Technical Documentation and Help

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psychometrics for you

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1 INFORMATION

This document is the print version of the online technical documentation and help for the Vienna Test System (https://help.schuhfried.com/) from SCHUHFRIED. Please note that the technical documentation and help is versioned and only valid for the VTS version listed on the title page.

2 THE VIENNA TEST SYSTEM

The **Vienna Test System (VTS)** is SCHUHFRIED's software solution for digital psychological assessment. It offers a wide selection of tests, languages and norms, as well as flexible options for test presentation and scoring. The VTS is the result of 77 years of experience in computer-based psychological assessment. It covers a wide range of modern methods for personality and ability assessment, which are regularly updated and further developed. The range of available tests is constantly expanding. In addition to tests based on classical test theory, an increasing number of adaptive and multimedia tests are being developed using innovative technologies and modern test theory.

This technical documentation and help is designed to support users in making the most efficient use of the Vienna Test System (VTS).

On the following pages, you will find detailed information about the VTS software solution:

- Product description
- Available languages
- System requirements

For information on installing the system please see the section: Installation and configuration

Information on the use of the VTS can be found in the section: Usage

Technical specifications of our peripheral devices can be found in the section: Peripheral devices

Information about the changes in different VTS versions can be found in the section: Release Notes

If you require further assistance, our Support team will be happy to help.

This documentation is maintained and updated by SCHUHFRIED GmbH, please visit our website for the imprint & additional ressources.

We hope you enjoy working with the Vienna Test System!

2.1 Product description

2.1.1 Intended use

The Vienna Test System is SCHUHFRIED GmbH's software solution for computer-based psychological assessment. Its areas of application range from individual assessments and tests in personnel psychology to clinical neuropsychology, traffic psychology, and sports psychology.

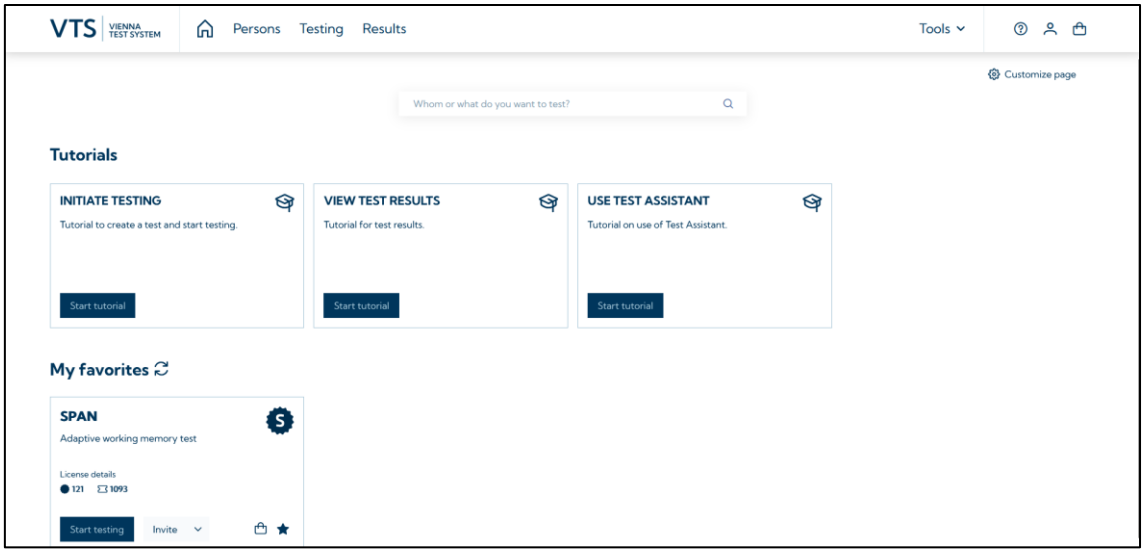
The Vienna Test System offers a wide portfolio of tests, including intelligence test batteries, special intelligence tests, ability tests, personality tests, and aptitude and interest tests. The tests are based on both classical and modern test theories and include adaptive and multimedia formats. They are designed to ensure the most comprehensive, fair, and valid psychological testing of a person.

The VTS consists of several components that can be used as needed, depending on the use case.

This page provides an overview of the functions and structure of the VTS, its different product variants, the required licenses and available purchasing options.

2.1.2 Structure and program components

The VTS consists of the VTS administration software, which is required for test presentation and the management of persons, test results, settings, and licenses. The administration software also manages VTS users (adding/removing users, managing rights). Provided that the appropriate licenses are available, testing can be started, and persons can be invited for testing directly from within the administration software.



The VTS administration software includes several components necessary for using the VTS:

- **Database**: SQL database for storing all relevant information and personal data or test results
- **Testplayer**: Application used to conduct tests. The Testplayer is available in a browser-based version (*Testplayer Web*) and a version that must be installed locally (*Testplayer Client*).

All functions of the VTS can be managed and used in the administration software. These include:

- **Managing test takers**: Creating new persons (either manually or via import), updating personal data, deleting persons → *Persons* page in the administration software
- **Presenting tests**: Selecting individual tests and configuring them (selecting test forms / subtests / scales), creating test batteries, assigning tests / test batteries to persons, initiating testing sessions or generating invitation links for testing in open mode or proctored mode → *Testing* page in the administration software
- **Viewing results**: Opening individual or multiple results, exporting results (PDF, .csv, VTS-format), creating reports → *Results* page in the administration software
- **VTS Tools**: Creating your own tests using the Test Generator, selecting suitable tests with the help of the Test Assistant, perform further analyses of the test results in VTS Analytics

- **Managing settings**: Configuring test administration and scoring (e.g., generating and creating Word reports), as well as setting up email options for sending invitation links

You can get to know the VTS administration software with a free demo account in VTS online. Simply follow the registration process under *Register for demo account*.

2.1.3 Product variants

The VTS administration software is available in two variants: the **Vienna Test System online** and the **Vienna Test System offline**.

2.1.3.1 Vienna Test System online

The Vienna Test System online (VTS online) is SCHUHFRIED's cloud-based solution. All you need to use VTS online is internet access. There is no need to install the administration software locally on your device. You can manage all functions of the VTS administration software in your browser. You can access your data and results at any time and from anywhere. VTS online can also be used via the browser on devices that do not run on Windows operating systems.

Thanks to the cloud-based infrastructure, you benefit from regular automatic updates of VTS. Your tests are therefore always up to date and feature the latest norms and functions. Your data is automatically backed up and protected in the best possible way on European servers. The infrastructure required for the efficient use of the VTS is provided via the cloud. You don’t need to worry about whether your devices meet the system requirements for the VTS. A stable internet connection is required to use the VTS online.

The VTS online is the ideal solution for users who want to administer efficient digital psychological assessments without any installation or maintenance costs.

A local software installation may also be necessary when using VTS online, for example, to administer tests that require additional input devices. In such cases, the Testplayer Client must be installed on the device used for testing. The Testplayer Client can only be installed on devices running the Windows operating system.

2.1.3.2 Vienna Test System offline

The VTS is also available as an on-premise solution (Vienna Test System offline). With this option, you receive an installation package that includes a specific VTS version. This allows you to install the VTS locally on your PC or server system. This means that the VTS is offline and linked to your local technical infrastructure and can only be run on the licensed devices. The VTS offline is only compatible with Windows operating systems.

Since all program components are installed on your devices, you always have full control over your data. However, depending on your specific use case, you must ensure that your devices' performance and configuration are suitable for the intended use. The VTS offline can also be used without an active internet connection.

WTS offline also has the ability to communicate with other software via interfaces. Provided that the external software supports the appropriate communication protocols, persons can be created in the VTS and test results can be retrieved via the external software, for example. More detailed information can be found on the page: Integration
.

2.1.3.3 Comparison of product variants

If you would like to find out which of the two variants best suits your needs, please see comparison below:

Function	VTS online	VTS offline
Browser-based use of the VTS administration software (without local installation)	✓	✗
Cloud-based infrastructure (data backup, computing power)	✓	✗
Completely local data storage on your infrastructure (on-premise solution)	✗	✓
Automatic updates	✓	✗
Free updates	✓	✓
System requirements of the VTS must be met	✗	✓
Use of the VTS on operating systems other than Windows	✓	✗
Online testing via email invitation	✓	ℹ[1]
Internet connection required	✓	✗
Report generation	✓	✓
Test Generator	✓	✓
VTS Analytics	✓	✗
Interfaces for communication with other software (e.g., GDT, HL7)	✗	✓

[1] Online testing is only possible in VTS offline if the technical requirements are met (e.g., correct network configuration).

2.1.4 Update & support

The VTS is continuously being developed and improved. A new VTS version is generally released twice a year, in March and September. This includes new functions and improvements to the tests and the administration software. In addition, the norms of the tests and the available languages are continuously updated (if the test is part of our actively maintained portfolio[1]).

SCHUHFRIED guarantees the functionality of the Vienna Test System only if the Vienna Test System is kept up to date, if your VTS version was released more than 36 months ago, the functionality of the system is no longer guaranteed and any technical support is subject to a fee. For details see our terms and conditions. We therefore strongly recommend that the software be updated continuously.

To keep your system up to date, SCHUHFRIED offers **free updates**[2] for VTS. To receive these updates, **you must have VTS version 8.27 or higher**. If this is the case, you will receive the installation package for the update free of charge in our marketplace and can update your VTS installation to the latest version yourself (see: Updating a single workstation installation).

If technical problems arise during an update, SCHUHFRIED will assist you in troubleshooting, provided that the problems were caused by SCHUHFRIED (e.g., by an error in the software) and your VTS version is not older than 36 months. If your VTS version is older than 36 months, technical support from SCHUHFRIED for an update is

subject to a fee. In the Release Notes, you will find information about when your VTS version was released. Using this information, you can check whether your version is older than 36 months.

If technical problems occur during operation, technical support from SCHUHFRIED is free of charge if the problems were caused by SCHUHFRIED and your VTS is not older than 36 months (see above). Therefore, please keep your VTS up to date. If you use VTS online, you will always have the latest version without any additional update or effort.

2.1.5 How do I get started with VTS?

- You can try VTS free of charge. On the homepage of VTS online, you can register for a *demo account* and experience the VTS administration software with a selection of tests from the SCHUHFRIED Selection. When you take the tests, however, only the instructions are presented, not the test items.
- The VTS administration software, licenses for the tests and, if required, our hardware can be purchased via the Marketplace.

[1] Currently, these are the tests: 2HAND, ATAVT, ATAVT-2, BMT, COG, DT, FCB5, INT, IVPE-R, LAT, MECH, MOUSE, PRIO, RT, SIGNAL, SPAN, STROOP, TACO, TMT-S, VIGIL, AVEM, GET, INSBAT 2, LVT, MLS, PP-R, SIMKAP, SMK, TOL-F, WAF, ZBA

[2] This does not apply to server/client installations where the update requires support from SCHUHFRIED's technical support team.

2.2 Available languages

This page provides an overview of the languages available for all tests and features in the VTS. Please note: The available languages may vary depending on the VTS version. The languages listed here refer to a specific VTS version, which you can identify by the URL of the website (e.g., https://help.schuhfried.com/en/vts/8.29/ → valid documentation for VTS version 8.29).

This page provides an overview of the languages available for all tests and features in the VTS. Please note: The available languages may vary depending on the VTS version. The languages listed here refer to a specific VTS version, which is stated on the title page of this document.

The languages are identified by abbreviations. The abbreviations are assigned to languages as follows:

de-DE: German
en-US: English
arb: Arabic
bg-BG: Bulgarian
bs-BA: Bosnian (Latin)
cs-CZ: Czech
da-DK: Danish
el-GR: Greek
es-EE: Estonian
es-ES: Spanish
fi-FI: Finnish
fr-FR: French
hr-HR: Croatian
hu-HU: Hungarian
is-IS: Icelandic
it-IT: Italian
ja-JP: Japanese
lt-LT: Lithuanian
mr-IN: Marathi
nb-NO: Norwegian
nl-NL: Dutch
pl-PL: Polish
pt-PT: Portuguese
pt-BR: Portuguese (Brazil)
ro-RO: Romanian
ru-RU: Russian
sk-SK: Slovak
sl-SI: Slovenian
sr-RS: Serbian (Latin)
sv-SE: Swedish
tr-TR: Turkish
uk-UA: Ukrainian
urd: Urdu
vi-VN: Vietnamese
zh-CN: Chinese
zh-TW: Chinese (Taiwan)

2.2.1 Software & Features

Component	Verfügbare Sprachen
VTS administration software	de-DE, en-US, cs-CZ, es-ES, fr-FR, hu-HU, it-IT, nl-NL, pl-PL, pt-PT, ro-RO, ru-RU, sk-SK, sl-SI, sv-SE, tr-TR, zh-CN
VTS Client Software	Language selection identical to the VTS administration software
VTS Testplayer Client	Language selection identical to the VTS administration software
VTS Analytics	de-DE, en-US
Test Generator	de-DE, en-US
Test Assistant	de-DE, en-US

Please visit the online version of this documentation (https://help.schuhfried.com/) to view the tables listing the available languages per test.

2.3 System requirements

The Vienna Test System (VTS) is available as a cloud hosted solution (VTS online) and as an installable solution to be run on customer premises (VTS offline). If VTS offline is used, there is the option to set it up as a single workstation solution (installed only on one PC) or as a server/client solution in a network (see also: Product description). Depending on your selected solution & intended use-case different system requirements apply.

2.3.1 VTS online

As a cloud based solution based on web technologies, VTS online has no specific hardware or software requirements other than a modern web browser and a stable network connection (100 MBit/s or more are recommended for optimal functionality).

The following browser and operating system combinations are officially supported:

Browser / operating system	Windows	Mac OS X	Mobile
Microsoft Edge	✓	-	-
Firefox	✓	✓	-
Chrome	✓	✓	✓ (Android)
Safari	-	✓	✓ (iOS)

For tests requiring SCHUHFRIED hardware (see: Peripheral devices) as well as some older tests, an installation of the VTS Testplayer is necessary on the PC that is used for the testing (for details see: Additional requirements for specific tests). In such cases, the requirements stated for clients in a server/client solution apply. The VTS Testplayer for VTS online can be installed without administrator rights, except for the optional Response Panel drivers. The drivers are however only needed when a Response Panel is used.

2.3.2 VTS offline

All installable components of the VTS require a Windows based operating system running on a x86 based processor (Intel or AMD). The Windows user performing the installation needs to have administrator rights. Currently, the following versions of Windows are supported:

- Windows 11
- Windows Server 2016
- Windows Server 2019
- Windows Server 2022
- Windows Server 2025

ARM based processors are not supported. It is not possible to install on Windows versions in S mode. The N and KN versions of Windows require the installation of the Media Feature Pack.

The required hardware specifications depend on the operation variant. The VTS can operate as single workstation solution with all system components installed on one machine. For higher testing volume and many parallel test administrations, it can also be installed as a client/server solution with central data management.

2.3.2.1 Single workstation solution

Requirement	Minimum	Recommended
Processor (x86)	4 Core	≥ 8 Core
RAM	8 GB	≥ 16 GB
Disk space	10 GB	50 GB (SSD)
Graphics card memory	≥ 512 MB	

VTS can be operated with an integrated SQL Server Express server, which however imposes a 10 GB overall data limit. For higher data volumes, the use of a full Microsoft SQL Server is recommended, SQL Server 2016 until SQL Server 2022 are supported.

A USB port must be available for each peripheral device and the hardware license dongle, if one is used.

Additionally, the following software components may be required:

- Microsoft Word (version 2007) or compatible is required if *Word reports* (see: (8.29-en) (en-US) Important terms and definitions) are to be viewed and edited.
- Microsoft XPS document needs to be be installed and activated for viewing or printing certain types of reports.

2.3.2.2 Server/client solution

2.3.2.2.1 Server

The required hardware specifications for the server depend on the planned number of parallel test administrations. In general, a client-server solution enables up to 200 parallel test administrations. The table below provides an approximate indication of the number of parallel test administrations possible with different hardware configurations. Please note that the actual capacity may vary depending on several factors, such as processor performance, installed software, and operating system configuration.

With appropriate infrastructure and system setup, the Vienna Test System also supports the parallel administration of more than 200 tests. We are available to provide guidance on the necessary requirements (for more information please contact us, see: Contact us).

Requirement	Minimum	Recommended	Requirement
Parallel tests	**≤ 50**	**≤ 100**	**≤ 200**
Processor (x86)	4 Core	≥ 8 Core	≥ 16 Core
RAM	8 GB	≥ 16 GB	≥ 32 Core
Disk space	10 GB	50 GB (SSD)	

For client/server installations the use of a full Microsoft SQL Server is recommended, SQL Server 2016 until SQL Server 2022 are supported.

A USB port must be available for each peripheral device and the hardware license dongle, if one is used.

Additionally, the following software components may be required:

- Microsoft Word (version 2007) or compatible is required if *Word reports* (see: (8.29-en) (en-US) Important terms and definitions) are to be viewed and edited.

- Microsoft XPS document needs to be be installed and activated for viewing or printing certain types of reports.

2.3.2.2.2 Clients

Requirement	Minimum	Recommended
Processor (x86)	2 Core	≥ 4 Core
RAM	4 GB	≥ 8 GB
Disk space	1 GB	10 GB (SSD)
Graphics card memory	≥ 512 MB	

2.3.2.2.3 Network requirements

A fast and stable connection between the clients and the server is required. A bandwidth of at least 100 Mb/s is recommended for the clients and 1000 Mb/s is recommended for the server. At lower bandwidths a sufficient performance of the VTS cannot be guaranteed. To minimize the effect of interference, a cable connection is recommended over a wireless connection. It is also important to ensure that the cabling of the network and other network components is sound.

The VTS uses HTTPS to connect between client and server. The system installs a self-signed SSL certificate by default. Those self-signed certificate are supporting typical DNS name ending .local, but should not be used with official domains. However, using a fully-fledged SSL certificate (RSA 2048 bit) is recommended when utilizing the system via the internet. For details see: Encrypted communication in VTS (https).

VTS uses multiple ports for communication that must be configured correspondingly/opened in the firewall. For details see: Server/client installation and Installation of the VTS clients.

2.3.3 General

- Some tests require specific hardware from SCHUHFRIED or other additional requirements, see Additional requirements for specific tests for details.
- We strongly recommend keeping the Vienna Test System up to date by always using the latest available version. This ensures access to the most recent features, performance improvements, and important bug fixes. For VTS Versions older than 36 months we do not offer technical support free of charge, for details see the section Update & support.
- We recommend monitors with a screen diagonal of 14“-27“ and a resolution of at least 1280 x 1024. The resolution should not exceed 1920 x 1200. For CRT monitors the refresh rate must be at least 75 Hz.
- Before you install the VTS please make sure to read through our guide: Installation and configuration

2.3.3.1 Safety features

If the Vienna Test System is used in healthcare services, the use of the following devices may be required:

- Medical grade isolation transformer in accordance with EN 60601
- Galvanic medical network insulation in accordance with EN 60601 (if the computer is connected to a data network)

Please consult your in-house health and safety officer.

The SCHUHFRIED input and output devices are developed and produced according to the technical safety requirements of EU Directive 93/42/EC, even though the Vienna Test System is not declared as a medical device. The CE mark confirms that our products comply with the technical safety regulations and the electro-magnetic compatibility norm (EN 60601 family of norms), bio-compatibility guidelines (EN 30993), product-specific requirements, and underlying quality management standards. For details visit the section: Peripheral devices.

Please consult us before purchasing new equipment. We will be happy to assist you in selecting the most suitable items for your needs.

2.3.4 Additional requirements for specific tests

For certain tests in the Vienna Test System, additional requirements must be met to ensure the test functions correctly. These additional requirements may include:

- The use of certain peripheral devices (hardware sold by SCHUHFRIED to administer the tests)
- Specific requirements for your PC (e. g. regarding screen size)
- Installation of the VTS Testplayer Client on the PC that is used for the testing

Please find below the tests and the additional requirements that must be met for each.

2.3.4.1 Use of peripheral devices

- The tests COG, DT, INHIB, PP-R, RT, SIGNAL, STROOP, SWITCH, VIGIL, WAF, WAFV, ZBA require any Response Panel (Ag Panel or Ug Panel).
- The test sets CFADHD, CFD, CFSD, COGBAT, DRIVE-FR, DRIVE-PL, DRIVEPLS, DRIVESC, DRIVESTA, FEV, SAAIR, SARAIL, SAROAD, SFTEAM, SLEEP, TATEENS2 require any Response Panel (Ag Panel or Ug Panel).
- The tests 2HAND and SMK require the Universal Response Panel (Ug Panel). Please note: The test forms S4 and S5 of the 2HAND can also be administered with the Advanced Response Panel (Ag Panel).
- The test PP-R requires also the Peripheral Perception Unit 2 (PP-HW2) hardware.
- The test MLS requires the MLS Work Panel.

2.3.4.2 Specific requirements for your PC

- If you conduct tests in a browser it is required that the browser can run in full screen mode. Please make sure that your system allows this.
- WAF, WAFA and CFD can also be presented using a touchscreen. The use of a capacitive touchscreen is required.
- For the PP-R test the screen size should not be larger than 22".
- The WG test requires a screen size larger than 16".

2.3.4.3 Installation of the VTS Testplayer Client

Some tests require that the VTS Testplayer Client is installed on the PC that is used for the testing. Those tests can not be started without installation of the VTS Testplayer. **This also applies if you are using VTS online**.

For the VTS Testplayer Client the system requirements stated under *Clients* in the Server/Client section of the System requirements must be met.

The following tests require the installation of the VTS Testplayer Client:

- The tests: COG, DT, INHIB, PP-R, RT, SIGNAL, STROOP, SWITCH, VIGIL, WAF, WFV, ZBA, 2HAND, SMK, MLS, ATAVT, SMART (test form S1 only), 2D, 3D, COMPRO, BACO, GET, 5POINT, AWLT, LEVE, WIWO, WOBT, VISCO, GECO, WG, PAD, TOM, VIP, WRST/S1 & S2, LAMBDA-2
- The test-sets: CFADHD, CFD, CFSD, COGBAT, DRIVE-FR, DRIVE-PL, DRIVEPLS, DRIVESC, DRIVESTA, FEV, SAAIR, SARAIL, SAROAD, SFTEAM, SLEEP, TATEENS2

3 INSTALLATION AND CONFIGURATION

Please follow the instructions carefully to ensure successful installation of the VTS.

3.1 VTS installation procedure

1. Make sure that you have the necessary licenses to install the VTS. There are three licensing options:
   - Product key
   - VTS dongle
   - manually created software dongle (if using a product key or a VTS dongle is not possible)
2. Make sure that your PC meets the system requirements.
3. If you want to install and use the VTS exclusively on one PC (= single workstation installation), please follow the instructions on the single workstation installation page to install the VTS administration software and the corresponding licenses.
4. If you want to set up the VTS as a server/client system, please follow the instructions on the server/client installation page to install the VTS administration software, the corresponding licenses, and the clients.
5. Do not connect the peripheral devices (e.g., the response panel) until after installing the VTS. If you need to use a USB hub, one with a power supply is required.

If you encounter any problems during installation, our support team will be happy to assist you by email or phone.

3.1.1 Important information

- The VTS can **only be installed on Windows operating systems**. Apple-based hardware/operating systems are not supported for local VTS installations. However, the browser-based VTS online also allows to use VTS on Apple devices.
- Many PC manufacturers (e.g. Dell, HP, IBM, Lenovo) supply their own drivers for graphics cards. Please check that the latest drivers for your graphics card are installed on your computer.
- During the installation of the VTS, Microsoft® SQL Server Express (the exact version can be found in the system requirements) is installed by default. If necessary, the VTS can be installed on a different SQL server version. However, this must be installed manually and configured accordingly before installing the VTS. Detailed information can be found in the instructions for: Server/client installation
- All .exe files of the Vienna Test System are digitally signed. The validity of the certificate used for this is checked by the operating system by default.
- It **is not possible** to install the VTS via a remote connection with a VTS dongle (hardware dongle)! Example: You want to install VTS on PC 1, where the VTS dongle is also plugged in. You connect from PC 2 to PC 1 → In this case, installation on PC 1 is not possible because the VTS dongle is not recognized.

3.2 Licensing the VTS

There are three options available for licensing the VTS: licensing via a product key; licensing via a VTS dongle (hardware dongle); licensing via a software dongle - only for systems that are not connected to the Internet and where using a hardware dongle is not possible, e.g. server systems based on virtual hardware.

3.2.1 Licensing with product key

The product key is a code in the format (xxxxxxxx-xxxx-xxxx-xxxx-xxxxxxxxxxxx) which you will receive by email after purchasing the VTS. This key must be entered during the installation process.

> To activate a product key, an internet connection is required during installation to verify its validity.

3.2.2 Licensing with VTS dongle

The VTS Dongle (hardware dongle) is a USB dongle that contains all your licenses. The dongle must be connected to the PC on which the VTS is being installed. It must also remain connected whenever the VTS is in use.

If you choose this licensing option, the VTS Dongle will be sent to you by SCHUHFRIED after purchase.

3.2.3 Licensing with software dongle

The software dongle is intended for scenarios where neither a product key nor a VTS Dongle can be used. This applies especially in cases where a server/client installation is to be carried out on servers without internet access.

If the VTS is licensed via a software dongle, a license that is linked to the physical hardware of your PC (= the software dongle) must be created and installed on your PC **before installation**. To do so, a *fingerprint* of the computer on which the VTS administration software will be installed must be generated **prior to the installation** of the VTS. Based on this fingerprint, SCHUHFRIED will generate all licenses required and requested for the VTS now and in the future. These newly created licenses will be sent to you separately by SCHUHFRIED. Please follow these steps:

1. Copy the *GetFingerprint* folder from the *Tools* directory in the VTS installation files or from the USB stick containing the installation files to a local directory on your computer. You need write access to this directory!
2. Start the program *GetFingerprint.exe.*
3. A file with the extension .c2v will be created in the same directory (e.g. *Fingerprint_COMPUTERNAME.c2v*).
4. Send this file to info@schuhfried.com.
5. After processing by SCHUHFRIED, you will receive an email with instructions on how to install the licenses.
6. Follow the instructions in the email to install the licenses or the instructions at: Install licenses

Please note that the fingerprint must be generated on the computer on which the VTS is installed.

The software dongle records hardware-dependent parameters of the computer on which it was created. This also applies to specific properties of a virtual system. If the virtual

system is “moved,” the software dongle becomes invalid and your Vienna Test System is blocked. For more details, please contact SCHUHFRIED support **before making any changes to the server**.

The following properties of the virtual system **must remain the same** for the software dongle to remain valid:

- Virtual MAC address
- CPU properties
- UUID (Universal Unique Identifier) of the virtual image; the UUID is generated by the virtualization software. When a clone is created, a new UUID is generated.

3.3 Single workstation installation

This page provides all the information you need to install the VTS for use on a PC. The installation and use of the VTS on a PC is referred to as a single workstation installation (local installation). During installation, the VTS administration software and all required program components are installed.

If you are updating the VTS to a newer version, please refer to the information prorvided on this page Updating a single workstation installation.

3.3.1 Prerequisites for installation

- The system requirements are met.
- You have all the necessary licenses.
- If necessary, you have USB ports for the VTS dongle and the peripheral devices.
- You have administrator rights.
- All Windows updates have been installed, and no updates are pending.

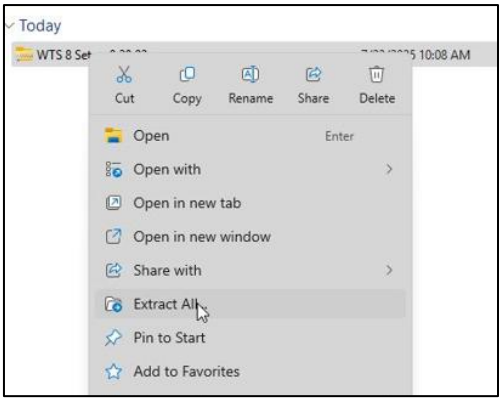
> Make sure your system meets the requirements and restart your system before starting the installation.

3.3.1.1 Licensing

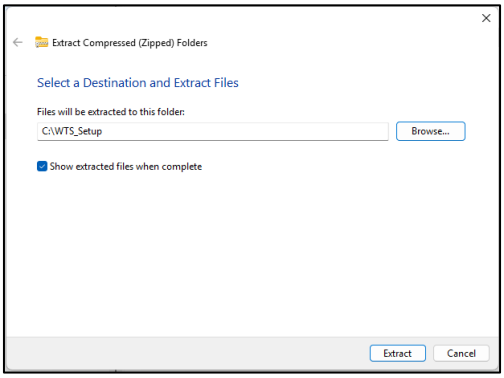
1. When using the product key: Have the product key ready and make sure you are connected to the internet. You will receive the product key in an email after purchase.
2. When using the VTS dongle (USB dongle): **Before installation, plug it into** the PC on which the installation is to be carried out and ensure it is recognized correctly (if necessary, unplug and reconnect it).

3.3.2 Installing the VTS

1. **Starting the setup**
    a. Download the setup (approx. 5 GB) using the link provided in the email from SCHUHFRIED after purchase. The setup is delivered as a .zip file. Unzip the file into a folder. The file path to the folder should not be too long (e.g., *C:\WTS_Setup*).
        i. To unzip, right-click on the folder containing the installation files and select *Extract All:*



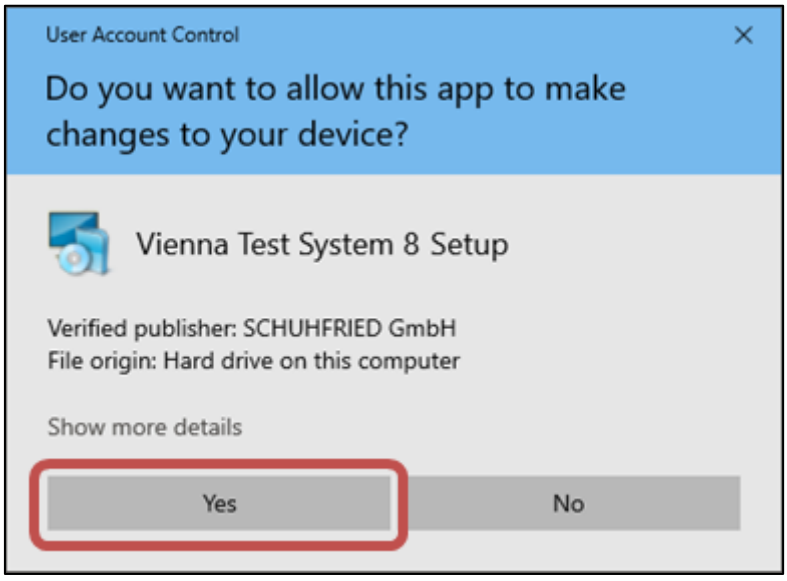
ii. Select a folder and confirm with *Extract*:



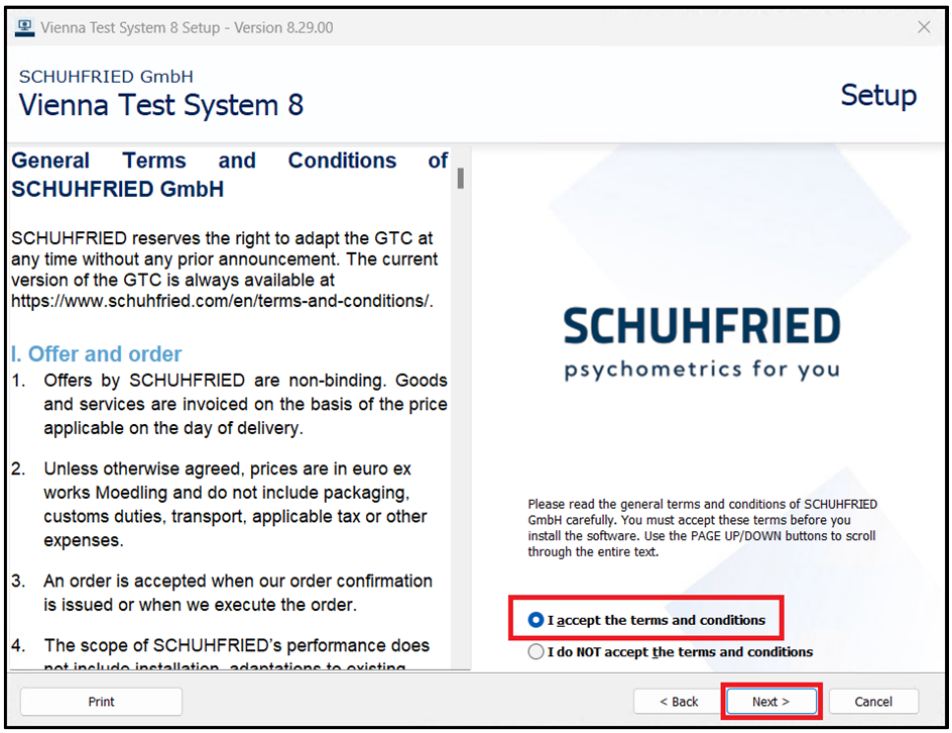
b. If the setup files are on a USB stick, plug in the USB stick and open the drive.

c. Start the installation by double-clicking on the file **Wts8Setup.exe**.

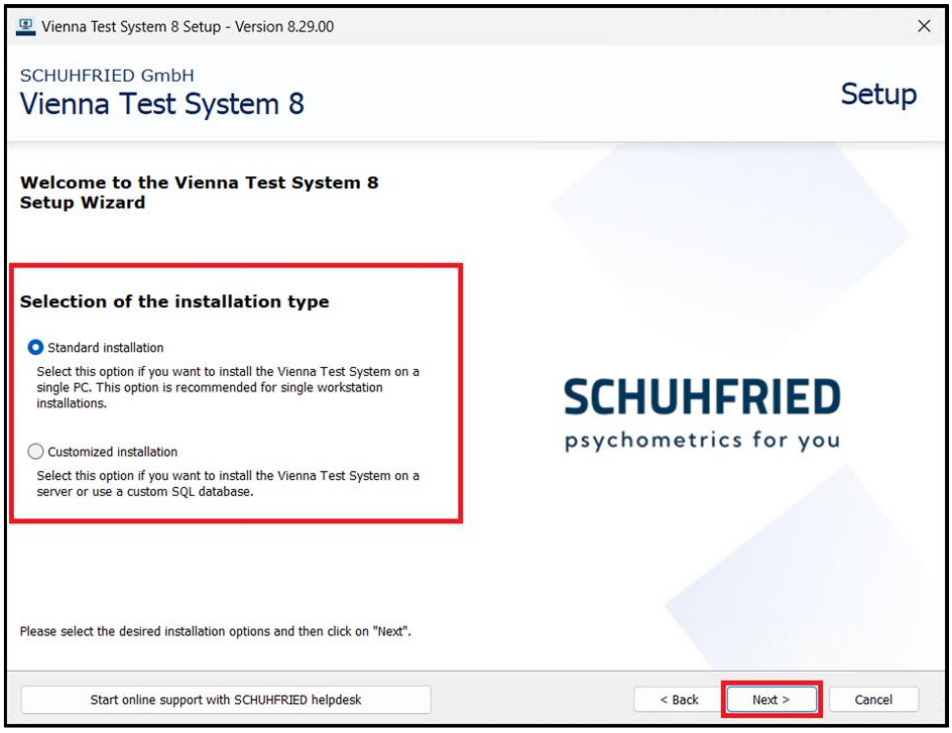
d. Confirm the Windows security prompt (*User Account Control*) by clicking *Yes*.



2. **Confirm the license agreement**
    a. Select *I accept the terms and conditions* and then click *Next.*



3. **Select the type of installation**
    a. For single workstation installations, we recommend selecting the *Standard installation* option.

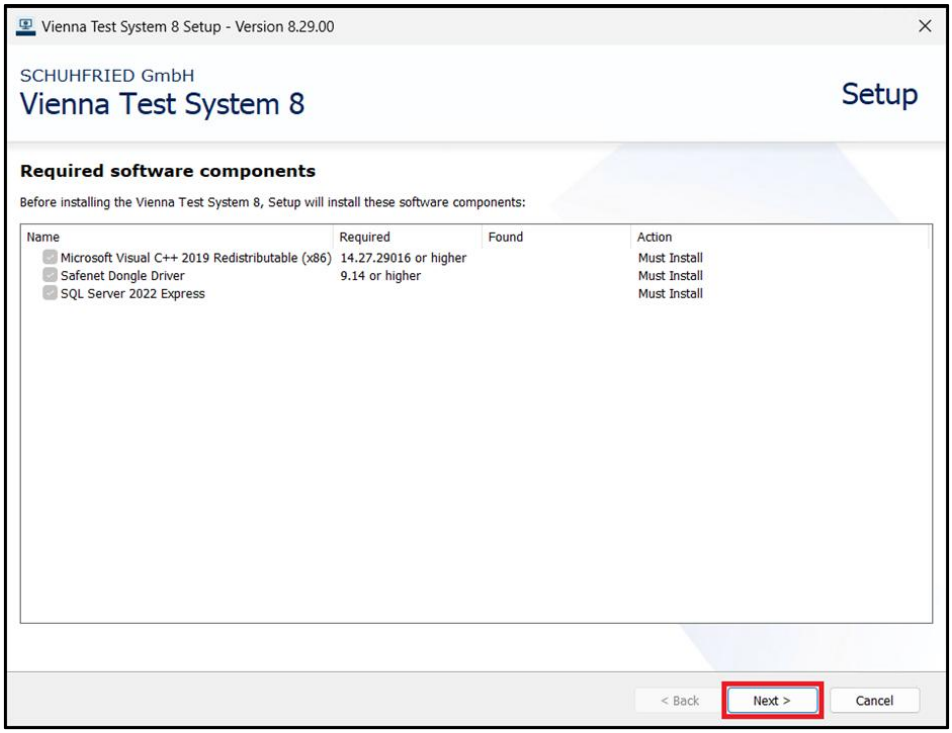


Note: The *Customized installation* option allows you to use your own SQL database for special use cases, which must be set up manually before installing VTS, and offers extended settings options for licensing (use of an external license server).

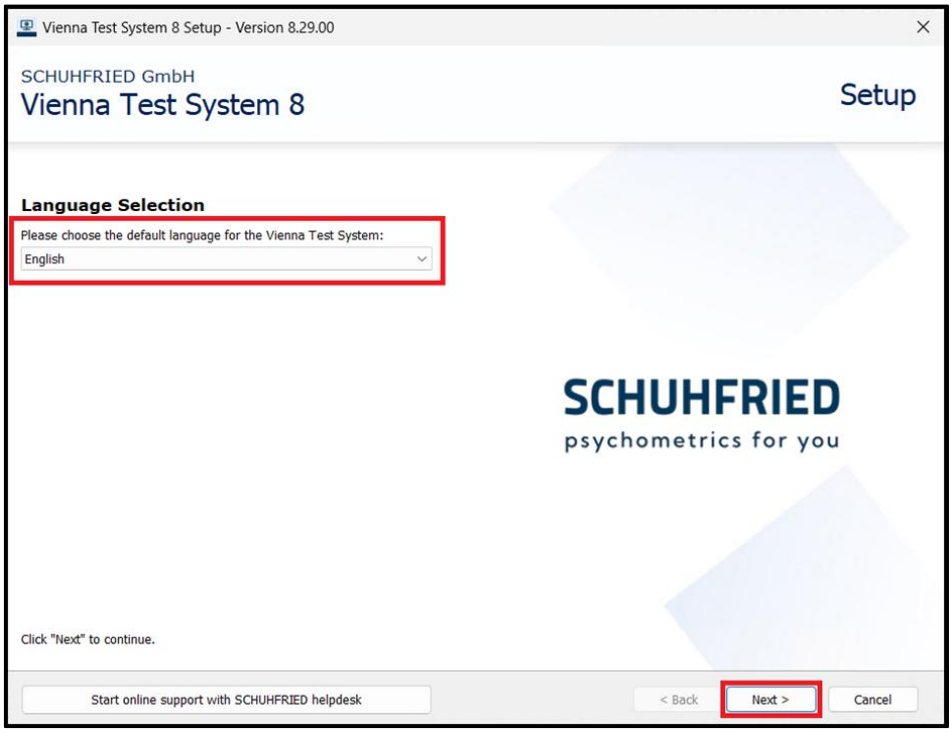
4. **Check required software components and install if necessary**

   a. The setup program will now check which software components need to be installed. Depending on your operating system and existing installations on your PC, different programs may be required. Once the system check is complete, a list of the programs to be installed will be displayed. Please do not make any changes.
   Note: If all required programs are already installed, this page will be skipped and the installation will continue with step 5 (*Select the language for the administration software*).

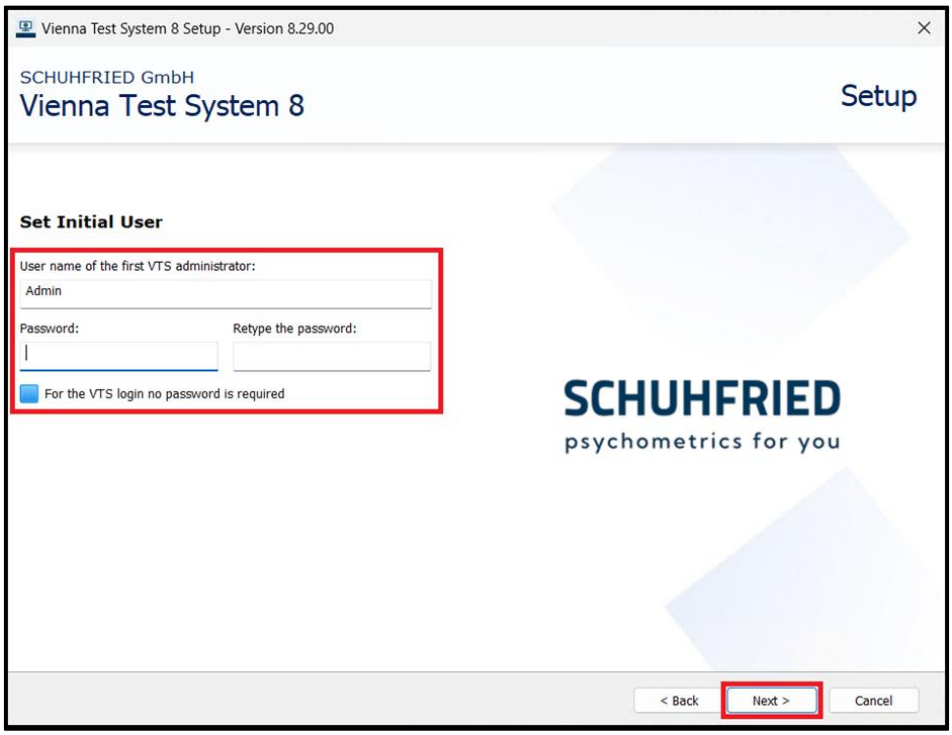
   b. Press *Next.*



5. **Select the language for the administration software**
   a. Select the desired language and press *Next.*
   b. The language of the administration software can be changed at any time after installation.



6. **Create first user (test system administrator)**
    - Define a user name (the VTS offers *Admin* as default) and a password for the test system administrator.
    - It is possible not to set a password (option: *For the VTS login no password is required*). Please note that in this case, other appropriate technical and organizational measures must be taken to ensure the security of personal data in accordance with the GDPR.

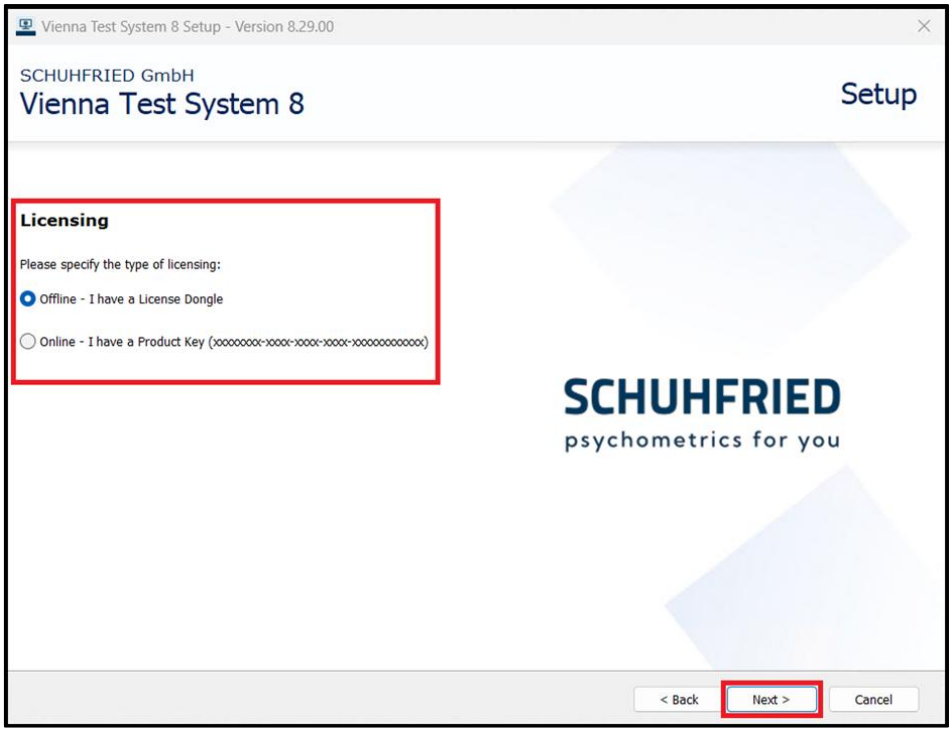


Guidelines for user names and passwords

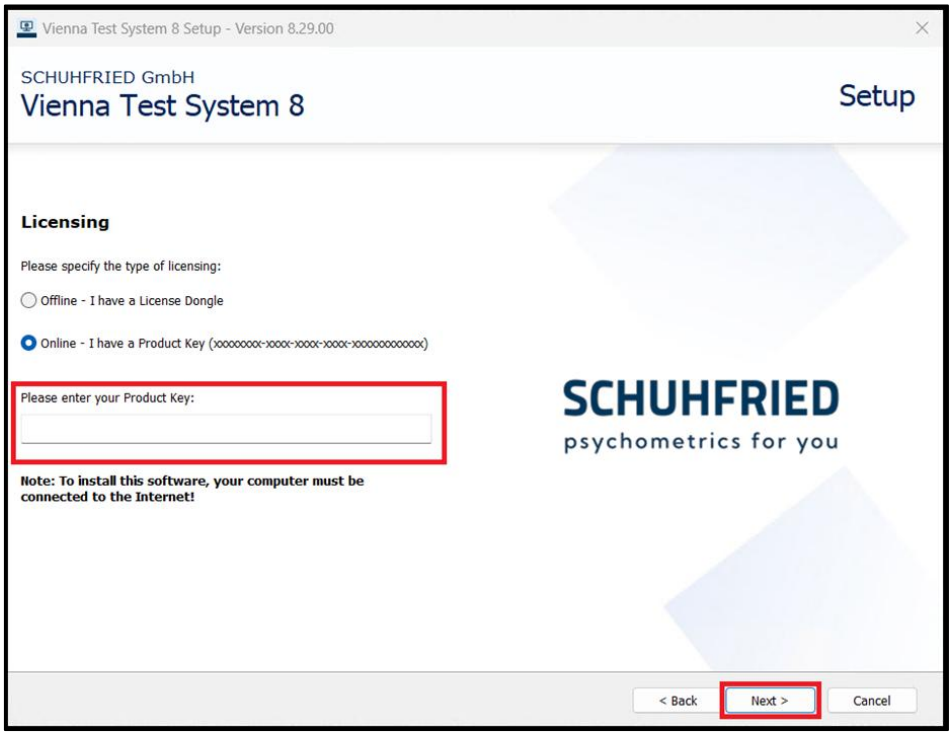
- The username must not start or end with a space.
- The username may only contain the following characters: A-Z, a-z, 0-9, and the special characters: !"#$%'*+-=?^_|~
- The password must be at least 8 characters long.
- The password may only contain the following characters: A-Z, a-z, 0-9, and the special characters: !"#$%'*+-=?^_|~
- **Be sure to note down the user name and password! The VTS cannot be started without these credentials.**

7. **Select licensing**

a. Now select whether you want to use a VTS dongle (option: *Offline - I have a License Dongle*) or a product key (option: *Online - I have a Product Key*) for licensing.



b. If you select the option *Online - I have a Product Key*, you will now be prompted to enter the product key.



Please note that you will need an internet connection during installation if you are using a product key!

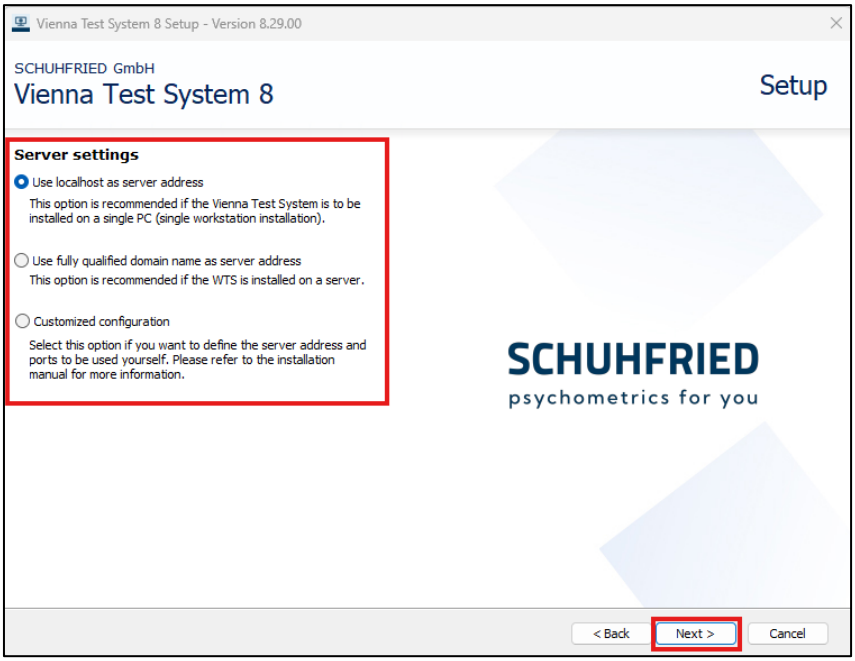
c. Confirm with *Next*.

8. Select the appropriate server settings

a. The VTS administration software can also be installed as a server/client system, where several PCs connected in a network with VTS Admin Clients access a central server. It is necessary to select the appropriate address for the server at this point.

b. For a **single workstation installation, we recommend using the option *'Use localhost as server address*.** This option is recommended if you want to install and use VTS exclusively on one PC.

   i. Select the option ***'Use localhost as server address*** and confirm with *Next.*



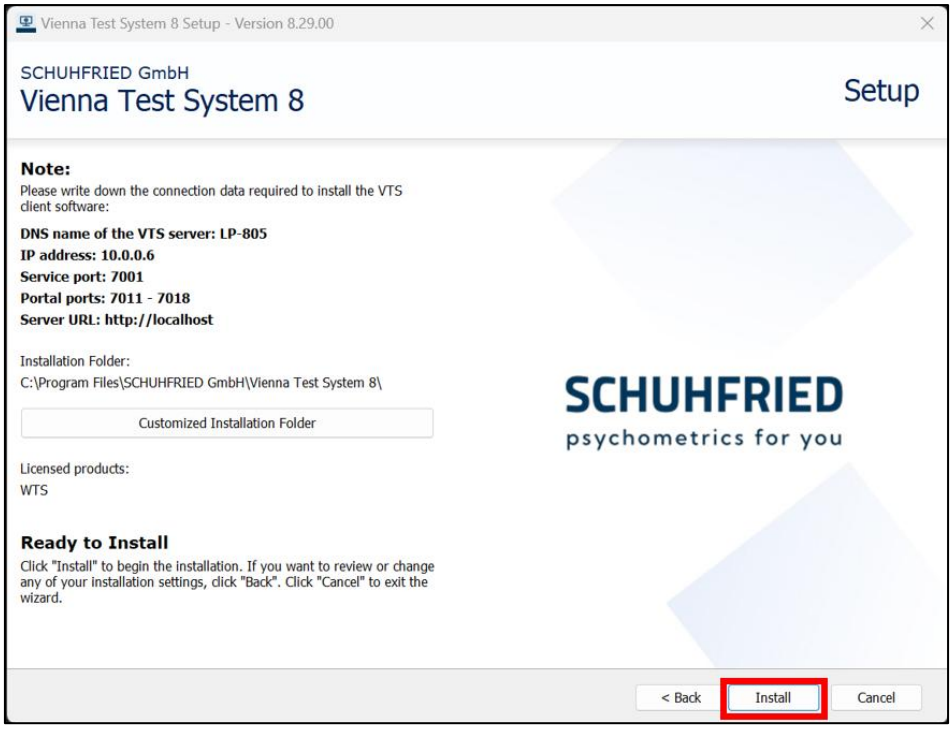
c. A detailed description of the other options can be found in the instructions for installing a VTS server system.

