imc STUDIO 2022

Getting Started

Disclaimer of liability

The contents of this documentation have been carefully checked for consistency with the hardware and software systems described. Nevertheless, it is impossible to completely rule out inconsistencies, so that we decline to offer any guarantee of total conformity.

We reserve the right to make technical modifications of the systems.

Copyright

Open Source Software Licenses

Some components of imc products use software which is licensed under the GNU General Public License (GPL). Details are available in the About dialog.

A list of the open source software licenses for the imc measurement devices is located on the imc STUDIO/imc WAVE installation medium in the folder "*Products\imc DEVICES\OSS*" or "*Products\imc DEVICEcore\OSS*". If you wish to receive a copy of the GPL sources used, please contact our Hotline.

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1 General introduction

1.1 Before you start

Dear user.

1. The software you have obtained, as well as the associated manual are directed toward competent and instructed users. If you notice any discrepancies, we request that you contact our Hotline⌐5⌐.

2. Updates during software development can cause portions of the manual to become outdated. If you notice any discrepancies, we request that you contact our Hotline.

3. Please contact our Hotline if you find descriptions in the manual which you believe could be misunderstood and thereby lead to personal injury.

4. Read the enclosed license agreement⌐8⌐. By using the software, you agree to the terms and conditions of the license agreement.

1.2 imc Customer Support / Hotline

If you have problems or questions, please contact our Customer Support/Hotline:

imc Test & Measurement GmbH

Hotline   (Germany):   **+49 30 467090-26**

E-Mail: hotline@imc-tm.de
Internet: https://www.imc-tm.com

International partners

For our international partners see https://www.imc-tm.com/distributors/.

Tip for ensuring quick processing of your questions:

If you contact us **you would help us,** if you know the **serial number of your devices** and the **version info of the software**. This documentation should also be on hand.

- The device's serial number appears on the nameplate.
- The program version designation is available in the About-Dialog (click on the symbol 🛈 in the menu bar).

Product Improvement and change requests

Please help us to improve our documentation and products:

- Have you found any errors in the software, or would you suggest any changes?
- Would any change to the mechanical structure improve the operation of the device?
- Are there any terms or explanations in the manual or the technical data which are confusing?
- What amendments or enhancements would you suggest?

Our Customer Support⌐5⌐ will be happy to receive your feedback.

1.3 Legal notices

Quality Management

imc Test & Measurement GmbH holds DIN-EN-ISO-9001 certification since May 1995. You can download the CE Certification, current certificates and information about the imc quality system on our website: https://www.imc-tm.com/quality-assurance/.

imc Warranty

Subject to the general terms and conditions of imc Test & Measurement GmbH.

Liability restrictions

All specifications and notes in this document are subject to applicable standards and regulations, and reflect the state of the art well as accumulated years of knowledge and experience. The contents of this document have been carefully checked for consistency with the hardware and the software systems described. Nevertheless, it is impossible to completely rule out inconsistencies, so that we decline to offer any guarantee of total conformity. We reserve the right to make technical modifications of the systems.

The manufacturer declines any liability for damage arising from:

- failure to comply with the provided documentation,
- inappropriate use of the equipment.

1.4 Notes regarding this document

The manual for imc STUDIO is available both as an e-book and in PDF format. In the menu bar, click on the symbol 🌐 to open the help.

The program "*imc Help and Documentation*" (in the Start menu or via the menu ribbon "*Help*" > "*Additional Documents*") provides you with access to the PDF-file and other documents such as the device documentation.

What is the best way to read the imc STUDIO documents?

Getting Started

Before installing the software, start by reading the document "*Getting Started*". This contains important tips for achieving problem-free installation, for updating the software, as well as for operation and integration of devices in measurement setups.

All information presented in the document "*Getting Started*" is also presented in the manual.

Manual - complete documentation

The manual serves as reference material. This document describes how to operate the software and how to configure parameters for the devices. In some case, individual device groups have special functions. The documentation for these usually appear exclusively in the device manuals.

Tutorials

Some chapters come with supplemental tutorials 47 . We recommend practicing these tutorials as an "accompanying" introduction to the respective topic.

	Reference	Training programs for introduction to the systems, and advanced workshops

We recommend that before you begin working with imc STUDIO you participate in an extensive training session. Such training will enable you to get started working efficiently much faster. Additionally, you will obtain valuable tips and information on how to use the software more effectively. More information is available on our homepage under "*Service & Training*" > "*imc ACADEMY*".

	Note	Notes on the descriptions and the screenshots

- The help may also contain parts **shared imc software components**. These parts may differ from the rest of the help in terms of style and structure. All help files are equipped with a full text search functionality and have an index.
- The screen shots appearing in this documentation were created with a **variety of Windows versions** and their appearance may thus differ from that of your installed program.
- imc STUDIO works with user groups and access rights. The **user group** has wide-reaching influence on the visibility and/or operability of menus, icons, etc. Note that in all imc STUDIO documents the administrator roll is assumed to be filled. All descriptions are therefore related to the full utilization of the user interface.
- The following descriptions and screenshots always pertain to the **view with the full scope of functions** (*Complete*). Many of these functions are also found in the minimized view at another location.

Special notes

	Warning

Warnings contain information that must be observed to protect the user from harm or to prevent damage to property.

	Note

Notes denote useful additional information on a particular topic.

	Reference

A reference in this document is a reference in the text to another text passage.

1.5 imc Software License Agreement

imc Test & Measurement GmbH
Voltastr. 5
13355 Berlin
Commercial register: Berlin-Charlottenburg HRB 28778
Managing director: Kai Gilbert, Michael John Flaherty

imc Test & Measurement GmbH
Terms and Conditions
Governing the Use of imc Test & Measurement GmbH Software
As of: June 9, 2022

§ 1 Objects of the Agreement

(1) In addition to the "General Terms and Conditions Governing imc Test & Measurement GmbH Deliveries and Services to Customers", these terms and conditions apply to all contracts concluded with   imc Test & Measurement GmbH (hereinafter referred to as "imc") which involve the transfer of rights of use to any software developed by imc (standard software, software created or adjusted specifically for the Customer, which is recorded on the machine-decodable data carriers such as data files, databases and database material, updates, upgrades, releases, etc., including corresponding documentation, information and materials, hereinafter referred to as "Software").

(2) The Software is provided to the Customer as an executable object program on machine-decodable data carriers specified in the "Objects of the Agreement". The Software's product documentation is also supplied to the Customer either in print or on a machine-decodable data carrier. Unless otherwise expressly agreed in writing, the Customer is not issued the source code of the Software.

§ 2 Rights of Use, Scope

With regard to any transfer of rights of use to Software created by imc, the following provisions apply:

(1) Basic provisions

    a) The Customer is granted a non-exclusive and – subject to the terms and conditions governing the use of Software by third parties, resale and leasing – non-transferrable right of use to the Software for its own purposes. "Use" signifies running the programs and editing the data records.

    b) Until each due fee is paid in full, the Customer is entitled to use the Software solely on a revocable basis. If the Customer is in default with regard to the payment of fees, imc is entitled to revoke the use of the respective services for the duration of the default. The Customer is granted the permanent right to use copyright protected services, in particular the Software, only upon full payment of the agreed fee.

    c) The Customer agrees to undertake appropriate precautionary measures to prevent unauthorized access by third parties to the Software. The original data carriers and the data carries used to make copies as per the agreement, as well as the documentation, are to be stored in a secure location. Employees are to be notified that the production of copies beyond the scope of the agreement is not permitted.

    d) If the right of use is revoked or expires due to another reason, the Customer is obligated to return to imc the Software, the copies made by the Customer and the documentation. Provided that a physical return of the Software and the copies is not possible due to technical reasons, the Customer is obligated to delete such and confirm deletion to imc in writing.

(2) Reproduction

    a) The Customer is entitled to make copies of the Software only if copies are necessary to use the Software in accordance with the contract. The following are considered cases in which reproduction is necessary: installation of the Software from the original data carrier onto the hard disk drive of the hardware used, as well as loading the Software into the computer memory.

    b) The Customer is entitled to create a backup copy if such is necessary to safeguard future use. Copies may only be made for other purposes after prior written consent has been issued by imc.

    c) The Customer is not allowed to make any reproductions other than those expressly permitted under the provisions of this agreement.

