# Original Software Manual
# Parameter setting software for efector octavis

**VES004**
V1.20.11

English

706399_03_UK 2017-07-28

# Contents

# 1 About this manual

Contents



202

## 1.1 Preliminary note

21948

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

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

## 1.2 Copyright

6088

## 1.3 What do the symbols and formats mean?

203

The following symbols or pictograms illustrate the notes in our instructions:

**⚠ WARNING**

Death or serious irreversible injuries may result.

**⚠ CAUTION**

Slight reversible injuries may result.

**NOTICE**

Property damage is to be expected or may result.

| | |
|---|---|
|  | Important note<br>Non-compliance can result in malfunction or interference |
|  | Information<br>Supplementary note |
| ► ... | Request for action |
| > ... | Reaction, result |
| → ... | "see" |
| abc | Cross-reference |
| 123<br>0x123<br>0b010 | Decimal number<br>Hexadecimal number<br>Binary number |
| [...] | Designation of pushbuttons, buttons or indications |

## 1.4 How is this documentation structured?

204
1508

This documentation is a combination of different types of manuals. It is for beginners and also a reference for advanced users. This document is addressed to the programmers of the applications.

How to use this manual:

- Refer to the table of contents to select a specific subject.
- Using the index you can also quickly find a term you are looking for.
- At the beginning of a chapter we will give you a brief overview of its contents.
- Abbreviations and technical terms → Appendix.

In case of malfunctions or uncertainties please contact the manufacturer at:
Contact → **ifm weltweit • ifm worldwide • ifm à l'échelle internationale** (→ p. 213)

We want to become even better! Each separate section has an identification number in the top right corner. If you want to inform us about any inconsistencies, indicate this number with the title and the language of this documentation. Thank you very much for your support!

We reserve the right to make alterations which can result in a change of contents of the documentation. You can find the current version on **ifm's** website:
→ **ifm weltweit • ifm worldwide • ifm à l'échelle internationale** (→ p. 213)

## 1.5 History of the manual

21947

What has been changed in this manual? An overview:

| Date | Theme | Change |
|---|---|---|
| 2016-05-26 | Release V1.10 | • Sensor VNB001 added<br>• Sensor VNB211 added |
| 2016-12-28 | Release V1.20 | • transfer to CMS<br>• evaluation unit VES150 added |

# 2 Safety instructions

Contents



21950

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.

## 2.1 Functions and features

21951

The efector octavis 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.

# 3 Installation

Contents



21953

## 3.1 System requirements

21955

The PC must meet the following requirements for installation.

- Hardware
  - Min. dual-core processor or higher, min. 2 GHz clock frequency
  - Min. 2 GB RAM
  - Min. 5 GB freely available hard disc memory
  - Ethernet network card for 10Base-T/100Base-TX, TCP/IP protocol
- Software
  - Operating system Microsoft Windows XP SP3, Vista SP2, Windows 7 SP1 or Windows 8
  - Windows Server 2008 SP2, Windows Server 2008 R2 SP1, Windows Server 2012

The latest version of the software can be downloaded from
→ www.ifm.com > [Download] > [Service]

## 3.2 Install the VES004 software

21957

To install the VES004 software:

| | |
|---|---|
| i | To install the VES004 software no administrator rights are necessary. |

► Unpack the downloaded ZIP file on a local data carrier

## 3.3 Install the USB driver

21959

- 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.

| | |
|---|---|
| i | 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.

## 3.4 Start the parameter setting software

21963

The software VES004 is directly runable in the unpackted installation folder.
To start the VES004 software:

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

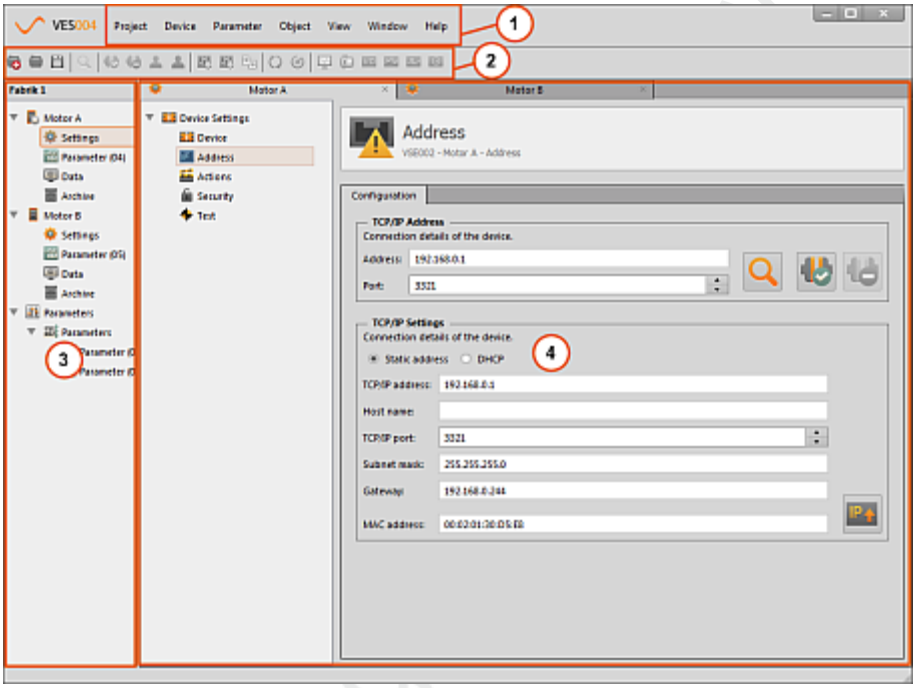
# 4 User interface

Contents



21965

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. 12)
(2) Tool bar; → chapter **Tool bar** (→ p. 13)
(3) Tree view; → chapter **Tree view** (→ p. 13)
(4) Detailed view; → chapter **Detailed view** (→ p. 15)

Additionally, a context menu can be used within the user interface. The context menu simplifies the use of the software.
→ chapter **Context menu** (→ p. 16)
→ chapter **Context menu functions** (→ p. 195)

## 4.1 Menu bar

21968

The menu bar contains the most important functions of the software grouped together in menus.
Functions that are not available for a selected object are greyed out.
Example:


The menus are described in the following chapters, starting with the [Project] menu
→ chapter **[Project] menu** (→ p. 24)

## 4.2 Tool bar

21972

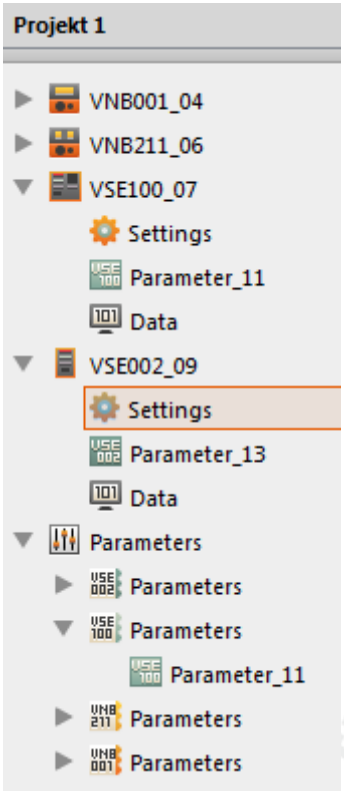
The tool bar contains frequently used functions as symbols.
In the following cases the symbols are shown greyed:
- if they are not available for the selected element
- if they are not available in the current situation.

Example:

## 4.3 Tree view

21976

The tree view contains the devices, parameters, settings, etc. belonging to a project (→ screenshot below). The elements are displayed in groups. You can select an element and open it in the detailed view by double clicking on it (→ chapter **Detailed view** (→ p. 15)).




The top line of the tree view shows the name of the project (→ [Projekt 1] in the above screenshot).

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. 16)
  → chapter **Context menu functions** (→ p. 195)
- [Object] menu
  → chapter **[Object] menu** (→ p. 45)

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

## 4.4 Detailed view

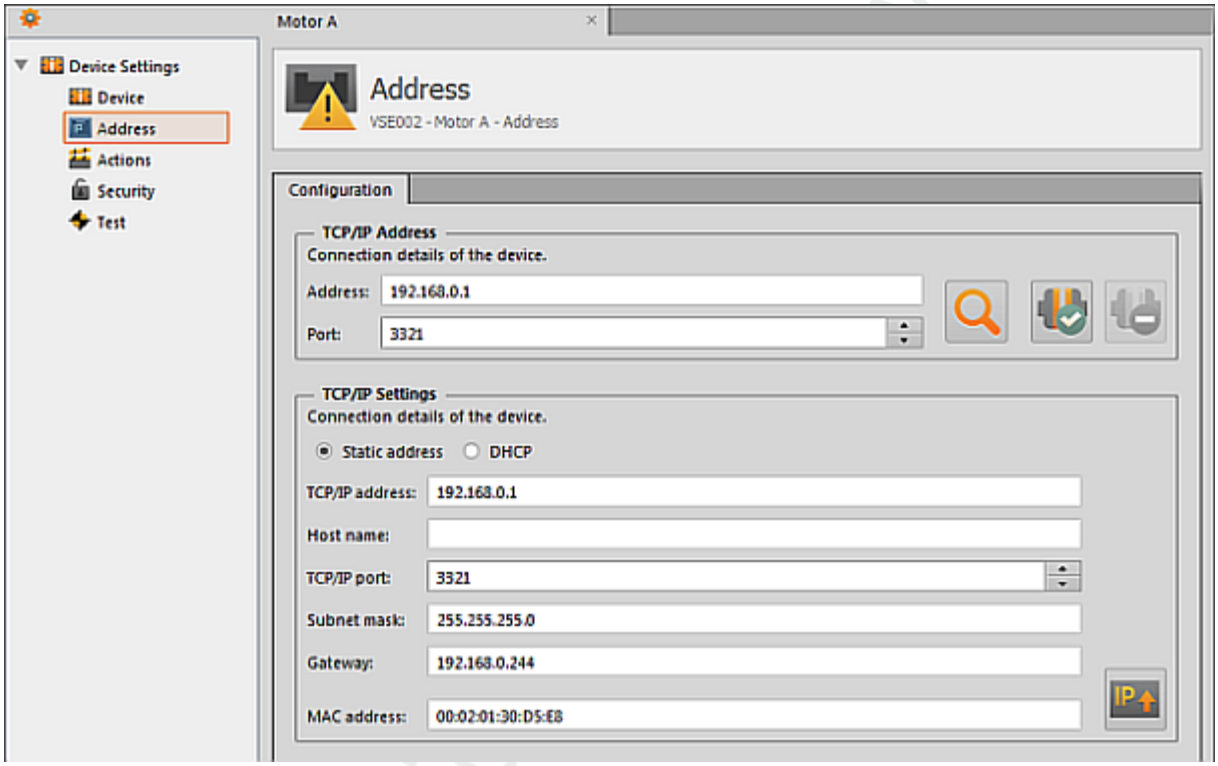
21980

The detailed view 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.

22123

The settings and parameters changed in the parameter setting software must be written to the device before use.

► Write settings and parameters to the device via **[Device] menu > [Write to Device]** **(→ p. 33).**




As soon as an element is selected in the tree view (i.e. marked by a mouse click), its detailed view will be displayed (in the above screenshot: for the element [Address]).

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 ([Motor A] in the above example).

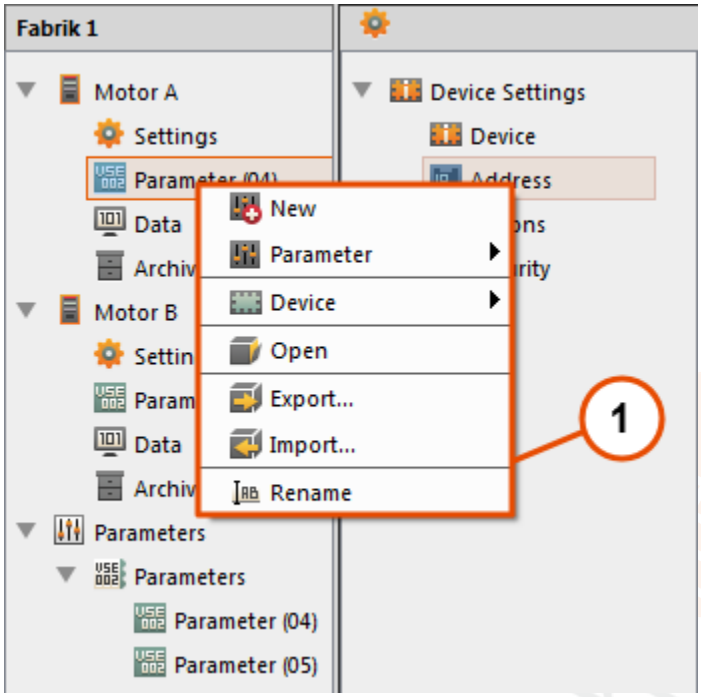
► To close a tab in the detailed view:
  • Click on the "x" (at the right edge of the tab)
  Or
  • [STRG]+[F4]

► 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]

# 4.5 Context menu

21984

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. 195)

# 5 Connection (diagnostic electronics)

Contents



21988

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

## 5.1 Network setting IP address range

21990

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 |

## 5.2 Factory setting parameters

21992

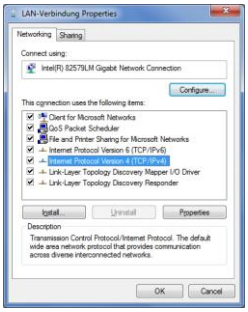
| VSE diagnostic electronics - Parameters | Factory setting |
|---|---|
| Dynamic Host Configuration Protocol (DHCP) | off |
| IP-address / Port | 192.168.0.1 : 3321 |
| Subnet-mask | 255.255.255.0 |

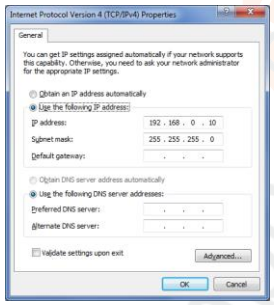
# 5.3 Verify and set the IP address of the PC

21994

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]



# 5.4 Connect to the device

Contents



21998

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.

## 5.4.1 Create a new project

22000

► 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:

## 5.4.2 Open an existing project

22003

► 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

### 5.4.3 Create a new device (VSE)

22006

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]

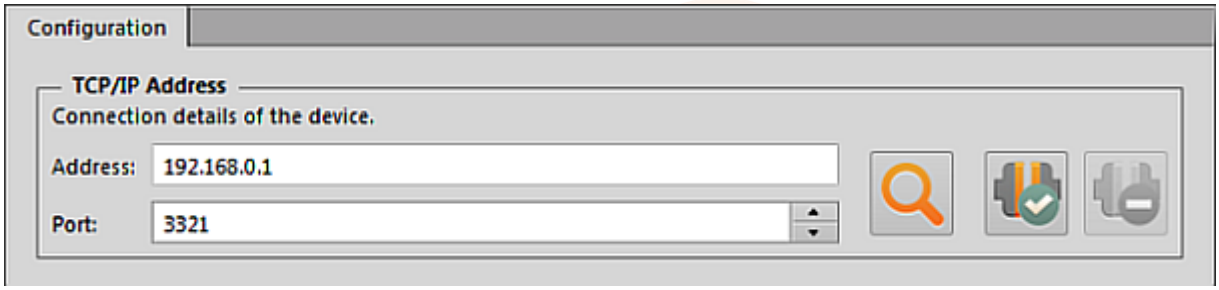
► Select the VSE diagnostic electronics that is used

> 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] |

# 6 Connection (vibration monitor)

Contents



22012

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

## 6.1 Install the USB driver

22014
21959

- 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.

# 6.2 Connect to the device

Contents



22019

► 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.

## 6.2.1 Create a new project

22021

► 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:

## 6.2.2 Open an existing project

22023

► 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

## 6.2.3 Create a new device (VNB)

22031

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]

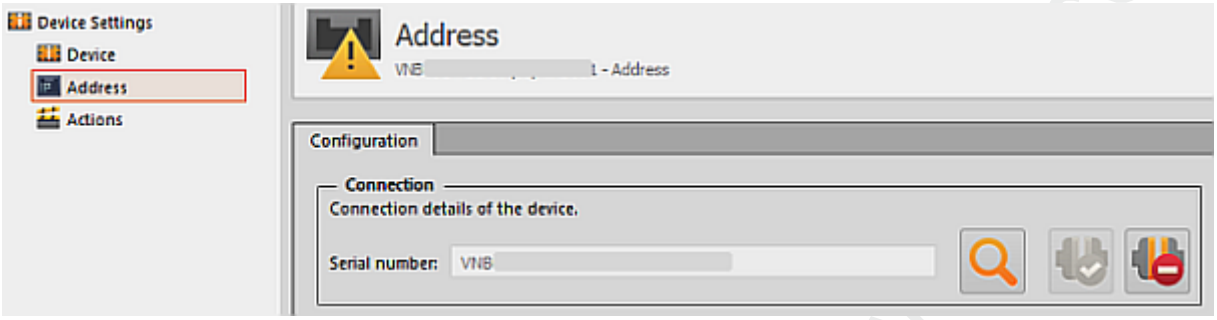
► Select the VNB vibration monitor used

> 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] |

# 7 Menus

Contents



22036

This chapter describes the menus. The menus can be reached via the **menu bar** (→ p. 12).

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

## 7.1 [Project] menu

Contents

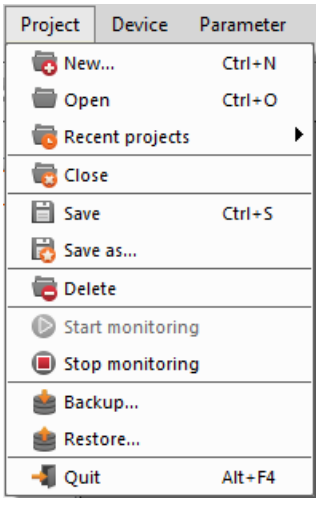


22038

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. 12).



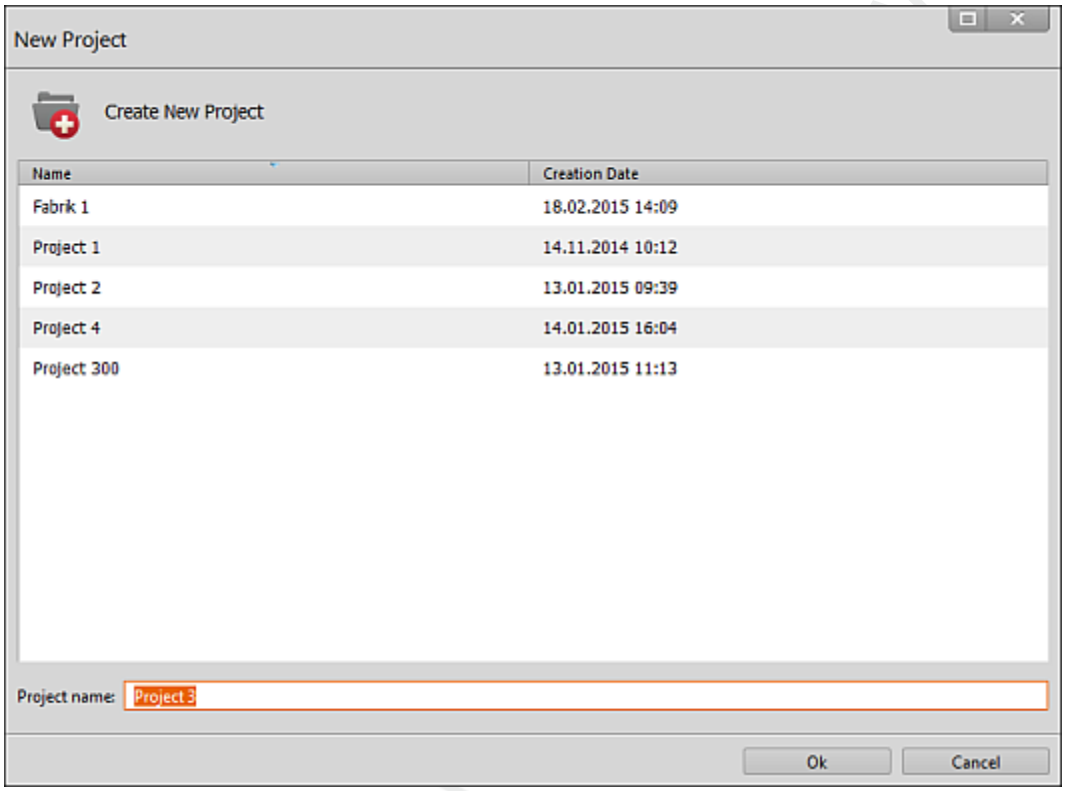

Only one project can be open at a time. Save the opened project before creating a new project or opening another project.

## 7.1.1 [Project] menu > [New...]

22040

Create a new project or
Overwrite an existing project.

► Choose either:
[Project] menu > [New...]
Or:
Left-click on the symbol [ ] (create new project)
Or:
[CTRL]+[N]




(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

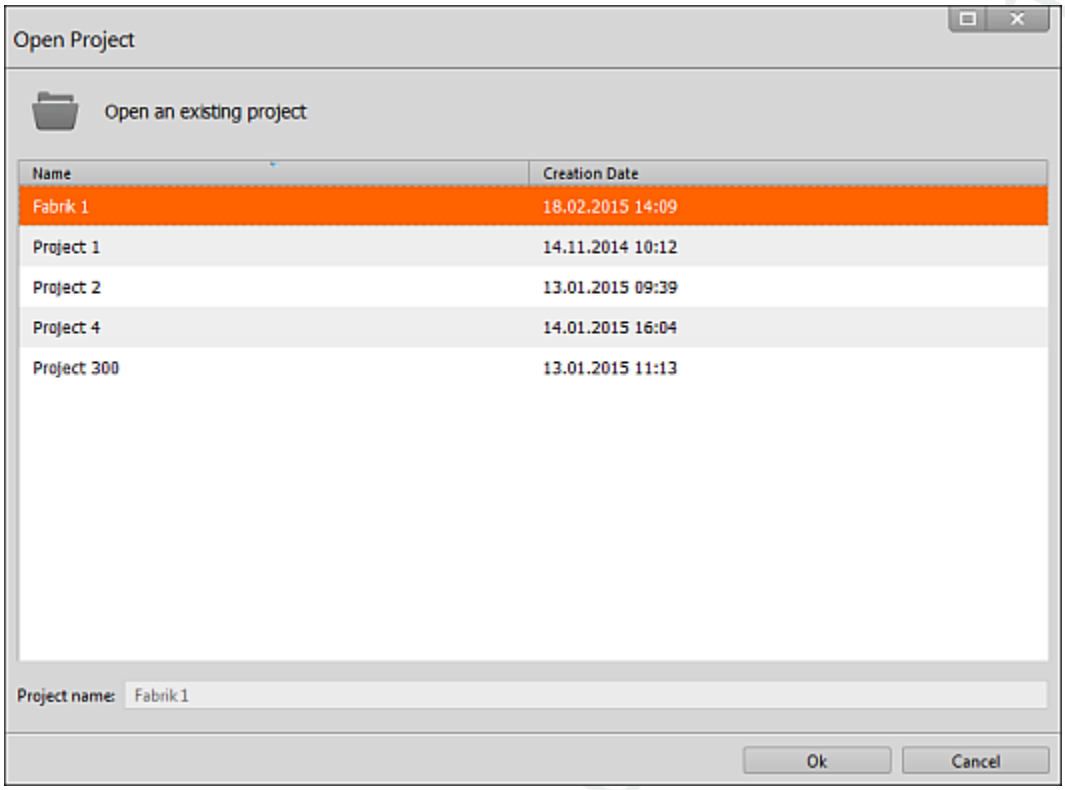
► Acknowledge the confirmation prompt with [OK]

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

## 7.1.2 [Project] menu > [Open...]

22042

Open a previously created project.




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

23570

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

## 7.1.3 [Project] menu > [Recent Projects]

22045

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

### 7.1.4 [Project] menu > [Close]

22047

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].

### 7.1.5 [Project] menu > [Save]

22048

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.

23570

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

### 7.1.6 [Project] menu > [Save as...]

22050

Save the opened project under a new name.
The memory location can not 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.

### 7.1.7 [Project] menu > [Delete]

22051

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.

### 7.1.8 [Project] menu > [Stop monitoring]

22886

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. 178)

Requirement:

- Monitoring in progress

► Choose either:
Select menu [Project] > [Stop monitoring]
or:
Left-click on the symbol [] (Stop project data monitoring)

### 7.1.9 [Project] menu > [Start monitoring]

22865

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. 178)

Requirement:

- Monitoring stopped

► Choose either:
Select menu [Project] > [Start monitoring]
or:
Left-click on the symbol [  ] (Start project data monitoring)

### 7.1.10 [Project] menu > [Save...]

22054

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].

### 7.1.11 [Project] menu > [Restore...]

22055

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)

### 7.1.12 [Project] menu > [Quit]

22056

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.

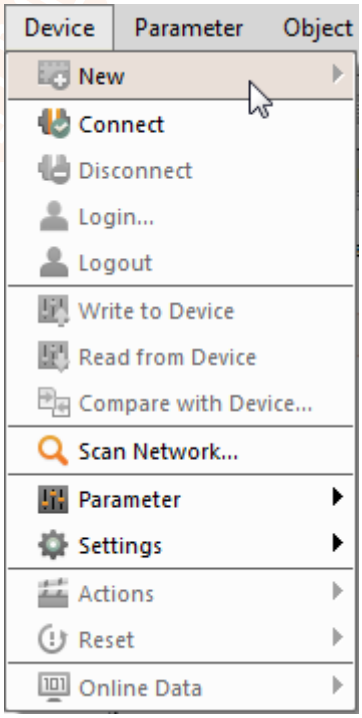
> The current project is saved and closed, and the program is quit.

# 7.2 [Device] menu

Contents



22057




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.

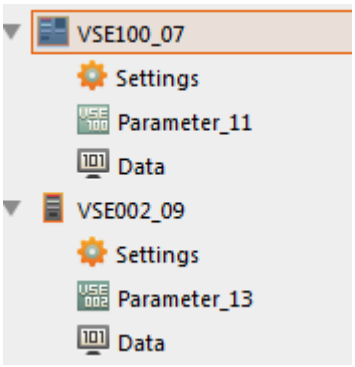
The [Device] menu is active when a device is selected in the **tree view** (→ p. 13).

The [Device] menu can be reached via the **menu bar** (→ p. 12).

## 7.2.1 [Device] menu > [New]

22059

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 (→ figure).




### [Device] menu > [New] > [Vibrationsmonitor]

22870

The program supports the following devices:
- vibration monitor

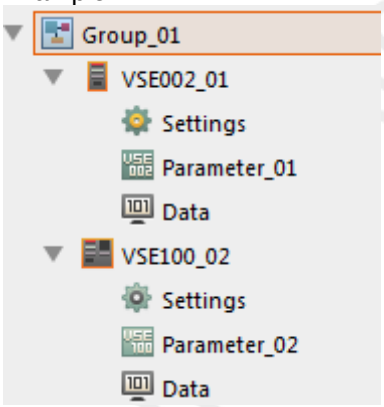
and, connected to it:
- diagnostic electronics VSE002
- diagnostic electronics VSE100
- diagnostic electronics VSE150 (PROFINET IO)
- vibration sensor VNB001
- vibration sensor VNB211

| | |
|---|---|
| ! | The set device type cannot be changed at a later date. |

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

22871

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




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

22872

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

## 7.2.2 [Device] menu > [Connect]

22063

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.

## 7.2.3 [Device] menu > [Disconnect]

22064

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.

## 7.2.4 [Device] menu > [Login...] (VSE only)

22065

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. 65)

The access rights on the corresponding security level can be adapted
→ chapter **VSE > [VSEnnn_#] > Detail [Device Settings] > [Security]** (→ p. 63)

> 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. 64)).

## 7.2.5 [Device] menu > [Logout] (VSE only)

22066

This applies only to VSEnnn:

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

> The function [  ] "Logout" changes to security level 0. The function is only available if one of the security levels between 1...4 is active.
→ Kapitel **VSE > [VSEnnn_#] > Detail [Device Settings] > [Security]** (→ p. 63)

## 7.2.6 [Device] menu > [Write to Device]

22067

Prerequisite:

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

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

22123

The settings and parameters changed in the parameter setting software must be written to the device before use.

► Write settings and parameters to the device via **[Device] menu > [Write to Device] (→ p. 33).**

## 7.2.7 [Device] menu > [Read from Device]

22069

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.

## 7.2.8 [Device] menu > [Compare with Device...]

22070

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.

## 7.2.9 [Device] menu > [Scan Network...]

22071

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.