9. Start the installation

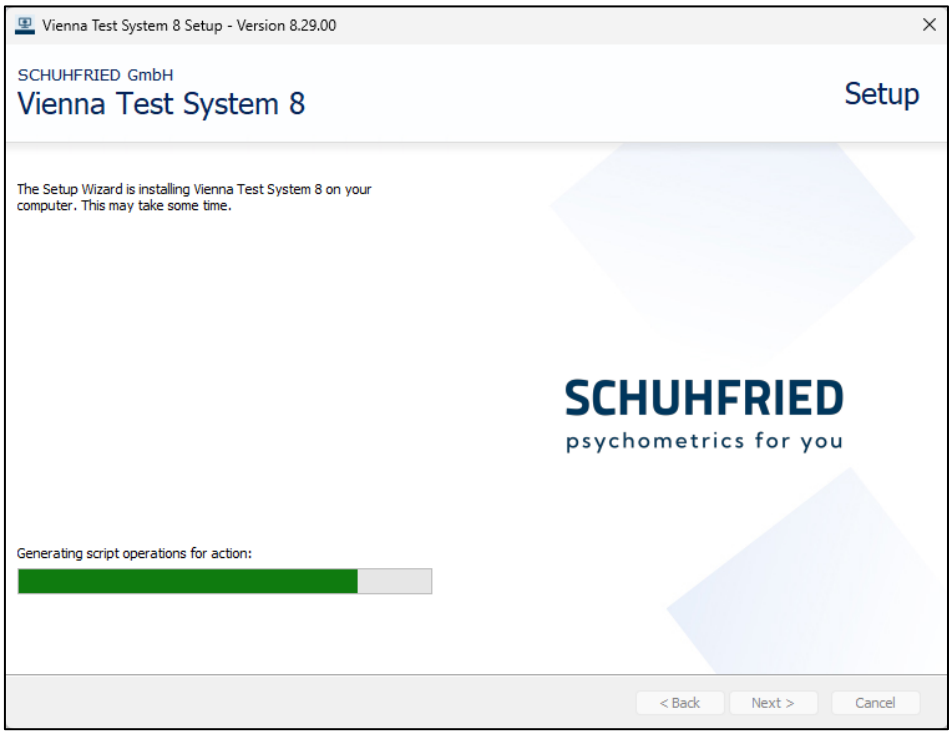
a. You will see a summary of the settings.

b. If necessary, change the installation folder using the *Customized Installation Folder* button.

c. Start the installation by clicking the *Install* button.



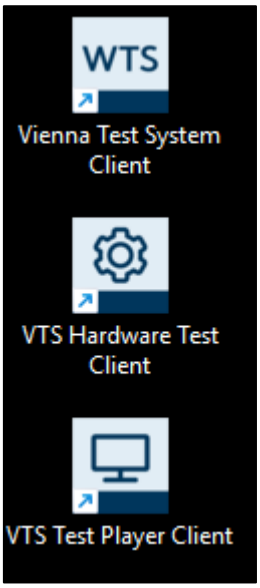
d. The installation is in progress. This may take several minutes.



e. If the installation was successful, you will see a note that you must confirm with *OK*.

3.3.3 Checking the installation

- If you want to make sure that the installation was successful, you can check whether the *WTS Service* has been started.
- To do so, start the VTS Admin Client or the Testplayer using the shortcuts on the desktop.



- If you have purchased peripheral devices, please perform the hardware test to ensure that all devices have been installed successfully.

3.3.3.1 Notes

- The VTS administration software can also be installed via command line. Details can be found on the page: Silent installation via command line
- Please consider setting up a data backup: Backup & recovery of the VTS

3.3.4 Updating a single workstation installation

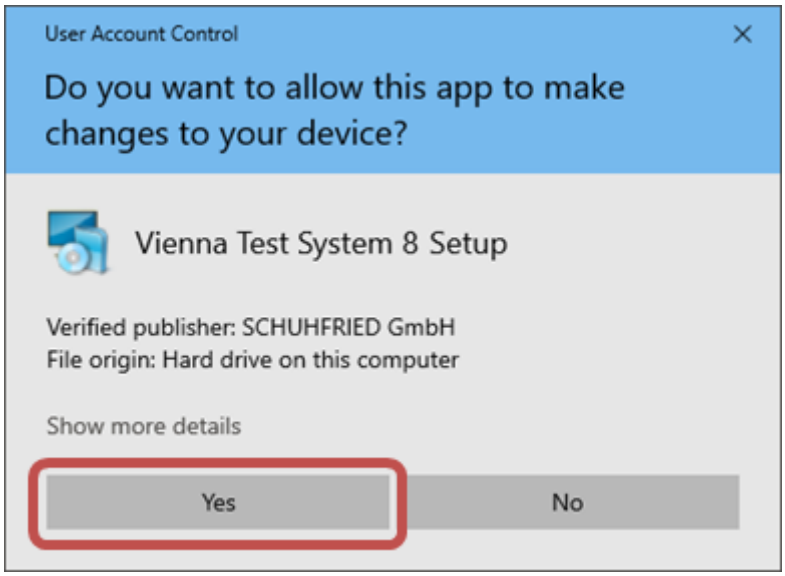
These instructions describe how to update your single workstation installation to a newer VTS version.

3.3.4.1 Update requirements

- You have the installation files for the new VTS version (you can download these or obtain them from SCHUHFRIED).
- You have the necessary licenses.
- You have administrator rights on the PC where the VTS is installed.
- Sufficient free memory is available.
- Perform a manual update of the SQL database if you did use a custom SQL database (i.e. the VTS was not installed with the default SQL Server Express database): Manual update of the VTS SQL database.

3.3.4.2 Performing the update

1. Perform a **backup**: Backup & recovery of the VTS
2. **Start the update**
   a. Start the PC and log in with a user **who has local administrator rights**.
   b. Download the setup for the new VTS version (approx. 5 GB) using the link provided in the email you received from SCHUHFRIED after your purchase. The setup is delivered as a .zip file. Unzip the file into a folder. The file path to the folder should not be too long (e.g., *C:\VTS_Setup*).
   c. If the setup is on a USB stick, insert the USB stick and open the drive.
   d. Start the installation by double-clicking on the file **Wts8Setup.exe**.
   e. Confirm the Windows security prompt (*User Account Control*) by clicking *Yes*.



3. **Follow the installation program**
   a. When updating, the installation program must be run as described on the page Single workstation installation.

3.3.4.3 Troubleshooting

- If you try to update an older version of VTS, it can happen that the SQL Server version is no longer supported by the new setup. In that case manual adaptations are necessary. See the description on the page: Update from older SQL Server versions.

3.4 Server/client installation

On this page you will find all the information you need to install the VTS for use as a server/client system. A server/client system consists of one (or more) PCs that serve as servers where the VTS database and the VTS administration software are installed. On other PCs connected to the server via a network (local or internet), the VTS client applications can be installed. These allow testing (using the Testplayer Client) or managing the VTS (using VTS Admin Client).

> More detailed information on installing the clients can be found on the page Installation of the VTS clients.

If you are updating the VTS to a newer version, please note the information on the page Updating a server/client installation.

The VTS administration software can also be installed via command line. Details can be found on the page Silent installation via command line.

3.4.1 Requirements for installation

- The system requirements are met.
- You have all the necessary licenses.
- You have administrator rights on the server where VTS is to be installed.
- All required ports are enabled and not blocked:
  - This is in any case the port: 1947
  - When using the default settings, the ports are: 7001, 7011, 7012, 7013, 7014, 7015, 7016, 7017, 7018
  - If using custom ports: all custom ports
  - Note: The check can be performed using a PowerShell command (e.g. `Test-NetConnection -ComputerName 127.0.0.1 -Port 1947`).
- All Windows updates have been installed, no updates are pending.

> Make sure your system meets the requirements and restart your system before starting the installation.

3.4.2 Using your own SQL database

In the *standard installation*, the VTS installs the supplied Microsoft® SQL Server Express version (the exact version can be found in the system requirements).

For certain applications and high data volumes, it may be necessary to use a different Microsoft® SQL Server version. This option is available via the *customized installation* of the VTS.

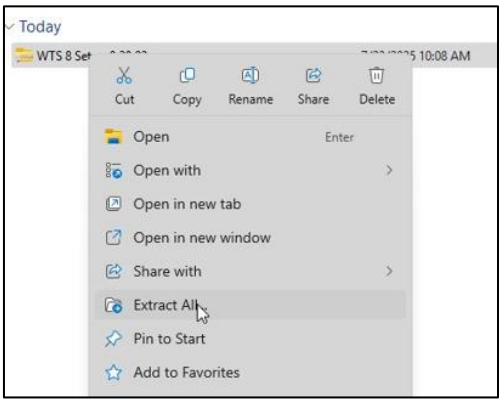
> If you are performing an **initial installation** of a VTS server/client system and are not using the supplied Microsoft® SQL Server Express version, **the appropriate Microsoft® SQL Server and the VTS database must be installed manually using the corresponding scripts before starting the VTS installation**. The instructions can be found on the page Manual installation of the VTS SQL database.

3.4.3 Licensing

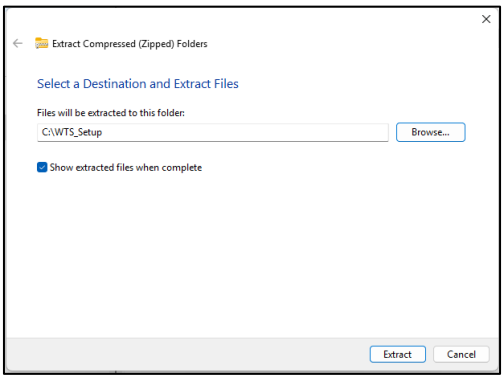
1. When using the product key: Have the product key ready and ensure that you have an internet connection on the server. You will receive the product key via email after purchase.
2. When using the VTS dongle (USB dongle): **Before installation, connect it to the server on which** the installation is to be carried out and ensure that the dongle is recognized correctly (if necessary, unplug and reconnect it).
3. If you are using the software dongle, install the corresponding license files on the server on which the VTS is to be installed **before you** start the installation. You will find the corresponding instructions in the email you received from SCHUHFRIED together with the license files.

3.4.4 Installing the VTS

1. **Starting the setup**
   a. Start the server and log in with a user who **has local administrator rights**.
   b. Download the setup (approx. 5 GB) using the link provided in the email you received from SCHUHFRIED after purchase. The setup is delivered as a .zip file. Unzip the file into a folder. The file path to the folder should not be too long (e.g., *C:\WTS_Setup*).
      i. To unzip, right-click on the folder containing the installation files and select *Extract All:*



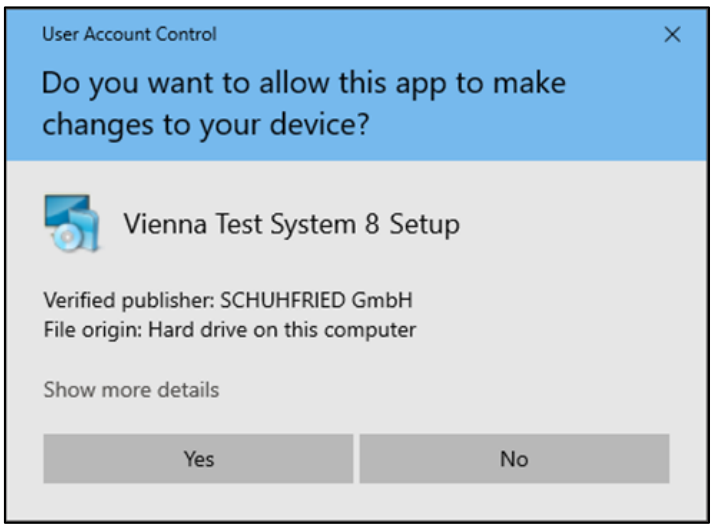
      ii. Select a folder and confirm with *Extract*:



c. If the setup is on a USB stick, connect the USB stick and open the drive.

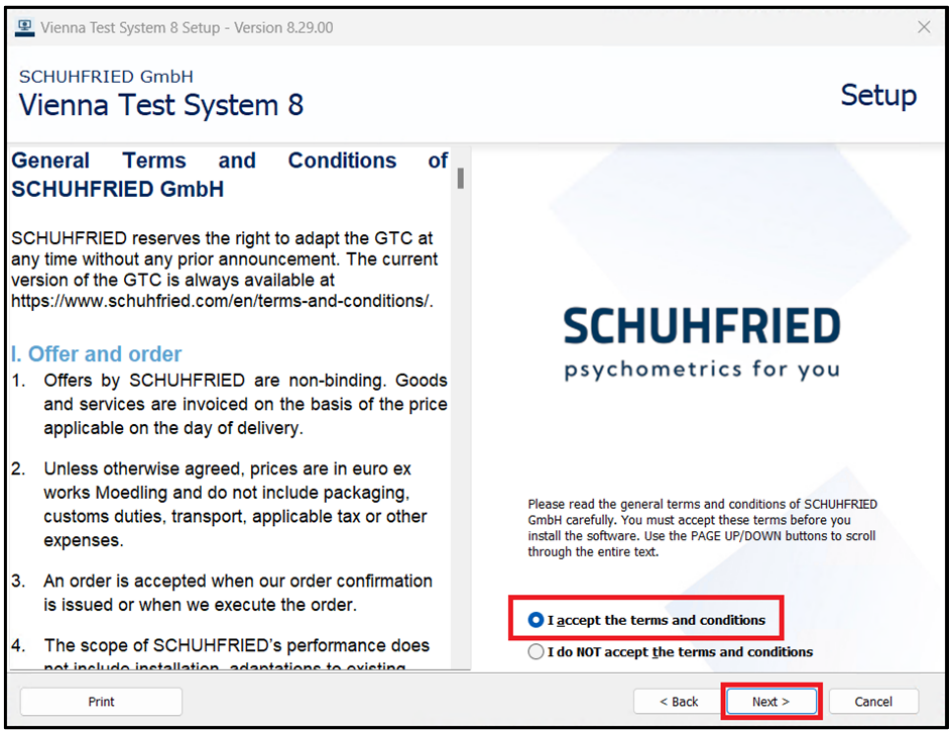
d. Start the installation by double-clicking on the file **Wts8Setup.exe**.

Confirm the Windows security prompt (*User Account Control*) by clicking *Yes*.



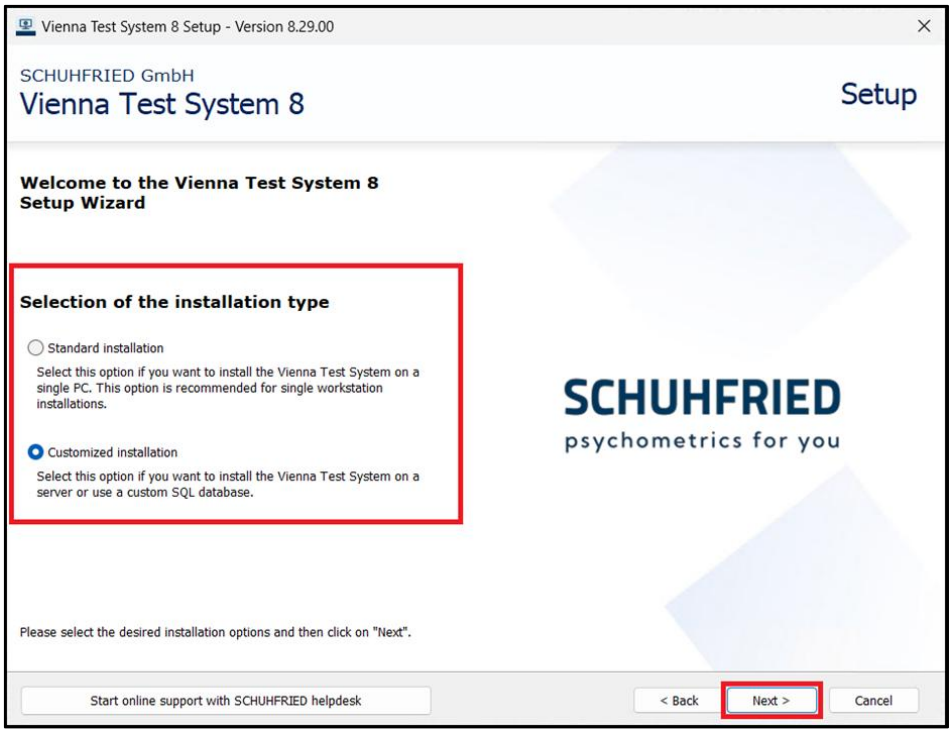
2. Now confirm the license agreement

a. Select *I accept the terms and conditions* and then click *Next.*



3. Select the type of installation

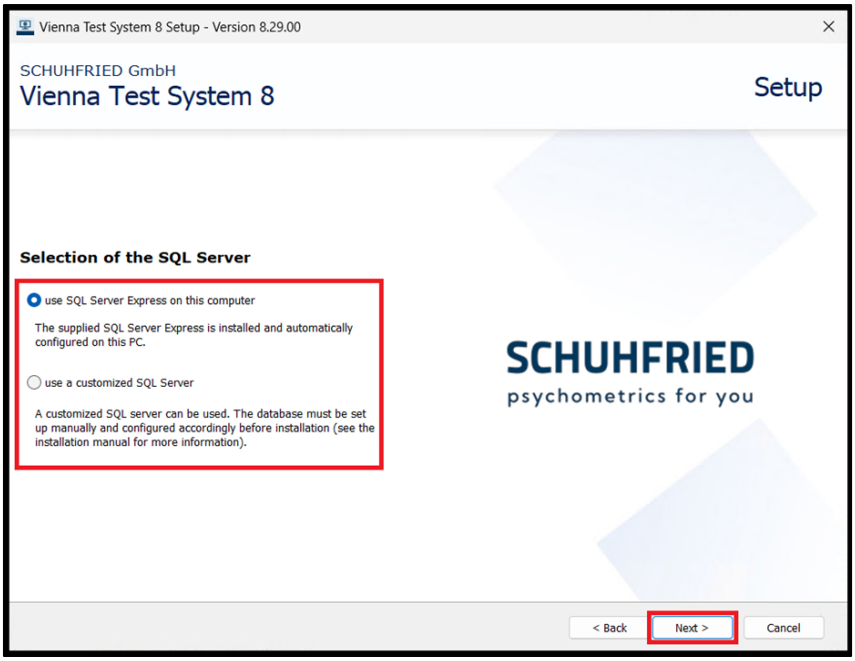
a. When installing a server/client system, we recommend the *Customized installation* option. Select this option and press *Next.*



b. On the next page, select:

   i. whether you want to use the **supplied Microsoft® SQL Server Express version** (option *use SQL Server Express on this computer*)

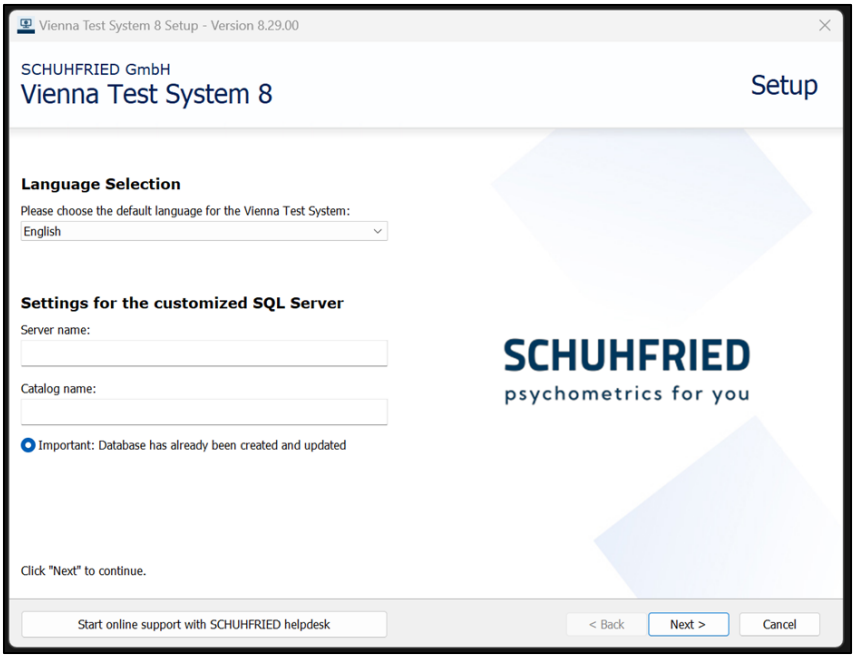
   ii. or whether you want to **use a custom Microsoft® SQL Server** and press *Next.*
   ATTENTION: To use a custom Microsoft® SQL Server Express during installation, it must already be installed manually and the VTS database must be prepared. See: Manual installation of the VTS SQL database.



c. If you selected the option *use a customized SQL Server*, you must do the following on the next page:

   i. Select the desired **language for the administration software** (this can be changed at any time after installation).

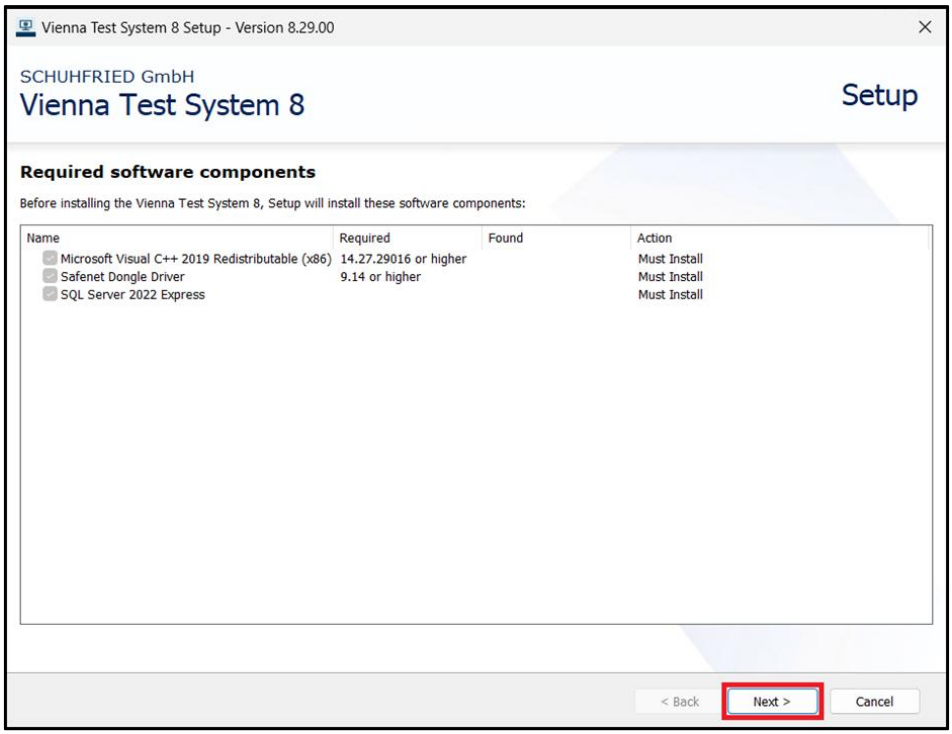
   ii. Enter the **server name and catalog name of the customized (and already set up) SQL server**.



4. Install required programs

a. The setup will now check which required programs need to be installed. Depending on your operating system and existing installations on your PC, different programs may be required. Once the system check is complete, a list of the programs to be installed will be displayed. Please do not make any changes.

Note: If all required programs are already installed, this page will be skipped and the installation will continue with step 5 (*Select the language of the administration software*).

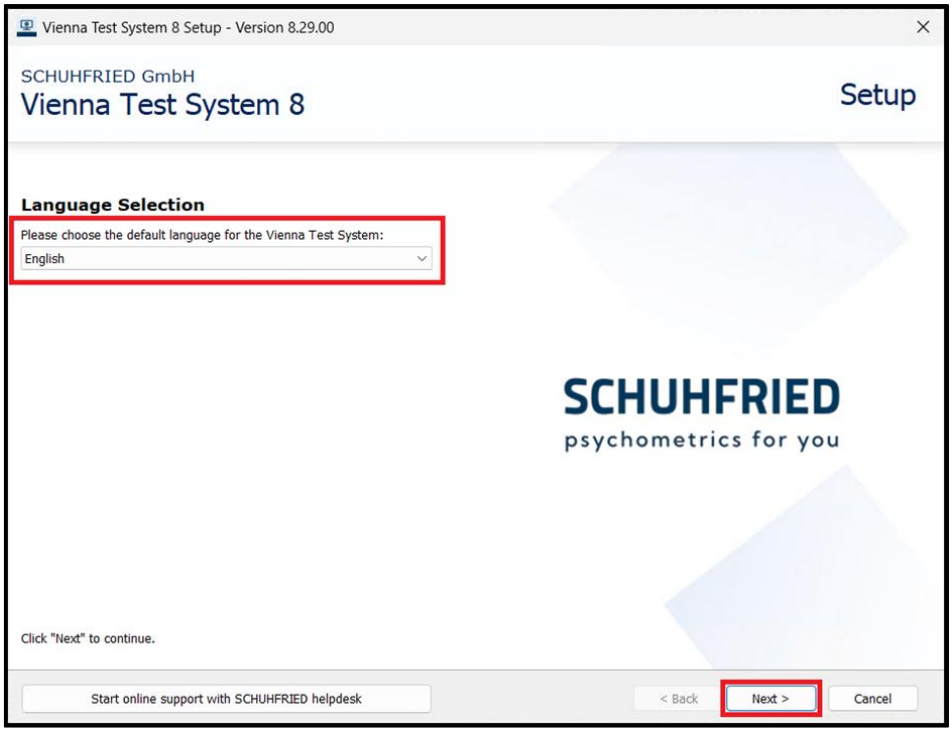


b. Press *Next*

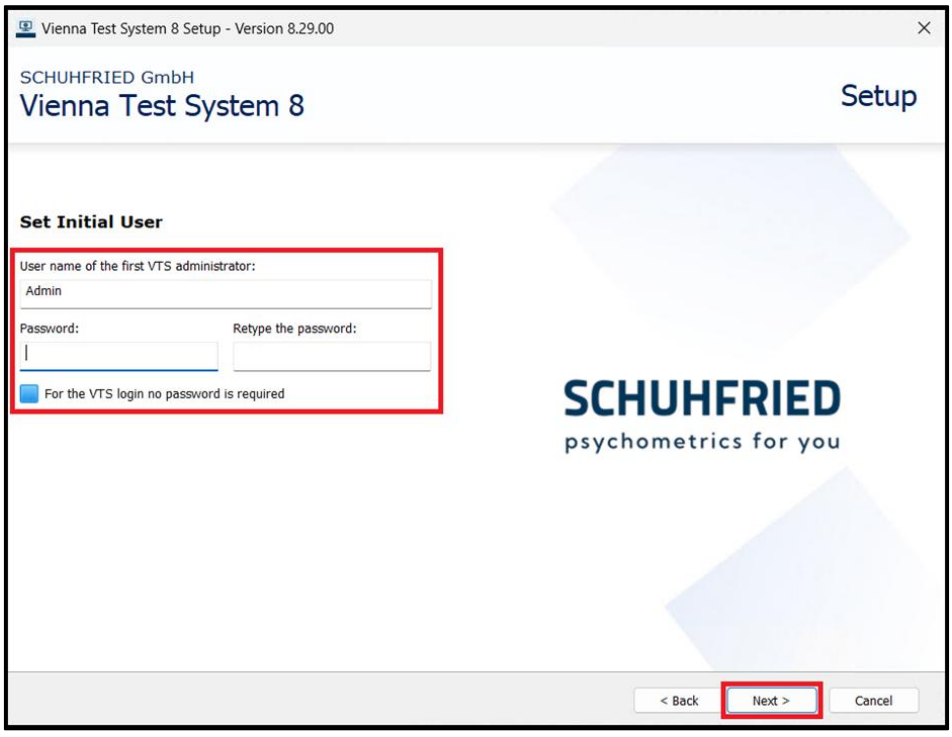
5. Select the language for the administration software (optional)

a. If you did not select the option *use a customized SQL server* in step 3 (*Select the type of installation*), you must now select the desired language for the administration software and press *Next.*

b. The language of the administration software can be changed at any time after installation.



6. **Create first user (test system administrator)**
   - Define a user name (the VTS offers *Admin* as the default) and a password for the test system administrator.
   - It is possible not to set a password (option: *For the VTS login no password is required*). Please note that in this case, other appropriate technical and organizational measures must be taken to ensure the security of personal data in accordance with the GDPR.

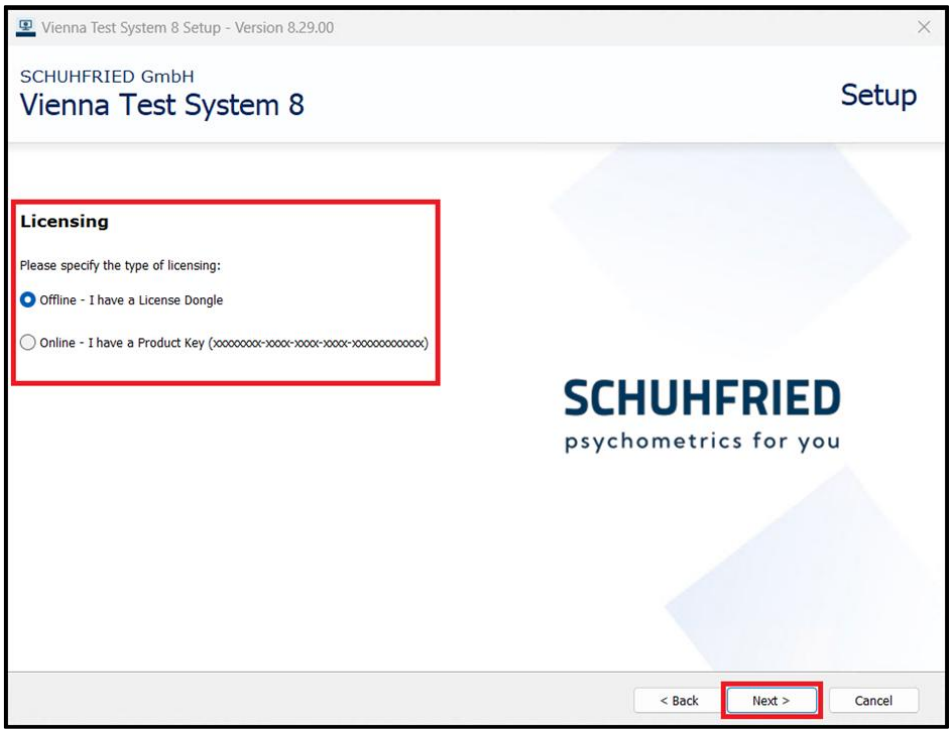


Guidelines for the user name and password

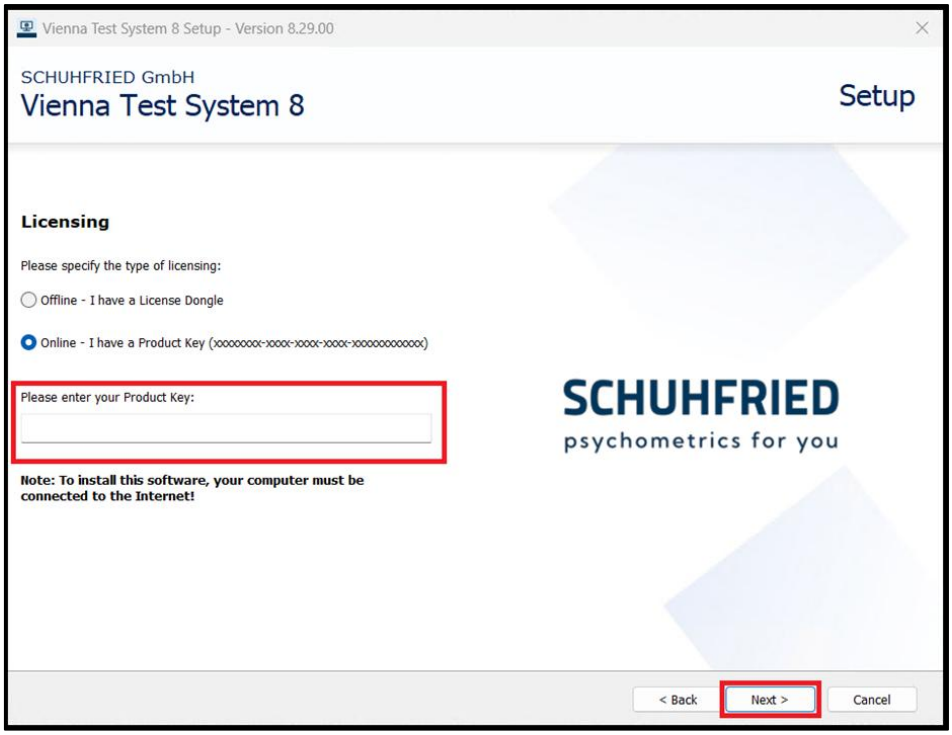
- The user name must not start or end with a space.
- The user name may only contain the following characters: A-Z, a-z, 0-9, and the special characters: !"#$%‘*+-=?^_|~
- The password must be at least 8 characters long.
- The password may only contain the following characters: A-Z, a-z, 0-9, and the special characters: !"#$%’*+-=?^_|~
- **Be sure to note down the user name and password! The VTS cannot be started without these credentials.**

7. Select licensing

a. If you are not using a software dongle, you must now select whether you want to use a VTS dongle (option: *Offline - I have a License Dongle*) or a product key (option: *Online - I have a Product Key*) for licensing.

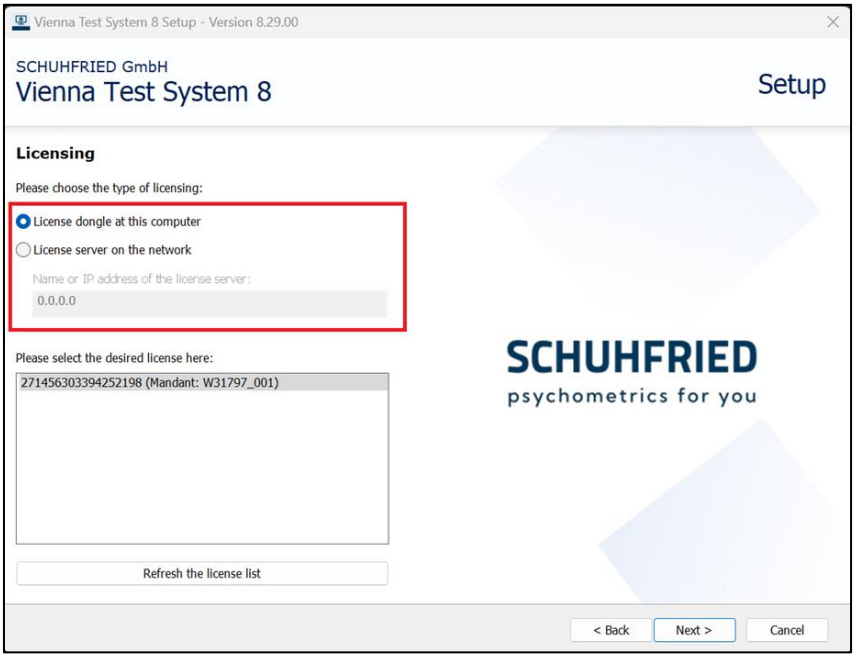


b. If you select the option *Online - I have a Product Key*, you will now be prompted to enter the product key.



Please note that if you are using a product key, you will need an internet connection during installation!

8. **Select where your license dongle is located**
    a. Now select where the license dongle to be used is located:
        i. Select the option *License dongle on this computer* if the license dongle is located on the server on which VTS is being installed. This applies both when using a software dongle and when using the VTS dongle.
        ii. If the license dongle is located on another PC in the network, the option *License server on the network* can be selected.



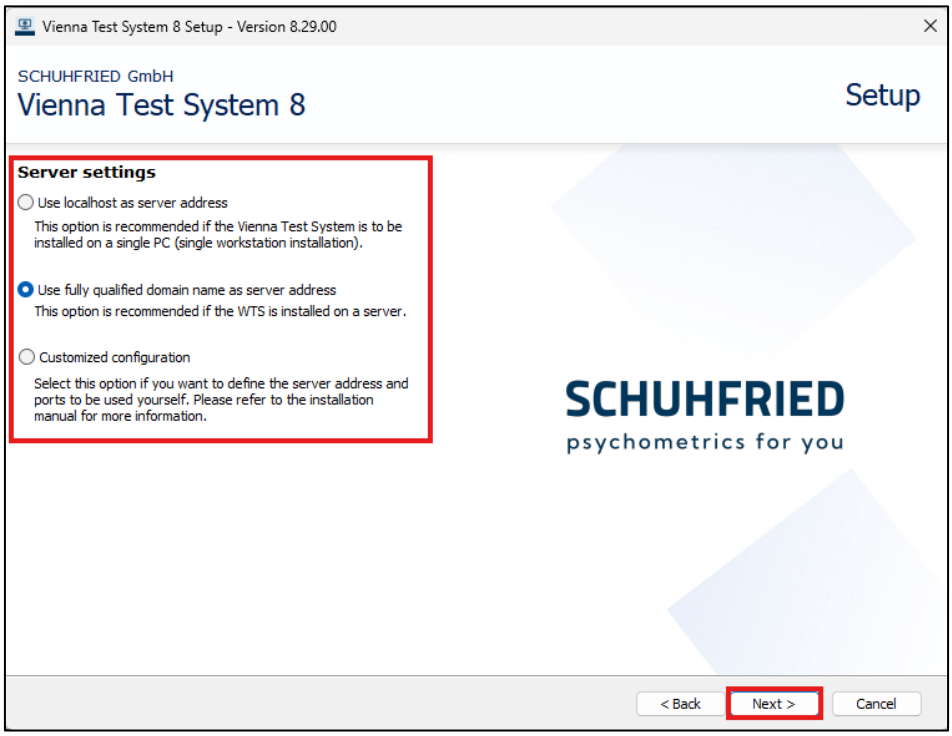
b. If you have selected the option *License server on the network*, you must enter **the name of the license server or the IP address** in the field below the option.

c. If several multi-client systems are available, select the multi-client system that is to be used for the installation (field *Please select the desired license here*).

9. Select the appropriate server settings

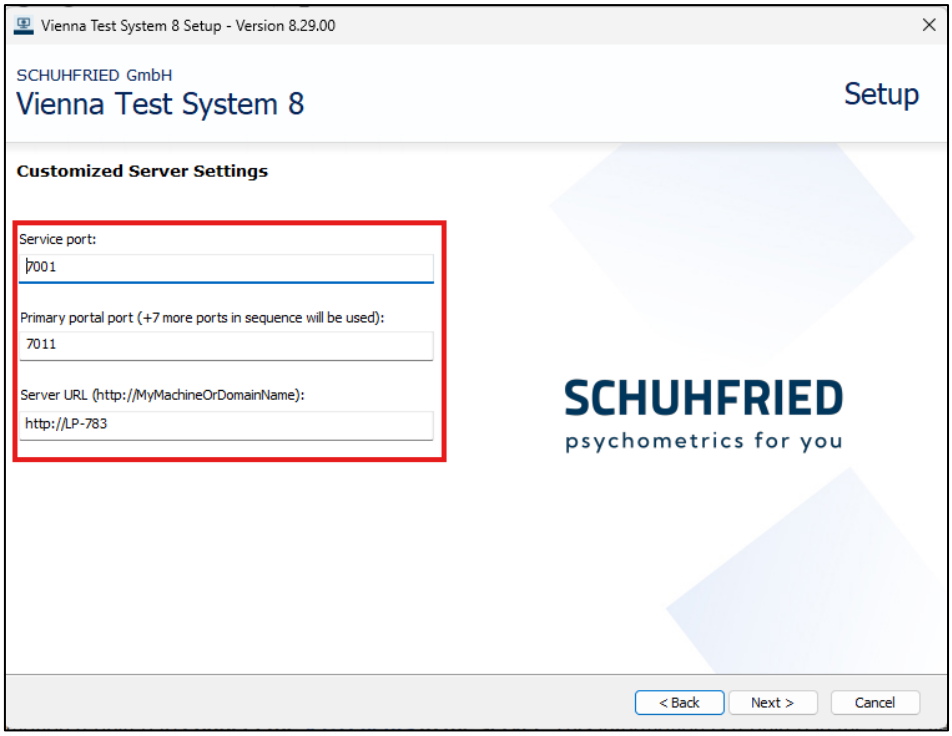
a. For a server/client installation, we recommend using the option *Use fully qualified domain name as server address.*

b. If you want to specify the server address and the ports to be used yourself, select the option *Customized configuration.*



c. If you have selected the *Customized configuration* option, you must now **specify the address of the server** on which the Vienna Test System will be installed. You can also **select the ports** to be used for communication between the server and clients (or accept the default values).

ATTENTION: The ports specified here must be open for access by the VTS clients!

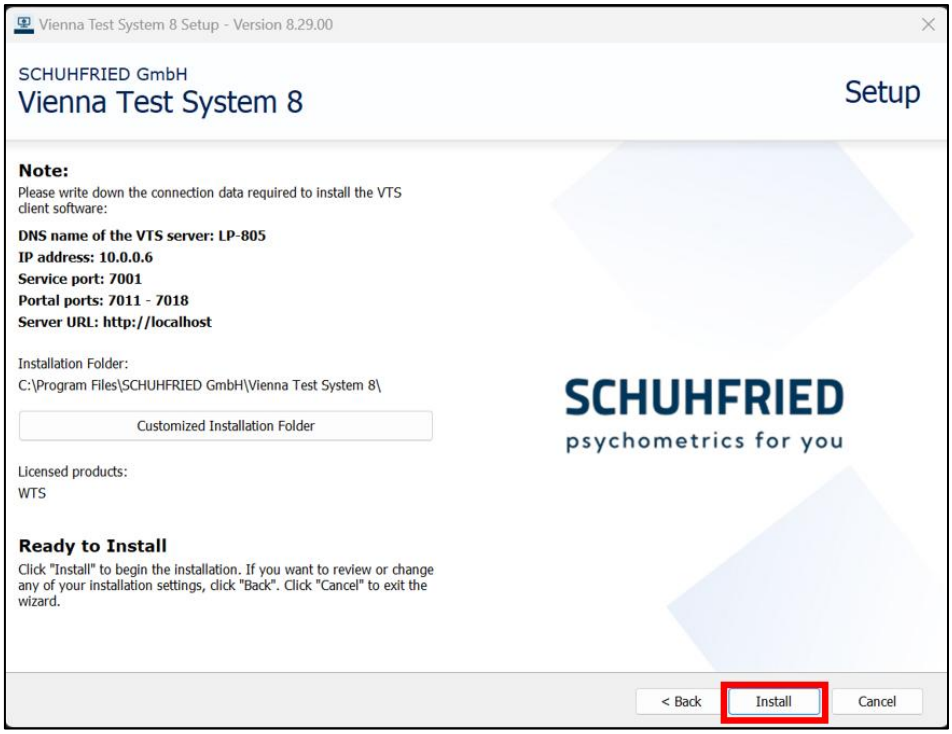


10. Start the installation

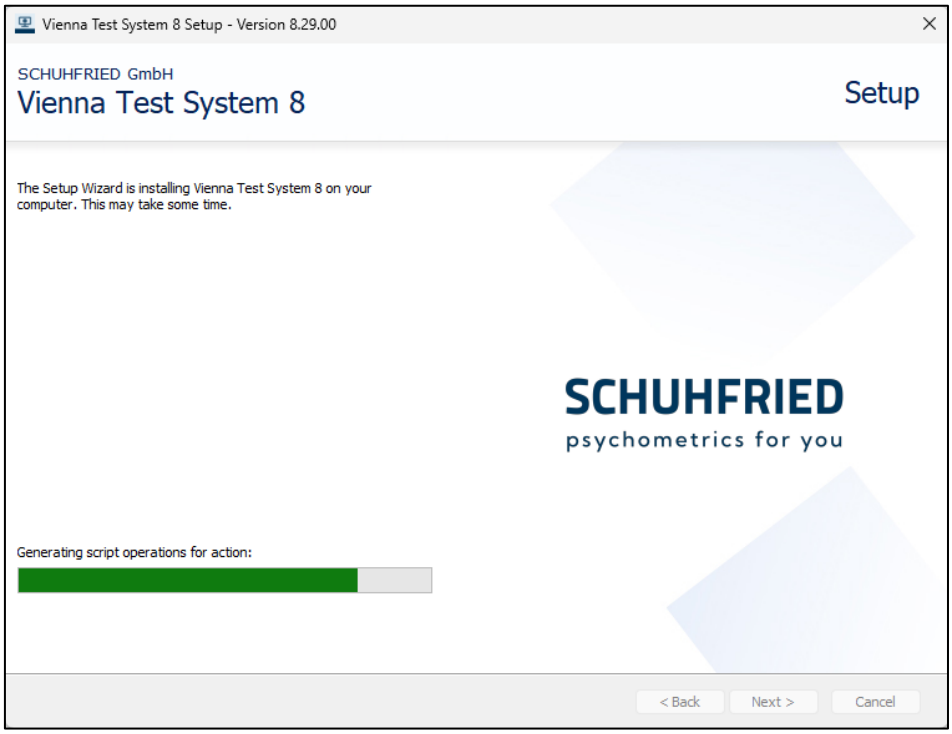
a. You will see a **summary of** the settings and all the information required to **connect the VTS clients to the server**. This information is required in the VTS client setup.
Make a note of this data and keep it in a safe place. You will need this information to install all VTS clients!

b. If necessary, change the **installation folder** using the *Customized Installation Folder* button.

c. Start the installation by clicking the *Install* button.



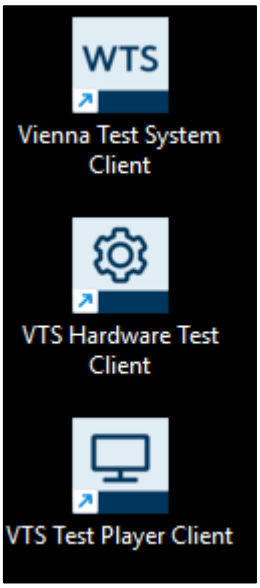
d. The installation will be carried out. This may take several minutes.



e. If the installation was successful, you will see a note that you must confirm with *OK*.

3.4.5 Checking the installation

- If you want to make sure that the installation was successful, you can check whether the *WTS Service* has been started.
- To do this, start the VTS Admin Client or the Testplayer Client using the shortcuts on the desktop.



- If you have purchased peripheral devices, please now perform the **hardware test** to ensure that all devices have been installed successfully.

3.4.5.1 Notes

- The VTS can also be installed using a command line (silent installation): Silent installation via command line
- Please consider setting up a data backup: Backup & recovery of the VTS

3.4.6 Installation of the VTS clients

These instructions describe how to install the **VTS client software**. The VTS client software is used to install the VTS administration software and the Testplayer on additional PCs in the network in server/client systems, enabling access to the central VTS server and its stored data.

The VTS client software enables the setup of distributed systems across multiple locations in a server/client system. A practical example is a system for group testing: several test rooms, where the VTS Admin Client is installed on the test supervisor's PC and the VTS Testplayer Client is installed on the test stations. The central VTS server manages the persons, test data, settings, and licenses.

The VTS client software must be installed on the corresponding PCs in the network. An **additional installation package** (e.g. *WTS 8 Client Setup 8.28.01.zip*) is available for this purpose. The installation package contains two client programs:

- **VTS Testplayer Client**: used to start the tests.
- **VTS Admin Client**: the administration software for the VTS. Depending on the rights of the user, the VTS can be managed, persons can be created and test results can be viewed here.

An **alternative** to using the VTS client software **is to use the browser-based VTS user interface**. In a server/client system, the administration interface of the VTS (as well as the Testplayer Web) can be accessed directly in the browser via the corresponding URLs. A local installation is not necessary for this. Depending on the application, it may still be necessary to install the VTS Testplayer Client on the devices on which testing is to be carried out (especially if certain tests that require input devices are used).

3.4.6.1 Requirements for installation

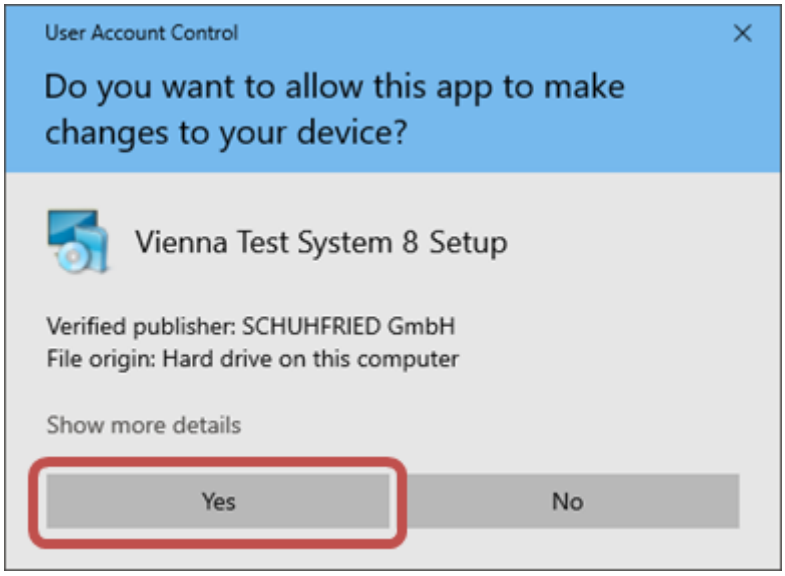
- The system requirements are met.
- You have administrator rights.
- All ports required for communication with the server are enabled and not blocked:
  - When using the default settings in the server installation, these are: 7001, 7011, 7012, 7013, 7014, 7015, 7016, 7017, 7018
  - If using custom ports: all custom ports specified during server installation.
- All Windows updates have been installed, no updates are pending.

Make sure your system meets the requirements and restart your system before starting the installation.

3.4.6.2 Installing the client software

1. **Starting the setup**
   a. Start the PC and log in with a user who **has local administrator rights**.
   b. Download the setup (approx. 600 MB) using the link provided in the email you received from SCHUHFRIED after your purchase. The setup is delivered as a .zip file. Unzip the file into a folder. The file path to the folder should not be too long (e.g., *C:\WTS_Setup*).
   c. If the setup is on a USB stick, connect the USB stick and open the drive.
   d. Start the installation by double-clicking on the file **ClientSetup.exe**.

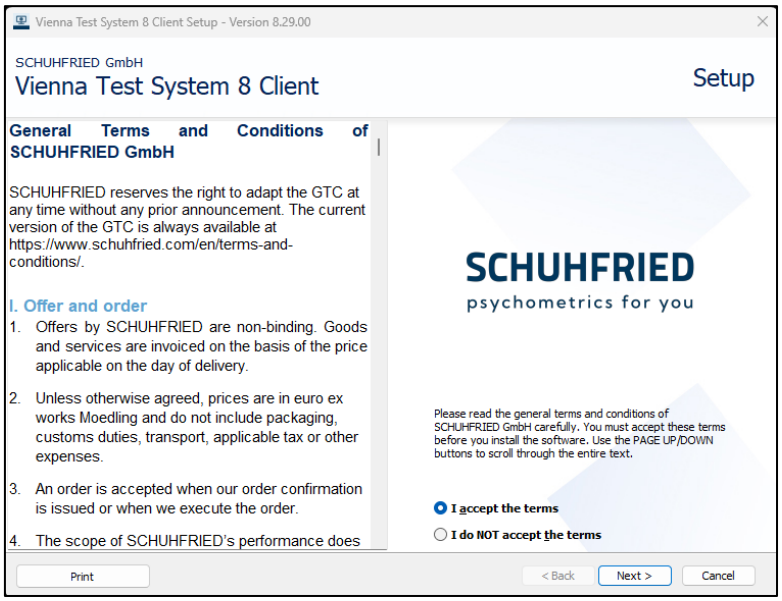
e. Confirm the Windows security prompt (*User Account Control*) by clicking *Yes*.



2. Accept the general terms and conditions

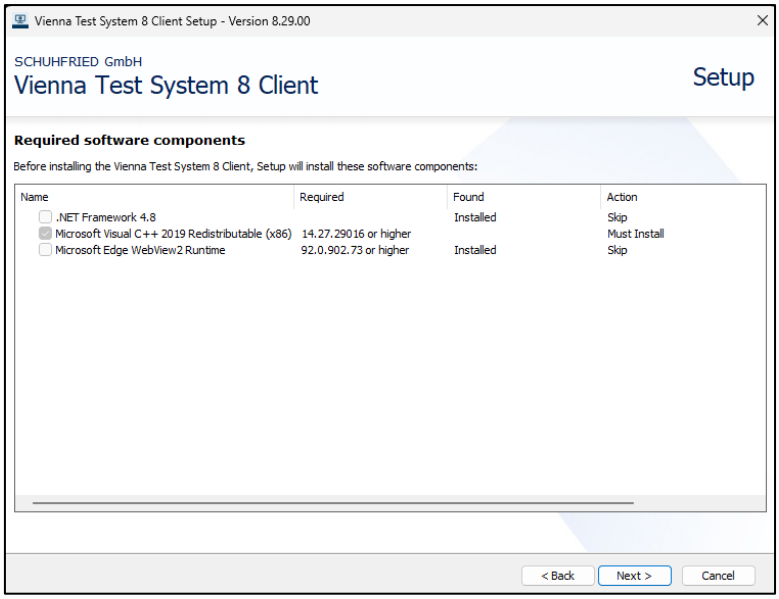
a. Please read through the general terms and conditions

b. Select *I accept the terms* and confirm with *Next*



3. Check required software components and install if necessary

a. The setup program will now check which software components need to be installed. Depending on your operating system and existing installations on your PC, different programs may be required. Once the system check is complete, a list of the programs to be installed will be displayed. Please do not make any changes.