(3) Use of the Software by Third Parties, Resale and Leasing

   a) The Software may be used for the purposes stipulated in this contract, in particular for the Customer's business operations. Access to the Software may also be provided to parties which rely on using the Software as instructed by the Customer. In particular, the Customer is entitled to operate the Software or allow the Software to be operated on data processing devices, which are located on the premises of and are directly owned by a third party company (outsourcing). The prohibition against multiple use remains unaffected.

   b) The Customer may permanently sell or give the Software to third parties provided that the Customer is granted permanent use of the Software. In the context of its period of use, the Customer may temporarily transfer the Software to third parties for a fee or free of charge. The prohibition against multiple use remains unaffected. The Customer is expressly notified that transfer to third parties is not permitted and use by third parties is technically not possible if an individual license must be acquired or an individual activation is required for third party usage, such as in the case of runtime licenses.

   c) With regard to the valid use of Software by a third party, the Customer is obliged to ensure that the third party acknowledges the provisions of this agreement governing the rights of use as binding for such third party. The Customer may not transfer Software and documentation to third parties if there are grounds to suspect that the third party may infringe upon the provisions of this agreement governing the rights of use, in particular with regard to the unauthorized production of copies.

   d) Subject to the provisions stipulated in § 4 Paragraphs 1 and 2 or a deviating express agreement in writing, the Customer may not use the Software while the Software is being used by a third party (prohibition against multiple use); in the event that the Software is transferred to the third party, the customer is obliged to surrender to imc all Software copies including, if applicable, all existing backup copies, or to destroy copies not surrendered.

(4) Decompilation

   The reverse translation of the provided program code into other code forms (decompilation), disassembling and other forms of reverse engineering of the various production phases of the Software is not permitted. If interface information is required to achieve the interoperability of a separately created computer program, such may be requested from imc, or a third party to be named by imc, for a minor fee. Section 69 e of the German Copyright Act ("UrhG") remains unaffected by this provision.

(5) Changes by imc

   If imc conducts adjustments, changes or enhances the Software on behalf and on account of the Customer, the Customer thus acquires the corresponding rights of use to the changes or enhancements of the Software to which he is entitled according to the stipulations of this agreement.

(6) Exceptional Usage Requests by the Customer

   If the Customer requests to use the Software according to terms which deviate from the requirements stipulated in Paragraphs 2 through 5, this exceptional use of the Software must be agreed in writing by imc. In such an instance, the Customer agrees to provide imc with information about the desired scope of use, the pertinent field of application, etc. If imc subsequently grants a license covering the Customer's special intended use, the parties agree that a new license fee is owed by the Customer, which is independent of payments made by the Customer for the previously existing license.

§ 3 Copyright, Protection of the Software

(1) The intellectual property, in particular the copyright as well as all industrial property rights and trade secrets, are retained by imc and are not transferred to the Customer. The Customer's ownership of the machine-decodable data carries and data processing units remains unaffected.

(2) Copyright notices, serial numbers as well as designations and reservations of rights which serve as program identification or a protective right may not be removed or changed. The Customer is obliged to transfer the existing protective right notices to all copies. In particular, backup copies of the Software must be expressly designated as such.

§ 4 License Types, Multiple Use

(1) In the case of a Single-User License, the Software may be activated and run on only one data processing unit. "Activation" refers to the process of transferring the license to the data processing unit.

If the technical specifications for the Software permit a second activation, then the Customer may additionally activate the Software on a second data processing unit. However, the Software may only run on one data processing unit at any one time, not on both simultaneously.

(2) With a Network License, the Software may be run on as many data processing units as the amount of licenses obtained. In this case a central data processing unit acts as the license server for which the activation process is performed.

If the technical specifications for the Software permit a second activation, then the Customer may additionally activate and run the Software on as many data processing units as the amount of licenses obtained. However, these additional data processing units must be used by the same users who operate the Software via the license server.

(3) Subject to the provisions in Paragraphs 1 and 2 or a deviating express agreement in writing regarding network use, multiple use of the Software is not permitted.

(4) If the data processing unit is changed, the Customer is obliged to delete the Software from the hard disk drive of the previously used hardware.

§ 5 Software-Subscription

If the Software used is a software-subscription, the following additional restrictions apply:

(1) The right of use is valid for a limited time period. The start and end of the time period are specified. After the end of the time period, the right of use is expired.

(2) If the Customer wishes to continue using the Software after elapse of the specified time period, the subscription must be renewed.

§ 6 Trial Version

If the Software used is a free trial version, then the following additional limitations apply:

(1) The trial version only entitles the user to test the Software. In particular, commercially productive utilization is not permitted.

(2) The rights of use granted expire after the elapse of a period stated in the product description.

§ 7 License Key

(1) Upon delivery of the Software the Customer receives a License Key. Using this License Key, the Customer is able to activate the Software purchased. By means of this License Key the Customer can also view his license status and order updates and upgrades.

(2) The License Key is to be protected against access by third parties in order to prevent misuse. If, however, a third party gains unlawful access to the Key, the Customer is obliged to notify imc immediately via telephone, as well as in writing, so that the previous License Key may be suspended and a new one issued.

§ 8 Conclusion

(1) The law of the Federal Republic of Germany shall apply under exclusion of private international law. The provisions of the UN Convention on Contracts for the International Sale of Goods (CISG) do not apply.

(2) The place of performance for all obligations arising from this agreement is imc's registered seat. Insofar as the Customer is a merchant as defined by the German Commercial Code (HGB), a legal entity under public law, or a special asset under public law, the exclusive place of jurisdiction for all disputes directly or indirectly arising from the contractual relationship is agreed as imc's registered seat. The same applies to persons who have no general place of jurisdiction in Germany, as well as to persons who have moved their place of residence or usual whereabouts abroad since conclusion of the contract, or whose place of residence or usual whereabouts is unknown at the time the action is filed. In addition, imc is entitled to file suit at the statutory venue.

(3) Oral side-agreements are not valid. Deviating or supplementary conditions as well as modifications of this contract, including this written requirement clause, are only valid if agreed in writing and expressly marked as a modification or supplement.

(4) If certain provisions of this contract are inoperative or unfeasible, this does not prejudice other provisions of the contract. The contracting parties agree to contractually substitute an operable provision which approximates the commercial intention of the contract as closely as possible for any inoperable one.

2 Overview

This document describes the **first steps in operating imc STUDIO** and the installation of additional imc products. This document uses textual references to the product documentation.

imc STUDIO is the common framework forming a **product package** through the combination of modular components (plug-ins).

Which components are available depends on the product installation (order).

Chapter overview

Synopsis	Chapter
Startup operations for imc STUDIO - **installation** and **product configuration** prior to first use	• System requirements 12 • Installation / Uninstall 13 • **Product Configuration / Licensing** 26 • **The first start** 28 • Device connection / Network / Firewall 30
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Navigation through the entire **software**	• Navigation Pane 94
The **software user's interface** is flexible. Saving and restoring of views	• Saving / Loading views 98

Customer Support - Hotline

If you have any open questions about our products, please contact our Hotline.

Questions or problems? Contact our Customer Support / Hotline 5 .

3 Setting Up - Software

3.1 System requirements

Supported operating systems
Windows 10*/11* (64 bit)
*released in conformance with the version of Windows 10/11 applicable at build date of imc software

Minimum requirements for the PC [1]	Recommended configuration for the PC [2]
4-core CPU 2 GHz	4-core CPU 2 GHz or higher
4 GB RAM	16 GB RAM
10 GB free hard disk space (NTFS format) [3]	10 GB free SSD hard disk space (NTFS format) [3]
Display resolution 1366 x 768	Display resolution: 1920x1080 or more

1   A system with minimum requirements is **not adequate for connection with multiple devices** and complex design tasks with the imc STUDIO Developer. Use such systems preferably only for data monitoring purposes.

2   Requirements and recommended minimum configurations for the applied PC will rise with increasing number of connected devices and the resulting overall system data rate. Another crucial factor will be the extend of used live analysis and visualization functions on the PC (in particular Data Processing, imc Inline FAMOS and active curve windows).
A smooth operation will also heavily rely on sufficient RAM memory resources on the PC: It must ensure to satisfy all vital functions without any outsourcing to slow external swap file (HDD/SSD) in order to guarantee sustainable performance.

3   The hard drive memory requirement increases if measured data are saved to the PC.

Other operating system components

The following components are installed with the imc STUDIO setup if they are not already present:

Component	Version	Folder in "System" directory
Microsoft .NET Framework	4.8	DotNetFx4.8
Microsoft VC 2015-2019	14.28.29910	Microsoft Visual C++ Redistributable\2019
Microsoft VC 2010	10.0.402219.1	Microsoft Visual C++ Redistributable\2010
Microsoft VC 2005	6.0.3790.0	Microsoft Visual C++ Redistributable\2005
Microsoft Build Tools 2015	14.0.23107.10	MSBuildTools2015

Supported Measurement Devices

Which devices you can use in imc STUDIO is described in the documentation on the "*Setup*" > "*Device Overview*", as well as in the "*Technical Data Sheet*".

3.2 Installation - Preparation

Software requires a license

This means that the program may only be started **upon obtaining a license** (see Product Configuration / Licensing 26).

Administrator rights required

For the purposes of installation and uninstallation, a user account with **administrator privileges for the PC is required**.

If you are logged on to the PC **without administrator rights**, **log yourself out** and log back on with an administration-level user account. If you don't possess the appropriate account type, you will need the support of your system administrator or IT department.

See also Notes on Windows User Account Control 16 .

Restarting the computer in the process of installation

During the installation process, the installation program will prompt you to restart the PC.

❗ Note	Restarting
After the restart, login to **the same user account** with which you had previously begun the installation.	

Coexisting applications: imc STUDIO, imc STUDIO Monitor, imc WAVE, ...