## 7.2.10 [Device] menu > [Parameter]

Contents

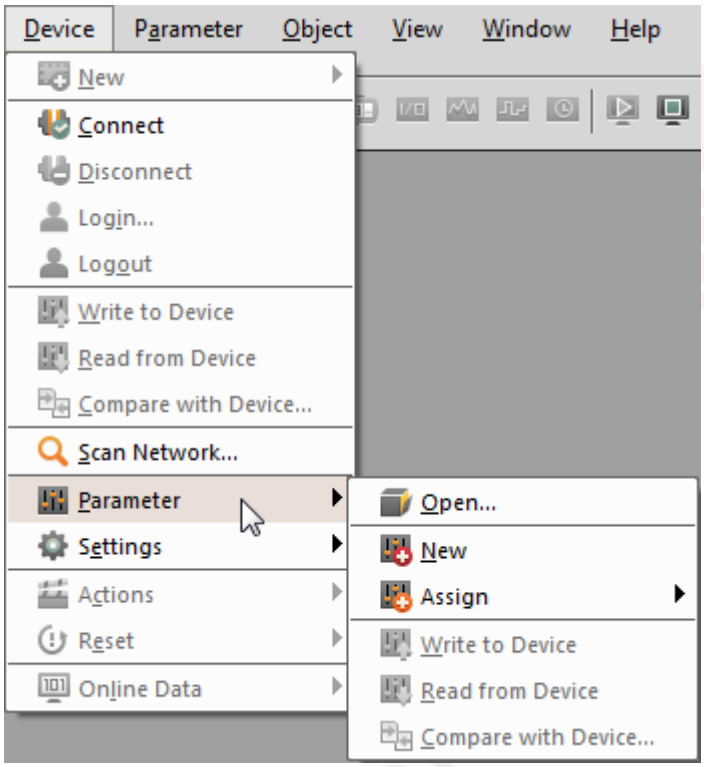


22115

Prerequisite:

- in the tree view, the device is selected

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




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

22119

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]

22120

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]

22121

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]

22122

Prerequisite:

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

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

22123

The settings and parameters changed in the parameter setting software must be written to the device before use.

► Write settings and parameters to the device via **[Device] menu > [Write to Device]** (→ p. 33).

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

22124

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]

22125

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.

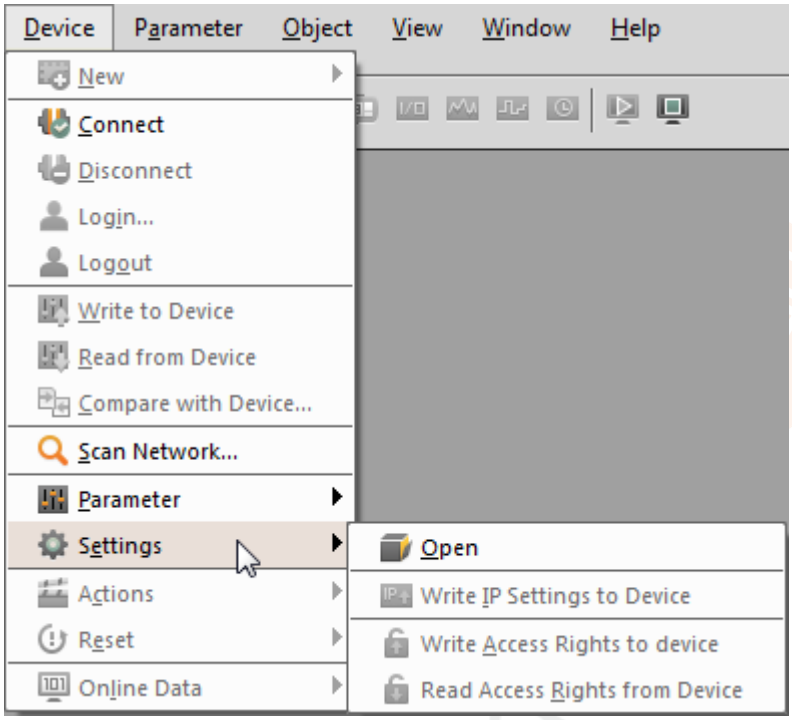
## 7.2.11 [Device] menu > [Settings]

Contents



22126

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




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

22128

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)

22129

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]

22130

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]

22131

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.

## 7.2.12 [Device] menu > [Actions]

Contents

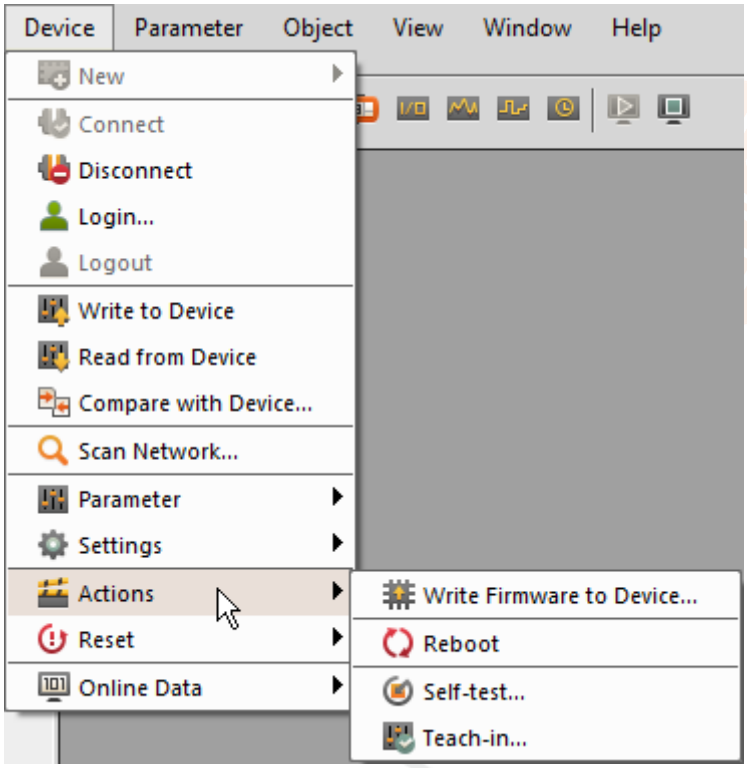


22132

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)

22134

This applies only to VSEnnn:

| |
|---|
| Beforehand, save parameters, settings and history!<br>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.<br>> Otherwise the diagnostic electronics may be damaged and may have to be returned to the manufacturer. |

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

22135

This applies only to VSEnnn:
The function [] "Reboot" reboots the diagnostic electronics.

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

22136

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]

22137

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

## 7.2.13 [Device] menu > [Reset] (VSE only)

Contents



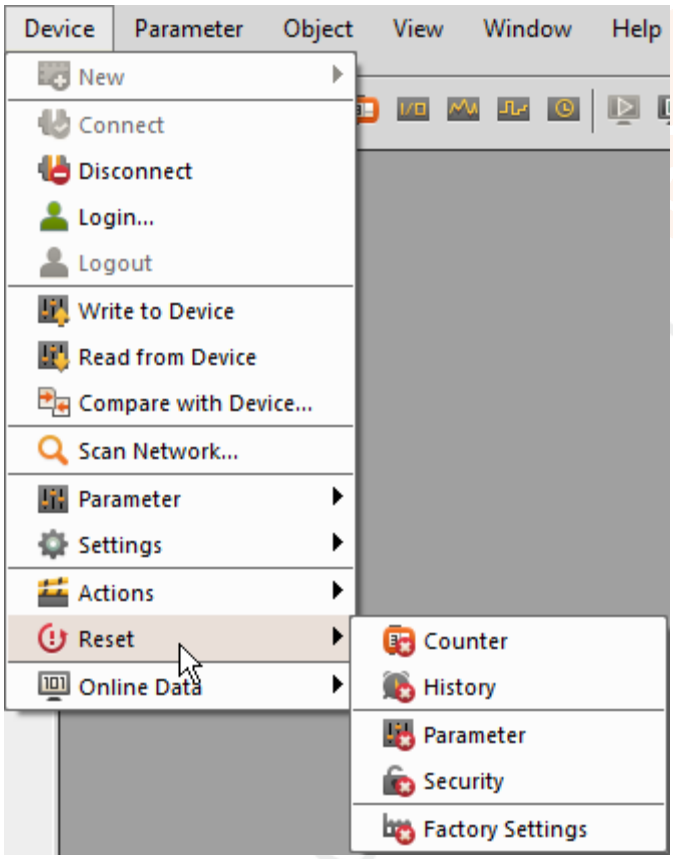
22138

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]

22140

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

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

22141

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]

22142

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

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

22143

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

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

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

22144

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

| | |
|---|---|
| ℹ | Restoring to the factory settings requires security level 4.<br>The function [Factory Settings] does not reset the IP settings. |

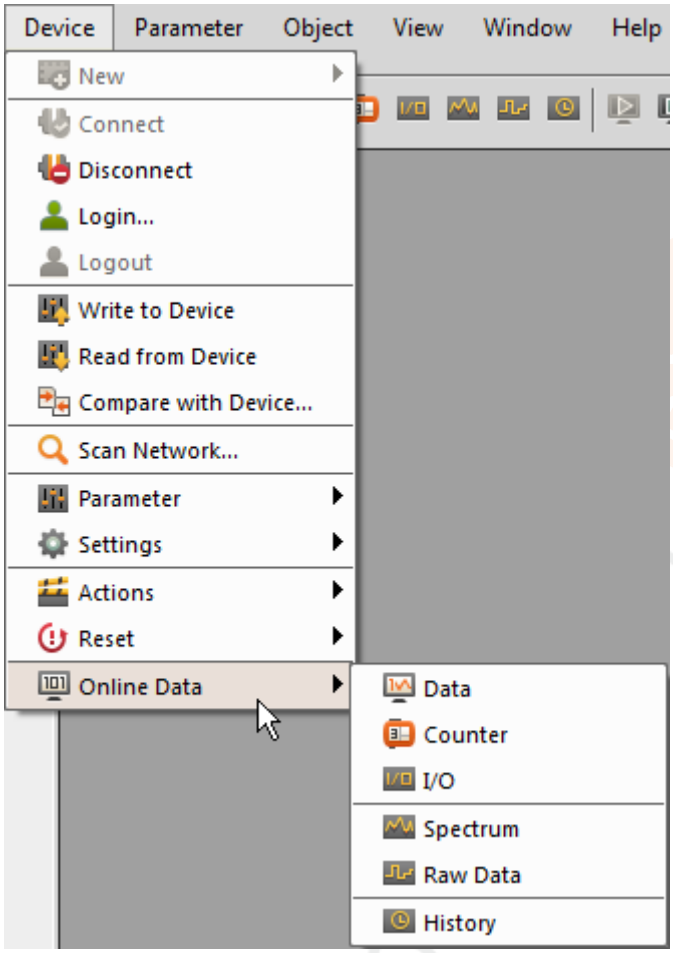
## 7.2.14 [Device] menu > [Online Data]

22145

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)
→ figure above.

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

# 7.3 [Parameter] menu

Contents



22147

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. 12).**


## 7.3.1 [Parameter] menu > [New]

22149

Prerequisite:

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

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

## 7.3.2 [Parameter] menu > [Device]

22150

Prerequisite:

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

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

### 7.3.3 [Parameter] menu > [Write to Device]

22153

Prerequisite:

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

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

22123

The settings and parameters changed in the parameter setting software must be written to the device before use.

► Write settings and parameters to the device via **[Device] menu > [Write to Device] (→ p. 33).**

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

22154

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.

# 7.4 [Object] menu

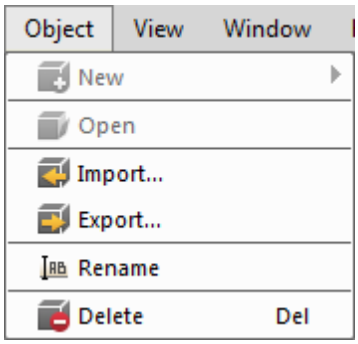
Contents



22155

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. 12).**




## 7.4.1 What are objects?

22157

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

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

## 7.4.2 [Object] menu > [New]

22158

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

### 7.4.3 [Object] menu > [Open]

22159

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.

### 7.4.4 [Object] menu > [Import]

22160

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 |
| Parameters file: | *.ipar |
| Data file:: | *.idat |

### 7.4.5 [Object] menu > [Export]

22161

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 |

## 7.4.6 [Object] menu > [Rename]

22162

Prerequisite:

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

► To rename an object:
Choose either:
Function [AB] "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]

## 7.4.7 [Object] menu > [Delete]

22163

Prerequisite:

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

| | |
|---|---|
| i | 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

# 7.5 [View] menu

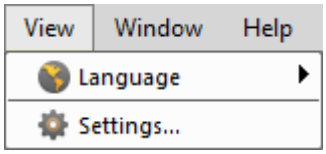
Contents



22164

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. 12).




## 7.5.1 [View] menu > [Language]

22166

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.

## 7.5.2 [View] menu > [Settings]

Contents



22167

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

### [View] menu > [Settings] > Tab [Common settings]

22881

| Section | Dialogue element | Display | Switching function |
|---|---|---|---|
| Common settings | Automatically open the last opened project | checkbox | activate / deactivate |
| Colour scheme | Colour scheme | selected colour scheme:<br>• light<br>• dark | selectable from list |
| Data display settings | Activate storage of the data display settings | checkbox | activate / deactivate |
| | Reset all data display settings to the corresponding standard value | selected setting:<br>• all display settings<br>• only online monitoring<br>• only data recordings | selectable from list |

**Switching functions:**

| | |
|---|---|
|  | Reset data display to the standard settings |

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

22882

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 [Diagnostic electronics VSExxx]

22883

| Section | Dialogue element | Display | Switching function |
|---|---|---|---|
| Signal weightings | Activate signal weighting | checkbox | activate / deactivate |
| Ethernet protocol for data monitoring | • TCP (standard)<br>• UDP | selected setting | Select an option<br>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 reestablish the connection (via  ).

## [View] menu > [Settings] > Tab [Project data monitoring]

22884

| Section | Dialogue element | Display | Switching function |
|---|---|---|---|
| Default behaviour | Default | selected setting:<br>• on<br>• off | selectable from list |
| Monitoring data | • objects<br>• counters<br>• alarms<br>• inputs | checkbox | activate / deactivate |

## [View] menu > [Settings] > Tab [Diagnostics]

22885

Parameters for recording the self-diagnostics of the software.

| Section | Dialogue element | Display | Switching function |
|---|---|---|---|
| Trace levels | Error messages | checkbox | activate / deactivate |
| | Warning messages | checkbox | activate / deactivate |
| | Information messages | checkbox | activate / deactivate |
| | Debug information | checkbox | activate / deactivate |
| Trace to file | Max. file size | configured value | increase / reduce value |
| | Max. number of backup files | configured value | increase / reduce value |
| | Storage folder | configured path | --- |

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

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

22886

| 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:<br>• dot<br>• comma | selectable from list |
| | Digit grouping | selected setting:<br>• none<br>• comma<br>• 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:<br>• semicolon<br>• comma<br>• 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<br>(several versions available) |

# 7.6 [Window] menu

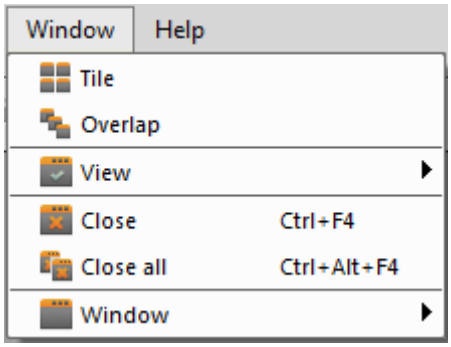
Contents



22168

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. 12).




## 7.6.1 [Window] menu > [Tile]

22170

Prerequisite:

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

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

## 7.6.2 [Window] menu > [Overlap]

22171

Prerequisite:

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

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

## 7.6.3 [Window] menu > [View]

22172

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

### 7.6.4 [Window] menu > [Close]

22173

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

► Choose either:
Function [  ] "Close Window"
Or:
Key [CTRL] + [F4]

### 7.6.5 [Window] menu > [Close All]

22174

Close all windows and tabs in the detailed view:

► Choose either:
Function [  ] "Close All Windows"
Or:
Key [CTRL]+[ALT]+[F4]

### 7.6.6 [Window] menu > [Window]

22175

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.

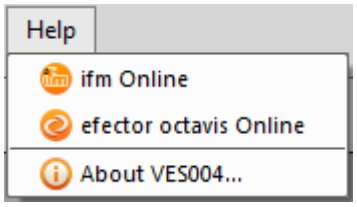
# 7.7 [Help] menu

Contents



22176

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




## 7.7.1 [Help] menu > [ifm Online]

22178

Opens the start page on the ifm website → www.ifm.com

## 7.7.2 [Help] menu > [efector octavis Online]

22179

Opens the page for [Vibration monitoring systems] on the ifm website.
The page starts with the language set on the PC.
This is not affected by the language set in the VES004 software.

## 7.7.3 [Help] menu > [About VES004]

22180

Shows in a separate window the following data:

- VES004
  - software release, e.g. V1.10.04.6209
  - ifm's internet address
  - email address of the ifm support
- Qt
  The program works with the QT software library.
  Here you can find notes and licence information on Qt.
- OpenSSL
  The program works with the OpenSSL program.
  Here you can find notes and license information on OpenSSL.

# 8 Configure VSEnnn

Contents



22181

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

Add a new device to a project: → chapter ***[Device] menu > [New...]*** (→ p. 31)

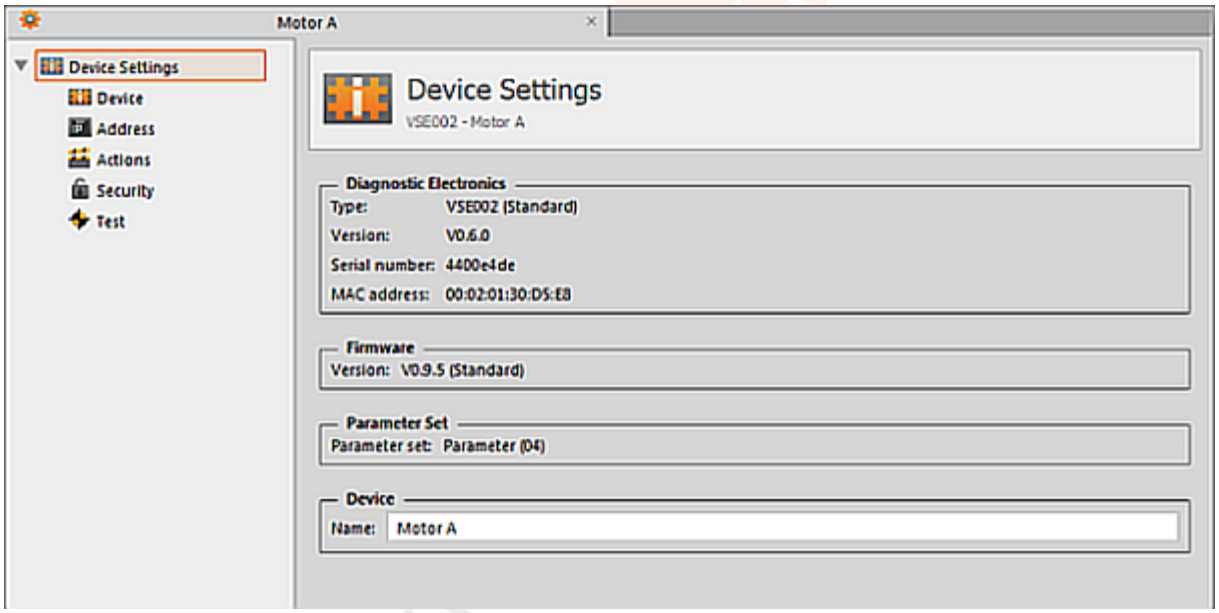
## 8.1 VSE > Device [VSEnnn_#] > [Settings]

Contents



22183

This chapter describes the functions contained in the device [VSEnnn_#]. The device [VSEnnn_#] can be reached via the **tree view (→ p. 13).**



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

Contents



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)

The detailed view contains the following information:
- Type (article number)
- Hardware version
- Serial number
- MAC address
- Firmware version
- Parameter set used

In the detailed view you can enter a name for the device. The name will be shown in the tree view.

In the detailed view, the detail [Device Settings] contains the following elements:
- Device
- Address
- This applies only to VSE15n: Fieldbus (name of the concrete fieldbus)
- Actions
- Security
- Test

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

22192

The element [Device] contains the following sections:

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

22193

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]

22196

The element [Address] contains the following sections:

### VSE > ... > [Address] > Tab [configuration]

22197

This section holds information about the diagnostic electronics and the current connection status. The TCP/IP address contains the information of the current connection of the software to the device. The TCP/IP settings are the network settings currently stored in the VSE.

| Section | Dialogue element | Display | Switching function |
|---|---|---|---|
| TCP/IP address | Adress | Current IP address<br>Preset = 192.168.0.1 |  |
| | Port | Current port<br>Preset = 3321 | |
| TCP/IP settings | Option field | Choose either:<br>• static IP address or<br>• obtain IP address via DHCP |  |
| | TCP/IP adress | Current IP address<br>Preset = 192.168.0.1 | |
| | Host name | Name of the host | |
| | TCP/IP port | Current port<br>Preset = 3321 | |
| | Subnet mask | Current subnet mask<br>Preset = 255.255.255.0 | |
| | Gateway | Current IP address of the gateway | |
| | MAC adress | Hardware adress | |

**Switching functions:**

| | |
|---|---|
|  | scan the network for connected devices |
|  | connect the device |
|  | disconnect the device |
|  | transfer the TCP/IP settings to the device |

**Note:**

- 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]

Contents



22874

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

### VSE > ... > Detail [Geräteeinstellungen] > [PROFINET IO]

22874

This applies only to VSE150:

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

22876

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:<br>• configured value<br>• value read by the device | free text<br>(usually provided by the host PLC) |
| | IP address | Choose either:<br>• configured value<br>• value read by the device | (usually provided by the host PLC) |
| | Subnet mask | Choose either:<br>• configured value<br>• value read by the device | (usually provided by the host PLC) |
| | Gateway | Choose either:<br>• configured value<br>• 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]

22877

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

| Section | Dialogue element | Display | Switching function |
|---|---|---|---|
| Information | Status | connected / initialised \| ready (not connected)<br>value read by the device | --- |
| | MAC address | value read by the device | --- |
| | MAC adress IE1 | value read by the device | --- |
| | MAC address IE2 | value read by the device | --- |
| | MAC address | value read by the device | --- |
| Communication diagnostics | Current queue load | Bus load (0...32)<br>value read by the device | --- |
| | Queue overflow counter | value read by the device | --- |

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

Contents



22201

Prerequisite:

- VES software is connected to the device via [  ]

The element [Actions] contains the following sections:

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

22202

| Section | Dialogue element | | Switching function |
|---|---|---|---|
| Reboot | --- |  | Reboot the device.The device is disconnected.<br>After the reboot the software tries to re-establish the connection. |
| Execute self-test | --- |  | Type VSA: Execute self-test of the dynamic inputs<br>Type IEPE: Wire-break detection |
| Carry out teach-in | --- |  | Start the teach-in for the selected objects of the parameter set (only possible for objects with activated auto-teach option) |

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

22206

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. 107).

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

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

22207

Here you can delete diverse parameters 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<br>Synchronise the real-time clock of the device with the time of the operating system. |
| Reset parameters | --- |  | Reset all parameters to the default values |
| Reset security settings | --- |  | To do so, at least security level 1 is required!<br>Reset all security settings to the default values |
| Restore factory settings | --- |  | To do so, security level 4 is required!<br>Restore all factory settings<br>The connection settings (TCP/IP address, port, subnet mask, gateway) are exempt from this. |

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

**Contents**



22213

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]

22216

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:<br>enter new password | |
| | | Confirmation:<br>repeat password | |
| | ... | ... | ... |
| | Password: security level | New:<br>enter new password | |
| | | Confirmation:<br>repeat password | |
| Connect / log in | Current status: | Not connected<br>Security level # (not logged in]<br>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]

22218

For OPC servers, only the following rights can be changed:
- write parameters
- carry out teach-in
- change IP settings
- restart device
- reset counter

For level 4, access rights can principally not be changed.

► 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 rights for all lower levels changes to [not allowed] and cannot be changed there any more (= ✖)
- if an access right changes from [not allowed] to [allowed] (= ✔), the access right in the next lower level changes to [not allowed], but can be changed (= ✖)
for all lower levels the access rights remains [not allowed] and cannot be changed (= ✖)

| Section | Dialogue element | Display | Switching function |
|---|---|---|---|
| Access Rights | Read parameters: | current access rights for<br>• OPC server<br>• level 4<br>• level 3<br>• level 2<br>• level 1<br>• level 0 | ✔ (grey) = allowed, cannot be changed<br>✔ (green) = allowed, can be changed<br>✖ (red) = not allowed, can be changed<br>✖ (grey) = not allowed, cannot be changed |
| | Write parameters: | | |
| | Carry out teach-in: | | |
| | Read data: | | |
| | Read spectrum: | | |
| | Read history: | | |
| | Delete history: | | |
| | Adapt dyn. inputs: | | |
| | Read external inputs: | | |
| | Test (OUT/LED): | | |
| | Change variants: | | |
| | Change IP settings: | | |
| | Reboot the device: | | |
| | Reset the counters | | |
| Connect / log in | Current status:: | not connected<br>security level # (not logged in]<br>security level # | , , , , , |

**Switching functions:**

| | |
|---|---|
| | write access rights to device |
| | read access rights from device |
| | connect the device |
| | disconnect the device |
| | log in to the device, to do so select security level |
| | disconnect the device |

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

22225

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]

22226

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<br>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<br>(VES100 only) | I/O # | 0 / 1 | specify manually the digital status |

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

22227

| Section | Dialogue element | Display | Switching function |
|---|---|---|---|
| LEDs | Sensor # | green<br>yellow<br>red<br>OUT | specify manually the digital status |
| | System | green<br>yellow<br>red<br>OUT | specify manually the digital status |

# 8.2 VSE > Device [VSEnnn_#] > [Parameter_#]

Contents



22228

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

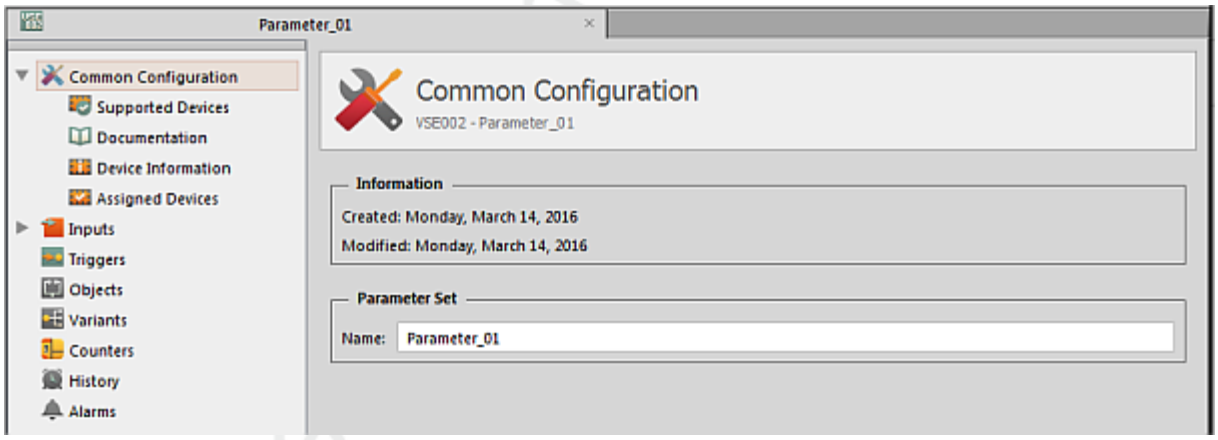
The object [Parameter_#] is assigned to the object [VSEnnn_#].
The object [Parameter_#] can be accessed via the **tree view** (→ p. 13).

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



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

Contents



22230

The detail [Common Configuration] contains 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 detailed view you can enter another name for the parameter set. The name will be shown in the tree view.

In the detailed view the detail [Common Configuration] contains the following elements:
- Supported devices
- Documentation
- Device information
- Assigned devices

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

22231

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]

22232

| 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 (VSE002 or VSE100) 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]

22233

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]

22234

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]

22235

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]

**Contents**



22236

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]

22237

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:

Displays the digital I/Os of the diagnostic electronics VSE100 with an overview of the most important configured parameters.