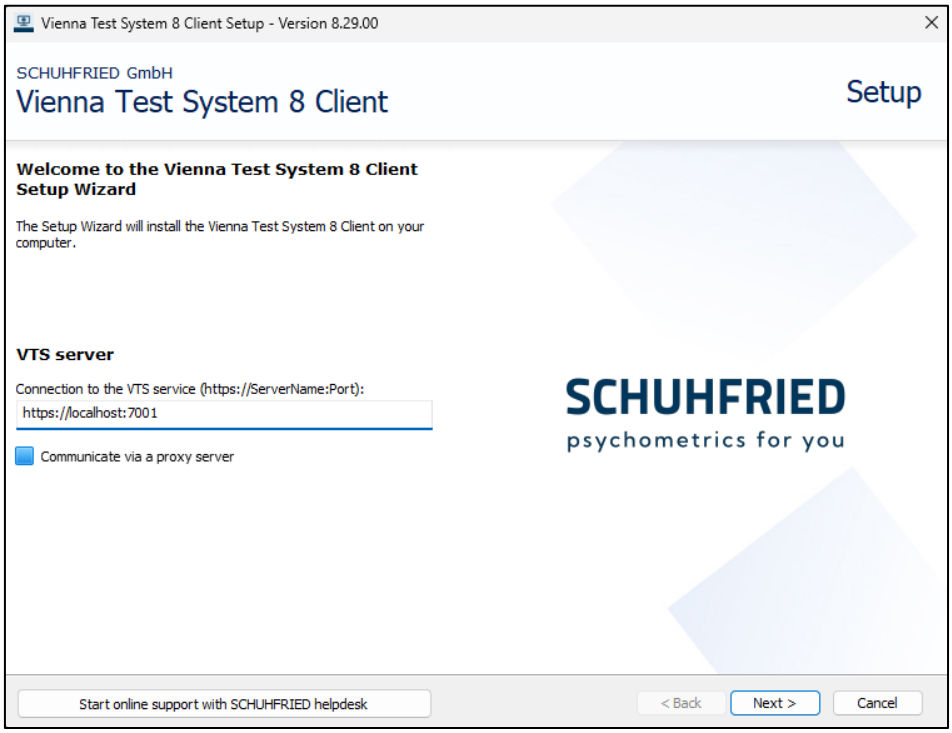
Note: If all required programs are already installed, this page will be skipped.

b. Press *Next.*

4. Specify connection data

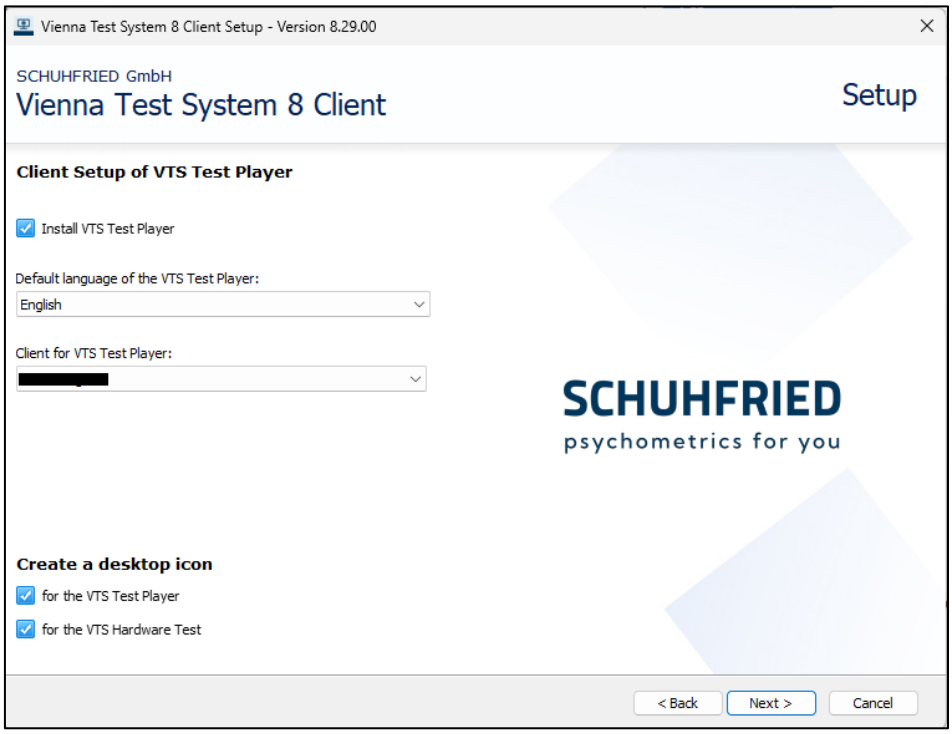
a. In the next step, you must specify the connection data for the VTS server. Enter the **name** (or IP address) of the server and the **port of the service**. The format for the server address is: `https://SERVERNAME:PORT`, e.g.: `https://WTSSERV:7001`

b. If a proxy server is used, select the *Communicate via a proxy server* checkbox and enter your configuration.



5. **Selecting the client programs**

   a. In the first step, select whether you want to install the VTS Testplayer Client.



   b. The following options can then be entered:

      i. Default language of the VTS Testplayer: This language is independent of the test language used.

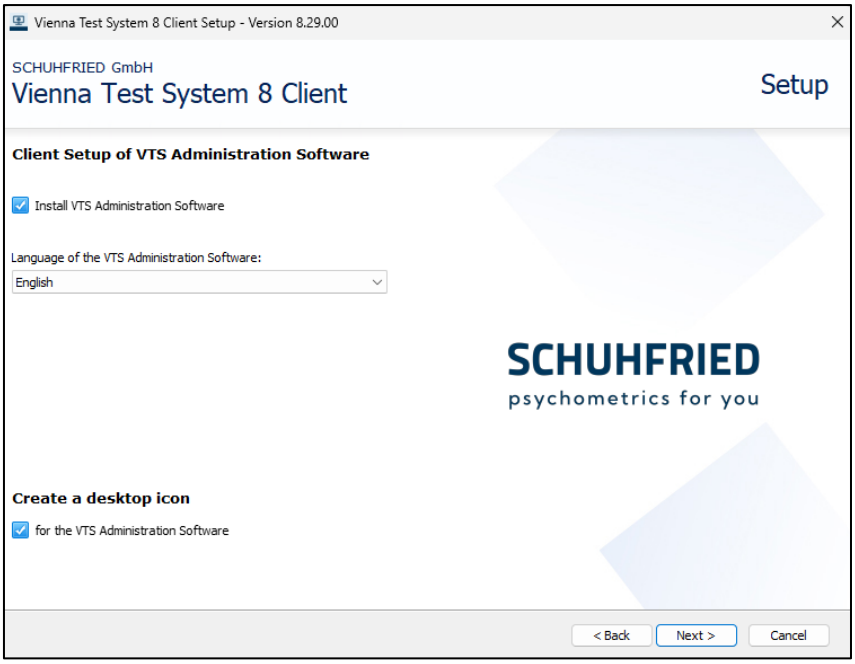
      ii. Multi-client for VTS Testplayer: Here you can set whether a fixed multi-client should be used or whether the multi-client should be requested each time the Testplayer is started.

      iii. Icons on the desktop:

         1. VTS Testplayer for Direct Testing
         2. Hardware test to check the connected SCHUHFRIED peripheral devices on the client.

   c. After clicking *Next* select whether you want to install the VTS Admin Client.

      i. You can set the default language and decide whether an icon should be created on the desktop.

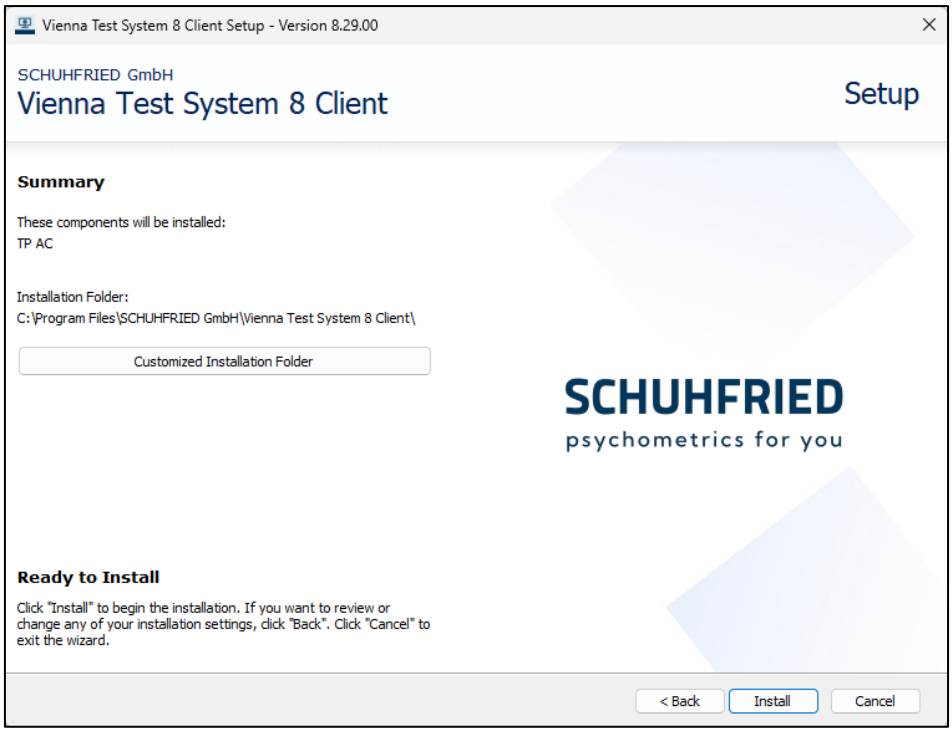


6. Starting the installation

a. You will see a summary of the selected settings.
TP: Testplayer
AC: Administration software

b. If necessary, select the desired installation folder using the *Customized Installation Folder* button.

c. To start the installation, press *Install*.



d. The installation will be carried out.

e. If the installation was successful, a confirmation message will appear. Confirm with *Finish*. The installation is now complete. You will find entries for starting the respective programs on the desktop and in the start menu.

3.4.6.2.1 Notes on installing the VTS clients

- If you install **only** the administration software, you will not be able to start any tests, not even directly from the administration software. To be able to start a test, you **also** need to install the VTS Testplayer Client.
- If you are using a proxy server, these settings will be adopted from the global proxy settings in Windows. However, this only applies if the proxy server is located between the computer where client installation is running and the computer where the server is installed.
- If the *WTS Service* can be reached at a user-defined address in the network, the Testplayer can be started with the "-s" parameter, e.g.: WTSTestplayer.exe -s https://localhost:7000/. With the "-s" parameter, the same Testplayer Client can be used for testing with a different VTS than the default system. Please note that this functionality is only supported within the same VTS version and cross-version functionality is not supported.
- The VTS clients can also be installed via command line. For details, see the page: Installing the VTS clients via the command line

3.4.6.2.2 Notes on updating from earlier VTS versions

Up to and including VTS version 8.28, there was a third client program, the *Control Monitor*. This had to be installed as separate client software. Starting with VTS version 8.29, the functionality of the *Control Monitor* is integrated into the Vienna Test System by default through the *Progress Monitor component*. The *Progress Monitor* can be accessed in the administration software (also in VTS online) via *Tools → Progress Monitor*. No additional installation or configuration is necessary.

Note on updating
If you update from VTS version 8.28 or earlier to VTS version 8.29 or later, the separate *Control Monitor* client software will be automatically uninstalled. Please use the integrated *Progress Monitor* in the VTS afterwards.

3.4.6.3 Installing the VTS clients via the command line

The VTS clients, e.g. the VTS Admin Client (AC) or the VTS Testplayer (TP), can also be installed via the command line. With this type of installation, no visible setup is started. All required parameters are transferred via the installation command.

3.4.6.3.1 Installation command

The installation command has the following structure:

```
ClientSetup.exe    /qx
         INSTALL_AC=1 LANGUAGE_AC=de-DE
         INSTALL_TP=1 LANGUAGE_TP=de-DE MANDANT_ID=AUTO
         WTS_SERVICE_BASE_ADDRESS=https:|//XX.XX:7xxx
```

3.4.6.3.1.1 Explanation of parameters

The possible parameters are:

Parameter	Value	Description
/qx	1. qr 2. qb 3. qn	1. Display installation progress enabled 2. Display installation progress as progress bar only (without details) 3. Do not display installation progress
INSTALL_AC **INSTALL_TP**	1 or 0	If one of these parameters is set to “1”, the administration software (AC) or the Testplayer (TP) is installed. If a parameter is set to “0”, the corresponding software is not installed. If the AC or TP is installed, the **“WTS_SERVICE_BASE_ADDRESS” must** be specified. The default language must also be set for the component to be installed (see below).
WTS_SERVICE_BASE_ADDRESS	Text	**Address of the WTS Service and port** through which the clients communicate with the server. These parameters are absolutely necessary when TP or AC are installed, e.g. WTS_SERVICE_BASE_ADDRESS=https:|//WTSSERV:7001
LANGUAGE_AC **LANGUAGE_TP**	Text	The language in which the administration software or Testplayer is installed. The available languages are listed below.
MANDANT	Text	Optional parameter – Client name: If this option is specified, the client setup does not attempt to resolve the client via the server installation, so that the client setup can be installed independently of the server setup. If this parameter is specified, it is not necessary for the server to be accessible. The parameter also accepts an empty string (“”).
MANDANT_ID	Text	This parameter can be used to set the client with which the Testplayer should start (e.g. W12345_001). If “AUTO” is entered, the first client found on the server is selected. If the client is to be entered at each start, **MANDANT_ID=“-”** must be specified!
RUN_CLIENT_SETUP	0	The execution of the client setup is suppressed.
ICON_AC **ICON_TP** **ICON_HWT**	0 or 1	Determines whether the corresponding desktop icons are installed. During the Testplayer installation, you can specify whether an icon for the hardware test (ICON_HWT) should be created in addition to the Testplayer icon.
CACHE_DIRECTORY	Text	Specifies the path where the cache for the administration software and the Testplayer should be created. Example: CACHE_DIRECTORY="d:\temp\schuhfried"

Parameter	Value	Description
/exelang	1031 or 1033	1031: starts the setup in German 1033: starts the setup in English This parameter is optional.

3.4.6.3.1.2 Examples

Installation of the administration software with icon in English:

```
ClientSetup.exe /qr INSTALL_AC=1 ICON_AC=1 LANGUAGE_AC=en-US
WTS_SERVICE_BASE_ADDRESS=https:|//192.168.0.113:7001
```

Installation of the Testplayer in German including icons for Testplayer and hardware test:

```
ClientSetup.exe /qr INSTALL_TP=1 ICON_TP=1 ICON_HWT=1 LANGUAGE_TP=de-DE
MANDANT_ID=AUTO
WTS_SERVICE_BASE_ADDRESS=https://WTS_SERVER:7001
```

Installation of the Testplayer in German, with icon for the Testplayer, with a specific multi-client:

```
ClientSetup.exe /qr INSTALL_TP=1 ICON_TP=1 LANGUAGE_TP=de-DE
MANDANT_ID=W12345_003 WTS_SERVICE_BASE_ADDRESS=https://WTS_SERVER:7001
CACHE_DIRECTORY="D:\Temp\Schuhfried"
```

Installation of the Testplayer in English, with icon for the Testplayer, without specific client:

```
ClientSetup.exe /qr INSTALL_TP=1 ICON_TP=1 LANGUAGE_TP=en-US
WTS_SERVICE_BASE_ADDRESS=https://WTS_SERVER:7001
MANDANT_ID=
```

3.4.6.3.1.2.1 Uninstalling

The clients can also be uninstalled via command line. Depending on the operating system, the following command can be used:

```
msiexec /uninstall wts8clientsetup.msi /quiet
```

```
msiexec /uninstall wts8clientsetup.x64.msi /quiet
```

3.4.6.3.1.3 Notes on use

- The addresses of the VTS server can be specified either as IP addresses or as domain names.
- If the client is to be selected **each time the** Testplayer is started, the value for “MANDANT_ID” must be omitted.
- Double quotation marks around the values of a property are not necessary, but are permitted (e.g. DEFAULT_CULTURE=”en-US”). However, it is not possible to assign an empty value to a property (except for MANDANT_ID), e.g.

TP_PROP="" or LANGUAGE_TP= is not permitted and will result in incorrect processing.

- It is important that the VTS server and port are specified correctly and that the service on the server is accessible during installation. The installation will run even if the server is not accessible, but it will not be successful!
- The default value 0 can also be explicitly specified for the parameters INSTALL_xx and ICON_xx. This means that the respective component or icon will NOT be installed (e.g. INSTALL_TP=0).
- Since a double slash (//) is a reserved character string in the command line, the | character must be placed in front of it. This particularly affects URL entries that begin with https://.... Therefore, https:|//my-domain:7001 must be written instead of https://my-domain:7001!
- If specified, the parameter /exelang must be in the first position.

3.4.6.3.1.4 Available languages

The following languages are available for the parameters LANGUAGE_AC and LANGUAGE_TP:

Language	Code
Chinese – Simplified	zh-CN
German	de-DE
English (USA)	en-US
French	fr-FR
Italian	it-IT
Dutch	nl-NL
Polish	pl-PL
Portuguese	pt-PT
Hungarian	hu-HU
Romanian	ro-RO
Russian	ru-RU
Swedish	sv-SE
Slovak	sk-SK
Slovenian	sl-SI
Spanish	es-ES
Czech	cs-CZ
Turkish	tr-TR

3.4.7 Updating a server/client installation

These instructions describe how to update your server/client installation to a newer VTS version.

3.4.7.1 Update requirements

- You have the installation files for the new VTS version (you will receive these either by download or from SCHUHFRIED.).
- You have the necessary licenses.
- You have administrator rights on the server on which VTS is installed.
- Sufficient free memory is available on the server.

3.4.7.2 Changes to the server hardware

Please note that an existing software dongle will remain in place when the VTS is updated. Therefore, the properties of a server (virtual system or hardware server) must not be changed. If the virtual system is “moved”, the software dongle will become invalid and your VTS will be locked. For more details, please contact SCHUHFRIED Support **before making any changes to the server**.

The following properties of the server **must remain the same** for the software dongle to remain valid:

- Virtual MAC address
- CPU properties
- UUID (Universal Unique Identifier) of the virtual image; the UUID is generated by the virtualization software. When a clone is created, a new UUID is generated.

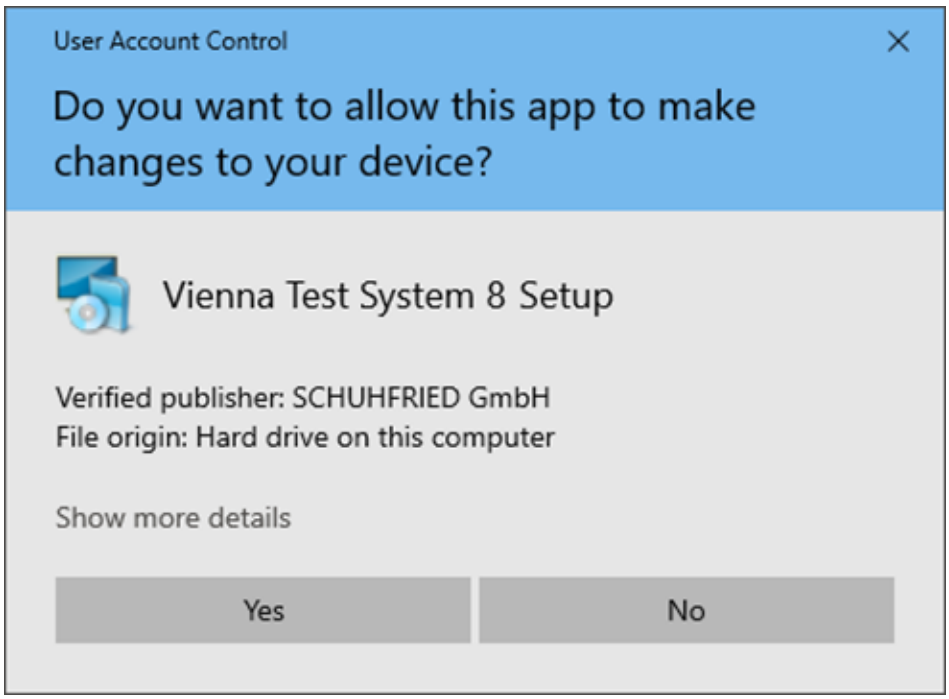
3.4.7.3 Update when a customized SQL server was used

If the supplied SQL Server Express was **not** used during installation, the SQL database must be updated manually. The corresponding instructions can be found here: Manual update of the VTS SQL database.

3.4.7.4 Performing the update

If you are using VTS client programs, please note that you must first update the server on which the VTS administration software is installed and only then update the PCs on which the clients are installed!

1. Perform a **backup**: Backup & recovery of the VTS .
2. **Start the update**
    a. Start the server and log in with a user **who has local administrator rights**.
    b. Download the setup for the new VTS version (approx. 5 GB) using the link provided in the email you received from SCHUHFRIED after your purchase. The setup is delivered as a .zip file. Unzip the file into a folder. The file path to the folder should not be too long (e.g. *C:\WTS_Setup*).
    c. If the setup is on a USB stick, connect the USB stick and open the drive.
    d. Start the installation by double-clicking on the file **Wts8Setup.exe**.
    e. Confirm the Windows security prompt (*User Account Control*) by clicking *Yes*.



3. **Follow the installation program**
    a. During the update, the installation program must be run as described on the page Server/client installation.
4. **Update the client programs**
    a. Please have the **IP address (or name) of the server** ready for the client update, as you will need to re-enter it during the update.
    b. If you have installed VTS client programs, run the VTS client setup for the new version on the PCs with the VTS clients installed to update them.
    c. After updating the first client, verify that the VTS is functioning properly. You can then proceed to update the remaining client systems accordingly.

When a VTS client program is started, the system checks whether the version of the VTS client program matches the version of the VTS administration software on the server. The client is not started if the versions do not match.

3.4.7.5 Troubleshooting

- If you try to update an older version of VTS, it can happen that the SQL Server version is no longer supported by the new setup. In that case manual adaptations are necessary. See the description on the page: Update from older SQL Server versions.

3.5 Integration

The Vienna Test System (VTS) can be integrated into existing IT environments and connected with other software through various interfaces. These are provided by the **VTS Integration Service (VIS)**, which enables smooth data exchange between VTS and external systems, e.g. HR management software (HRMS) or hospital information systems. Several plug-ins are provided, tailored for different integration needs. VIS automatically loads when the system starts and runs in the background as a separate process alongside the VTS.

VIS can be configured after VTS installation, provided the required licenses are available (see the section *license information* below). Each plug-in includes its own setup guide. In addition to VIS, the VTSCommand Tool provides several functions related to archiving, cleanup and certificate management.

3.5.1 Available VIS plugins

3.5.1.1 GDT plugin

The **GDT Plugin** establishes a GDT interface between the **VTS** and an **external system**. Data exchange is handled through a **file-based mechanism**.

For more detailed information about the plugin, refer to GDT plugin

3.5.1.2 HL7 plugin

The **HL7 Plugin** establishes a HL7 interface between the **VTS** and an **external system**. Data exchange is handled through a **file-based or TCP-based mechanism**.

For more detailed information about the plugin, refer to HL7 plugin

3.5.1.3 Universal Plugin

The **Universal Plugin** provides a **SOAP 1.2 Web Service** that enables an **external system** to communicate with **VIS**. It supports key operations related to **person records** and **test results**.

For more detailed information about the plugin, refer to Universal plugin

3.5.2 VTSCommand tool

VTSCommand is a command-line utility designed to export and save test results from the **Vienna Test System (VTS)** as `.xstp` archive files. This tool requires Universal Plugin to be configured and running in order to perform archiving operations.

In addition to archiving, the tool offers the following capabilities:

- **Result Cleanup:** Optionally deletes all archived test results.
- **Person Cleanup**: Optionally deletes person records from the VTS if all associated test results have been successfully archived, if no test results exist, or if only unfinished tests are present.
- **Certificate Management**: Allows replacement of the service's certificate with a different **X.509 certificate** to be used by the VTS.

For more detailed information about the tool, refer to the VTSCommand tool

3.5.3 License information

VTS Integration Service (VIS) license is required to run VIS and its plugins. This license is separate from the Vienna Test System administration software license and is mandatory for the service to operate. In addition, HL7 plugin requires dedicated license

to load and function. The following table provides an overview of the required licenses for the various plugins.

Plugin/Tool	Required license
GDT plugin	VIS license
HL7 Plugin	Dedicated HL7 plugin license
Universal plugin	VIS license
VTSCommand tool	VIS license needed for archiving functionality. No license needed for certificate management.

3.5.4 GDT plugin

The **GDT (Geräte-Daten-Träger) plugin** provides a standardized interface for data exchange between the **Vienna Test System (VTS)** and external systems. It is available as plugin of the VTS Integration Service. It facilitates communication by exchanging `.GDT` files through a predefined directory, enabling seamless integration based on the GDT format standard. This plugin is ideal for environments that interact with other medical or diagnostic systems, as it ensures reliable and well-structured data transfer.

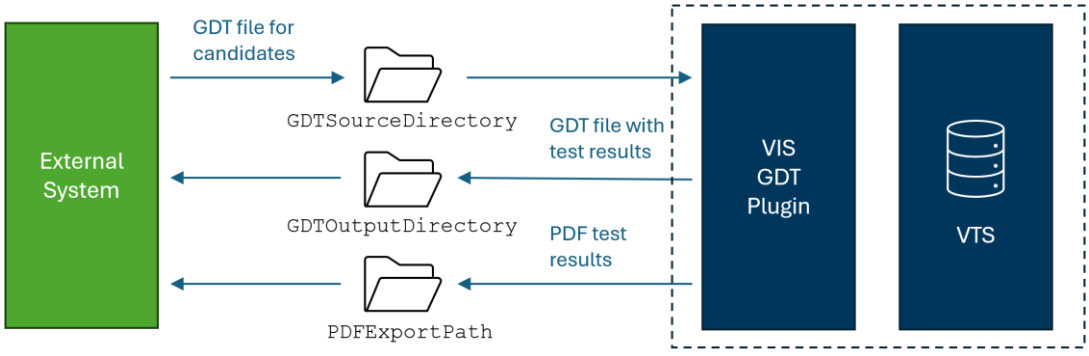
The GDT plugin implements the following so called “set types”, as defined in the **GDT standard, version 2.1** (see https://www.qms-standards.de/standards/gdt-schnittstelle/):

- **6302 – New Test Request** for importing new persons into VTS
- **6310 – Test Data Transfer** for export of test result data out of VTS

Please note that only certain fields from these data sets are supported. For a detailed list of the implemented fields, refer to the sections about the input and output files below.

3.5.4.1 Overview of functionality

The GDT plugin periodically checks the input folder for new files that contains persons for import. When a new file is detected, the plugin automatically imports the persons into VTS. After a person completes a testing and VTS generates a PDF with the test results, the GDT plugin processes this PDF and generates a corresponding GDT file with customizable test result variables. This GDT result file is saved in the output folder, where your external system can process it further. The following diagram outlines the flow of data and the relevant folders:



The PDF version of the test results is also saved in the PDF output folder, making it available for external processing if needed.

Note: Data exchange between VTS and GDT plugin happens over an internal file system folder. This folder should **not** be accessed or modified by your external system to avoid interfering with the internal workflow.

3.5.4.2 Setup and configuration

In order for the GDT interface to function, the GDT plugin must be configured in the settings file of the VIS and the VTS must be configured to automatically export test results after every completed testing. Here is a short step by step guide on how to configure a minimal working GDT setup. For advanced options please refer to the sections below.

3.5.4.2.1 1. Adapt the VIS settings file

The GDT plugin must be enabled and configured in the settings file (`appsettings.json`) of the VIS, by default located in `%PROGRAMFILES%\SCHUHFRIED GmbH\Vienna Test System 8\IntegrationService\appsettings.json`
Note: This is the default installation path. If the Vienna Test System was installed to a different location, the actual path may vary accordingly.

This file contains the configuration of all available VIS plugins. All settings relevant to the GDT plugin can be found under the section starting with “GDTPlugin”.

```
"GDTPlugin": {
  //...
}
```

3.5.4.2.1.1 1.1. Enable the GDT plugin

In order to enable the GDT plugin, change the value of the `Enabled` property to `true`.

```
"Enabled": "true",
```

3.5.4.2.1.2 1.2. Configure your directories

The configuration file contains default values for the file paths used by the GDT plugin (`GDTSourceDirectory`, `GDTOutputDirectory`, `PDFExportPath`, `StandardExportFolder`). While the default values can be used, it is usually recommended to change them to a location of your choice:

- `GDTSourceDirectory`, `GDTOutputDirectory`, `PDFExportPath` must also be accessible to the system that you want to connect to (e.g. your hospital information system).
- `StandardExportFolder` is only used by VTS, its value must also be configured in VTS (detailed instructions below).

Note: Since the configuration is in a JSON file, all backslashes (“\”) must be escaped (“\\”). The use of network drives is possible, but Windows filesystem restrictions require that the logon account of the *WTS Service* has access to the chosen location. By default, the *Local System Account* is configured, which usually does not have such access.

Example

Example directory configuration in the appsettings.json file, assuming "C:\My-GDT-Exchange" is a custom folder intended for GDT file exchange.

```
"GDTPlugin": {
    "Enabled": "true",
    // ...
    "GDTSourceDirectory" : "C:\\My-GDT-Exchange\\VTS-Source",
    "GDTOutputDirectory" : "C:\\My-GDT-Exchange\\VTS-Output",
    // ...
    "PDFExportPath": "C:\\My-GDT-Exchange\\VTS-PDF-Export",
    "StandardExportFolder":
"C:\\ProgramData\\SCHUHFRIED\\export\\_tempGDTExport",
    // ...
  },
```

3.5.4.2.1.3 1.3. Define export definition(s)

Although the GDT standard defines how data is exchanged, it doesn't specify which results from VTS should be included. That's why export definitions are needed — they determine which variables of the conducted tests, test sets, or test batteries will be exported. Only those listed in the `ExportDefinitions`section will be included in the export. If a test, test set or test battery is not listed there, its results will not be sent.

Export definitions must be tailored to each specific use case; they depend on the tests used, the goals of the testing, and the connected system. By default, an example export definition is provided, but it only applies to the FEV test set. Therefore, in order to get a fully functional GDT connection, the required export definitions must be created in this step, usually together with psychological experts.

For a detailed description on how an export definition is defined, see Export definitions.

3.5.4.2.1.4 1.4. Apply changes

⚠ After saving changes to the settings file, you must restart the Windows service *WTS Service* to apply the updates and load the plugin with the new configuration. A description of how to restart the service can be found on the page: The VTS does not start from the troubleshooting section. If you are unsure how to restart a Windows service, you may also reboot your machine.

3.5.4.2.2 2. Configuration in the Vienna Test System administration software

Now that the GDT plugin is configured, the VTS must be configured accordingly, in order to enable generated test results to automatically trigger a GDT data exchange. The following settings must be configured in the *Settings* tab of the Vienna Test System administration software (old design in gray). Please note that those settings are currently only available in the old design of the Client, you may need to switch to it to access them. You can switch to the old design using the *New design* toggle button: 

.

3.5.4.2.2.1 2.1. Configuration of the default folder for data export

Go to *Settings* → *Data export / import* → *Default folder for data export* and use the folder selector to choose the directory where thr VTS will export test results to.

> This folder **must match** the path specified in the `StandardExportFolder` element of the GDT plugin configuration in the settings file.

Click the *Save* button to apply the changes.

3.5.4.2.2.2 2.2. Configuration of the automatic test result output

Navigate to *Settings* → *Test Results Output* → *Automation Options*, then enable the checkbox *Automatic test results output*.

In the *Automatic file name* dropdown, select the option *3 – Personal ID and unique test ID*.

Click *Save* to apply the changes.

3.5.4.2.2.3 2.3. Configuration of the automatic test result output for Direct testing

Required only if testing is done in Direct Testing mode.

Navigate to *Settings → Direct Testing→ Scoring*, then in the *Automatic test results output* dropdown, select the option *2 - Save the test results automatically as PDF file in the folder for data export*.

In the *Automatic file name* dropdown, select the option *3 – Personal ID and unique test ID.*

Click *Save* to apply the changes.

3.5.4.2.3 3. Test your setup

3.5.4.2.3.1 3.1. Import

Place an example GDT file into the configured `GDTSourceDirectory`. After a short time, it should be detected, processed and deleted by the VIS plugin. Verify that the person was created correctly.

See section Example input file for an example input file.

3.5.4.2.3.2 3.2. Export

Administer a test, test set or test battery for which an export definition is configured. After the testing is completed, a GDT output file should appear in the configured `GDTOutputDirectory`.

3.5.4.2.3.3 3.3. Troubleshooting

In all cases, you may check the log files for information about possible issues (see the Logging section).

- **Input files are not processed**
  - Make sure the configured directories are spelled exactly as required.
  - Ensure you have a valid license for the VIS service.
  - Ensure the *WTS Service* has been restarted and all settings are correctly applied.
- **Input files are processed but no persons get created (or not correctly)**
  - The input files could contain invalid or unsupported data.
  - Make sure input files are encoded in UTF-8.
  - Ensure that the Windows user running the *WTS Service* has sufficient rights to access the `GDTSourceDirectory`.
- **No output files are created**
  - Make sure the configured directories are spelled exactly as required.
  - Ensure that the StandardExportFolder in the VIS settings file matches the configuration in VTS.
  - Ensure there is a matching export definition for your tests.

- Ensure that the Windows user running the *WTS Service* has sufficient rights to access the output directories.
- Ensure the *WTS Service* has been restarted and all settings are correctly applied.

- **Unexpected GDT files are created for my finished tests / test battery**
  - When an export definition matches a test battery, it will overrule test definitions defined for single tests. On the other hand, if no export definition matches your test battery, export definitions for single tests apply. Make sure that the export definitions match your expectations.

3.5.4.3 Further information and reference

The following sections contain more detailed information about the various topics related to the GDT plugin and its functionality.

3.5.4.3.1 VIS settings file

The GDT plugin must be enabled and configured in the VIS settings file that is by default located in `%PROGRAMFILES%\SCHUHFRIED GmbH\Vienna Test System 8\IntegrationService\appsettings.json`
Note: This is the default installation path. If the Vienna Test System was installed to a different location, the actual path may vary accordingly.

This file contains the configuration of all available VIS plugins. All settings relevant to the GDT plugin can be found under the section starting with “GDTPlugin”.

3.5.4.3.1.1 Settings reference

Field	Description	Note
`Enabled`	Defines if the plugin is enabled and should be started.	**Must be set to** `true`
`GDTSourceDirectory`	Path to the folder from which the plugin will read the input GDT files containing personal data to import. Your system connected to VTS over the GDT interface must be configured to upload those files here.	**Must be modified to match your setup.** The use of network drives is possible, but Windows filesystem restrictions require that the logon account of the "WTS Service" has access to the chosen location. By default, the "Local System Account" is configured, which usually does not have such access.
`GDTOutputDirectory`	Path to the folder where the plugin outputs GDT files with test results. Your system connected to VTS over the GDT interface must be configured to import from here.	**Must be modified to match your setup.**
`StandardExportFolder`	Path to the folder where VTS outputs PDF files with results of finished tests.	**Must be modified to match your setup.**
`PDFExportPath`	Path to the folder where GDT plugin uploads results in PDF format referenced in the exported GDT file.	**Must be modified to match your setup if your receiving system must access results in pdf format in addition to GDT format.**
`GDTSender`	Short name of the system communicating with VIS. Used in name of the GDT file with test result data like [GDTSender][GDTReceiver].gdt . Maximal length defined by the GDT interface is 4 characters.	Modify only if needed.

Field	Description	Note
`GDTReceiver`	Identification of the system running VIS. Used to create name of the GDT file with test result data like [GDTSender][GDTReceiver].gdt Maximal length defined by the GDT interface is 4 characters.	Modify only if needed.
`TimeoutInSec`	Defines how often will plugin check for new incoming GDT files with persons for import and how often will prepare newly finished test results for the export. The value is specified in seconds.	Modify only if needed.
`PersonDefaultLanguage`	Default language used for the imported persons in case language is not provided in the GDT file with personal data to import.	Set only if person langue cannot be provided in the GDT file with personal data to import.
`PersonDefaultEducationLevel`	Default education level used for the imported persons in case education level is not provided in the GDT file with personal data to import.	Set only if education level of the persons cannot be provided in the GDT file with personal data to import.
`ExportRawScore`	Defines if raw scores are exported in addition to variables configured in the export definition.	Modify only if needed.
`StoreProcessedFailedFiles`	Defines if system stores files exported by VTS after processing. If set to `true` system will create subfolders `Processed` and `Failed` in the `StandardExportFolder` and stores processed PDF files there instead of deleting them. Otherwise will processed files be deleted.	Modify only if needed.
`ExportDefinitionGroup`	Definition of variables exported in the GDT file with test results. It is possible to create export definition for single tests as well as for a whole test battery or test battery with customized scoring. More information about the export definition can be found in the section below.	**Must be modified to match used tests.**

3.5.4.3.1.2 Export definitions

While the GDT standard clearly defines how data is exchanged, we still need to define which variables generated within VTS shall be exported. This is done via export definitions. To ensure export, every performed test, test set or test battery must have a corresponding export definition defined in the section `ExportDefinitions`. If a test or

test set does not have an entry in the `ExportDefinitions`, **its results will not be exported**.

Each export definition must include a `Name` that matches the specific test, test set, or test battery it is intended for. It must also contain a list of `Variables` to be included in the export.

Each item in the `Variables` list should include the following fields:

- `TestName`: The test label of the test from which the variable is exported. The test label is the commonly used short form of the test name, it is explicitly stated on the title page of the corresponding test manual.
- `ShortCode`: A unique identifier for the variable used in the export. Available variables are described in the test manual or can easily be obtained by an example CSV export of a test result where each variable shows up as a column.
- `DisplayName`: Optional. A descriptive label for the variable that will appear in the exported data (can be freely chosen). If not provided, description of the variable as defined by SCHUHFRIED is used.

Multiple export definitions can be provided, but each test, test set, or test battery may have only one export definition.

If a test battery is performed and it does not have its own export definition, the system will attempt to export each individual test within the battery based on their own export definitions. This means that even without a battery-level configuration, results for tests inside the battery can still be exported, provided those individual tests are configured correctly in the `ExportDefinitions`.

3.5.4.3.1.3 Example

Export definition for the AVEM and BFSI tests, as well as for a custom test battery TB1 and the FEV test set.

```
{
       "ExportDefinitions": [
            {
           "Name": "FEV", //test set
           "Variables": [
             {
               "TestName": "RT",
               "ShortCode": "MRZ",
               "DisplayName": "Reaktionsfähigkeit"
             },
             {
               "TestName": "COG",
               "ShortCode": "MTRN",
               "DisplayName": "Konzentrationsleistung"
             },
             {
               "TestName": "LVT",
               "ShortCode": "S",
               "DisplayName": "Orientierungsleistung"
             },
             {
               "TestName": "DT",
               "ShortCode": "ZV",
               "DisplayName": "Belastbarkeit"
             },
             {
               "TestName": "ATAVT",
               "ShortCode": "UEB",
               "DisplayName": "Aufmerksamkeitsleistung"
             }
           ]
         },
         {
           "Name": "TB1", //custom testbattery TB1
           "Variables": [
             {
               "TestName": "BFSI",
               "ShortCode": "A",
               "DisplayName": "TB Veträglichkeit"
             },
             {
               "TestName": "AVEM",
               "ShortCode": "DISTANZ",
               "DisplayName": "TB Distanzierung"
             }
           ]
         },
         {
           "Name": "BFSI", //standard test
           "Variables": [
             {
               "TestName": "BFSI",
               "ShortCode": "A",
               "DisplayName": "Agreeableness"
             },
             {
               "TestName": "BFSI",
               "ShortCode": "C",
               "DisplayName": "Conscientiousness"
             },
             {
               "TestName": "BFSI",
               "ShortCode": "E",
               "DisplayName": "Extraversion"
             },
             {
```

```
            "TestName": "BFSI",
            "ShortCode": "N",
            "DisplayName": "Emotional stability"
          },
          {
            "TestName": "BFSI",
            "ShortCode": "O",
            "DisplayName": "Openness"
          }
        ]
      },
      {
        "Name": "AVEM", //standard test
        "Variables": [
          {
            "TestName": "AVEM",
            "ShortCode": "DISTANZ",
            "DisplayName": "Distancing ability"
          },
          {
            "TestName": "AVEM",
            "ShortCode": "EHRGEIZ",
            "DisplayName": "Work-related ambition"
          },
          {
            "TestName": "AVEM",
            "ShortCode": "ERFOLG",
            "DisplayName": "Experience of success at work"
          },
        ]
      }
    ]
  }
```

3.5.4.3.2 GDT input files

The GDT input files containing personal data for import must follow the structure defined for the GDT set type **6302 – New Test Request**. It must include all mandatory fields, and each line must be terminated with carriage return and line feed characters (CR LF).

To be processed, the input file must be placed in the preconfigured `GDTSourceDirectory`

> The input GDT file **must be encoded in UTF-8**. Using any other encoding may result in incorrect handling of names containing **special characters**, and proper data processing cannot be guaranteed.

3.5.4.3.2.1 File name

Name of the file must match format `[GDTReceiver][GDTSender][free text].gdt` with the values of `GDTReceiver` and `GDTSender` as defined in the VIS settings file, see: GDT plugin.

The following example file name matches the default values in the configuration: **WTSBAD_max_mustermann.GDT:**

- “WTS” is the `GDTReceiver`
- “BAD” is the `GDTSender`
- “_max_mustermann” is just free text that is irrelevant for processing
- “.GDT” is the mandatory file extension

3.5.4.3.2.2 File structure

> The file structure must be exactly as defined in the GDT standard. The following description is only provided as contextual information. For details on the required file structure, see the GDT 2.1 standard.

The file consists of several lines in text format. Each line starts with 3 characters specifying the length of the line in total characters, including control characters. It is then followed by a 4 character field label and the content. Each line is terminated by a carriage return and line feed character.

Considering the example line “0133102John”, it consists of:

- “013”: the total length (3 for “013” itself + 4 for the field label “3102” + 4 for “John” + the 2 control characters *CR LF*)
- “3102”: the field label for Patient First Name
- “John”: the value

3.5.4.3.2.3 Supported field labels

Field label	GDT Description	Field in VTS	Note
8000	Sentence ID		**Mandatory** Must contain 6302
8100	Sentence Length		**Mandatory** The system does not validate the **Length** field in incoming messages, even though this value is typically required. The field should indicate the total length of the entire message or sentence in bytes. However, **VIS does not check this value and will not reject messages that contain an incorrect length.**
9218	Version GDT		**Mandatory** Must be 2.10
3000	Patient Number / Patient Label	Personal ID	**Mandatory** Numerical number between 1 and 2147483647 No leading zeros allowed.
3101	Name of Patient	Last name	**Mandatory**
3102	Patient First Name	First name	**Mandatory**
3103	Patient Birth Date	Date of birth	**Mandatory** Format DDMMYYYY
3110	Patient Sex	Gender	**Mandatory** Allowed values: • 1 - male • 2 - female

Field label	GDT Description	Field in VTS	Note
3628	First Language of Patient	Language	**Optional -** Value taken from the configuration if not provided. Language code in BCP 47 format. E.g. de-DE for German, en-US for English.
4221	Education level	Education level	**Optional -** Value taken from the configuration if not provided. Numerical value between 0 and 5. • ? - Education level unknown • 1 - Compulsory schooling not completed (less than 9 years of school) or special school • 2 - Completed compulsory schooling or an intermediate secondary school (9-10 years of school) • 3 - Completed vocational training (10-12 years of school) • 4 - High school graduation with university entrance exam (12-13 years of school) • 5 - University or college degree

3.5.4.3.2.4 Example input file

```
01380006302
0128100128
01392182.10
01330001234
0123101Doe
0133102John
017310302031988
01031101
0143628de-DE
01042213
```

Example file for download: WTSBAD_example_input_file.gdt

3.5.4.3.3 Output GDT file

The output GDT file containing test result data follows the structure of GDT set type **6310 - Test Data Transfer**

The output file is stored by the GDT plugin into predefined folder `GDTOutputDirectory`.

3.5.4.3.3.1 File name

Exported output GDT files have the following name structure `[GDTSender][GDTReceiver].[gdt/incremental number]` This means the extension will be .gdt for the first file, and a three digit number starting with 001 for all subsequent files, e.g. `BADWTS.GDT`, `BADWTS.001`, `BADWTS.002`.

3.5.4.3.3.2 Example output file

Example of an output GDT file containing test results for the BFSI test based on the example configuration

```
01380006310
0128100864
0138402BFSI
014921802.10
017300086220512
0153101Homola
0173102Vladimir
017310326042021
01031102
017620026052025
0156201143014
0356220Big-Five Struktur Inventar
0126303pdf
0136304BFSI
0506305C:\PDFexport\BADWTS_86220512_BFSI.pdf
0258410BFSI/S1 - A - PR
0228411Agreeableness
01084200
0108421%
0208410BFSI/S1 - A
0228411Agreeableness
0098420
0258410BFSI/S1 - C - PR
0268411Conscientiousness
01084200
0108421%
0208410BFSI/S1 - C
0268411Conscientiousness
0098420
0258410BFSI/S1 - E - PR
0218411Extraversion
01084200
0108421%
0208410BFSI/S1 - E
0218411Extraversion
0098420
0258410BFSI/S1 - N - PR
0288411Emotional stability
01084200
0108421%
0208410BFSI/S1 - N
0288411Emotional stability
0098420
0258410BFSI/S1 - O - PR
0178411Openness
01084200
0108421%
0208410BFSI/S1 - O
0178411Openness
0098420
```

3.5.4.3.4 Test result in PDF format

In addition to the GDT output file, the GDT plugin also generates a test result in PDF format. This PDF file is saved in the directory specified by the `PDFExportPath` setting and is referenced in the GDT file using field **6305 – Reference to the file**.

3.5.4.3.5 Logging

The **VIS** and **GDT plugin** generate log data that can be used to analyze their functionality. This data is recorded in the following log files:

```
C:\ProgramData\Schuhfried\Logs\VTS.Integration.Service.log
```

Please note: The directory “C:\ProgramData” is hidden by default. You can either make hidden items visible in your Windows Explorer or simply paste the path to the file into its address bar.

3.5.5 HL7 plugin

The **HL7 plugin** provides a standardized interface for data exchange between the Vienna Test System (VTS) and external systems. It is available as plugin of the VTS integration service (VIS). It facilitates the HL7 (Health Level Seven) standard for the electronic exchange of clinical and administrative data between healthcare systems. It enables seamless communication between various medical applications, ensuring interoperability and efficient data sharing.

The plugin implements a subset of the **HL7 version 2.5.1** standard, the following message types are supported:

- **ORM** – Order messages
  - Used for creation of new persons and assigning testing to that person
- **ORU** – Observation result messages
  - Used for output of test results in numerical format
- **MDM** – Medical document management messages
  - Used for output of test results in PDF format

VTS implements a **subset of segments** for each supported message type, tailored to the needs of our system. More information about the structure of messages can be found in the sections for each message within this documentation.

3.5.5.1 Overview of functionality

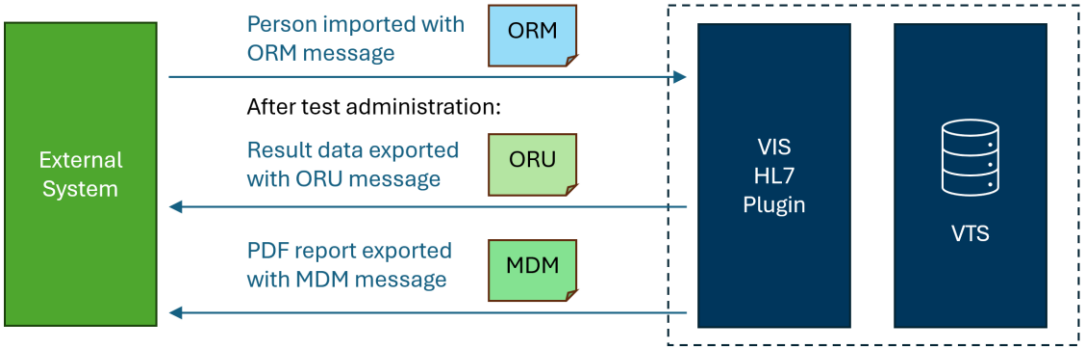
The HL7 plugin enables both the import of persons into the system as well as the automatic export of test results and reports after a completed testing. Persons are imported using **ORM messages** that allow the specification of personal data (e.g. first name, last name, date of birth) according to the HL7 standard. Once a person is successfully imported, testing can begin based on the customer’s workflow — either through Direct Testing or by starting the test directly from the VTS administration software.

After a testing is completed, the HL7 plugin can trigger an automatic export back to the connected external system:

- **Test result values** are exported using **ORU messages**
- **A PDF document** containing test results or **PDF reports** generated from a Word-based report template are exported using **MDM messages**

The plugin supports exporting **both ORU and MDM messages**, or just one of them, depending on the preferred configuration.

Only persons that have been imported via HL7 trigger an automatic export via HL7. Test results for individuals who are manually created or already exist in the system prior to HL7 import will **not** be exported. The following diagram outlines the basic workflow when using VTS with the HL7 plugin:



The data exchange is possible via a file based interface or over TCP communication, which are here referred to as **file-based** and **TCP-based** mode. The core functionality of the HL7 plugin is identical in both **file-based** and **TCP-based** mode. The only difference lies in the method of message transmission between the VTS and the connected system.

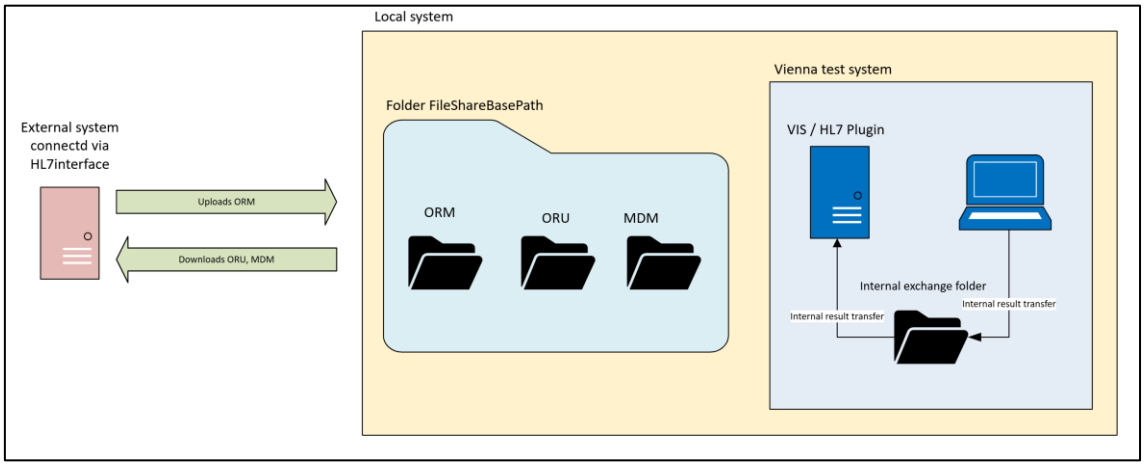
3.5.5.1.1 File-based mode

In **file-based mode**, the HL7 plugin monitors a folder for incoming **ORM messages**. When a new file is detected, the plugin processes the message and creates a new person record based on the data contained in the ORM message.

Once a testing is completed, the plugin performs the following actions:

- If configured**, generates an ORU message** containing the values of selected test variables.
    - The ORU message is saved into the “ORU” subfolder in the configured `FileShareBasePath`
- If configured**, generates an MDM message** that includes a **Base64-encoded PDF**
    - The ORU message is saved into the “MDM” subfolder in the configured `FileShareBasePath`

This workflow ensures that both structured data (via ORU) and document-based results (via MDM) are consistently exported and available for integration with external systems.



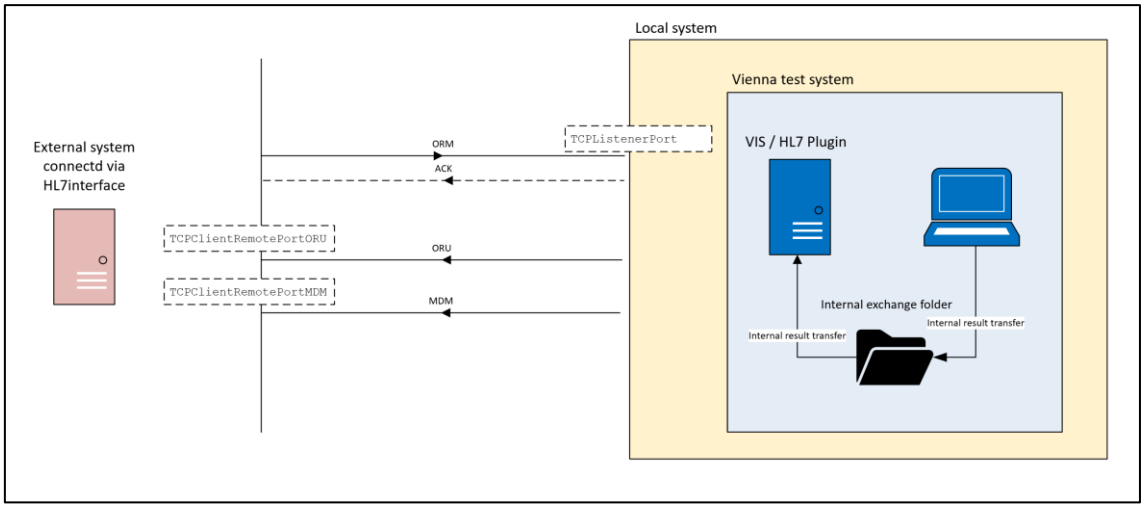
3.5.5.1.2 TCP-based mode

In TCP-based mode, the HL7 plugin listens on a predefined port for incoming **ORM messages**. Upon receiving and processing a message, the plugin will, depending on the configuration, either send an **ACK message** with a status response or proceed without acknowledgment. If the incoming ORM message meets all required criteria, a new person record is created and becomes available for testing.

