



Software manual
VSE OPC UA server
VOS050
V1.4.0 or higher

GB

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1 Preliminary note

1.1 Legal and copyright information

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1.2 Open source information



For more open source information see: documentation.ifm.com.

1.3 Legal notice OPC Foundation SDK

This product includes software under the OPC Redistributables Agreement of Use of the OPC Foundation in the version current at the time of order.

1.4 Purpose of the document

This software manual describes the VSE OPC UA Server and the VSE OPC UA Server Configurator.

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

1.5 Symbols used

✓ Condition

► Instruction

▷ Interim result, interim reaction

▷ Final result, reaction

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

→ See link, cross-reference



Important note

Non-compliance may result in malfunction or interference



Information

Supplementary note

2 Safety instructions

- Read this document before setting up the product and keep it during the entire service life.
- The product must be suitable for the corresponding applications without any restrictions.
- Only use the product for its intended purpose (→ Intended use).
- If the operating instructions or the technical data are not adhered to, personal injury and/or damage to property may occur.
- The manufacturer assumes no liability or warranty for any consequences caused by tampering with the product or incorrect use by the operator.

3 Intended use

The VSE OPC UA Server provides data values of the integrated ifm VSE diagnostic electronics via the OPC UA interface for further processing on an OPC UA client (not included in the scope of delivery).

The VSE OPC UA Server Configurator software is used by the user to maintain and configure the VSE OPC UA Server.

4 Function

The VSE OPC UA Server Configurator allows the user to perform basic maintenance tasks for the VSE OPC UA Server, e.g.:

- Starting or stopping the VSE OPC UA Server
- Managing data sources (VSE diagnostic electronics)
- Setting the network configuration and host name of the VSE OPC UA Server
- Setting Client Connections and Subscriptions
- Setting the connection and monitoring of the VSE diagnostic electronics
- Log file configuration
- User management
- Licence management

4.1 Supported VSE firmware versions

The program supports the following VSE firmware versions:

- 0.6.11
- 0.7.x
- 0.11.x
- 0.13.x
- 2.0.x

4.2 OPC UA security settings

4.2.1 Recommended security policies

The OPC UA server supports all security guidelines and message modes recommended by the OPC UA Foundation:

- Basic256Sha256 (Sign; Sign&Encrypt)
- Aes128Sha256RsaOaep (Sign; Sign&Encrypt)
- Aes256Sha256RsaPss (Sign; Sign&Encrypt)

4.2.2 Non-recommended security policies

The following supported security policies are no longer state of the art and are therefore classified as insecure:

- None (None)
- Basic128Rsa15 (Sign; Sign&Encrypt)
- Basic256 (Sign; Sign&Encrypt)



Recommendation of the OPC UA Foundation:

- Do not use these security policies to ensure the security of the product.

5 VSE OPC UA Server Configurator

5.1 Signing in

- ✓ Use a recommended browser: Google Chrome, Mozilla Firefox or Microsoft Edge.
- ▶ Call the URL of the VSE OPC UA Server Configurator in the browser:
https://<IP or Hostname>:<Configurator-Port>/
Default: https://localhost:44350/
- ▷ The login screen will be displayed.
- ▶ Log in with the login data assigned during installation.
-  If an incorrect password to an existing user is entered 3 times, the login for this user will be blocked for 10 minutes.
- ▷ The Configurator interface appears.

5.2 Logout

- ▶ Click on  to leave the Configurator.
- ▷ The login screen will be displayed.

5.3 Server status

5.3.1 Displaying the server status

The server status is displayed in the menu bar next to the menu [Server status].

Or:

► Open the menu [Server status].

▷ The server status is displayed:

Status	Colour	Description
[Running]	Green	The server is running.
[Stopped]	Red	The server is stopped.
[Stop pending]	Grey	The server will be stopped.
[Start pending]	Grey	The server will be started.

5.3.2 Starting/stopping the server

► Open the menu [Server status].

► If the server is not running: Click on [Start server] to start the server.

Or:

If the server is running: Click on [Stop server] to stop the server.

5.4 Data sources

In the section [Datasources], the data sources and their properties are displayed in tabular form.

5.4.1 Adding a device / data source

- ▶ Under [Datasources], click on + [Device].
 - ▷ The dialogue window [Add VSE device] appears.
- ▶ Select the option [Scan network] to search for all available devices in the network.
- ▶ Click on [Scan].
 - ▷ The program searches for available devices.
 - ▷ The table shows all detected devices.



The option [Scan network] searches for all available devices via broadcast. Not all available devices in a network environment may be detected, e.g. due to network segmentation, use of firewalls or routers.

- ✓ If not all devices are found:
 - ▶ Add all devices with the help of the options [Specific] or [Range], see below.

OR

- ▶ Select the option [Specific] and enter the IP address and port of a device.
- ▶ Click on [Add to list].
 - ▷ The program adds the devices to the table.



Only after the device has been added to the view [Datasources] and the server has been restarted, the program will check whether the device exists in the network.

OR

- ▶ Select the option [Range] and enter the start and end address of an IP range and the port.
- ▶ Click on [Add to list].
 - ▷ The program will add all devices of the IP range to the table.



Only after the device has been added to the view [Datasources] and the server has been restarted, the program will check whether the device exists in the network.

- ✓ Devices are listed in the table.
- ▶ Activate the devices in the table that are to be included in the view [Datasources] .
- ▶ Deactivate the devices in the table that are not to be included in the view [Datasources] .
- ▶ Click on [Add devices] to include the selected devices in the view [Datasources] .
 - ▷ The view [Datasources] shows all added devices.
 - ▷ The view [Datasources] shows the available functions (column [Actions]).
- ▶ Click on [Upload changes] to upload the changes to the server. For the changes to take effect, restart the server in the [Server status] area.

OR

- ▶ Click on [Upload and Restart] to upload the changes to the server and restart the server.

OR

- ▶ Click on [Reset changes] to discard the changes.

- Optional: [Filtering the data source list](#) (→ [11](#))

5.4.2 Renaming a data source

- Under [Datasources] in the row of the data source in the column [Actions], click on .
- Rename the data source.
- Click on [Upload changes] to upload the changes to the server. For the changes to take effect, restart the server in the [Server status] area.