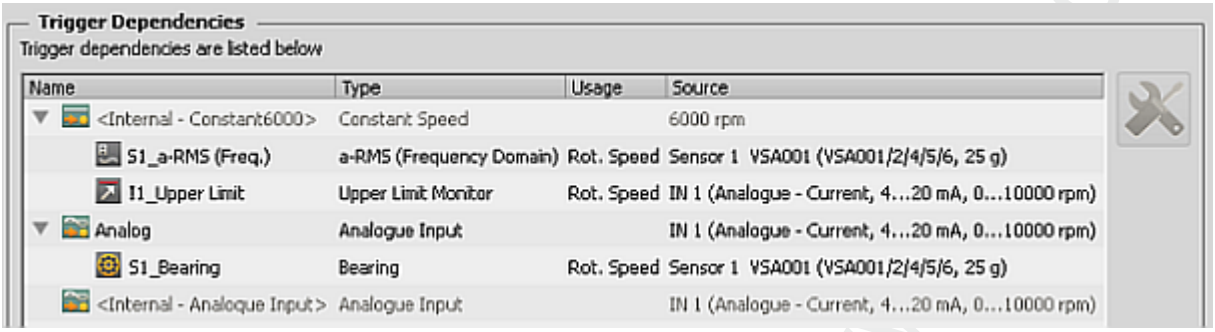
| Section | Dialogue element | Display | Switching function |
|---|---|---|---|
| Digital I/Os | I/O 1 | use, information |  |
| | I/O 2 | use, information | |
| | I/O 3 | use, information | |
| | I/O 4 | use, information | |
| | I/O 5 | use, information | |
| | I/O 6 | use, information | |
| | I/O 7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

**Switching functions:**

| | |
|---|---|
|  | configure the selected object |

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

22240




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

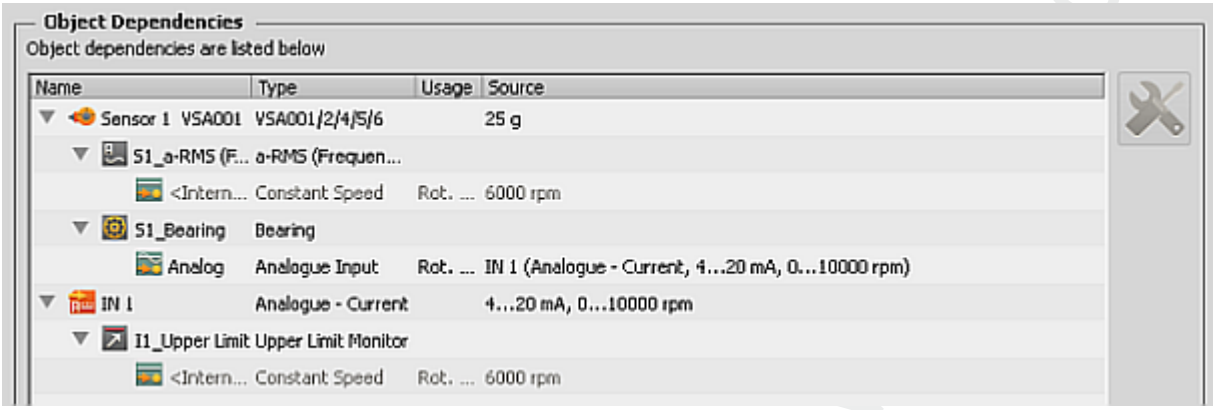
| Section | Dialogue element | Display | Switching function |
|---|---|---|---|
| Trigger dependencies | Name | name of the trigger |  |
| | Type | parameter type | |
| | Use | use of the parameters | |
| | Source | name of the object | |

**Switching functions:**

| | |
|---|---|
|  | configure the selected object |

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

22242




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]

22244

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]

22245

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 | |

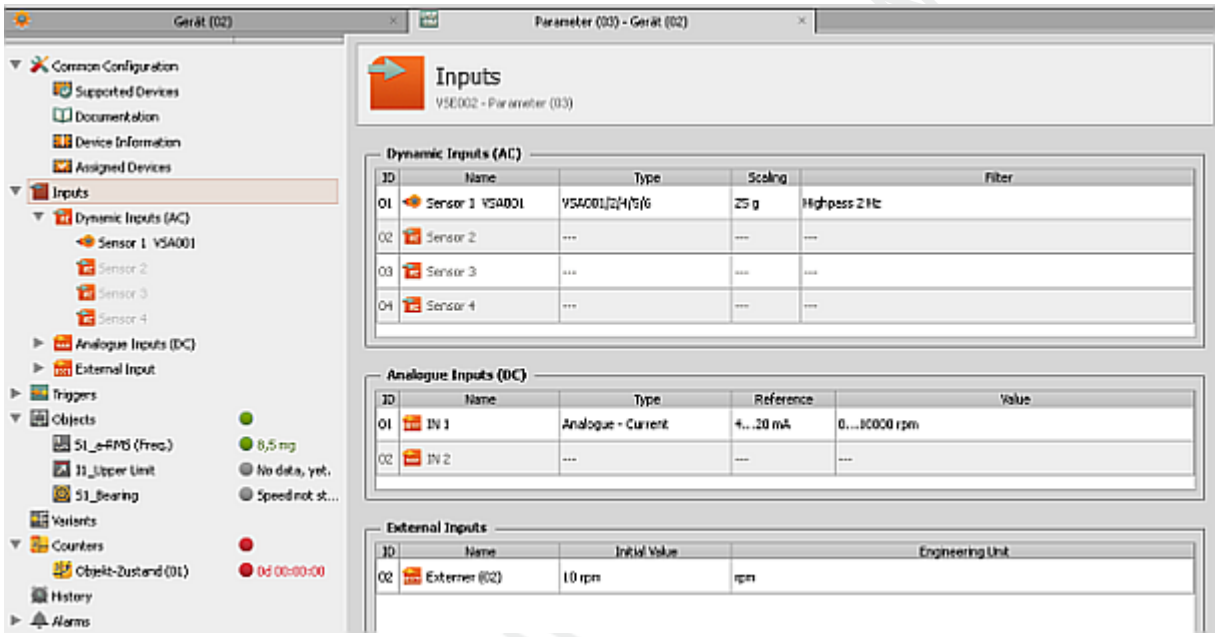
## 8.2.2 VSE > [Parameter_#] > Detail [Inputs]

Contents



22246

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



The detailed view contains the following information about the parameter set:

| Section | Dialogue element | Display | Switching function |
|---|---|---|---|
| Dynamic inputs (AC) | ID | Iconsecutive 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 signals | |
| 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 desired line!
(→ following pages)

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

22248

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 |

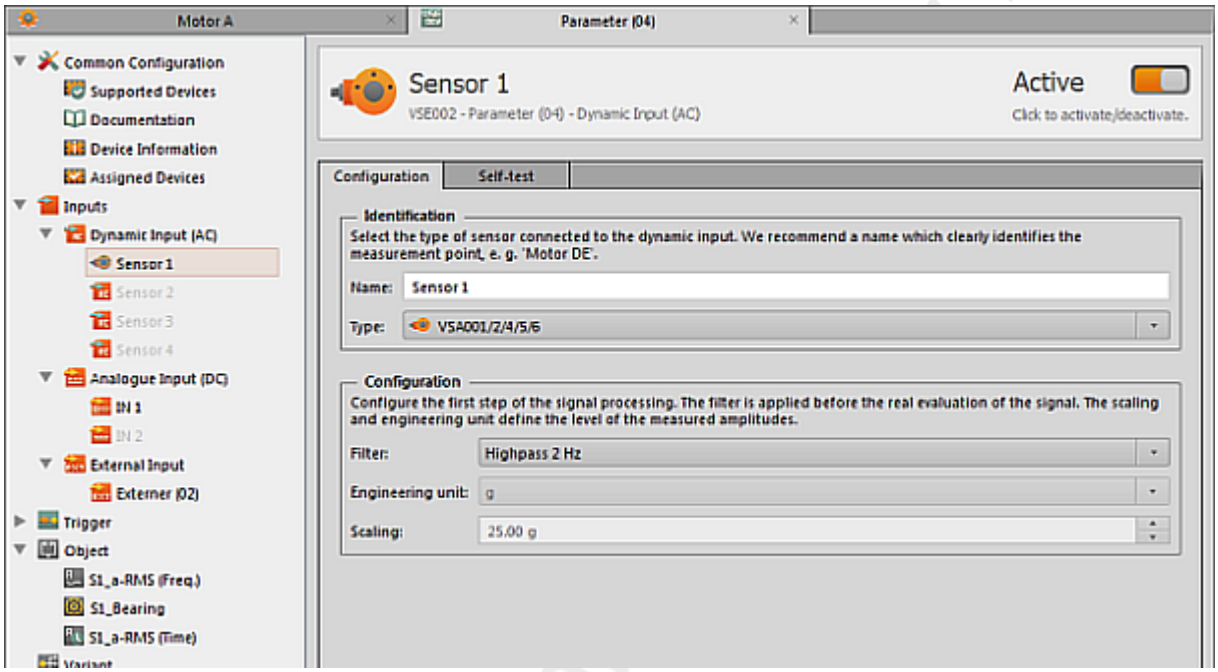
## VSE > ... > Detail [Inputs] > [Dynamic Inputs (AC)] > [Sensor #]

**Contents**



22251

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" | freely selectable | mV/g<br>V/g<br>mV/(m/s²) |
| IEPEx10 | from hardware version "AI" of the diagnostic electronics no longer supported | freely selectable | mV/g<br>V/g<br>mV/(m/s²) |
| DC current signal | • supported from hardware version "AI" of the diagnostic electronics and firmware version 0.10.0<br>• specification: Filter = unfiltered | freely selectable | freely selectable |
| AC current signal | --- | freely selectablei according to formula | freely selectable |

The filter is especially noteworthy for monitoring in the time domain according to ISO 10816 (= 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 highpass | --- |
| > 600 $min^{-1}$ | 10 Hz highpass | supported from hardware version "AI" of the diagnostic electronics and firmware version 0.6.0 |

**If sensor type = DC current signal**

22584

| 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:<br>$v_{min}$<br>$v_{max}$<br>$i_{min}$<br>$i_{max}$ | <br>smallest measured value<br>largest measured value<br>smallest current signal<br>largest current signal |

Formula for offset:

| | | |
|---|---|---|
| $\frac{(i_{max} - 10\ mA)\ v_{min} - (i_{min} - 10\ mA)\ v_{max}}{i_{max} - i_{min}}$ | Legend:<br>$v_{min}$<br>$v_{max}$<br>$i_{min}$<br>$i_{max}$ | <br>smallest measured value<br>largest measured value<br>smallest current signal<br>largest current signal |

**Example scaling + offset**

23819

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)**

22585

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

**Example scaling**

22586

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]**

22258

For sensors of type VSAnnn 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 the analogue value can be monitored. The signal that is present at the analogue input can be a current or a pulse signal. In the case of VSE100 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 #]:

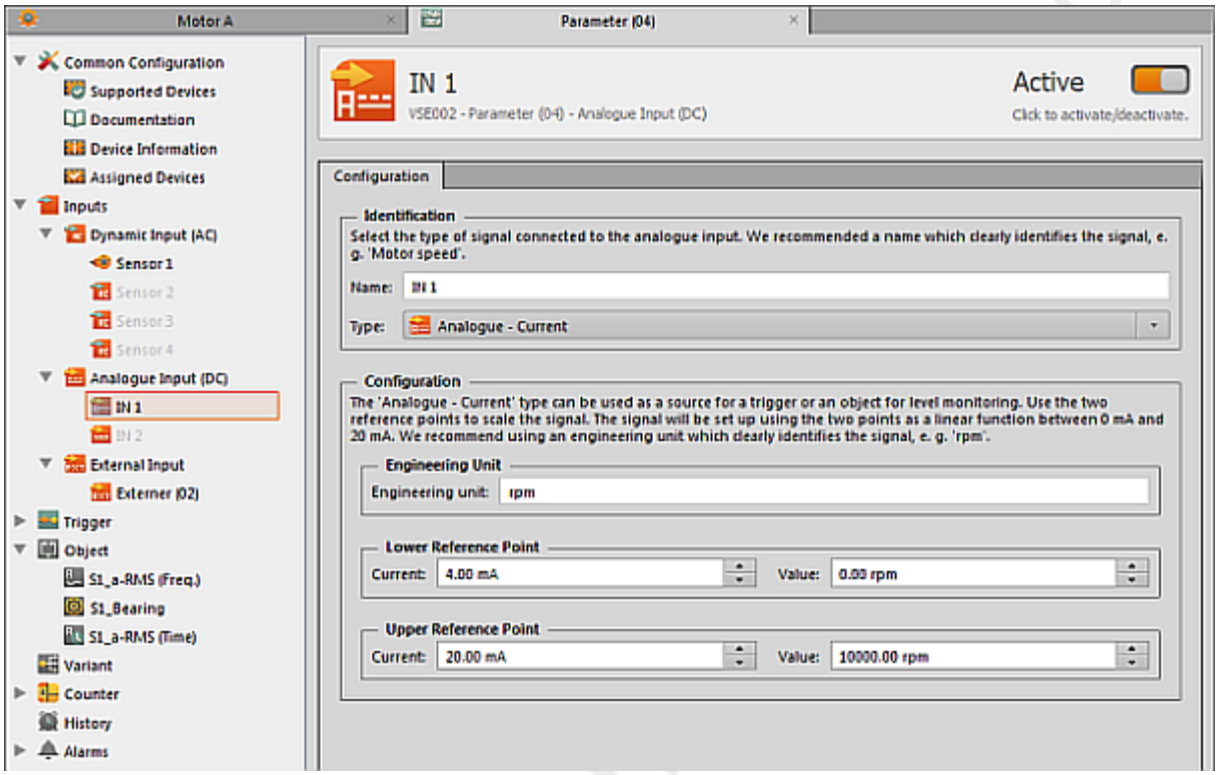
| Section | Dialogue element | Display | Switching function |
|---|---|---|---|
| --- | ID | consecutive number of the input on the diagnostic electronics |  |
| | Name | configured name of the input | |
| | Type | signal type of the input | |
| | Reference | signal value range according to input type | |
| | 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 #]

22260




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 outputs (DC)] > [IN #] > Section [Identification]

22587

| 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 |
| Analogue - Voltage<br>(visible only for VSE100) | 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]

22262

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.

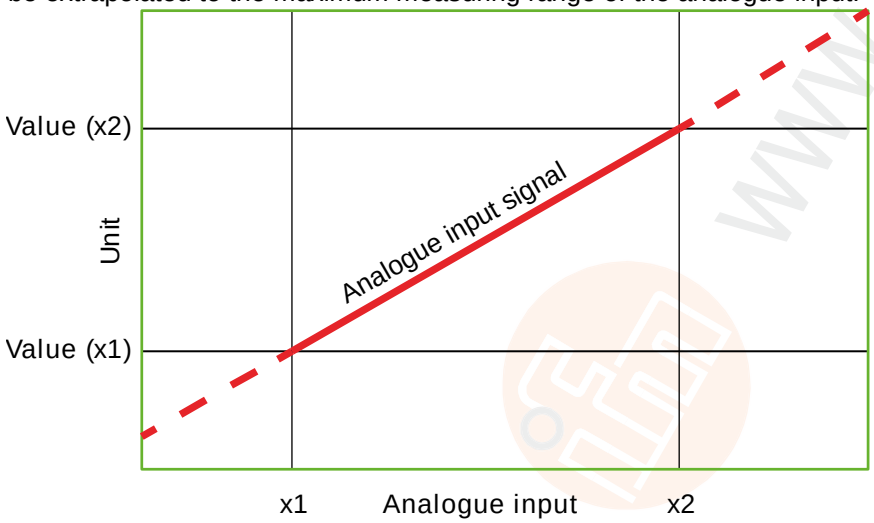
The displayed parameters and data depend on ...
- the configured input type
- the configured unit

| 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 levell | High levell | 10000.00 rpm | increase / reduce value |

**Configured input types**

22588

- 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).

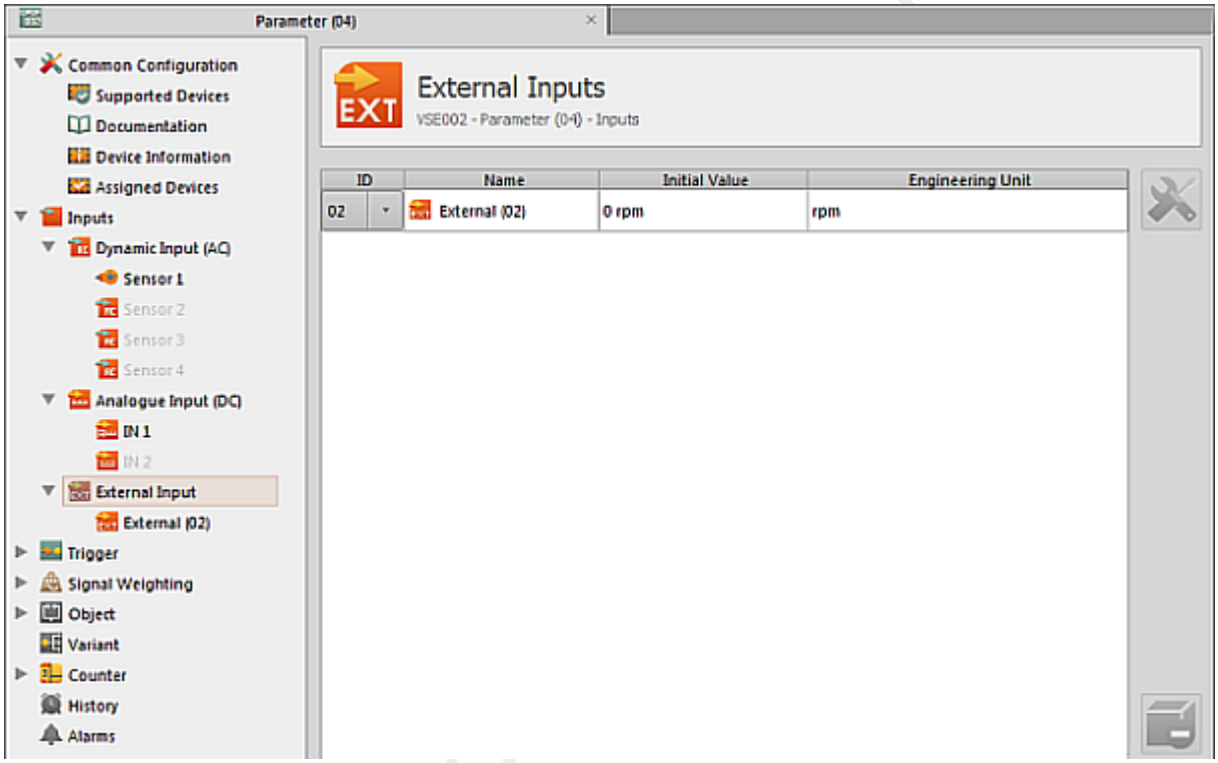
## VSE > ... > Detail [Inputs] > [External Inputs]

22264

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. 113)).

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.

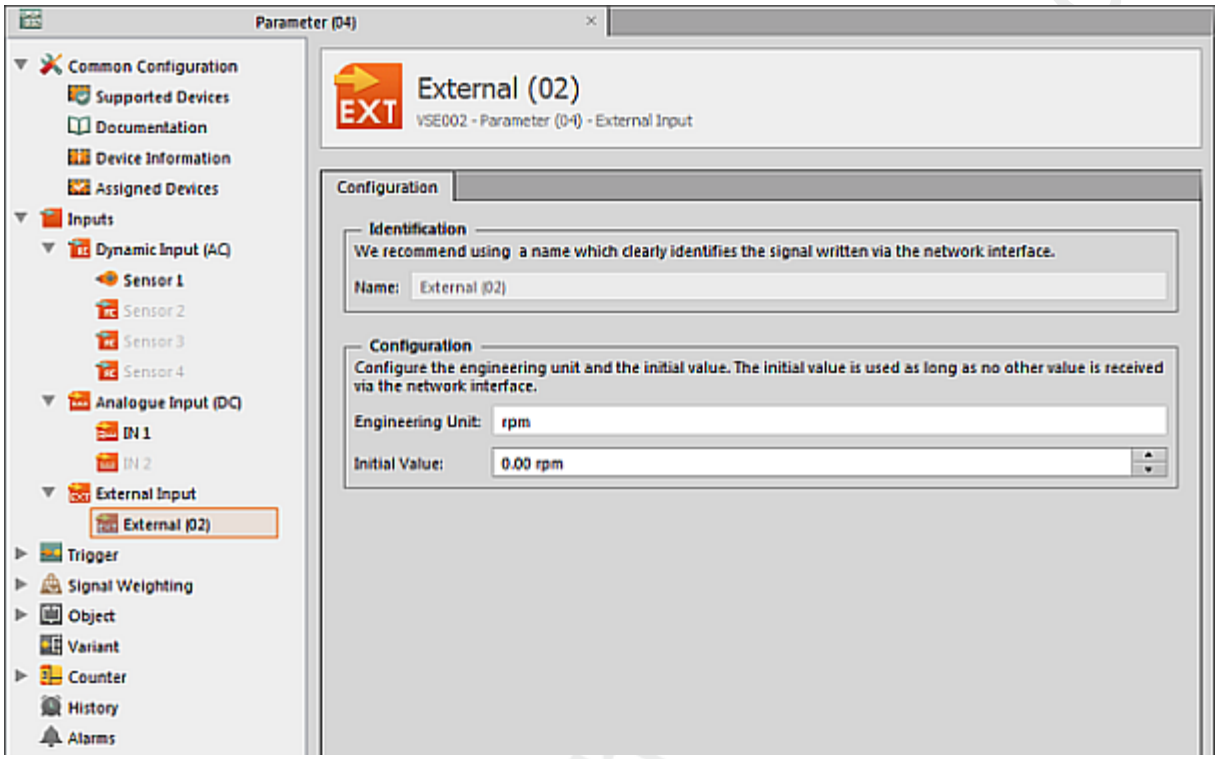
| Section | Dialogue element | Display | Switching function |
|---|---|---|---|
| External inputs | ID | 01 | can be assigned to any free ID (01...24) |
| | Name | Extern_# | # changes according to the assigned ID |
| | Initial value | 0 rpm |  |
| | Unit | rpm | |

**Switching functions:**

| | |
|---|---|
|  | configure the selected object |
|  | delete the selected object |

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

22267




The object [External_#] contains the following sections:

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

Change name:

► Mark the entry in the tree in the detailed view (via double-click or [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. "$min^{-1}$") 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.

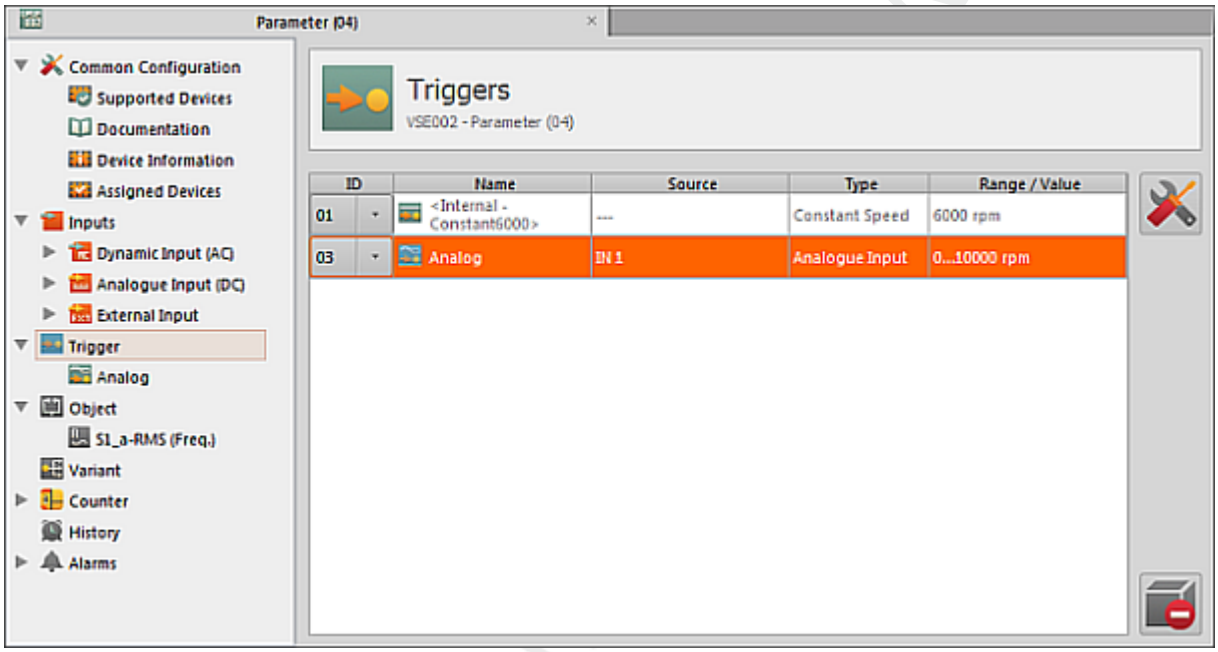
## 8.2.3 VSE > [Parameter_#] > Detail [Trigger]

Contents



22269

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.




| 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

22589

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

### Analogue input trigger

22590

- 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

22592

- 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

22593

- 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

22594

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

## Create a trigger

22591

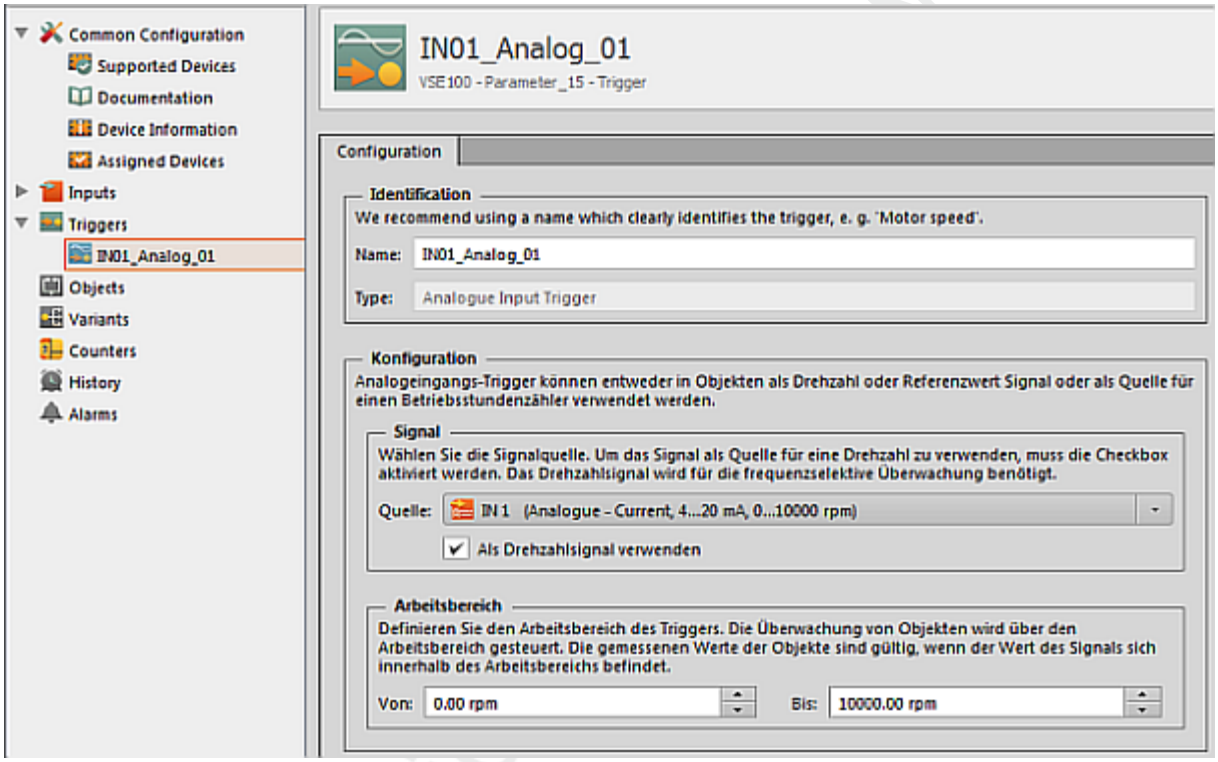
► In the detailed view, mark [Trigger]
Right-click in the empty, white area of the detailed view
Click on the desired trigger

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

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

22271

Description using the example "Analogue input trigger"




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

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

22273

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]

22274

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 |

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

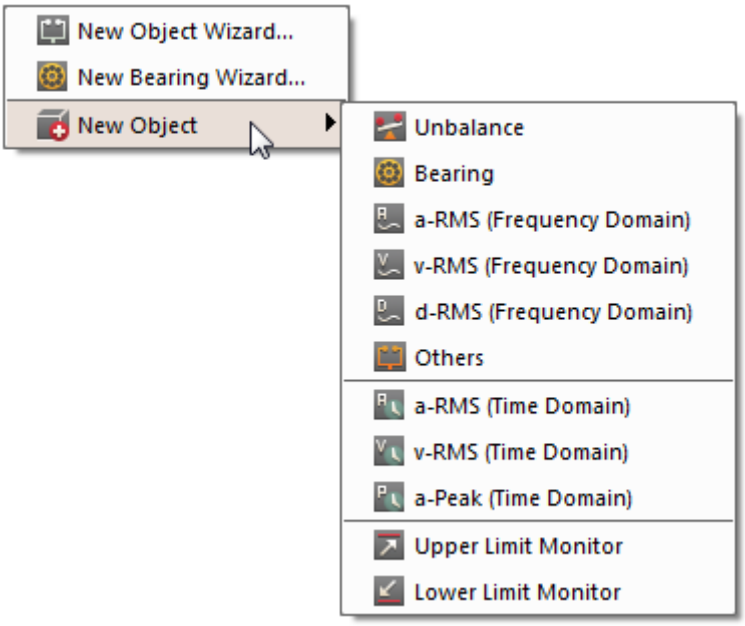
Contents



22279

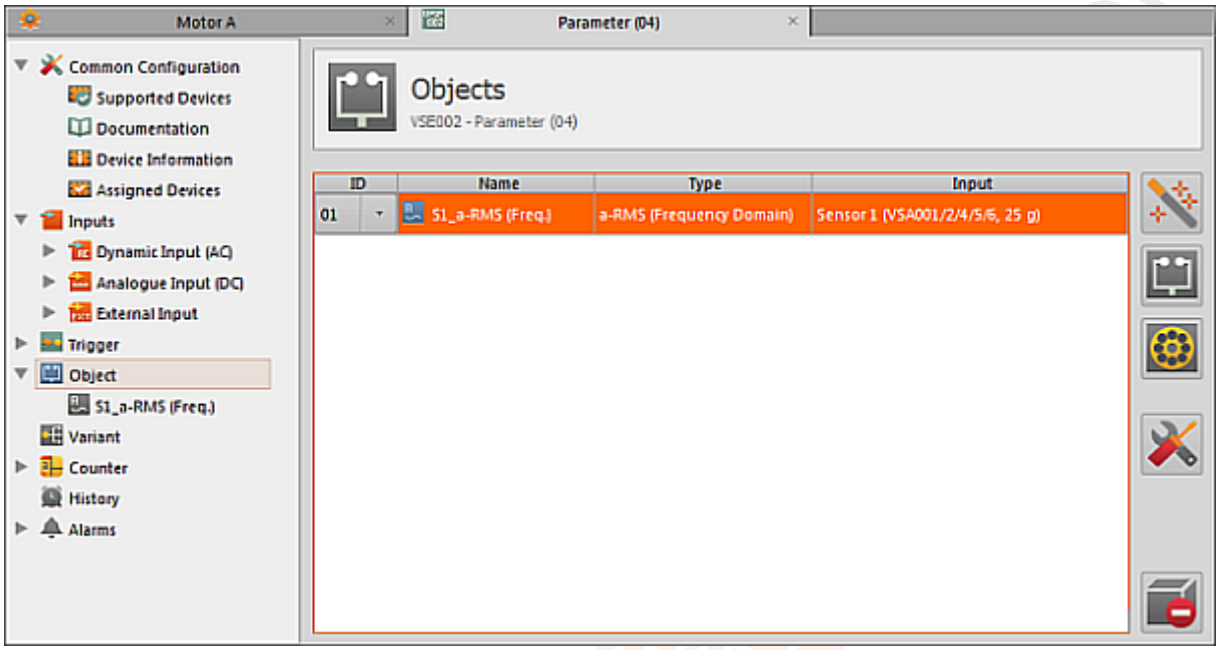
Objects are used to calculate and monitor characteristic values. The characteristic values can be calculated for the signals of the inputs (dynamic, analogue and/or external inputs). Predefined object types are offered to facilitate the configuration of monitoring tasks for the corresponding machine.