Once a testing is completed, the plugin performs the following actions:

- If configured**, generates an ORU message** containing the values of selected test variables.
    - Sends the ORU message over TCP connection to predefined address and port
- If configured**, generates an MDM message** that includes a **Base64-encoded PDF**
    - Sends the MDM message over TCP connection to predefined address and port

This workflow ensures that both structured data (via ORU) and document-based results (via MDM) are consistently exported and available for integration with external systems.



3.5.5.2 Setup and configuration

For the HL7 interface to function correctly, the HL7 plugin must be configured in the VIS settings file. Additionally, configuration through the old design of the VTS is required to set up the CSV export profile for data transmitted via the ORU message, as well as to configure the PDF file sent with the MDM message. This PDF may either contain the result directly or a result generated from a Word-report template. Here is a short step by step guide on how to configure a minimal working HL7 setup using file-based mode. For advanced options please refer to the sections below.

3.5.5.2.1 1. Adapt the VIS settings file

The HL7 plugin must be enabled and configured in the settings file of the VIS, by default located in `%PROGRAMFILES%\SCHUHFRIED GmbH\Vienna Test System 8\IntegrationService\appsettings.json`
Note: This is the default installation path. If the Vienna Test System was installed to a different location, the actual path may vary accordingly.

This file contains the configuration of all available VIS plugins. All settings relevant to the HL7 plugin can be found under the section starting with “HL7Plugin”.

```
"HL7Plugin": {
  //...
}
```

3.5.5.2.1.1 1.1. Enable the HL7 plugin

In order to enable the HL7 plugin, change the value of the `Enabled` property to `true`.

```
"Enabled": "true",
```

3.5.5.2.1.2 1.2. Configure a file share path

The file-based data exchange facilitates a directory for exchanging the various messages. The path to this directory must be set via the `FileShareBasePath` setting. The directory specified must exist and be accessible both by the VIS as well as the external system that you want to connect to (e.g. your KIS).

Note: Since the configuration is in a JSON file, all backslashes (“\”) must be escaped (“\\”). The use of network drives is possible, but Windows filesystem restrictions require that the logon account of the “WTS Service” has access to the chosen location. By default, the “Local System Account” is configured, which usually does not have such access.

Example

Example directory configuration in the appsettings.json, assuming "C:\My-HL7-Exchange" is a custom folder intended for HL7 file exchange

```
"HL7Plugin": {
    "Enabled": "false",
    // ...
    //File based settings
    "FileShareBasePath": "C:\\My-HL7-Exchange",
    // ...
  },
```

3.5.5.2.1.3 1.3. Apply changes

⚠ After saving changes to the settings file, you must restart the Windows service “WTS Service” for the system to apply the updates and load the plugin with the new configuration. If you are unsure how to restart a Windows service, you may also reboot your machine.

3.5.5.2.2 2. Configuration in the Vienna Test System Client

Now that the HL7 plugin is configured, the VTS must be configured accordingly. The following settings must be configured in the “Settings” tab of the Vienna Test System Client (old design). Please note that those settings are currently only available in the old design of the Client, you may need to switch to it to access them.

- Configuration of folder for internal data export
- Configuration of Person database, so that it contains necessary fields
- If ORU message is desired, configuration of variables transmitted in the ORU message

- If MDM message is desired, configuration of type of file transmitted in the MDM message

3.5.5.2.2.1 2.1. Configuration of folder for internal data export

Go to **Settings** → **Data export / import** → **Default Folder for data export** and use the folder selector to choose the directory where the VTS will export the test results.

This folder serves as the internal exchange location for transferring data between the VTS and the HL7 plugin and can be set to any directory of your choosing.

3.5.5.2.2.2 2.2. Configuration of Person database

1. Navigate to **Settings** → **Person Management** → **Person database** and click on the **Define** button.
2. In the opened **"Define person database"** window, ensure that the following fields are selected in the right-hand panel of the selector:
    - **Personal ID**
    - **Test battery for Direct Testing**
    - **Comments**
3. If any of these fields are not already selected, add them from the list of available fields on the left-hand side.
    - Additional fields may also be selected. While they do not interfere with the functionality of the HL7 plugin, they will not be included in the exported data.
4. Click **OK** to save the changes.

3.5.5.2.2.3 2.3. Configuration for the ORU message

The **ORU message** includes values of test variables that can be freely defined. To configure which variables should be exported, follow these steps:

1. Navigate to **Settings** → **Data export / import**.
2. Click **"Open Management"** under **"Manage export settings"**.
3. In the **"Export Definitions of Results"** window, click **"New"** to create a new export definition.
    - You may assign any name to the new export definition.
4. Select the newly created export definition from the list and configure it as follows:
    - **Delete** all default entries related to personal data export:
        - Person’s Name
        - Date of birth
        - Test duration in minutes
        - Education level
        - Gender
    - From the **"Person database fields"** panel, **add the "Comment" field** and ensure it remains the **first entry** in the table.
    - Enable the checkbox **"Export testing date"**.
5. After configuring the mandatory fields, select any additional test variables you wish to export from the **"Selection"** panel on the right side of the window.

6. Once your selection is complete, click **"Save"** to save the export profile and close the window.
7. Navigate to **Settings** → **Direct Testing** → **Scoring**.
    - In the **"Automatic data export"** dropdown, select the name of the export profile you created in steps 3–6 above.
    - Click **Save** to apply the changes.
8. Navigate to **Settings** → **Test Results Output** → **Additional Options**.
    - In the **"Automatic data export after test presentation"** dropdown, select the name of the export profile you created in steps 3–6 above.
    - Click the **Save** button to apply the changes.

3.5.5.2.2.4 2.4 Configuration for the MDM message

The **MDM message** can be used to export one of the following PDF files, **but not both** at the same time"

- A **PDF containing the test result**, or
- A **PDF generated from a Word report template**.

The required configuration depends on which export format you intend to use.

1. Navigate to **Settings** → **Direct Testing** → **Scoring**.
2. In the **"Automatic file name"** dropdown, select: `3 - Personal ID and unique test ID`
3. In the **"Preferred scoring method"** dropdown, select the scoring method to be used.
4. To export test results as PDF files:
    - In the **"Automatic test results output"** dropdown, select: `2 - Save the test results automatically as PDF file in the folder for data export`
    - *If you do not wish to export results as PDF, skip this step.*
5. To export a PDF generated from a Word report template:
    - In the **"Automatic report generation"** dropdown, select: `2 - Save the report automatically as PDF file in the folder for data export`
    - In the **"Default report template"** dropdown, select the desired Word report template.
    - *If you do not wish to export results as PDF, skip this step.*
6. Click **Save** to apply the changes.
7. Navigate to **Settings** → **Test Results Output** → **Automation Options**.
8. In the **"Automatic file name"** dropdown, select: `3 - Personal ID and unique test ID`
9. To export test results as PDF files:
    - Check the box for **"Automatic test results output"**.
    - *If you do not wish to export results as PDF, skip this step.*
10. To export a PDF generated from a Word report template:

- Check the box for **"Automatic report generation"**.
- In the **"Default report template"** dropdown, select the desired Word report template.
- *If you do not wish to export results as PDF, skip this step.*

11. Click **Save** to confirm and apply the settings.

3.5.5.2.3 3. Test your setup

3.5.5.2.3.1 3.1. Import

Place an example HL7 ORM file into the configured `FileShareBasePath` in the “ORM” subdirectory. After a short time, it should be detected, processed and deleted by the VIS plugin. Verify that the person was correctly created.

See HL7 plugin for an example input file.

3.5.5.2.3.2 3.2. Export

Administer a test, test set or test battery for which an export definition is configured. After the testing is completed, an ORM and MDM output file should appear in the configured `FileShareBasePath` in the respective subdirectories.

3.5.5.2.3.3 3.3. Troubleshooting

In all cases, you may check the log files for information about possible issues (see HL7 plugin)

- **Input files are not processed**
  - Make sure the configured directories are spelled exactly as required
  - Ensure you have a valid VTS license for the VIS service
  - Ensure the “WTS Service” has been restarted and all settings are correctly applied
- **Input files are processed but no persons get created (or not correctly)**
  - The input files could contain invalid or unsupported data
  - Make sure input files are encoded in UTF-8
- **In case of TCP-based mode: No connection can be made to the service or no outputs are delivered**
  - Make sure all configured ports are reachable and accessible through the firewall
  - The configured ports must not be occupied by other services
- **No output files are created**
  - Revisit the ORU and MDM settings in the VTS client
  - Ensure the “WTS Service” has been restarted and all settings are correctly applied

3.5.5.3 Further information and reference

The following sections contain more detailed information about the various topics related to the HL7 plugin and its functionality.

3.5.5.3.1 VIS settings file

The HL7 plugin must be enabled and configured in the settings file of the VIS, by default located in `%PROGRAMFILES%\SCHUHFRIED GmbH\Vienna Test System`

`8\IntegrationService\appsettings.json`
Note: This is the default installation path. If the Vienna Test System was installed to a different location, the actual path may vary accordingly.

This file contains the configuration of all available VIS plugins. All settings relevant to the HL7 plugin can be found under the section starting with “HL7Plugin”.

3.5.5.3.1.1 Settings reference

Field	Description	Note
`HL7Plugin.Enabled`	Defines if the plugin is enabled and should be started.	**Must be set to** `true`
`HL7Plugin.ReceivingApplication`	Value used for MSH-5 Receiving application	Modify only if needed.
`HL7Plugin.ReceivingFacility`	Value used for MSH-6 Receiving facility	Modify only if needed.
`HL7Plugin.SendingApplication`	Value used for MSH-3 Sending application	Modify only if needed.
`HL7Plugin.SendingFacility`	Value used for MSH-4 Sending facility	Modify only if needed.
`HL7Plugin.Mode`	Configuration if File-based or TCP-based mode is used.	**Must be configured.** Allowed values: • `FILE` - for File-based mode • `TCP` - for TCP-based mode
`HL7Plugin.FileShareBasePath`	Specifies the path to the folder used for exchanging files containing HL7 messages. Dedicated subfolders for ORM, ORU, and MDM messages will be automatically created within this directory. The plugin will read from and write to these subfolders as part of its operation.	**Must be configured if File-based mode is used.**

Field	Description	Note
HL7Plugin.TCPClientRemoteHost	Specifies the IP address or hostname of the system connected through the HL7 interface. This value is required for establishing communication between systems.	**Must be configured if TCP-based mode is used.**
HL7Plugin.TCPClientRemotePortORU	Specifies the port on the system connected via the HL7 interface to which the HL7 plugin sends ORU messages over a TCP connection.	**Must be configured if TCP-based mode is used.**
HL7Plugin.TCPClientRemotePortMDM	Specifies the port on the system connected via the HL7 interface to which the HL7 plugin sends MDM messages over a TCP connection.	**Must be configured if TCP-based mode is used.**
HL7Plugin.TCPListenerPort	Specifies the port on the local system running VIS where the HL7 plugin listens for incoming ORM messages transmitted over a TCP connection.	**Must be configured if TCP-based mode is used.**
HL7Plugin.TCPSendTimeout	Specifies the timeout value, in milliseconds, for sending messages to the host. If the HL7 plugin is unable to complete the transmission within this time, the send operation will be cancelled.	Modify only if needed.

Field	Description	Note
`HL7Plugin.SendAck`	Determines whether the HL7 plugin sends an ACK (acknowledgment) message after receiving and processing an incoming ORM message. The ACK message includes information indicating whether the processing was successful and is sent over the same TCP connection.	Modify only if needed. Allowed values: • `true`- ACK message will be send • `false`- ACK message will not be send
`HL7Plugin.TXA2DocumentType`	Specifies the value assigned to the TXA-2 (Document Type) field within the MDM message. This value can be any string up to a maximum length of 30 characters."	Modify only if needed.
`HL7Plugin.TXA17DocumentCompletitionStatus`	Specifies the value assigned to the TXA-17 (Document Completion Status) field within the MDM message. The value indicates the completion status of the document and therefore should conform to HL7-defined codes.	Modify only if needed.
`HL7Plugin.TXA17DocumentCompletitionStatus`	Specifies the value assigned to the OBX-3 (Observation identifier) used in the MDM message.	Modify only if needed.
`AppSettings.Service.MandantName`	Specifies multi-client (e.g. V12345_001) where plugin imports persons.	**Must be configured.**
`AppSettings.Service.Language`	Language used for the imported persons.	**Must be configured.** Language code in BCP 47 format. E.g. de-DE for German, en-US for English.

3.5.5.3.1.2 Example

Example of the section with the initial configuration of the HL7 plugin in the appsettings.json

```
    "HL7Plugin": {
      "Enabled": "false",
      "ReceivingApplication": "KIS",
      "ReceivingFacility": "ORBIS",
      "SendingApplication": "WTS",
      "SendingFacility": "WTS",
      //Possible Values: TCP, FILE
      "Mode": "FILE",
      //File based settings
      "FileShareBasePath": "C:\\HL7FileShare",
      //TCP settings
      //Host can be Hostname or IPAddress
      "TCPClientRemoteHost": "192.168.1.1",
      "TCPClientRemotePortORU": "11001",
      "TCPClientRemotePortMDM": "11001",
      "TCPListenerPort": "11000",
      //Timeout for sending Messages to TCPClientRemote-Address in ms
      "TCPSendTimeout": "10000",
      //Determine if ACK messages should be send on every incoming tcp
  message
      "SendAck": "true"
    },
    "AppSettings": {
      "Service.MandantName": "IncLic_001",
      "Service.Language": "de-DE",
      "LicenseServer": "https://localhost:7014",
      "PortalApiAddress": "https://localhost:7014"
    },
```

3.5.5.3.2 Input ORM message

The input ORM message with personal data to import should contain following segments: MSH, PID, PV1, ORC, OBR, OBX. The message consists of several segments, each segment must start with the field identifier and be terminated using the **Carriage Return (CR)** character (`0x0D`).

> The input message **must be encoded in UTF-8**. Using any other encoding may result in incorrect handling of names containing **special or national characters**, and proper data processing cannot be guaranteed.

In file-mode, the input files must have the extension `*.hl7`. Otherwise, they will not be processed.

3.5.5.3.2.1 Supported ORM fields

Field in ORM message	Filed in VTS	Note
MSH-6		Multi-client. Used to identify mandant where person is imported
MSH-9		Message type. Must contain `ORM` at the fist first component e.g. `ORM^any_text`

Field in ORM message	Filed in VTS	Note
PID-5.1	Last name	
PID-5.2	First name	
PID-7	Date of birth	In format YYYYMMDD
PID-8	Gender	M for Male. F for Female.
PV1 – Patient Visit segment		Segment PV1 must be present in the message. No data are loaded from the segment.
ORC-2.1	Personal ID	Numerical number between 1 and 2147483647 No leading zeros allowed.
OBR-4.1	Test battery for Direct Testing	
OBX-2		Supported values `MN` and `ED`
OBX-5	Education level	**Optional** Numerical value between 0 and 5. • ? - Education level unknown • 1 - Compulsory schooling not completed (less than 9 years of school) or special school • 2 - Completed compulsory schooling or an intermediate secondary school (9-10 years of school) • 3 - Completed vocational training (10-12 years of school) • 4 - High school graduation with university entrance exam (12-13 years of school) • 5 - University or college degree Education level will be set to "? - Education level unknown" if not provided.

3.5.5.3.2.2 Example of the minimal ORM message

```
MSH|^~\&||||IncLic_001|||ORM^any_text||||||||
PID|||||Mustermann^Max||19900418|M|||
PV1||||||||||||||||||||||||||||||||||||||||||||
ORC||123456|||||||||||||||||
OBR||||NameOfTestBattery|||||||||||||||||||||||||||||||||||||||
OBX||ED|||1||||||
```

Example file for download: ORM_file.hl7

3.5.5.3.3 Acknowledgment message ACK

When configured, the **HL7 plugin** returns an **ACK (Acknowledgment) message** upon successful receipt and processing of an **ORM message**.

The `MSA-1` segment of the ACK message will contain:

- 'AA' (Application Accept) if the message was successfully processed.
- 'AR' (Application Reject) if the message was not successfully processed.

```
MSH|^~\&|WTS|WTS|KIS|ORBIS|20250617091651||ACK^O01^ACK|638857486118860565|
P|2.5|||NE|NE|NE
MSA|AA|MSGWTS202100000001
```

3.5.5.3.4 Output ORU message

ORU message contains following segments: MSH, PID, PV1, ORC, OBR and OBX for each exported variable.

Structure of **MSH** segment:

```
MSH-2  Fixed value: ^~\&
MSH-3  Value of SendingApplication from config file
MSH-4  Value of SendingFacility from config file
MSH-5  Value of ReceivingApplication from config file
MSH-6  Value of ReceivingFacility from config file
MSH-7  Date time of the message. Format YYYYMMDDHHMMSS
MSH-9  ORU^R01
MSH-10 Unique message ID
MSH-11 P
MSH-12 2.5
MSH-15 NE
MSH-16 NE
MSH-17 NE
```

The **PID, PV1, and ORC** segments are **exact copies** of the corresponding segments from the incoming ORM message, containing the personal data of the imported person.

The **OBR** segment contains name of the taken test battery for direct testing on position **OBR-4** and date of the test presentation on position **OBR-6**.

For each exported variable is one **OBX** segment created. OBX segments have the following structure:

```
OBX-1  Sequential increasing ID
OBX-2  NM - Numeric
OBX-3  Name of the exported variable
OBX-5  Value of the variable
OBX-11 F - Fianal result
OBX-14 - Date time of the observation in format YYYYMMDD
```

3.5.5.3.4.1 Example of the ORU message

```
MSH|^~\&|WTS|WTS|KIS|ORBIS|20250529121752||ORU^R01|638841178723625157|P|2.
5|||NE|NE|NE
PID|||||Mustermann^Max||19900418|M|||
PV1||||||||||||||||||||||||||||||||||||||||||||||||
ORC||123456|||||||||||||||||||
OBR||||NameOfTestBattery||20250529||||||||||||||||||||||||||||||||||||
OBX|0|NM|PRIO/S1 RawScore - A - Raw score Artistic interests
(A)||893||||||F|||20250529|||
OBX|1|NM|PRIO/S1 RawScore - C - Raw score Conventional interests
(C)||908||||||F|||20250529|||
```

3.5.5.3.5 Output MDM message

MDM message contains following segments: MSH, EVN, PID, PV1, TXA and OBX containing exported pdf with base 64 encoding.

Structure of **MSH** segment:

```
MSH-2  Fixed value: ^~\&
MSH-3  Value of SendingApplication from config file
MSH-4  Value of SendingFacility from config file
MSH-5  Value of ReceivingApplication from config file
MSH-6  Value of ReceivingFacility from config file
MSH-7  Date time of the message. Format YYYYMMDDHHMMSS
MSH-9  ORU^R01
MSH-10 Unique message ID
MSH-11 P
MSH-12 2.5
MSH-15 NE
MSH-16 NE
MSH-17 NE
```

Structure of **EVN** segment:

```
EVN-1 Fixed value T02
EVN-2 Date time of the message. Format YYYYMMDDHHMM
EVN-3 Date time of the message. Format YYYYMMDDHHMM
```

The **PID** and **PV1** segments are **exact copies** of the corresponding segments from the incoming ORM message, containing the personal data of the imported person.

Structure of **TXA** segment:

```
TXA-1  Fixed value 1
TXA-2  Value of TXA2DocumentType from config file
TXA-3  Fixed value application/pdf
TXA-8  Date time of the message. Format YYYYMMDDHHMM
TXA-12 Name of the exported pdf file with ^WTS suffix
TXA-16 Name of the exported pdf file
TXA-17 Value of TXA17DocumentCompletitionStatus from config file
```

Structure of **OBX** segment:

```
OBX-1  Fixed value 1
OBX-2  Fixed value ED
OBX-5  PDF in base 64 encoding with fixed format
WTS^application^pdf^Base64^[PdfFileInBase64Encoding]
OBX-11 Fixed value F
OBX-14 Date time of the obesrvation in format YYYYMMDDHHMMSS
```

3.5.5.3.5.1 Example of the MDM message

```
MSH|^~\&|WTx|WT2x|KIx|ORBIx|20250529122932||MDM^T02^MDM_T02|638841185728576710|P|2.5|||NE|NE|NE
EVN|T02|202505291229|202505291229
PID|||||Mustermann^Max||19900418|M|||
PV1||||||||||||||||||||||||||||||||||||||||||||||||
TXA|1|Report|application/pdf|||||202505291229||||21000008_7ad50946-ecd4-4e04-8d3c-96bac437cc34.pdf^WTS||||21000008_7ad50946-ecd4-4e04-8d3c-96bac437cc34.pdf|AU
OBX|1|ED|||WTS^application^pdf^Base64^[PdfFileInBase64Encoding]||||||F|||20250529121738|||
```

3.5.5.3.5.2 Line separators

In the generated files, each line is terminated using the **Carriage Return (CR)** character (`0x0D`).

When messages are transmitted over TCP using the **Minimal Lower Layer Protocol (MLLP)**:

- A **Vertical Tab (VT)** character (`0x0B`) is added at the **beginning** of the message.
- A combination of **File Separator (FS)** and **Carriage Return (CR)** characters (`0x1C 0x0D`) is appended at the **end** of the message

3.5.5.3.6 Logging

The **VIS** and **HL7 plugin** generate log data that can be used to analyze their functionality. This data is recorded in the following log files:

```
C:\ProgramData\Schuhfried\Logs\VTS.Integration.Service.log
```

Please note: The directory “C:\ProgramData” is hidden by default. You can either make hidden items visible in your Windows Explorer or simply paste the path to the file into its address bar.

3.5.5.3.7 Limitations

Test results can only be transmitted for persons who were imported into the system via the HL7 interface. Results for persons who were created manually or who already existed in the system prior to HL7 import will **not** be exported.

3.5.6 Universal plugin

The **Universal plugin** provides a standardized interface to the **Vienna Test System (VTS)**, enabling:

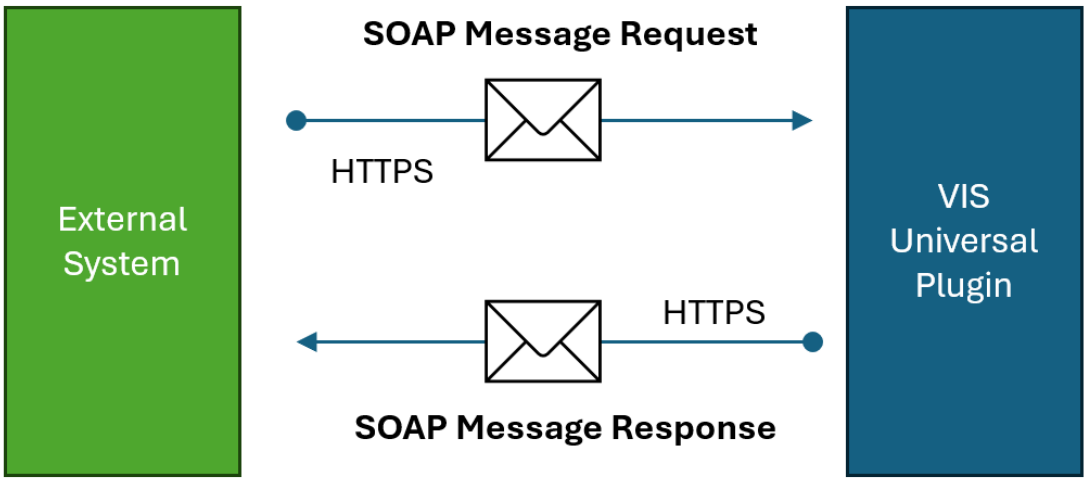
- **Person management** (creation, updating, searching and sending invitations for an online test)
- **Export of test results** in **PDF**, **CSV** and **SPSS** formats
- Various other operations such as the retrieval of test status or triggering an archiving operation

Communication is handled via a **SOAP 1.2 Web Service**, ensuring compatibility with open standards and integration flexibility.

3.5.6.1 Overview of functionality

SOAP (Simple Object Access Protocol) is a standard for sending messages between systems and applications. It offers a reliable way to exchange information. The Universal plugin includes a SOAP web service that supports different message types, allowing external systems to control the VTS or get data from it. Although SOAP supports various transport methods, the Universal plugin uses only HTTPS for communication.

The Universal plugin web service is passive, meaning it only reacts to incoming messages. It does not initiate any communication on its own and relies entirely on external systems to send requests or commands.



3.5.6.1.1 Authentication

The Universal plugin requires WS-Security authentication using a **UsernameToken over HTTPS**. All SOAP requests must be sent over a secure HTTPS connection, and the WS-Security header must include a `UsernameToken` containing the valid username and password. No client certificates are required. When testing with tools like SoapUI, ensure that WS-Security is enabled with `UsernameToken`, and set the password type to either plain text (`PasswordText`), as required by your environment. Username and password for authentication are configured in the plugin config file, see also Universal plugin.

3.5.6.2 Setup and configuration

In order for the SOAP web service to be available, the **Universal plugin** must be configured in the **VIS settings file**. By default, the plugin listens to **port 9010**. If this port

is unavailable or already in use by another application, it can be easily changed within the configuration file.

Here is a short step by step guide on how to configure a minimal working setup. For advanced options please refer to the sections below.

3.5.6.2.1 1. Adapt the VIS settings file

The Universal plugin must be enabled and configured in the VIS settings file by default located in `C:\Program Files\SCHUHFRIED GmbH\Vienna Test System 8\IntegrationService\appsettings.json`
Note: This is the default installation path. If the Vienna Test System was installed to a different location, the actual path may vary accordingly.

This file contains the configuration of all available VIS plugins. All settings relevant to the Universal plugin can be found under the section starting with “UniversalPlugin”.

```
"UniversalPlugin": {
  //...
}
```

3.5.6.2.1.1 1.1. Enable the Universal plugin

In order to use the Universal plugin, ensure the value of the `Enabled` property is set to `true` (it is enabled by default).

```
"Enabled": "true",
```

3.5.6.2.1.2 1.2. (Optional) Configure a custom port

If a port different to the standard one shall be used to listen to incoming requests, it needs to be changed in a setting named “Urls”, outside of the section “UniversalPlugin”.

```
"Urls": "https://localhost:9010",
```

3.5.6.2.1.3 1.3. Apply changes

⚠ After saving changes to the settings file, you must restart the Windows service “WTS Service” for the system to apply the updates and load the plugin with the new configuration. If you are unsure how to restart a Windows service, you may also reboot your machine.

3.5.6.2.2 2. Test your setup

3.5.6.2.2.1 2.1. Verify service operation

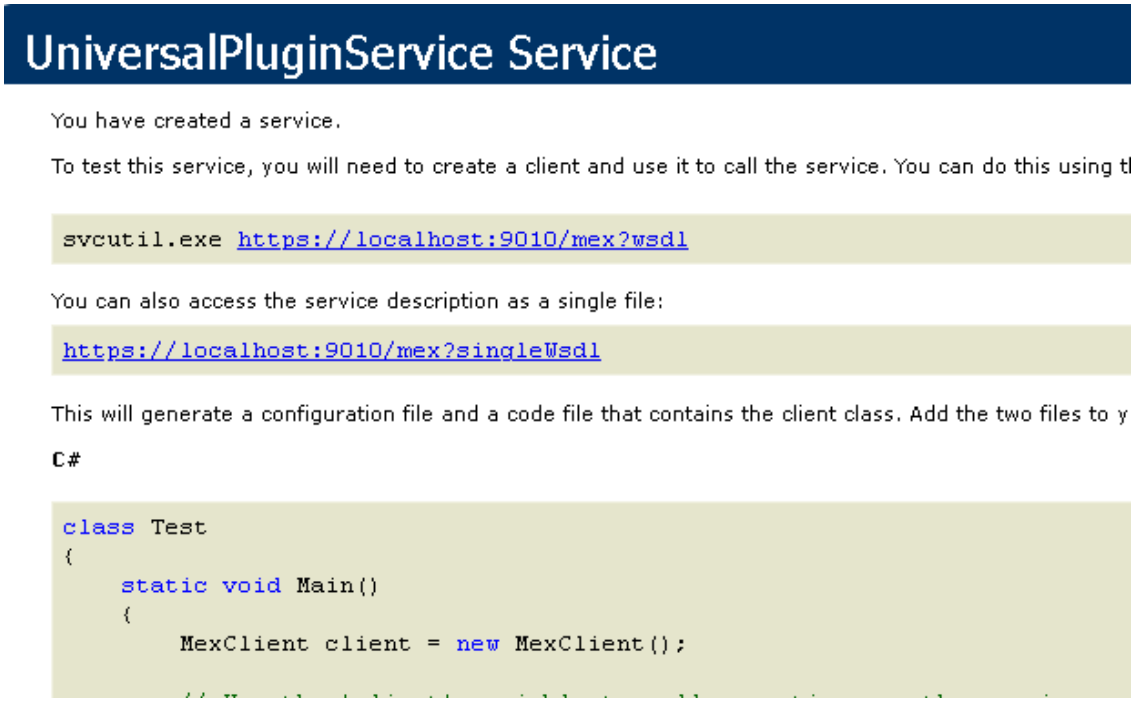
To confirm that the Universal plugin is running correctly, open a web browser and navigate to the plugin’s **Metadata Exchange (MEX) endpoint**:

```
https://[machineName]:[port]/mex
```

For example, if running locally on the default port:

```
https://localhost:9010/mex
```

This endpoint provides metadata about the service and should be accessible if the plugin is properly configured and operational. The following screenshot shows how it should look like in the web browser:



Please note that the “singleWsdl” endpoint does not work due to legacy reasons (namespace collisions that cannot be resolved in order to maintain compatibility).

3.5.6.2.2.2 2.2. Samples

A sample project can be downloaded from the following link: https://dev.azure.com/SchuhfriedGmbh/SchuhfriedPublic/_git/VisSamples.

Consider reading the project’s README.md before running it.

3.5.6.2.2.3 2.3. Troubleshooting

In all cases, you may check the log files for any hints about what could be wrong (see: Universal plugin)

- **The MEX service endpoint cannot be reached in browser**
  - A firewall may block incoming connections to the configured port. Ensure that incoming connections on the specified port are accepted.
  - Verify that the configured port matches the port used in the URL
  - Ensure the “WTS Service” has been restarted and all settings are correctly applied
- **Messages are terminated with 401 or 403 HTTP status codes**
  - Ensure that messages are properly authenticated (see above)
- **Messages are terminated with error status codes**
  - Ensure that there are no inconsistencies in your data, e.g. malformed fields or a reference to a non-existing test battery.
  - Check the logs for information about possible issues.

3.5.6.3 Further information and reference

The following sections contain more detailed information about the various topics related to the Universal plugin and its functionality.

3.5.6.3.1 VIS settings file

The Universal plugin must be enabled and configured in the settings file of the VIS by default located in `C:\Program Files\SCHUHFRIED GmbH\Vienna Test System 8\IntegrationService\appsettings.json`
Note: This is the default installation path. If the Vienna Test System was installed to a different location, the actual path may vary accordingly.

This file contains the configuration of all available VIS plugins. All settings relevant to the Universal plugin can be found under the section starting with “UniversalPlugin”.

3.5.6.3.1.1 Settings reference

Field	Description	Note
`Urls`	URL and port under which is plugin running	Modify only if needed.
`UniversalPlugin.Enabled`	Defines if the plugin is enabled and should be started.	**Must be set to** `true`
`UniversalPlugin.DefaultTestBattery`	Default test battery for direct testing used for the imported persons in case test battery is not provided in the call to create new person.	Modify only if needed.
`UniversalPlugin.CertificateSearchKind`	Type of identification of the certificate in the communication with the plugin.	Modify only if needed.
`UniversalPlugin.CertificateSearchValue`	Identification of the certificate used in the communication with the plugin.	Modify only if needed.
`UniversalPlugin.UsernameToVisService`	The expected username that clients must provide in the WS-Security `UsernameToken` when sending SOAP requests. This acts as the primary identity used to validate the sender.	**Must be configured.**
`UniversalPlugin.PasswordToVisService`	The password associated with the specified username. This value must match the password included in the WS-Security `UsernameToken` received in the SOAP message. Depending on the client's configuration, the password may be sent in plain text or as a password digest.	**Must be configured.**
`AppSettings.Service.MandantName`	Specifies multi-client (e.g. V12345_001) where plugin performs actions.	**Must be configured.**

Field	Description	Note
`AppSettings.Service.Language`	Language used for the imported persons.	**Must be configured.** Language code in BCP 47 format. E.g. de-DE for German, en-US for English.

3.5.6.3.1.2 Example

Example of the section with the initial configuration of the Universal plugin in the appsettings.json

```
"Urls": "https://localhost:9010",
"UniversalPlugin": {
  "Enabled": "true",
  "DefaultTestBattery": "",
  "CertificateSearchKind": "FindBySubjectName",
  "CertificateSearchValue": "SchuhfriedSelfSignedCertificate",
  "UsernameToVisService": "customUsername",
  "PasswordToVisService": "customPassword"
},
```

3.5.6.3.2 Interface description

A complete description of the interface is available in the **WSDL file** available via the interface's **Metadata Exchange (MEX) endpoint** (`https://[machineName]:[port]/mex`).

Below is a summary of the available endpoints:

3.5.6.3.2.1 Endpoints

Name	URL
IUniversalPluginService	`https://[machineName]:[port]/Universal`
IUniversalPluginServiceStreamed	`https://[machineName]:[port]/UniversalServiceStreamed`
IUniversalPluginSpecialCaseService	`https://[machineName]:[port]/UniversalSpecialCase`
IMex	`https://[machineName]:[port]/mex`

3.5.6.3.2.2 IMex interface

Operation name	Description
Ping	Ping endpoint to verify functionality of the plugin. Can be called without authentication.

3.5.6.3.2.3 IUniversalPluginService operations

Operation name	Description
GetCandidate	Returns data for a single person.
GetAllCandidates	Returns data for all persons in the database.
AddCandidate	Creates new person in the VTS database.
UpdateCandidate	Updates existing person.
DeleteCandidate	Deletes one person.
DeleteCandidates	Deletes multiple persons.
DeleteAllTestResults	Deletes results of specified persons.
GetInvitationLink	Creates new person and generates invitation link for online testing.
GetResultIDsForCandidate	Returns IDs of all results for a person.
GetVariableValuesForResult	Returns values of specified test variables from a test result.
GetResultAsSPSS	Returns test result exported in SPSS format.
GetControlMonitorEntries	Returns data from active test sessions currently in progress for individual machine.
GetControlMonitorEntriesUsingDepartmentFeature	Returns data from active test sessions currently in progress for individual machine filtered by department of the test person.
StartArchive	Triggers archiving process.

3.5.6.3.2.4 IUniversalPluginServiceStreamed operations

Operation name	Description
ImportTestResults ***(deprecated)***	*Deprecated - may be removed in a future version.*
GetResultAsPDF	Returns test result exported in PDF format.
GetResultAsCSV	Returns test result exported in CSV format.
GetWordReportAsPDF ***(deprecated)***	*Deprecated - may be removed in a future version.*

3.5.6.3.2.5 IUniversalPluginSpecialCaseService operations

Operation name	Description
GetTestProtocol ***(deprecated)***	*Deprecated - may be removed in a future version.*
GetFitValue ***(deprecated)***	*Deprecated - may be removed in a future version.*
GetTotalPresentedItemsCount ***(deprecated)***	*Deprecated - may be removed in a future version.*
AddCandidates ***(deprecated)***	*Deprecated - may be removed in a future version.*

3.5.6.3.2.6 Data types

The data types used in the available operations are specified in the WSDL document. The names of the fields should be self-explanatory.

3.5.6.4 Logging

The **VIS** and **Universal plugin** generate log data that can be used to analyze their functionality. This data is recorded in the following log files:

```
C:\ProgramData\Schuhfried\Logs\VTS.Integration.Service.log
```

3.5.7 VTSCommand tool

The **VTSCommand tool** is a command-line utility designed to export and save test results from the **Vienna Test System (VTS)** as `.xstp` archive files. In addition to archiving, the tool offers the following capabilities:

- **Result cleanup:** Optionally deletes all archived test results.
- **Person cleanup**: Optionally deletes person records from VTS if all associated test results have been successfully archived, if no test results exist, or if only unfinished tests are present.
- **Certificate management**: Allows replacement of the service's certificate with a different **X.509 certificate** to be used by VTS.

3.5.7.1 Preconditions

For the tool to work, the Universal plugin must be configured and running on port 9010. For more information about configuring the Universal Plugin, refer to the Universal Plugin Documentation.

Username and password in the configuration of the Universal plugin **must stay empty** for the VTSCommand tool to be able to connect to it.

Example of the section with the initial configuration of the Universal plugin in the appsettings.json

```
"Urls": "https://localhost:9010",
"UniversalPlugin": {
  "Enabled": "true",
  "DefaultTestBattery": "",
  "CertificateSearchKind": "FindBySubjectName",
  "CertificateSearchValue": "SchuhfriedSelfSignedCertificate",
  "UsernameToVisService": "",
  "PasswordToVisService": ""
},
```

3.5.7.2 Location of the tool

The tool is by default located in the folder `C:\Program Files\SCHUHFRIED GmbH\Vienna Test System 8 Client\AdminClient\VTSCommand.exe`

Note: This is the default installation path. If the Vienna Test System was installed to a different location, the actual path may vary accordingly.

3.5.7.3 Parameters

The following parameters define the specific actions the tool should perform.

Parameter		Description
Archiving functionality		
`-a`	Mandatory	Starts archiving functionality.
`-m MandantName`	Mandatory	Specification of the multi-client where the operation will be performed.
`-p Path`	Optional	Specifies the directory where the archive file will be saved. This location must be accessible to the service user under which the tool is running. If not specified, the archive will be saved by default to: `%ProgramData%\Schuhfried\Archive`
`-e`	Optional	Additionally performs CSV export of persons and creates .csv file.
`-d`	Optional	Deletes exported results. Additionally if all results of a person are deleted, person gets deleted as well.
`-w`	Optional	Includes persons without planned tests in the archiving process. If parameter `-e` is used, separate csv file containing persons without planned tests will be created. If parameter `-d` is used, persons who without planned tests will be deleted.
`-u`	Optional	Includes persons with unfinished tests in the archiving process. If parameter `-e` is used, separate csv file containing persons with unfinished tests will be created. If parameter `-d` is used, persons with unfinished tests will be deleted. -u
`-x minutes`	Optional	Specifies the maximum execution time in minutes. Once this time limit is reached, the export process will be stopped.
`-o days`	Optional	Limits archived results to those older than the specified number of days.
`-y`	Optional	If specified, the export will be anonymized. This applies to both the test results export and the optional CSV export of person data (using the `-e` option).
`-h`	Optional	Help command
Configuration of X509 Certificate		

Parameter		Description
`-c`	Mandatory	(Re)configure X509 Certificate for VIS & VTS
`-k`	Required if in combination with `-v`	Defines the certificate search kind. This is the field by which we will be finding the certificate in the Windows certificate store. Valid values are: `FindByThumbprint, FindBySubjectName, FindBySubjectDistinguishedName, FindByIssuerName, FindByIssuerDistinguishedName, FindBySerialNumber, FindByTimeValid, FindByTimeNotYetValid, FindByTimeExpired, FindByTemplateName, FindByApplicationPolicy, FindByCertificatePolicy, FindByExtension, FindByKeyUsage, FindBySubjectKeyIdentifier`
`-v`	Required if in combination with `-k`	Value used to search for the certificate in the Windows certificate store. Example: Use certificate subject name if `-k FindBySubjectName` or certificate thumbprint if `-k FindByThumbprint`
`-f`	Required if in combination with `-q`	Full path to the *.pfx file including filename
`-q`	Required if in combination with `-f`	Password to the *.pfx file
`-n`	Optional	If specified, the tool will not ask for user confirmation in the console

3.5.7.4 Using the tool for archiving

The **VTSCommand** tool supports both **manual archiving** and **automated archiving**, allowing flexible integration into your workflows. For automated use, the tool can be triggered by external schedulers such as **Windows Task Scheduler**, enabling daily or periodic execution for continuous archiving.

3.5.7.4.1 Archiving Options

You can configure the tool to:

- **Archive test results** while keeping them in the system, or
- **Archive and delete test results** from the system after archiving.

In addition to archiving, the tool supports:

- **Deleting persons** with no test results (e.g., created but never used),
- **Deleting persons** with **unfinished tests** (e.g., tests never started or abandoned),
- **Exporting persons** to a `.csv` file.

An **anonymization option** is available for the entire archiving process, allowing sensitive personal data to be anonymized both in archived data and exports, if required.

3.5.7.4.2 Archiving Scope and Retention

You can specify a **retention period** to control which test results are archived or deleted. Only test results older than the defined number of days are processed; newer ones remain in the system.

3.5.7.4.3 Example commands for archiving

The following command exports test results in mandant `W12345_001`. File with extension .xstp will be created in default archiving folder `%ProgramData%\Schuhfried\Archive`

```
VTSCommand.exe -m W12345_001 -a
```

The following command will export and delete all test results and corresponding persons provided they do not have any other unfinished or planned tests.

```
VTSCommand.exe -m W12345_001 -a -d
```

The following command will delete all exported test results and corresponding persons if they do not have any other unfinished or planned tests. Persons in the database with unfinished tests or no test results yet will also be deleted.

```
VTSCommand.exe -m W12345_001 -a -d -w -u
```

The following command will export and delete all test results older than 60 days. Corresponding persons will be also deleted provided they do not have any other unfinished or planned tests. If the export takes more than 8 hours, it will be stopped automatically.

```
VTSCommand.exe -m W12345_001 -a -d -o 60 -x 480
```

3.5.7.5 Using the tool for the configuration of X509 Certificate

The **VTSCommand** tool can be used to (re)configure which X.509 certificate is used by the VTS for the following purposes:

- Hosting TLS services (VIS & VTS)
- Encrypting generated reports

There are two ways to (re)configure the X.509 certificate for VIS and VTS:

1. By referencing an existing certificate installed in the **Local Machine Personal certificate store**
2. By providing the path and password to a `*.pfx` file that contains the certificate and its private key (the certificate will then be installed in the **Local Machine Personal certificate store**)

> ***Note:*** *The tool must be run with administrator privileges; otherwise, the operation will fail.*

3.5.7.5.1 Example commands for certificate configuration

The following command finds a certificate by thumbprint in the computer/my certificate store and configures it to be used by VIS & VTS.

```
VTSCommand.exe -c -k FindByThumbPrint -v
2e6ded878a02917790863e9436dc8878a4140a50
```

The following command installs a certificate from the given pfx file into computer/my certificate store and configures it for the use by VIS & VTS. It skips the (Yes/no) user approval in the console.

```
VTSCommand.exe -c -n -f c:\users\admin\desktop\mycert.pfx -q
mypassword1234
```

3.6 Advanced topics

3.6.1 Install licenses

In the Vienna Test System (VTS), there are several options for installing licenses:

1. If you are using **VTS version 8.28 or later and have an internet connection**, you will find the instructions on the page: Using VTS version 8.28 or later, with internet connection
2. If you are using **VTS version 8.28 or later but do not have an internet connection**, you will find the instructions on the page: Using VTS version 8.28 or later, without internet connection
3. If you are using **VTS version 8.27 or earlier**, you will find the instructions on the page: Using VTS version 8.27 or earlier

Notes on license installation

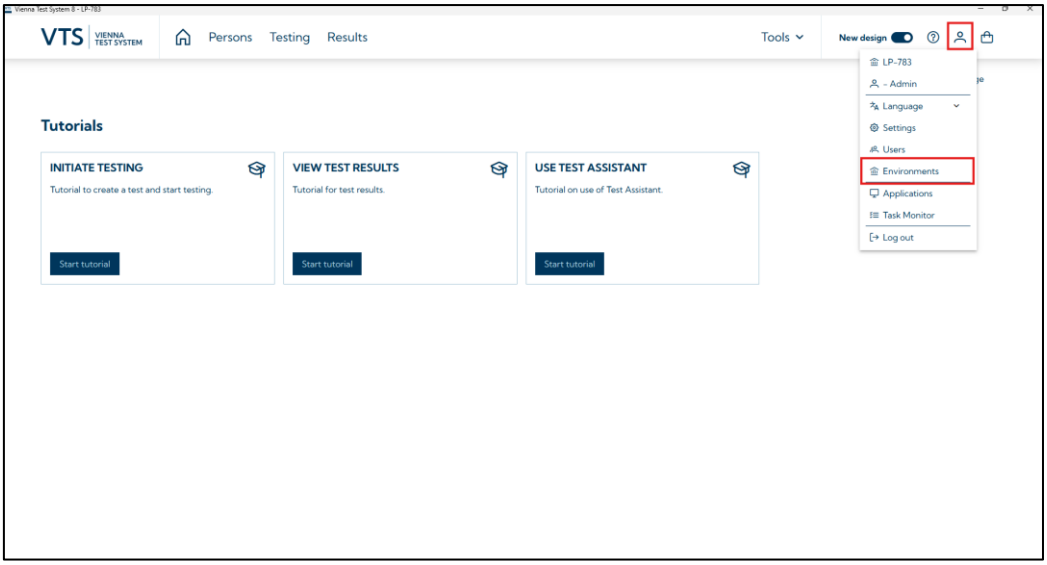
- When you install the VTS administration software for the first time, you will receive either a product key by email or a VTS dongle containing the licenses. How to install the administration software is described on the page Installation and configuration .
- In **VTS online, you do not need to import your purchased licenses separately**. After you have purchased the test licenses for your VTS online in the Marketplace, they are automatically stored for you and ready to use.
- In special cases (especially when installing server/client systems on hardware without internet connection), it may be necessary to install the license before installing the VTS administration software. You will find the corresponding instructions on the page Installation via the Sentinel Admin Control Center.
- If you are using VTS offline, the licenses (license files) for tests or for updating the administration software will be sent to you by email after purchasing the respective products and will be in the format *.v2c* or *.sflic.*

3.6.1.1 Using VTS version 8.28 or later, with internet connection

> Starting with VTS version 8.28, you can switch between two different designs of the administration software. If you are using the older design (dark gray color scheme), please install the update as described on the page (en-US) Using VTS version 8.27 or earlier.

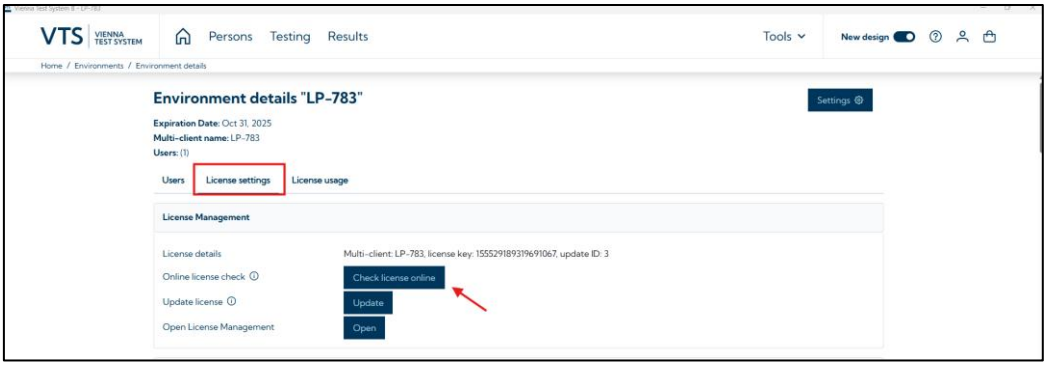
If you are using the new design (white and light blue color scheme) that is enabled by default and your computer has an internet connection, please follow these steps:

1. If you have received a VTS dongle (USB stick), please connect it to your PC.
2. Start the Vienna Test System and click on the icon for your personal account in the top right corner.
3. There, please open your *Environments:*

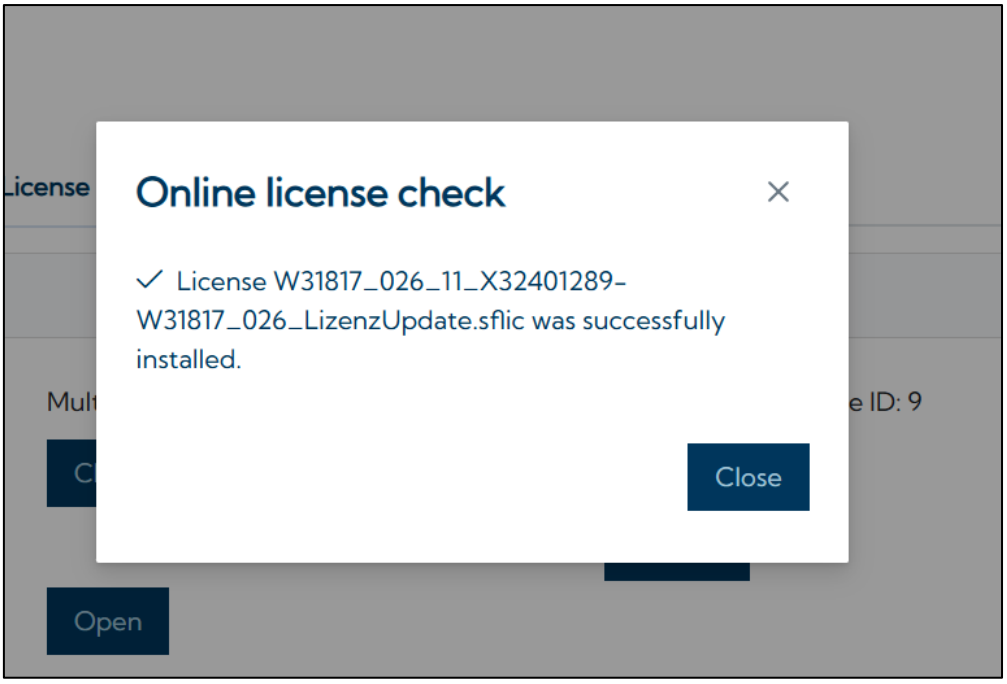


4. Select the workstation you want to update.

5. Go to *License settings*, where you will find the *License Management* section.
6. Click on the button *Check license online.* The VTS will check whether new licenses are available (an active internet connection is required for this).



7. If you have already purchased new licenses, they will now be installed automatically and you will see the following information:



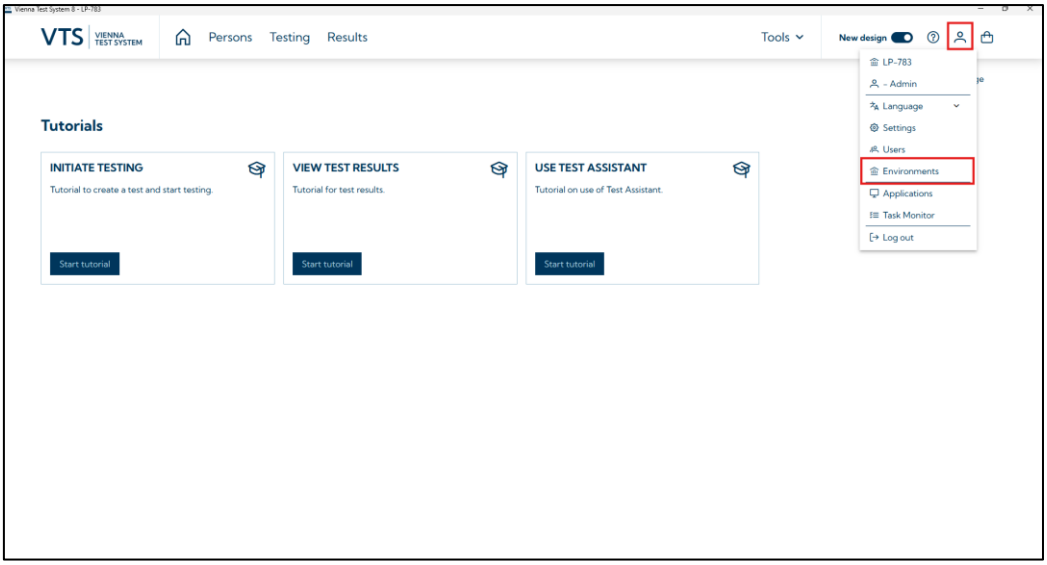
8. The new licenses are now available in your Vienna Test System.

3.6.1.2 Using VTS version 8.28 or later, without internet connection

Starting with VTS version 8.28, you can switch between two different designs of the administration software. If you are using the older design (dark gray color scheme), please install the update as described on the page Using VTS version 8.27 or earlier.