OR

- Click on [Upload and Restart] to upload the changes to the server and restart the server.

OR

- Click on [Reset changes] to discard the changes.

5.4.3 Deleting a data source

- Under [Datasources] in the row of the data source in the column [Actions], click on .
- ▷ The data source will be deleted from the table.
- Click on [Upload changes] to upload the changes to the server. For the changes to take effect, restart the server in the [Server status] area.

OR

- Click on [Upload and Restart] to upload the changes to the server and restart the server.

OR

- Click on [Reset changes] to discard the changes.

5.4.4 Filtering the data source list

- Under [Datasources], enter the filter text for the name of the data source in the input field .
- ▷ The table only shows data sources whose names (column [Name]) contain the filter text.

5.4.5 Displaying the status of a data source

Under [Datasources], the status of the data source will be displayed in the row of a data source in the column [Status] .

Status	Colour	Description
[Connected]	green	The data source is connected and available to the program.
[Timeout]	red	The data source was connected and is currently not available for the program.
[Pending]	grey	The data source was not yet connected and is currently not available for the program. This state is only reached if the data source has been added and the server has not yet been restarted. (No initial connection was established between server and data source)

5.5 OPC UA server settings

Under [OPC UA - Server settings], the basic server settings are configured.

5.5.1 Configuring server address settings

- Under [OPC UA - Server settings] in the [Server address settings] tab, configure the server address settings.

The OPC UA server address(URL) consists of:

[Transport protocol]://[Server]:[Port]/[Suffix]

Input field / display field	Description
[Transport protocol]	Communication protocol for connecting to the OPC UA server. (Display only)
[Server ports]	The port for connections with the OPC UA server. Value range: 1...65535 Default value: 32210 ► Ensure that the configured port is accessible for OPC UA clients in the network.
[URL suffix]	The suffix of the OPC UA server address. (Display only)
[Server address]	The complete OPC UA server address. (Display only)

5.5.2 Setting the data type of the node ID

- Under [Type settings of the OPC UA server node identifier] in the [Server address settings] tab, set the data type of the node ID.

Data type	Description
String	String data type Recommended default setting.
Numerical	Numeric data type Setting not recommended.

5.5.3 Setting the data tree

- Under [OPC UA server data tree settings] in the [Server address settings] tab, set the type of data tree (static or dynamic).

Option field	Description
[Static tree]	A complete static standard data tree is displayed. Values in the data tree that are not configured in the VSE show the status code <code>BadResourceUnavailable</code> .
[Dynamic tree]	Default setting Only the values that have been configured in the VSE are shown in the data tree. Configured values return a valid value. Non-configured values are hidden.

More information: [Address model](#) (→  22)

5.5.4 Setting the structure of the device node name

- Under [OPC UA server data tree settings] in the [Server address settings] tab, set the structure of the VSE device node name in the data tree.

Option field	Description
{{IP}:{PORT}}	Default setting The BrowseName of the VSE device node is set to {IP}:{Port}. The DisplayName of the VSE device node is set to {IP}:{Port} ({DeviceName}).
{{Gerätename}}	The BrowseName and the DisplayName of the VSE device node are set to {DeviceName}.

More information: [Address model](#) (→ [22](#))

5.5.5 Setting the client access and subscriptions

- Under [OPC UA - Server settings], in the [Clients & subscriptions] tab, configure the settings for client connections and subscriptions.

Input box	Description	Possible values
[Maximum clients count]	Maximum number of OPC UA clients that can connect to the server simultaneously.	1...100
[Maximum subscriptions count]	Maximum number of OPC UA client subscriptions that the server supports simultaneously.	1...300

5.5.6 Setting VSE device communication

- Under [OPC UA - Server settings] in the [Device connection] tab, configure the settings for the connections to VSE devices.

Input field	Description	Possible values
[Timeout]	Maximum response time for connected VSE devices. If the response time is exceeded, the associated nodes of the device are set to the status <code>BadNoCommunication</code> .	1000...30 000 [milliseconds]
[Connection retry]	Setting for reconnecting to a VSE device after connection failure.	Default setting Forever : The server attempts to permanently restore the failed connection to a VSE device.

5.5.7 Setting VSE device monitoring

- Under [OPC UA - Server settings] in the [Device monitoring] tab, configure the settings for the monitoring of the VSE devices.

Input box	Description	Possible values
[Cyclic value computation]	All VSE object monitoring values are recorded cyclically during the specified time period. For each cycle, depending on the VSE object type, there will then be a resulting value or a combination of the resulting max., min. and/or average values.	[On]: [Cyclic value computation] activated [Off]: [Cyclic value computation] deactivated
[Cycle time]	Duration for object monitoring	100...10 000 [milliseconds]

5.5.7.1 Values for cyclic value calculation

The table indicates which value is to be expected depending on the object type if cyclic value calculation is activated.

Object type	Calculation item Value	Calculation item Maximum
Unbalance	mean value	maximum
Bearing	mean value	maximum
A_RMS_FD	mean value	maximum
V_RMS_FD	mean value	maximum
D_RMS_FD	mean value	maximum
A_RMS_TD	mean value	maximum
V_RMS_TD	mean value	maximum
Other	mean value	maximum
A_PEAK_TD	maximum	not available
UpperMonitor	maximum	not available
LowerMonitor	minimum	not available

5.5.8 Showing authentication and security

At [OPC UA - Server settings] in the [Security] tab, the settings for authentication and security are displayed.

Display	Description	Possible values
[Authentication]	Setting how the OPC UA clients can authenticate themselves to the server.	Default value: Anonymous : No restrictions for the connection to the OPC UA server
[Transport security]	The type of transport security used with OPC UA client-server communication.	Default value: Certificate: The server generates a self-signed (non-CA) certificate for signing and encrypting messages via the TLS protocol.

5.5.9 Setting security policies

Under [OPC UA - Server settings] in the [Security] tab, the security policies can be set.