► Create an object: right-click into the empty white area of the detailed view, then continue via the context menu:




Or

► Use one of the buttons to create an object.




**Switching functions:**

| | |
|---|---|
| | edit 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

Contents



22285

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]

22286

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.

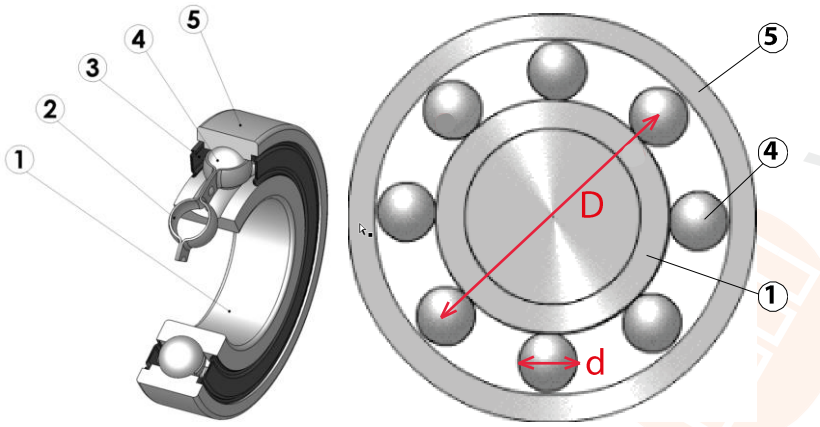
Applications:
- Fans
- Motors
- Spindles (especially during acceleration), etc.

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

22287

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)

22289

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]

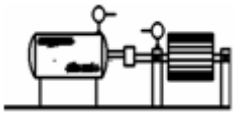
22290

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<br>loose fitting | FFT: 1.0 • $f_n$, 2.0 • $f_n$, 3.0 • $f_n$ |
|  | meshing, discrete tooth fault<br>meshing, too high transverse forces | FFT and H-FFT: 1.0 • $f_n$<br>FFT: number of teeth • $f_n$ |
|  | slide bearing, unstable lubricating film<br>slide bearing, wear | FFT: 0.42...0.48 • $f_n$<br>FFT: 1.0 • $f_n$, 2.0 • $f_n$, 3.0 • $f_n$ |
|  | pump, eccentric pump impeller<br>pump, cavitation | FFT: number of blades • $f_n$<br>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)

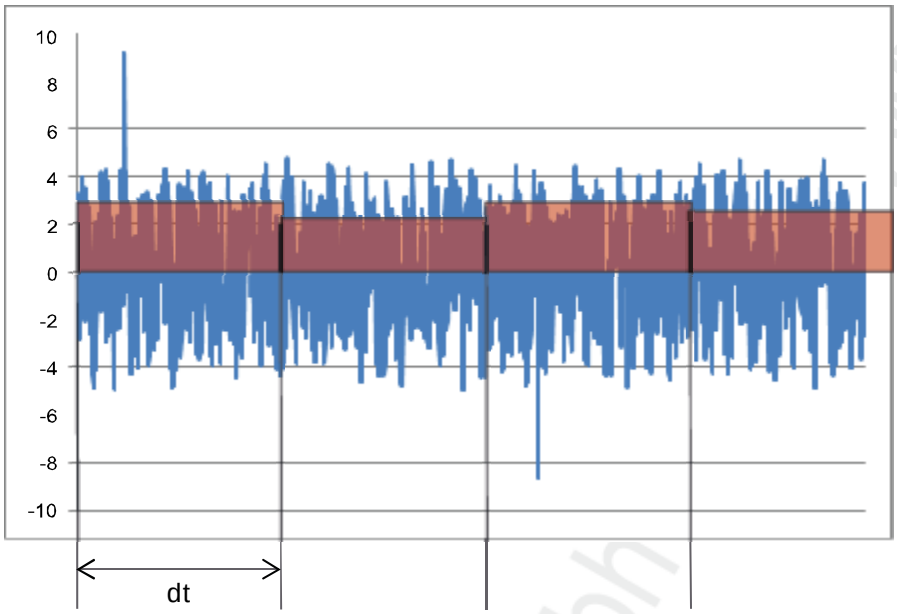
22296

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)

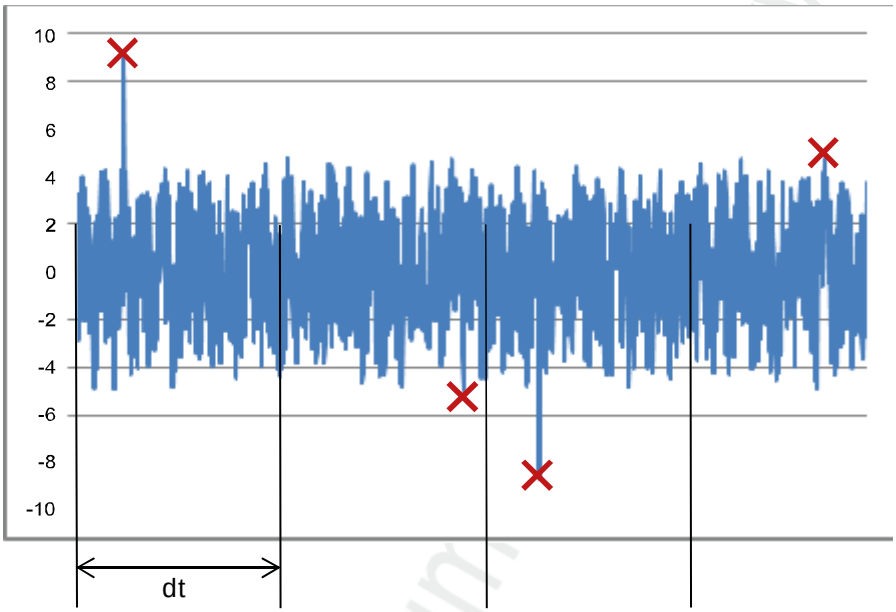
### VSE > ... > Object types > [a-Peak (time domain)]

22298

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]

22300

[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

**Contents**



22301

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]

22303

► 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<br>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]

22304

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]

22309

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)

22310

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]

22595

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]

22596

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]**

22597

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]:**

22598

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)

22311

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]

22599

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]

22600

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]

22312

| 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]

22601

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]

22602

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]

22313

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

22603

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)

22604

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]

22605

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]

22134

| 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]

22606

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

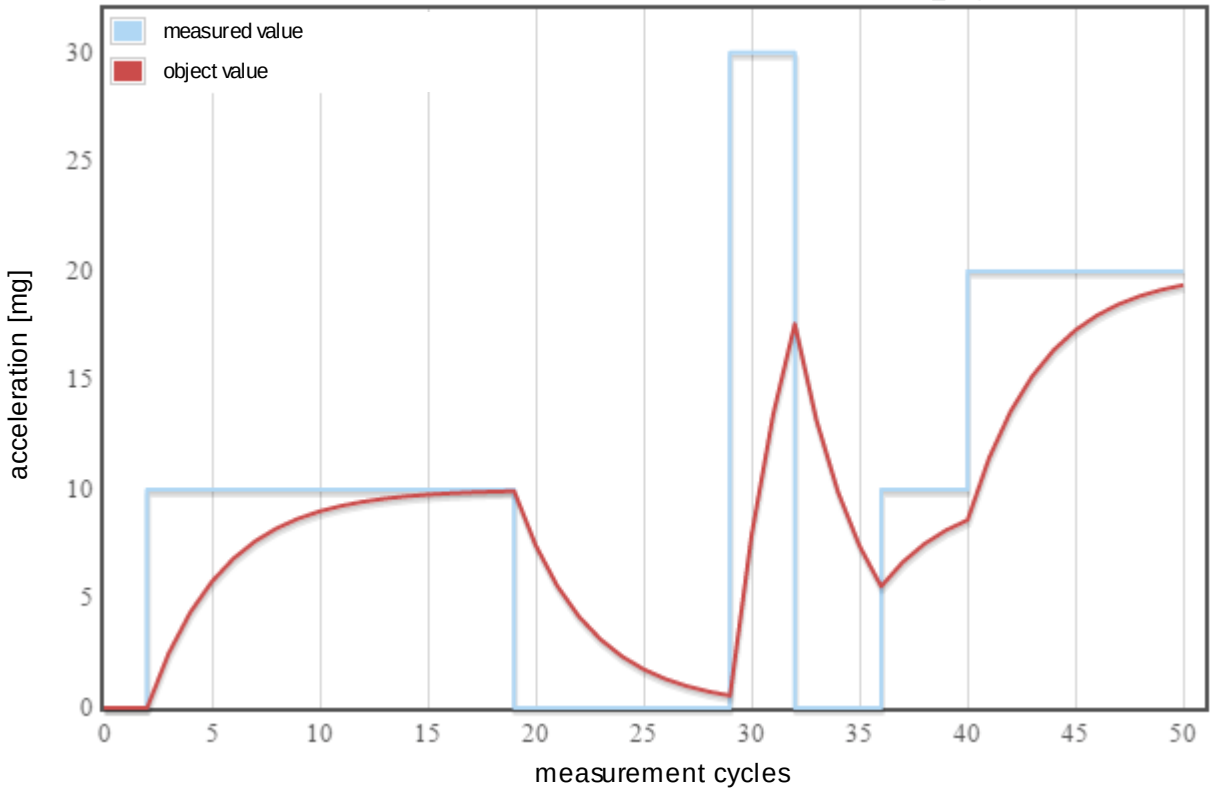
22607

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.

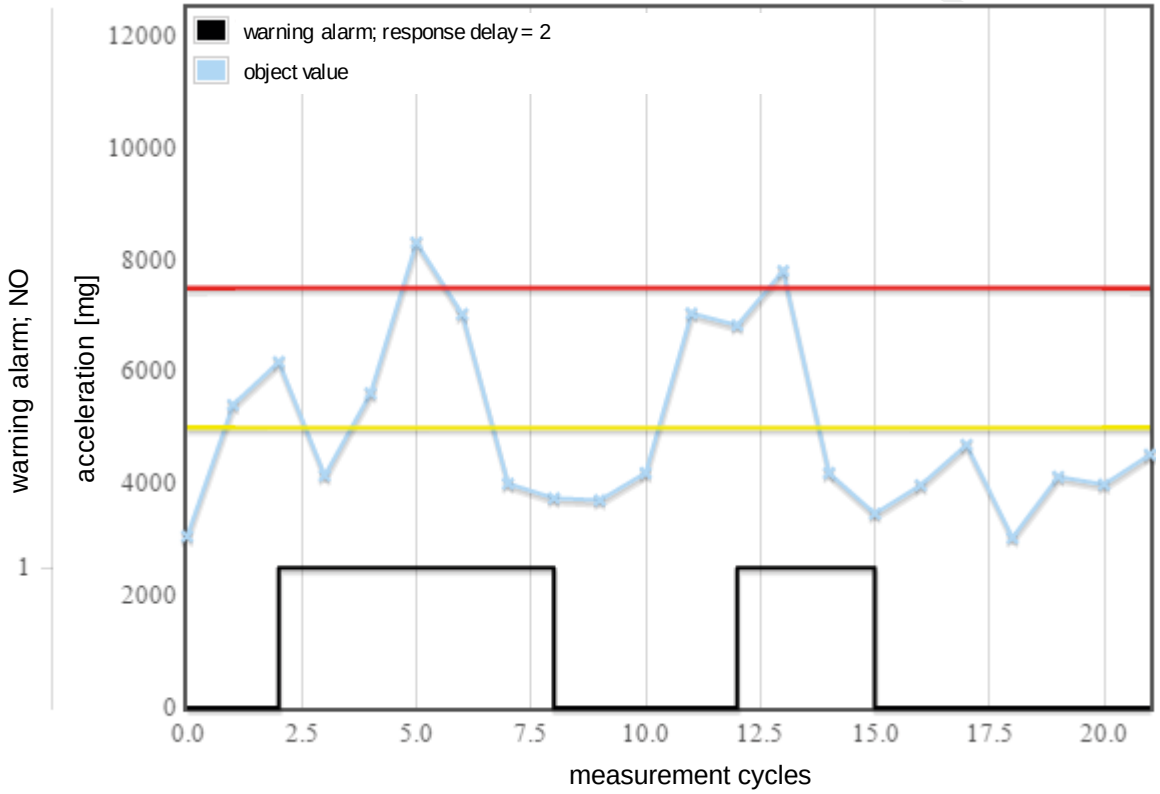


### Section [Response delay]

22608

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.

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

Contents



22317

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.

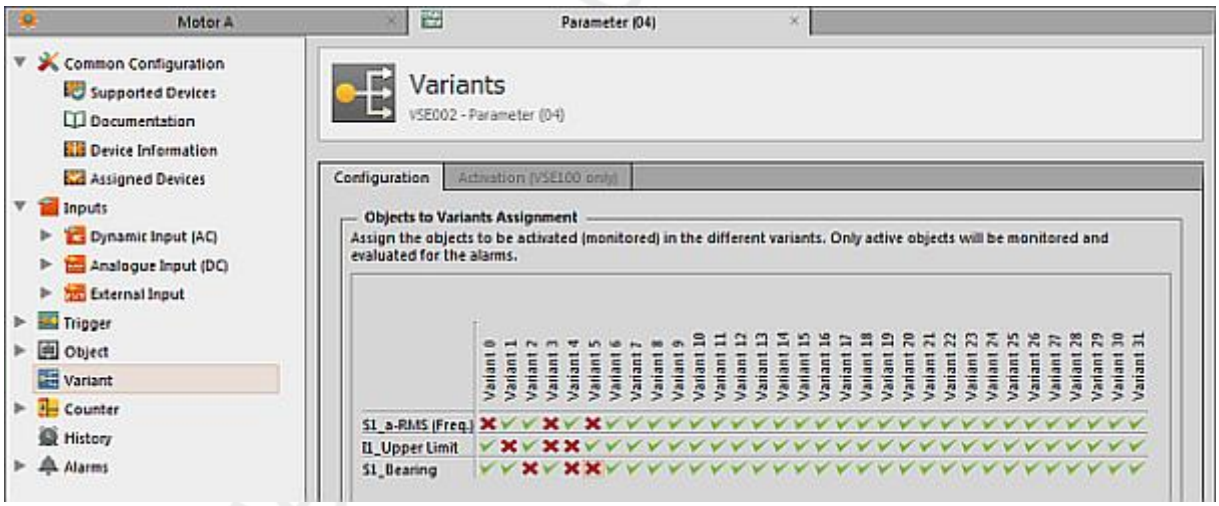
In this case, rolling element bearing monitoring would be an own variant differing from common monitoring during normal operation.

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

22318

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. 113)) or
- for VSE100 via the digital I/Os

Only the objects active in the current variant are calculated and evaluated.



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

22319

Objects are assigned to the variants. The objects can be freely activated/deactivated 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 method of activation used can limit the number of possible variants (→ tab [Activation] or variant switching without the digital I/Os of the VSE100 diagnostic electronics).

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

Contents



22320

This applies only to VSE100:

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. 113)), no further configuration is necessary.

If the activation of the variants is done via the digital I/Os of the diagnostic electronics, two different methods are available:
- active variant 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<br>• Active variant determined by the state of several I/Os (as a dual value) | | select option |
| Activation | Digital I/O | ✖ IO # (not used)<br>✔ IO # variant input | checkbox<br>activate / deactivate |
| | High | Variant # | selectable from list |
| | Low | Variant # | selectable from list |
| | ST | Self test | checkbox<br>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.

If you want to switch between more than 2 variants, several I/Os are necessary. In this case the following applies:

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

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

**Example 1:**

22322

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:**

22323

Configuration for the activation of variants:

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

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

| Aktive Variante | 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 diagnostic electronics is 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 a corresponding value assigned to it. The sum of all values determines the active variant.

#### Example

22325

| 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 |

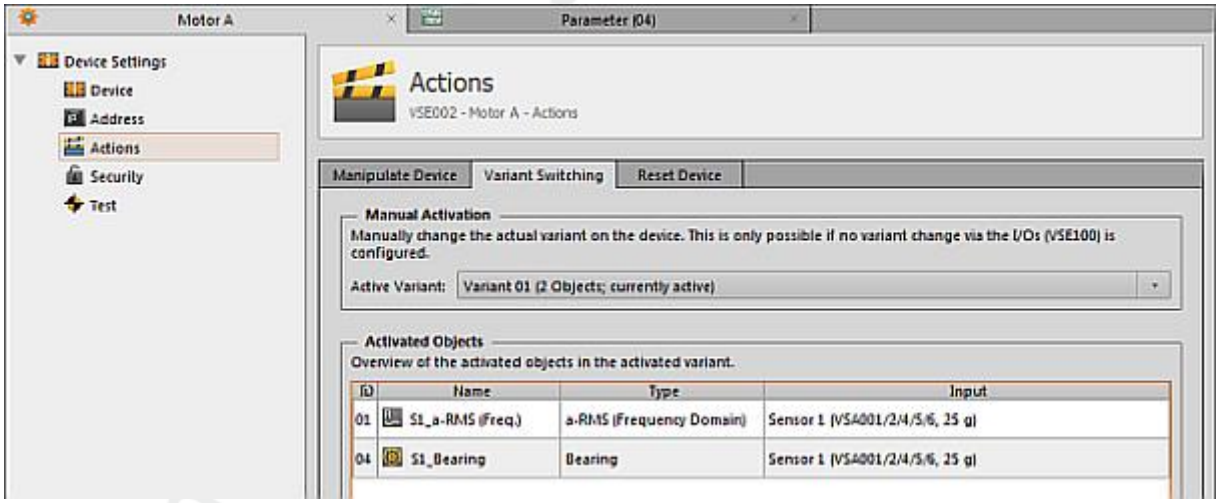
### Manual variant switching via the VES004 software

22326

Prerequisite:
- This requires a connection to the diagnostic electronics.
- The I/Os of the VSE100 must not be used for the change of variant.

The current variant can be changed in the device settings of the diagnostic electronics under [Actions] in the tab [Variant Switching].

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



### Variant switching via OPC

22327

Prerequisite:

- The I/Os of the VSE100 must not be used for the change of variant.

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.

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

Contents



22328

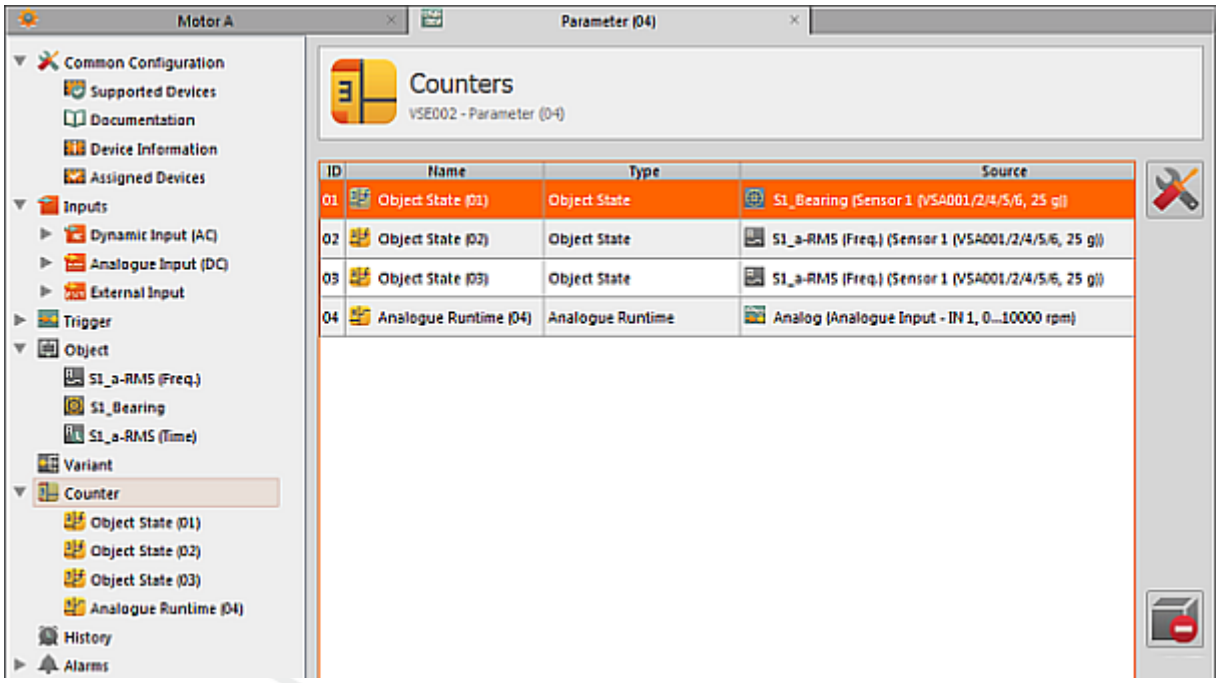
The octavis VSE unit has 32 internal counters (from firmware 0.6.x). Depending on the event to start the counter we differentiate the following counter types:

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

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

22329

The counters overview page shows the counters configured in the parameter set and their most important parameters.



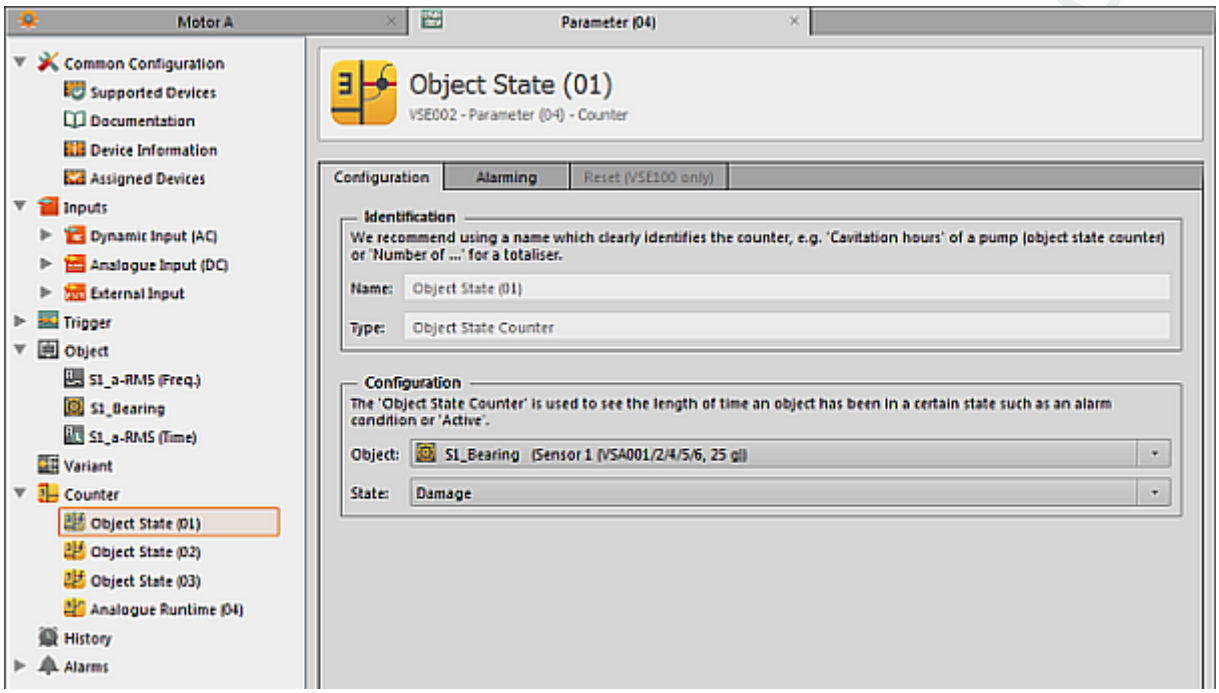

► Right-click into the white area of the detailed view to create a counter.

**Switching functions:**

| | |
|---|---|
|  | go to the configurati→ p. of the selected counter |
|  | delete the selected counter |

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

22335




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<br>(visible only for VSE100) | 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]

22338

- 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:<br>• number of pulses or<br>• duration in seconds | increase / reduce value |
| | Alarm group | configured alarm group | selectable from list |

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

22339

This applies only to VSE100:

Indicate the digital input I/O # that will 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 | use of the input | activate / deactivate |
| | ... | ... | ... |
| | I/O 8 | use of the input | activate / deactivate |

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

22340

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) measures the period during which an analogue or digital input (VSE100 only) is in a certain range or condition. Based on the source the following types of runtime counters are distinguished:

- Analogue runtime counter: The counter is activated by a trigger that refers to an analogue or external input. If the value for the corresponding input is within the working range defined in the trigger, the time is counted.

> From hardware version "AI" (version "V0.6.0") in combination with firmware version 0.10.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 voltage is supplied to the diagnostic electronics, the time is counted.
- Digital runtime counter (visible only for VSE100): The counter is activated by a digital input of VSE100. If the input is in the corresponding state, the time is counted.

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

22342

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

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

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

22344

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

22345

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

22346

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.