If you are using the new design that is enabled by default (white and light blue color scheme) and the computer does **not have an internet connection**, please follow these steps:

1. Save the license file(s) you received by email on the PC on which the VTS is installed, or download the license file(s) directly from the Marketplace under your order details.
    a. Alternatively, you can use a data carrier (e.g., USB stick) that the VTS can access. Connect the data carrier with the licenses to the PC where the VTS is installed.
2. If you have received a VTS dongle (USB stick), please connect it to your computer.
3. Start the Vienna Test System (administration software) and click on the icon for your personal account in the top right corner.
4. There, please open your *Environments:*



5. Select the workstation you want to update.

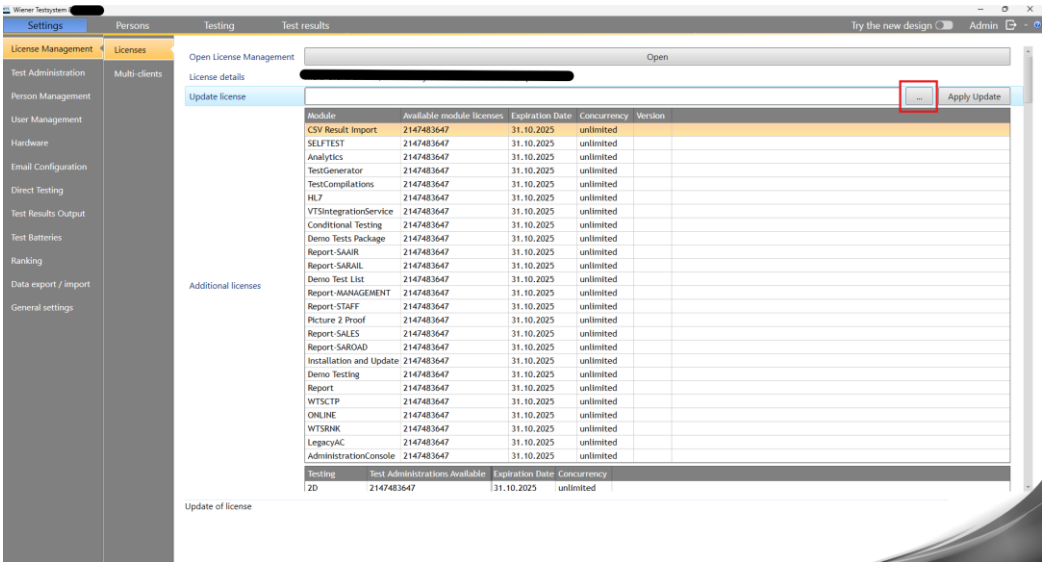
6. Go to the *License settings* tab.
7. Load the new license file by clicking *Update* and selecting the appropriate license file. After selecting the license file, click *Open*.

8. The new licenses will be installed and are now available in your Vienna Test System.

3.6.1.3 Using VTS version 8.27 or earlier

To install the licenses, please proceed as follows:

1. Save the license file(s) on the computer running the Vienna Test System or on a data carrier that can be accessed by the Vienna Test System.
    a. Please note that for software versions up to and including 8.8, files with the extension .v2c must be used. From version 8.8 onwards, files with the extension .sflic should be used.
2. If you have received a VTS dongle (USB stick), please connect it to your computer.
3. Start the Vienna Test System and go to *Settings --> License Management --> Licenses:*



4. Select the license file by clicking on the button with the three dots in the *Update License* line (marked in red in the screenshot above). After selecting the license file, please click *Open*.
5. Click on the *Apply Update* button. The new licenses will now be installed and available in your Vienna Test System.

Please note

- If you are using license files with the extension .v2c, all previously issued license files must be imported before installing the current license file(s).
- Updates to the VTS administration software are protected by a separate license. Before the actual update installation, the system checks whether the necessary license for the update is available.

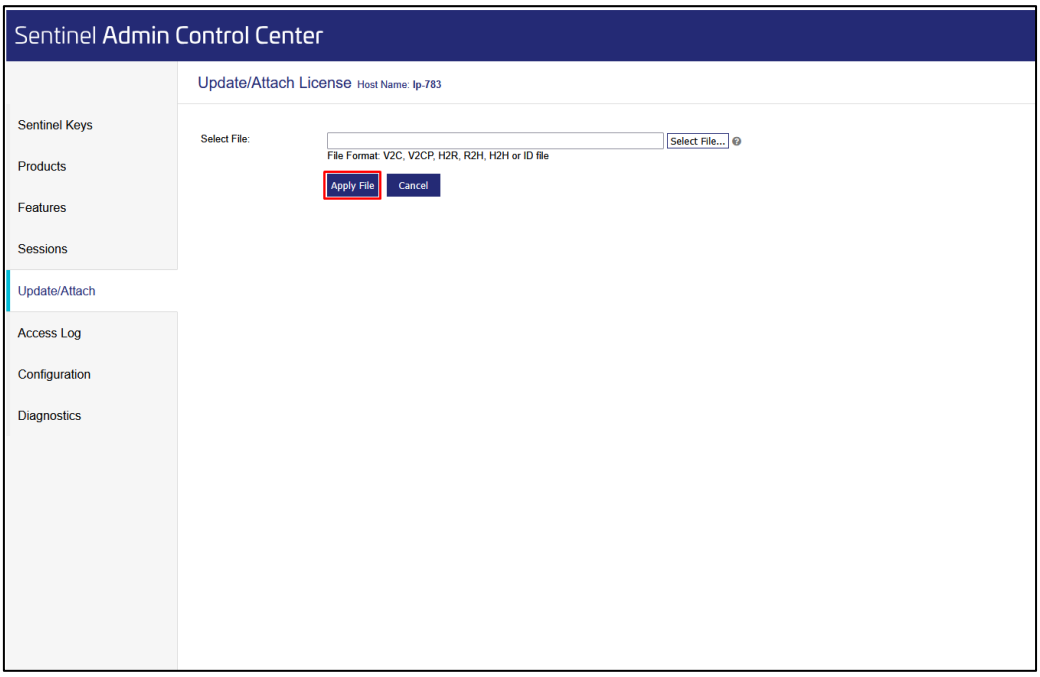
3.6.1.4 Installation via the Sentinel Admin Control Center

If you are using a software dongle, you must import the required licenses via the *Sentinel Admin Control Center* (license management) **before** installing the VTS.

> Only license files with the extension .v2c can be installed via license management.

1. Open your internet browser and enter http://localhost:1947 in the address bar.
2. The *Sentinel Admin Control Center* opens.
3. Select *Update/Attach* in the left navigation bar.
4. Open the license file with *Select File…*.

5. Click on *Apply File* to install the licenses.



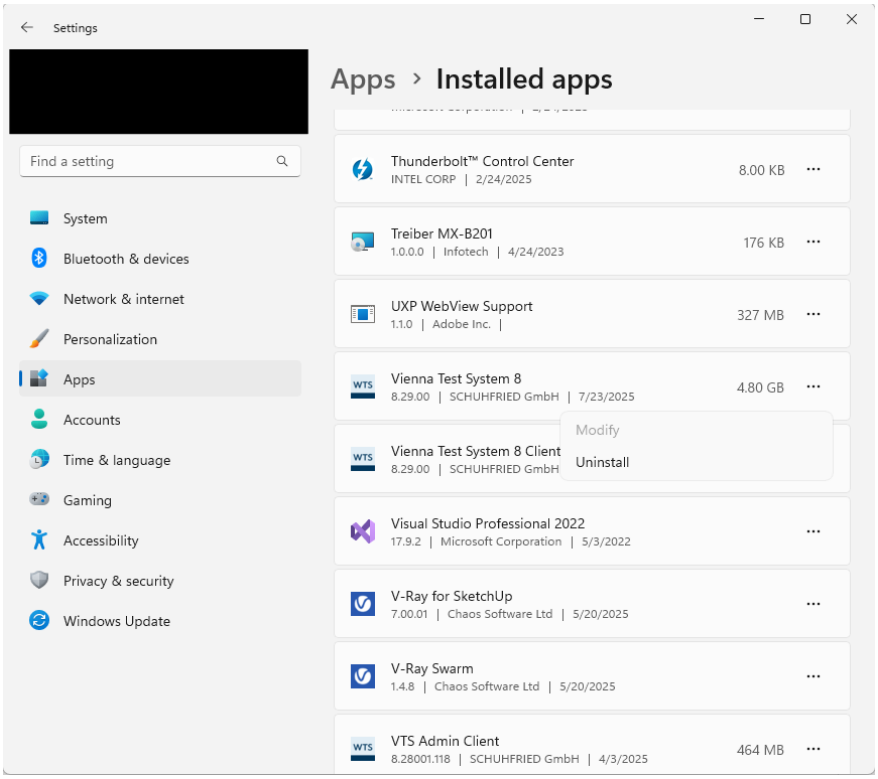
6. You will receive a confirmation message once the licenses have been successfully installed.
7. You will now see the licenses in the *Products* area.

In the VTS administration software, *license management* can be opened on the *Environment Details* page. Licenses for testing can also be installed via license management if necessary.

3.6.2 Uninstalling VTS

To uninstall VTS, proceed as follows:

1. Open Settings (Windows key + I).
2. Go to *Apps* → *Installed apps.*
3. Uninstall VTS.



The databases, and thus all persons and results, **remain** on your system even if the VTS has been uninstalled. Further steps are necessary to remove all files. Please contact our Support for further information.

3.6.3 Backup & recovery of the VTS

The VTS offers the option of backing up the entire system and restoring it. This can be done either

- on the same computer
- on another computer

However, there are a few things to bear in mind and all relevant files must be backed up.

There are two locations where the VTS stores data and which must be backed up accordingly:

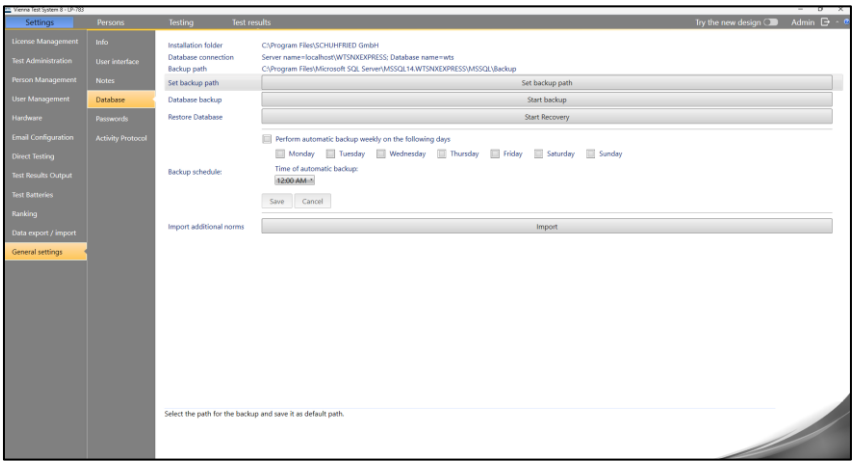
1. The *wts* and *dtc* databases in the SQL server
2. The *WordTemplate* folder under `%PROGRAMDATA%\schuhfried\media`

3.6.3.1 Backing up files

1. We recommend setting up a folder backup (using *Windows Backup* or by manually copying the folder to a safe location) for the *WordTemplate* folder located at %PROGRAMDATA%\schuhfried\media.
2. For the SQL server, VTS offers a built-in function that can be used to trigger an **automatic backup of the SQL server database**. VTS offers the option of defining a backup plan that automatically triggers the backup of the SQL server database according to a weekly schedule. We recommend using this function to set up a backup.

a. In the VTS user interface, go to *Settings* → *General Settings* → *Database* and configure an automatic backup using the appropriate settings. This is only possible in the old VTS user interface. If necessary, deactivate the option *New design:*

i. Make sure that the backup is only performed when the VTS is not in use.



3. In addition, a **manual backup of the SQL database** can be performed:
   a. Stop the *WTS Service*.
   b. Open the *Task Manager* → *Services* → right-click on *WTS Service* → *Stop*
   c. Copy the files in the folder: `%PROGRAMDATA%\Schuhfried\SQLDatabase` to another secure folder.
   d. Restart the *WTS Service*.

3.6.3.1.1 Restoring the VTS on the same computer

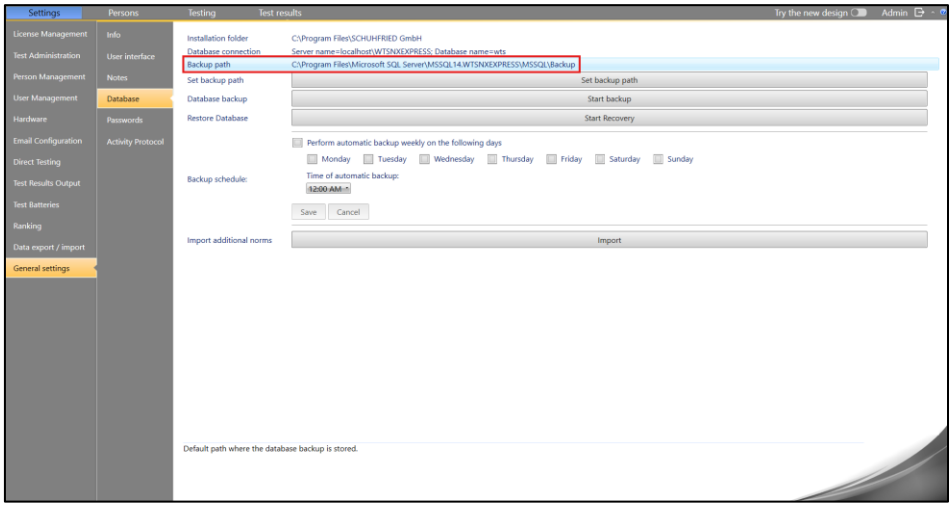
1. You can restore the VTS to a previous, functional state by importing the file created by the automatic backup using the *Restart restoration* function.
   a. It is not possible to import a backup file that was created with an older version of VTS.
2. Restoring the *WordTemplate* folder is not usually necessary, as the folder is still available on the same computer.

3.6.3.1.2 Restoring the VTS on another computer

This procedure can be useful if you need to use a new PC and want to transfer the data from the VTS that was installed on your old PC. To do this, proceed as follows:

1. Perform a backup on the old machine and save the SQL database *wts* and *dtc* as described above.
2. Perform a manual backup of the *WordTemplate* folder under %PROGRAMDATA%\schuhfried\media (copy it to a USB stick, for example).

3. Install the VTS on the new PC (see Installation and configuration).
4. Copy the files created with the backup from the old computer to the corresponding folder on the new computer.
    a. The path to which the backup files of the SQL database must be copied can be read from the VTS administration software.



5. Start the recovery via *Start Recovery*.
6. Copy the backed up folder *WordTemplate* to the path %PROGRAMDATA%\schuhfried\media on the new PC.
7. If you did **not** select *'localhost' as the server address* in the server settings when installing VTS (i.e., you are hosting VTS at an address other than localhost), you must configure the SQL database using the `update_identityserverconfiguration.sql` script.

3.6.3.1.2.1 Notes

- The VTS version on the old and new PCs must be the same.
- The appropriate licenses must be available for installation on the new PC.

3.6.4 Security levels of VTS users

During installation of the VTS, a first user of the VTS is created. With this user, you can start using the Vienna Test System right after installation. The necessary access data is defined during installation (see Single workstation installation or Server/client installation).

The user created during installation is automatically assigned the highest security level (Admin, security level 0). This user can **create new users** and **define their permissions**, as well as change all settings in the Vienna Test System.

When creating additional users in the Vienna Test System, there are different security levels that can be used to configure access to the settings and to the data in the system.

> **Note:** There must always be one user who has the highest security level 0. Otherwise, the Vienna Test System can no longer be administered.

The following security levels are possible:

Security level	Authorization
0	All functions and settings of the Vienna Test System are accessible at this security level.
1	No settings can be changed at this security level. This means that no test batteries can be created or changed, no basic settings (e.g., folder for data storage) can be changed, and no tests can be installed. However, the Vienna Test System can be used for test presentation and access to the databases is unrestricted.
2	At this security level, the Vienna Test System can only be used for test presentation and scoring. The other functions are locked. The test results are only available to a limited extent: Only data records saved during test presentation can be scored after test presentation. Other test results cannot be called up.
3	At this security level, the Vienna Test System can only be used for test presentation. All other functions and access to the database are completely blocked.

3.6.5 Manual changes after installation

3.6.5.1 1. Changing the machine name after installation

If a full SSL certificate is not used, the machine name should be avoided from being changed under any circumstances once the Vienna Test System has been installed. The supplied self-signed SSL certificate is linked to the original machine name. If the machine name is changed, communication between the VTS components will no longer be correctly configured.

If this does happen, the following steps should be taken:

1. Uninstall the Vienna Test System (the database will not be deleted)
2. Make sure that the certificate “SchuhfriedSelfSignedCertificate” is deleted:
    a. Open the *Certificate Management*, run *certlm.msc* on the local computer.
    b. Go to *Personal → Certificates.*
    c. Right-click on *SchuhfriedSelfSignedCertificate* and select *Delete*.
3. Reinstall the Vienna Test System (the existing database will be recognized and used).
4. Make adjustments to the VTS database using an SQL script to apply the new computer names:
    a. Run the SQL script: *update_identityserverconfiguration.sql*. The script is located in the installation files in the Scripts\Help folder.
    b. It is important that the same version of the Vienna Test System is used when uninstalling and reinstalling the software.

3.6.5.2 2. Change the Bit.ly configuration

The VTS uses the external tool “Bitly” to send invitation links via email to the test takers. The following changes can be made to the configuration:

3.6.5.2.1 1. IsBitlyEnabled

This key can be used to enable or disable the Bitly service. Valid values are ‘true’ and “false.” Here is an example:

```
<add key="IsBitlyEnabled" value="false"></add>
```

3.6.5.2.2 2. BitlyAccessToken

This key can be used to overwrite the system's default token. For example, you can use your own Bitly account. Here is an example:

```
<add key="BitlyAccessToken" value="123456789abcdefghijk"></add>
```

3.6.6 Manual installation of the VTS SQL database

This guide explains how **to manually install the VTS database on a Microsoft® SQL Server using a script**. The required Microsoft® SQL Server version can be found in the system requirements for the VTS version to be installed.

These instructions **apply if you are performing a customized installation of VTS for the first time** and prefer not to use the provided Microsoft® SQL Server Express version.

If you are updating a VTS installation that uses a manually installed SQL Server, you must also update the SQL Server or the corresponding VTS databases manually using scripts. You can find the instructions here Manual update of the VTS SQL database.

3.6.6.1 Prerequisites

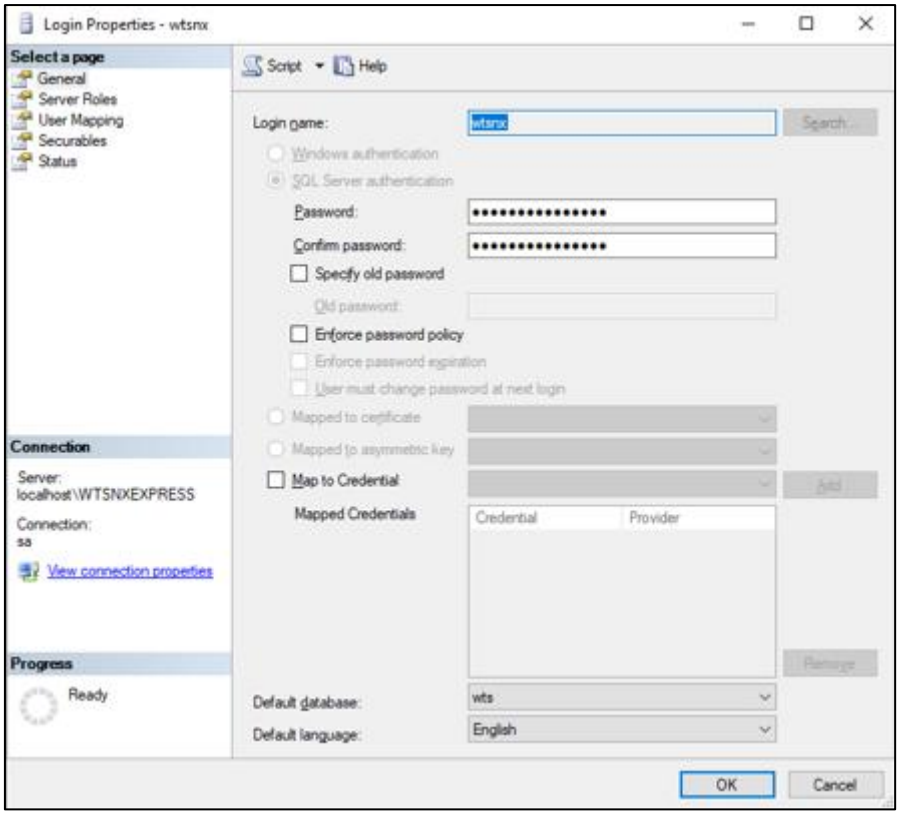
- The SQL server is installed (the version corresponds to the system requirements of the VTS version to be installed).
- You have the SQL Server login data with sufficient rights to create further logins.
- You have permission to execute scripts with the user `sa`.
- You have the necessary SQL scripts for creating the database. These can be found in the VTS installation files (setup) in the `Scripts` folder.

3.6.6.2 Preparing the SQL Server

Before the database can be set up using the scripts, a login “wtsnx” must be created in the designated database instance. **This is mandatory for the installation!**

> You will receive the login password from technical support. Please contact our Support for this.

1. **Creating the login “wtsnx” with Microsoft SQL Server Management Studio:**
    a. Connect to the appropriate SQL Server instance.
    b. Navigate to **Security --> Logins** and add a login with the following details:
        - **Login name**: `wtsnx`
        - **Login type**: SQL Server authentication
        - **Password**: Contact our Support
        - **Enforce password policy**: Deactivate this option



3.6.6.3 Creating the databases for installing the VTS

In this step, all databases required for installing the VTS are set up one after the other using the corresponding scripts.

The following databases must be created:

- *WTS* database: contains person and test data
- *DTC* database: contains information for the browser-based user interface.
- *WTSKatalog* database: contains metadata (only for VTS version 8.28 or older)

> The scripts are located in the installation files under `Scripts\First Installation`. `v8.X.X` stands for the corresponding VTS version. For example, if you are installing VTS 8.29, the scripts are labeled v8.29.0.

3.6.6.3.1 1. Creating the WTS database

Execute the following scripts one after the other in the exact order specified and observe the notes below on executing the scripts!

1. `wts_1_create_database_v8.X.X.sql`
2. `wts_2_create_tables_v8.X.X.sql`
3. `wts_3_insert_data_v8.X.X.sql`
4. `wts_4_optimize_database_v8.X.X.sql`

3.6.6.3.1.1 Notes on executing the scripts

- Make sure that the database is created with the collation **Latin1_General_CI_AI**.
- Make sure to execute the scripts with *sa* user (or a user with equivalent rights).

- By default, a database with the name **wts_deploy** is created.
    - Do **not use a hyphen ('-')** if you use a different name for the database.
    - If a different name is to be used when creating the database, the four SQL scripts must be adjusted accordingly.
- Scripts 1, 2, and 4 can generally be executed from Microsoft SQL Server Management Studio.
- Execute script 3 **via the "sqlcmd" command line**. The command for this is**:** `sqlcmd -S <NameorIPofSQLServer>\<InstanceName> -U sa -P <password> -d <DatabaseName> -i <path to script & scriptname.sql>`
    - Correct installation can only be guaranteed with the user "sa"!

3.6.6.3.1.2 Example of the installation command for script 3

```
sqlcmd  -S localhost\wtsnxexpress
        -U sa
        -P 1234
        -d wts
        -i C:\temp\wts_3_insert_data_v8.15.1.sql
```

3.6.6.3.2 2. Creating the DTC database

Execute the following scripts one after the other in the exact order specified and observe the notes below on executing the scripts!

1. `dtc_1_create_database_v8.X.X.sql`
2. `dtc_2_create_tables_v8.X.X.sql`

3.6.6.3.2.1 Notes on executing the scripts

- Make sure that the database is created with the collation **SQL_Latin1_General_CP1_CI_AS**.

3.6.6.3.3 3. Creating the VTS catalog database

This step is only necessary if you are installing with VTS version 8.28 or earlier. This database is no longer necessary as of VTS version 8.29.

1. In Microsoft® SQL Server Management Studio:
    a. Right-click on Databases and select *Append*.
    b. Click on the *Add* button and select the file `WTSKatalog.mdf`.
    c. **Important**: If necessary, enter the name `WTSKatalog` in the *Append as* column field.
    d. **Caution:** Change the file path in the *Current File Path* column to the .mdf and .ldf files in the extracted folder.
2. Then run the `productdb_1_update_schema_v8.X.X.sql` script on the `WTSKatalog`database.

3.6.6.3.3.1 Notes on executing the scripts

- Make sure that the database is created with the collation **SQL_Latin1_General_CP1_CI_AS**.
- Make sure that the WTSKatalog database is linked to the `wtsnx` user.

3.6.7 Manual update of the VTS SQL database

This guide describes how to perform a manual update to a new version of the VTS database. This guide only applies if you want to update a VTS installation that does not use the provided Microsoft® SQL Server Express version. For such VTS installations, the update cannot be performed by the setup program, but must be done manually instead.

3.6.7.1 Prerequisites

- You have the necessary scripts for the update. These can be found in the installation files in the `Scripts` folder.
- If you are using a VTS version older than VTS version 8.25.00, the password for the SQL login `wtsnx` be changed. Please contact our Support for assistance.

3.6.7.1.1 1. Update the VTS database

> The scripts are located in the installation files under `Scripts\Update Installation`. `v8.X.X` stands for the corresponding VTS version. If you install VTS 8.29, for example, the scripts are labeled v8.29.0.

Execute the following scripts one after the other in the exact order specified and observe the notes below on executing the scripts!

1. `wts_1_update_schema_v8.X.X.sql`
2. `wts_2_update_data_v8.X.X.sql`
3. `wts_3_optimize_database_v8.X.X.sql`

3.6.7.1.1.1 Notes on executing the scripts

- All scripts can be executed in Microsoft® SQL Server Management Studio.

3.6.7.1.2 2. Update the DTC database

- Execute the script `dtc_1_update_schema_v8.X.X.sql`.

> If you are updating from a VTS version that did not yet use a DTC database, first create a DTC database. A description can be found on the page: Manual installation of the VTS SQL database (section 2).

3.6.7.1.3 3. Update the WTSKatalog database

> This step is only necessary if you are installing with a VTS version 8.28 or earlier. From VTS version 8.29 onwards, this database is no longer necessary.

1. Delete the currently used WTSKatalog database and attach the current version of the WTSKatalog database.
   a. A description of how to attach the current WTS catalog database can be found on the page: Manual installation of the VTS SQL database (section 3).
   b. **Note**: If you are updating from a VTS version that did not yet use a VTS catalog database, it is sufficient to attach the current VTS catalog database for the update as described in point a).
2. Run the script `productdb_1_update_schema_v8.X.X.sql`

3.6.8 Silent installation via command line

The VTS administration software can also be installed via the command line. With this type of installation, no visible setup is started. All necessary parameters are transferred via the installation command.

3.6.8.1 Installation command

The installation command has the following structure:

```
WTS8setup.exe /qX DEFAULT_CULTURE="de-DE" AC_USERNAME_PROP="Admin"
AC_PASSWORD_PROP="xxx" WTS_SERVICE_PORT="7001" WTS_PORTAL_PORT="7011"
WTS_PORTAL_URL="xxx"
```

This command can be supplemented with additional optional parameters. For example:

```
LICENSE_FILE="c:\TEMP\W12345_001_01_ID21_31001_Lizenz.v2c"
APPDIR="C:\Program Files\Wiener Testsystem 8"
ICON_TP="1"
/L*V "%temp%\WTS8Silent.log"
```

3.6.8.2 Explanation of parameters

The possible parameters are:

Parameter	Wert	Beschreibung
/qx	1. qr 2. qb 3. qn	1. Display installation progress 2. Display installation progress as progress bar only (without details) 3. No display of installation progress
DEFAULT_CULTURE	de-DE, en-US, …	**Mandatory parameter for initial installation** Determines the language of the administration software and the testplayer. This information is absolutely necessary! The possible languages are listed here: Silent installation via command line. The language of the administration software can also be changed after installation.
AC_USERNAME_PROP	Text	**Mandatory parameter for initial installation** Defines the name of the first user for the Vienna Test System.
AC_PASSWORD_PROP	Text	Defines the password for the user defined by **AC_USERNAME_PROP**. **If NO_AC_PASSWORD is set to 0, this parameter must be used!**
NO_AC_PASSWORD	0 or 1	If the parameter is set to 1, no password is required for login. In this case, other suitable measures must be taken to

Parameter	Wert	Beschreibung
		ensure data protection in accordance with the GDPR. If a password is assigned with **AC_PASSWORD_PROP**, this parameter can be omitted.
PRODUCT_KEY	Text	Specifies the product key if a software dongle is installed with one.
LICENSE_FILE	Text	Specifies the path for a v2c license file if it is to be imported during installation. This is **not necessary** for a first-time installation.
APPDIR	Path	This entry determines the path in which the Vienna Test System is to be installed. If this parameter is not specified, it is the installation directory: *C:\Program Files (x86)\Schuhfried GmbH\Vienna Test System 8*.
ICON_TP	0 or 1	If this parameter is set, the setup creates an icon for the testplayer on the desktop and an entry in the Start menu.
/L*V	Text	This parameter specifies the complete path to a file in which a log file of the installation is created. The file is created during the installation.
/exelang	1031 or 1033	1031: starts the setup in German 1033: starts the setup in English This parameter is optional.
WTS_PORTAL_URL	Text	Specifies the address at which the VTS portal should be accessible. This value should be either the domain name or the machine name (default=machine name). The corresponding URL should be specified.
WTS_SERVICE_PORT	7001	**Mandatory parameter** Specifies the port for the WTS service. A free port in the range 7001 to 7999 must be specified here, via which the VTS clients communicate with the WTS service on the server.
WTS_PORTAL_PORT	7011	Specifies the **base port for the VTS portal**. A free port in the range 7001 to 7999 must be specified here. Please note that seven additional consecutive ports will also be used. This specification is optional. If the default value (7011) is used, the following ports are used: 7011, 7012, 7013, 7014, 7015, 7016, 7017, 7018.

Parameter	Wert	Beschreibung
LICENSE_SERVER_ID	Text	Specifies the IP address or name of the license server in the network, if one is used. This parameter must only be specified if the dongle is connected to a separate license server. In this case, the license server is not the server on which the VTS is installed. The default value is `localhost.` For details, see steps 7 and 8 of the instructions for installing a server/client system.
DB_SERVER_INSTANCE	Text	Specifies the server name of the SQL server (only to be specified if a user-defined SQL server is to be used).
DB_CATALOG_NAME	Text	Specifies the catalog name of the SQL server (only to be specified if a user-defined SQL server is to be used).
SQL_SA_USER	Text	Specifies the login name of the SQL server system administrator (only if a user-defined SQL server is used and the sa user can be specified).
SQL_SA_PASSWORD	Text	Specifies the password of the SQL server system administrator (only if a user-defined SQL server is used and the sa password can be specified).
MANDANT_ID	Text	This parameter can be used to set the multi-client with which the testplayer should start (e.g. W12345_001). If “AUTO” is entered, the first multi-client found on the server is selected. If the multi-client is to be entered each time the program is started, MANDANT_ID="-" must be specified.
CERTIFICATE_FILEPATH	Text	This parameter can be used to specify the file path to your own certificate, which is used for communication between the components.
CERTIFICATE_PASSWORD	Text	If CERTIFICATE_FILEPATH is set, this parameter can be used to specify the password for your own certificate.
CERTIFICATE_SUBJECT	Text	If CERTIFICATE_FILEPATH is set, this parameter must be used to specify the subject (or domain) of your own certificate.
EXISTING_CERTIFICATE_SUBJECT	Text	**Optional** If this variable is provided, the installation program attempts to find a valid certificate in the Windows certificate store (LocalComputer/Personal) whose CN (common name) corresponds to the provided variable. This certificate must

Parameter	Wert	Beschreibung
		contain a private key that is accessible in the store and is used for all TLS connections and other encryption and signing operations. This variable must not be used simultaneously with EXISTING_CERTIFICATE_THUMBPRINT or CERTIFICATE_FILEPATH.
EXISTING_CERTIFICATE_THUMBPRINT	Text	**Optional** If this variable is provided, the installation program attempts to find a valid certificate in the Windows certificate store (LocalComputer/Personal) whose thumbprint matches the provided variable. This certificate must have a private key that is accessible in the store and is used for all TLS connections and other encryption and signing operations. This variable cannot be used simultaneously with EXISTING_CERTIFICATE_SUBJECT or CERTIFICATE_FILEPATH.

3.6.8.3 Examples

Installation in English with log file:

```
WTS8setup.exe /qr DEFAULT_CULTURE="en-US" AC_USERNAME_PROP="admin"
AC_PASSWORD_PROP="admin" /L*V "%temp%\WTS8Silent.log"
WTS_SERVICE_PORT="7001" WTS_PORTAL_PORT="7011"
WTS_PORTAL_URL="https://localhost"
7011"
```

Installation in German with creation of the Testplayer icon on the desktop without using a password:

```
WTS8setup.exe /qr DEFAULT_CULTURE="de-DE" AC_USERNAME_PROP="admin"
NO_AC_PASSWORD="1" ICON_TP="1" WTS_SERVICE_PORT="7001"
WTS_PORTAL_PORT="https://localhost"
```

Installation with product key:

```
WTS8setup.exe /qr DEFAULT_CULTURE="de-DE" AC_USERNAME_PROP="admin"
AC_PASSWORD_PROP="Admin123" PRODUCT_KEY="xxx-xxx-xxx-xxx-xxx"
WTS_SERVICE_PORT="7001" WTS_PORTAL_PORT="7011"
WTS_PORTAL_URL="https://localhost"
```

Installation with your own certificate:

```
WTS8setup.exe /qn DEFAULT_CULTURE="en-US" AC_USERNAME_PROP="admin"
AC_PASSWORD_PROP="Admin123"
WTS_SERVICE_PORT="7001" WTS_PORTAL_PORT="https://localhost"
CERTIFICATE_FILEPATH="<path>\certificate.pfx"
CERTIFICATE_PASSWORD="MyCertPwd"
CERTIFICATE_SUBJECT="http://www.schuhfried.com"
```

3.6.8.4 Notes on use

- The parameters **AC_USERNAME_PROP**, **AC_PASSWORD_PROP** and **NO_AC_PASSWORD** are only required for initial installation. Any entries will be ignored during an update.
- The parameters **DB_SERVER_INSTANCE** and **DB_CATALOG_NAME** only need to be specified if a user-defined SQL server is to be used. If they are not specified, SQL Server Express is automatically installed and used as the database. If **DB_SERVER_INSTANCE** is specified, the installation of SQL Server Express as a prerequisite is automatically skipped.
- The parameters **SQL_SA_USER** and **SQL_SA_PASSWORD** only need to be specified if a user-defined SQL Server is used, but they are optional. If they are not specified, the database must have been created or updated before the setup is executed. The setup cannot create or update the database without sa users.
- If no dongle (hardware or software dongle) is found **and the parameter PRODUCT_KEY** is specified, an attempt is made to generate a software dongle. This requires an **internet connection**. If a dongle is available, any value specified after PRODUCT_KEY is ignored.
- Double quotation marks (") around the parameter values are only necessary if the value contains spaces (e.g., a path or file name).
- If a parameter is specified, **it must contain a value**. Empty values (e.g., AC_PASSWORD_PROP="" or AC_PASSWORD_PROP=) are not permitted and will result in incorrect processing.
- The parameter /exelang must be placed first, if specified. There must always be a space before the language ID (1031 or 1033). /exelang=1031 will not work.

3.6.8.5 Available languages

The following language codes can be used for the **DEFAULT_CULTURE** parameter.

Language	Language code
Chinese – Simplified	zh-CN
German	de-DE
English (USA)	en-US
French	fr-FR
Italian	it-IT
Dutch	nl-NL
Polish	pl-PL
Portuguese	pt-PT
Hungarian	hu-HU

Language	Language code
Rumanian	ro-RO
Russian	ru-RU
Swedish	sv-SE
Slovak	sk-SK
Slovenian	sl-SI
Spanish	es-ES
Czech	cs-CZ
Turkish	tr-TR

3.6.9 Update from older SQL Server versions

If your installation is based on a no longer supported version of Microsoft SQL Server, the VTS installer will display a corresponding message. In this case, installation is not possible without certain manual adaptations before running the VTS setup. Which version of Microsoft SQL Server is supported is stated on the page: System requirements.

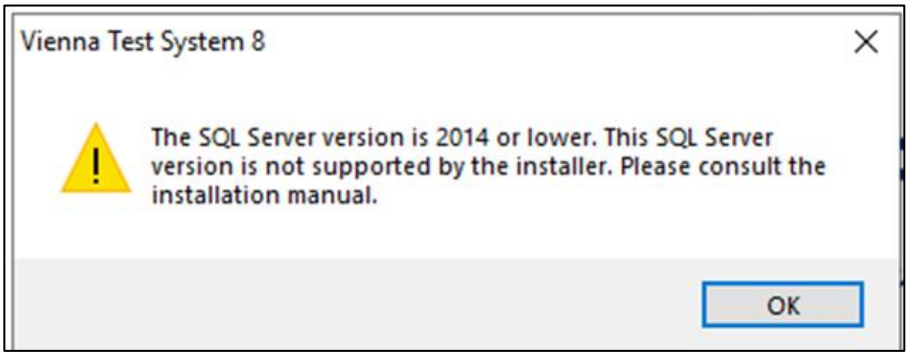


Figure 1 Example for the error message

3.6.9.1 Installation with a user-defined database

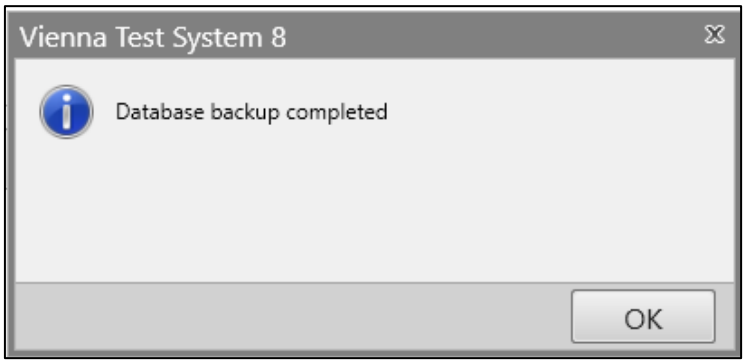
If you have installed your VTS server using scripts (see Manual installation of the VTS SQL database), you must first update your SQL server before updating the VTS database to the latest version. Follow the instructions here Manual update of the VTS SQL database.

3.6.9.2 Standard installation

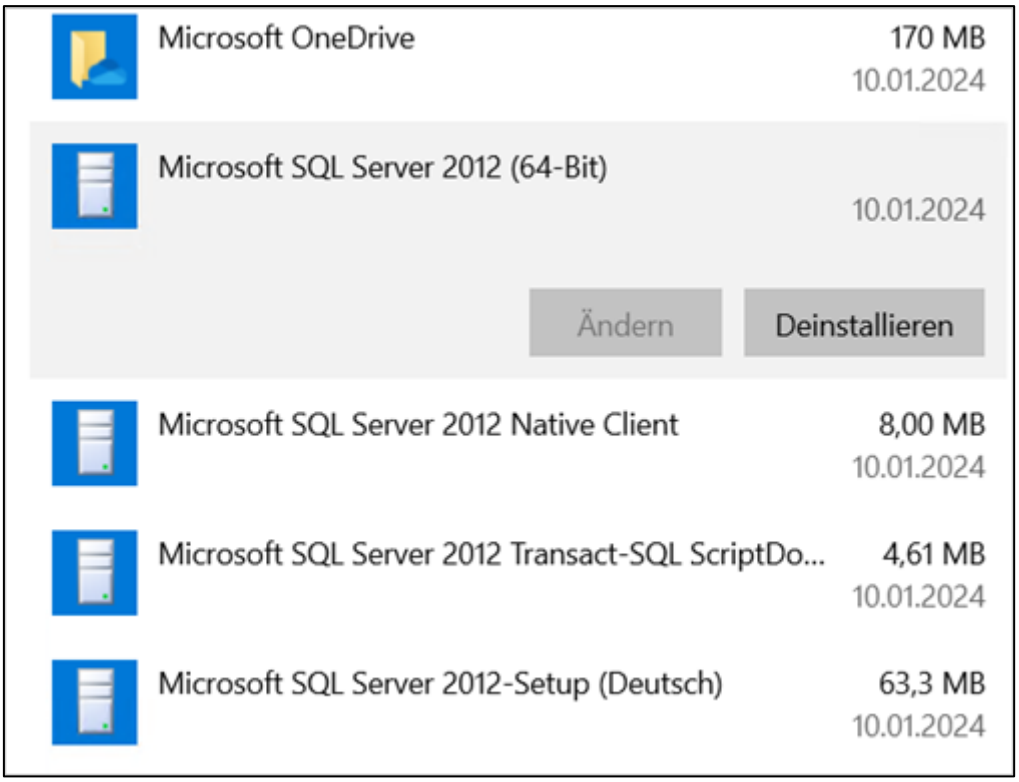
For a standard installation, please perform the following steps before starting the setup:

1. Open the VTS administration software.
2. Use the *Set backup path* button to specify a storage location for the database backup.
3. Go to *Settings* → *General settings* → *Database* → *Start backup* and start the database backup.
    a. The database backup may take some time. Depending on the size of your database and your hardware, the process may take several minutes or hours.

b. When the backup is complete, the following dialog box appears:

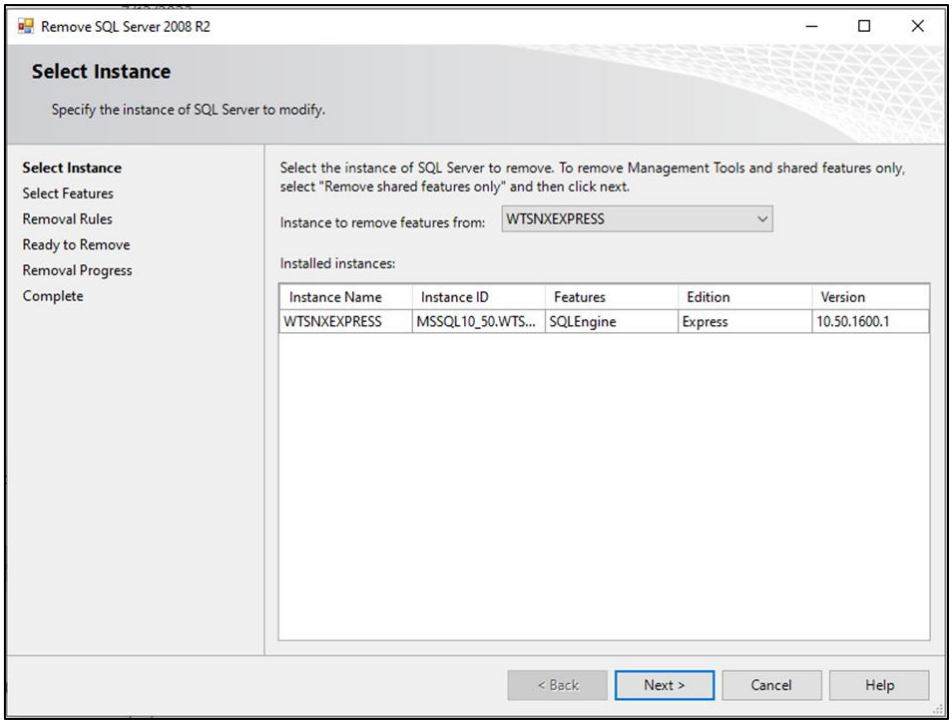


4. Close the VTS administration software.
5. Right-click on the taskbar and select *Task Manager* from the context menu.
6. When the Task Manager appears, go to *Services* → *WTS Service*.
    a. Right-click on *WTS Service* and select *Stop* from the context menu.
    b. Wait until the service has stopped.
7. Right-click on the *Start* button in Windows OS. A pop-up window will appear.
8. Click on *Installed Apps* in the context menu.
9. A Windows dialog box will appear showing all your installed apps.
10. Scroll to *Microsoft SQL Server*. There may be several apps installed that start with this name. Here is an example:

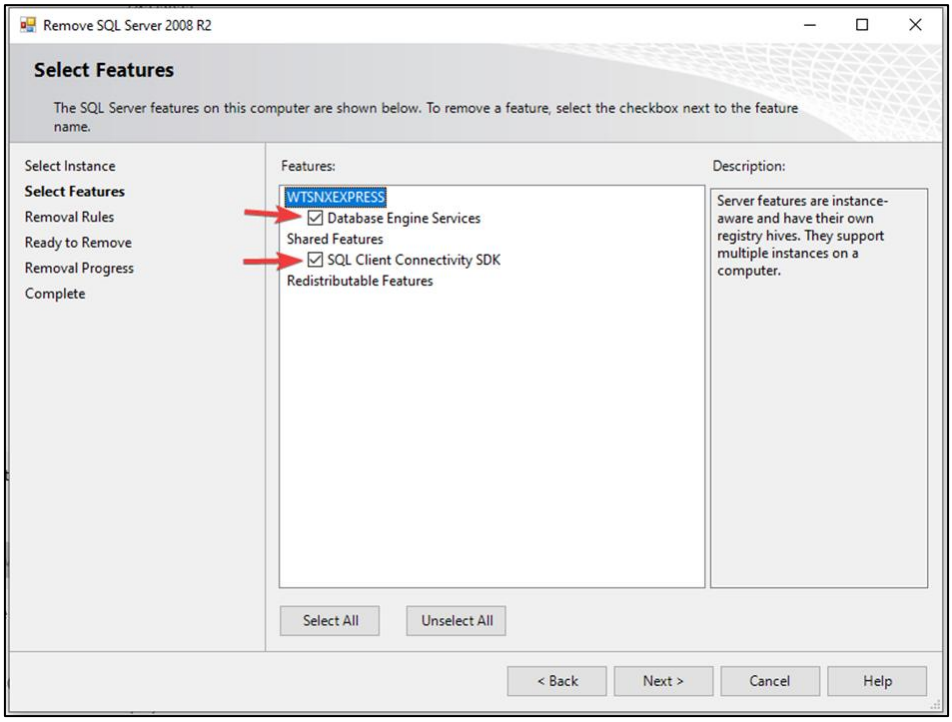


11. Uninstall the version that does not contain any words after the year, version, and description of whether it is a 32-bit or 64-bit version. (The version selected on the screen may differ depending on the version of SQL Server you are using.)
    a. Click the *Uninstall* button to uninstall SQL Server.
    b. The following (or a very similar) dialog will appear:

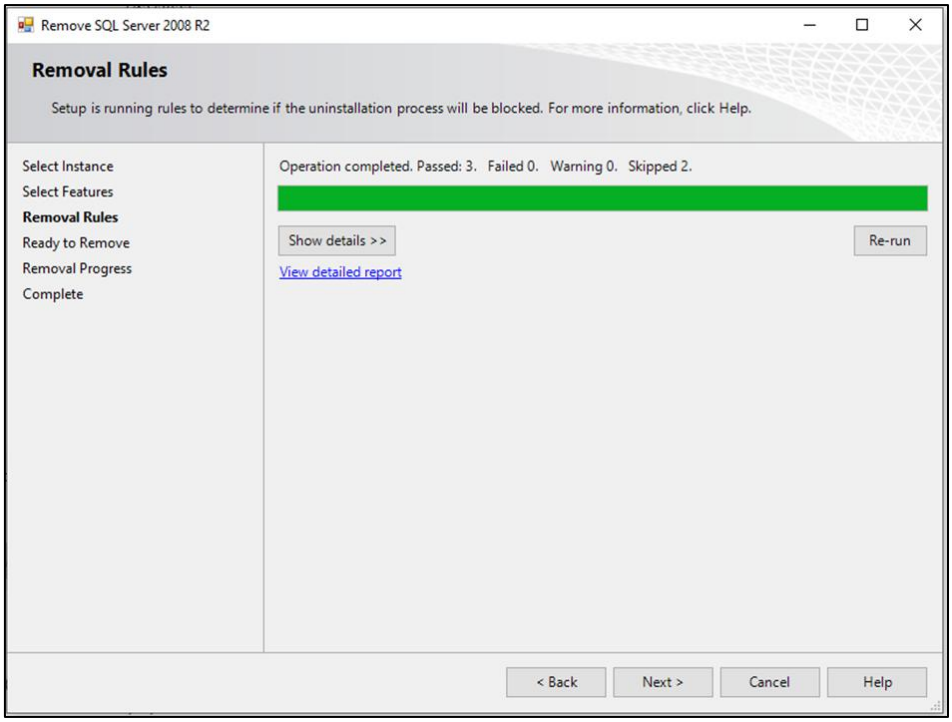
    c. Click the Remove link. Windows OS may prompt you to install additional features, such as .NET Framework 3.5. If this happens, simply click *Download* and install this feature.
    d. Depending on your SQL Server version, the SQL Server uninstall program will display the following (or a very similar) dialog:



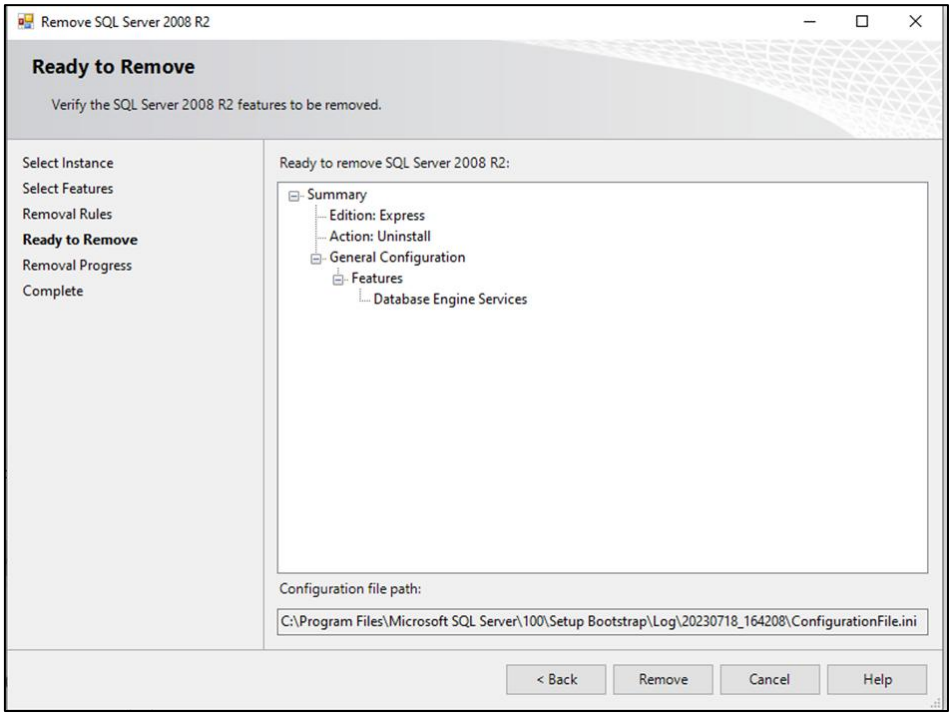
e. Click *Next*.



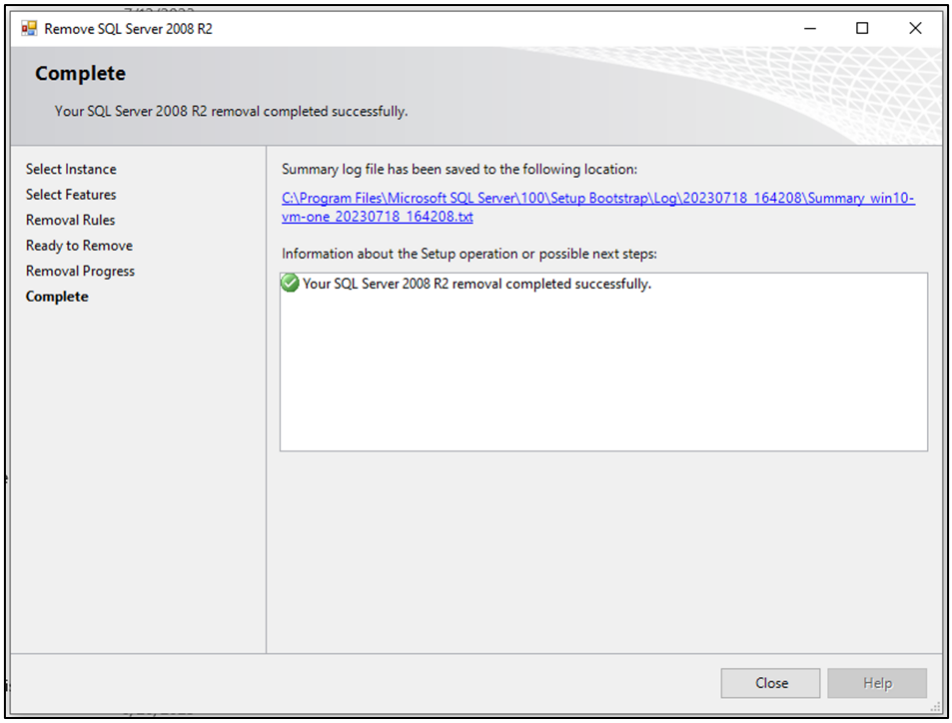
f. Select all check boxes and click *Next*.



g. Click *Next*.



h. Click *Remove* and wait for the deinstallation to complete.