Setting	Description	Possible values
[Security mode message]	Setting of the security policy for messages ► Select at least one option.	• [None]: – Communication is not secured. – This mode is insecure and should not be used. – Can only be combined with Security Policy = None (= no security policy activated). • [Sign]: – Signing – Enabled by default • [SignAndEncrypt]: – Signing and end-to-end encryption – Enabled by default
[Security policy]	Setting of the server security policy If no option is selected, Security Policy = None.	• [Basic128Rsa15]: – This mode is insecure and should not be used. • [Basic256]: – This mode is insecure and should not be used. • [Basic256Sha256] – Enabled by default • [Aes128ha256RsaOaep] – Enabled by default • [Aes256Sha256RsaPss] – Enabled by default

5.6 Log file

The log file settings can be configured in the [Log file] section.

5.6.1 Setting the log level

The log level indicates the scope of the events to be logged.

► Select the required log level in the [Log level] list.

[Log level]	Description
[Error]	Only error messages will be logged.
[Warning]	Warning messages and error messages will be logged.
[Information]	Information, warning messages and error messages will be logged.
[Debug]	Debug messages, information, warning messages and error messages will be logged.

5.6.2 Setting the storage location and the log file

► Go to [Log level and location] and configure the log file settings in the [File logging] section.

Input box	Description	Possible values
[Storage path of log files]	File path for the log files of the OPC UA server	e.g. C:\LogFile
[Max log file count]	Maximum number of log files. If the number is exceeded, the oldest log file will be overwritten.	1...50
[Max log file size]	Maximum file size of a log file in MB.	1...50 [MB]

5.6.3 Downloading log files

The user can download all existing log files from the application:

- Under [Log level and location] in the section [File logging], click on the button [Download].
- ▷ The existing log files are combined in a zip file and then downloaded to the local computer.
- ▷ Depending on the size of the collected logs, it may take some time to create the zip file.

5.7 User administration / authentication

The users are displayed and managed in the [User settings / authentication] area.

5.7.1 Changing the password

- ▶ Under [User settings / authentication] in the user's row in the column [Actions], click on [Change password].
 - ▷ The view [Change password] appears.
- ▶ Enter the current password in the field [Enter current password].
- ▶ Enter the new password in the field [Enter new password].
- ▶ Enter the new password again in the field [Confirm new password].
- ▶ Click on [Change & login].
 - ▷ The password will be changed.
 - ▷ If required: Log in with the new password.

5.7.1.1 Password requirements

- Minimum length: 8 characters
- Must contain:
 - at least one upper case letter
 - at least one lower case letter
 - At least one number
 - At least one special character

5.8 Licence management

The installed licences are displayed in the [Licences] area.

New licences can be added.

5.8.1 Licence activation

The software is always delivered with a time-limited test licence. You can choose in the licence activation window whether you want to activate the test licence or whether you want to activate a permanent licence.

5.8.1.1 Activating a test licence

After activating the test licence, the software can be used to a limited extent for 30 days. After the test licence has expired, the software can no longer be used. For further use of the software, a permanent licence activation is required. If no permanent licence has been activated, the software will inform you of the imminent expiry of the test licence in a notification window when you log in. The information is provided 10 days before the licence expires.

5.8.1.2 Limitation of the test licence

The test licence is limited. The test licence enables the connection to a VSE device for a period of 30 days.

5.8.1.3 Activating a permanent licence

As a registered ifm customer, you can activate the permanent licence online or offline.

Licence activation code (LAC):

During the activation process, you need to enter the licence activation code (LAC).

- If you have purchased the software and the accompanying licences directly from ifm, ifm will have sent you the LAC by email.

Online licence activation

- ▶ Click on [Add licence] (not during the first activation after the installation of the software).
- ▶ Select [Online activation].
- ▶ Click on [NEXT].
- ▶ Enter the licence activation code (LAC) received via email.
- ▶ Click on [NEXT].
- ▶ Click on [FINISH].
- ▷ All activated licences are displayed.

Offline licence activation

If no online activation is possible because there is no Internet connection, licences can also be activated offline.

- ▶ Click on [Add licence] (not during the first activation after the installation of the software).
- ▶ Select [Offline activation].
- ▶ Click on [NEXT].
- ▶ Note down the indicated fingerprint.
OR
Click on [Save as .txt file], select the required directory and save fingerprint.txt.

- ▶ Open the page <https://licensing.ifm.com> on a computer with an online connection, click on [Activate licence], follow the instructions of this page and copy the generated licence key.
- ▶ Continue the licensing process in the software:
Click on [NEXT].
- ▶ Enter the licence key you received.
- ▶ Click on [NEXT].
- ▶ Click on [FINISH].
- ▷ All activated licences are displayed.

5.9 Setting the language:

- ▶ Go to [Language] and select the required interface language.

5.10 Import/export

In the [Import/export] area, the server settings can be imported and exported.

5.10.1 Exporting server settings

The user can export the server settings:

- ▶ Click on the [Export] button in the [Import/export] area.
- ▶ Enter the file name, select the storage location and save the export file.
- ▷ The settings are exported.

5.10.2 Importing server settings

The user can import the server settings:

- ▶ Click on the [Import] button in the [Import/export] area.
- ▶ Select and open the file with the server settings.
- ▷ The settings are imported.
- ▷ The existing settings are overwritten in the user interface.
- ▷ The newly imported settings are not yet activated.
- ▶ Carefully check the imported settings.
- ▶ Click on [Upload changes] to upload the changes to the server. For the changes to take effect, restart the server in the [Server status] area.

OR

- ▶ Click on [Upload and Restart] to upload the changes to the server and restart the server.

OR

- ▶ Click on [Reset changes] to discard the changes.



Invalid settings will not be imported.

6 Address model

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6.1 Overview

The following table shows the data tree nodes of the VSE OPC UA server.



For a dynamic data tree: Only the nodes that are configured in the VSE are displayed. Nodes that are not configured are hidden.

For a static data tree: The full data tree is displayed. Nodes that are not configured in the VSE receive the status code `BadResourceUnavailable`.

More information: [Setting the data tree \(→ 12\)](#)



The structure of the VSE device node name in the data tree can be set.