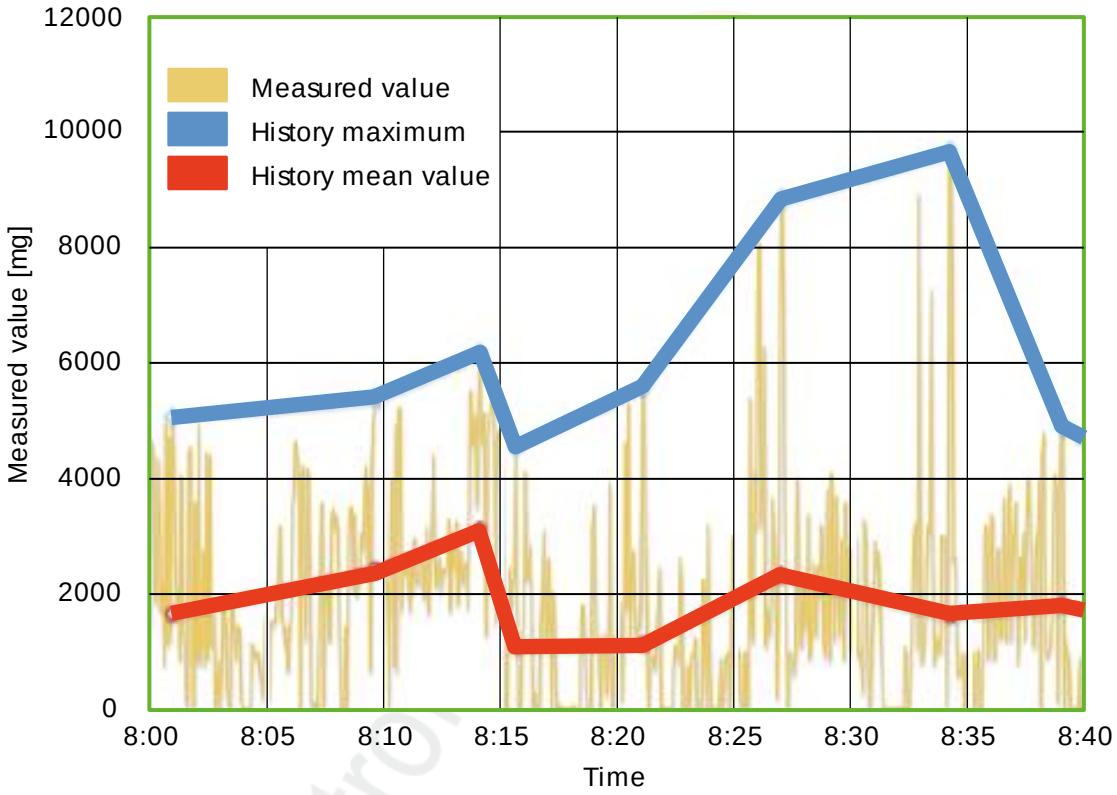
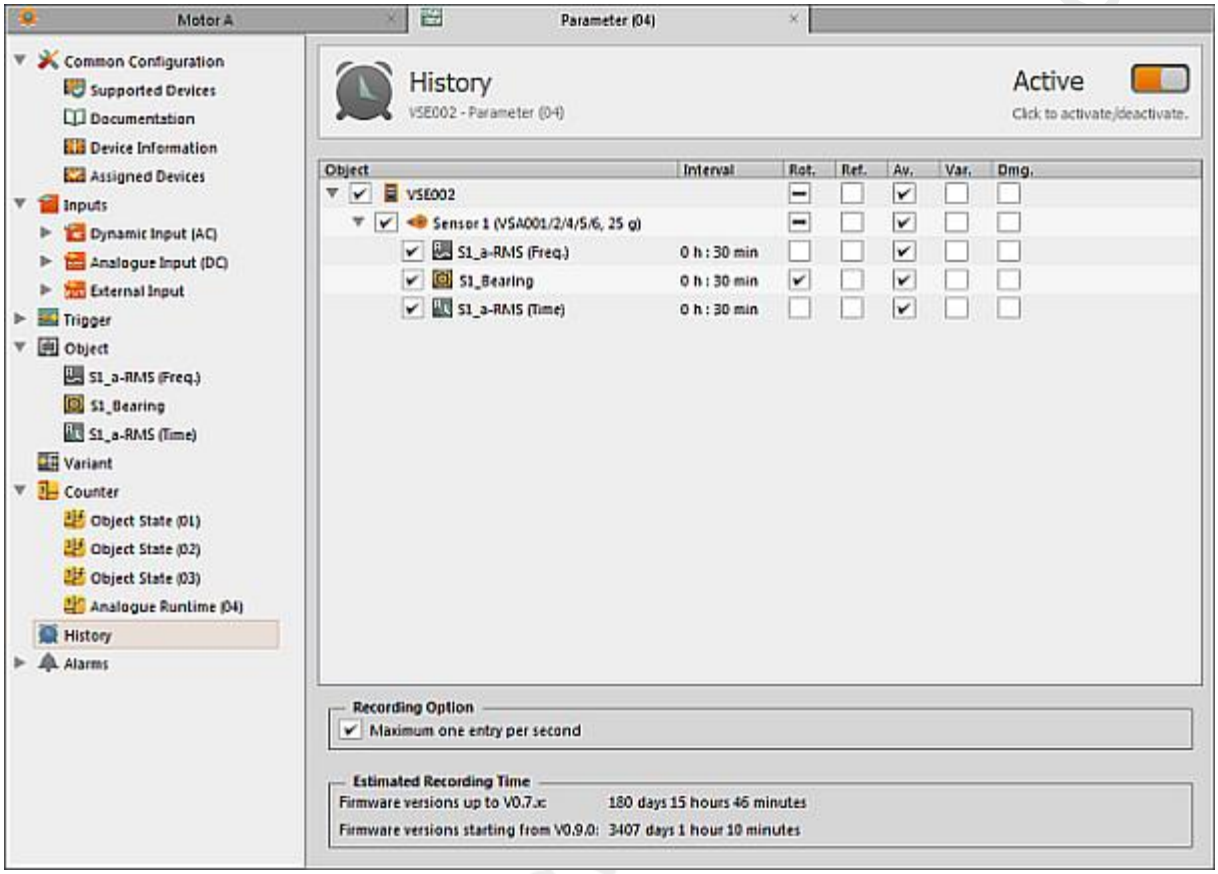



Diagram: History of the measured values (example)

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

22347




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.<br>Parameters cannot be configured. |
|  | Switch: the history memory is activated.<br>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:<br>the highest value measured during the interval is recorded |
| Rot. | -- | ☐ Option not activated<br>▬ Option partly activated<br>☑ Option fully activated | Rotational speed:<br>additionally records the value of the trigger for the rotational speed at the time of the highest measured value |
| Ref. | -- | ☐ Option not activated<br>▬ Option partly activated<br>☑ Option fully activated | Reference value / reference:<br>additionally records the value of the trigger for the reference value at the time of the highest measured value |
| Av. | -- | ☐ Option not activated<br>▬ Option partly activated<br>☑ Option fully activated | Average value (from firmware 0.5.19):<br>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<br>▬ Option partly activated<br>☑ Option fully activated | Variant switching (from firmware 0.5.19):<br>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<br>▬ Option partly activated<br>☑ Option fully activated | Damage alarm [Rot.] (from firmware 0.7.11):<br>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. |
| Record options | Maximum one entry per second | ☐ Option not activated<br>☑ Option fully activated | Protection of the history memory chip<br>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<br>If [Variant switching] or/and [Damage Alarm] is activated in an object, only the maximum time is displayed. |

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

Contents



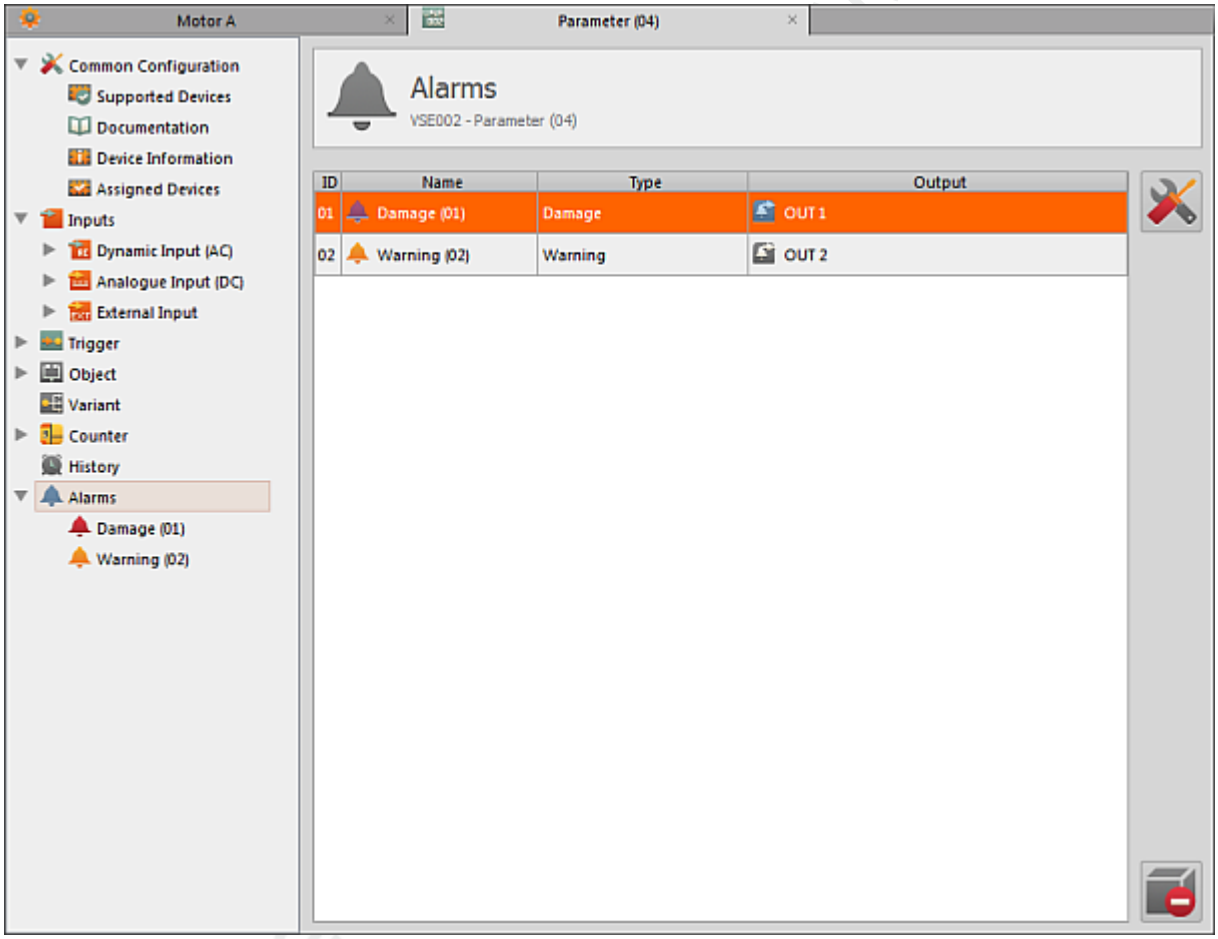
22353

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

22354

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

22356

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]

Contents



22357

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.

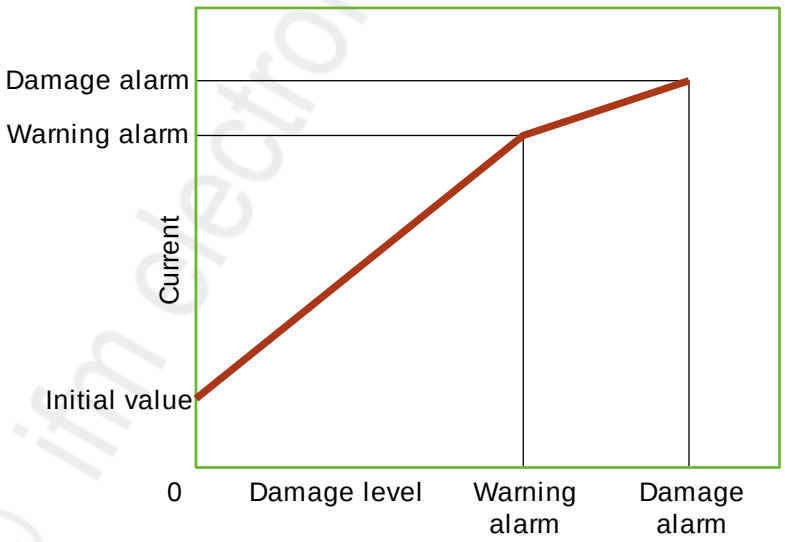
Only the analogue output OUT1 serves as an output channel for the analogue alarm.The output signal may be as follows:
- 4...20 mA (all diagnostic units)
- 0...10 V (only VES100)

► 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]**

22359

| 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:<br>• current 4...20 mA<br>• voltage 0...10 V<br>(visible only for VSE100) | 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<br>• minimum = 2 V | checkbox (depending from [Configuration] > [Signal]) | activate / deactivate |

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

22360

► 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<br>✘ do not evaluate object |

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

22361

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<br>• force current of 22 mA | option field |

### VSE > ... > Detail [Alarms] > Alarm types > [Warning alarm]

22362

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]

22363

| 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:<br>• normally closed<br>• 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]

22364

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<br>✖ do not evaluate object |

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

22365

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]

22366

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]

22370

| 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:<br>• normally closed<br>• 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]

22371

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<br>✗ do not evaluate object |

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

22372

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]

22373

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]

22374

| 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:<br>• normally closed<br>• normally open | selectable from list |
| | Keep signal for a minimum of 150 ms *) | checkbox | activate / deactivate |

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

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

22375

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<br>✖ do not evaluate object |

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

22376

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]

22377

A counter alarm allows you to select the different alarm groups (→ chapter **VSE > ... > Detail [Counter] > Tab [Alarming]** (→ p. 116)) 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]

22378

| 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:<br>• normally closed<br>• 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]

22379

The source of a counter alarm is a combination of different alarm groups of the counters
→ chapter **VSE > ... > Detail [Counter] > Tab [Alarming]** (→ p. 116)
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]

22380

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]

22381

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]** (→ p. 38)).

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

22383

| 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:<br>• normally closed<br>• 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

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

Contents



22887

This applies only to VSE150:

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

22890

| Section | Dialogue element | Display | Switching function |
|---|---|---|---|
| Mode | • Standard mode | Option field | Select an option |
| | • Expert mode | Option field | |
| Process image | Input | current value:<br>… elements (… bytes) | --- |
| | Output | current value:<br>… elements (… bytes) | --- |
| | Total | current value:<br>… elements (… bytes) | --- |
| | Admin. data | current value:<br>… bytes | --- |
| | Free | current value:<br>… bytes | --- |
| Export details about the process image | --- | --- | |
| Export General Station Description (GSD) file | --- | --- | |

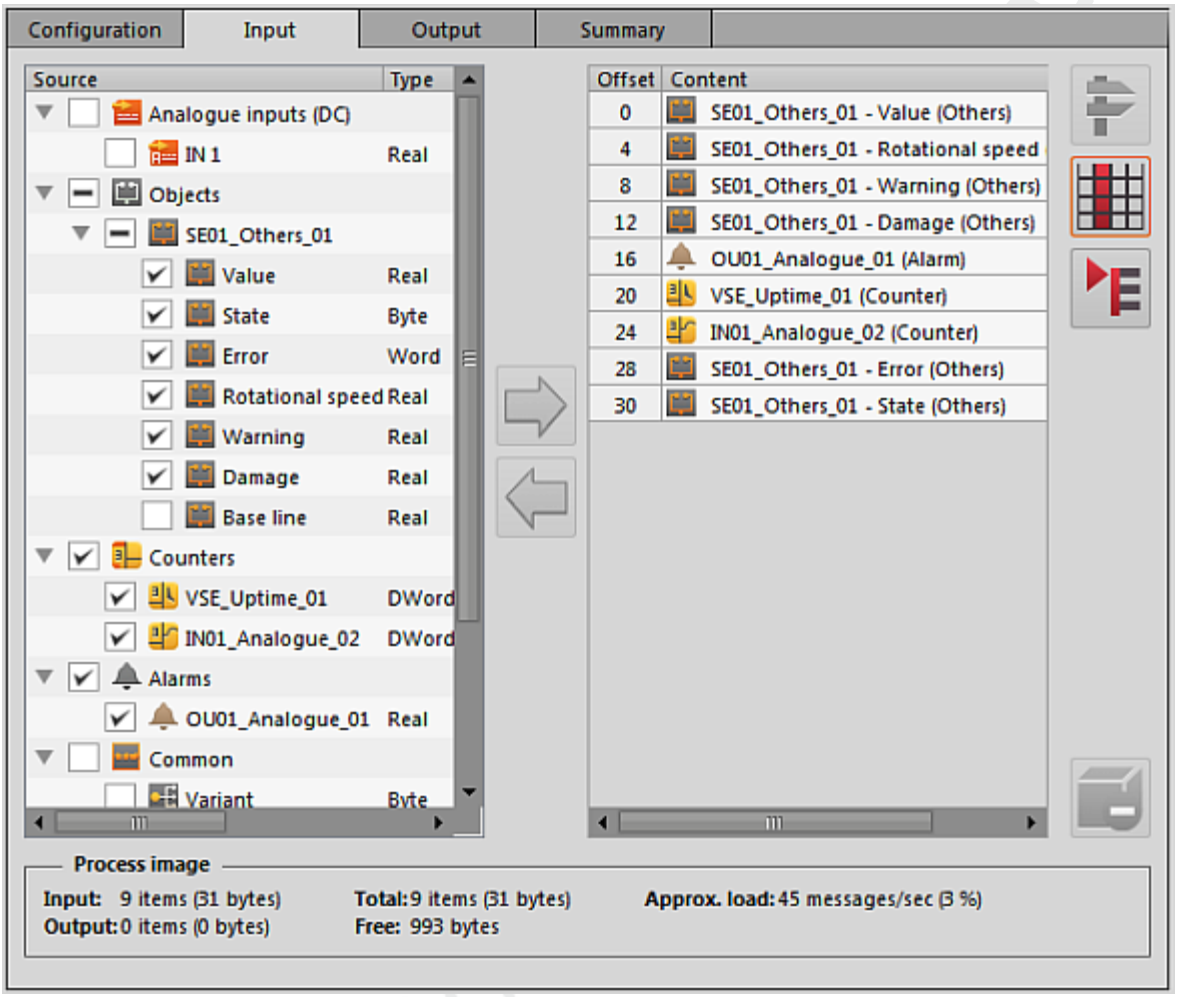
**Switching functions:**

| | |
|---|---|
| | 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 into a directory to be specified<br>In the expert mode:<br>Create a user-defined (non-certificated) GSD file |

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

22891

The terms "Input" and "Output" are from the fieldbus master's point of view.




► Select the "Source" in the left window (activate the checkbox).
Add the selected element to the process image via [➡].

> The selected elements appear as "Content" in the right window.
The offset address, depending on the data length (number of bytes) of the selected elements, is indicated in the left column.

► If required:
Remove the element selected in the process image from the process image via [⬅].

| Section | Dialogue element | Display | Switching function |
|---|---|---|---|
| Process image | Input | current value:<br>… items (… bytes) | --- |
| | Output | current value:<br>… items (… bytes) | --- |
| | Total | current value:<br>… items (… bytes) | --- |
| | Free | current value:<br>… items (… bytes) | --- |
| | Approximate load | current value:<br>… messages/sec (… %) | --- |

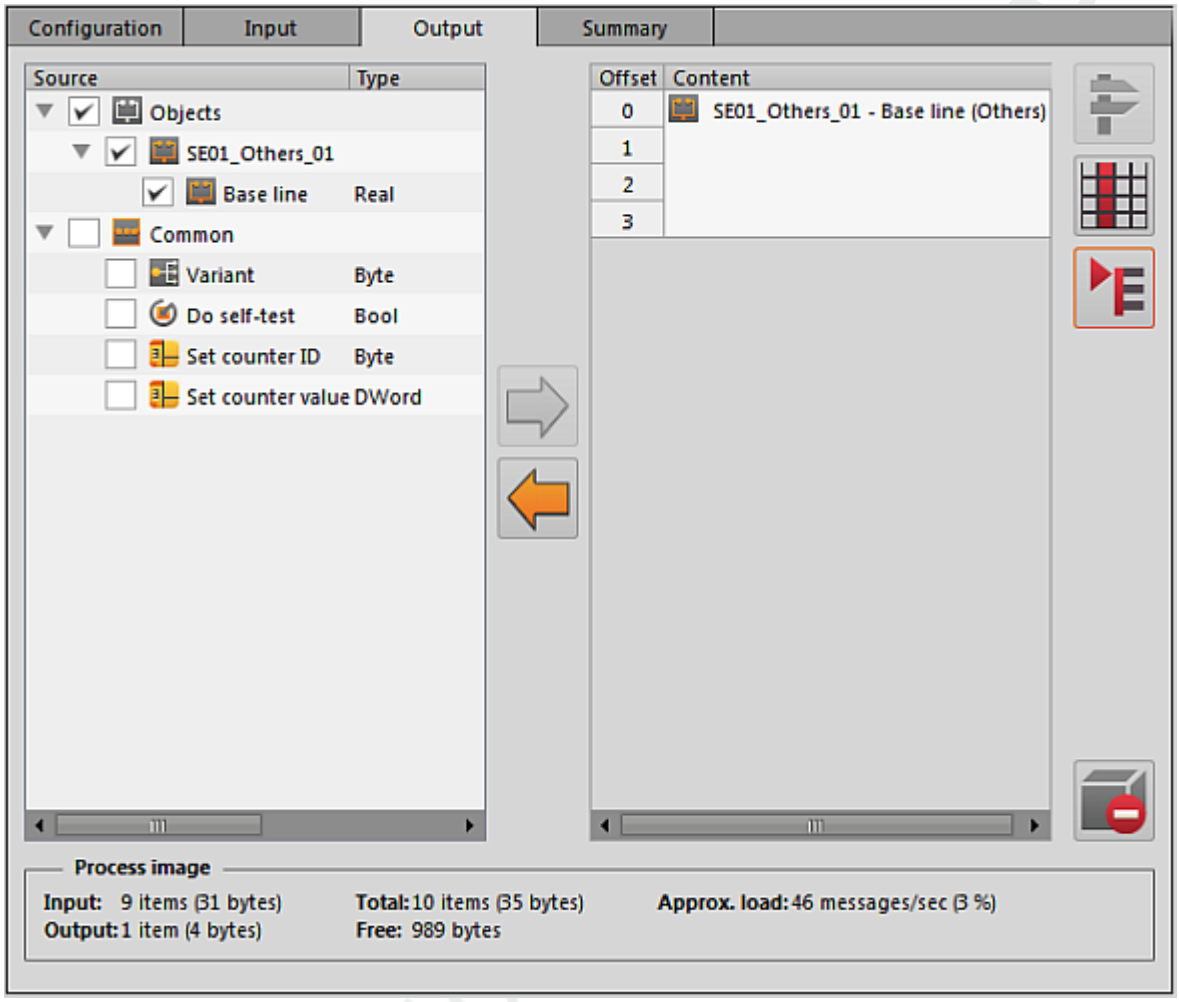
**Switching functions:**

| | |
|---|---|
|  | 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 [  ]. |
|  | Optimises the process image<br>The program tries to group the data packages to be transferred as 4-byte units |
|  | Switching the display mode:<br>• Offset (0, 4, 5, 7, ...) \| Contents<br>• Offset (0..3, 4, 5..6, 7..10, ...) \| Contents<br>• contents |
|  | Switching the detailed view:<br>• one line for each byte<br>• one line for each parameter |
|  | Removes the selected element from the process image |

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

22892

The terms "Input" and "Output" are from the fieldbus master's point of view.




► Select the "Source" in the left window (activate the checkbox).
Add the selected element to the process image via [➡].

> The selected elements appear as "Content" in the right window.
The offset address, depending on the data length (number of bytes) of the selected elements, is indicated in the left column.

► If required:
Remove the element selected in the process image from the process image via [⬅].

| Section | Dialogue element | Display | Switching function |
|---|---|---|---|
| Process image | Input | current value:<br>… items (… bytes) | --- |
| | Output | current value:<br>… items (… bytes) | --- |
| | Total | current value:<br>… items (… bytes) | --- |
| | Free | current value:<br>… items (… bytes) | --- |
| | Approximate load | current value:<br>… messages/sec (… %) | --- |

**Switching functions:**

| | |
|---|---|
|  | Remove the element selected in the process image from the process image via [  ]. |
|  | Add the element selected in the [Quelle] to the process image via [  ]. |
|  | Optimises the process image<br>The program tries to group the data packages to be transferred as 4-byte units |
|  | Switching the display mode:<br>• Offset (0, 4, 5, 7, ...) \| Contents<br>• Offset (0..3, 4, 5..6, 7..10, ...) \| Contents<br>• contents |
|  | Switching the detailed view:<br>• one line for each byte<br>• one line for each parameter |
|  | Removes the selected element from the process image |

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

22893

The terms "Input" and "Output" are from the fieldbus master's point of view.

Display of the parameters selected for communication with the fieldbus master:

- 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:<br>• grouped according to slots, in ascending order according to the offset<br>• as above, with additional details about group and module<br>• 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 Configure VNB001

Contents



22184

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]** (→ p. 31)).

## 9.1 Establish a connection to the VNB sensor

22390

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

► If not yet done: Install VNB-USB driver (→ chapter **Install the USB driver** (→ p. 10)).

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]

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

Contents



22393

This chapter describes the functions contained in the object [VNB001_#].
The object [VNB001_#] can be accessed via the tree view (→ chapter **Tree view** (→ p. 13)).

To open the [Settings] menu:

► In the tree view, select the device.