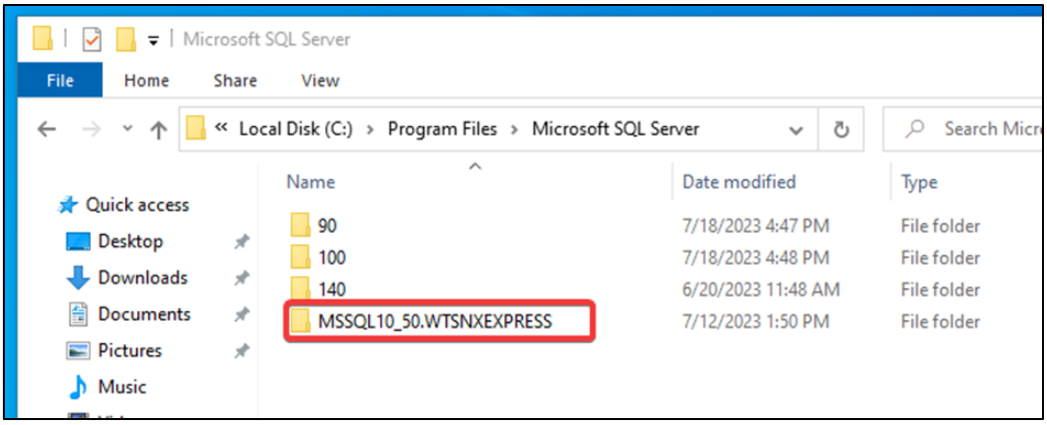


i. Click *Close*.

12. Restart your computer.

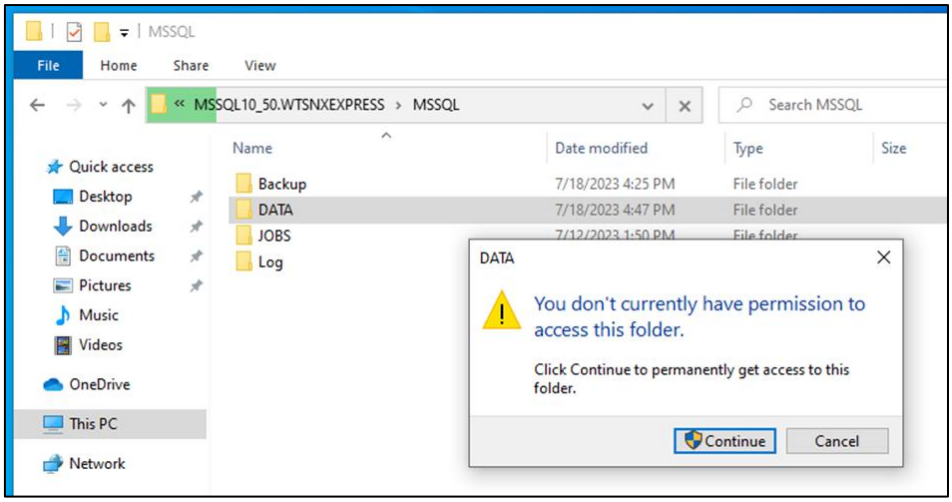
13. Open File Explorer and navigate to the C: drive and then to the path *C:\Program Files\Microsoft SQL Server*.

14. The name of one of the subfolders ends with `WTSNXEXPRESS`, e.g.:



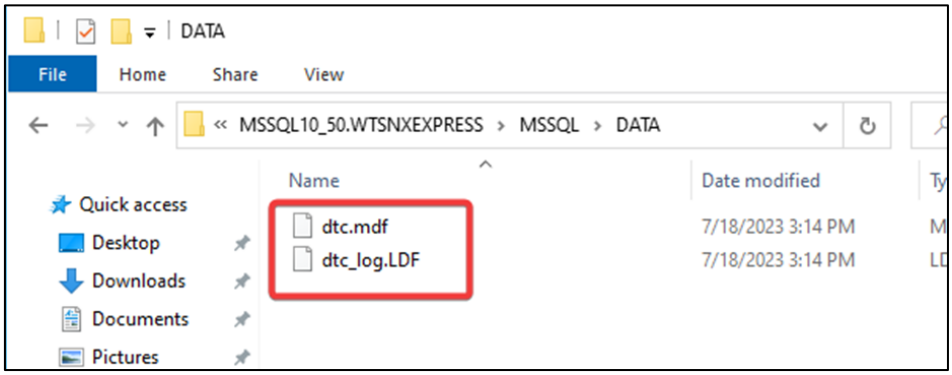
a. Go to this folder and then to the path of the subfolder MSSQL\Data.

b. Windows will ask for administrator rights.



c. Grant administrator rights by clicking on the *Continue* button.

d. You should now see two files named `dtc.mdf` and `dtc_log.LDF`:



e. Open another File Explorer window and enter the following path in the address bar: `%PROGRAMDATA%\schuhfried\sqldatabase`. Confirm with the Enter key.

f. Cut the files `dtc.mdf` and `dtc_log.LDF` from the `MSSQL\Data` folder and paste them into the folder `%PROGRAMDATA%\schuhfried\sqldatabase`.

15. Go to the folder containing the latest version of the VTS installer and start it again. It should install the newer version of Microsoft SQL Server while preserving your database files. If the installer does not run properly, please contact support.

3.6.10 Encrypted communication in VTS (https)

Communication between clients and servers is implemented in VTS 8 using the standardized Microsoft technology *Windows Communication Foundation* WCF. WCF offers several options for securing communication. The version used as standard in VTS ensures confidentiality, integrity, and authentication end-to-end between clients and servers (“message” security). This version is implemented at the application level and uses AES-256 for encryption (https://docs.microsoft.com/en-us/dotnet/framework/configure-apps/file-schema/wcf/message-of-wshttpbinding).

Additional information on WCF Security can be found here: https://docs.microsoft.com/en-us/dotnet/framework/wcf/feature-details/security-overview

The other APIs are hosted with the HTTPS protocol by default, using a self-signed, trusted SSL certificate.

By default, VTS always uses encrypted communication. The necessary certificates are generated automatically.

3.6.10.1 Using your own HTTPS certificate

To use your own HTTPS certificate, installation can be carried out via the command line: Silent installation via command line. Manual configuration afterwards is possible, but **not recommended**.

> Currently, only valid RSA certificates (2048-bit) can be used.

3.6.10.1.1 Installing the certificate via the command line

Starting with VTS version 8.26, the setup program also supports the installation of your own certificates, which are transferred via command line options. To do this, the installation command must be extended with the following parameters:

- EXISTING_CERTIFICATE_SUBJECT: Common Name (CN) of the certificate subject of a certificate stored in `LocalComputer/Personal windows certificate store`.
- EXISTING_CERTIFICATE_THUMBPRINT: Thumbprint of the certificate subject of a certificate stored in `LocalComputer/Personal windows certificate store`.

In both cases (provided that the installation program does not find any invalid certificates), the certificate must contain a private key with a length of at least 2048 bits.

The installation program configures the certificate and links it to the required ports.

For details on installation via command line, see: Silent installation via command line

3.6.10.1.2 Automatic certificate configuration with VTSCommand.exe

Since VTS version 8.27, you can automatically reconfigure the SSL/TLS/encryption/signing X509 certificate for all VTS components using the binary command line tool *VTSCommand.exe*. The command line tool can be found in the AdminClient subfolder of the VTS installation folder (Default: `%programfiles%\SCHUHFRIED GmbH\Vienna Test System 8 Client\AdminClient`).

The binary command line tool must be executed in a shell with extended rights or as an administrator. The tool can configure the X509 certificate for the entire VTS in two ways:

1. Use an existing certificate in the Windows certificate store of the local computer. To do this, execute the following command in Powershell: `.\VTSCommand.exe -c -k [X509-Certificate-Search-Type] -v [Certificate-Search-Term]`
   Where:
   a. `[X509-Certificate-Search-Type]`: Specifies the type of certificate search. The following values are allowed: `FindByThumbprint, FindBySubjectName, FindBySubjectDistinguishedName, FindByIssuerName, FindByIssuerDistinguishedName, FindBySerialNumber, FindByTimeValid, FindByTimeNotYetValid, FindByTimeExpired, FindByTemplateName,`

`FindByApplicationPolicy`, `FindByCertificatePolicy`, `FindByExtension`, `FindByKeyUsage`, `FindBySubjectKeyIdentifier`

b. `[Certificate-Search-Term]` specifies the content of the search. It depends on which `[X509-Certificate-Search-Type]` you used, e.g. for `FindByThumbprint` `[Certificate-Search-Term]` is the thumbprint value of your certificate, e.g. " 993e3fcb87b355fb2a4d954abacbb33ba7f59865 ". For `FindBySubjectName` `[Certificate-Search-Term]` is the common name (CN) part of the certificate subject, e.g. *SchuhfriedSelfSignedCertificate*.

c. Examples:

i. `.\VTSCommand.exe -c -k FindByThumbprint -v 993e3fcb87b355fb2a4d954abacbb33ba7f59865`

ii. `.\VTSCommand.exe -c -k FindBySubjectName -v SchuhfriedSelfSignedCertificate`

2. Use a pfx file containing the exported certificate and its private key, as well as the password for opening the file (the certificate from the pfx file will be installed in the local Windows certificate store on your computer). The command is: `.\VTSCommand.exe -c -f [Pfx-Path] -q [Pfx-FilePassword]` Where:

a. `[Pfx-Path]` is the full path to your pfx file including the file name, e.g. `c:\users\admin\desktop\mycert.pfx`.

b. `[Pfx-FilePassword]` is the password required to read the pfx file

c. Example: `.\VTSCommand.exe -c -f c:\users\admin\desktop\mycert.pfx -q myCertPassword.1234`

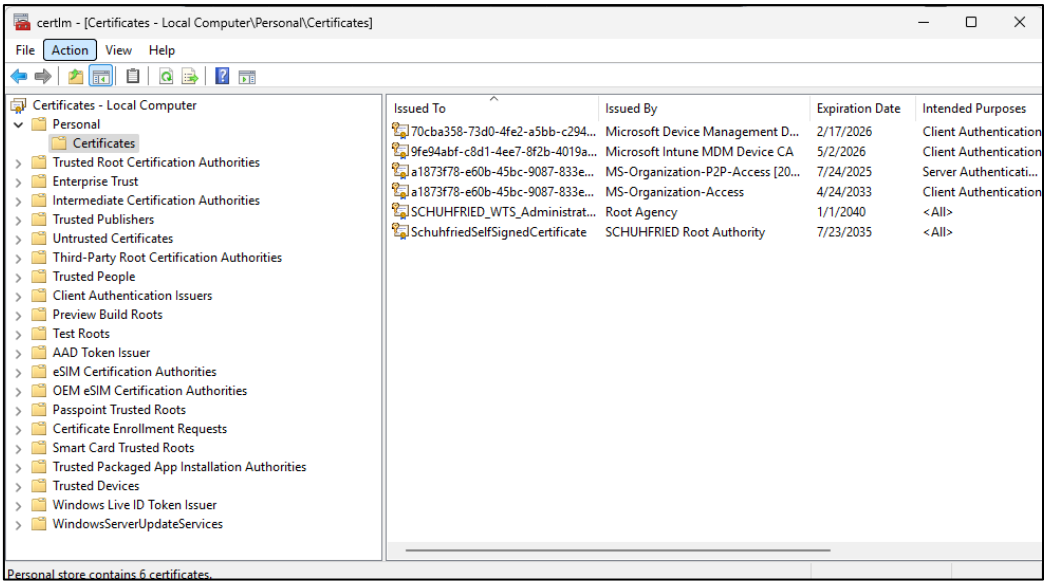
3.6.10.1.2.1 Notes

- You can also simply run the file .\VTSCommand.exe -c to enter all parameters interactively.
- You can use the -n parameter to remove yes/no questions. In this case, everything will be confirmed automatically.
- The tool updates the new certificate information in all necessary configuration files of the VTS.
- The tool backs up all configuration files in the folder *C:\ProgramData\Schuhfried\Backup* before changing them.
- During the execution of the tool, the VTS services such as the *WTS Service* or the *VIS (Universal Plugin)* are restarted.

3.6.10.1.3 Manual installation

In addition to the *WTS Service*, the VTS contains additional APIs that communicate using the HTTPS protocol. By default, the *WTS Service* and APIs encrypt their communication with a trusted, self-signed SSL certificate. However, it is possible to use your own SSL certificate issued for the hosted domain. To do so, the following steps are necessary:

1. Make sure that your certificate is stored under *Personal --> Certificates (Certificates - Local Computer)*.



2. Replace the default value (`SchuhfriedSelfSignedCertificate`) with the name of your own certificate.
    a. This must be done everywhere in the configuration file where the following key-value pairs are used: “`CertificateSearchValue`”: “`FindBySubjectName`” and “`CertificateSearchKind`”= “`your-certificate-CN`”.
3. Replace the default value with the name of your own certificate in the following configuration files:
    a. *Installation path*\Service\Service.Wcf\appsettings.json
    b. *Installation path*\Service\Service.Wcf\VTS.Service.Wcf.dll.config
    c. *Installation path*\Api\appsettings.json
    d. *Installation path*\Portal\appsettings.json
    e. *Installation path*\Testplayer.web\appsettings.json
    f. *Installation path*\\Identity\appsettings.json
    g. The *installation path* is by default: `%programfiles%\SCHUHFRIED GmbH\Vienna Test System 8`

    Example:

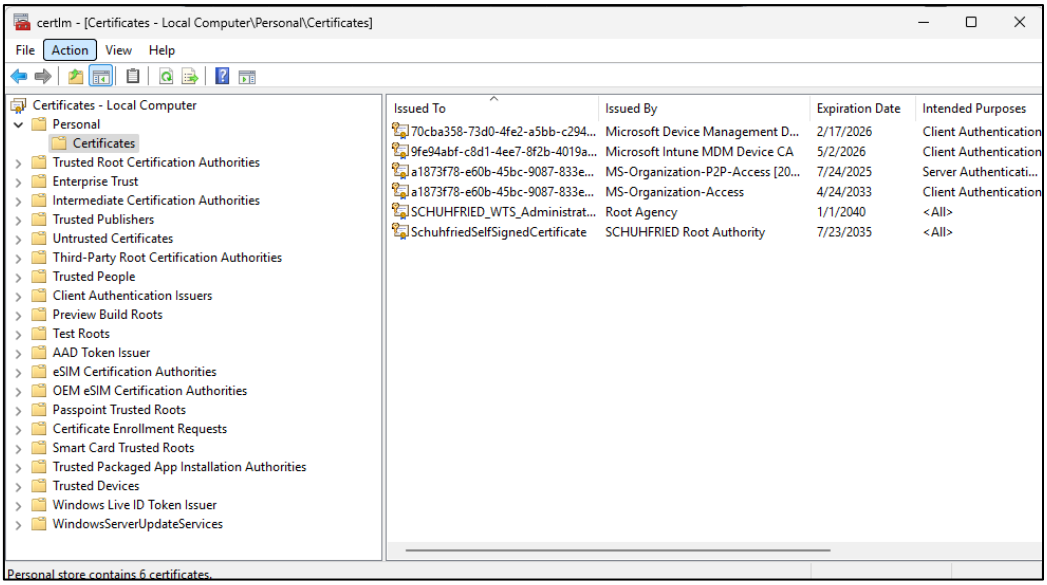
4. If changing the certificate applicant (subject) also changes the URL at which the VTS provides the service and APIs, the values in the *Client* table in the VTS database must be updated with the correct URL. The supplied SQL script `update_identityserverconfiguration.sql` can be used for this task after the correct URL has been added to the script. The script can be found in the *Scripts\Help* folder in the installation files.
5. Restart the *WTS Service*.

3.6.10.2 Configuring the VIS Universal Plugin to use an encrypted connection via HTTPS

The following steps describe how to configure the Universal Plugin to use HTTPS by using the self-signed certificate provided during setup or your own SSL certificate.

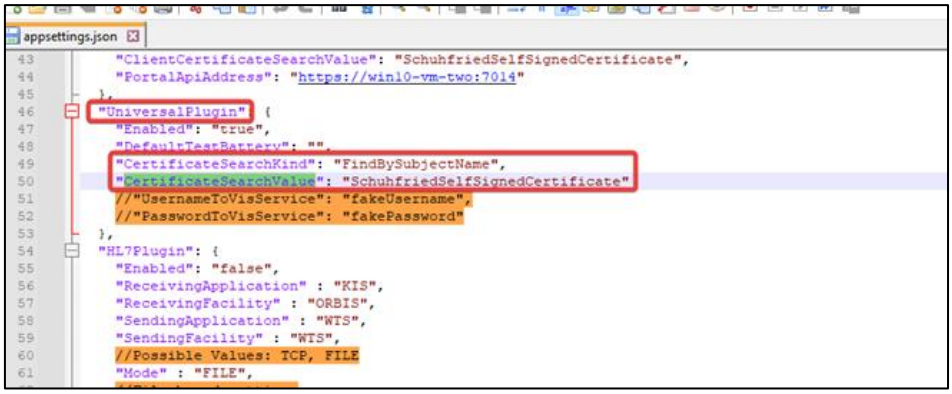
The following steps must be performed:

1. (Optional if you are using your own certificate) Make sure that your certificate is available under *Personal → Certificates (Certificates - Local Computer)*.



2. (Optional if you are using your own certificate) Enter the name (*subject*) of the certificate in the appsettings.json file in the *IntegrationService* folder in the installation folder (by default: `%programfiles%\SCHUHFRIED GmbH\Vienna Test System 8\IntegrationService\appsettings.json`).

    a. The change must be made in the *UniversalPlugin* section by adding the values for *CertificateSearchKind* and *CertificateSearchValue*:



3. Restart the *WTS Service*.

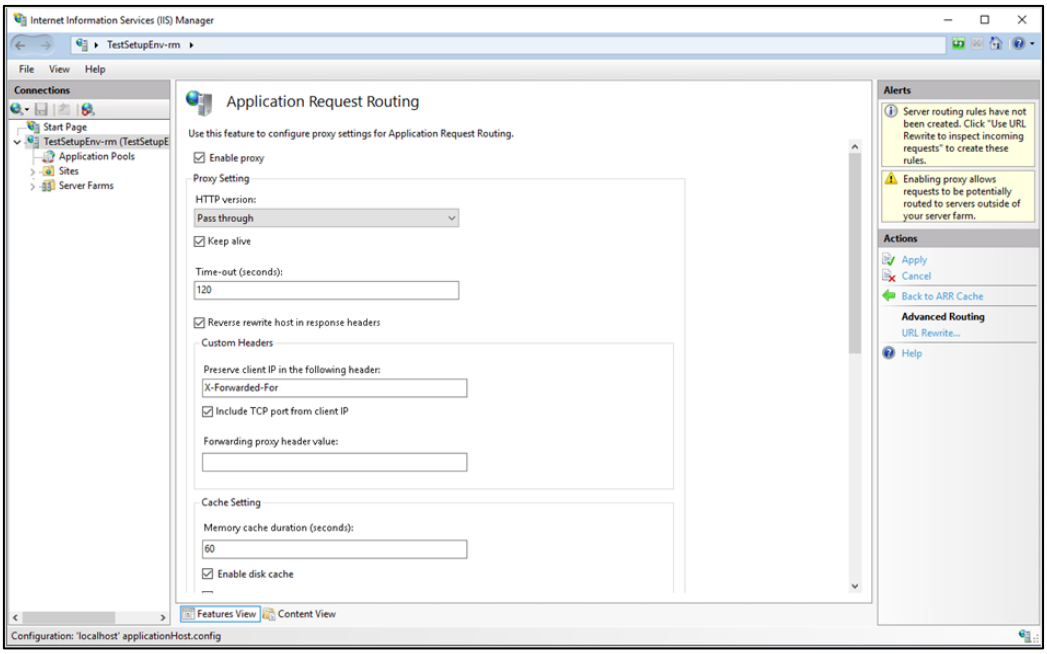
3.6.11 Setting up Testplayer Web with a reverse proxy via IIS

Testplayer Web is hosted in Kestrel. However, additional configuration options are sometimes required that Kestrel does not offer (e.g., port sharing). In this case, a reverse proxy can be configured using the Windows function *Internet Information Services* (IIS).

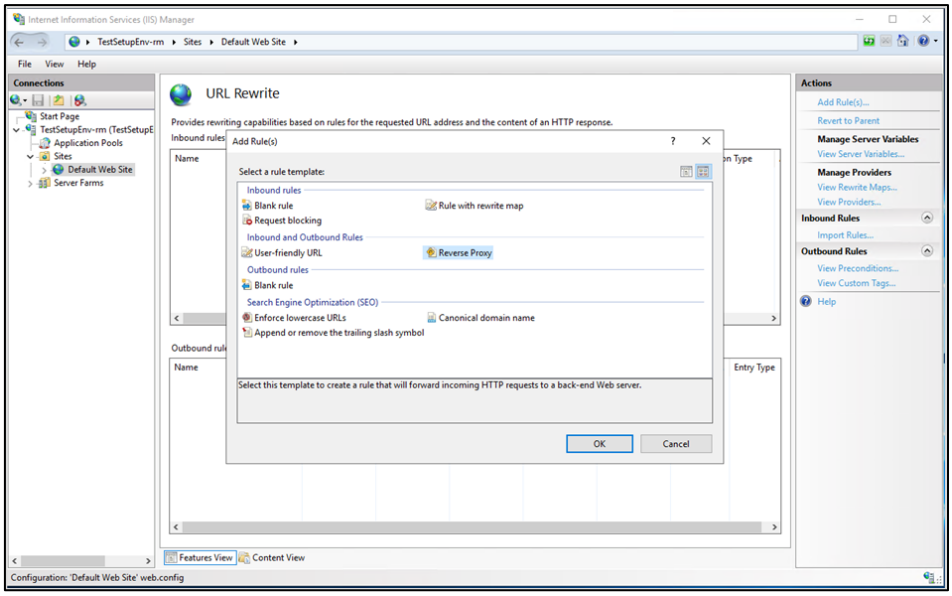
The following steps are required:

1. Download the IIS module *URL-Rewrite* and install it with the default settings (https://iis-umbraco.azurewebsites.net/downloads/microsoft/url-rewrite).
2. Download the IIS module *Application Request Routing* (ARR) and install it with the default settings (https://iis-umbraco.azurewebsites.net/downloads/microsoft/application-request-routing).

3. Start IIS and go to *Application Request Routing*. Then activate *Enable proxy* and click on *Apply.*



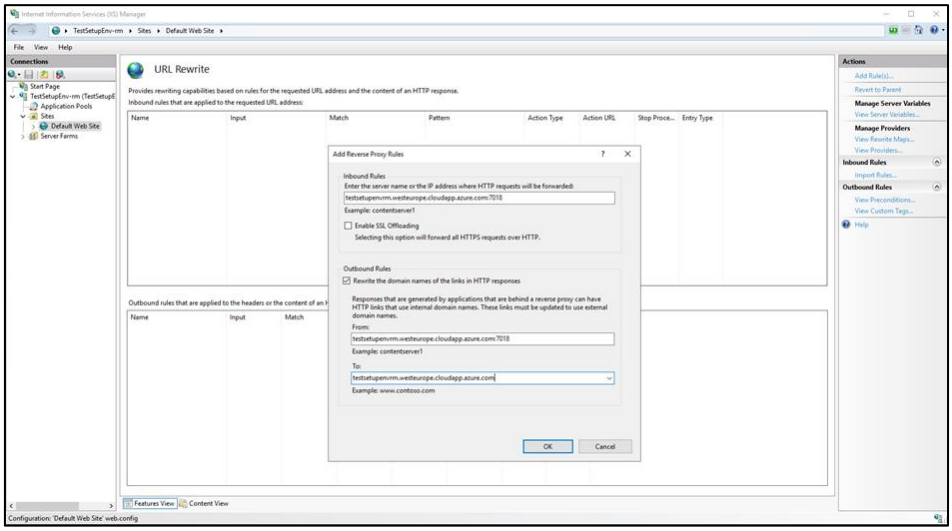
4. Go to a website (either a default website or create a new one) and click *URL Rewrite.*
   Note: In order for the reverse proxy to be configured correctly, **the added website must not contain a virtual directory.**
5. Configure a new reverse proxy rule.
   a. Add Rule(s)...
   b. Select *Reverse Proxy*.



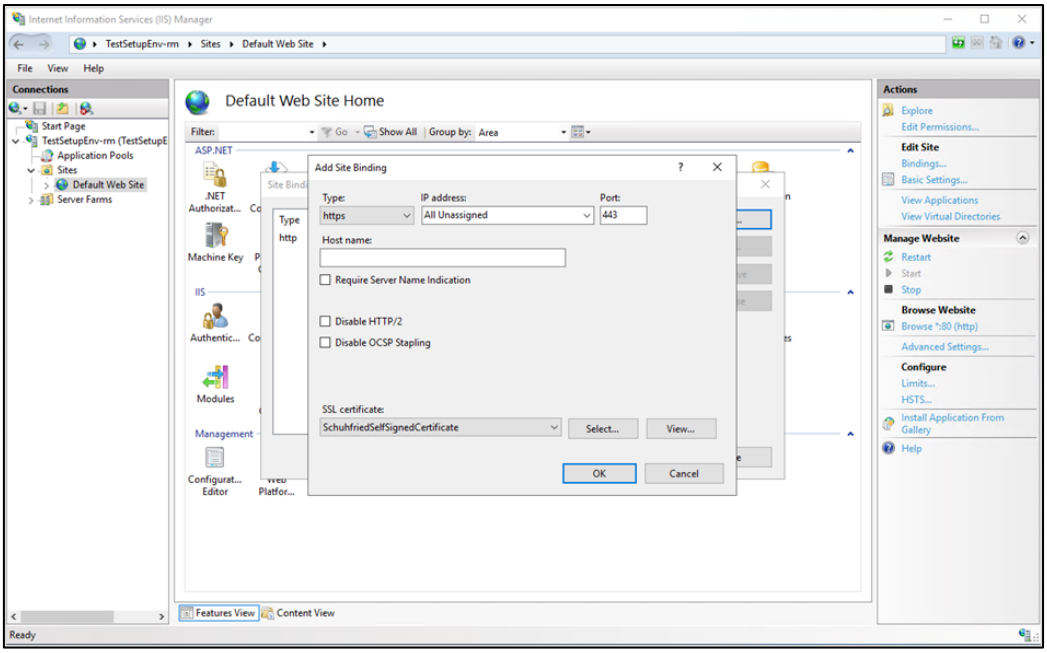
c. Under *Inbound Rules*, enter {domain}:7018, where *domain* is the domain under which Testplayer Web is hosted in Kestrel.

d. Disable *Enable SSL offloading.*

e. Enable *Rewrite domain names in HTTP responses* and set the domain under *To*. Click *OK*.



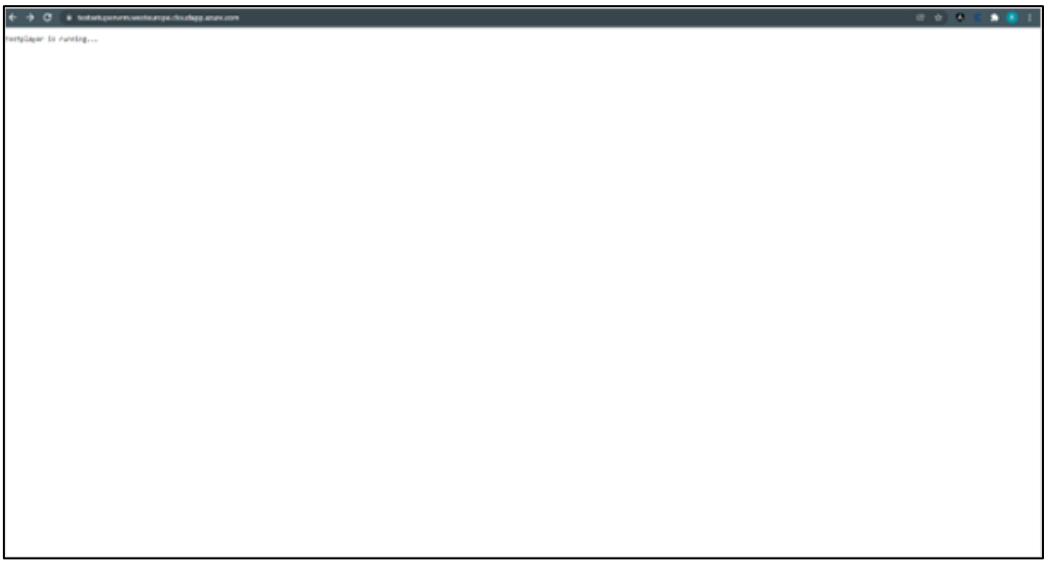
6. Right-click on the website, select *Edit Site Bindings*, and add a binding for HTTPS if it does not already exist. For *SSL Certificate*, you can select the certificate installed by the setup or use your own certificate issued for the configured domain. Click *OK*.



7. If Testplayer Web is not installed on the same computer where the IIS reverse proxy is configured, the *Response buffer threshold (KB)* (*Application Request Routing Cache -> Server Proxy Settings*) may need to be increased. You can see

this if a white page is displayed when running the test. We recommend increasing this value to 2048. However, depending on the test used, this value may be higher.

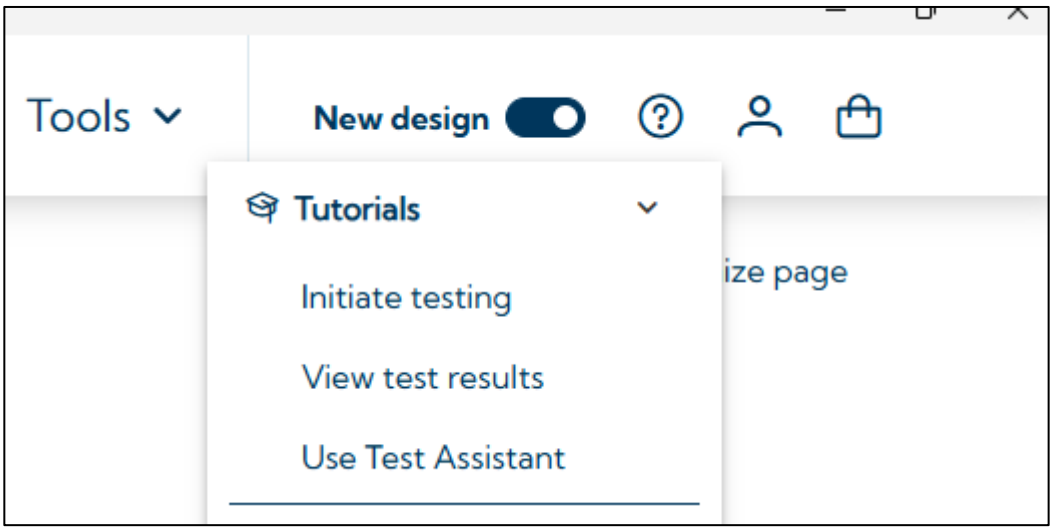
8. If everything has been configured correctly, you should see the following content when you navigate to the configured domain:



4 USAGE

4.1 Tutorials

The VTS offers interactive tutorials that explain the basic functions and how to use the system. You can find the tutorials under the following menu item:

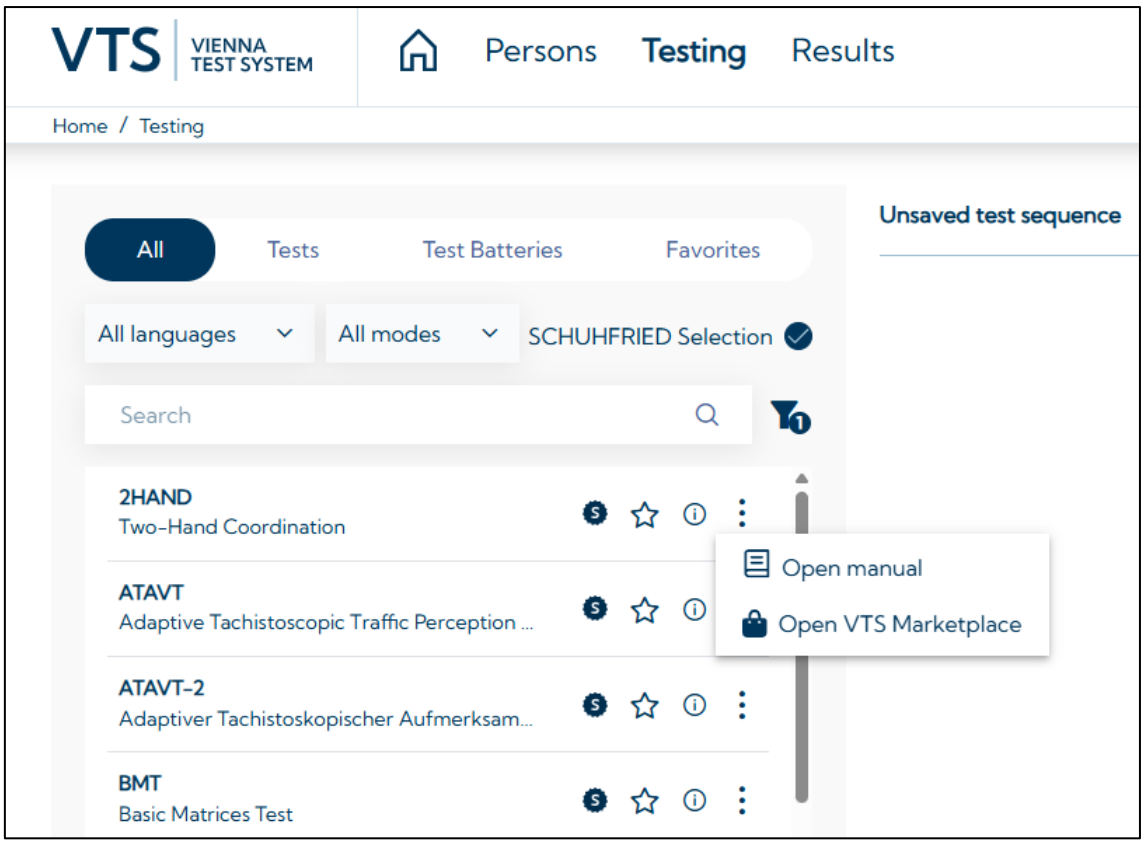


The tutorials can be started at any time and repeated as often as required.

4.2 Manuals

Information on the tests can be found in the manuals. You can access the manuals in the VTS using the corresponding option.

1. Go to the *Testing* tab→ Search for the test for which you want to open the manual.
2. Click on the icon with the three vertically arranged dots and select *Open manual.*



4.3 Ergonomic requirements for the workstation

To enable standardized and comfortable testing with the VTS, the workstations used for testing should be ergonomically set up. This ensures that all test takers have the same conditions to perform at their best during testing.

4.3.1 Desk and chair

The table and seat height should be adjusted to suit each test taker and set up so that they can work in an upright position. The viewing angle of the screen should be approximately positioned at 30 degrees. The foot-operated keys and foot pedals must be positioned so they can be operated from a normal sitting position.

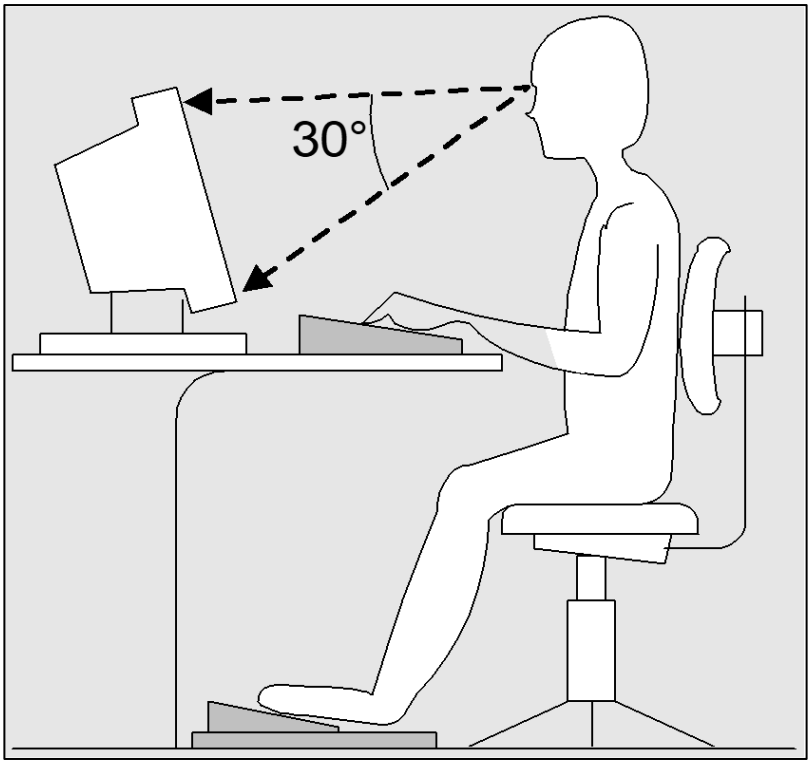


Figure 2 Optimal height of the work desk

4.3.2 Light

The workplace should have natural daylight and sufficient and adequate lighting. The lighting should be set up to create and ensure a balanced contrast between the screen and the rest of the work area.

The screen should be positioned so that the line of sight is parallel to the window. The lighting should not be reflected in the screen and should not cause glare. If the ideal position for the screen is not possible due to spatial constraints, other suitable measures must be taken to prevent glare and reflections.

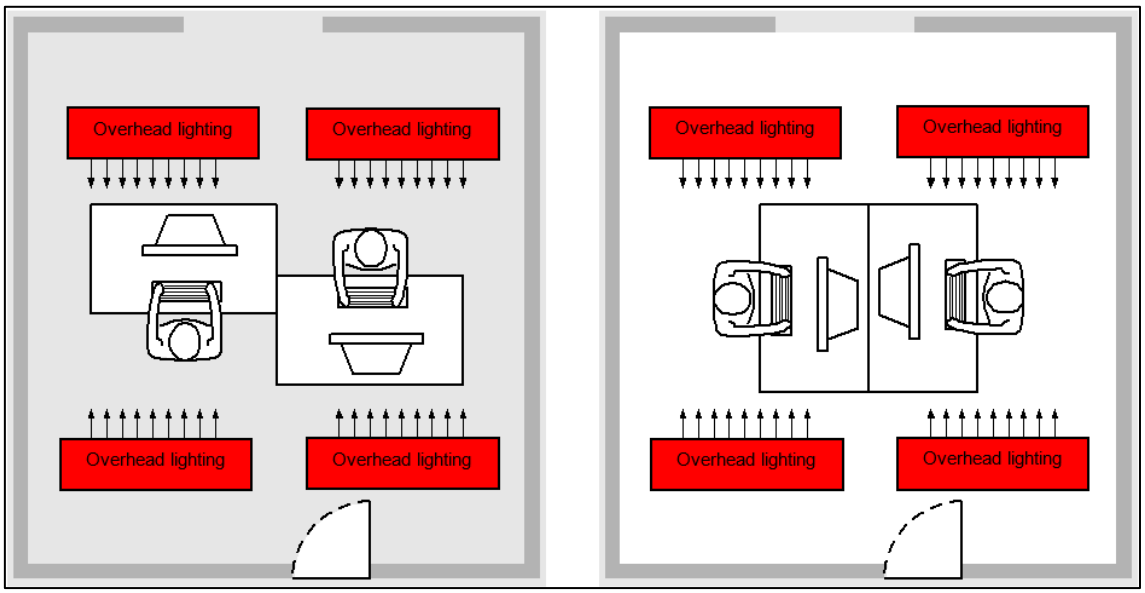


Figure 3 Incorrect (left) and correct (right) positioning of the workstation.

4.3.3 Noise

The testing must not be disturbed by noise. Taking into account external noise, a noise level of 50 dB(A) must not be exceeded.

4.3.4 Temperature

The room temperature at the workstations must be between 19° and 25° C. The air speed must not be more than 0.1 m/s. The air humidity should be between 30% and 70% or between 40% and 70% if air conditioning is used.

4.3.5 Breaks

The test administrator is responsible for deciding on the timing of breaks; this should take account of test taker’s needs. In test batteries breaks can be inserted between individual tests using the PAUSE program module.

5 SUPPORT

Please note that the functionality of VTS is only guaranteed if your system is kept up to date. Please refer to the information in the Update & support section for more details. If you have VTS version 8.27 or higher, you can obtain a free update to the latest VTS version from the Marketplace. How to perform an update yourself is described on the page: Updating a single workstation installation

5.1 Contact us

For frequently occurring problems, you will find possible solutions on the Troubleshooting page. Please try to find a solution to your problem there before contacting our technical support.

Technical support

Our support team is available to answer technical questions or help with difficulties you may encounter. Technical support from SCHUHFRIED is free of charge provided that the problem was caused by SCHUHFRIED and your VTS version is not older than 36 months (see: (8.29-en) (en-US) Product description#Update_and_Support).

You can reach our support team:

By using our contact form

By phone: +43 2236 42315-360

Mon-Thu: 8:00 a.m. - 4:00 p.m. (CET)

Fri: 8:00 a.m. - 1:30 p.m. (CET)

To enable our support team to assist you quickly and easily:

- Please have the **serial number of the system** or your **customer number** ready.
- Please download the **TeamViewer** linked here if requested to do so by our support team.

! Download TeamViewer

Product information & psychological consulting

A team of experienced psychologists is available to answer any questions you may have about our products:

Austria: +43 2236 42315-0

info@schuhfried.com

http://www.schuhfried.com

5.2 Troubleshooting

This page provides an overview of technical problems and possible solutions:

If you are experiencing problems with peripheral devices (our external hardware, such as the response panel), you can also use the VTS Hardware Tests to narrow down possible problems.

If the problems cannot be solved using the solutions listed here, our support team is available to assist you.

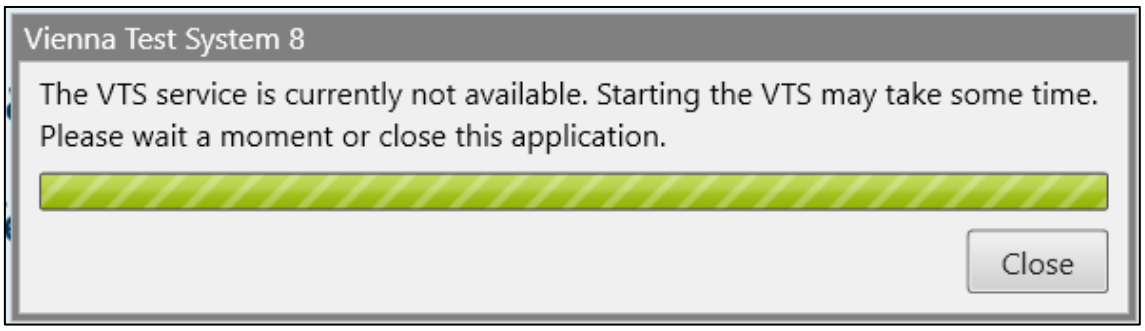
5.2.1 The VTS does not start

5.2.1.1 Description

After attempting to start the VTS administration software, the VTS does not open. This can happen if:

- the **WTS Service** has not been started
- the **Sentinel LDK License Manager** service has not been started
- the **SQL Server (WTSNXEXPRESS)** service has not been started
- the **VTS dongle** has not been recognized, if you are using it for licensing the VTS
- the **system capacities** are too small

The following message may be displayed: *The VTS Service is currently not available. Starting the VTS may take some time. Please wait a moment or close this application.*



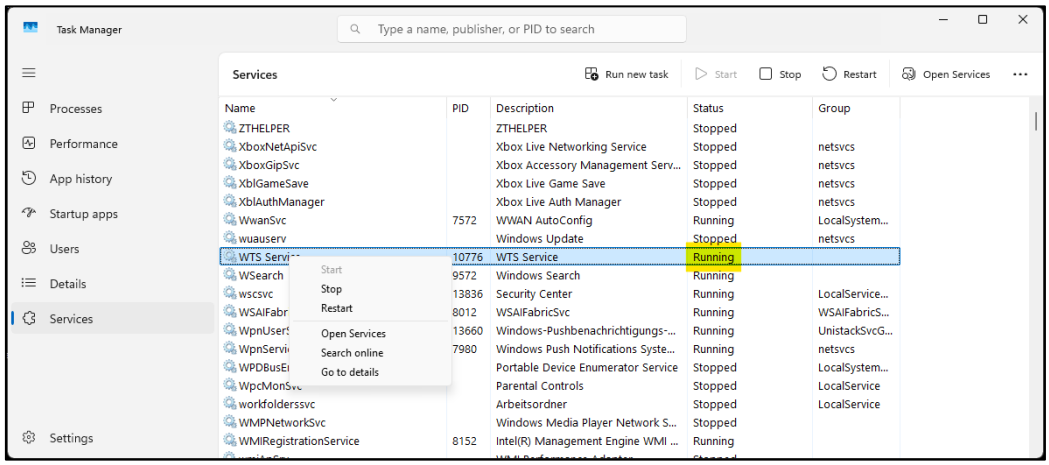
5.2.1.2 Troubleshooting

1 - The services required for the VTS have not been started

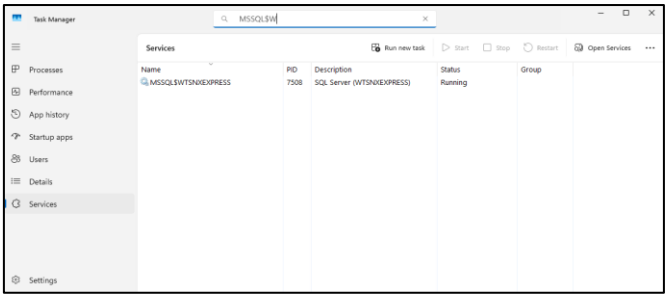
Restart the services and try again.

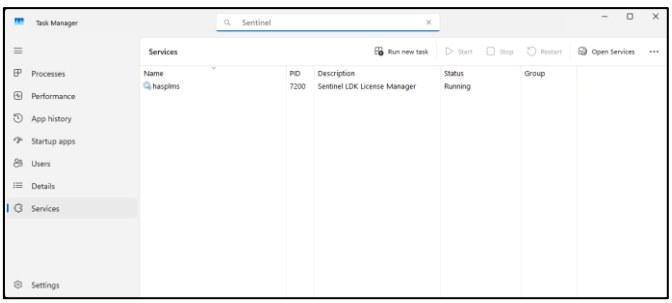
> Administrator rights are required to restart the services. If you do not have these rights, restart your PC.

1. To restart the *WTS Service*, start the Task Manager (press CTRL+SHIFT+ESC) and select *Services*.
2. Then search for W*TS Service* and check whether the status is *Running* (marked yellow in the screenshot).



3. If this is not the case, right-click on *WTS Service* and press *Start* or *Restart*.
4. Check in the same way whether the *SQL Server (WTSNXEXPRESS)* service and the *Sentinel LDK License Manager (hasplms)* service are running and start them if necessary.





2 - The VTS dongle was not recognized

1. Make sure that the correct VTS dongle (with the serial number that matches the installation) is plugged into the PC.
2. If necessary, disconnect the VTS dongle and reconnect it, then restart the PC.
3. Start the VTS administration software.

3 - System capacities are too small

1. Make sure that your PC meets the system requirements.

5.2.2 Delayed operation, long loading times

5.2.2.1 Description

The VTS is slow during test execution or administration. There are long loading times at the start of the test, during test execution, or even interruptions during testing.

5.2.2.2 Troubleshooting

1 - Check system requirements and resources

Check that the hardware used meets the minimum requirements according to the VTS system requirements. Also ensure that sufficient hard disk space is available and that your systems are operating well under normal conditions. You can check this using the Windows Task Manager or the *Device Performance and Health* section in the Windows security app.

2 - Antivirus software

Various antivirus or security programs can interfere with or impair the execution of the Vienna Test System. In such cases, we recommend defining exception rules in the respective tool. The following directories contain system components and files relevant to the VTS and should be excluded:

Index	Example path
%ProgramData%\Schuhfried	C:\ProgramData\Schuhfried
%LOCALAPPDATA%\Schuhfried	C:\Benutzer\Benutzer\AppData\Local\Schuhfried
%ProgramFiles%\SCHUHFRIED GmbH	C:\Programme\SCHUHFRIED GmbH
%ProgramFiles(x86)%\SCHUHFRIED GmbH	C:\Program Files (x86)\SCHUHFRIED GmbH

In addition, some of these programs also feature active process monitoring, usually referred to as *real-time protection*, *behavior monitoring*, *process monitoring*, or similar. Such process monitoring can have a negativ impact on the performance of the VTS. We also recommend excluding the following VTS processes from monitoring using rules in the respective tool:

- VTS.IdentityServer.Web
- VTS.Integration.Service
- VTS.Portal.Api
- VTS.Portal.Web
- VTS.Service.Wcf
- VTS.TestPlayer.Web

3 - Drivers and Windows updates

Check that your system has the latest drivers for all system components and that all available Windows updates have been installed. Some PC manufacturers (e.g., Dell, HP, IBM, Lenovo, etc.) provide their own drivers for graphics cards. Please ensure that the latest drivers for your graphics card are installed on your PC.

4 - Other programs

Please ensure that no programs are installed on the computer that could interfere with testing (e.g., by heavily loading the CPU, consuming excessive memory, or displaying output on the screen).

5 - Network connection

When using VTS online or a server/client installation, please ensure that you have a sufficiently fast connection to the internet or to your VTS server.

6 - VTS update

We recommend always using the latest VTS version in order to benefit from performance improvements as soon as they become available.

5.2.3 Response Panel is not recognized

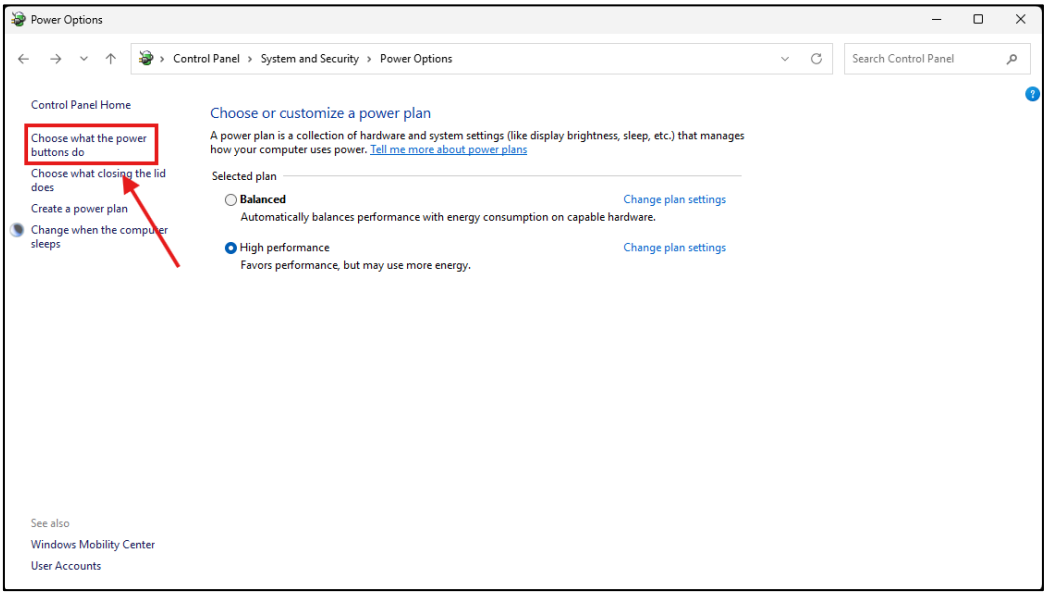
5.2.3.1 Description

The Response Panel (USB panel) is not recognized by the PC. This issue may be caused by the Quick Start feature being enabled in the Windows power settings. When the system wakes up, some drivers may not load correctly.