More information: [Setting the structure of the device node name \(→ 13\)](#)

Information on the status codes can be found in this chapter: [Status codes \(→ 29\)](#)

Information on the data access options can be found in this chapter: [Data Access Options \(→ 28\)](#)

Address / name	Node class OPC UA	Data type OPC UA	Data type ifm VSE	Description	Access
ifm	Object	FolderType	IfmType		r
VSE	Object	FolderType	VSE		r
System	Object	FolderType	SystemType		r
Version	Object	FolderType	VersionType		r
Driver	Property	String		e.g. "V1.1.0.0"	r
Default: {IP}:{Port} Optional: Device_1... Device_X	Object	FolderType	VSEDeviceType	Optional the user can configure DeviceName instead of {IP}:{PORT} The DeviceName can contain any name e.g. Engine_No4	r
Information	Object	FolderType	DeviceInformationType		r
Device	Object	FolderType	DeviceBaseInfoType		r
Name	Property	String		e.g. "Fantastic Pump"	r
Type	Property	Enumeration	DeviceTypeEnum (→ 43)	e.g. VSE100	r
Revision	Property	String		e.g. "AA (Board rev. 8)"	r
Serial	Property	String		e.g. "1 1 123456"	r
Firmware	Property	String		e.g. "V0.11.12"	r
State	Object	FolderType	DeviceStateType		r
SystemMode	DataVariable	Enumeration	SystemModeEnum (→ 46)	e.g. Measure	r
EEPROMHealth	DataVariable	Enumeration	EEPROMCheckEnum	e.g. OK	r
InputXXSelftestResult	DataVariable	Enumeration	SelfTestResultTypeEnum	e.g. SensorOK	r
Information					r
TcpClientConnections					r
Client01... Client03					r
ID	Property	Int32		e.g. 1	r
IPAddress	VSEDataVariableType	String		e.g. "72.123.124.2"	r
Port	VSEDataVariableType	Int32		e.g. 3321	r

Address / name	Node class OPC UA	Data type OPC UA	Data type ifm VSE	Description	Access
State	VSEDataVariableType	Enumeration	ClientConnectionStateEnum	e.g. Established	r
IP	Object	FolderType	DeviceAddressType		r
Hostname	Property	String		e.g. "Machine5"	r
DHCP	Property	Boolean		e.g. false	r
Address	Property	String		e.g. "72.123.124.2"	r
Port	Property	Int32		65100	r
Gateway	Property	String		"72.123.124.1"	r
SubnetMask	Property	String		"72.255.255.255"	r
MacAddress	Property	String		"AA:BB:CC:DD:EE:FF"	r
Documentation	Object	FolderType	DeviceDocumentationType		r
Company	Property	String		e.g. "ifm diagnostic"	r
Address	Property	String		e.g. "Aicher Str. 1A"	r
City	Property	String		e.g. "Rosenheim"	r
Location	Property	String		e.g. "First Floor"	r
Machine	Property	String		e.g. "MonsterFantastic"	r
CreatedBy	Property	String		e.g. "John"	r
CreationDate	Property	DateTime		e.g. "2020-04-27 08:10:45"	r
LastChange	Property	DateTime		e.g. "2020-04-27 08:10:45"	r
Description	Property	String		Description	r
ParameterChecksum	Property	String		e.g. "4529EFF1E49AED157C3D35-FA074DDCA762626CCD97AAE83EDE64E11E0CF27D0C"	r
Objects	Object	FolderType	ObjectsType		r
Object01... Object24	Object	FolderType	ObjectParameterType		r
Name	Property	String		e.g. "SE01_Unbalance_01"	r
Type	Property	Enumeration	ObjectTypeEnum (→ 44)	e.g. Unbalance	r
ID	Property	Int32		Object-ID, ≥ 1	r
Unit	Property	String		S.I. unit e.g. "m / s"	r
Warning	DataVariable	Float		e.g. 1.23	rw
Damage	DataVariable	Float		e.g. 4.11	rw
Baseline	DataVariable	Float		e.g. 4.11	r
InputID	Property	Int32		Input ID e.g. 1	r
InputType	Property	Enumeration	InputTypeEnum (→ 44)	Input type e.g. Dynamic	r
RotValueID	Property	Int32		ID of the assigned RPM object e.g. 1	r

Address / name	Node class OPC UA	Data type OPC UA	Data type ifm VSE	Description	Access
RefValueID	Property	Int32		ID of the assigned RPM reference ob- ject e.g. 2	r
Value	DataVariable	Float		e.g. 3.14	r
RotSpeed	DataVariable	Float		e.g. 5.46	r
Maximum	DataVariable	Float		e.g. 6.28	r
RefValue	DataVariable	Float		e.g. 6.78	r
State	DataVariable	Enumeration	ObjectStateEnum (→ □ 45)	OK	r
Error	DataVariable	String		e.g. "Speed not sta- ble"	r
Counters	Object	Folder	CountersType		r
Counter01... Counter32	Object	Folder	CounterParameterType		r
Name	Property	String		e.g. "OB01_Object- State_01"	r
Type	Property	Enumeration	CounterTypeEnum (→ □ 43)	ObjectState	r
ID	Property	Int32		1	r
Unit	Property	String		"s"(time) / "A_String" (totalis- er)	r
Limit	Property	Float		3600.5 (time) / 100.0 (totaliser)	r
Value	DataVariable	Float		3.14	rw
State	DataVariable	Enumeration	CounterStateEnum (→ □ 43)	Normal/LimitEx- ceeded	r
Alarms	Object	Folder	AlarmsType		r
Analogue	Object	Folder	AnalogueAlarmsType		r
Alarm01	Object	Folder	AnalogueAlarmParameterType		r
Name	Property	String		"OU01_Ana- logue_01"	r
ID	Property	Int32		1	r
Unit	Property	String		"km/h"	r
Value	DataVariable	Float		3.14	r
Alarm01... Alarm10	Object	Folder	DigitalAlarmParameterType		r
Name	Property	String		e.g. "OU01_Ana- logue_01"	r
Type	Property	Enumeration	DigitalAlarmTypeEnum (→ □ 44)	Damage	r
ID	Property	Int32		1	r
Value	DataVariable	Boolean		true	r
Variants	Object	Folder	DeviceVariantsType		
ActiveVariant	DataVariable	Int32			rw
Inputs	Object	Folder	InputsType		
External	Object	Folder	ExternalInputsType		
Input01... Input24	Object	Folder	ExternalInputParameterType		
Name	Property	String		e.g. "OU01_Ana- logue_01"	r