Some imc programs are installed as an independent and specially adapted instance of imc STUDIO. They are based on imc STUDIO.

Unless otherwise stated, these programs are installed and used in parallel. As long as these instances are based on the same version of imc STUDIO (e.g. 2022 R1), they are all subordinated to the same program installation, which means they share resources.

For this reason, installation of the instances in this case must be performed in one single shared Setup procedure. Any attempt to perform installation in succession or subsequently will cause the already existing instances to be deleted.

> Do not install imc STUDIO and imc WAVE in succession, but always at the same time.

This applies particularly to the joint and parallel installation of imc WAVE and imc STUDIO, which must be performed in a single step.

Update or parallel installation

The Setup utility checks whether any version of imc STUDIO is currently installed on the computer. If so, it can be uninstalled by means of the Setup. An associated confirmation prompt is posted in that case. All user data such as the database remain intact.

The **two versions** can be **installed in parallel** provided that they have differing version numbers (e.g. 5.2 and 2022). The new version can be installed in the same folder (default case: "C:\Program Files\imc"). In this folder, a new subfolder with the new version number is created for imc STUDIO.

In both cases, you are able to **adopt** a variety of **settings** from the old versions. These include the project settings and views. By contrast, other settings such as the product configuration and the database path need to be set up from the beginning.

Adopting the settings with the help of the existing database (recommended)

When an existing database continues in use, any settings which can be retained will be retained. For a parallel installation, two data bases are needed. Create a copy so that the old imc STUDIO version can continue to work with the existing database. A confirmation prompt about making a copy is posted.
See: <u>Update with the help of the existing database</u> 15 .

Adopting the settings without using the existing database

Some settings, e.g the views, can also be retained without the database. To do this, save and import the appropriate settings.
See: <u>Update without using the existing database</u> 15 .

The subsequent procedure - an overview

Follow the installation program instructions (see: "*Installation step by step* 17 ").

- The installation process first checks whether the **required system software** is installed. If ones is missing, it will be installed automatically.
- After restarting the system, the selected products are installed.
- After the installation is concluded, it is possible to start imc LICENSE Manager directly to activate your license.
- Once the license has been activated, imc STUDIO is ready for use.

Uninstalling

Un-installation is performed via the menu item "*Windows-Settings*" > "*Apps & features*".

◆	**Reference**	See also

- <u>Recommended Virus Scanner Settings</u> 35
- <u>Changing Languages and Installing Additional Languages</u> 34

3.2.1 Update with the help of the existing database

When an existing database continues in use, any settings which can be retained will be retained. This includes Views, any Setup-columns created by the user, the user administration and all experiments.

If you wish to run multiple versions of imc STUDIO or maybe restore an older version at a later time, create a copy of the database.

> ❗ **Note**   **The database**
>
> **It is impossible to use the imc STUDIO database by both versions in parallel.**
>
> - If the same path is selected in the new imc STUDIO version, the database is used automatically. When loading old experiments, a note is posted in the logbook that the **experiments belong to an older version. Once saved, they can no longer be loaded** with the old version.
> - If the database structure has been altered, you will be notified of this. A **dialog for performing conversion** appears. This dialog can be used to convert the database and, if desired, copy it first. After the conversion, the entire **database can no longer be used with the old version**.

> ❗ **Note**   **Using new views**
>
> - Be aware that the new version provides new functions, such as new or enhanced Setup pages and new menu items.
> - **Use of the new Views is recommended, in order for these new functions to be accessible! Please look under "What's new" whether there have been any changes in this regard.**
> - User-made columns such as meta data columns are not automatically inserted into the pages. The configurations of these columns, however, is adopted from the old View. You can re-insert these columns at the desired position (by means of the Column Chooser).
> - Multiple views are provided. Select a view and add whatever Setup pages are required or saved, and save the view under a new name.
> - How to save Views is explained in the section "*Views* 98".

3.2.2 Update without using the existing database

In imc STUDIO, various settings were saved with the respective **project** and apply to all the experiments it contains. Among other things, these include the view settings: user-defined views, column configurations (e.g. metacolumns).

> Please first check which settings you will need.

In order to **retain these settings** in the new version after having **performed the update** without using the existing database, export of the settings are necessary.
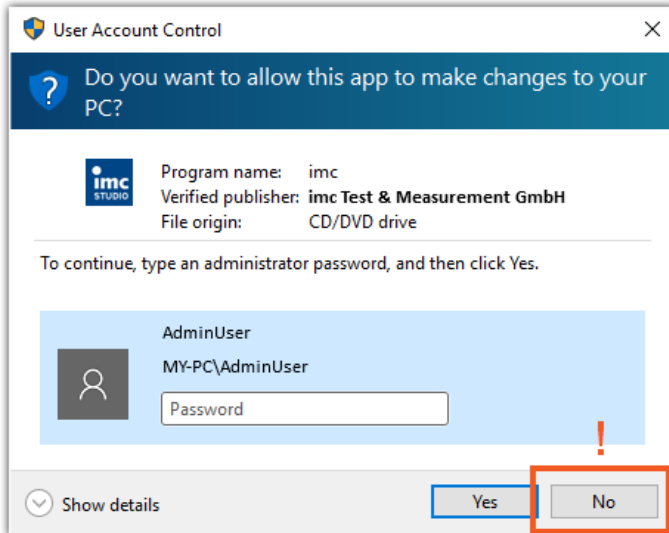
- If you wish to reuse **all of the project's settings**, export the project settings (by means of the Projects-dialog: Menu ribbon: "*Project*" > "*Manage Project*").
- If you wish to reuse **only the viewing settings**, export the views 100.

3.2.3 Notes and troubleshooting

Notes on Windows User Account Control

**Do not change the user account**

Example of a password request.
Select "No".

With Windows, installation can be started without administrator rights. In this case, the operating system requires selection of a user account and associated password, as shown in the example.

> ⚠ **Do NOT continue with the installation** in this way, otherwise it will be incorrect. **Select "No"**.

Confirm the prompt by the user account control
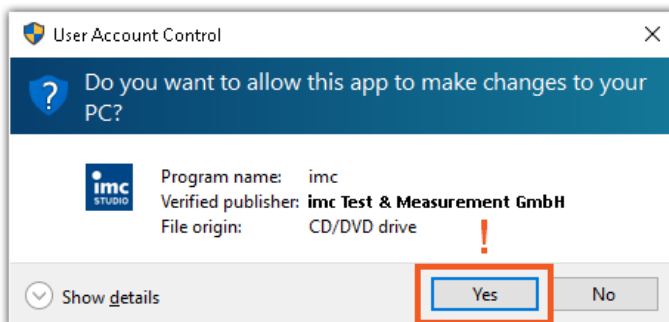
Select "Yes", to start the installation.

When you are logged in to a user account possessing administrator rights, you may receive a prompt by the Windows User Account Control (UAC) to allow changes. Select **"Yes"**.

Notes on the security software

Some virus scanners **prevent correct installation** of imc programs. We are currently aware of this affecting products from the companies McAfee and ESET. In principle, almost any virus scanner can have settings possibilities which prohibit necessary functions during installation.

For installation purposes, certain steps are necessary, such as:

- registration of programs for Autorun
- registration of programs as a service
- running of scripts from the TEMP-folder
- ...

The error profile may include various messages during installation. Or installed programs failing to launch.

In such cases, please contact your administrator to find out whether certain rules can be suspended for the duration of the installation. For any further questions, please contact our Hotline [5].

Reference	See also

Recommended Virus Scanner Settings [35]

3.3 Installation - Step by step

Actual texts appearing in the user interface may differ from those shown in the screen shots, depending on the product configuration (path/version name).

Installation after Download

If you have obtained the product electronically (download), start the installation program manually.