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

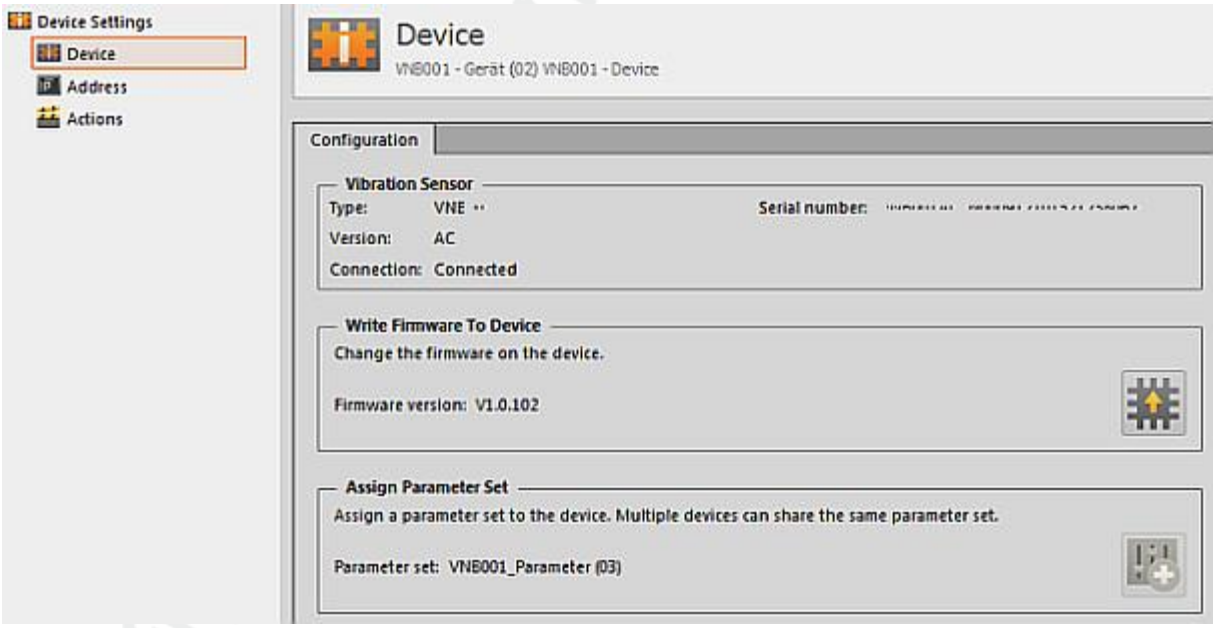
> The detailed view shows the following information and configuration options:
- Device
- Address
- Actions

## 9.2.1 VNB001 > ... > [Device Settings] > Detail [Device]

22394

The information and functions of the element [Device] 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 [Device] > Tab [Configuration]

22397

| 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 | |
| Assign parameter set | Parameter set | configured parameter set | |

**Switching functions:**

Prerequisite:

- VES software is connected to the device via [ ]

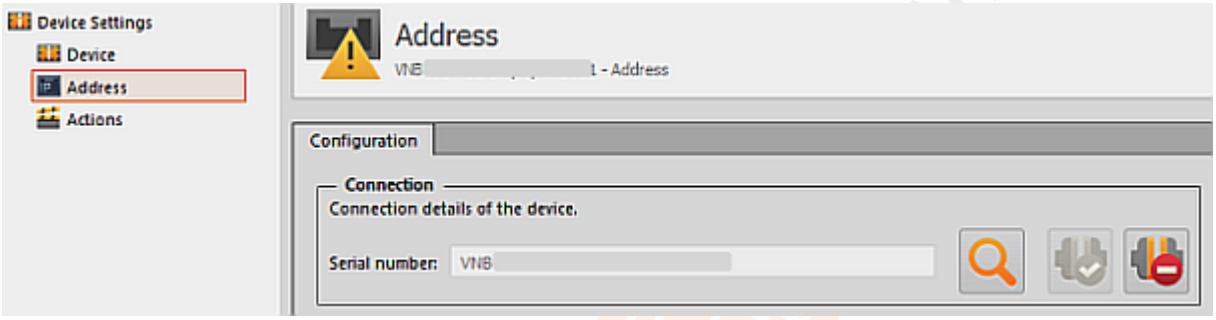
| | | |
|---|---|---|
| | Write firmware to device | ► Activate the button.<br>> A dialogue window appears.<br>► Select file with new firmware and confirm with [OK].<br>> Software updates the firmware of the device. |
| | Assign parameter set<br>(only active if several parameter sets are available) | ► Activate the button.<br>> A dialogue window appears.<br>► Select file with new firmware and confirm with [OK].<br>> Software updates the firmware of the device.<br>Optional:<br>► Select [Device] > [Write to Device] to write the assigned parameter set to the device. |

## 9.2.2 VNB001 > ... > [Device Settings] > Detail [Address]

22399

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]

22401

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

## 9.2.3 VNB001 > ... > [Device Settings] > Detail [Actions]

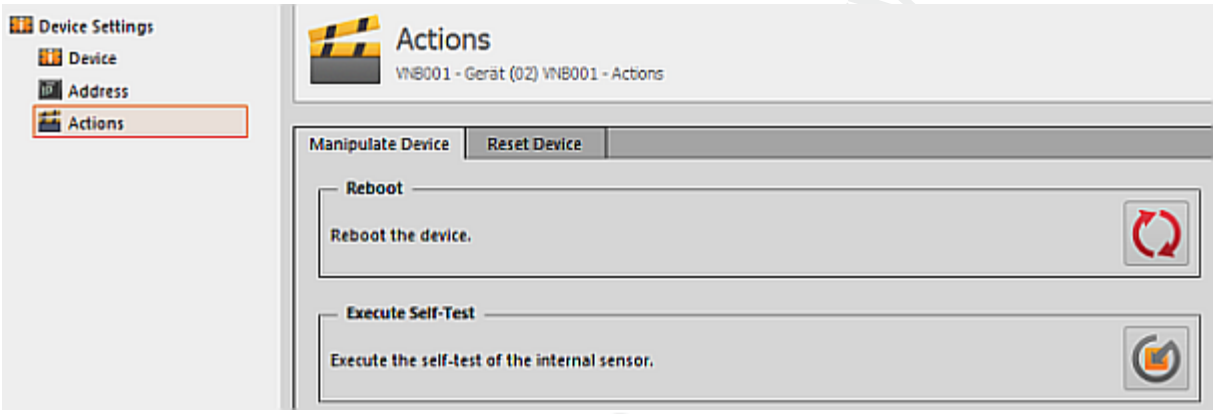
22407

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

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

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

22412




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

**Switching functions:**

| | | |
|---|---|---|
| | Reboot the device | ► Activate the button.<br>> The confirmation message appears.<br>► Start the process with [Yes]<br>OR<br>Abort the process with [No]<br>> If [Yes]: The device reboots. |
| | Execute self-test in the device | ► Activate the button.<br>> The device carries out a self-test.<br>> A message window with the result of the self-test appears.<br>► Close the message window with [OK]. |

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

22413


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

**Switching functions:**

| | | |
|---|---|---|
|  | Reset history | ► Activate the button.<br>> The confirmation message appears.<br>► Start the process with [Yes]<br>OR:<br>Abort the process with [No].<br>> If [Yes]: The software deletes the history of the device. |
|  | Reset parameters | ► Activate the button.<br>> The confirmation message appears.<br>► Start the process with [Yes]<br>OR:<br>Abort the process with [No].<br>> If [Yes]: The software resets all parameters to their default values. |
|  | Restore factory settings | ► Activate the button.<br>> The factory settings of the device are restored. |

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

Contents



22415

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]** (→ p. 43))

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.

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

Contents



22417

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

► Open the tab [Parameter_#]

► In the detailed view, select [Common Configuration]

> The detailed view shows the following information:

| Section | Dialogue element | Display | Possible values |
|---|---|---|---|
| Information | Created | date on which the data set was created | -- |
| | Changed | date on which the data set was 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]<br>• imperial [in/s] |
| | Speed values | acceleration values | • RMS = effective value<br>• Peak = peak value |

### VNB001 > ... > [Parameter_#] > ... > Detail [Supported Devices]

22418

The element [Supported Devices] offers information about the devices used here.

### VNB001 > ... > Detail [Supported Devices] > Tab [Configuration]

22419

| 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]

22420

The element [Documentation] offers information about location and parameter setting data of the sensor.

### VNB001 > ... > Detail [Documentation] > Tab [Application]

22421

| Section | Dialogue element | Display | Description |
|---|---|---|---|
| Application | Company | free text | max. 100 characters |
| | Address | | |
| | City | | |
| | Location | | |
| | Machine | | |

### VNB001 > ... > Detail [Documentation] > Tab [Description]

22422

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]

22423

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]

22424

| 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<br>(only active if at least one output is used for alarms) |

## VNB001 > ... > Detail [Device Information] > Tab [Object Dependencies]

22426

| 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 | |

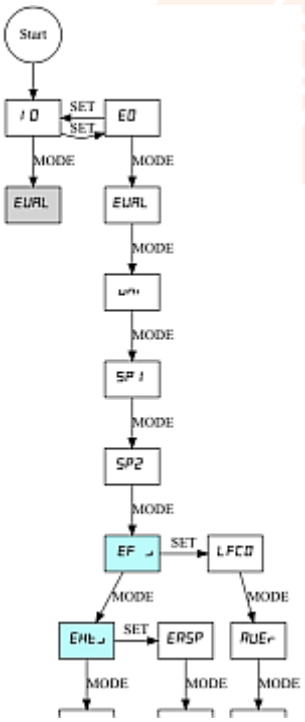
**Switching functions:**

| | |
|---|---|
| | configure selected object or input<br>(only active if at least one object is defined) |

## VNB001 > ... > Detail [Device Information] > Tab [Device Menu]

22428

Visualises the menu of the target device (here: detail)



## VNB001 > ... > [Parameter_#] > ... > Detail [Assigned Devices]

22431

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]

22432

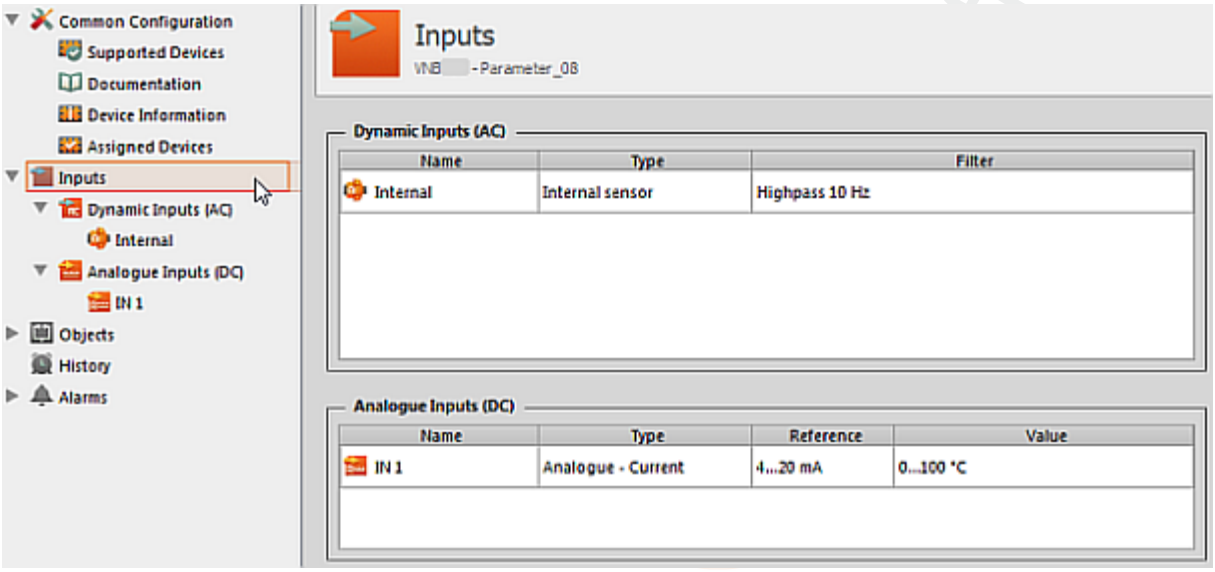
Displays all devices assigned to the parameter set.

| 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 | |

## 9.3.2 VNB001 > ... > [Parameter_#] > Detail [Inputs]

22434

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]

22436

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]

22437

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 |

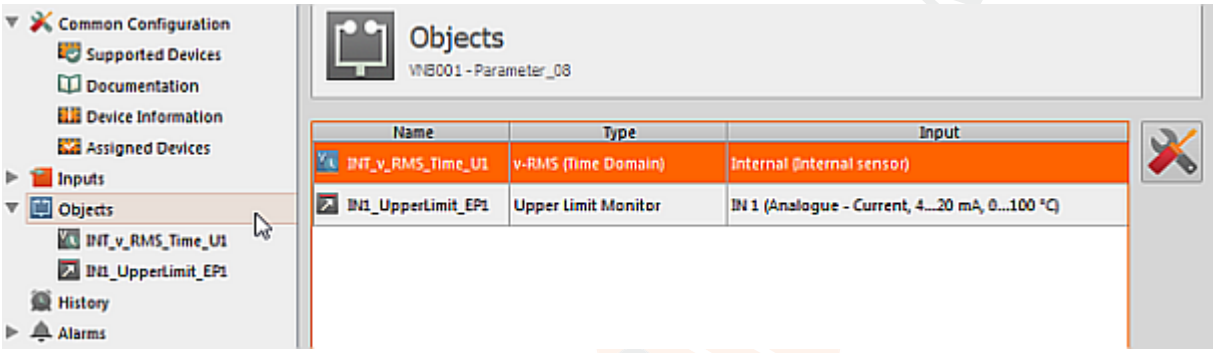
## 9.3.3 VNB001 > ... > [Parameter_#] > Detail [Objects]

Contents



22438

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.<br>RMS = root mean square<br>Applications:<br>• measurements in accordance with ISO 10816 and other applicable standards (v-RMS)<br>• loose machine parts (v-RMS)<br>• alignment errors (v-RMS) |
| Upper limit monitor | Monitors analogue signals (DC signals).<br>The signal source can be an analogue input |

| Section / column | Dialogue element | Display | Switching function |
|---|---|---|---|
| Name | -- | • SE01_v_RMS_Time_U1<br>• IN1_UpperLimit_EP1 | |
| Type | -- | • v-RMS (time domain)<br>• upper limit monitor | |
| Input | -- | • internal (internal sensor)<br>• 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]

22439

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]

22440

| Section | Dialogue element | Display | Switching function |
|---|---|---|---|
| Filter | Type | configured filter type<br>→ [Inputs] > [Dynamic Input > [Internal] | fixed |
| | From | 0 Hz | fixed |
| | 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]

22441

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]

22442

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 |

## 9.3.4 VNB001 > ... > [Parameter_#] > Detail [History]

22443

Nothing can be configured here.

| Section | Dialogue element | Display / Switching function | Beschreibung |
|---|---|---|---|
| Object | VNB001 | sensor / input type / input | fixed |
| Interval | -- | 0 h : 05 min : 00 s | measurement duration:<br>the highest value measured during the interval is recorded |
| Av. | -- | ☐ Option not activated<br>▬ Option partly activated<br>☑ Option fully activated | average value (from firmware 0.5.19):<br>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

22445

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

22446

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.

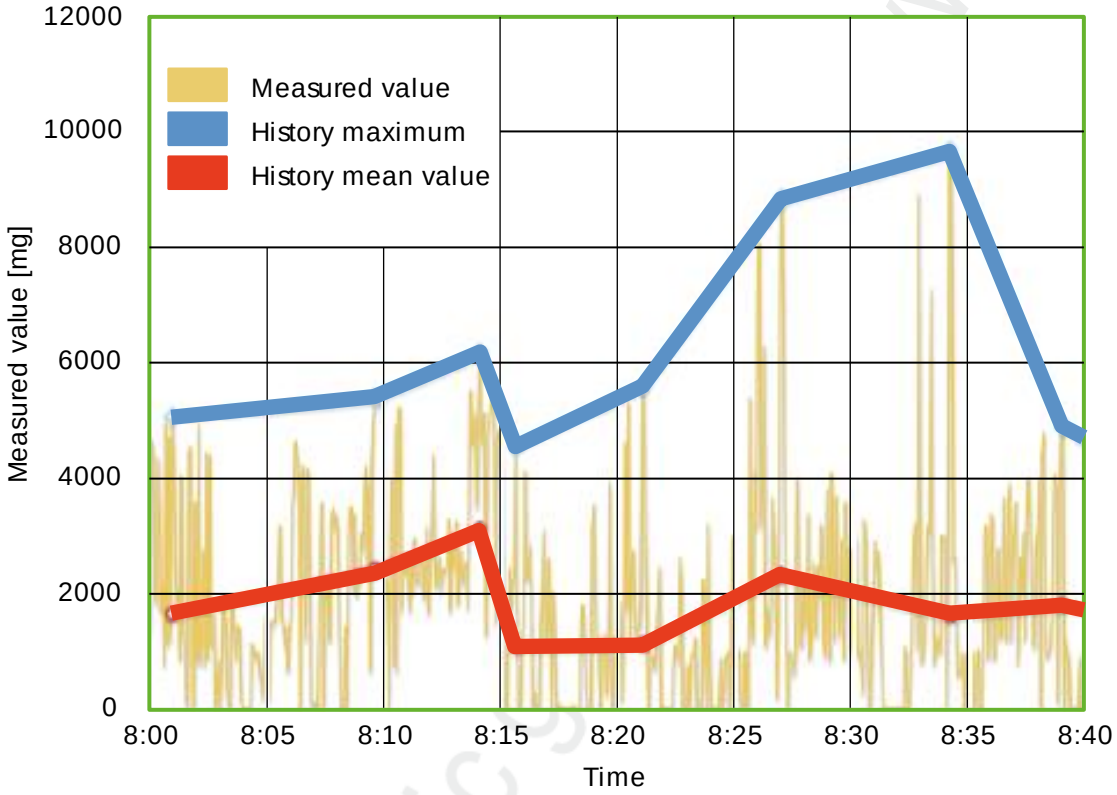
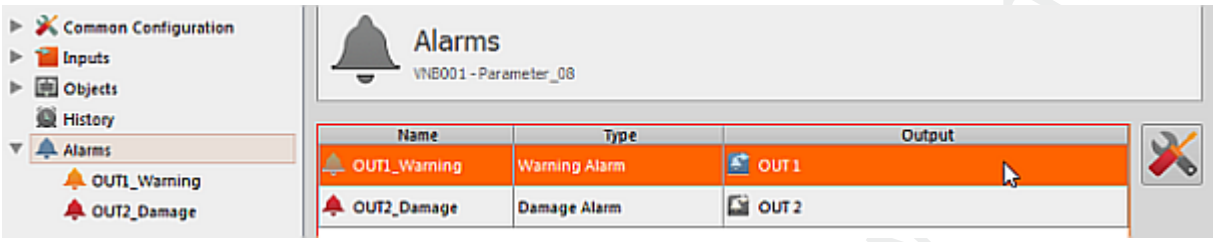



Diagram: History of the measured values (example)

## 9.3.5 VNB001 > ... > [Parameter_#] > Detail [Alarms]

22447

Displays the existing alarms



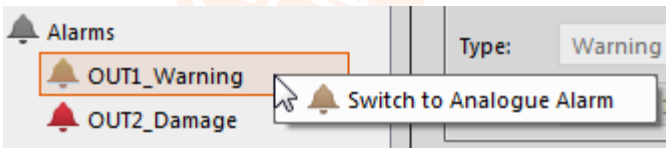
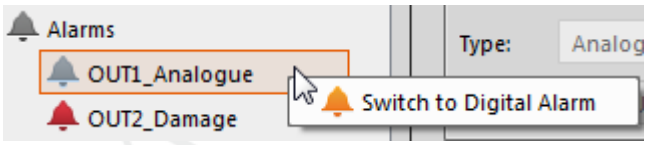

**Switching functions:**

| | |
|---|---|
| | go to the configurati→ p. of the selected alarm |

### VNB001 > ... > Detail [Alarms] > [OUT1_Warning] > Tab [Configuration]

22449

Configure the warning alarm (via the context menu), either:

| | |
|---|---|
| • analogue as an analogue alarm |  |
| • digital as a warning alarm |  |





| 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:<br>• normally closed<br>• normally open | selectable from list |
| | Switch-on delay | configured time | increase / reduce value |
| | Switch-off delay | configured time | increase / reduce value |

## VNB001 > ... > Detail [Alarms] > [OUT1_Warning] > Tab [Source]

22450

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<br>✖ do not evaluate object |

## VNB001 > ... > Detail [Alarms] > [OUT2_Damage] > Tab [Configuration]

22453

| 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:<br>• normally closed<br>• 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]

22454

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<br>✖ do not evaluate object |

# 10 Configure VNB211

Contents



22185

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)** (→ p. 22)

## 10.1 Establish a connection to the VNB sensor

22456

► 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** (→ p. 10))

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]

# 10.2 VNB211 > Object [VNB211_#] > Detail [Device Settings]

Contents



22457

This chapter describes the functions contained in the object [VNB211_#].
The object [VNB211_#] can be accessed via the **tree view** (→ p. 13).

To open the [Settings] menu:

► In the tree view, select the device.

► Choose either:
[Device] menu > [Settings] > [Open]
Or:
Double-click on [VNB211_#] > [Settings]

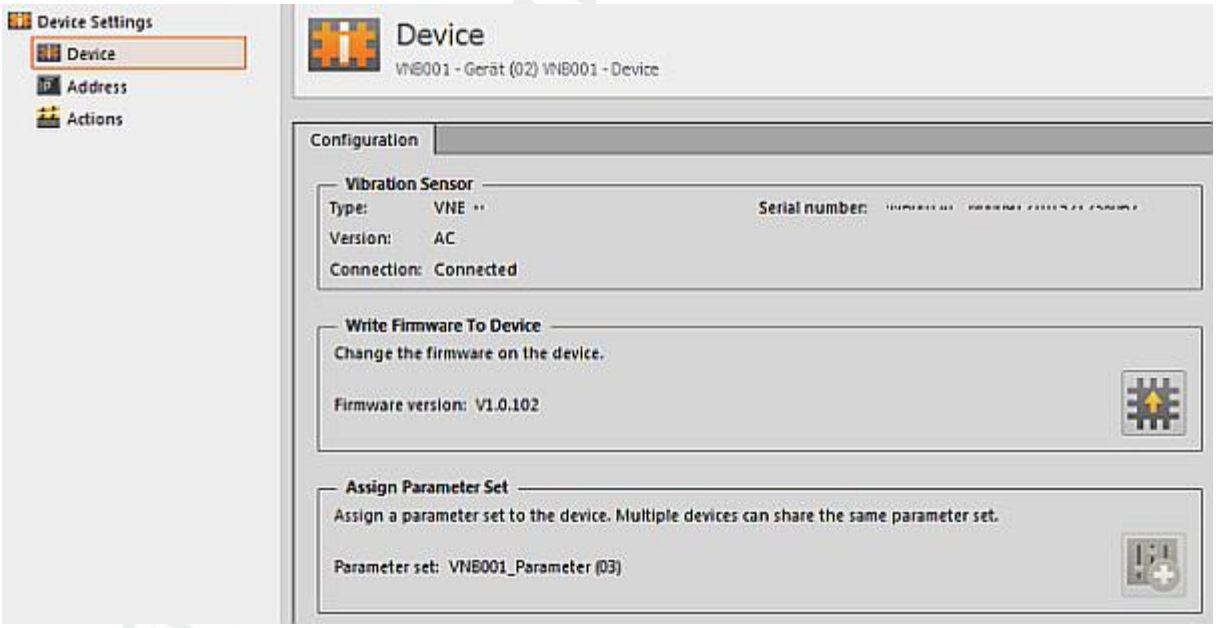
> The detailed view shows the following information and configuration options:
- Device
- Address
- Actions

## 10.2.1 VNB211 > ... > [Device Settings] > Detail [Device]

22458

The information and functions of the element [Device] 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. 155)).



## VNB211 > ... > Detail [Device] > Tab [Configuration]

22460

| 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 |  |
| Assign parameter set | Parameter set | configured parameter set |  |

**Switching functions:**

Prerequisite:

VES software is connected to the device via [  ]

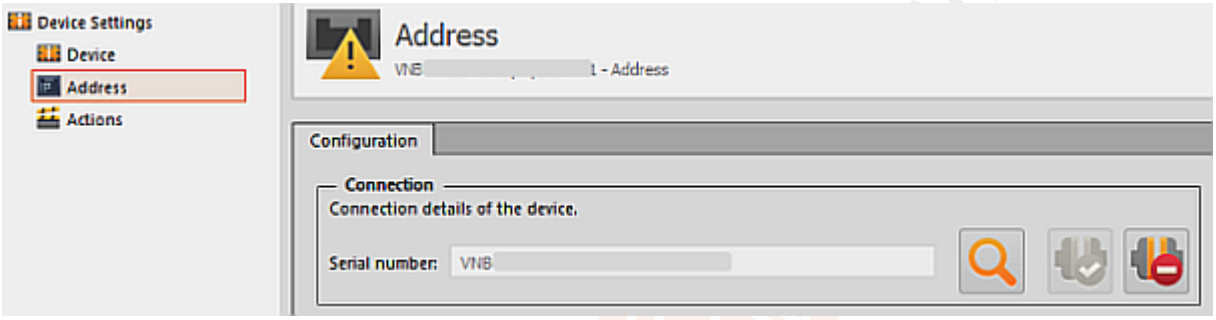
| | |
|---|---|
|  | Write firmware to device |
| | ► Activate the button.<br>> A dialogue window appears.<br>► Select file with new firmware and confirm with [OK].<br>> Software updates the firmware of the device. |
|  | Assign parameter set<br>(only active if several parameter sets are available) |
| | ► Activate the button.<br>> A dialogue window appears.<br>► Select the desired parameter set and confirm with [OK]<br>> The software assigns the selected parameter set to the device.<br>Optional:<br>► Select [Device] > [Write to Device] to write the assigned parameter set to the device. |

## 10.2.2 VNB211 > ... > [Device Settings] > Detail [Address]

22461

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. 155))




### VNB211 > ... > Detail [Address] > Tab [Configuration]

22462

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

## 10.2.3 VNB211 > ... > [Device Settings] > Detail [Actions]

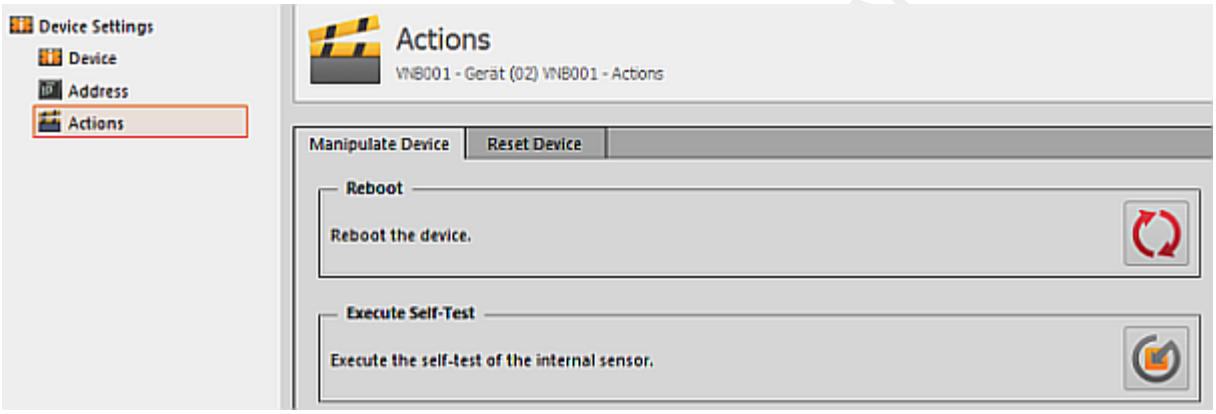
22463

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. 155)).

### VNB211 > ... > Detail [Actions] > Tab [Manipulate Device]

22465




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

**Switching functions:**

| | | |
|---|---|---|
| | Reboot the device | ► Activate the button.<br>> The confirmation message appears.<br>► Start the process with [Yes]<br>OR<br>Abort the process with [No]<br>> If [Yes]: The device reboots. |
| | Execute self-test in the device | ► Activate the button.<br>> The device carries out a self-test.<br>> A message window with the result of the self-test appears.<br>► Close the message window with [OK]. |

## VNB211 > ... > Detail [Actions] > Tab [Reset Device]

22467


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

**Switching functions:**

| | | |
|---|---|---|
| | Reset history | ► Activate the button.<br>> The confirmation message appears.<br>► Start the process with [Yes]<br>OR:<br>Abort the process with [No].<br>> If [Yes]: the software deletes the history of the device. |
| | Reset parameters | ► Activate the button.<br>> The confirmation message appears.<br>► Start the process with [Yes]<br>OR:<br>Abort the process with [No].<br>> If [Yes]: the software resets all parameters to their default values. |
| | Restore factory settings | ► Activate the button.<br>> The factory settings of the device are restored. |

# 10.3 VNB211 > Object [VNB211_#] > [Parameter_#]

Contents



22468

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]** (→ p. 43))

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.

## 10.3.1 VNB211 > ... > [Parameter_#] > Detail [Common Configuration]

Contents



22469

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

► Open the tab [Parameter_#]

► In the detailed view, select [Common Configuration]

> The detailed view shows the following information:

| Section | Dialogue element | Display | Possible values |
|---|---|---|---|
| Information | Created | date on which the data set was created | -- |
| | Changed | date on which the data set was 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]<br>• imperial [in/s] |

### VNB211 > ... > [Parameter_#] > ... > Detail [Supported Devices]

22470
22418

The element [Supported Devices] offers information about the devices used here.

#### VNB211 > ... > Detail [Supported Devices] > Tab [Configuration]

22471
22419

| 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
22420

The element [Documentation] offers information about location and parameter setting data of the sensor.

### VNB211 > ... > Detail [Documentation] > Tab [Application]

22473
22421

| Section | Dialogue element | Display | Description |
|---|---|---|---|
| Application | Company | free text | max. 100 characters |
| | Address | | |
| | City | | |
| | Location | | |
| | Machine | | |

### VNB211 > ... > Detail [Documentation] > Tab [Description]

22474
22422

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
22423

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
22424

| 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<br>(only active if at least one output is used for alarms) |

### VNB211 > ... > Detail [Device Information] > Tab [Object Dependencies]

22477
22426

| 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 | |

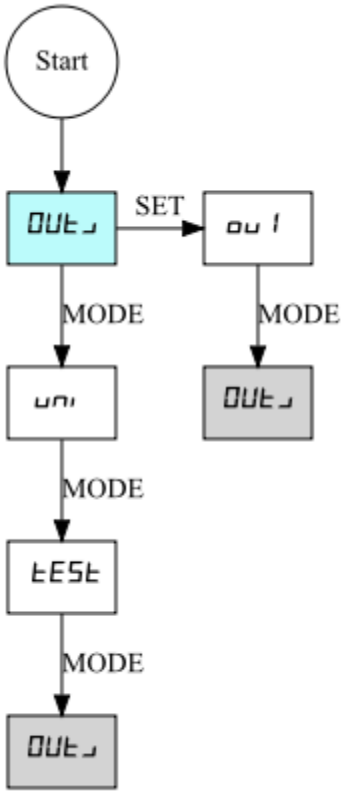
**Switching functions:**

| | |
|---|---|
| | configure selected object or input<br>(only active if at least one object is defined) |

### VNB211 > ... > Detail [Device Information] > Tab [Device Menu]

22478

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
22431

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
22432

Displays all devices assigned to the parameter set.