Address / name	Node class OPC UA	Data type OPC UA	Data type ifm VSE	Description	Access
ID	Property	Int32		e.g. 1	r
Unit	Property	String		e.g. "km/h"	r
Value	DataVariable- Type	String		e.g. 3.14	rw
Analogue	Object	Folder	AnalogueInputsType		
Input01... Input02	Object	Folder	AnalogueInputParameterType		
Name	Property	String		e.g. "OU01_Ana- logue_01"	
ID	Property	Int32		e.g. 1	
Unit	Property	String		e.g. "km/h"	
Type	Property	Enumeration	SensorTypeEnum (→ 45)		
Value	DataVariable- Type	Float		e.g. 3.14	
Dynamic	Object	Folder	DynamicInputsType		
Input01... Input04	Object	Folder	DynamicInputParameterType		
Name	Property	String		e.g. "OU01_Dy- namic_01"	
ID	Property	Int32		e.g. 1	
Unit	Property	String		e.g. "km/h"	
Type	Property	Enumeration	SensorTypeEnum (→ 45)		
Value	DataVariable- Type	Float		e.g. 3.14	
Commands	Object	Folder	DeviceCommandsType		
ResetCounters	Method				
ResetHistory	Method				
Reboot	Method				
SetTime	Method			Requires Input Ar- gument: "01-01-1999 00:00:00"	
SelfTest	Method				
History	Object	Folder	DeviceInformationType		
Object01... Object24	Object	Folder	ObjectParameterType		
Name	Property	String		"SE01_Unbal- ance_01"	
Type	Property	Enumeration	ObjectTypeEnum	Unbalance	
ID	Property	Int32		1	
Unit	Property	String		"m/s"	
Baseline	DataVariable	Float		4,11	
InputID	Property	Int32		1	
InputType	Property	Enumeration	InputTypeEnum	Dynamic	
RotValueID	Property	Int32		1	
RefValueID	Property	Int32		2	
Warning	VSEDataVari- ableType	Float		1,23	rw

Address / name	Node class OPC UA	Data type OPC UA	Data type ifm VSE	Description	Access
RotSpeed	VSEDataVariableType	Float		5,46	
RefValue	VSEDataVariableType	Float		6,78	
Value	VSEDataVariableType	Float		3,14	
Average	VSEDataVariableType	Float		3,14	

Legend:

r = read access only

rw = read access and write access

6.2 Data Access Options

Simple reading of current VSE device data by an OPC client is possible at any time without subscription. However, only the most recent data available for the specified node are retrieved (current value).

► Recommendation: For performance reasons, retrieve the required nodes with subscription.



► Observe the detailed descriptions of the status codes Good, UncertainLastUsableValue and BadWaitingForInitialData for the OPC nodes. ([→ Status codes](#)  29)

6.3 Status codes

The detailed OPC status codes apply to states in which a connection to the server has been established.

Other states, such as `BadCommunicationError`, fall back on the standard behaviour of the OPC UA client implementation.

The device name can be edited. In the following descriptions, the standard device name `Device_X` is used.

6.3.1 Device_X > Information > ... (1/1)

- Device_X > Information > Device > Name
- Device_X > Information > Device > Type
- Device_X > Information > Device > Revision
- Device_X > Information > Device > Serial
- Device_X > Information > Device > Firmware
- Device_X > Information > State > EEPROMHealth
- Device_X > Information > State > InputXXSelftestResult
- Device_X > Information > State > SystemMode
- Device_X > Information > State > ActiveVariant
- Device_X > Information > State > TCPClientConnections
- Device_X > Information > IP > Hostname
- Device_X > Information > IP > DHCP
- Device_X > Information > IP > Address
- Device_X > Information > IP > Port
- Device_X > Information > IP > Gateway
- Device_X > Information > IP > SubnetMask
- Device_X > Information > IP > MacAddress

The following status codes apply to the named nodes:

Status code	Description
Good	The connection to the device is okay. The property value was set accordingly.
BadWaitingForInitialData	The connection to the device was established. The value of the property has not yet been set.
BadNoCommunication	No connection to the device. The connection was interrupted or not established.

6.3.2 Device_X > Documentation > ... (1/1)

- Device_X > Documentation > Company
- Device_X > Documentation > Address
- Device_X > Documentation > City
- Device_X > Documentation > Location
- Device_X > Documentation > Machine
- Device_X > Documentation > CreatedBy
- Device_X > Documentation > CreationDate
- Device_X > Documentation > LastChange
- Device_X > Documentation > Description
- Device_X > Documentation > ParameterChecksum

The following status codes apply to the named nodes:

Status code	Description
Good	The connection to the device is okay. The property value was set accordingly.
BadWaitingForInitialData	The connection to the device was established. The value of the property has not yet been set.
BadNoCommunication	No connection to the device. The connection was interrupted or not established.

6.3.3 Device_X > Objects > ObjectXX > ... (1/5)

- Device_X > Objects > ObjectXX > Name
- Device_X > Objects > ObjectXX > Type
- Device_X > Objects > ObjectXX > ID
- Device_X > Objects > ObjectXX > Unit
- Device_X > Objects > ObjectXX > Warning
- Device_X > Objects > ObjectXX > Damage
- Device_X > Objects > ObjectXX > Baseline
- Device_X > Objects > ObjectXX > InputID
- Device_X > Objects > ObjectXX > InputType
- Device_X > Objects > ObjectXX > RotValueID

The following status codes apply to the named nodes:

Status code	Description
Good	All of the following conditions are met: • The connection to the device is okay. • The object with e.g. ID '1' is configured on the VSE device. • The value of the property/data variable has been set.
BadWaitingForInitialData	The connection with the device was established The value of the property was not set. This status is only displayed for a very short time after the connection with the device has been established, until the value of the property / data variable has been initialised / set.
BadResourceUnavailable	The connection to the device is okay. The object with e.g. ID '1' is not configured/parameterised on the VSE device.
BadNoCommunication	No connection to the device. The connection was interrupted or not established.