Installation language settings

When you start the installation, you first see a dialog for selecting the installation language.
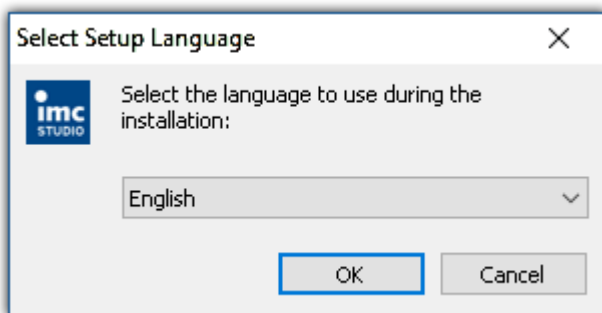
Selecting the language during installation

Performing installation

Once you have selected the language, the installation setup starts with a welcome page:
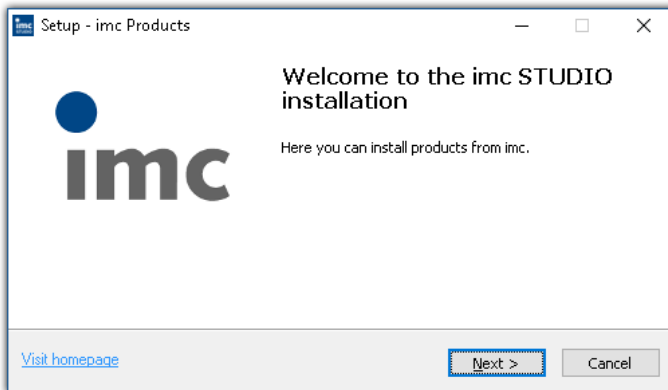
Installation setup welcome page

On the installation setup's next page, you are offered the following choices:

- open the "*Readme*"-file,
- open the "*Getting Started*"-document,
- separate installation of imc LICENSE Manager and
- display of the installation medium contents.
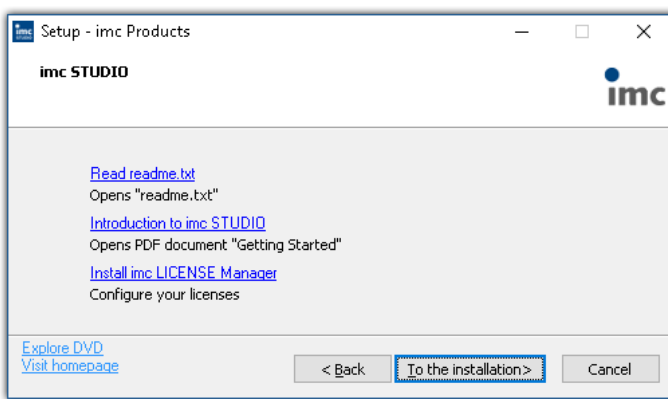
Before starting installation
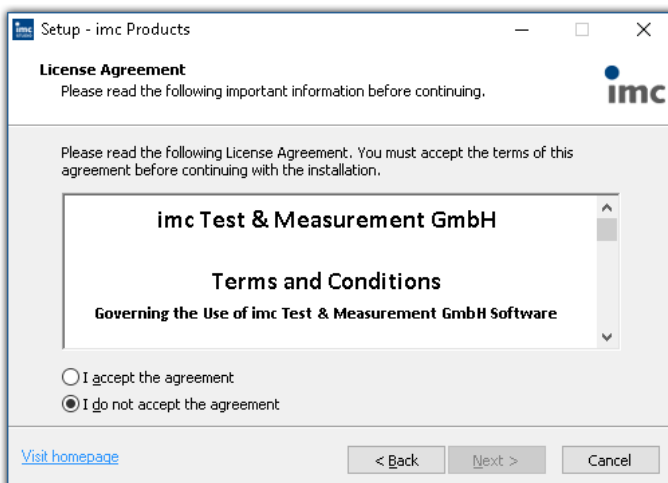
You must accept the license agreement to continue the installation.

License agreement
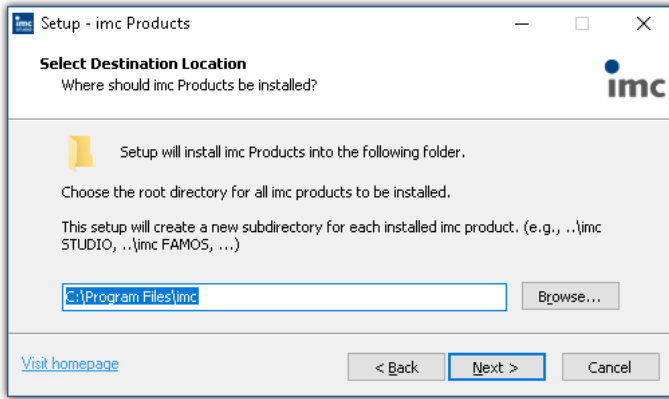
Entering the installation path

In the next step, select the file path where the products should be installed. For each imc product, a separate subfolder is created in this path (e.g. imc STUDIO 2022). Therefore it is recommended that the path should end with "..\imc".

3.3.1 Select the products / Installation type

Now you can select which components should be installed. There are three types available:

- "*Full functionality for 30-day demo*" : hereafter called "*Demo*"
- "*Typical functionality incl. imc STUDIO Professional*" : hereafter called "*Typical*"
- "*User-defined* 21 "

For the "*Demo*" and "*Typical*" installation types the installation settings are already configured. If you need further settings choose the "*user-defined* 21 " installation type.

"*User-defined*" gives you the ability to affect all installation settings.

Installation type	Beschreibung
Demo	Use the installation type "*Demo*" in order to test the full scope of **imc STUDIO** and/or **imc WAVE** for 30 days. No other products which require a password will be installed.
Typical	Use the installation type "*Typical*" in order to install the **Professional edition** of **imc STUDIO** including all necessary components. Optionally, the password-protected sensor management system imc SENSORS is installed.
User-defined	Use the installation type "*User-defined*" if you wish to **configure the individual products**. With this type, it is possible to install **password-protected components**. Further, you can install and configure additional imc products such as **imc FAMOS**. Note that some components can require a separate license.

🛑 Note	Note on re-configuring imc STUDIO

Regardless of which variant of the installation is selected, when imc STUDIO is installed, all components are included. This way, after successful installation it is possible to adapt the imc STUDIO configuration at any time by means of the "*product configuration* 26 " and to select the appropriate edition.

Products	Demo	Typical	User-defined	Description
				● : included ○ : optional
imc LICENSE Manager	●	●	●	Managing the licensing (internal functions, does not appear in the list)
imc Shared Components	●	●	●	Proving common components of the imc products, such as the curve window (internal functions, does not appear in the list)
Required system components	●	●	●	System components require using of imc products.
imc SENSORS (1)		○	○	imc SENSORS is a database application for administering and editing sensor information. Applicable with devices of the firmware group imc DEVICES.
imc STUDIO Developer (Demo) (2)	●		○	imc STUDIO is modular software platform handling all aspects of modern measurement technology from simple data acquisition to sophisticated test configurations.
imc STUDIO Professional (3)		●	○	
imc STUDIO any edition (3)			○	
imc WAVE (Demo) (2)	●		○	imc WAVE is a software package for NVH (Noise Vibration and Harshness) analysis. It is based on imc STUDIO and is installed as a separate instance of imc STUDIO. It can be equipped with multiple, separately licensed analyzers.
imc WAVE (3)			○	
Firmware and driver package imc DEVICES	●	●	○	Package of device drivers and firmware required by imc STUDIO and imc WAVE for devices of the imc DEVICES group (e.g. CRONOS family, C-SERIES, SPARTAN, BUSDAQ).
Firmware and driver package imc DEVICEcore	●	●	○	Package of device drivers and firmware required by imc STUDIO and imc WAVE for devices of the imc DEVICEcore group (e.g. EOS).
imc FAMOS Enterprise (Demo) (2)	●		○	imc FAMOS is a program for analyzing, evaluating and documenting measurement results.
imc FAMOS Reader (3)	●	●	○	
imc FAMOS any edition (3)			○	
imc Format Converter	●	●	○	Converts imc measurement data to other formats such as EXCEL and ASCII.
imc Documentation	●	●	○	Installs the documentation on the selected products. If the checkmark is removed, it is not possible to open the documentation via the software.

1:    imc SENSORS requires a password for installation. If you do not wish to install imc SENSORS, you can de-select it in the associated step of the installation.

2:    The associated Demo license must be activated after concluding installation by means of imc LICENSE Manager, otherwise it is not possible to start the product. Once the demo trial period has elapsed, use the product configuration 26 to covert the product to the license you have purchased.

3:    The associated license must be activated after concluding installation by means of imc LICENSE Manager, otherwise it is not possible to start the product.

When you select "*Demo*" or "*Typical*", the start of the installation follows immediately (see: "*Starting the installation* 25 "). By contrast, if you select "*User-defined*", the installation is first configured 21 .

3.3.2 User-defined

The installation variant can be configured in detail. Based on your selection of components desired, different installation steps are displayed.
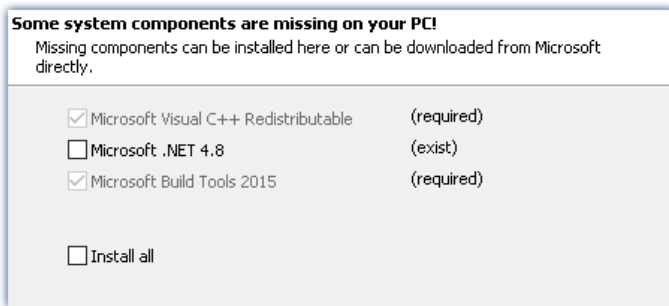
Selecting components
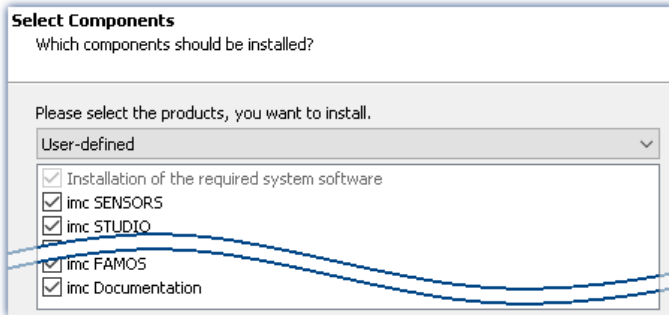
Selecting User-defined installation

Once you have selected the installation type "*User-defined*", it is possible to select/de-select the desired products in the box at the bottom.

