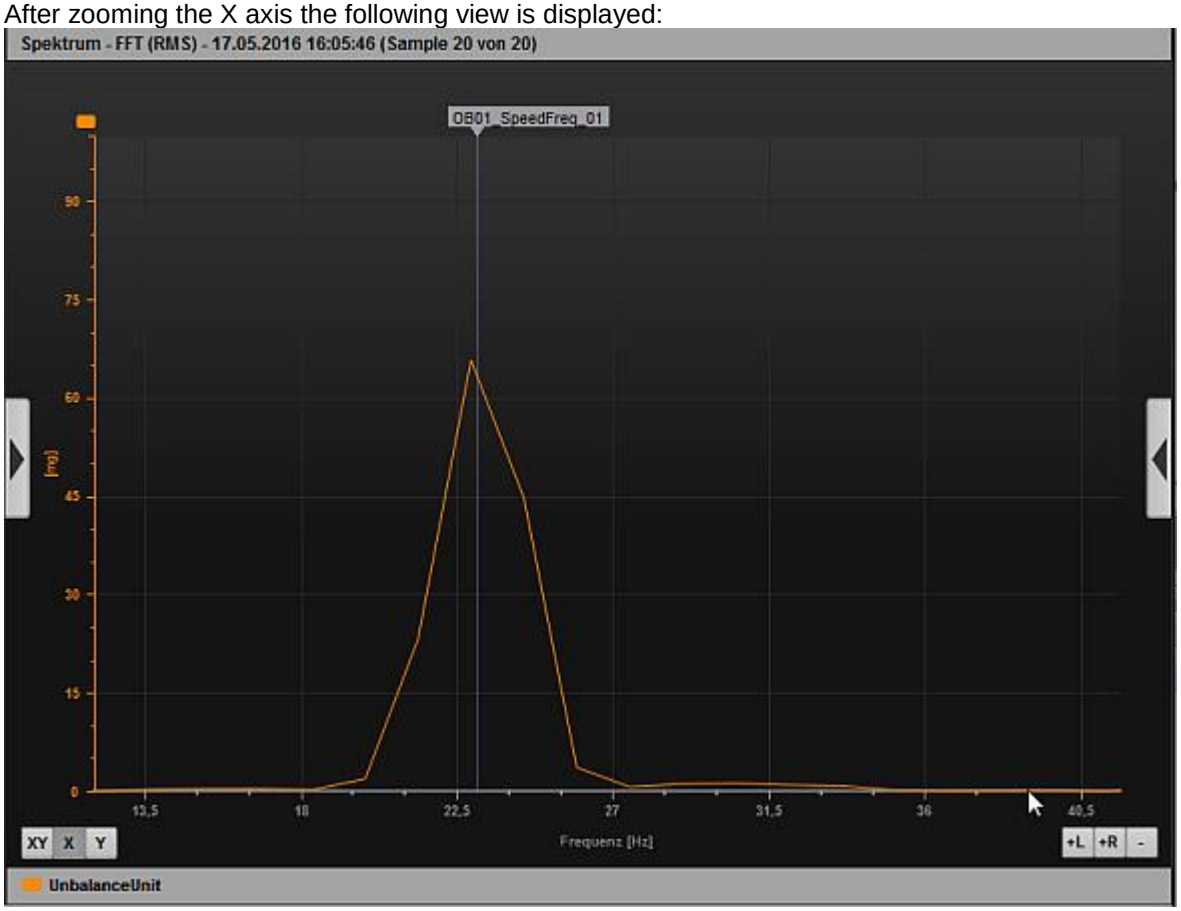
26030

Prerequisite:
- sensor (e.g. VSA001) defined as [Dynamic input]
- trigger defined for the rotational speed range to be examined
- object defined for bearing monitoring; including...
- subobjects configured according to the bearing data
- appropriate limit values configured

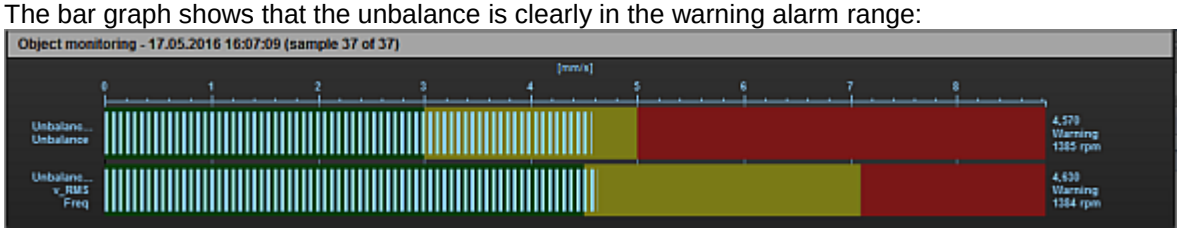
The peak in the spectrum only indicates that there is a damage:



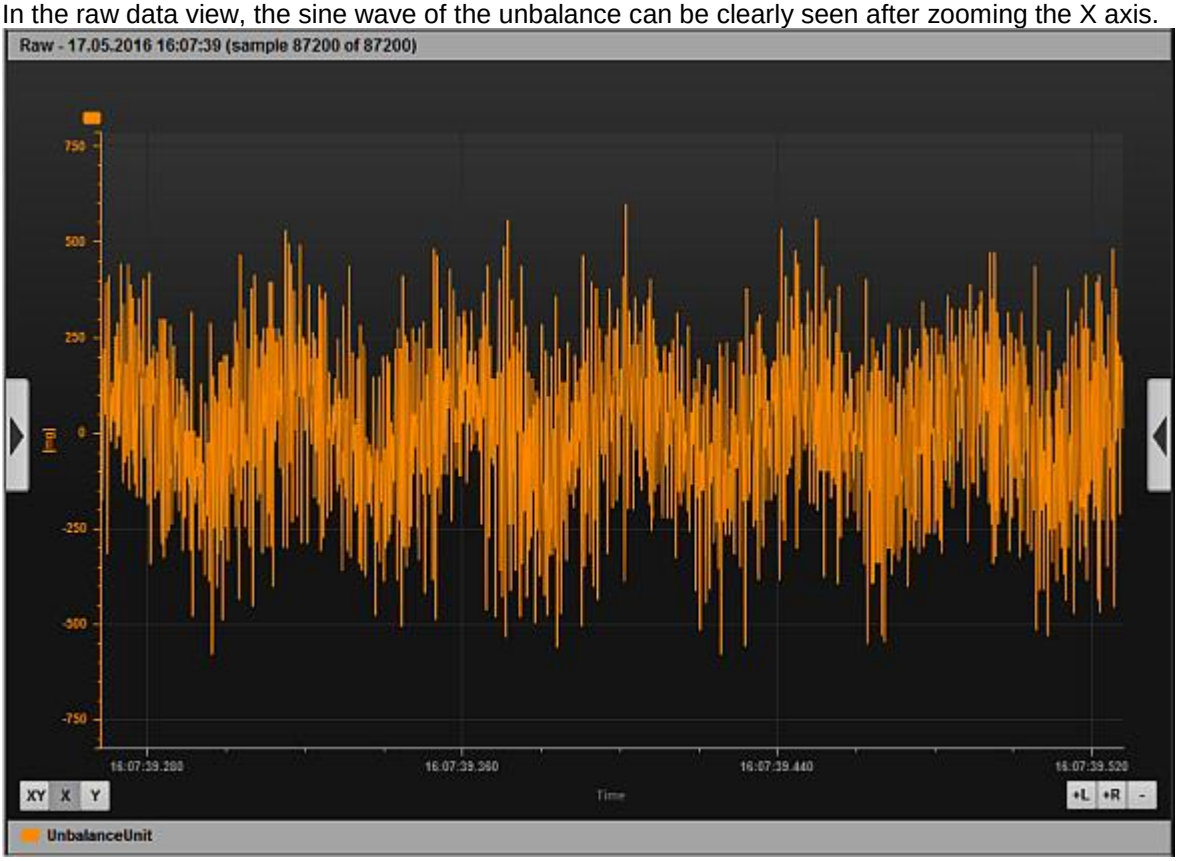
After zooming the X axis the following view is displayed:



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.



12.3 Context menu functions

Content

26000

12.3.1 Context menu data sources

25997

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 existing axis	Adds the selected object to the table.

12.3.2 Context menu diagram area

25998

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 a mean value of x measurement 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 measurement 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 measurement values are displayed again.
Remove row	Removes the row of the selected object from the diagram.
Zoom mode	The zoom mode activates the zoom for a selected axis. The zoom can only be activated for x, y or both axes.

12.3.3 Context menu diagram axes

25999

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 (teach value)).

Function	Description
Delete axis	Removes the selected axis from the diagram.
Characteristics	Opens the Properties window.

12.3.4 Context menu of the diagram data line

26001

Function	Description
Characteristics	Opens the Properties window.
Go to	Goes to the beginning or end of the measurement 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 from the highest amplitude in the indicated peak finder radius. The peak finder radius can be set in the diagram properties.
Remove line	Removes the line of the selected object from the diagram.
Measurement cursor	Shows a measurement cursor 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).