6.3.4 Device_X > Objects > ObjectXX > ... (2/5)

- Device_X > Objects > ObjectXX > RefValueID

The following status codes apply to the named node:

Status code	Description
Good	All of the following conditions are met: • The connection to the device is okay. • The object with e.g. ID '1' is configured on the VSE device. The value of the property/data variable has been set.
BadWaitingForInitialData	The connection with the device was established The value of the property was not set. This status is only displayed for a very short time after the connection with the device has been established, until the value of the property / data variable has been initialised / set.
BadResourceUnavailable	The connection to the device is okay. The object with e.g. ID '1' is configured on the VSE device, but no reference value RPM object is configured.
BadNoCommunication	No connection to the device. The connection was interrupted or not established.

6.3.5 Device_X > Objects > ObjectXX > ... (3/5)

- Device_X > Objects > ObjectXX > Value
- Device_X > Objects > ObjectXX > RotSpeed

The following status codes apply to the named nodes:

Status code	Description
Good	All of the following conditions are met: • The connection to the device is okay. • The object with e.g. ID '1' is configured on the VSE device. • An OPC subscription is active for this data variable. • The value of the data variable was set accordingly (see BadWaitingForInitialData). • The VSE device is in system mode <code>Supervise</code> or <code>Selftest</code>. • The object is active in the current variant.
UncertainLastUsableValue	All of the following conditions are met: • The connection to the device is okay. • The object with e.g. ID '1' is configured on the VSE device. • The data variable has received at least one Good value from the device. AND at least one of the following conditions is met: • The device is in system mode <code>Measure</code> or <code>Setup</code>. • The object is not active in the current variant, but was previously active in another variant and has provided values. • An error occurred during the ObjectResult calculation. • An OPC subscription for this data variable existed and was deleted.
BadWaitingForInitialData	All of the following conditions are met: • The connection to the device is okay. • The object with e.g. ID '1' is configured on the VSE device. • No OPC subscription is or was active for this data variable. (No object monitoring data was ever received by the OPC server.)
BadNoCommunication	All of the following conditions are met: • No connection to the device. • The connection was interrupted or not established.
BadResourceUnavailable	One of the following conditions is met: • The object with e.g. ID '1' is not configured on the VSE device. • The object with e.g. ID '1' is in the state <code>MonitoringDisabled</code> because it is a fast measuring cycle object (only time domain objects with a measurement time of < 10.24 ms).

6.3.6 Device_X > Objects > ObjectXX > ... (4/5)

- Device_X > Objects > ObjectXX > Maximum

The following status codes apply to the named node:

Status code	Description
Good	All of the following conditions are met: • The connection to the device is okay. • The object with e.g. ID '1' is configured on the VSE device. • An OPC subscription is active for this data variable. • The value of the data variable was set accordingly (see BadWaitingForInitialData). • The VSE device is in system mode <code>Supervise</code> or <code>Selftest</code>. • The object is active in the current variant.
UncertainLastUsableValue	All of the following conditions are met: • The connection to the device is okay. • The object with e.g. ID '1' is configured on the VSE device. • The data variable has received at least one Good value from the device. AND at least one of the following conditions is met: • The device is in system mode <code>Measure</code> or <code>Setup</code>. • The object is not active in the current variant, but was previously active in another variant and has provided values. • An error occurred during the ObjectResult calculation. • An OPC subscription for this data variable existed and was deleted.
BadWaitingForInitialData	All of the following conditions are met: • The connection to the device is okay. • The object with e.g. ID '1' is configured on the VSE device. • No OPC subscription is or was active for this data variable. (No object monitoring data was ever received by the OPC server.)
BadNoCommunication	All of the following conditions are met: • No connection to the device. • The connection was interrupted or not established.
BadResourceUnavailable	The connection to the device is okay. AND One of the following conditions is met: • The object with e.g. ID '1' is not configured on the VSE device. • The object with e.g. ID '1' is in the state <code>MonitoringDisabled</code> because it is a fast measuring cycle object (Only time domain objects with a measurement time of < 10.24 ms). • The object with e.g. ID '1' is configured on the VSE device, but the object does not support maximum value calculation or the monitoring of maximum value calculation is deactivated (CyclicComputation is deactivated). The following objects do not support maximum value calculation: – A_PEAK_TD (Acceleration Peak Time Domain) – Lower Limit Monitor – Upper Limit Monitor

6.3.7 Device_X > Objects > ObjectXX > ... (5/5)

- Device_X > Objects > ObjectXX > State
- Device_X > Objects > ObjectXX > Error

The following status codes apply to the named nodes:

Status code	Description
Good	All of the following conditions are met: • The connection to the device is okay. • The object with e.g. ID '1' is configured on the VSE device. • An OPC subscription is active for this data variable. • The value of the data variable was set accordingly (see BadWaitingForInitialData).
UncertainLastUsableValue	All of the following conditions are met: • The connection to the device is okay. • The object with e.g. ID '1' is configured on the VSE device. • The data variable has received at least one Good value from the device. • An OPC subscription for this data variable existed and was deleted.
BadWaitingForInitialData	All of the following conditions are met: • The connection to the device is okay. • The object with e.g. ID '1' is configured on the VSE device. • No OPC subscription is or was active for this data variable. (No object monitoring data was ever received by the OPC server.)
BadNoCommunication	All of the following conditions are met: • No connection to the device. • The connection was interrupted or not established.
BadResourceUnavailable	• The object with e.g. ID '1' is not configured on the VSE device.

6.3.8 Device_X > Counters > CounterXX > ... (1/2)

- Device_X > Counters > CounterXX > Name
- Device_X > Counters > CounterXX > Type
- Device_X > Counters > CounterXX > ID
- Device_X > Counters > CounterXX > Unit
- Device_X > Counters > CounterXX > Limit

The following status codes apply to the named nodes:

Status code	Description
Good	All of the following conditions are met: • The connection to the device is okay. • The counter with e.g. ID '1' is configured on the VSE device. • The value of the property/data variable has been set.
BadWaitingForInitialData	All of the following conditions are met: • The connection to the device was established. • The value of the property was not set. • This status is only displayed for a very short time after the connection to the device has been established, until the value of the property/data variable has been initialised/set.
BadResourceUnavailable	All of the following conditions are met: • The connection to the device is okay. • The counter with e.g. ID '1' is not configured on the VSE device.
BadNoCommunication	All of the following conditions are met: • No connection to the device. • The connection was interrupted or not established.