Required system components

Required system components (example)

In the next step, the system components which the products selected require are displayed, along with a note about which are already installed on your system. It is also possible to re-install any already installed components. Which components are missing/present depends on the system and it update status, so that the illustrations are intended as an example only.

Configuring imc Shared Components
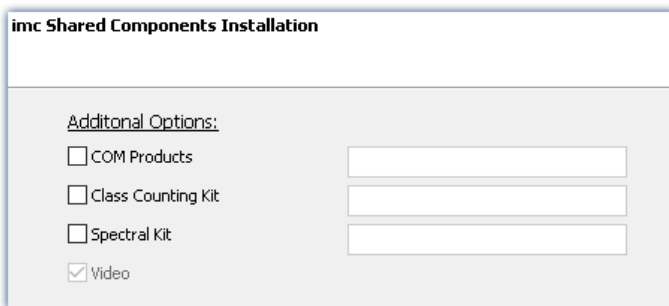
Configuring imc Shared Components

In this installation step, it is possible to install password-protected components of imc Shared Components.

Option/Component	Description
COM Products	The imc COM programming interface is a system integration tool
Class Counting Kit	Function library for imc COM products
Spectral Kit	Function library for imc COM products

Password for imc SENSORS

If you have selected imc SENSORS, you are prompted to enter the password prior to installation. But if you do not wish to install imc SENSORS, de-select it here.
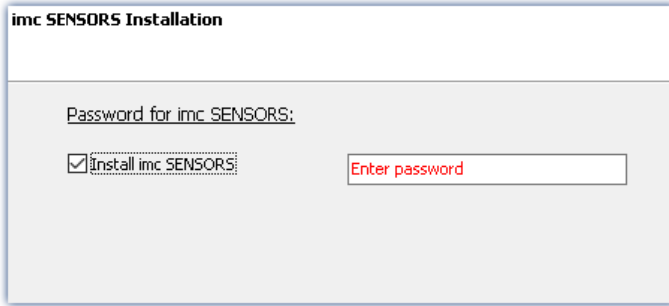
Password prompt for imc SENSORS
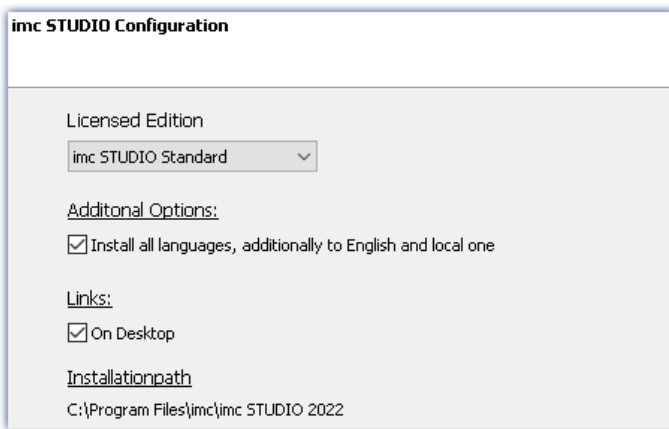
Configuring imc STUDIO

It is possible to make settings for your licensed product edition here. In consequence, later product configuration 26 can be omitted.

Configuring imc STUDIO

Option/Component	Description
Licensed edition	Information on the editions is provided in the **Technical datasheet** for imc STUDIO.
Install all languages	This option installs imc STUDIO in all available languages. If you do not need any extra languages, you can shorten the installation process.
	Please note that some functions require other languages. E.g. foreign-language parameter sets can only be imported if the corresponding language is installed.
	If the option is de-selected, then English and the operating system's language (if available) are installed automatically. If desired, all other supported languages can be installed later (see section "*Installing additional languages* 35 ").
Links	Program starting links can be created on the Desktop.

Configuring imc DEVICES
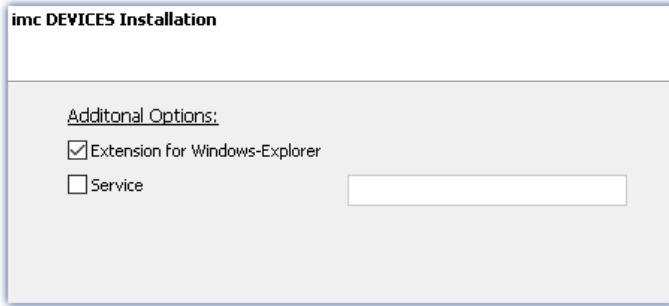
Here, you can install optional components of the imc DEVICES device driver package, which are used by imc STUDIO and imc WAVE.

Configuration imc DEVICES

Option/Component	Description
Extension for Windows-Explorer	Access to the device hard drive via the Windows-Explorer.
Service	Service support. Install this component only if requested by Customer Support.
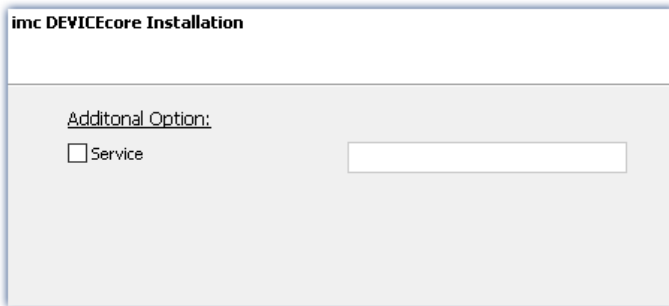
Configuring imc DEVICEcore

Here, you can install optional components of the imc DEVICEcore device driver package, which are used by imc STUDIO and imc WAVE.

Configuration imc DEVICEcore

Option/Component	Description
Service	Service support. Install this component only if requested by Customer Support.

Configuring imc FAMOS

Configuration of the imc FAMOS installation

In this step, you configure the imc FAMOS installation. Select the editions you wish to install. Note that all editions except the *Reader*-edition require a license.

Follow the Assistant's instructions and select your preferred language for the help files and example files like projects, sequences and dialogs. Select any optional components which you wish to install along with imc FAMOS. Additionally, a folder for sample files is needed.

Reference	imc FAMOS editions

More detailed information on the imc FAMOS editions is provided in the imc FAMOS manual.

Once all products have been configured, the installation can start.

3.3.3 Starting the installation

Before the installation, a **system reboot** is performed. For this reason, first **close any running programs** before continuing!

Confirm the reboot by means of the checkbox and then continue (button: "*Install*"). Initially, the required system components are installed. Subsequently, the PC reboots automatically.
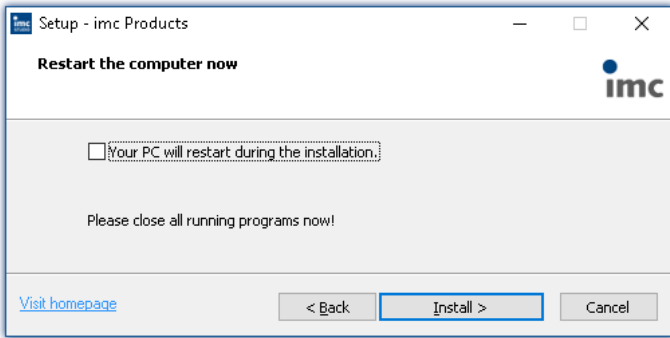
Concluding the installation setup and starting installation

⚠ Warning	Windows user account

After restarting, **be certain to log in with the same user account** with which you started the installation process. Using a different user account can cause failure of correct installation of the components.

After logging in, the actual installation of the products begins. You are presented with a list of which components are to be installed, which you can confirm by clicking on "*OK*".

The figure shows an example; the actual dialog may appear differently depending on your respective previous selections.
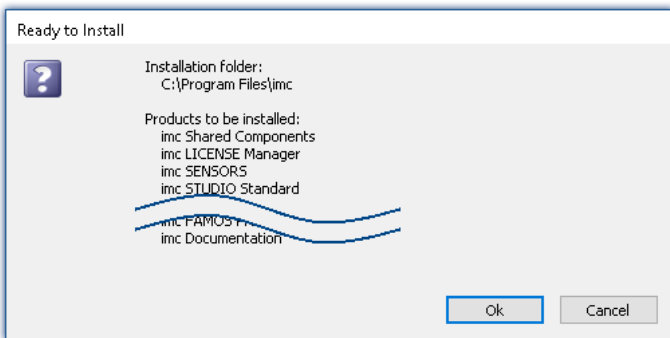
List of components to install, following restart (example)

Next, installation of the individual imc products begins.