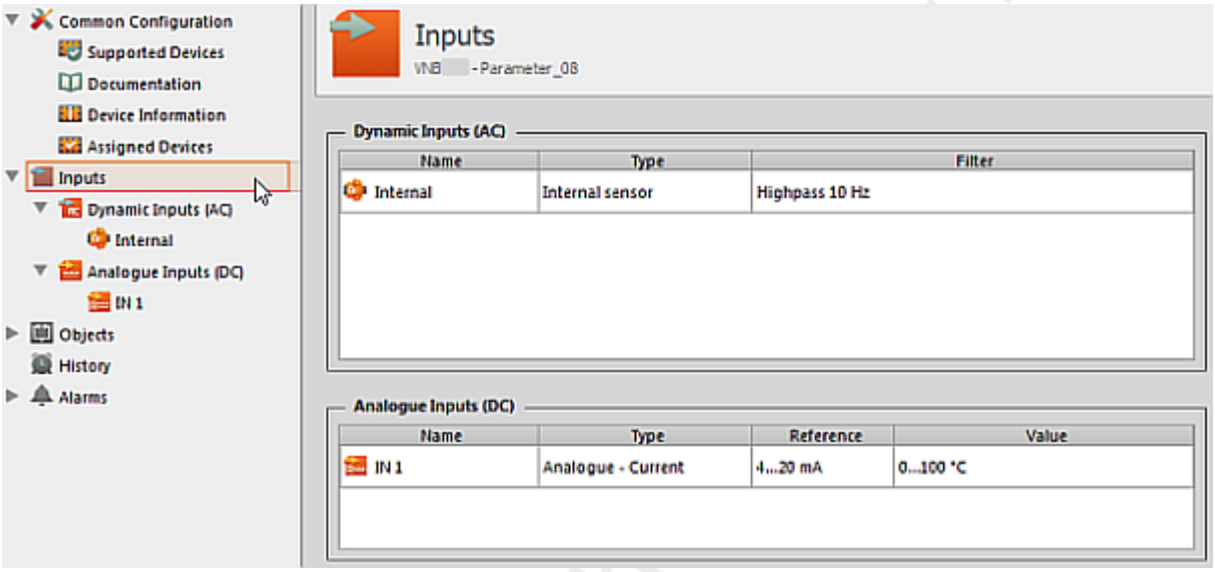
| Section | Dialogue element | Display | Switching function |
|---|---|---|---|
| Assigned devices | No. | consecutive number in the list | --- |
| | Name | configured name of the device | |
| | Type | article number of the device | |
| | Firmware | read firmware version | |
| | Serial no. | read serial number of the device | |

## 10.3.2 VNB211 > ... > [Parameter_#] > Detail [Inputs]

22481

In an empty parameter set (factory setting) of the VNB211 no input is defined.
The user must activate / add these inputs by himself according to their 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 filter | (after right-click) |
| | Type | internal sensor (fixed) | |
| | Filter | configured filter | |
| Analogue inputs (DC) | Name | configured filter | (after right-click) |
| | Type | analogue - current (fixed) | |
| | Reference | 4...20 mA (fixed) | |
| | Value | configured value range | |

**Switching functions:**

| | |
|---|---|
| | add new dynamic input |
| | add new analogue input |
| | go to the configurati→ p. of the selected input |

## VNB211 > ... > [Parameter_#] > ... > Detail [Dynamic Inputs (AC)] > [Internal]

22484
22436

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)] > [IN 1]

22485

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 |

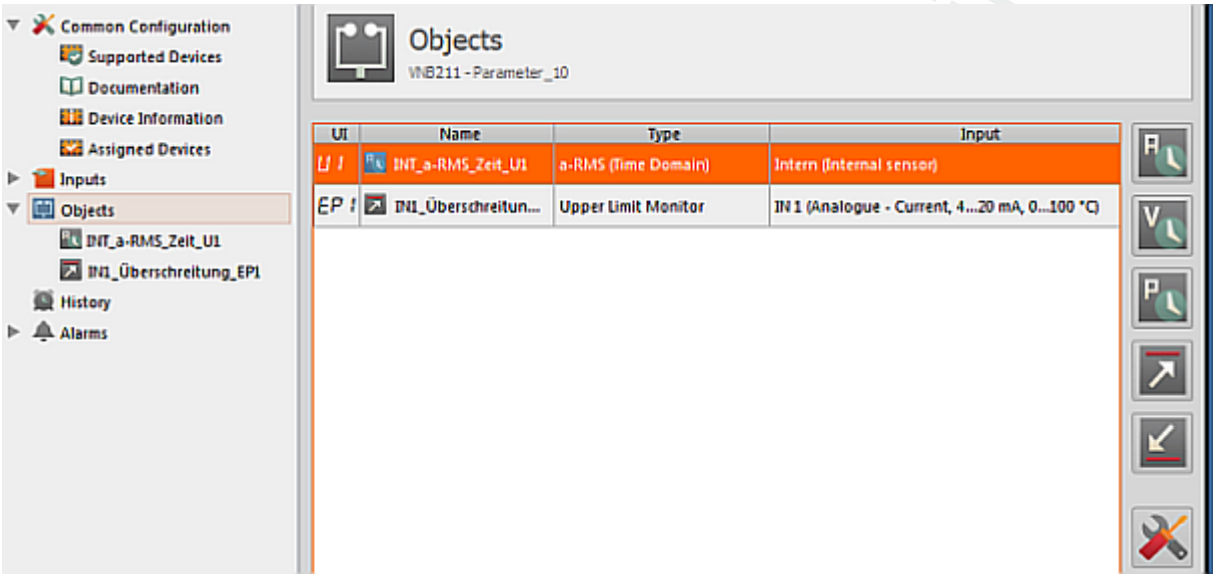
## 10.3.3 VNB211 > ... > [Parameter_#] > Detail [Objects]

**Contents**



22486

Displays the configured objects




**Switching functions:**

| | |
|---|---|
| | add new object of type "a-RMS (time domain)" |
| | add new object of type "v-RMS (time domain)" |
| | add new object of type "a-Peak (time domain)" |
| | add new object of type "Upper limit monitor" |
| | add 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

Contents



22493

Preconfigured object types for the following monitoring tasks are offered which can be configured using a wizard:

| Name Objekttyp | Menüpunkt auf dem Gerät | Hinweis |
|---|---|---|
| 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

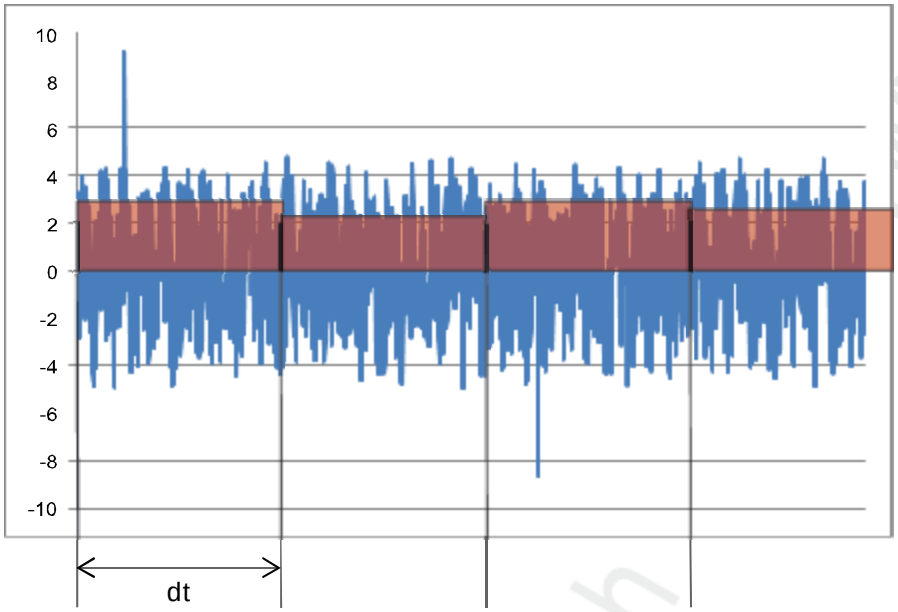
## VNB211 > ... > Object types > [a-RMS], [v-RMS] (time domain)

22494

- 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)

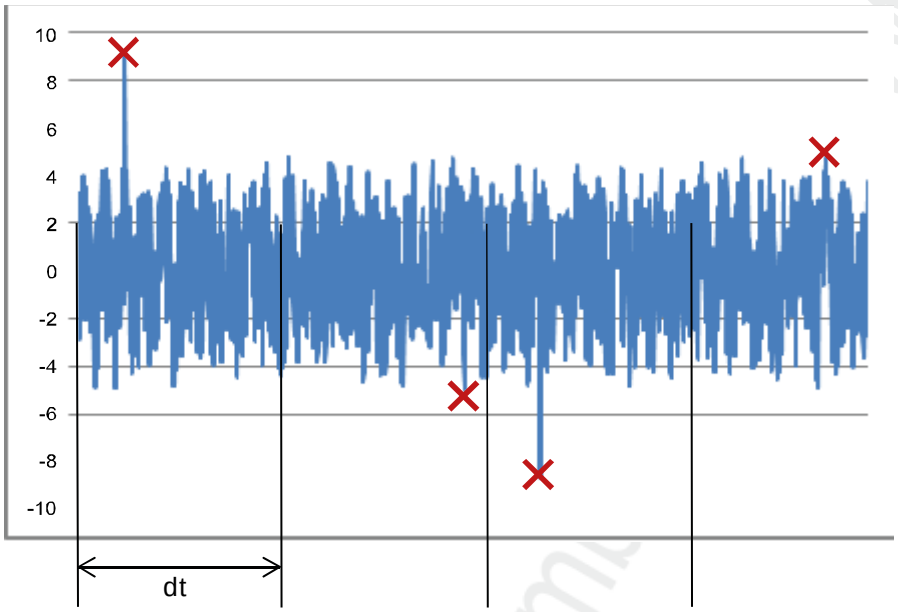
### VNB211 > ... > Object types > [a-Peak (time domain)]

22495

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]

22496

[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]

22497

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<br>according to input and object type | free text |
| | Type | selected object type | fixed |
| | Menu item on the device | short form of the type<br>(figure # results from the table [Object types]) | fixed |
| Configuration | Input | preset input:<br>for a-RMS, v-RMS, a-Peak:<br>internal (internal sensor)<br>for upper limit, lower limit:<br>IN 1 (analogue, current, 4...20 mA) | fixed |

## VNB211 > ... > Detail [Objects] > ... > Tab [Processing]

22498

| Section | Dialogue element | Display | Switching function |
|---|---|---|---|
| Filter<br>only for a-RMS, v-RMS, a-Peak | Type | • lowpass<br>• highpass<br>• bandpass | selectable from list |
| | From | configured lower limit frequency | depending on the filter type:<br>increase / reduce value<br>or: fixed |
| | To | configured upper limit frequency | depending on the filter type:<br>increase / reduce value<br>or: fixed |
| Limits | Warning alarm | configured value | increase / reduce value |
| | Hysteresis<br>only for upper limit / lower limit | configured value | increase / reduce value |
| | Damage alarm | configured value | increase / reduce value |
| | Hysteresis<br>only for upper limit / lower limit | configured value | increase / reduce value |
| Processing<br>only for a-RMS, v-RMS, a-Peak | Averaging | configured value | increase / reduce value |
| Processing | Measurement time | configured value | increase / reduce value |

## 10.3.4 VNB211 > ... > [Parameter_#] > Detail [History]

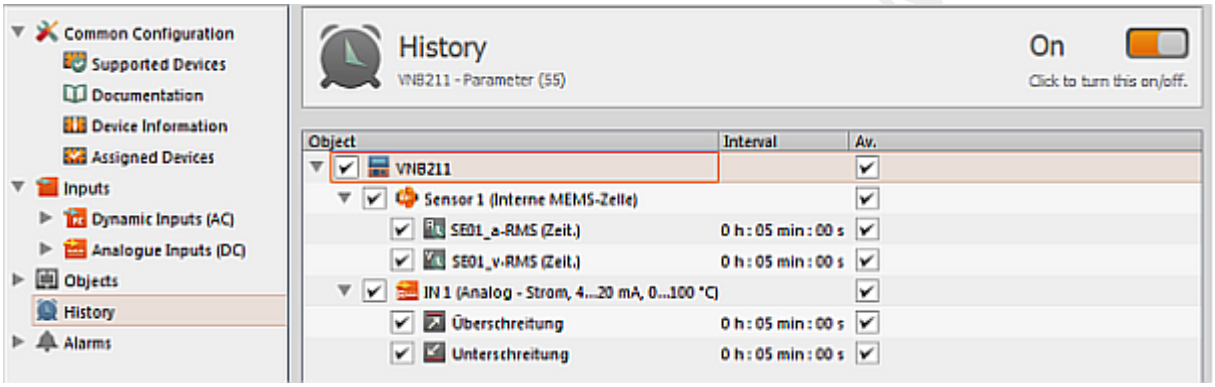
Contents



22499

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.<br>Parameters cannot be configured. |
|  | Switch: the history memory is activated.<br>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 | Beschreibung |
|---|---|---|---|
| Object | VNB211 | sensor / input type / input | fixed |
| Interval | -- | 0 h : 05 min : 00 s | measurement duration:<br>the highest value measured during the interval is recorded |
| Av. | -- | ☐ Option not activated<br>▬ Option partly activated<br>☑ Option fully activated | mean average<br>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
22445

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
22446

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.

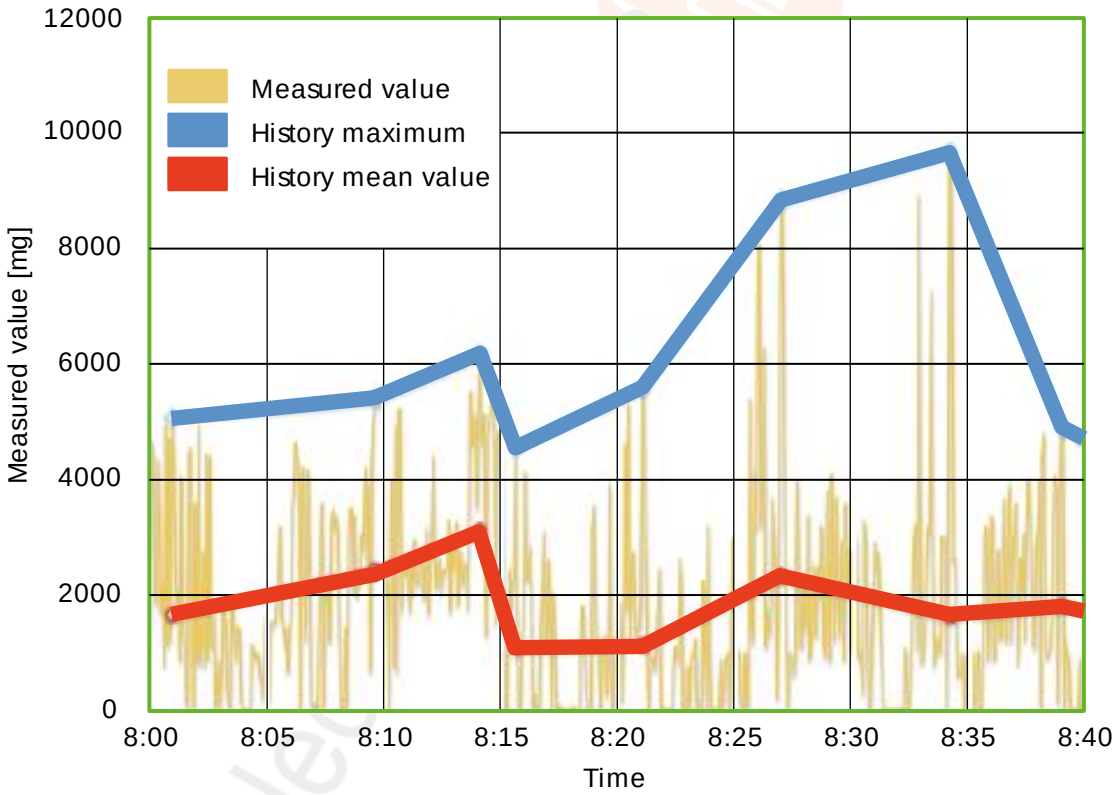
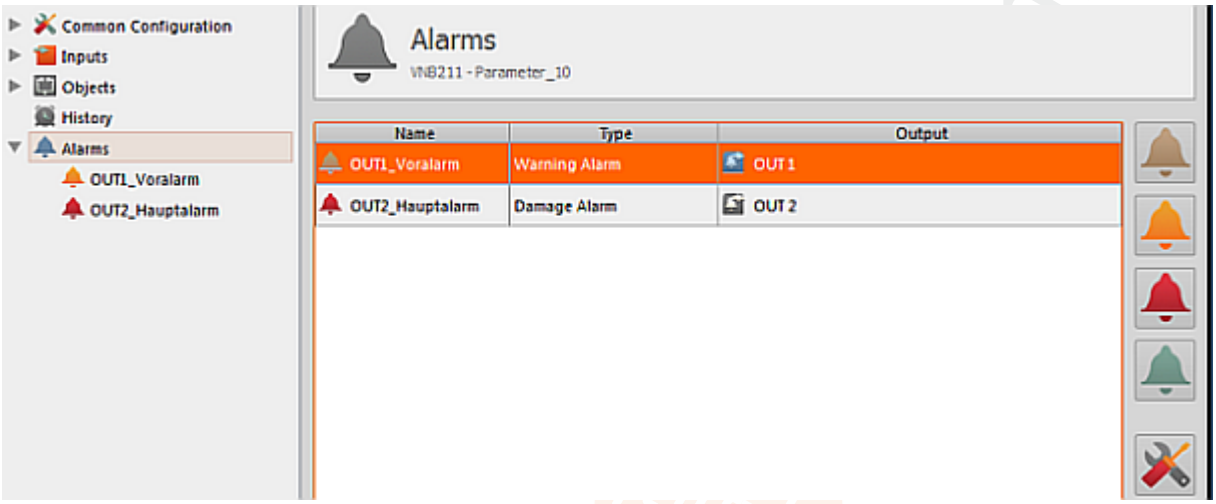



Diagram: History of the measured values (example)

## 10.3.5 VNB211 > ... > [Parameter_#] > Detail [Alarms]

22503

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]

22509

| 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 |
| Configuration | Switch | configured signal:<br>• normally closed<br>• normally open | selectable from list |
| | Switch-on delay | configured time | increase / reduce value |
| | Switch-off delay | configured time | increase / reduce value |
| Signalling<br>(only for analogue alarm) | Signal | configured signal:<br>• current 4...20 mA | selectable from list |
| | Values | configured value type | selectable from list |
| Scaling<br>(only for 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]

22510

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<br>✖ do not evaluate object |

# 11 Monitoring

Contents



22186

By "monitoring", we understand the detection of measured data.

## 11.1 Monitoring types

Contents



22542

### 11.1.1 Types of measurement data

22511

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 monitoring types are available:

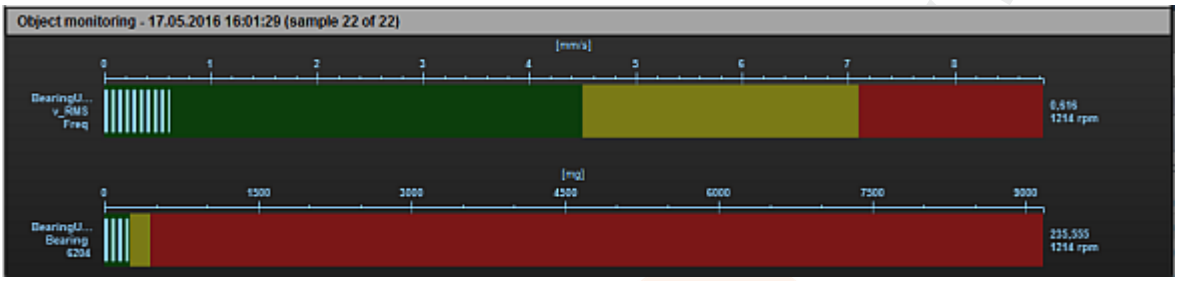
| | | |
|---|---|---|
|  | Data monitoring | Show object values via different diagram types<br>(→ chapter **Data monitoring** (→ p. 180))<br>All objects or subobjects can be selected as a source and added to the diagram. |
|  | Counter monitoring<br>(only VSE) | Display the current states of the configured counters<br>(→ chapter **Counter monitoring** (→ p. 180))<br>All counters configured in the diagnostic electronics can be selected as a source and added to the diagram. |
|  | I/O monitoring | Display the current states of the inputs and outputs<br>(→ chapter **I/O monitoring** (→ p. 180))<br>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<br>(only VSE) | Display frequency spectra (FFT / H-FFT)<br>(→ chapter **Spectrum monitoring** (→ p. 181))<br>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<br>(only VSE) | Display raw data of a dynamic input (time signal)<br>(→ chapter **Raw data monitoring** (→ p. 182))<br>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<br>(→ chapter **History monitoring** (→ p. 183))<br>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. |

## 11.1.2 Data monitoring

22534

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 |

## 11.1.3 Counter monitoring

22547

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:**

No special switching functions available.

## 11.1.4 I/O monitoring

22548

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.

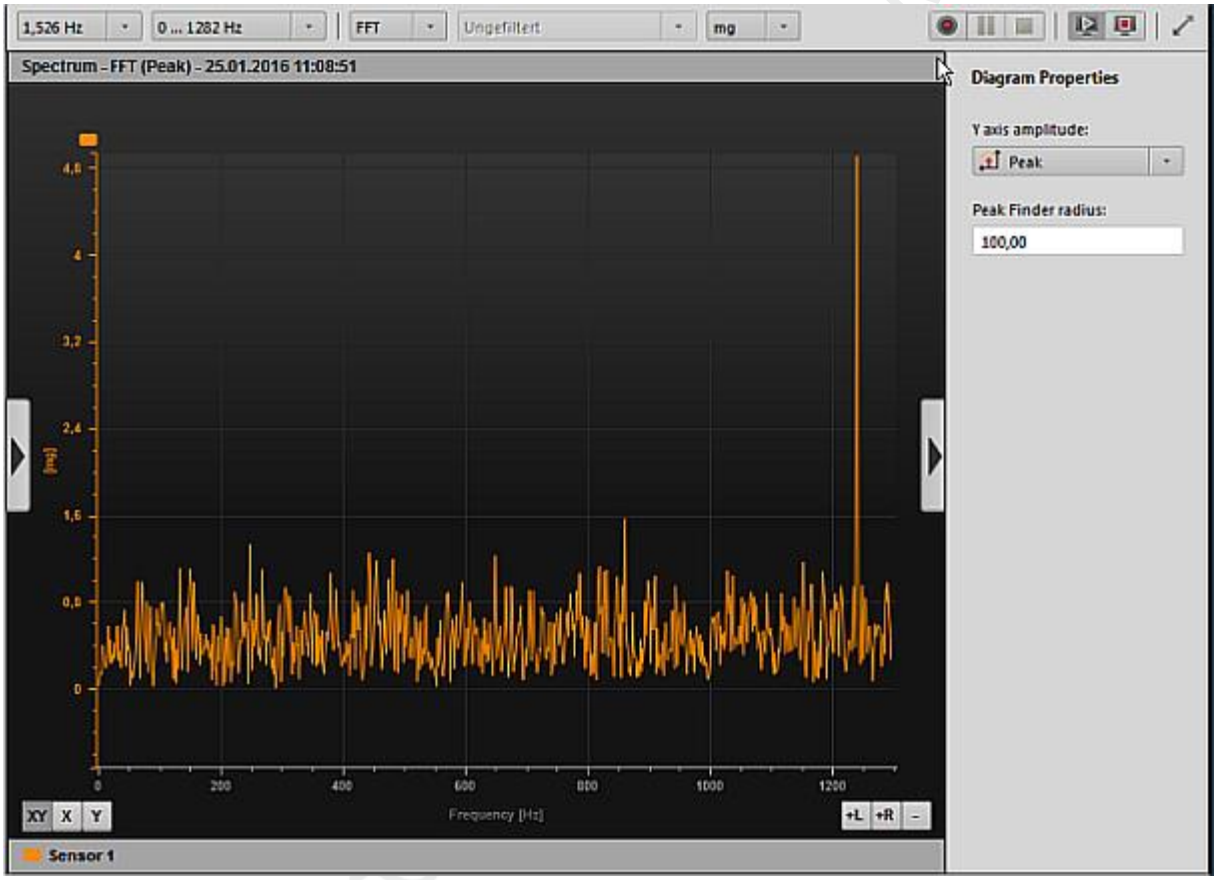
## 11.1.5 Spectrum monitoring

22549

In the spectrum monitoring section, you can view the data based on the frequency analysis. You can choose between the standard FFT and the 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:**

Folgende spezielle Switching functions vorhanden:

| | | | |
|---|---|---|---|
| 1. | Selection field | Resolution:<br>frequency resolution for calculating the spectrum | 24,414 Hz<br>...<br>0,191 Hz |
| 2. | Selection field | Frequency band, what frequency range is to be displayed<br>850 values per spectrum<br>(850 • resolution = frequency range) | |
| 3. | Selection field | Type of analysis | FFT<br>H-FFT |
| 4. | Selection field | Type of filtering for H-FFT | |

| | | | |
|---|---|---|---|
| 5. | Selection field | Unit of the y axis for FFT analysis | mm<br>mm/s<br>mg |

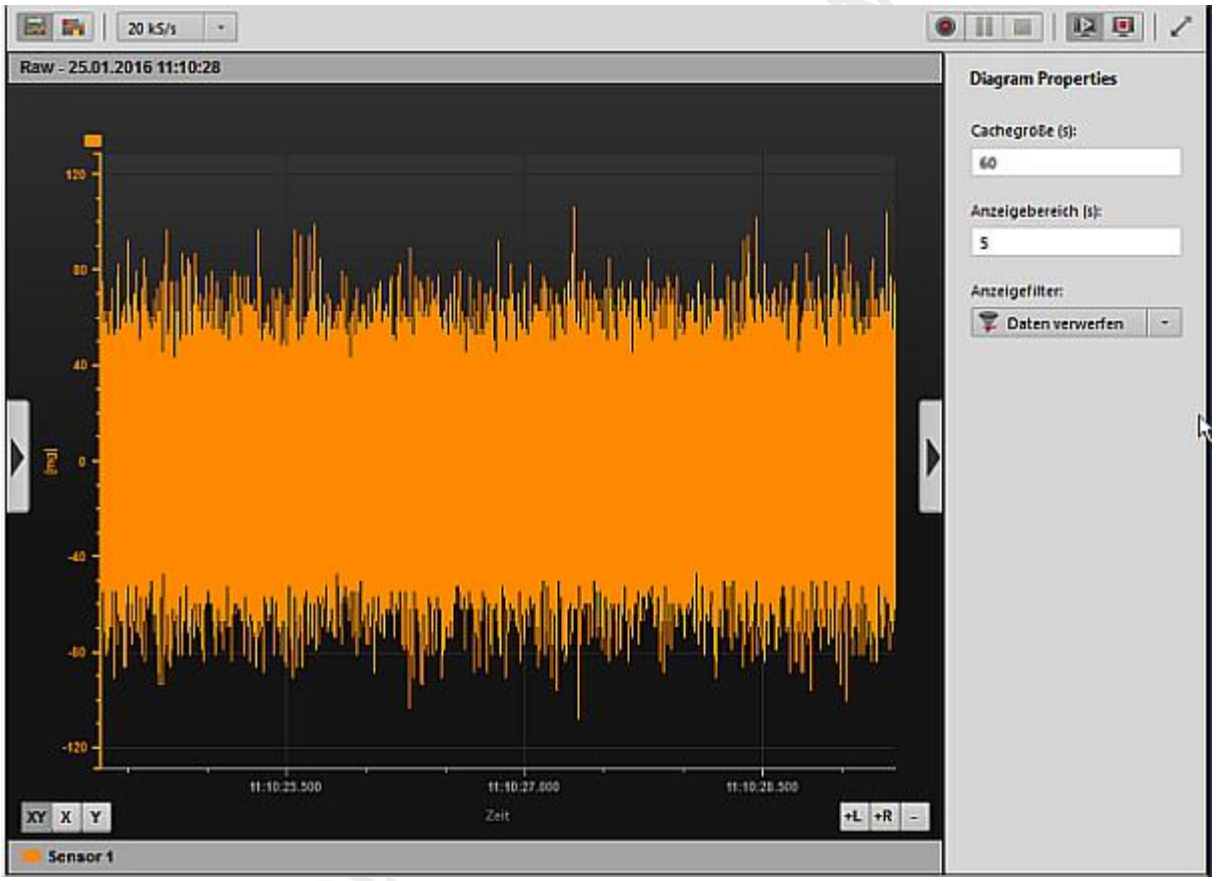
## 11.1.6 Raw data monitoring

22551

The monitoring of the time signal allows you to view the raw data of the dynamic input. These are the unfiltered data obtained directly after the analogue-digital conversion.