6.3.9 Device_X > Counters > CounterXX > ... (2/2)

- Device_X > Counters > CounterXX > Value
- Device_X > Counters > CounterXX > State

The following status codes apply to the named nodes:

Status code	Description
Good	All of the following conditions are met: • The connection to the device is okay. • The counter with e.g. ID '1' is configured on the VSE device. • An OPC subscription is active for this data variable. • The value of the data variable was set accordingly (see BadWaitingForInitialData). • The VSE device is in system mode <code>Supervise</code> or <code>Selftest</code>.
UncertainLastUsableValue	All of the following conditions are met: • The connection to the device is okay. • The counter with e.g. ID '1' is configured on the VSE device. • The data variable has received at least one Good value from the device. AND at least one of the following conditions is met: • The device is in system mode <code>Measure</code> or <code>Setup</code>. • An OPC subscription for this data variable existed and was deleted.
BadWaitingForInitialData	All of the following conditions are met: • The connection to the device is okay. • The counter with e.g. ID '1' is configured on the VSE device. • No OPC subscription is or was active for this data variable. (No object monitoring data was ever received by the OPC server.)
BadNoCommunication	All of the following conditions are met: • No connection to the device. • The connection was interrupted or not established.
BadResourceUnavailable	The following condition is met: • The counter with e.g. ID '1' is not configured on the VSE device.

6.3.10 Device_X > Alarms > Analogue > AlarmXX > ... (1/2)

- Device_X > Alarms > Analogue > AlarmXX > Name
- Device_X > Alarms > Analogue > AlarmXX > Type
- Device_X > Alarms > Analogue > AlarmXX > ID
- Device_X > Alarms > Analogue > AlarmXX > Unit

The following status codes apply to the named nodes:

Status code	Description
Good	All of the following conditions are met: • The connection to the device is okay. • The alarm with e.g. ID '1' is configured on the VSE device. • The value of the property/data variable has been set.
BadWaitingForInitialData	All of the following conditions are met: • The connection to the device was established. • The value of the property was not set. This status is only displayed for a very short time after the connection to the device has been established, until the value of the property/data variable has been initialised/set.
BadResourceUnavailable	All of the following conditions are met: • The connection to the device is okay. • The alarm with e.g. ID '1' is not configured on the VSE device.
BadNoCommunication	All of the following conditions are met: • No connection to the device. • The connection was interrupted or not established.

6.3.11 Device_X > Alarms > Analogue > AlarmXX > ... (2/2)

- Device_X > Alarms > Analogue > AlarmXX > Value

The following status codes apply to the named node:

Status code	Description
Good	All of the following conditions are met: • The connection to the device is okay. • The analogue alarm is configured on the VSE device. • An OPC subscription is active for this data variable. • The value of the data variable was set accordingly (see BadWaitingForInitialData). • The VSE device is in system mode <code>Supervise</code> or <code>Selftest</code>.
UncertainLastUsableValue	All of the following conditions are met: • The connection to the device is okay. • The analogue alarm is configured on the VSE device. • The data variable has received at least one Good value from the device. AND at least one of the following conditions is met: • The device is in system mode <code>Measure</code> or <code>Setup</code>. • An OPC subscription for this data variable existed and was deleted.
BadWaitingForInitialData	All of the following conditions are met: • The connection to the device is okay. • The analogue alarm is configured on the VSE device. • No OPC subscription is or was active for this data variable. (No alarm monitoring data was ever received by the OPC server.)
BadNoCommunication	No connection to the device. The connection was interrupted or not established.
BadResourceUnavailable	The analogue alarm is not configured on the VSE device

6.3.12 Device_X > Alarms > AlarmXX > ... (1/2)

- Device_X > Alarms > AlarmXX > Name
- Device_X > Alarms > AlarmXX > Type
- Device_X > Alarms > AlarmXX > ID

The following status codes apply to the named nodes:

Status code	Description
Good	All of the following conditions are met: • The connection to the device is okay. • The alarm with e.g. ID '1' is configured on the VSE device as a digital alarm. • The value of the property/data variable has been set.
BadWaitingForInitialData	All of the following conditions are met: • The connection to the device was established. • The value of the property was not set. This status is only displayed for a very short time after the connection to the device has been established, until the value of the property/data variable has been initialised/set.
BadResourceUnavailable	All of the following conditions are met: • The connection to the device is okay. • The alarm with e.g. ID '1' is not configured on the VSE device or the alarm is not a digital alarm.
BadNoCommunication	All of the following conditions are met: • No connection to the device. • The connection was interrupted or not established.

6.3.13 Device_X > Alarms > AlarmXX > ... (2/2)

- Device_X > Alarms > AlarmXX > Value

The following status codes apply to the named node:

Status code	Description
Good	All of the following conditions are met: • The connection to the device is okay. • The alarm with e.g. ID '1' is configured on the VSE device as a digital alarm. • An OPC subscription is active for this data variable. • The value of the data variable was set accordingly (see BadWaitingForInitialData). • The VSE device is in system mode <code>Supervise</code> or <code>Selftest</code>.
UncertainLastUsableValue	All of the following conditions are met: • The connection to the device is okay. • The alarm with e.g. ID '1' is configured on the VSE device as a digital alarm. • The data variable has received at least one Good value from the device. AND at least one of the following conditions is met: • The device is in system mode <code>Measure</code>. • An OPC subscription for this data variable existed and was deleted.
BadWaitingForInitialData	All of the following conditions are met: • The connection to the device is okay. • The alarm with e.g. ID '1' is configured on the VSE device as a digital alarm. • No OPC subscription is or was active for this data variable. (No object monitoring data was ever received by the OPC server.)
BadNoCommunication	All of the following conditions are met: • No connection to the device. • The connection was interrupted or not established.
BadResourceUnavailable	The following condition is met: • The alarm is not configured on the VSE device or the alarm is not a digital alarm.