12.4 Characteristics

Content

25987

12.4.1 Diagram area properties

26017

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 a mean value of x measurement 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 measurement values in the spectrum are shown as peak or RMS. The conversion factor for a single frequency is root(2), peak = RMS * root(2).

12.4.2 Axis properties

25985

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 (teach value)).
Auto scaling	The value axis (y-axis) scales automatically based on the measurement values.
Date-time format	Determines how the date and time are displayed in 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 speed can be taken from an analogue input or entered manually. This conversion makes it easy to detect whether peaks in the spectrum are multiples of a certain speed. Displaying the spectrum in relation to the rotational speed is also called frequency factor analysis.

12.4.3 Data line properties

26011

Property	Description
Colour	The colour of the data line can be modified.
Notifications	The measured values in spectrum monitoring can be averaged for representation purposes to avoid fluctuations.

Property	Description
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 Anhang

Content

13.1 Licence Information

Content

57503

13.1.1 ifm VES004 V2.0

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14 Terms and abbreviations

A

Address

This is the "name" of the bus participant. All participants need a unique address so that the signals can be exchanged without problem.

Architecture

Specific configuration of hardware and/or software elements in a system.

B

Bus

Serial data transmission of several participants on the same cable.

C

CSV file

CSV = **C**omma **S**eparated **V**alues (also: **C**haracter **S**eparated **V**alues)
A CSV file is a text file for storing or exchanging simply structured data.
The file extension is `.csv`.

Example: Source table with numerical values:

value 1.0	value 1.1	value 1.2	value 1.3
value 2.0	value 2.1	value 2.2	value 2.3
value 3.0	value 3.1	value 3.2	value 3.3

This results in the following CSV file:

```
value 1.0;value 1.1;value 1.2;value 1.3
value 2.0;value 2.1;value 2.2;value 2.3
value 3.0;value 3.1;value 3.2;value 3.3
```

D

Data type

Depending on the data type, values of different sizes can be stored.

Data type	min. value	max. value	size in the memory
BOOL	FALSE	TRUE	8 bits = 1 byte
BYTE	0	255	8 bits = 1 byte
WORD	0	65 535	16 bits = 2 bytes
DWORD	0	4 294 967 295	32 bits = 4 bytes
SINT	-128	127	8 bits = 1 byte
USINT	0	255	8 bits = 1 byte
INT	-32 768	32 767	16 bits = 2 bytes
UINT	0	65 535	16 bits = 2 bytes
DINT	-2 147 483 648	2 147 483 647	32 bits = 4 bytes
UDINT	0	4 294 967 295	32 bits = 4 bytes
REAL	$-3.402823466 \cdot 10^{38}$	$3.402823466 \cdot 10^{38}$	32 bits = 4 bytes

ULINT	0	18 446 744 073 709 551 615	64 Bit = 8 Bytes
STRING			number of char. + 1

DC

Direct **C**urrent

DHCP

DHCP = **D**ynamic **H**ost **C**onfiguration **P**rotocol = protocol for the dynamic configuration by the→host.
DHCP is a protocol that provides dynamic configuration of IP addresses and associated information. The protocol supports use of IP addresses which are only available in limited number by a centralised management of the address assignment.
The participant logs on to a server with this service when it is switched on in a network for the first time. The server assigns a local free →IP address to the participant.

E

EDS

EDS = **E**lectronic **D**ata **S**heet
An EDS is a device description fiile in ASCII format, comparable to the GSD or the GSDML file of Profibus or Profinet.

Ethernet

Ethernet is a widely used, manufacturer-independent technology which enables data transmission in the network at a speed of 10...10 000 million bits per second (Mbps). Ethernet belongs to the family of so-called "optimum data transmission" on a non exclusive transmission medium. The concept was developed in 1972 and specified as IEEE 802.3 in 1985.

F

Fieldbus

A →bus for industrial applications: mechanically extremely robust and excellent data protection.

Firmware

System software, basic program in the device, virtually the →runtime system.
The firmware establishes the connection between the hardware of the device and the application program. The firmware is provided by the manufacturer of the controller as a part of the system and cannot be changed by the user.

G

Gateway

Gateway = access, coupler.
Gateways enable connection of completely different systems. Gateways are used when two incompatible network types are to be connected by converting the protocol of one system to the protocol of the other system.
Example: connection between AS-i and higher-level fieldbus systems such as →Ethernet DP, →DeviceNet, Interbus-S or other interfaces, e.g. RS-485. The device includes an AS-i master which is directly coupled to the →host interface (e.g. Ethernet DP slave).

GSD

Generic **S**tation **D**escription
Describes the interface to the device to be connected to the fieldbus.