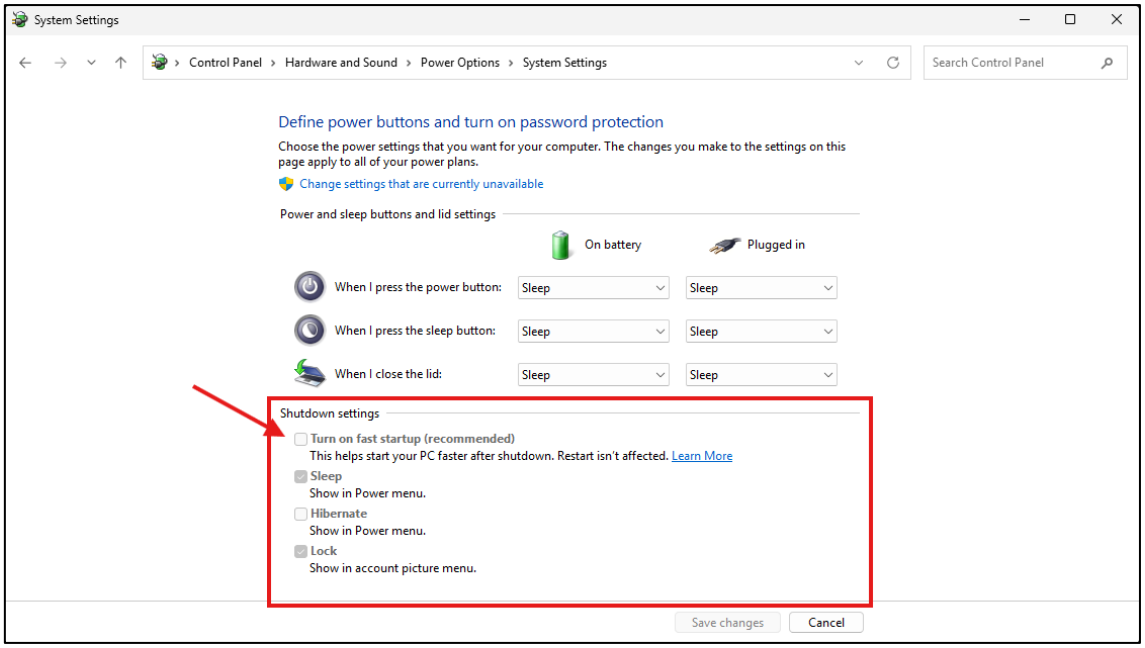
5.2.3.2 Troubleshooting

Unplug the USB panel, wait 30 seconds, and then plug the panel back in. To prevent this problem in the future, **disable Windows Fast Startup**:

1. Open the power options via *Control Panel --> All Control Panel Items --> Power Options*:



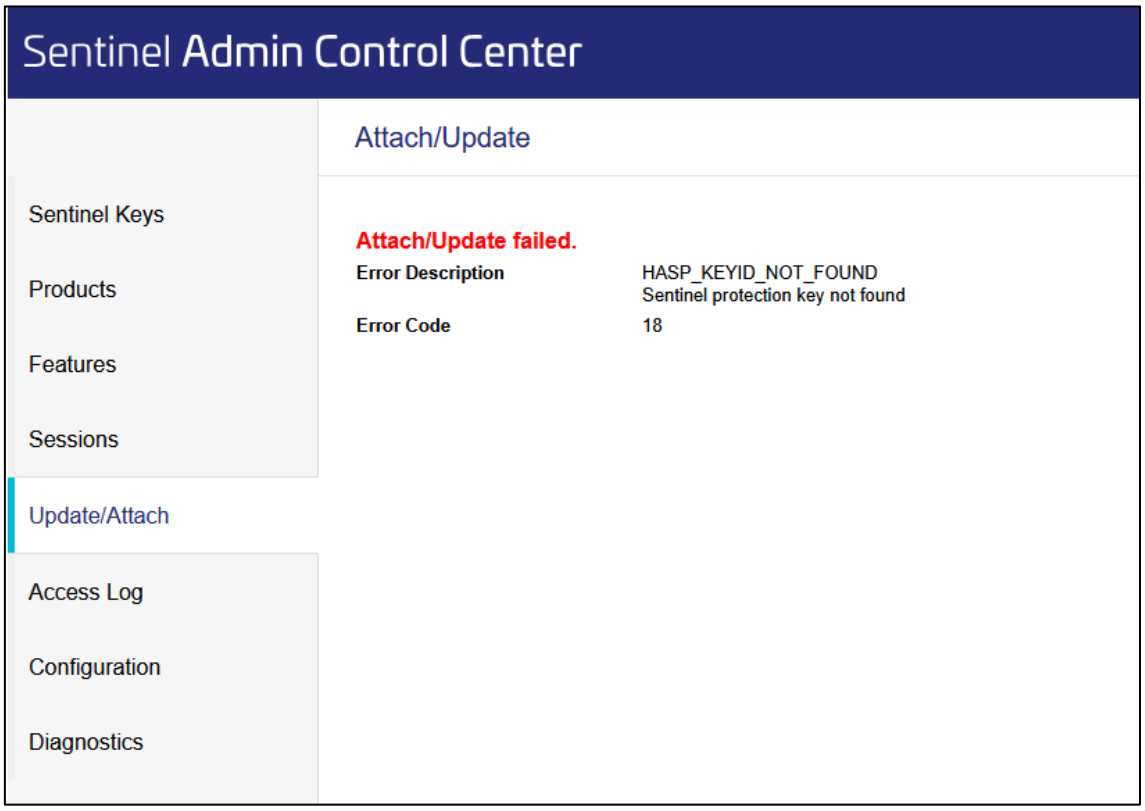
2. On the left side, select *Choose what the power buttons do* and make sure that *Turn on fast startup (recommended)* is NOT enabled.



5.2.4 Licenses cannot be installed

5.2.4.1 Description

When trying to import a license file into the *Sentinel Admin Control Center* (see: Install licenses), the error message **HASP_KEYID_NOT_FOUND** with error code 18 appears.



This error message indicates that you are trying to install a license file with an incorrect Hasp ID. This can have the following causes:

- You are trying to install a license file, e.g. for the serial number (multi-client) W03812_002, on the PC with the serial number (multi-client) W03812_001.

Please check whether the name of the serial number matches the serial number of the installed VTS on the PC.

- You can find the multi-client name (serial number) of your installed VTS as shown in the following screenshots:

Figure 4 On the Environment details page (new VTS user interface)

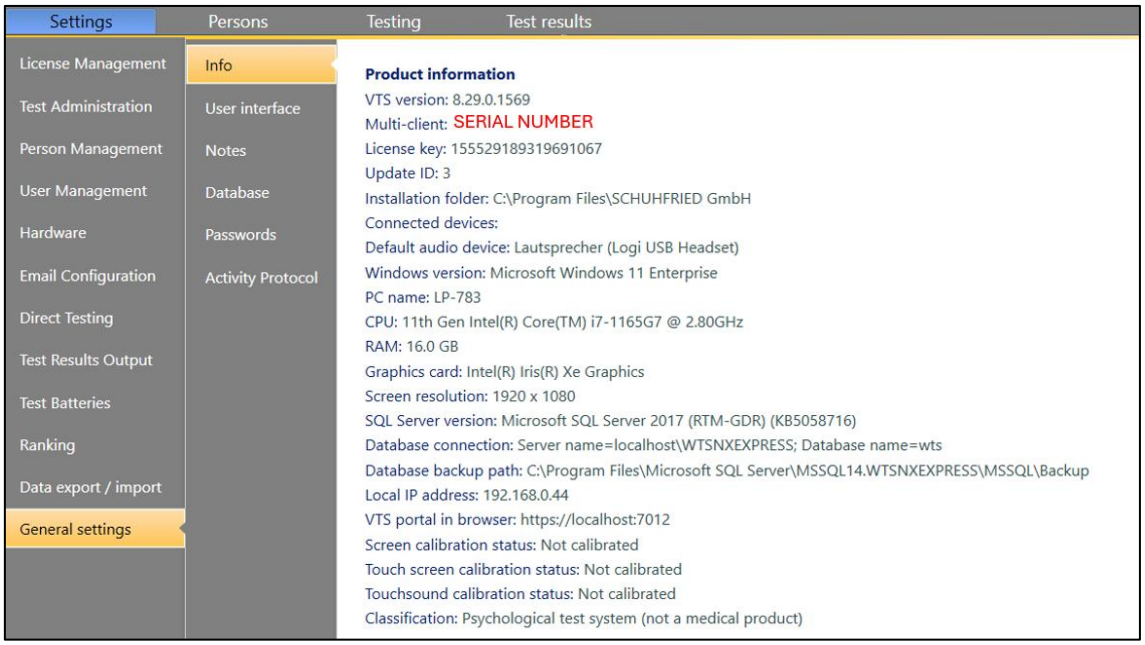


Figure 5 Under Settings → General settings → Info (in the old VTS user interface)

- You have received a new hardware dongle or software dongle from SCHUHFRIED, but the license file was created for the old serial number. In this case, please contact our support team.

5.2.4.2 Troubleshooting

5.2.4.2.1 Try again on the correct PC

1. Once you've verified that the license file matches the serial number of the installed VTS, open your browser and go to: http://localhost:1947.
2. Select *Update/Mount* and go to *Select File*. Please select the V2C license file and confirm.
    a. For more details, see: Install licenses.

5.2.5 Problems printing test results

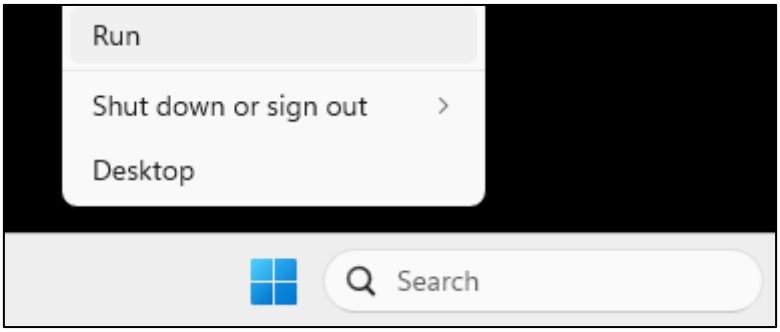
5.2.5.1 Description

Test results cannot be printed. This may be due to the Windows feature *Microsoft XPS Document Writer* not being enabled.

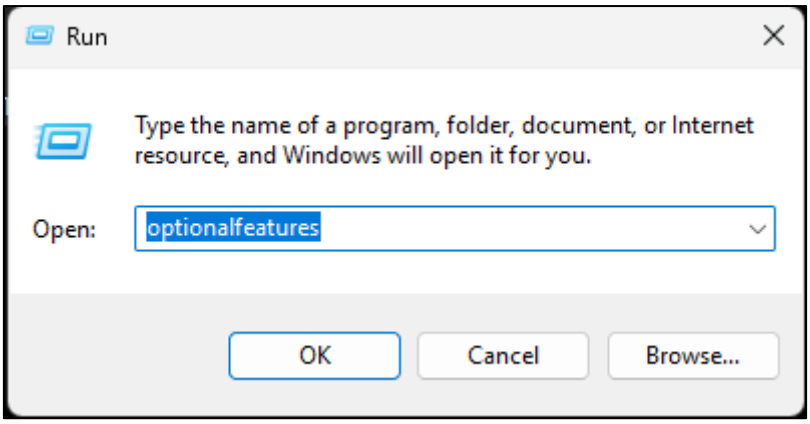
5.2.5.2 Troubleshooting

Enable *Microsoft XPS Document Writer:*

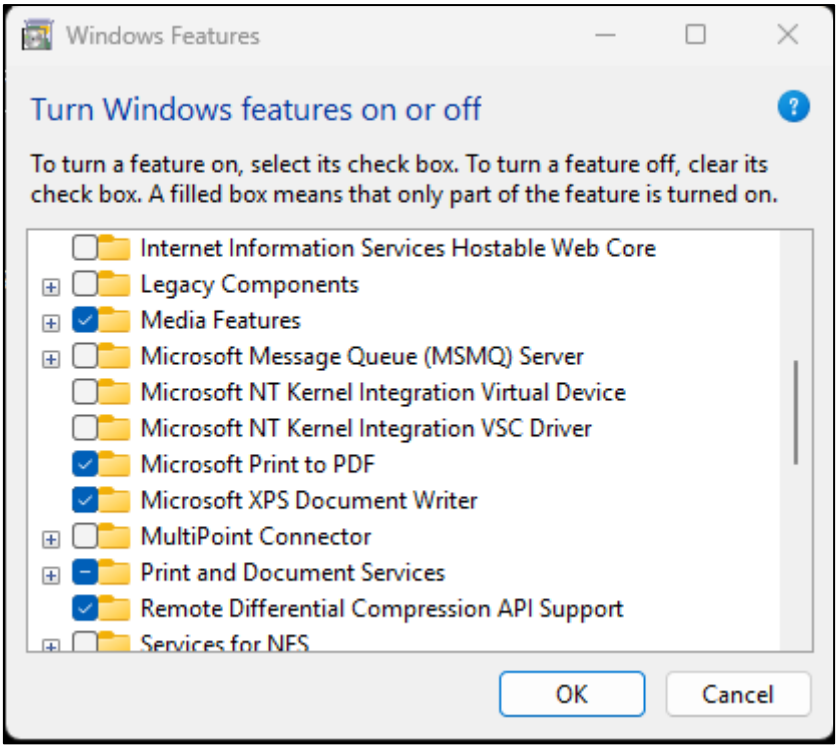
1. Right-click on the Windows icon in the taskbar and select *Run.*



2. Enter `optionalfeatures` and confirm by clicking *OK*.



3. In the window that opens, enable the option *Microsoft XPS Document Writer* and confirm by clicking *OK*.

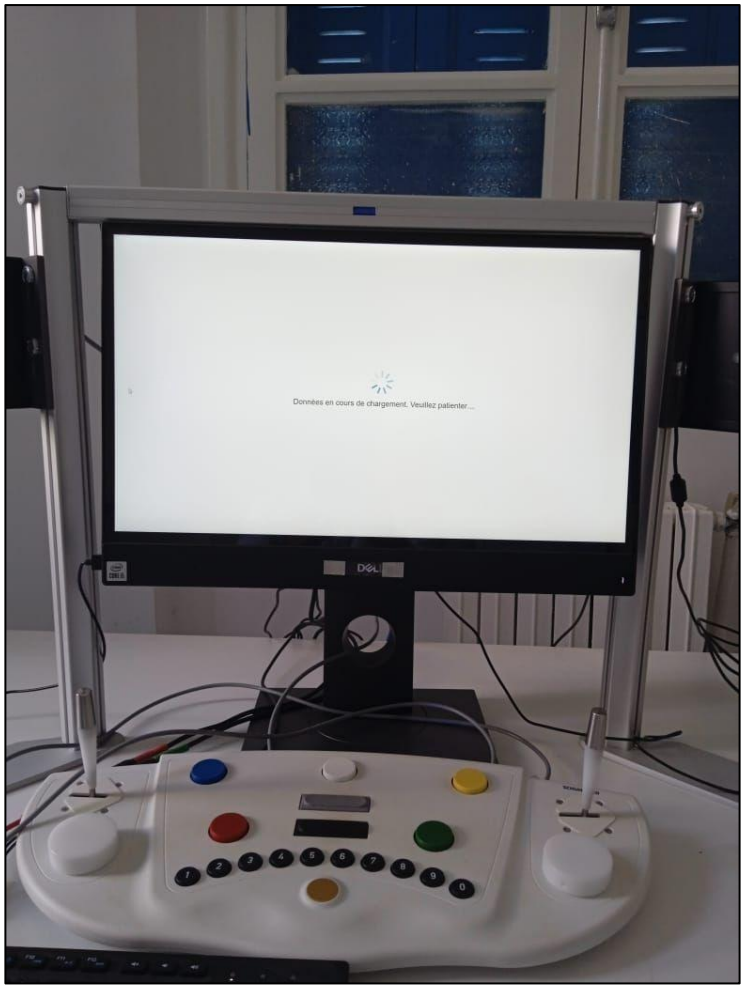


4. Restart the PC.

5.2.6 The Testplayer Client fails to load

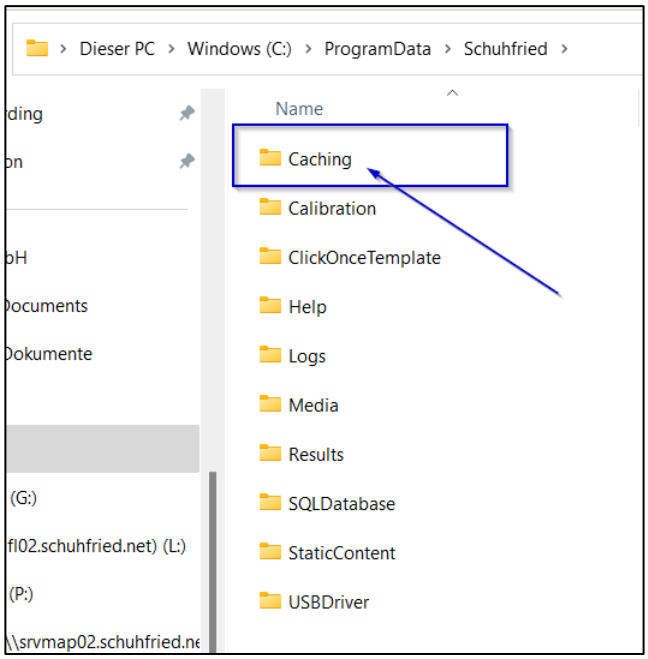
5.2.6.1 Description

After attempting to start a test, the Testplayer Client fails to finish loading and remains stuck on the loading screen:



5.2.6.2 Troubleshooting

1. Please delete the caching folder in %programdata%\schuhfried and restart the test.



5.2.7 Umlauts are not imported correctly

5.2.7.1 Description

When importing persons into VTS, special characters, such as umlauts, are not imported correctly into VTS. The import is done via a .csv file containing the required personal data. This problems may occur if the .csv file is not formatted correctly.

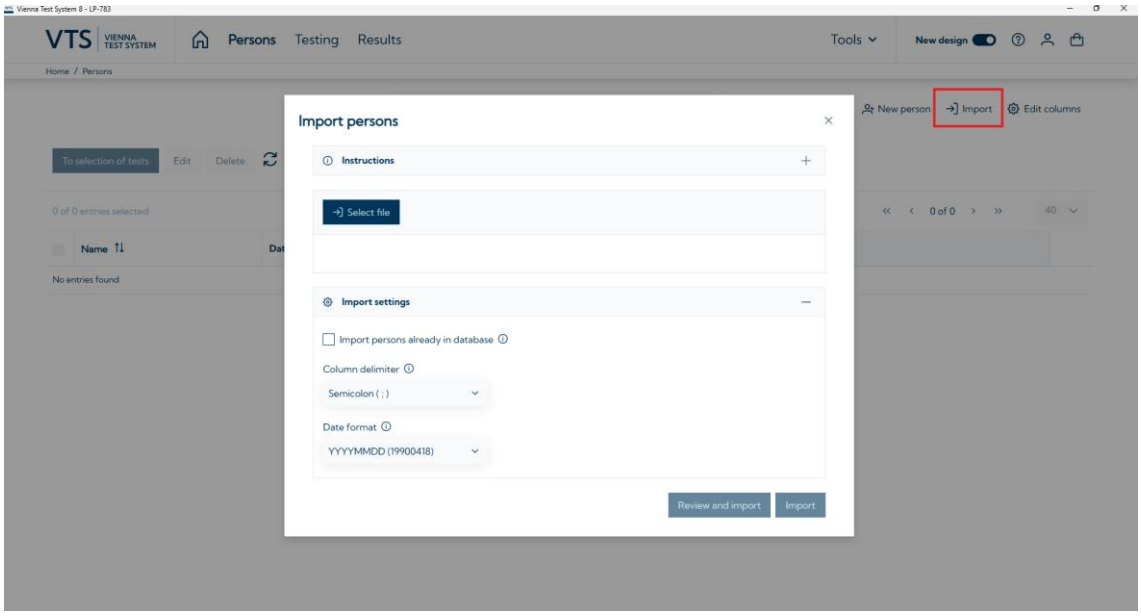


Figure 6 Importing persons into VTS

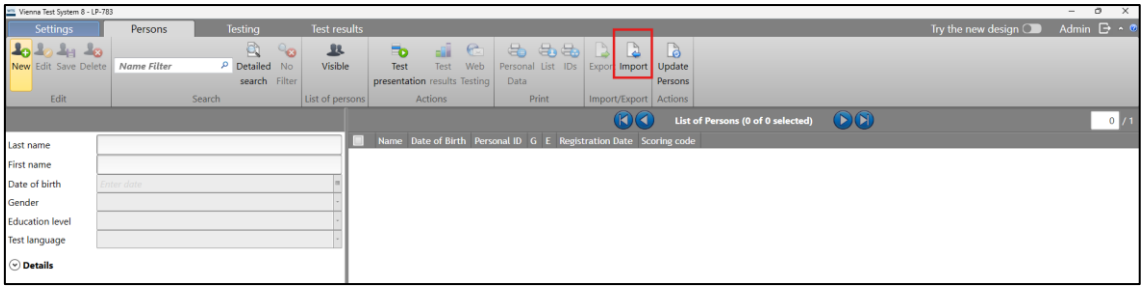


Figure 7 Importing persons into VTS (old VTS user interface)

5.2.7.2 Solution

1. Make sure the correct file format option is selected when saving.
    a. When using Microsoft Excel: Use the *Save As* option and select *CSV UTF-8 (delimited) (*.csv)*.

5.2.8 Test results are not merged into a single test result

5.2.8.1 Description

Two test results for the same test taker are not merged into a single test result, even though this should be supported. The VTS offers the option of merging test results for the same test taker from the same test in order to obtain a single test result. This can be useful if, for example, different subtests of the same test are taken at two different times. However, this only works if the test times of the results you want to merge are not too far apart.

The limits are:

- When merging **individual test results and test set results**, there is a limit of **3 months** (exactly 3 * 30 days = 90 days).
- For the **CFD** test set, the limit is **10 days.**

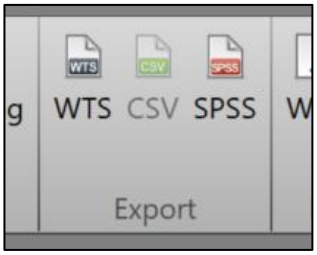
5.2.8.2 Troubleshooting

Please ensure that the test times of your test results do not exceed the limits mentioned above.

5.2.9 CSV export is grayed out

5.2.9.1 Description

The export of test results in .csv format is grayed out. This affects older VTS versions prior to 8.29 (if the old VTS user interface is used).



5.2.9.2 Troubleshooting

- You must first create an export definition in the VTS under *Settings → Data export/import → Manage export settings*.
- For more information, please use the VTS help function in the upper right corner (blue and white question mark icon) and search for *Export Definition*.
- No additional license is required to use CSV export.

6 PERIPHERAL DEVICES

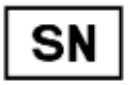
6.1 Operating instructions, safety and maintenance

Here you will find information on operating and maintaining the peripheral devices.

6.1.1 Warnings

This symbol means:
Caution, the hardware manual must be read before operation.

Symbol for the manufacturing date. The year in which the device was produced is shown next to the symbol.



Symbol for the manufacturing date. The year in which the device was produced is shown next to the symbol.

The product must be disposed of with certain waste material collection points or recycling centers or via the manufacturer.

Symbol for the manufacturer. The manufacturer is provided next to this symbol.

Symbol for a device of protection class 2 according to IEC 60417-4172

Symbol for the designation of the device. The designation stands next to the symbol.

This symbol specifies the permissible temperature range.

This symbol specifies the permissible humidity for the storage.

This symbol specifies the permissible atmospheric pressure for the storage.

6.1.2 Maintenance of the devices

All VTS devices are maintenance-free. However, it is recommended to check their proper functioning using the Vienna Test System hardware test every six months.

Maintenance, repairs, and modifications must be carried out in accordance with currently effective legal regulations (e. g. Electrical Engineering Act).

Alterations and repairs carried out by unauthorized individuals or companies invalidate the manufacturer's warranty and product liability.

The devices must always be switched off before cleaning. Use only disinfectants, or mild detergents, to clean the equipment with a soft cleaning cloth. Avoid applying cleaning or disinfecting agents directly to the unit and its parts to prevent liquid from penetrating the enclosure.

Surface disinfectants are generally suitable for cleaning or disinfecting the devices. If the devices are used in healthcare facilities, only disinfectants approved for medical devices in accordance with the Medical Devices Act and Directive 93/42/EEC should be used. Permitted are alcohol-based (ethanol) or active oxygen-based liquids that do not contain solvents and are non-abrasive. (e.g. Schülke mikrozid AF liquid or ANTISEPTICA Descogen Liquid r.f.u.).

Wait a few minutes after cleaning the devices before using them again. This allows any remaining cleaning or disinfectant residues to evaporate.

The product life provided by the manufacturer is 10 years from the date of manufacture. This date can be found on the nameplate.

6.1.2.1 Packaging and transport

The packaging is reusable and should be kept for possible transport. We recommend the same conditions for transport as for storage. The foam contained in the packaging is made of pure PE and is CFC-free.

6.1.3 Safety

Although the devices are not classified as medical devices, they have been developed in accordance with the requirements of the ÖVE standard EN 60601. They only comply with these regulations when connected to a computer system that also complies with these regulations.

Route the connecting cables in a way that prevents the devices from being accidentally pulled or knocked over. The cables should be kept out of the test taker's reach, while ensuring there is enough length for each person to place the devices in a comfortable and accessible position.

When using headphones, ensure that the volume is not set to maximum before the test taker puts them on to prevent potential hearing damage.

Do not use any peripheral device if any parts are damaged or broken. The USB peripheral devices of the VTS must not be used in damp environments or in areas with a risk of explosion.

6.1.3.1 EMC notes

If the input and output devices of the Vienna Test System are used in a clinical environment, special precautions regarding EMC must be taken. Even in the non-medical environment, special care must be taken with regard to EMC. To ensure safe operation, the use of portable and mobile HF communication systems is prohibited, because they could interfere with the functioning of the system.

6.1.3.2 ESD notes

All input devices incorporate all precautions against electrostatic discharge necessary to prevent damage to components. The excess energy is discharged to earth by means of protective diodes. If the input device crashes, the points in the chapter Hardware Test and troubleshooting must be carried out. If the device failed during a test, the test must be repeated. ESD discharges can be caused by friction between rubber soles and plastic or carpeted floors. Particular caution is required when touching electrically conductive elements.

The chapter *Guidelines and manufacturer's declaration for EMC-compliant installation in healthcare facilities* discusses EMC-compliant repair and the applicable guidelines in more detail.

6.1.4 Exclusion of liability

The manufacturer or supplier can only be held responsible for matters affecting safety or performance of the device if

- assembly, upgrades, re-setting, alterations or repairs are carried out by persons authorized by him and
- the electrical installation at the place of use conforms to IEC or ÖVE EN 7 regulations and
- the devices are used in accordance with the instructions, and are not used at the same time as USB peripheral devices of other manufacturers.

6.1.5 Guidelines and manufacturer's declaration for EMC-compliant installation in healthcare facilities

Table 1: Electromagnetic emissions

The Panel Ag/Ug is intended for operation in the environment specified below. The customer or user of the Panel Ag/Ug should ensure that it is operated in such an environment.

Emissions test	Compliance	Electromagnetic environment - guidelines
RF emissions CISPR 11	Group 1	The Panel Ag/Ug uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
RF emissions CISPR 11	Class B	The PANEL Ag/Ug is suitable for use in all establishments, including domestic establishments and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.
Harmonic emissions IEC 61000-3-2	Not applicable	
Voltage changes and flicker IEC 61000-3-3	Not applicable	

Table 2: Electromagnetic immunity

The Ag/Ug panel is intended for operation in the electromagnetic environment specified below. The customer or user of the Ag/Ug panel should ensure that it is used in such an environment.

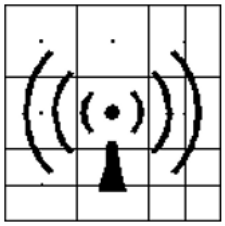
Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment - guideline
Electrostatic discharge (ESD) according to IEC 61000-4-2	± 6 kV contact discharge ± 8 kV air discharge	± 6 kV contact discharge ± 8 kV air discharge	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30 %.
Electrical fast transient/burst IEC 61000-4-4	± 2 kV for power supply lines ± 1 kV for input/output lines	Not applicable	The quality of the supply voltage should correspond to that of a typical business or hospital environment.
Surge voltages according to IEC 61000-4-5	± 1 kV differential mode voltage ± 2 kV common mode voltage	Not applicable	The quality of the supply voltage should correspond to that of a typical business or hospital environment.
Voltage dips, short interruptions and voltage variations on power supply input lines IEC 61000-4-11	< 5 % U_T (> 95 % dip in U_T) for ½ cycle 40 % U_T (60 % dip in U_T) for 5 cycles 70 % U_T (30 % dip in U_T) for 25 cycles < 5 % U_T (> 95 % dip in U_T) for 5 s	Not applicable	The quality of the supply voltage should be equivalent to that of a typical business or hospital environment. If the user of the Panel Ag/Ug requires continued operation even in the event of power supply interruptions, it is recommended that the Panel Ag/Ug be powered from an uninterruptible power supply or a battery.
Magnetic field at supply frequency (50 Hz/60 Hz) according to IEC 61000-4-8	3 A/m	3 A/m	Magnetic fields at mains frequency should be typical of those found in commercial and hospital environments.

Note: U_T is the mains AC voltage before the test levels are applied.

Table 3: Electromagnetic immunity

The Panel Ag/Ug is intended for operation in the electromagnetic environment specified below. The customer or user of the Panel Ag/Ug should ensure that it is used in such an environment.

Immunity tests	IEC 60601 test level	Compliance level	Electromagnetic environment - guidelines
			Portable and mobile radio equipment shall be used at a distance from the Ag/Ug panel, including the cables, not less than the recommended safety distance calculated according to the equation appropriate for the transmission frequency. **Recommended safety distance:**

Immunity tests	IEC 60601 test level	Compliance level	Electromagnetic environment - guidelines
Conducted RF disturbances according to IEC 61000-4-6	3 V_{eff} 150 kHz to 80 MHz	3 → *V*1 in V	$d = \left(\frac{3,5}{V1}\right) * \sqrt{P}$
Radiated RF disturbances according to IEC 61000-4-3	3 V/m 80 MHz to 2,5 GHz	3 → *E*1 in V/m	$d = \left(\frac{3,5}{E1}\right) * \sqrt{P}$ Figure 8 for 80 MHz to 800 MHz
			$d = \left(\frac{7}{E1}\right) * \sqrt{P}$ Figure 9 for 800 MHz to 2,5 GHz
			where P is the maximum rated power of the transmitter in watts (W) according to the transmitter manufacturer and d is the recommended safety distance in meters (m). The field strength of stationary radio transmitters should be less than the compliance level at all frequencies according to an on-site investigation[a,b]. Interference may occur in the vicinity of devices bearing the following symbol: 

Note 1: At 80 MHz and 800 MHz, the higher frequency range applies.

Note 2: These guidelines may not be applicable in all cases. The propagation of electromagnetic fields is influenced by absorption and reflection from buildings, objects, and people.

[a] The field strength of stationary transmitters, such as base stations for mobile telephones and mobile land radio services, amateur stations, AM and FM radio and television transmitters, cannot be accurately predicted in theory. In order to determine the electromagnetic environment resulting from stationary RF transmitters, an investigation of the location is recommended. If the determined field strength at the location of the Panel Ag/Ug exceeds the above-mentioned compliance level, the Panel Ag/Ug must be observed with regard to its normal operation at each location of use. If unusual performance characteristics are observed, it may be necessary to take additional measures, such as changing the orientation or location of the Panel Ag/Ug.

[b] Over the frequency range from 150 kHz to 80 MHz, the field strength should be less than [V1] V/m.

Table 4: Recommended safety distances

Recommended separation distances between portable and mobile RF telecommunications equipment and the Panel Ag/Ug.

The Panel Ag/Ug is intended for operation in an electromagnetic environment in which RF disturbance levels are controlled. The user of the Ag/Ug panel can help to avoid electromagnetic interference by maintaining the minimum distance between portable and mobile RF telecommunications equipment (transmitters) and the Ag/Ug panel, depending on the output power of the telecommunications equipment, as specified below.

The protective distance depends on the transmission frequency in m

Nominal power of the transmitter W	150 kHz to 80 MHz $d = \left(\frac{3,5}{V1}\right) * \sqrt{P}$	80 MHz to 800 MHz $d = \left(\frac{3,5}{E1}\right) * \sqrt{P}$	800 MHz to 2,5 GHz $d = \left(\frac{7}{E1}\right) * \sqrt{P}$
0.01	0.12	0.12	0.23
0.1	0.37	0.37	0.74
1	1.17	1.17	2.33
10	3.69	3.69	7.38
100	11.67	11.67	23.33

For transmitters whose maximum rated power is not specified in the above table, the separation can be determined using the equation corresponding to the relevant column, where P is the maximum rated power of the transmitter in watts (W) as specified by the transmitter manufacturer.

Note 1: At 80 MHz and 800 MHz, the higher frequency range applies.

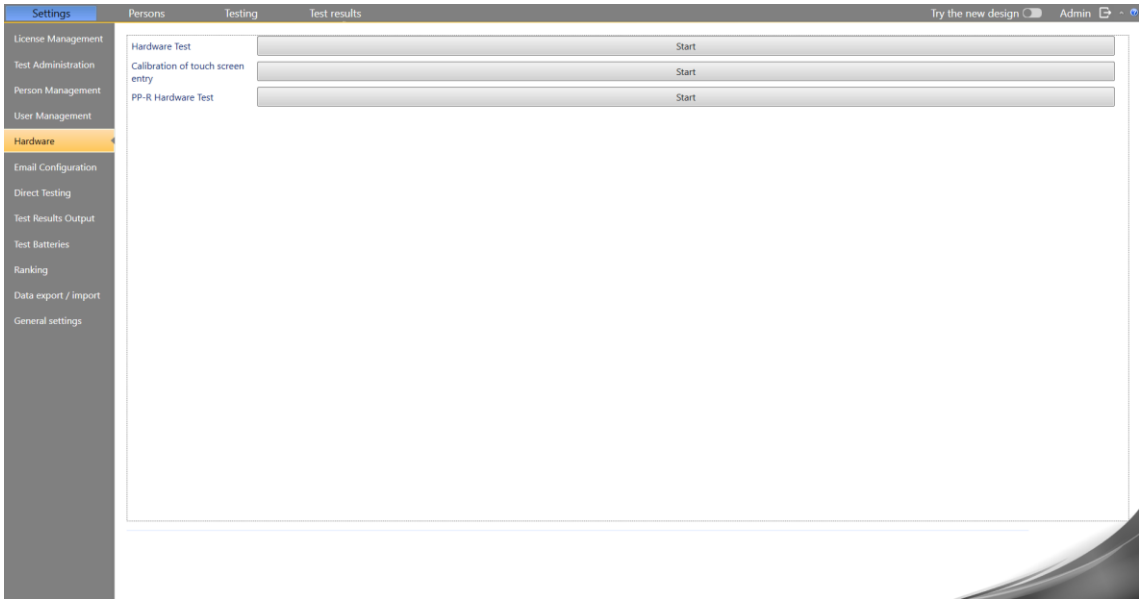
Note 2: These guidelines may not be applicable in all cases. The propagation of electromagnetic fields is affected by absorption and reflection from buildings, objects, and people.

6.2 Hardware Test and troubleshooting

The VTS includes hardware tests to verify that the peripheral devices are functioning correctly.

6.2.1 Hardware Tests

Under *Settings* → *Hardware*, you can start the hardware tests:



- To check one of the following devices, click the *Start* button next to *Hardware Test*:
  - Response panel
  - Foot-operated keys
  - Foot pedals
  - MLS work panel
  - Flicker tube
  - Peripheral Perception (PP-HW – with serial interface and solid aluminum base plate)
- To check the **Peripheral Perception PP-HW2** (USB interface), select *Start* next to *PP-R Hardware Test*.

6.2.1.1 Hardware Test

Use the hardware test to check the functional suitability of the peripheral devices of the Vienna Test System after completing the installation. It is recommended to perform the hardware test quarterly or half-yearly, dependent on your quality management system. Perform the test after each change of the system configuration.

At the beginning, a window will appear showing which devices are connected. Please verify that “Yes” appears for all your devices. After clicking *OK*, the hardware test will start with the first device entered. Please note that the **foot-operated keys** are checked as part of the **Response Panel** test, and the **foot pedals** are part of the test under **Analog input devices**.

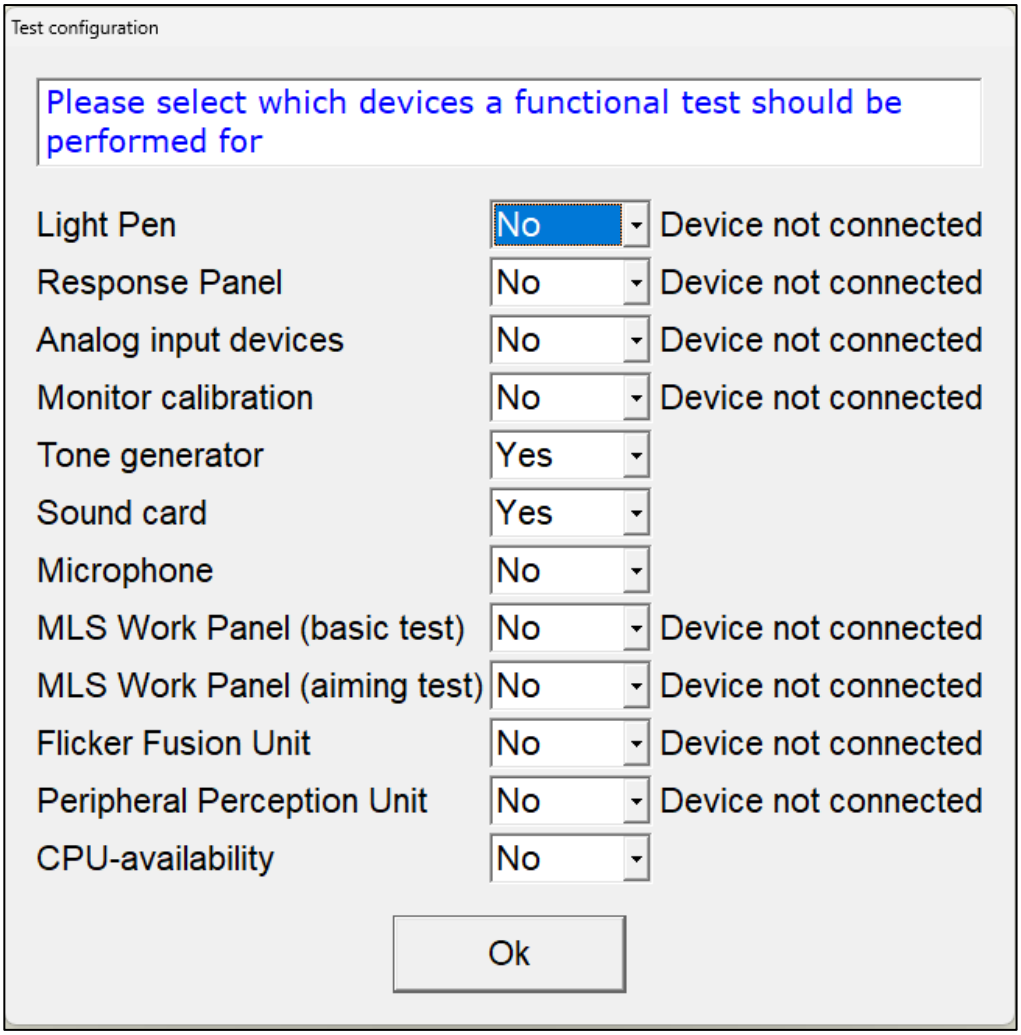
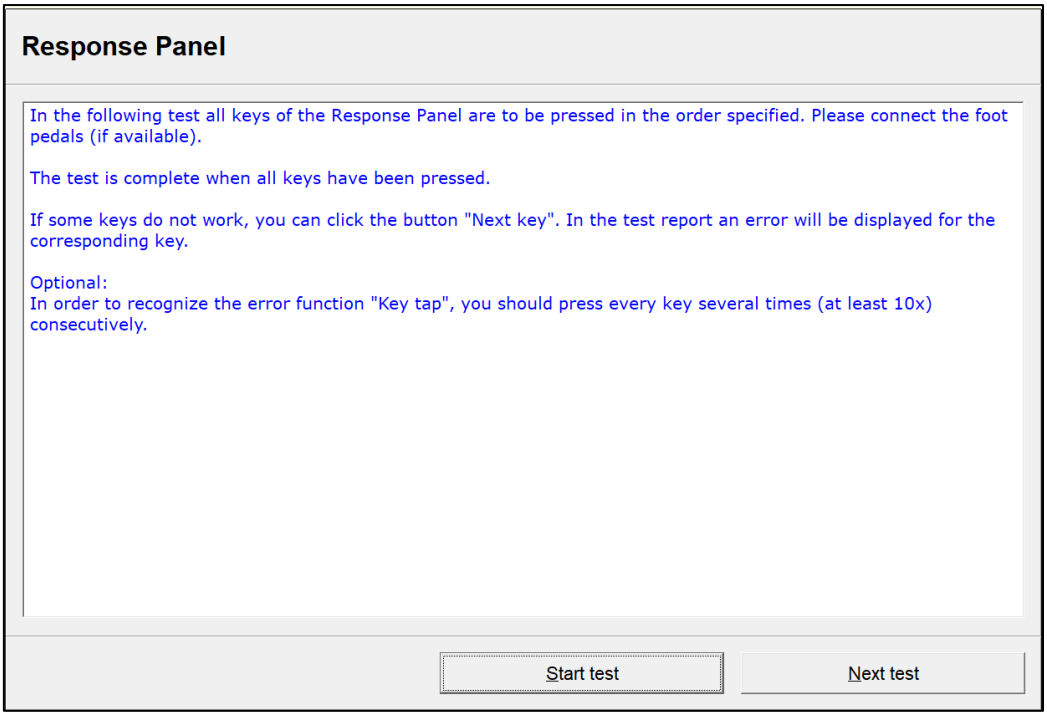


Figure 10 The Hardware Test of the VTS

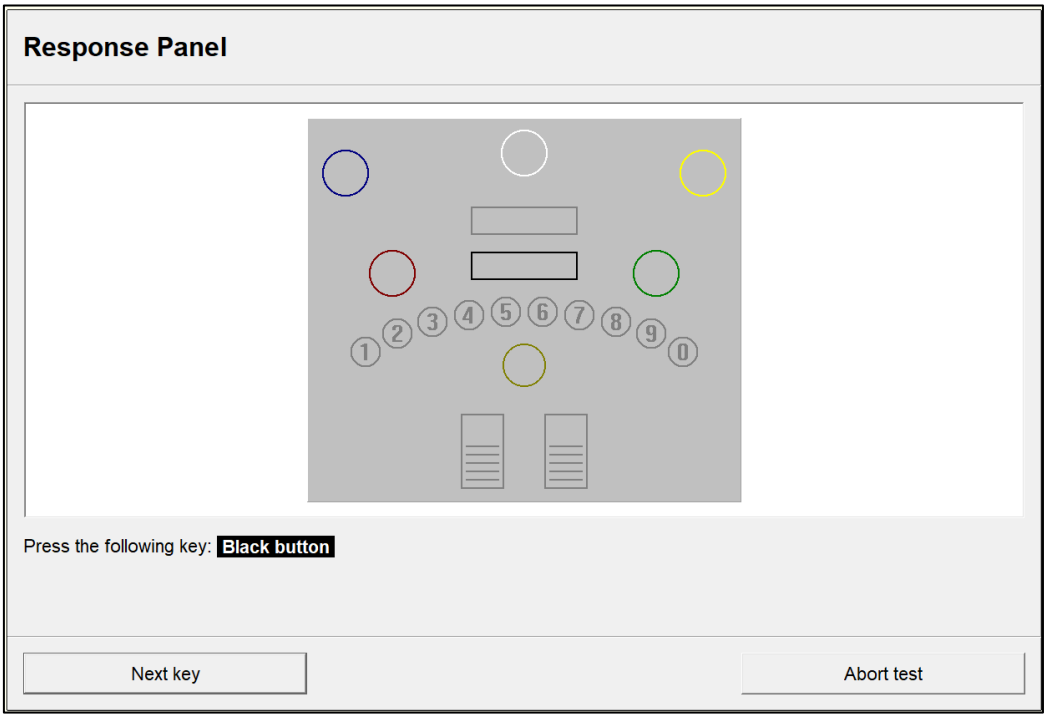
The program guides you through the test for each device. Please follow all indicated steps carefully. After completing all hardware tests, you can print a report as confirmation.

Hardware test using the example of the Response Panel

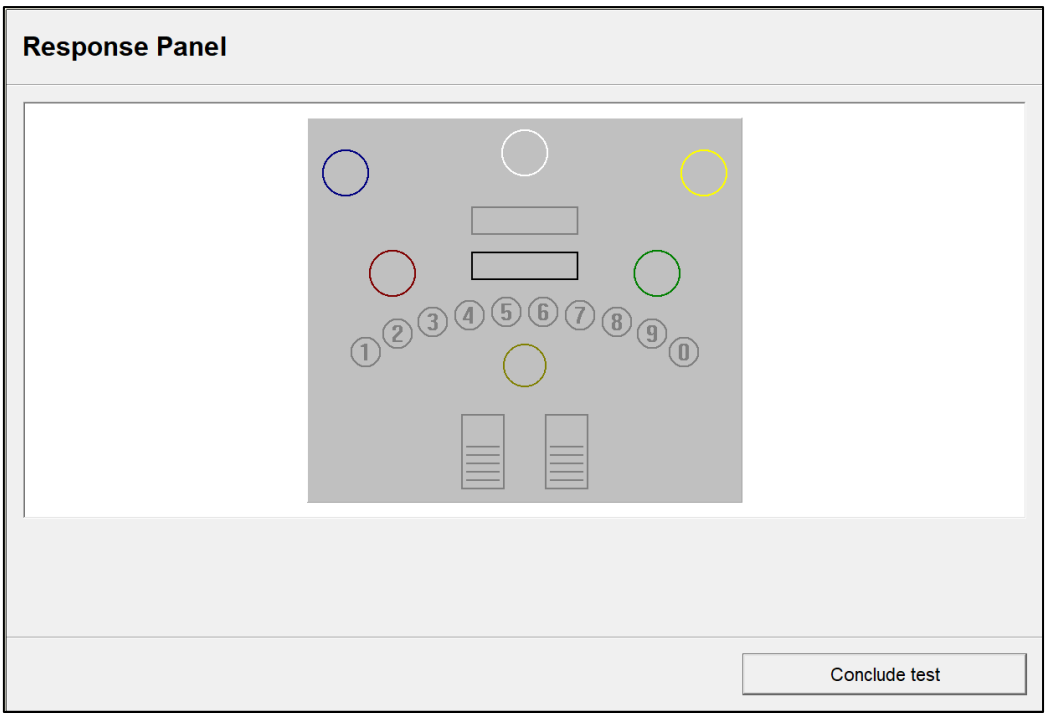
1. Each test begins with an introduction explaining how to perform the test. Click on *Start test* to begin the test. If you want to skip the test, click on *Next test*.



2. You will be asked to press the corresponding key. Once you have done this, press the next key. If a key does not work, click on *Next key* to skip it. Keys that are not pressed are noted in the report.

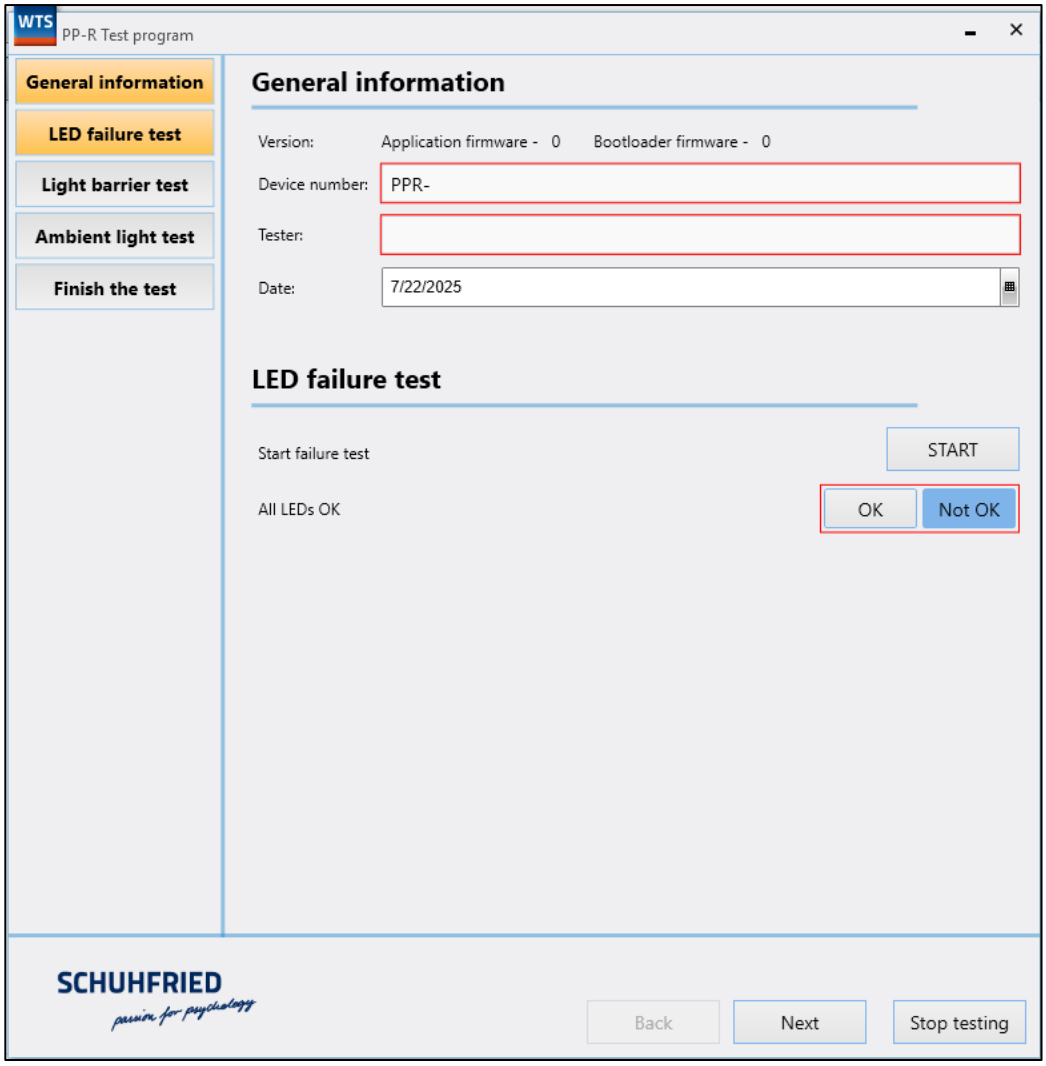


3. After the test has been completed, click **Conclude test** to finish it. The test for the next hardware component will then start automatically.

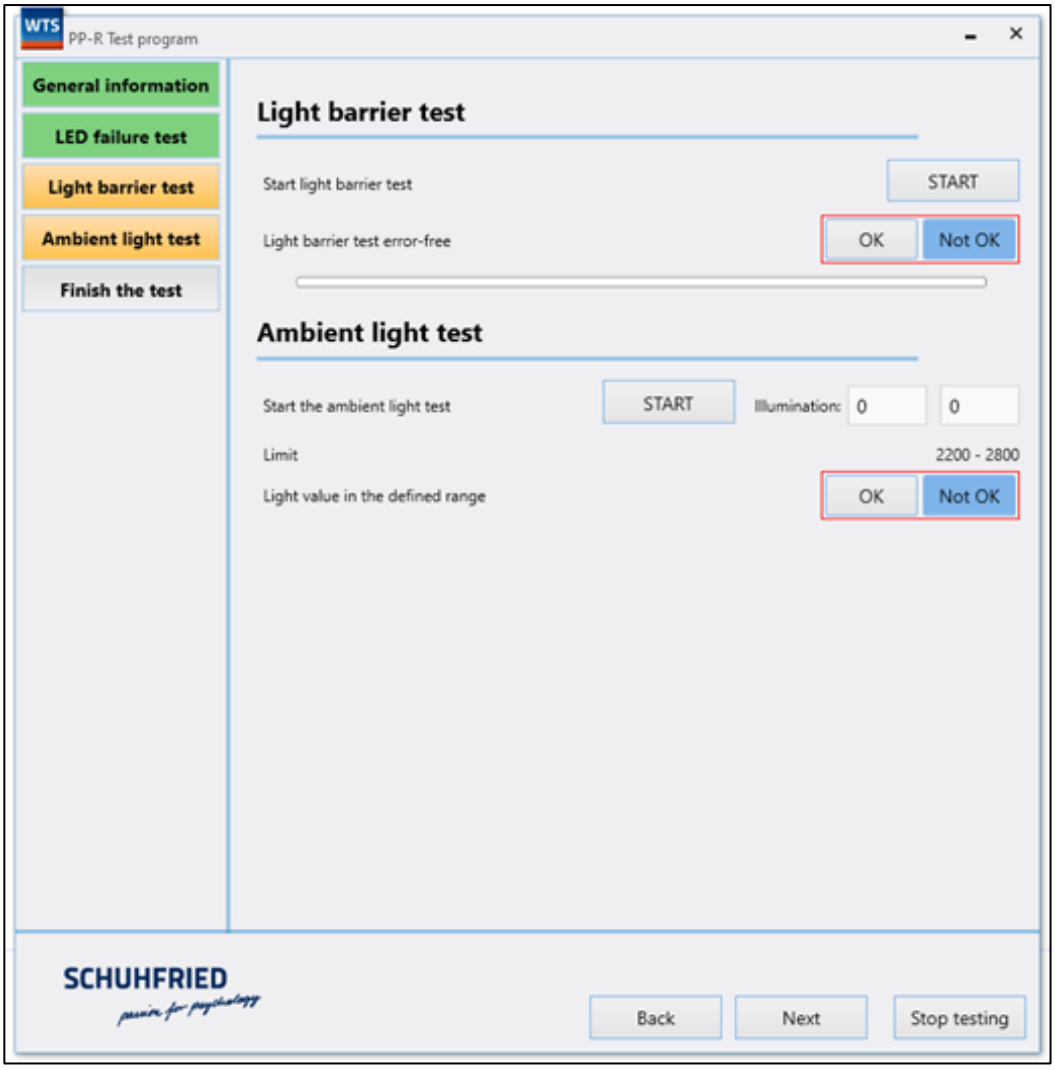


6.2.1.2 PP-HW2 hardware test

After starting the PP-HW2 hardware test, you will be asked to enter the HW device number and the person performing the test. The device number can be found on the device label on the back side of the LED-panels of the PP-HW2.