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:

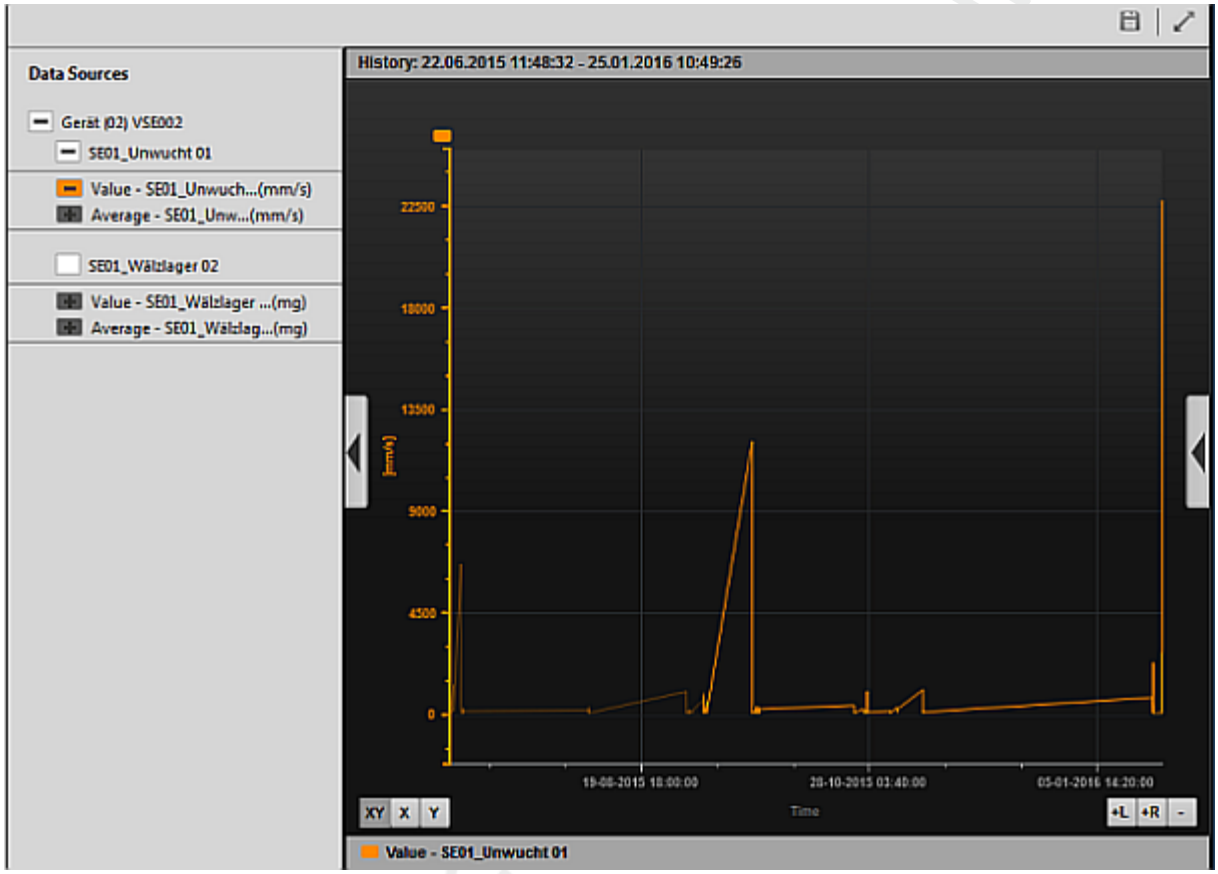
| | | | |
|---|---|---|---|
| 1. | Selection field | Sampling rate in 1,000 samples per second | 20 kS/s<br>...<br>100 kS/s |

## 11.1.7 History monitoring

22553

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<br>Memory location = project tree view > [Device_#] > [Data] > [History dd.mm.yyyy hh:mm:ss] |

# 11.2 Record and display measured data

Contents



22519

Prerequisite:

- VES software is connected to the device via [  ]

There are several methods to select a monitoring type:

- **Tool bar** (→ p. 13)

- **Menu bar** (→ p. 12)
- **Context menu** (→ p. 16) via right-click on the device in the tree view
  (→ also chapter **Context menu functions (→ p. 195)**)

► Select the monitoring type

> The monitoring is displayed in the **Detailed view** (→ p. 15).

> The program starts the data transfer.

## 11.2.1 Switching functions (Monitoring)

22521

The following switching functions are available for almost all monitoring types.

### Project data monitoring

22889

| Symbol | Description | Prerequisite |
|---|---|---|
|  | Start project data monitoring | Monitoring stopped |
|  | Stop project data monitoring | Monitoring in progress |

### Tool bar above the data display:

22522

| | |
|---|---|
|  | Change to the bar graph view<br>The bar graph consists of a progress bar, an axis and the displayed limit values, where applicable. The axis can be scaled and formatted freely. Values with the same engineering unit can be displayed on the same axis. |
|  | Change to the table view<br>A table can consist of several rows. Each row contains the name of the value that is displayed, the actual value together with the time stamp and the current alarm state, where applicable. |
|  | Change to the moving data display ((y-t-graph (continuous))<br>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.<br>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))<br>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.<br>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<br>Starts the recording of the current monitoring |
|  | Pause data recording<br>Pauses the recording of the current monitoring |
|  | Stop data recording<br>Stops the recording of the current monitoring |
|  | Starts data monitoring<br>Restarts the current monitoring. The new measurement values are displayed in the selected graph again |
|  | Stops data monitoring<br>Stops the current monitoring measurement; new measurement values are no longer displayed |
|  | Shows history and counters |
|  | Reload history<br>Update of the history data without having to close and reopen the history window |
|  | Save history |
|  | Switch full screen mode [F11]<br>Changes to the full screen mode (or: [F11]) or change back to the normal screen mode |

## Switching functions within the data display:

22533

| | |
|---|---|
|  | Selection of the data sources |
|  | Display of the properties |
| XY | Activate the zoom mode for the x- and y-axes<br>The zoom mode activates the zoom for a selected axis. |
| X | Activate the zoom mode for the x-axis<br>The zoom mode activates the zoom for a selected axis. |
| Y | Activate the zoom mode for the y-axis<br>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 |

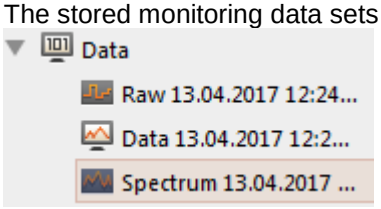
To undo the zoom:

- ► Right-click on the data display
- ► In the context menu: Click [Reset Zoom]

## 11.2.2 Record and save measured data

23592

► 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. 185)
► 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.

23570

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.

### 11.2.3 Rename measured data recordings

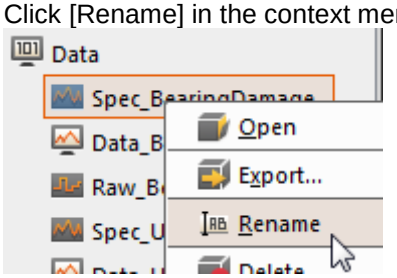
23593

> 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!<br>Otherwise, the program will not be able any more to find or activate the data set. |

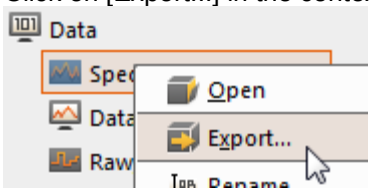
## 11.2.4 Export measured data

22895

The measured data recorded in the project are available as a list 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`

► Export the recording as selected file type with [Save].

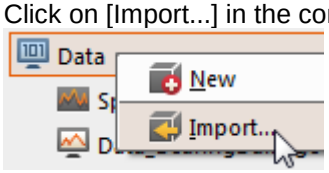
## 11.2.5 Import measured data

23594

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.<br>The export file name is not relevant.<br>> The program will offer the following alternatives:<br>▪ overwrite the existing data set<br>the original data set name is not affected<br>▪ import the data set to be imported in addition to the original data set<br>the original data set name is not affected<br>the copy of the data set is supplemented by the counting number "(1)" |

## 11.2.6 Evaluate measured data

Contents



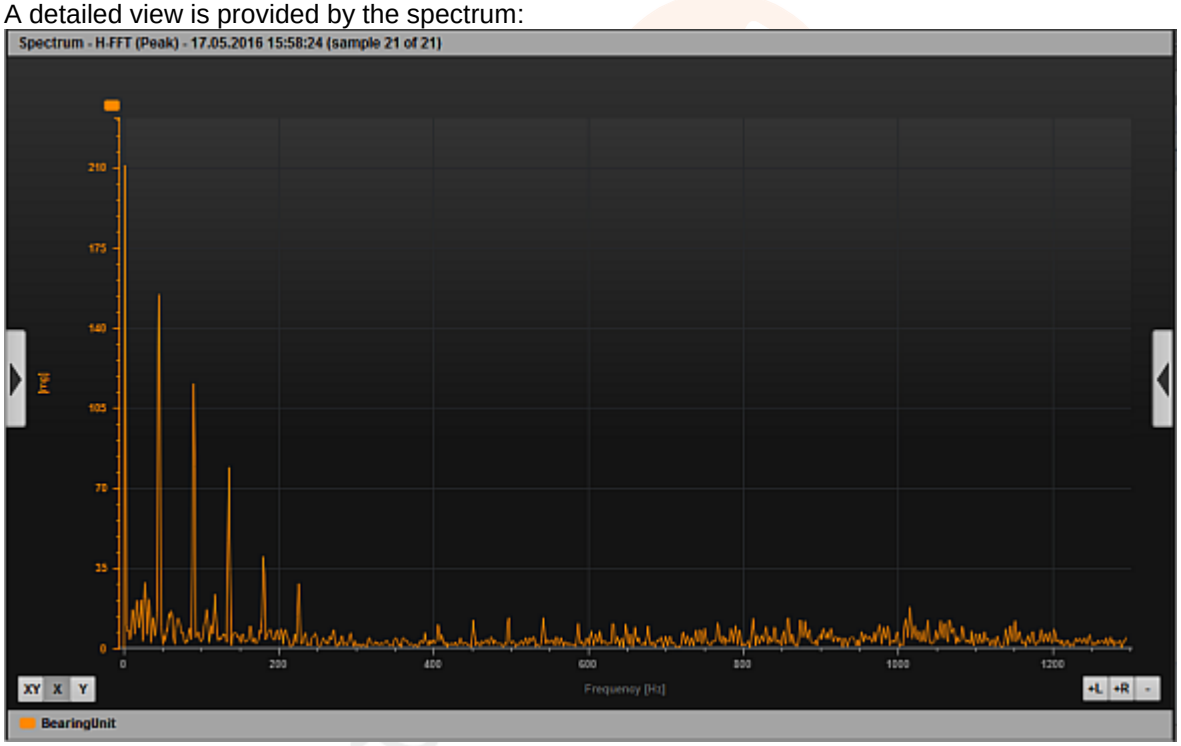
22894

### Example: Bearing damage

23571

Prerequisite:
- sensor (e.g. VSA001) defined as [Dynamischer Eingang]
- 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

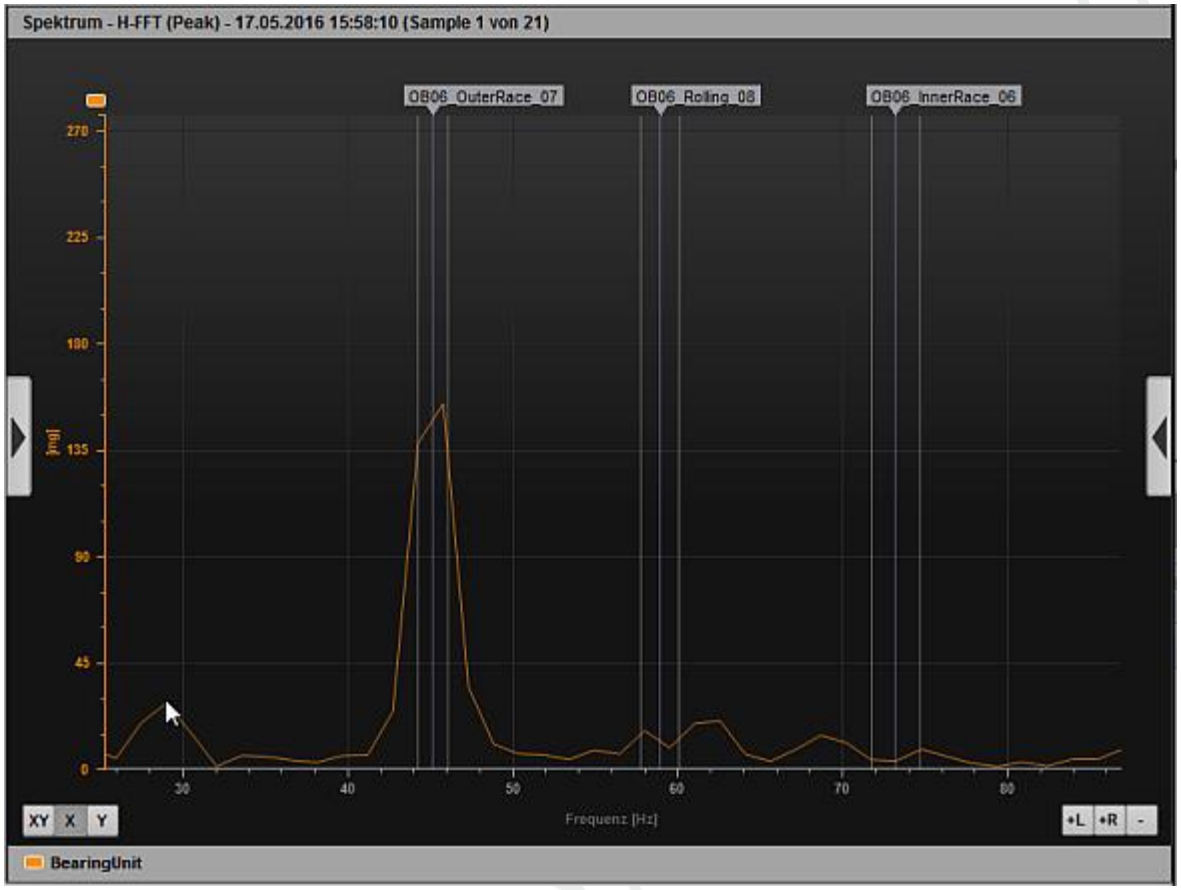
A detailed view is provided by the spectrum:




View: Measured data bearing damage (full screen)

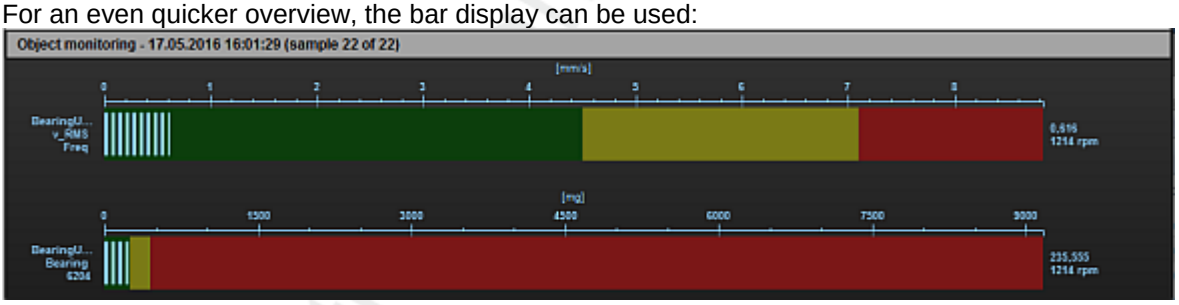
► Select X axis zooming by clicking on [X].
► Right-click on the graph legend (here: BearingUnit).
► Activate the following settings in the context menu (if necessary):
  • [Subobjekte] > [Alle]
  • [Suchradius]
► Use the left mouse button to open window that is to be as small as possible
  here: about 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:



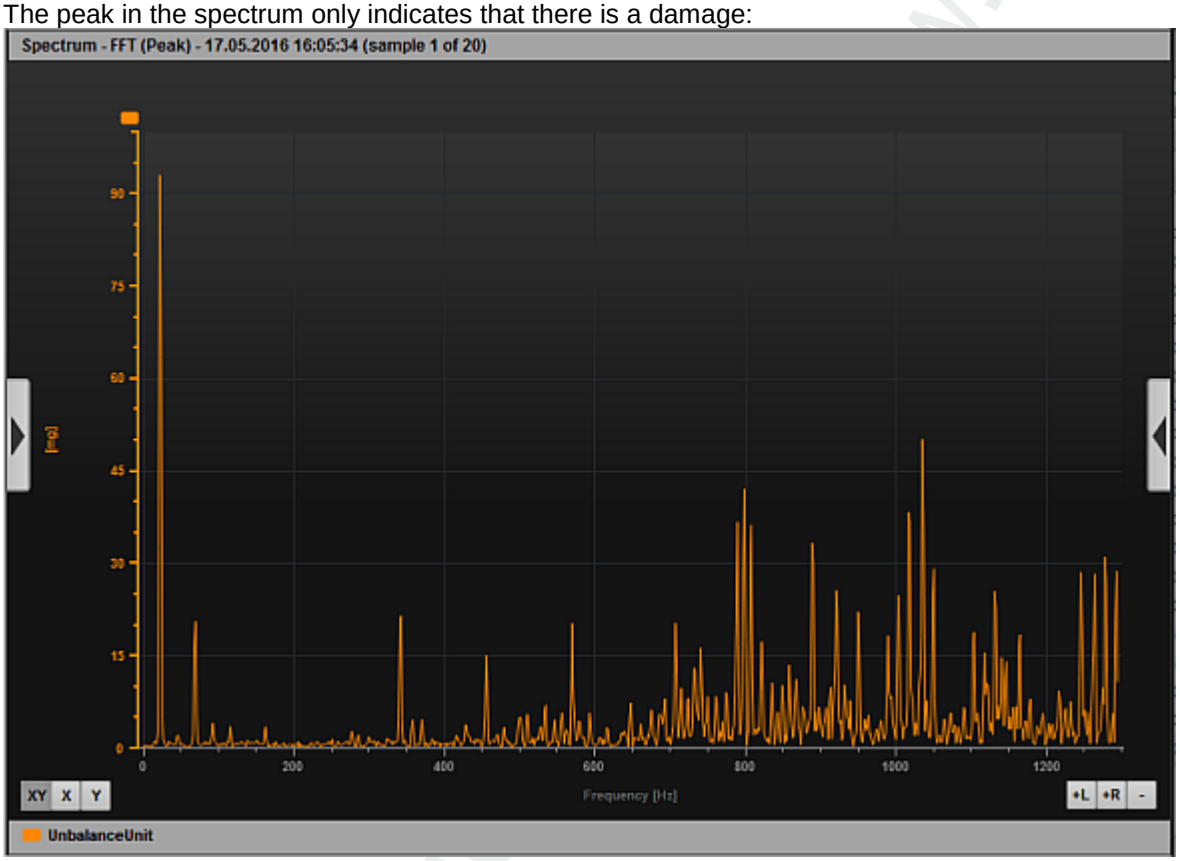

> The lower bar shows that the bearing is close to the warning alarm.

## Example: Unbalance

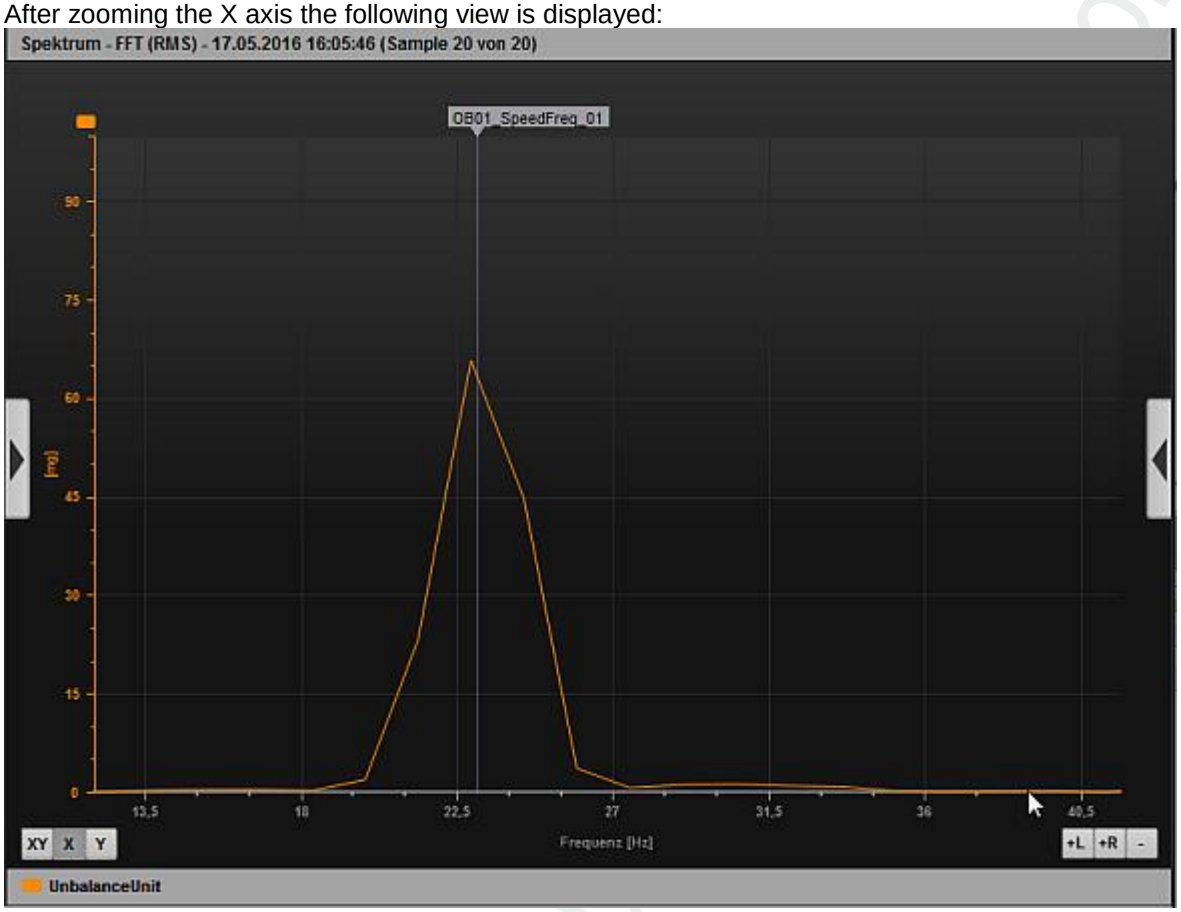
23572

Prerequisite:
- sensor (e.g. VSA001) defined as [Dynamischer Eingang]
- 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

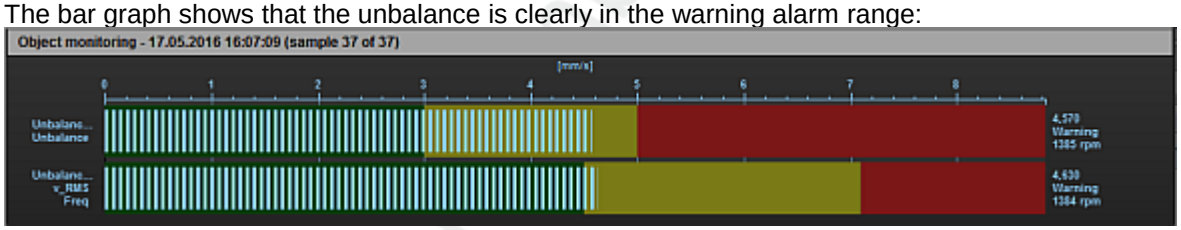
The peak in the spectrum only indicates that there is a damage:



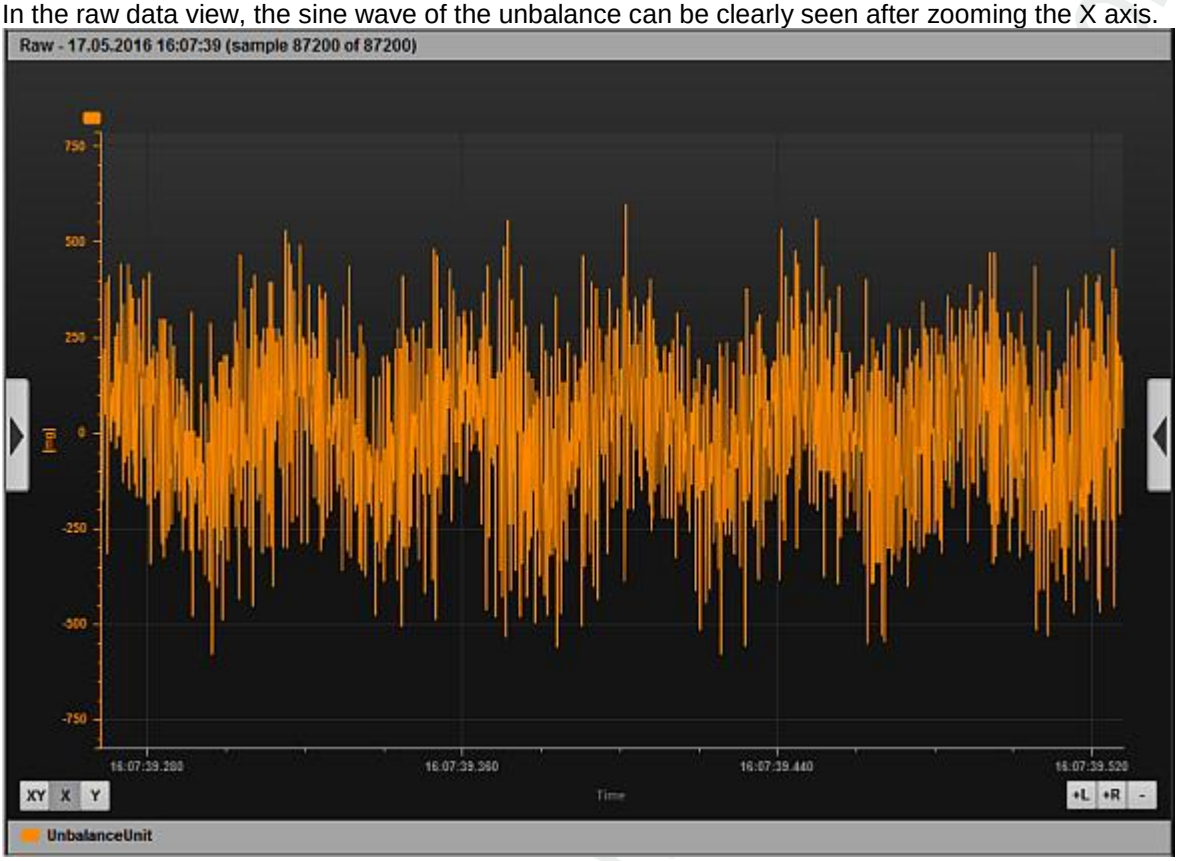
After zooming the X axis the following view is displayed:




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.



# 11.3 Context menu functions

Contents



22555

## 11.3.1 Context menu data sources

22556

| 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. |

## 11.3.2 Context menu diagram area

22557

| 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. |

### 11.3.3 Context menu diagram axes

22558

| 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)). |
| Delete axis | Removes the selected axis from the diagram. |
| Characteristics | Opens the Properties window. |

### 11.3.4 Context menu of the diagram data line

22559

| 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). |

# 11.4 Characteristics

Contents



22560

## 11.4.1 Diagram area properties

22561

| 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.<br>The conversion factor for a single frequency is root(2), peak = RMS * root(2). |

## 11.4.2 Axis properties

22562

| 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.<br>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. |

### 11.4.3 Data line properties

22563

| 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. |
| 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,...). |

# 12 Glossary of Terms

## 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

**D**irect **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

**G**eneric **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:
→ **ifm weltweit • ifm worldwide • ifm à l'échelle internationale** (→ p. 213)
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".

# 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 **What do the symbols and formats mean?** (→ p. 7))

## 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 **What do the symbols and formats mean?** (→ p. 7))

# 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).

# 13 Index

## [



## A



## B



## C

## D



## E



## F



## G



## H



## I



## L



## M



## N



## O



## P



## R



## S



## T



## U



## V

## W

# 14 Notizen • Notes • Notes

# 15 ifm weltweit • ifm worldwide • ifm à l'échelle internationale

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