You can find the current version of the GSD file on the **ifm** homepage:
→ www.ifm.com
e.g. for AC1375:
→ GSD file for SmartLink AC1375
→ download the file `ifm...07E5.gsd` (... = version)

GSDML

GSDML = **G**eneric **S**tation **D**escription **M**arkup **L**anguage.
Description language which can describe the characteristics of a device family across several levels. In this XML scheme, as much as possible of the semantics of the →GSD was adopted.

I

Instructions

Superordinate word for one of the following terms:
installation instructions, data sheet, user information, operating instructions, device manual, installation information, online help, system manual, programming manual, etc.

IP address

IP = **I**nternet **P**rotocol.
The IP address is a number which is necessary to clearly identify an internet participant. For the sake of clarity the number is written in 4 decimal values, e.g. 127.215.205.156.

L

LED

LED = **L**ight **E**mitting **D**iode.
Light emitting diode, also called luminescent diode, an electronic element of high coloured luminosity at small volume with negligible power loss.

Link

A link is a cross-reference to another part in the document or to an external document.

M

MAC-ID

MAC = **M**anufacturer‘s **A**ddress **C**ode
= manufacturer's serial number.
→ID = **Id**entifier
Every network card has a MAC address, a clearly defined worldwide unique numerical code, more or less a kind of serial number. Such a MAC address is a sequence of 6 hexadecimal numbers, e.g. "00-0C-6E-D0-02-3F".

Modbus

The Modbus protocol is a communication protocol based on a →master/slave architecture and was generated by Modicon (since 1994: Groupe Schneider) in 1979 for communication with its PLCs. In the industry, Modbus has become a de facto standard.
Modbus/TCP is based on →Ethernet TCP/IP. Modbus/TCP ports the protocol defined for the serial

interface to TCP. The →IP address clearly identifies each device in a network. Therefore the slave address was used to identify one of several logical units (unit IDs) in a physical device. To do so, the extended IP addressing is used.
Example: 192.168.83.28.1 means unit ID 1 on IP address 192.168.83.28.

O

OPC

OPC = **O**LE for **P**rocess **C**ontrol
Standardised software interface for manufacturer-independent communication in automation technology
OPC client (e.g. device for parameter setting or programming) automatically logs on to OPC server (e.g. automation device) when connected and communicates with it.

P

Pictogram

Pictograms are figurative symbols which convey information by a simplified graphic representation.
(→ chapter **Explanation of Symbols** (→ p. 9))

Profinet

PROFINET (**Pro**cess **Fi**eld **Net**work) is the open Industrial Ethernet Standard of Profibus & Profinet International (PI) for automation. Profinet uses TCP/IP and IT standards, is real-time Ethernet compatible and enables the integration of fieldbus systems.

The Profinet concept has a modular design, so that the user can choose the functionality himself. This is basically different as regards the type of data exchange, to meet the requirements regarding the speed.

For Profinet, there are the two perspectives Profinet-CBA and Profinet-IO:

- Profinet-CBA (Component Based Automation) is intended for the component-based communication via TCP/IP and the real-time communication for real-time requirements in modular plant construction. Both ways of communication can be used in parallel.
- Profinet-IO has been created for real-time (RT) and synchronous communication IRT (IRT = isochronous real-time) with the decentralised periphery. The designations RT and IRT only describe the real-time characteristics in the communication within Profinet-IO.

→ www.profibus.com (umbrella organisation)

R

RTC

RTC = **R**eal **T**ime **C**lock
Provides (batter-backed) the current date and time. Frequent use for the storage of error message protocols.

S

Symbols

Pictograms are figurative symbols which convey information by a simplified graphic representation.
(→ chapter **Explanation of Symbols** (→ p. 9))

T

TCP

The **T**ransmission **C**ontrol **P**rotocol is part of the TCP/IP protocol family. Each TCP/IP data connection has a transmitter and a receiver. This principle is a connection-oriented data transmission. In the TCP/IP protocol family the TCP as the connection-oriented protocol assumes the task of data protection, data flow control and takes measures in the event of data loss. (compare: →UDP)

U

UDP

UDP (**U**ser **D**atagram **P**rotocol) is a minimal connectionless network protocol which belongs to the transport layer of the internet protocol family. The task of UDP is to ensure that data which is transmitted via the internet is passed to the right application.
At present network variables based on →CAN and UDP are implemented. The values of the variables are automatically exchanged on the basis of broadcast messages. In UDP they are implemented as broadcast messages, in CAN as →PDOs.
According to the protocol, these services are unconfirmed data transmission: it is not checked whether the receiver receives the message. Exchange of network variables corresponds to a "1 to n connection" (1 transmitter to n receivers).

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