❗ Note	Disabling the system start

While installation is running, the operating system is disabled from starting again, meaning that no other programs can be started.
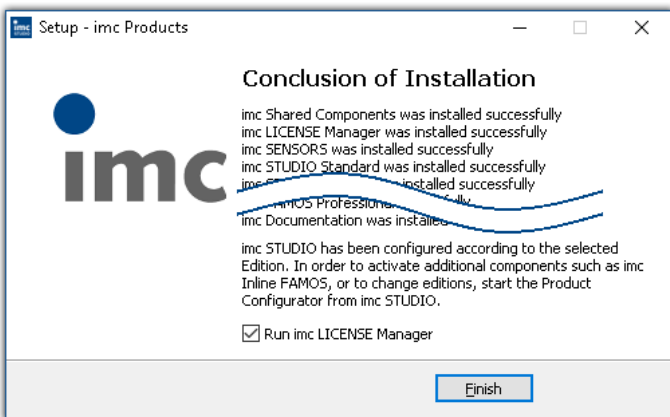
When installation is finished, the following message is posted.

Next, you can start imc LICENSE Manager in order to activate your license. It is also possible to start the imc LICENSE Manager later via the Start menu.

Concluding installation

3.4 Product configuration / Licensing

imc STUDIO can be ordered and licensed/activated in various product configurations. Further details can be found in the order forms or on https://www.imc-tm.com. For a list of all possible editions and components, see the "*Technical datasheet*" or contact our Hotline 5 .

Editions and components

The following editions are available for imc STUDIO, and each include a certain basic package of components/functionalities.

Edition	Order code
imc STUDIO Runtime	imc STUDIO-RUN
imc STUDIO Standard	imc STUDIO-STD
imc STUDIO Professional	imc STUDIO-PRO
imc STUDIO Developer	imc STUDIO-DEV

With an appropriate "*Engine*" activated, any edition can run the configurations of higher editions.

Additional optional or individually licensable components can also be integrated.

Each edition is able to apply configurations created with a higher edition, but not to modify them.

For the Edition **Standard**, **Professional** or **Developer**, the corresponding license is required. These can be activated in the imc LICENSE Manager. The Edition **Runtime** is a restricted version, free of charge. You can register this edition in the imc LICENSE Manager. There, select the option "**Trial versions and freeware**".

Licensing (imc LICENSE Manager)

The software licenses are managed with "*imc LICENSE Manager*". After concluding installation, you can start imc LICENSE Manager directly in order to configure your license (e.g. by means of the Windows Start menu: group "*imc*" > "*imc LICENSE Manager*"). If imc STUDIO is started without an appropriate license having been configured, the product configuration program opens, from where it is also possible to start imc LICENSE Manager.

Follow the instructions of the imc LICENSE Manager. imc LICENSE Manager offers a separate documentation. Start imc LICENSE Manager and click on "*Help*".

Changing the product configuration

You can change the product configuration in order to adapt it to the license purchased. For instance, if during installation you have selected a different edition or if you have purchased a product upgrade. To do this, start imc STUDIO and click in the menu bar (top right) on the symbol 🗄. The product configuration assistant now opens. You can change the configuration to correspond to the licenses you have purchased. Follow the instructions and close the assistant.
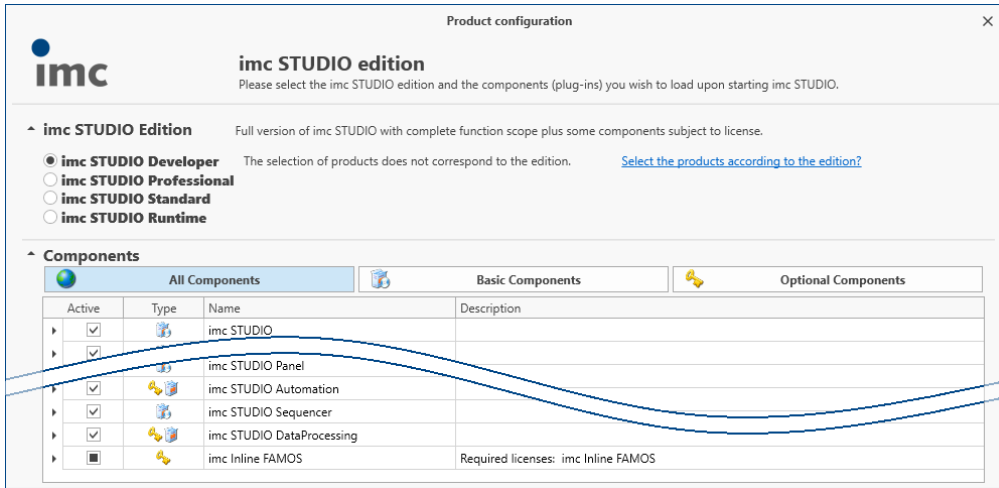
Assistant for altering the product configuration

After completing the configuration, you must close and restart imc STUDIO to apply the new settings.

Changing the edition

In the dialog's upper region, a number of editions are available for selection. The default selection is the edition currently being used. If you change the selection, you can decide whether the available components are to adapt to the selection. In most cases this is recommended, since this is the only way all of the edition's functions will be available after an update.

Optional components are not affected by the edition selection and remain in their previous state.

> Please only change the edition if you have activated an appropriate edition in the imc LICENSE Manager.

Changing the components used

Additional components for the edition selected are available to choose. Some of these components require a separate license.

In the bottom region of the dialog, the available components are shown. The set of components currently used is selected by default (except subsequently to an edition change).

Column		Description
Aktive	☑	The component(s) is/are activated.
	☐	The component(s) is/are deactivated
	⊟	Some of the components are activated. After clicking here, the components underneath are deactivated.
Type	🔑	The component requires an extra license in addition to the license for the edition.
	📦 / 📦	The component can be activated for the selected edition without any additional license.
Name		Product name of the component
Description		Short descriptive text about the component. More detailed descriptions of the individual components are provided in the Technical Spec Sheet.

Activate/deactivate the individual components in the column "*Active*".

🗨️❓ FAQ

Why are there sometimes two components for the same product? E.g. "Automation Editor" and "Automation Engine"

Answer: Many components are subdivided into their actual function, on one hand, and on the other their respective settings interface. This distinction exist for the following reason: each edition can run any function created with a higher-level edition, but not modify it.

In other words, using the component "Automation Engine", you can run Automation-Tasks in the Standard edition. However, the Editor ("Automation Editor") is only available in the Developer edition.

When should the "Engine" be deactivated

Answer: In most cases, it is not necessary to deactivate the engine if the component is not required. However, be aware that every component activated makes resource demands.

At a minimum, keeping unnecessary components active slows down the launch of the system.

Disadvantage: All functions belonging to the deactivated components no longer work. Example "Sequencer": Commands at Widgets, hotkeys/keyboard shortcuts, user-defined buttons, user-defined events.

3.5 Start

Start the software by means of the associated desktop icon or via the Start menu.

Further, as part of installation an icon is set up on your desktop and - depending on your choice during installation 17 - a symbol in the quick launch toolbar.

imc STUDIO If no icon was set up (installation option), then open the **Windows Start menu**. There you find the group "**imc**" and in it a link to start the product.

If product configuration / licensing 26 is missing, the Product configuration starts automatic.

Splash screen

Next, a splash screen appears, indicating that software components are being loaded. Depending on the installation and the PC capacity, this could take some time.

Loading the software components after start

Homepage - Start page

By default the Homepage is shown when the software is started. The Homepage shows certain functions, depending on the particular product, as buttons. Click on the corresponding buttons, to select your desired functions. After the first installation, the "***Homepage***" may appear as shown in the example below:
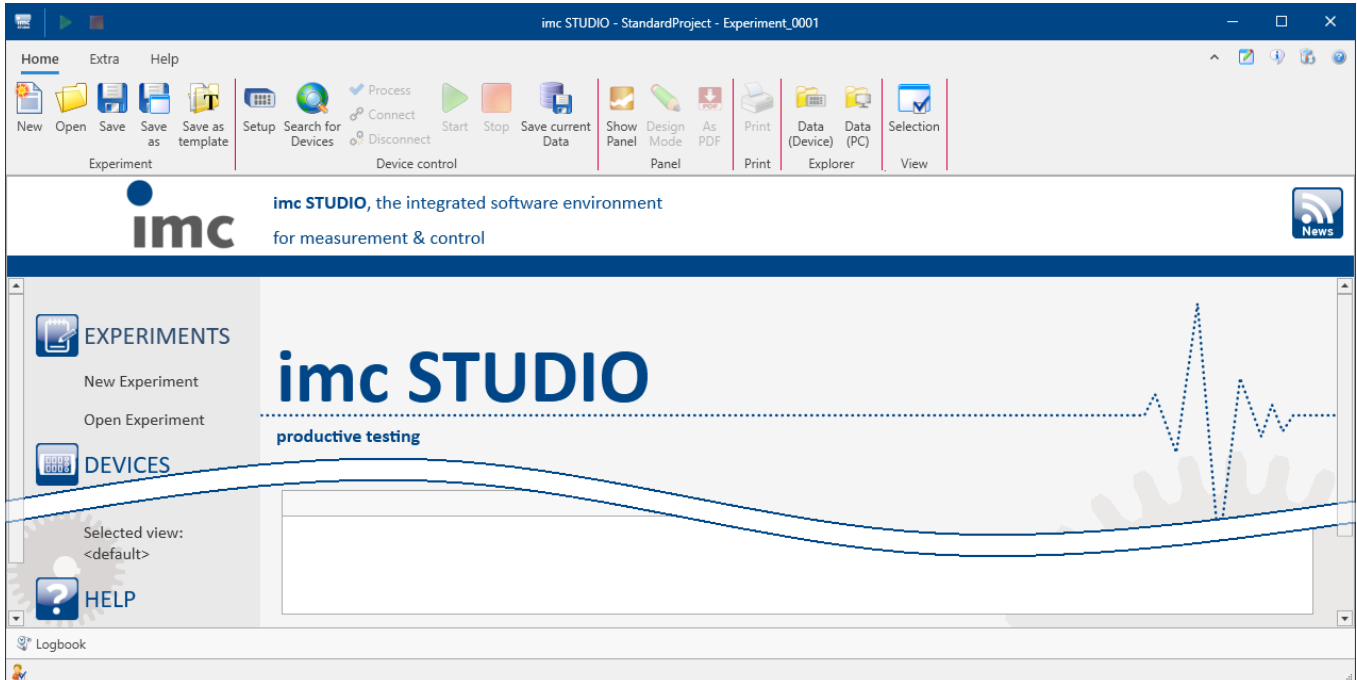
Start page (example)