Perform the test step by step by clicking on *START* for each individual test and confirm with *OK* if the results are as expected. This means that the LED-panels are working properly and the measured ambient illumination is within the specified range (specified under *Limit*).



At the end, a test report can be printed.

6.2.1.3 Troubleshooting

If a peripheral device isn't functioning properly, try the following steps to locate and resolve the problem:

- Disconnect the device and reconnect it
- Restart Windows
- Connect the device to a different USB port (the device driver may need to be reinstalled)
- Disconnect other USB devices
- Connect the device directly to the computer without a USB hub

6.3 VTS Dongle

The *VTS Dongle* or *Test System Dongle* is connected to your PC via USB and is required for licensing the VTS if you are not using a product key or software dongle. Details on the available licensing options can be found on the page: (en-US) Installation and configuration.

Your VTS dongle contains all licenses for the VTS and the tests. It must remain connected to the PC at all times to use the VTS.

6.3.1 Scope of delivery

- One VTS Dongle (USB dongle)

- One set of stickers in red, green, yellow, and black (to be used with a response panel, which is not part of the scope of delivery)

If you do not have a response panel but the red, green, yellow, and black keys are required for testing, the computer keyboard can bes used instead if necessary:

Response panel	PC keyboard
Red button	Left Ctrl or Alt or Shift key
Green button	Right Ctrl or Shift key
Yellow button	Backspace key
Black button	Space

Since some keyboards, especially on laptop computers, have an inconvenient key layout, the above alternatives are available. Select the keys that are most conveniently located and mark them with the colored stickers provided.

6.3.2 Specifications

Specifications	Value
Power supply	5V via USB port
Power consumption	max. 30mA
Max. dimensions (W/H/D)	15 x 8 x 75mm
Weight (without accessories)	9,5g
Storage temperature	-20 to 60°C
Operating temperature	10 to 30°C
Relative humidity	max. 70%, non-condensing

6.4 Response Panel

The newest generation of our Response Panels has been available since September 2025. It includes the **Standard Response Panel (SH Response Panel)** and the

Universal Response Panel (UH Response Panel). The documentation for previous Response Panels is available in the archive.

The Response Panel you need depends on the tests you want to administer. **The use of a Response Panel (SH Response Panel or UH Response Panel) is absolutely necessary** for the following tests: COG, DT, INHIB, PP-R, RT, SIGNAL, STROOP, SWITCH, VIGIL, WAF, WAFV, ZBA.

If you also want to test eye-hand coordination with the 2HAND and SMK tests, the **Universal Response Panel (UH Reponse Panel) is required**.

All other tests in the VTS do not require a Response Panel. However, many tests can still be administered using the Response Panel to avoid switching input devices (e.g., from a PC keyboard to a Response Panel).

6.4.1 Scope of delivery

- 1 Response Panel, Standard (SH) or Universal (UH)
- 2 joysticks (only with UH Response Panel)
- 2 joystick guides (only with UH Response Panel)

Standard Response Panel (SH)

- 7 color keys, 10 number keys, 1 sensor key
- Connection options for foot-operated keys
- Connection options for foot pedals - analog
- Sound generator (speaker)
- Connection option for headphones

Universal Response Panel (UH)

- 7 color keys, 10 number keys, 1 sensor key
- 2 control knobs
- 2 analog joysticks
- Joystick guides
- Connection options for foot-operated keys
- Connection options for foot pedals - analog
- Sound generator (speaker)
- Connection option for headphones

6.4.2 Commissioning

Use the supplied USB cable to connect the Response Panel to the PC that will be used for testing. The Vienna Test System (or the Testplayer) must be installed on this PC. Connect the USB cable to the USB-C port on the back of the Response Panel and the other end to a free USB-A port on your computer.

Figure 11 Connection options for the Response Panel from left to right: RJ-45 (currently not used), USB-A port, foot-operated keys/foot pedals, USB-C port, RJ-45 (currently not used)

The USB-C port must be used for power supply. Using the USB-A port for power supply is not possible.

6.4.2.1 Joystick guides

The joystick guides are attached to the UH Response Panel as shown. The joystick can be removed to make installation easier. Joystick guides are required for administering

the SMK and 2HAND tests. Please refer to the test manual for details on the correct placement of the joystick guides in each test.

Figure 12 Joystick guide attached to the UH Response Panel

6.4.2.2 Sound output

The Response Panel can output sound through the internal loudspeaker or through a headset (available as an accessory). The headset can be connected to the Response Panel using the USB-A port. You can also use a USB headset by connecting it to a free USB port on the computer. Use the Windows sound output settings (in the task bar) to select the output device you want to use:

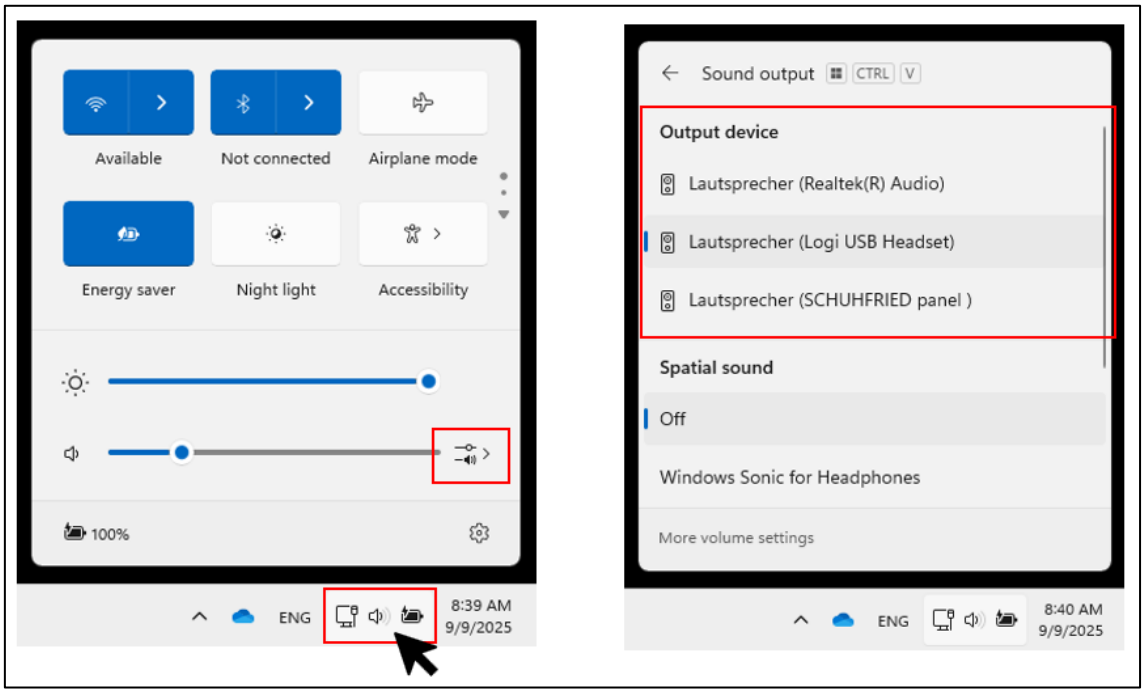


Figure 13 Selecting a device for sound output in Windows settings

When a USB headset is connected to the Response Panel, it must also be selected as the output device in the Windows sound output settings.

6.4.2.3 Foot-operated keys and foot pedals

Foot-operated keys or foot pedals (available as accessories) can be connected via a single connection port. Connect the foot-operated keys or foot pedals as required.

6.4.2.4 Specifications

Specifications	Value
Power supply	+5V DC via the USB cable
Power consumption	max. 500mA
Protection class	
Device type	B
Max. USB cable length	3m
Max. headset cable length	3m
Max. dimensions (W/H/D)	41 x 4 x 20cm
Weight (without accessories)	1,25 kg
Storage temperature	-20 to 60°C
Operating temperature	10 to 30°C
Relative humidity	max. 70%, non-condensing

6.5 Foot-operated keys and foot pedals

6.5.1 Foot-operated keys

The foot-operated keys connect to the back of the Response Panel.

6.5.1.1 Scope of delivery

One pair of foot-operated keys (left & right)

6.5.1.2 Specifications

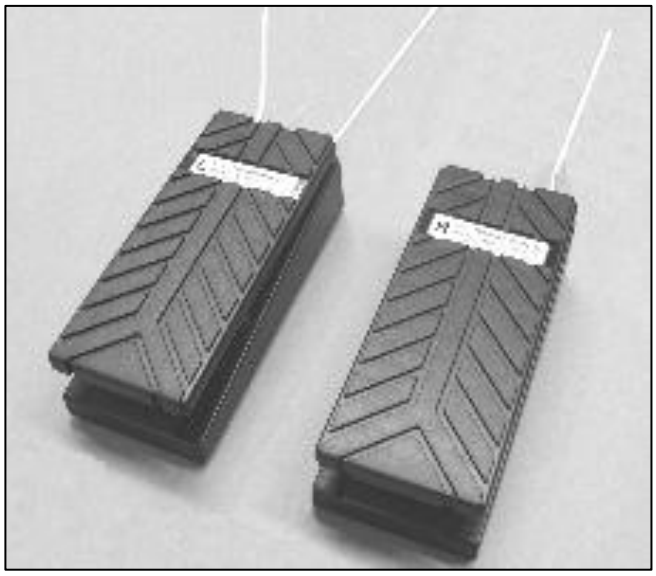
Specifications	Value
Max. dimensions (W/H/D)	160 x 55 x 310mm each
Weight (without accessories)	1,55kg
Storage temperature	-20 to 60°C
Operating temperature	10 to 30°C
Relative humidity	max. 70%, non-condensing

6.5.2 Foot pedals - analog

The analog foot pedals are connected to the Universal Response Panel (Ug panel).

6.5.2.1 Scope of delivery

One pair of foot pedals – analog (left and right)



6.5.2.2 Specifications

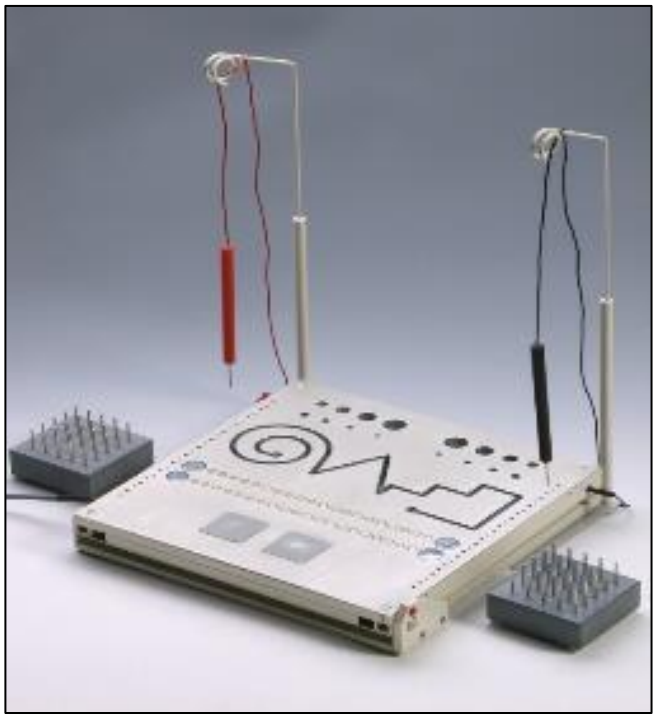
Specifications	Value
Max. dimensions (W/H/D)	80 x 60 x 200mm each
Weight (without accessories)	0,85kg
Storage temperature	-20 to 60°C
Operating temperature	10 to 30°C
Relative humidity	max. 70%, non-condensing

6.6 MLS Work Panel

The MLS Work Panel is a specialized peripheral device that is required for executing the MLS test in the VTS. It is only required for the MLS test which measures fine motor abilities.

6.6.1 Scope of delivery

- One MLS Work Panel
- 2 styluses (red = left, black = right)
- 2 stylus holders
- 2 pin holders with 25 pins each (short)
- 2 pin holders with 25 pins each (long)



The MLS Work Panel features:

- Holes of various diameters
- A multi-curved, milled line
- Two sets of 20 contact points
- 25 small holes on the left and right
- 2 tapping target areas

6.6.2 Specifications

Specifications	Value
Power supply	+5V DC via the USB cable
Power consumption	max. 500mA
Protection class	
Device type	B
Max. dimensions (W/H/D)	310 x 50 x 300mm
Weight (without accessories)	5,4kg

Specifications	Value
Storage temperature	-20 to 60°C
Operating temperature	10 to 30°C
Relative humidity	max. 70%, non-condensing

6.7 Peripheral Perception Unit 2 (PP-HW2)

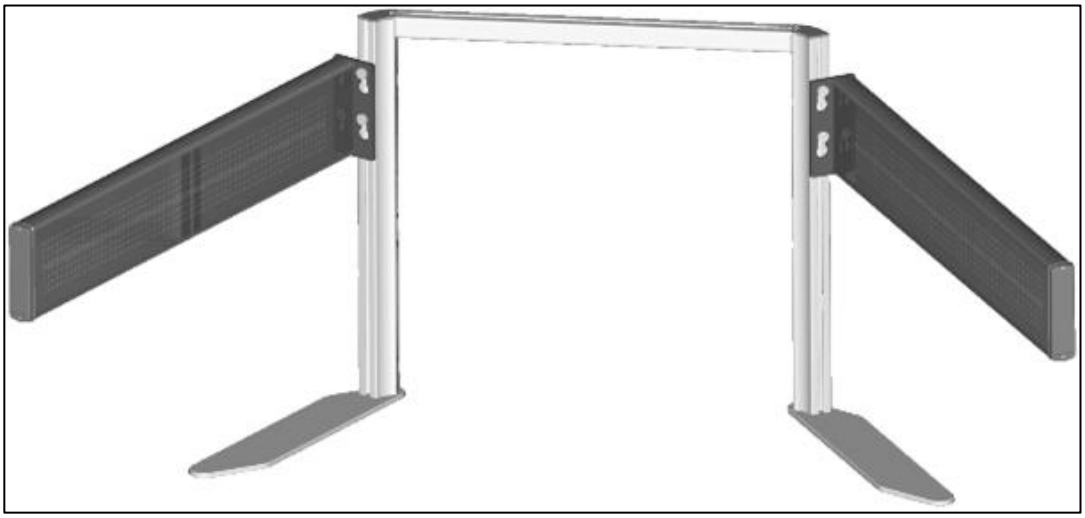
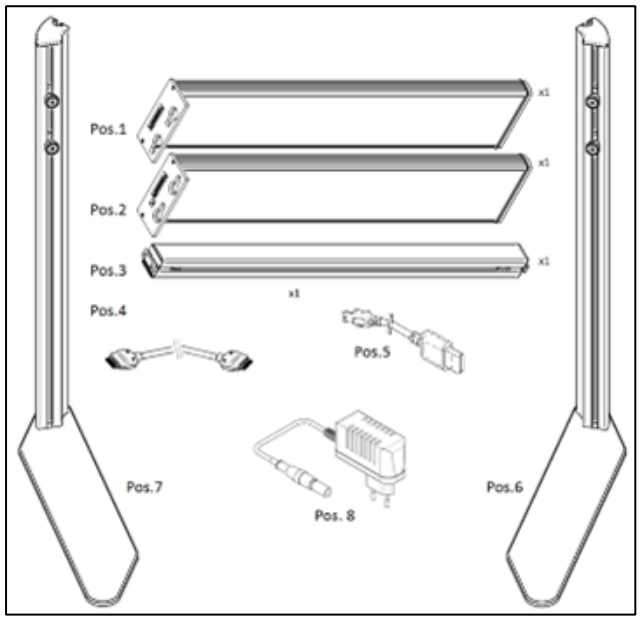


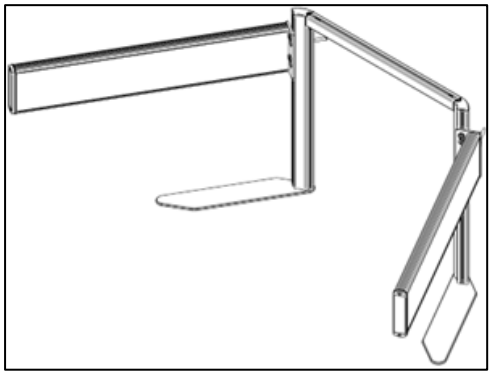
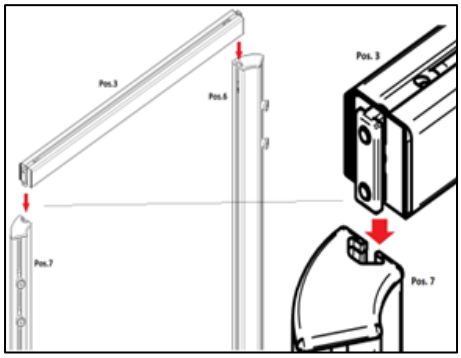
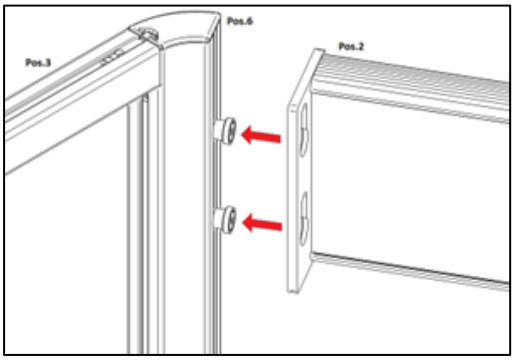
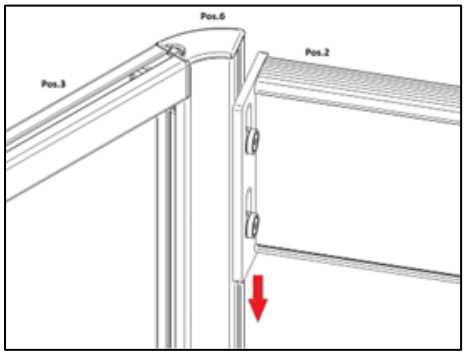
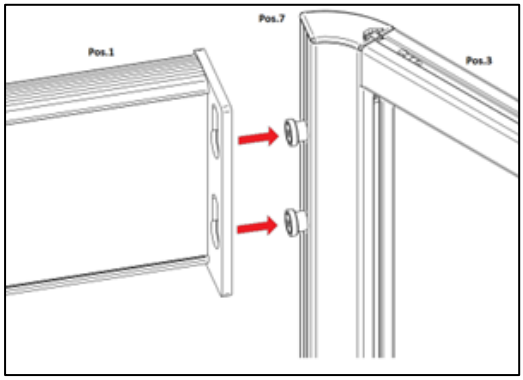
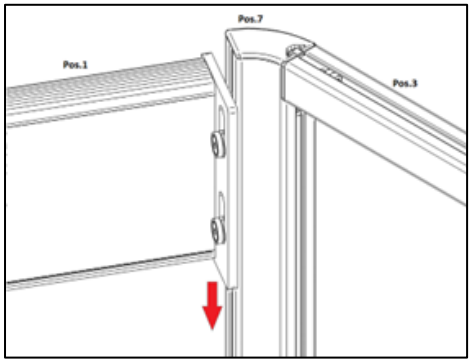
Figure 14 The Peripheral Perception Unit 2 (PP-HW2), fully set up

The Peripheral Perception Unit 2 (PP-HW2) is a specialized hardware equipment needed to execute the PP-R test in the VTS. It is only required for the PP-R test which measures perception and processing of peripheral visual information.

6.7.1 Scope of delivery

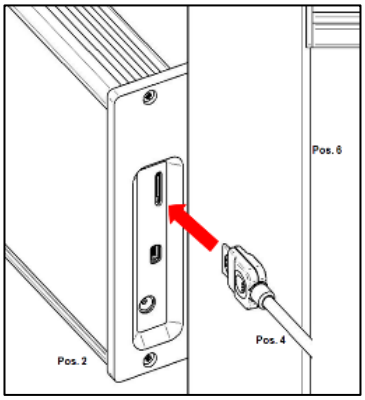
Pos.	Qty.	Description	
1	1	Left display element	
2	1	Right display element	
3	1	Crossbar	
4	1	Connecting cable 20pins/1m	
5	1	Connecting cable USB/3m	
6	1	Right pedestal	
7	1	Left pedestal	
8	1	Switching power supply 5V/4A	

6.7.2 Mechanical assembly

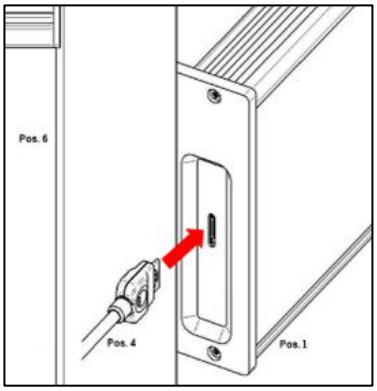
Goal	1. Attach the crossbar to the pedestals.
	
1. Attach right display element to the pedestals.	1. Lock right display element in place.
	
1. Attach left display element to the pedestals.	1. Lock left display element in place.
	

6.7.3 Cabling

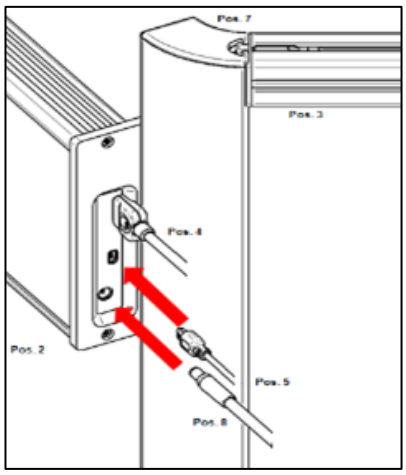
1. Attach cable to right display element.	1. Attach cable to left display element.

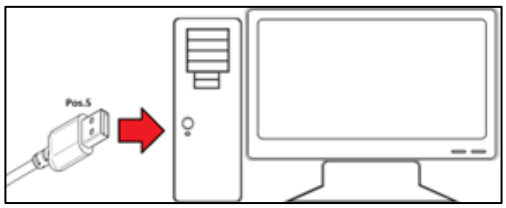


1. Attach USB cable and power supply.



1. Connection to a computer via USB cable.





The device may only be used with the parts included in the scope of delivery!
Only the enclosed switching power supply from *CINCON ELECTRONICS CO., Ltd.* with the type designation *TR30RAM050* may be used!

Before using the device, the cables must be connected. First connect the two display elements (Pos.1 and Pos.2) with the connecting cable provided (Pos.4). The jack on either end of the connecting cable can be plugged into either the left or right display element. See steps 1 and 2. Then connect the USB cable (Pos.5) to the right display element (Pos.2) and the computer (steps 3 and 4).

Power is supplied via the power adapter provided (Pos.8), which is also connected to the right display element (Pos.2) (see step 3). The power adapter (Pos.8) must also be plugged into a mains socket.

To disassemble the device, follow the cabling instructions in reverse order.

Place the test taker's monitor between the Peripheral Perception display elements so that the front of the monitor aligns evenly with the frame holding the display elements.

6.7.4 Specifications

Specifications	Value
Operating voltage	5V / 4A

Specifications	Value	
Power	20W	
Protection class	I	
Device type	B	
Max. dimensions (WxHxD)	1450 x 560 x 800 mm	
Weight (without accessories)	9,6kg	
Storage temperature	-20 to 60°C	
Operating temperature	10 to 30°C	
Relative humidity	Max. 70%, non-condensing	
Switching power supply	Manufacturer:	CINCON Electronics Co., LTD.
	Model:	TR30RAM050
	Output:	5V DC 4.0A

6.7.5 Requirements for the test setting

The test setting should allow the test taker to complete the test without disturbances, including those caused by visual and auditory stimuli.

The ambient brightness must not exceed 2500 lux, as otherwise the contrast between the stimuli presented and the ambient brightness will be too low. At levels higher than this there will be insufficient contrast with the stimuli presented in the test. If the ambient brightness is greater than 2500 lux, it should be reduced.

The ambient brightness is measured by a special brightness sensor in the PP-R hardware. If it is too high, the system prevents the test being administered.

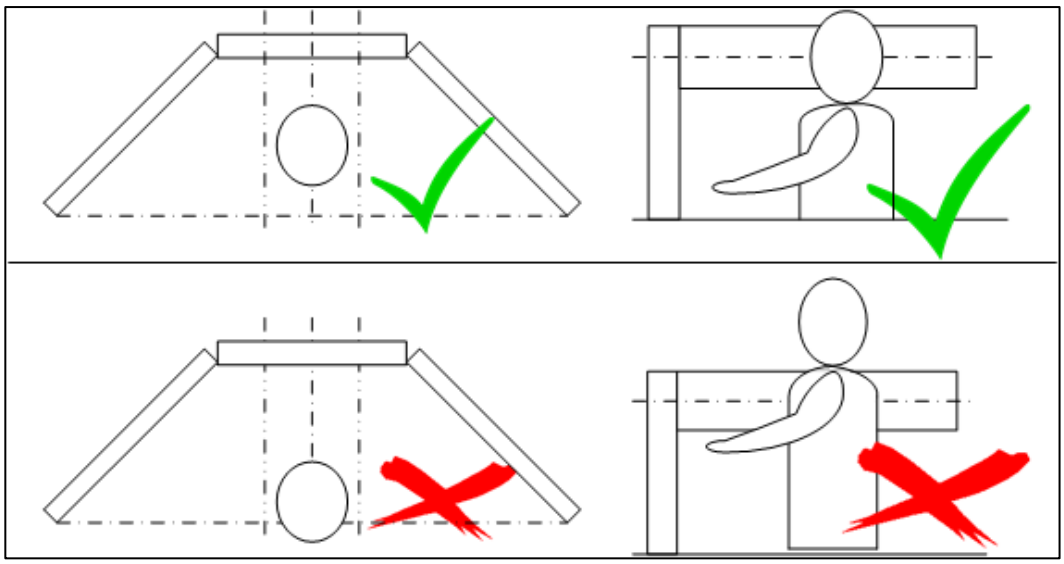
6.7.6 The test taker’s position

The test taker should sit as described under Ergonomic requirements for the workstation. It is important that the test taker's head is positioned between the two display elements. The head should align with the white markings in the middle of the sensor bars. This allows the device to determine the position of the head.

The **distance** between the metal frame and the face **must be between 20 and 45** cm. This distance is measured by the PP-R hardware. If this condition is not met, feedback is provided by the Vienna Test System.

The lateral distance between the head and the center of the screen should be no more than 10 cm. This distance is also measured by the PP-R hardware. If this condition is not met, feedback is provided by the Vienna Test System.

The correct (and incorrect) sitting position is shown schematically in the figure below. To better adjust the vertical position of the display elements, there are two positions where they can be mounted. For taller people, use the upper mounting option; for shorter people (or children), the lower option is preferable.



6.7.7 Safety note

To avoid the risk of electric shock, this device must only be connected to a power supply with a protective conductor.

6.8 Archive

6.8.1 Response Panel (2016-2025)

This page contains the documentation for the Response Panels that were sold from 2016 to 2025: the **Advanced Response Panel (Ag Panel)** and the **Universal Response Panel (Ug Panel).**

The use of a Response Panel (Ag Panel or Ug Panel) is absolutely necessary for the following tests: COG, DT, INHIB, PP-R, RT, SIGNAL, STROOP, SWITCH, VIGIL, WAF, WAFV, ZBA.

If you also want to test eye-hand coordination with the 2HAND and SMK tests, the Universal Response Panel (Ug Panel) is **required**. Please note: Test forms S3 and S4 of the 2HAND can also be administered with the Advanced Response Panel (Ag Panel).

All other tests in the VTS do not require a Response Panel. However, many tests can still be administered using the Response Panel to avoid having to change input devices (e.g., from a PC keyboard to a Response Panel).

6.8.1.1 Scope of delivery

- 1 Response Panel, Advanced (Ag) or Universal (Ug)
- 2 joysticks (only with Ug Response Panel)
- 2 joystick templates (only with Ug Response Panel)

Advanced Response Panel

- 7 color keys, 10 number keys, 1 sensor key
- 2 control knobs
- Connection options for foot-operated keys
- Connection options for foot pedals - analog
- Sound generator (speaker)
- Connection option for headphones and microphone (jack plug)

Universal Response Panel

- 7 color keys, 10 number keys, 1 sensor key
- 2 control knobs
- 2 analog joysticks
- Joystick templates
- Connection options for foot-operated keys
- Connection options for foot pedals - analog
- Sound generator (speaker)
- Connection option for headphones and microphone (jack plug)

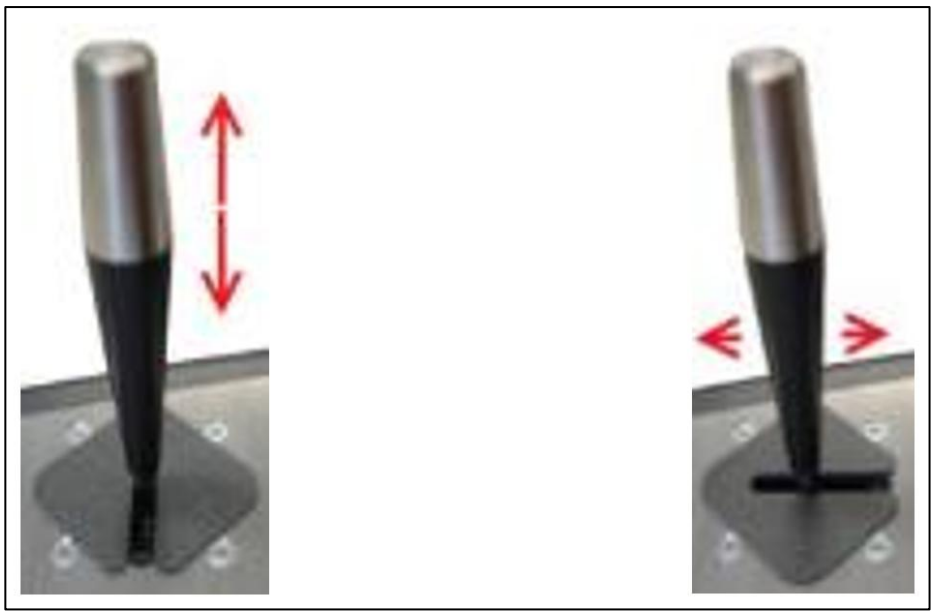
6.8.1.2 Startup

Use the supplied USB cable to connect the response panel to the PC used for testing. The Vienna Test System (or the Testplayer) must be installed on this PC. Connect the USB cable to the USB-B socket on the back of the Response Panel and the other end to a free port (USB-A socket) on your computer.

6.8.1.2.1 Joystick guides

The joystick guides are attached to the Response Panel Ug as shown. The joystick can be removed for easier installation.

Joystick guides are used in some tests to limit the joystick's freedom of movement to a specific direction. The following symbols are used in the instructions for these tests.



6.8.1.2.2 Sound input and output

In the Vienna Test System, sound output can be selected via the internal loudspeaker or via a headset (available as an accessory). The headset can be connected to the Response Panel using a 3.5 mm jack plug for headphones and a microphone. The sockets for connecting the headset are marked with a headphone and microphone symbol. If you want to use a USB headset, connect it to a free USB port on the computer. When the headset is connected, the internal speaker of the Response Panel is switched off.

The volume can be adjusted using the (+) and (-) buttons on the back of the Response Panel, but cannot be turned down to zero.

6.8.1.2.3 Foot-operated keys and foot pedals

Foot-operated keys or foot pedals (available as accessories) are connected via a single connection socket. The socket is marked with the label *Pedal*. Connect the foot-operated keys or foot pedals as required.

6.8.1.2.4 Specifications

Specifications	Value
Power supply	+5V DC via the USB cable
Power consumption	max. 500mA
Protection class	
Device type	B
Max. USB cable length	3m
Max. headset cable length	3m
Max. dimensions (W/H/D)	495 x 50 x 230mm
Weight (without accessories)	1,495kg
Storage temperature	-20 to 60°C

Specifications	Value
Operating temperature	10 to 30°C
Relative humidity	max. 70%, non-condensing

7 RELEASE NOTES

7.1 Version 8.29

Available from September 2025

7.1.1 What is new?

Availability: *Online* = The test/feature is available only in VTS online. *Offline* = The test/feature is available only in VTS offline. No specification: The test/feature is available in both VTS online and VTS offline.

Test/Feature	Details	Availability
New Test: ATAVT-2	A new test is available. ATAVT-2 is the updated and extended successor to the ATAVT test.	
Expanded Test Assistant	Test Assistant now offers seven SFS Assessments for testing particularly relevant questions: airline pilots, professional drivers, train drivers, apprentices, academic aptitude, athletes, and a brief neurocognitive assessment. • The test selections for the SFS Assessments are based on current scientific findings. Where available, legal requirements and professional guidelines were taken into account. Details can be found in the revised manual. • Scoring for SFS Assessments has been expanded and now includes a traffic light system (red-yellow-green) to make result interpretation easier. • Selected SFS Assessments now include cross-dimensional FIT scores, which are calculated based on results from current scientific meta-analyses in the respective areas. • The SFS Dimensions section lists all dimensions available in the Test Assistant, clearly organized by group. • The Test Assistant search function has been enhanced and now includes filters for job profiles, dimensions, assessments, and favorites. • Starting with this release, test batteries from the Test Assistant can be used for Direct Testing. To do so, the battery must be marked as a favorite and then assigned to a test taker. • Test batteries from the Test Assistant marked as favorites are now visible in the *Testing* tab. • The Test Assistant, with all available batteries and functions, is now also available in VTS offline for local installations and server systems.	
help.schuhfried.com	A new online platform is now available, providing Technical Documentation and Help. It offers comprehensive information about the VTS, including technical details, system requirements, available languages, and more.	

Test/Feature	Details	Availability
Progress Monitor	The desktop application Control Monitor has been replaced with the new, fully integrated web-based Progress Monitor, which is accessible via VTS online or VTS offline (new user interface). The Progress Monitor provides users with real-time tracking of testings, consolidating all essential information in one place. No installation or configuration is required on the server or client side. It's ready to use right away and can be accessed via *Tools → Progress Monitor*.	
Authentication options	External authentication providers can now be used to authenticate users, provided they support the OpenID Connect standard.	Offline

7.1.2 What was improved?

Availability: *Online* = The test/feature is available only in VTS online. *Offline* = The test/feature is available only in VTS offline. No specification: The test/feature is available in both VTS online and VTS offline.

Test/Feature	Details	Availability
GDT plugin	When using a test battery and performing an export based on a test battery export definition, the GDT plugin now generates one output file per test. Unlike previous versions, each file now contains only the variables relevant to that specific test. If no export definition is configured for the test battery, the export defaults to the individual export definitions of the single tests.	Offline
HL7 plugin	Improvements to ACK message • MSH.9 contains value 'ACK' instead of copying value from the incoming message • MSA.2 contains Message Control ID from the MSH.10 of the incoming message Improvements to ORU message • OBX.11 contains value 'F' indicating final result • OBX.14 contains date time of the observation in format YYYYMMDD Improvements to MDM message • OBX.3 contains configurable Observation identifier. By default string 'WTS001^Test Report^L' • OBX.11 contains value 'F' indicating final result • OBX.14 contains date time of the observation in format YYYYMMDD • TXA.2 contains configurable value. By default string 'Report' • TXA.17 contains configurable Document Completion Status. By default value 'AU' (Authenticated, Freigegeben)	Offline
Test battery import	It is now possible to import multiple test batteries simultaneously into VTS online and VTS offline (new design).	

Test/Feature	Details	Availability
CSV import	The CSV import functionality has been improved. Users can now specify the column delimiter and the date format of the file being imported. A data preview is available before import, allowing entries to be checked and potential issues identified before completing the process.	
Person management	The columns *Personal ID* and *Last Testing* have been added as optional columns in the *Persons* tab and can be enabled via *Edit Columns*. *Last Testing* shows the date of a person's most recent test. *Personal ID* displays the ID used to start the test in Direct Testing.	
User interface	• In the *Testing* tab, the version number of a test is now displayed in the info icon to the right of the test name. • The login pages have been redesigned and now correspond to match the latest design.	
Data export	Test results can now be exported in CSV format using predefined export profiles provided by SCHUHFRIED. This eliminates the need to create custom export profiles. Additionally, users can now select the norm to be used during the export process. Custom export profiles created in the past remain usable.	
Removal of demo mode licenses	All existing types of demo licences have been removed. Running tests in demo mode is now only supported in VTS online. This feature has been removed from VTS offline installations. The underlying business logic has been removed. Users can now control directly in the user interface if and when the demo mode is activated.	
End of testing	Testing via invitation links has been optimized. At the end of the test, a new message now appears, making it clear to test takers that the testing is completed.	
Test administration	It is now possible to administer all types of tests in the Testplayer Client without a personal ID.	
Data handling	To keep the database size as small as possible, temporary entries older than 30 days are now automatically deleted.	
Cross-server test session handling	Handling of testing sessions has been improved across multiple servers to enable scalable deployment. Testing sessions are now handled properly to allow seamless continuation on any server in multiple-server scenarios.	Offline
Test Generator	The Test Generator now includes an item analysis protocol, a new scoring method for calculating scale means, and the option of automatic navigation to the next test page. In addition, all tests created now have a default .csv export profile.	
Test FRF	Based on customer feedback, the FRF test has been updated: The test now automatically navigates to the next test page after an answer has been entered.	

7.1.3 What was fixed?

Fixed in: *Offline* = The bug only affected the test/feature in VTS offline and has been fixed there. *Online* = The bug only affected the test/feature in VTS online and has been

fixed there. No specification: The bug affected the test/feature in VTS online and VTS offline and has been fixed.

Test/Feature	Details	Fixed in
SIMKAP	In the SIMKAP test, feedbacks were sometimes not displayed correctly. This issue has been fixed.	
IVPE/PP	The IVPE and PP tests were not displayed in VTS online and VTS offline (new design). This issue has been fixed.	
VISGED	A translation error in the Spanish version of the VISGED test has been fixed.	
Person import	• The registration date was previously mandatory for importing persons from a CSV file. It is now optional and will be automatically set to the current date if not provided. • The *Personal ID* column was previously mandatory for importing persons from a CSV file. It is now optional and will be automatically set to a unique value if not provided.	
Data export	In some older tests, data was not properly anonymized when performing an anonymized export to SPSS. This issue has been fixed.	
Data export	The header of the column *Person's name* in the result export CSV file was rendered incorrectly when opened in MS Excel. This issue has been fixed.	Online
VIS integration (Universal Plugin)	• The certificate for the Universal plugin was not updated correctly when changed via the VTSCommand tool. This issue has been fixed. • The universal plugin of VIS did not correctly log information during the archiving task. This issue has been fixed. • The gender of persons when using the VIS Import/Export plugin was incorrectly imported. This issue has been fixed. • Invitation links generated by the universal plugin did not function correctly. This issue has been fixed.	Offline
VIS integration (HL7 Plugin)	Under certain conditions, characters requiring two bytes in UTF-8 encoding were not correctly displayed in a person's first or last name when the person was imported using the HL7 plugin in TCP mode. This issue has been fixed.	Offline
Test Assistant	Searching and viewing test batteries in the Test Assistant caused content rendering issues in the Firefox browser. This issue has been fixed.	Online
Performance	• Opening the modal window to create a new person took longer than necessary. This issue has been fixed. • Compatibility between the old and new user interfaces was incorrectly handled in terms of subtest selection for some tests/test sets. This issue has been fixed.	
VTS installation	In the installer for local VTS installations, it was in some cases not possible to specify a Fully Qualified Domain Name (FQDN). This issue has now been fixed.	

Test/Feature	Details	Fixed in
VTS installation	• Under certain circumstances, it was not possible to install a submandant / multi-client via UI. This issue has been fixed. • Update on systems with mirrored database failed when shrinking of the database was not possible. The issue has been fixed.	Offline
Test management	Under certain circumstances, settings for test duration were not properly set for Direct Testing. The issue hs been fixed.	
Testing	• Under certain circumstances, the custom scoring method was unable to generate test results. This issue has now been resolved. • Testplayer Web now provides more detailed messages when licenses are missing.	
Test Generator - Testing	It was not possible to create an invitation link for a test battery containing tests created with the Test Generator. This issue has now been resolved.	
Norms	Under certain circumstances, additional norms imported by customers could not be used in test batteries with customer-specific scoring (BATEVA). This issue has been fixed.	

7.1.4 New Translations

Test	New languages
ATAVT-2	English (en-US)
BMT	Portuguese (pt-PT)
CORSI	Lithuanian (lt-LT)
FCB5	Arabic (arb)
INT	Greek (el-GR) Finnish (fi-FI) Arabic (arb)
MECH	Hungarian (hu-HU)
PP-R	Lithuanian (lt-LT)
TACO	Arabic (arb) Lithuanian (lt-LT)
TOL-F	Serbian (sr-Latn)

7.1.5 Norms

Change: *Update* = An existing norm has been updated with new data. *New* = New norm data has been added or an old norm has been replaced.

Type: *Rep* = Representative norm sample. *Conv* = Norm based on a convenience sample.

Segmentation: *Total* = No segmentation in sub groups based on demographic criteria. *Gender* = Separate norms available for men and women. *Age* = Separate norms available for different age groups. *Education level* = Separate norms available for different education levels.

Test	Test Form	Norm Nr.	Change	Type	Norm name	Size (N)	Data collection	Segmentation
2HAND	S4	1030-1033	Update	Rep	Representative norm sample	601	2007-2024	Total, gender, age, education level
AMT	all except S4	5010	New	Rep	Representative norm sample - Slovakia	368	2020-2024	Total
ATAVT	all	5010	New	Rep	Representative norm sample - Slovakia	461	2020-2024	Total
COG	S11	5010	New	Rep	Representative norm sample - Slovakia	470	2020-2024	Total
DT	S1	5010	New	Rep	Representative norm sample - Slovakia	507	2020-2024	Total
DT	S1	1000, 1001, 1002, 1521	Update	Rep	Representative norm sample	849	1999-2025	Total, gender, age, education level
IVPE-R	S1	1000-1003	Update	Rep	Representative norm sample	621	2016-2024	Total, gender, age, education level
RT	S1	1030-1033	Update	Rep	Representative norm sample	652	2013-2024	Total, gender (new), age, education level
RT	S3	1030-1033	Update	Rep	Representative norm sample	1070	1996-2025	Total, gender, age, education level
RT	S3	5010	New	Rep	Representative norm sample - Slovakia	444	2020-2024	Total

7.2 Overview of changes per test

7.2.1 Adaptive Tachistoscopic Attention Test (ATAVT-2)

8.29

The test was released in German and English as the successor for the ATAVT test with a representative norm sample (N = 338).

7.2.2 Adaptive Working Memory Test (SPAN)

8.26

The test was released in German and English with a representative norm sample (N = 316).

7.2.3 Basic Matrices Test (BMT)

8.29

BMT is now available in Portuguese.

8.19

BMT is now available in Arabic and Turkish.

8.17

The test was released in English, German, French, Dutch and Polish with a representative norm sample (N = 357)

7.2.4 Big Five Test with Forced Choice (FCB5)

8.29

FCB5 is now available in Arabic.

8.26

FCB5 is now available in Hungarian and Portuguese. A variable description was corrected.

8.25

FCB5 is now available in French and Polish.

8.24

The test was released in German and English with a representative norm sample of N = 460 persons (test form S1, S2, S3).

7.2.5 Cognitrone (COG)

8.29

For test form S11, a new representative norm sample for Slovakia was added (N = 470) was added.

8.27

For test form S11, an additional representative norm sample from China was added (N = 493).

8.23.02

The size of the reference and comparison images for the COG test differed very slightly. They have now been unified to the exact same size.

8.23

An error in the Bulgarian instructions of COG was fixed.

8.21.01

COG is now available in Ukrainian.

8.19

COG was converted to the new design & software framework of the VTS 8 (converted from the older VTS 6 version).

8.14.10

For test form S11, a new convenience norm sample (*Professional drivers - Czech Republic,* N = 178) was added.

8.13

COG is now available in Chinese.

8.11

For test forms S1 and S3, the representative norm sample was updated with new data (N_{S1} = 796, N_{S3} = 354). For test form S5, a new representative norm sample was added (N = 340).

7.2.6 Determination Test (DT)

8.29

For test form S1, the representative norm sample was updated with new data (N = 849). For test form S1, a new representative norm sample for Slovakia was added (N = 507).

8.28

For test form S4, a new convenience norm sample (*Applicants - Portugal*, N = 1140) is available.

8.27

The Czech translation has been revised. For test form S1, a new representative norm sample from China is available (N = 505). For test forms S5 and S6, the representative norm sample was updated with new data (N_{S5} = 785, N_{S6} = 685).

8.22

DT is now available in Ukrainian.

8.19

DT is now available in Norwegian.

8.18

DT was converted to the new design & software framework of the VTS 8 (converted from the older VTS 6 version).

8.17

The administration of DT test form S6 required the computer's audio settings to be confirmed even though the test form does not use any audio output. This has been corrected.

8.14.10

For test form S1, a new convenience sample (*Professional drivers - Czech Republic,* N = 179) was added.

8.14

In test form S4 of DT, the norm sample was corrected because two variables were incorrectly keyed.

8.13.10

The scoring of DT was translated into Hungarian.

8.11

For test forms S1 and S3, the representative norm sample was updated with new data (N_{S1} = 759, N_{S3} = 547). For test form S4, a new representative norm sample was added (N = 347).

7.2.7 Inventory for Testing Cognitive Abilities (INT)

8.29

INT is now available in Arabic, Greek and Finnish.

8.28
The item pool for the Logical Reasoning, Numerical Ability, Verbal Ability and Visual-Spatial Ability subtests has been expanded for the S2 test form. In addition, five difficulty levels (very easy, easy, medium, difficult, very difficult) are now available in the extended options for the linear and randomized forms as well as for the start (difficulty of the first item) of adaptive testing. The representative norm sample was increased to N = 614 persons.

8.24
The Long-Term Memory subtest was added to the test.

8.22.03

INT is now available in Polish.

8.22
INT is now available in Czech.

8.21
INT is now available in Italian.

8.20
INT was extended to include the Visual-Spatial Ability subtest and re-normed as part of this (representative norm sample, N = 387).

8.19
INT is now available in Norwegian. The convenience sample *Applicants (pilots) - Norway* (N = 182) was included.

8.15
The adaptive standard form (S2) of the INT has been published and the test has been translated into Hungarian.

8.14
INT is now available in Chinese.

8.13
INT was released in German, English, Spanish and French.

7.2.8 Inventory of Driving Related Personality Traits - Revision (IVPE-R)

8.29

For test form S1, the representative norm sample was updated with new data (N = 621).

8.27

The IVPE-R is now fully browser-compatible.

8.24

There was an error in the Czech version of the IVPE-R test. This error was corrected.

8.21.01

The IVPE-R is now available in Polish and Ukrainian.

8.16.01

The IVPE-R is now available in Arabic.

8.11

The IVPE-R is now available in French.

8.10.10

The IVPE-R is now available in Urdu.

8.9

IVPE-R is now available in Czech, Russian and Slovak.

8.8

The test was released in German, English, Hindi, Spanish and Italian.

7.2.9 Line Orientation Test (LAT)

8.24

For test form S1, an additional representative norm sample from Hungary is available (N = 410).

8.13.10

LAT is now available in Hungarian.

8.11

The test was released in German and English with a representative norm sample (N = 374).

7.2.10 Mouse Ability Test (MOUSE)

8.28

MOUSE is now available in Lithuanian.

8.27

For test form S1 an additional representative norm sample from China was added (N = 451).

8.26

MOUSE is now available in Greek. For test form S1, a new representative norm sample was added (N = 361).

8.25

MOUSE was converted to the new design & software framework of the VTS 8 (converted from the older VTS 6 version) and is now available in Farsi.

8.17.00

MOUSE is now available in Chinese.

8.13.10

MOUSE is now available in Hindi.

8.13

MOUSE is now available in Polish.

8.11

For test form S1 a new convenience norm sample (*Patients with schizophrenic disorders*, N = 192) was added.

7.2.11 Professional Interest and Orientation Test (PRIO)

8.23

PRIO is now available in Italian.

8.17

PRIO was released in German and English with a representative norm sample (N = 341).

7.2.12 Reaction Test (RT)

8.29

For test forms S1 and S3, the representative norm samples were updated with new data (N_{S1} = 652, N_{S3}= 1070). For test form S3, a new representative norm sample for Slovakia was added (N = 444).

8.27

For test form S3, an additional representative norm sample from China was added (N = 492). For test forms S5 and S6, the representative norm samples were updated with new data (N_{S5} = 480, N_{S6} = 355).

8.23

For test form S3, a new convenience norm sample was added (*Professional drivers - Portugal*, N = 724). For test form S6, a new convenience norm sample was added (*Applicants - Portugal*, N = 346).

8.21.01

RT is now available in Ukrainian. In the RT test, there were slightly delayed measurements in the purely auditory test forms S2 and S8 under certain circumstances. The test has been optimized and the problem has been fixed.

8.19

There was an error in the nl-NL translation of the RT test. This error was corrected.

8.16.01

Following user feedback, the Portuguese translation of RT has been revised and improved. In the RT test, there were certain circumstances in which the Testplayer window did not close properly at the end of the test. This problem has been remedied.

8.14.10

For test form S3, a new convenience norm sample was added (*Professional drivers - Czech Republic*, N = 338).

8.14.00

The RT test was converted to the new design & software framework of the VTS 8 (converted from the older VTS 6 version).

8.12

For test form S4, a new representative norm sample was added (N = 362).

8.11

For test form S8, the representative norm sample was updated with new data (N = 338).

7.2.13 Signal Detection (SIGNAL)

8.28

For test form S1, the representative norm sample was extended with new data (N = 1105). The representative norm sample is representative for the population of the DACH area up to 79 years.

8.27

SIGNAL is now available in Greek. For test forms S2 and S3, a new representative norm sample was added (N_{S2} = 348, N_{S3} = 322).

8.26.00

Scoring was translated into Chinese and Slovakian. The Portuguese translation was revised.

8.23.00

For test form S1, a new convenience norm sample was added (*Applicants Portugal*, N = 355).

8.21.01

In the SIGNAL test, it was possible for individual reactions to not be registered correctly under certain circumstances. This error has been fixed.

8.19.00

SIGNAL is now available in Norwegian.

8.17.00

The test SIGNAL was converted to the new design & software framework of the VTS 8 (converted from the older VTS 6 version).

8.13.10

SIGNAL is now available in Chinese (scoring available only in English).

8.11

For test form S1, an additional representative norm sample from Poland was added (N = 349).

7.2.14 Stroop Interference Test (STROOP)

8.28

STROOP is now available in Greek. Scoring was translated into Hugarian and Slovak.

8.27

There was an error in the Polish version of the STROOP test. This error was fixed.

8.18

The test STROOP was converted to the new design & software framework of the VTS 8 (converted from the older VTS 6 version).

8.17

STROOP is now available in Danish.

8.12

In the STROOP test the variables at item level were missing from the SPSS export. This error was fixed.

8.11

For test form S7, an additional representative norm sample for Poland was added (N = 329).

7.2.15 Test of Mechanical-Technical Comprehension (MECH)

8.29

MECH is now available in Hungarian.

8.28

The test was released in German and English with a representative norm sample of N = 306 persons (test form S1).

7.2.16 The Attention and Concentration Test (TACO)

8.29

TACO is now available in Arabic and Lithuanian.

8.26

The test was extended with two new test forms (S5 and S6) measuring *Divided Attention.* For test forms S5 and S6 the representative norm sample (N = 302) was added.

8.22

TACO is now available in Polish.

8.20

The test was extended with two new test forms (S3 and S4) measuring *Sustained Attention.* For test forms S3 and S4 the representative norm sample (N_{S3} = 325, N_{S4} = 317) was added.

8.19

TACO is now available in Norwegian. The convenience sample *Applicants (Pilots) - Norway* (N = 182) was added.

8.15

TACO is now available in Hungarian.

8.14

The TACO test was first released in German, English, French and Spanish with a representative norm sample of N = 479.

7.2.17 Trail Making Test - Schuhfried Version (TMT-S)

8.26

The TMT-S was released in German and English with a representative norm sample (N = 304) and two test forms (S1 and S2).

7.2.18 Two-Hand Coordination (2HAND)

8.29

For the test form S4, the representative norm sample was updated with new data (N = 601).

8.28

The 2HAND is now available in Lithuanian.

8.27

For the test form S1, the representative norm sample was updated with new data (N = 780). For the test form S6, a new representative norm sample was added (N = 326).

8.26

The Portuguese translation of the test was revised.

8.23

For the test form S3, a new convenience norm sample (*Professional drivers - Portugal*) is available (N = 3424).

8.22.03

The 2HAND is now available in Ukrainian.

8.13.10

The test 2HAND was converted to the new design & software framework of the VTS 8 (converted from the older VTS 6 version).

8.12

For the test form S5, the representative norm was updated with new data (N = 313).

8.11

For the test form S4, the representative norm was updated with new data (N = 545).

7.2.19 Vigilance (VIGIL)

8.26.00

Scoring was translated into Chinese. The Portuguese translation was revised after feedback.

8.19.00

VIGIL is now available in Norwegian.

8.17.00

The test VIGIL was converted to the new design & software framework of the VTS 8 (converted from the older VTS 6 version). For test forms S1 and S2 the representative norm samples were updated with new data (N_{S1} = 611, N_{S2} = 738).

8.13.10

VIGIL is now available in Chinese, the scoring is available only in English. The scoring was translated into Hungarian.