6.3.14 Device_X > Commands > ... (1/1)

- Device_X > Commands > Reboot
- Device_X > Commands > ResetCounters
- Device_X > Commands > ResetHistory
- Device_X > Commands > SelfTest
- Device_X > Commands > SetTime

The following status codes apply to the named nodes:

Status code	Description
GoodCompletesAsynchronously	• The method was successfully executed. • The method is terminated asynchronously.
BadNotConnected	• There is no device connection.

6.4 Enum types

6.4.1 CounterTypeEnum

Indicates the VSE device parameter counter type.

Name	Value	Displayed name
None	0	None
VSEUptime	1	VSEUptime
AnalogueRuntime	2	AnalogueRuntime
DigitalRuntime	3	DigitalRuntime
ObjectState	4	ObjectState
Totalisator	5	Totalisator
RESERVED_6	6	
RESERVED_7	7	
RESERVED_8	8	
RESERVED_9	9	

6.4.2 CounterStateEnum

Indicates the VSE device parameter counter state.

Name	Value	Displayed name
None	0	None
Normal	1	Normal
LimitExceeded	2	LimitExceeded
RESERVED_3	3	
RESERVED_4	4	

6.4.3 DeviceTypeEnum

Indicates the VSE device type.

Name	Value	Displayed name
None	0	None
VSE002	1	VSE002
VSE003	2	VSE003
VSE100	3	VSE100
VSE101	4	VSE101
VSE150	5	VSE150
VSE151	6	VSE151
VSE152	7	VSE152
VSE153	8	VSE153
VSE154	9	VSE154
VSE903	10	VSE903
VSE950	11	VSE950
VSE951	12	VSE951
VSE953	13	VSE953

Name	Value	Displayed name
VYE004	14	VYE004
VYE113	15	VYE113
VYE114	16	VYE114
VYE115	17	VYE115
VYE117	18	VYE117
RESERVED_19	19	

6.4.4 DigitalAlarmTypeEnum

Indicates the digital alarm type of the VSE device.

Name	Value	Displayed name
None	0	None
Warning	1	Warning
Damage	2	Damage
Counter	3	Counter
Selftest	4	Selftest
Custom	5	Custom
RESERVED_6	6	
RESERVED_7	7	
RESERVED_8	8	
RESERVED_9	9	

6.4.5 InputTypeEnum

Indicates the VSE device parameter input type.

Name	Value	Displayed name
None	0	None
Analogue	1	Analogue
Dynamic	2	Dynamic
External	3	External
Digital	4	Digital
RESERVED_5	5	
RESERVED_6	6	
RESERVED_7	7	
RESERVED_8	8	

6.4.6 ObjectTypeEnum

Indicates the VSE device parameter object type.

Name	Value	Displayed name
None	0	None
Unbalance	1	Unbalance
Bearing	2	Bearing
A_RMS_FD	3	A_RMS_FD

Name	Value	Displayed name
V_RMS_FD	4	V_RMS_FD
D_RMS_FD	5	D_RMS_FD
A_RMS_TD	6	A_RMS_TD
V_RMS_TD	7	V_RMS_TD
A_PEAK_TD	8	A_PEAK_TD
UpperMonitor	9	UpperMonitor
LowerMonitor	10	LowerMonitor
Other	11	Other
RESERVED_12	12	
RESERVED_13	13	
RESERVED_14	14	
RESERVED_15	15	

6.4.7 ObjectStateEnum

Indicates the state of the object parameters of the VSE device.

Name	Value	Displayed name
None	0	None
OK	1	OK
Warning	2	Warning
Damage	3	Damage
Error	4	Error
InactiveByVariant	5	InactiveByVariant
MonitoringDisabled	6	MonitoringDisabled
RESERVED_7	7	
RESERVED_8	8	
RESERVED_9	9	
RESERVED_10	10	

6.4.8 SensorTypeEnum

Indicates the sensor type.

Name	Value	Displayed name
None	0	None
VSA00x	1	VSA00x
VSA003	2	VSA003
VSA101	3	VSA101
VSA201	4	VSA201
VSP0xA	5	VSP0xA
IEPE	6	IEPE
IEPEx10	7	IEPEx10
VSM001	8	VSM001
VSM101	9	VSM101
VSA20x	10	VSA20x

Name	Value	Displayed name
DCCurrent	11	DCCurrent
Other	12	Other
Current	13	Current
Voltage	14	Voltage
Pulse	15	Pulse
Frequency	16	Frequency
PulseWidth	17	PulseWidth
PWM	18	PWM
Counter	19	Counter
Level	20	Level
VE113A	21	VE113A
External	22	External
Digital	23	Digital

6.4.9 SystemModeEnum

Indicates the system mode of the VSE device.

Name	Value	Displayed name
None	0	None
SelfTest	1	SelfTest
Supervise	2	Supervise
Setup	3	Setup
Measure	4	Measure
Startup	5	Startup
RESERVED_6	6	
RESERVED_7	7	

6.5 History data monitoring

This area provides historical data.

6.5.1 Device_X > History > ObjectXX > ... (1/1)

- Device_X > History > ObjectXX > Name
- Device_X > History > ObjectXX > Type
- Device_X > History > ObjectXX > ID
- Device_X > History > ObjectXX > Value
- Device_X > History > ObjectXX > Unit
- Device_X > History > ObjectXX > RotSpeed
- Device_X > History > ObjectXX > RefValue
- Device_X > History > ObjectXX > Warning
- Device_X > History > ObjectXX > BaseLine
- Device_X > History > ObjectXX > RotValueID
- Device_X > History > ObjectXX > RefValueID
- Device_X > History > ObjectXX > InputID
- Device_X > History > ObjectXX > InputType
- Device_X > History > ObjectXX > Average

The following status codes apply to the named nodes:

Status code	Description
Good	All of the following conditions are met: • The connection to the device is okay. • The counter with e.g. ID '1' is configured on the VSE device. • The value of the property/data variable has been set.
BadWaitingForInitialData	All of the following conditions are met: • The connection to the device was established. • The value of the property was not set. • This status is only displayed for a very short time after the connection to the device has been established, until the value of the property/data variable has been initialised/set.
BadResourceUnavailable	All of the following conditions are met: • The connection to the device is okay. • The counter with e.g. ID '1' is not configured on the VSE device.
BadNoCommunication	All of the following conditions are met: • No connection to the device. • The connection was interrupted or not established.