imc STUDIO starts with a simplified view

Along with installation of imc STUDIO, a number of **Views** are provided. Views in this sense are defined designs for the user interface's appearance.

imc STUDIO offers a wide variety of possibilities and functions, but the entire scope of these is not always needed for a single simple measurement.

> **❗ Note**   imc STUDIO starts with a simplified view
>
> In order to make it easier to get familiar with the software, the program starts with a simplified view with limited choices. All important functions for measurement and visualization of measured data are available. The menu ribbon is structured in such a way that proceeding from left to right accesses all of the Main windows 31 .

Changing from the simplified view to View: Complete

You can switch to a different view at any time, in order to obtain access to all of the existing functions. To do this, go first to the menu item "*Extra*" and in the drop-down list of views, select: "**Complete**".

> **❗ Note**   Notes on the descriptions and the screenshots
>
> The following descriptions and screenshots always pertain to the view with the full scope of functions. Many of these functions are also found in the minimized view at another location.

3.5.1 Device Connection / Network / Firewall

To use an imc measurement device, imc STUDIO must set up a **connection via a network** (mostly LAN). Details on the network settings are presented in the chapter "*Setting Up - Connect the device* 36 ".

Firewall

The firewall used might **prevent** establishment of a **connection** between the operating software and the measurement device. If the software is unfamiliar to the firewall, then a corresponding prompt usually appears upon **accessing the network**. This happens, for example, after starting the software and upon first accessing the device (e.g. in a device search). Some firewall programs can also block access to system and hardware-components.

In all cases, **correct operation** is only possible if the **connection is not blocked**. The following programs are usually affected:

Program	Default path
imc STUDIO: imc.Studio.exe	C:\Program Files\imc\imc STUDIO...
imc DEVICES: imcDevices.exe	C:\Program Files (x86)\imc\imc DEVICES...
imc DEVICES Service: imcDevicesService.exe	C:\Program Files (x86)\imc\Shared
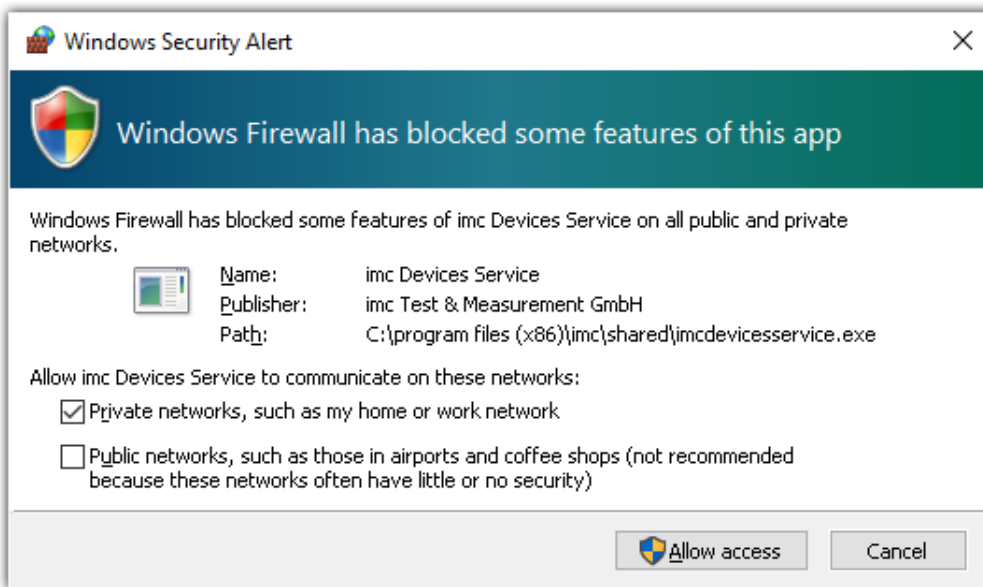
Example of the firewall warning

Windows firewall: Here, there is a distinction between private and public networks. For operation on LAN, it is sufficient to **enable "*Private networks*"**. Enable this access type. You may wish to read the operating instructions for your firewall, and / or ask your administrator / IT-department.

3.5.2 Main Windows / Components

imc STUDIO provides the framework for various **components**. Components appear within imc STUDIO as **main windows**. A component can have one or more main windows.

The main windows appear in the Navigation pane.

On the left you see an example of the Navigation pane with the main windows **Homepage**, **Setup**, **Panel**, **Automation** and **Sequencer** (**Panel** is selected).

To jump to one of the main windows, click on the corresponding button in the Navigation pane.

Navigation pane $\boxed{94}$: Select this link to go to further information on operation of the Navigation pane.

!	Note	Notes on the use of the simplified view

- When you use the simplified view $\boxed{29}$, the Navigation pane is hidden. In this case, in order to go to the main windows Setup and Panel, use the menu ribbon.
- The other main windows can only be reached via the Navigation pane.
- If you need it, you can show the Navigation pane $\boxed{96}$, or change the view $\boxed{98}$.

Tool window

Most components have their own tool window (e.g. the Panel with the tool windows: Widgets and Data Browser). The tool windows are described in their respective sections.

⚒	Reference	See also

Tool window $\boxed{95}$: Select this link to go to further information on operating the tool windows and for a description of the tool windows belonging to the imc STUDIO frame.

3.5.3 Important settings

User and User groups

imc STUDIO has the ability to administer various **users** which are permitted to use the program in various ways. For details see the section "User administration".

Options

Before beginning to work with imc STUDIO, you can change essential settings, such as the **folder path where the experiments are saved**.

You can change the folder path in the options (under "*Project Management*" > "*HDD settings*"):

Ribbon	View
Extra > Options ( )	all

❗ Note	Reading and writing access rights are required

Please note that this setting will apply for every user of imc STUDIO. Each user must possess reading and writing access rights for the specified folder path.

Checking and modifying the time zone

Applicable to devices belonging to the firmware group imc DEVICES: In order to assign a definitive point in time for all measured data, a specific time zone is set for all imc devices used. The factory setting is "***UTC+01:00***". If applicable, modify the time zone setting. For this purpose, the "*Devices properties*" dialog contains an entry "*Device time and synchronization*" > "*Time zone*".

Ribbon	View
Setup-Configuration > Device Properties	Complete

3.5.4 Error causes upon starting

Corrective actions for when the logbook opens with error messages directly upon starting imc STUDIO.

Message	Corrective action
No matching DEVICEcore found.	In the product configuration, the **firmware imc DEVICEcore** is activated. However, no appropriate firmware has been found or installed. By default all firmware products are activated. You can take the following corrective actions: • install the appropriate imc DEVICEcore-firmware. This is only necessary if you wish to use a device belonging to this firmware-group. • deactivate the component "*imc DEVICEcore device adapter*" in the product configurator 26 .
Error while initializing the plug-in "imcDevices V2.x Adapter" ...	In the product configuration, the **firmware imc DEVICES** is activated. However, no appropriate firmware has been found or installed. By default all firmware products are activated. You can take the following corrective actions: • install the appropriate imc DEVICES-firmware. This is only necessary if you wish to use a device belonging to this firmware-group. • deactivate the component "*imc DEVICES V2.x Adapter*" in the product configurator 26 .

Message	Corrective action
Could not load file or assembly 'imc.Studio.Plugins.DevSetup.Sensors.Stubs.dll' ...	In the product configuration, the component **imc STUDIO Sensors** is activated. However, no appropriate **imc DEVICES firmware** was found or installed. You can take the following corrective actions: • install the appropriate imc DEVICES-firmware. This is only necessary if you wish to use a device belonging to this firmware-group. • deactivate the component "*imc STUDIO Sensors*" in the product configurator ⌐26⌐.
The loaded Project-settings are from an older imc STUDIO version. If you save these settings, an older imc STUDIO version would not be able to read them correctly.	With every Version/Revision, new enhancements and other changes are introduced. In consequence of these changes, some saved projects may become no longer compatible with older versions. Make sure that no older version of imc STUDIO needs to access the database.
More than one DEVICEcore installation found in STUDIO installation directory.	Solution: Uninstall the older imc DEVICEcore version.
Could not connect to the Guardian process. Some functions (e.g. delete measurements) will not work.	The Guardian process is not running. Please start either the Guardian- or WatchDog-service. For more info, see the section "*Guardian*"

3.6 Info / Version information

imc STUDIO consist of multiple components. In order to see which components are included in your package, click in the menu bar on the symbol 🛈. Then a pop-up window appears displaying the product names and details on the components:
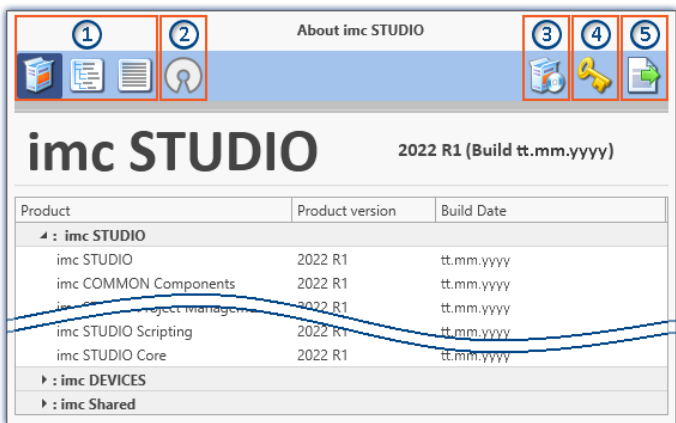
Version information (example)

With the buttons on the left side ①, you can change the list's depth of detail and how it is sorted. Additionally, you will receive all copyright notes regarding "*Open source software*" (ⓡ) ②.

With the buttons on the right side, you can start the assistant for the product configuration ⌐26⌐ ③, start the imc LICENSE Manager ⌐26⌐ ④ or export the product selection ⑤.

While performing the export, you can save the contents as a file in XML format. For inquiries for Hotline, it may be necessary to send it as an e-mail (see also chapter "*Customer Support / Hotline* ⌐5⌐").

3.7 Information and tips

3.7.1 Changing languages and installing additional languages

If in the installation type "User-defined ⌐21⌐" the option "***Install all languages***" was not selected, then upon conclusion of the installation, imc STUDIO is available in **English** plus, if provided, in **the operating system's language**. In all other cases all supported languages are already installed.

> **❗ Note**   **Observe operation system settings**
>
> Please ensure that your operating system is set correctly to the display language. Some languages require modifications to be made accordingly. In particular, the "System locale" must be set correctly to correspond with the display language.
>
> Otherwise, with some languages there can be problems with the characters. Languages affected include Japanese, Chinese, Russian, ...

Changing the language

By default, the imc software will start in the same language as the Windows version installed. If this language is not supported, then the English program version appears.

The language can be changed, irrespective of the Windows version. Use the program "***imc Language Selector***". The program is found in the Start menu under the group "imc".

> **❗ Note**   **Constraints**
>
> Only the imc software's texts are converted. Components which depend on the operating system's language setting are not affected.
>
> Please only use one of the following two languages:
>
> - Default: the operating system's language
> - English
>
> Any other selection may cause malfunctioning if the operating system and the imc programs use different languages.

Installing additional languages

If desired, all other supported languages can be installed later (no installation medium is required).

> **❗ Note**   **Which languages are be installed subsequently**
>
> In subsequent installation of languages, **all languages supported** are installed. There is **no selection** possibilities.

Step by step

- Administrator rights are required.
- Open the **installation folder** of imc STUDIO (e.g. "*C:\Program Files\imc\imc STUDIO...*"), e.g. with Windows Explorer or by means of the command line.
- There, open the folder "***Languages***"
- Run the file "***InstallLanguages.bat***".
- Wait until the script stops and posts the message "*Failures: 0*". This indicates that the installation has completed successfully.

> **❗ Note**   **Instruction notes**
>
> If installation was unsuccessful, the necessary user rights may be missing:
> - If "*InstallLanguages.bat*" is called via the **command line**, run the **command line as Administrator** (context menu: "Run as Administrator")
> - If "*InstallLanguages.bat*" is called via the **Windows Explorer**, run the **call as Administrator** (context menu: "Run as Administrator")

3.7.2 Recommended virus scanner settings

The presence of many channels can **burden the PC** if a virus protection program scans the data captured. This may cause a **jiggling display** and high demands on the processor.

We strongly recommend **removing imc STUDIO from the virus scan**. Most virus protection programs are able to classify individual programs as low-risk. To do this, please refer to the instructions for your virus scanner.

Low-risk	Default path
Add the program **imc.Studio.exe** to the list of low-risk programs	C:\Program Files\imc\imc STUDIO...
Add the program **imcDevices.exe** to the list of low-risk programs	C:\Program Files (x86)\imc\imc DEVICES...
Add the **database** path along with all subfolders to the list of low-risk folders	C:\Users\Public\Documents\DB

Ensure that its data are not searched for viruses during reading or writing.

> **🔀 Reference**   **Installation**
>
> See also the installation note: "*Notes on the security software* 🗎 17 "

4 Setting Up - Connect the device

There are multiple ways to **connect the imc measurement devices with the PC**. In most cases, the **connection via LAN** (local area network, Ethernet) is implemented. See chapter "*Connecting via LAN in three steps* [37]" for the **quickest way to connect** PC and measurement device.

But there are also other connection types:

- WLAN
- LTE, 4G, etc. (via appropriate routers)

These are described in a separate section: "*Special options for connecting to the device*".

The devices use the **TCP/IP protocol** exclusively. With this protocol, some settings and adaptations for your local network may be necessary. For this purpose, the support of your network administrator may be necessary.

> **❗ Note**
>
> When **using multiple TCP/IP connections**, e.g. LAN, WLAN and modem, observe the remarks in the chapter "*Computers with multiple TCP/IP connections*".

Recommended network configuration

Please use up-to-date, high-performance network equipment in order to achieve the maximum transfer bandwidth. This particularly means 100BASE-T (Fast Ethernet 100 MBit/s) or 1000BASE-T (GBit Ethernet). GBit Ethernet network equipment (switch) is backwards compatible, so that it can even be used to operate such imc devices which only support 100 MBit Fast Ethernet, but not also GBit Ethernet (such as CRXT or CRFX-2000GP).

The cable length between the switch and a PC or a device should be less 100 m. Use a shielded cable. If the length of 100 m is exceeded, then you have to insert another switch.

If the system is being integrated into an existing network, you must ensure that the minimum data rate can be guaranteed. Under some circumstances, this may require using switches to subdivide the network into separate segments in order to govern the data traffic in a targeted way and thus optimize the data rate.

In very demanding applications, you might consider grouping multiple GBit Ethernet devices via even higher-performance sections lines of the network (e.g. via 5 GBit Ethernet) and to connect these groups to NAS-components, for instance, via these lines.

When such imc devices are included which use network-based PTP-synchronization (e.g. CRXT or CRFX-2000GP), then it is necessary to use network switches which fully support this protocol on the hardware side. Appropriate network components are also available as imc accessories (e.g. CRFX/NET-SWITCH-5) and are then electrically and mechanically fully compatible with the imc systems.

4.1 Connecting via LAN in three steps

The most common case is described below: the PC and the device are connected via cable or network switch. The device's IP address must be set in the PC's address range. Subsequently, the device can be connected with the PC. If a connection has ever been established previously, the software recognizes the device's hardware configuration. In that case, experiment configurations can be prepared without any connection to the device.

Step 1: Connecting the measurement device

To connect via LAN there are two options:

1. The measurement device is connected to an **existing network**, e.g. via network switch. Only with a switch is it possible to run multiple devices.
2. The measurement device is connected directly to a network adapter on the PC (**point-to-point**).

In a LAN, the first case is typically implemented. Modern PCs and network switches are usually equipped with Auto-MDI(X) automatic crossover recognition, so that it is not necessary to distinguish between crossed and uncrossed connection cables. Thus both cable types can be used.

Step 2: IP-configuration

Start imc STUDIO. Open the dialog for configuring the device IP address by clicking on the button "*Device interfaces*" ( ).

Ribbon	View
Setup-Configuration > Device interfaces ( )	Complete

If this **button** is **not present** in the view, it is also possible to open the dialog after a device search if it failed to find any new devices. Subsequently, a prompt appears asking whether to search for devices with an inappropriately configured network interface. Close this message box by clicking "*Yes*".

Once the dialog starts, the system automatically searches for all devices in the network. In the tree diagram, all available devices are indicated. If the device appears among the group "*Currently not reachable*" ①, it is necessary to modify the device's LAN-settings. If the device appears among the group "*Ready for measurement*" ②, you can leave the settings as they are or review them.

Select the device for making modifications ③.

> If there is any IP-conflict, devices affected will not be listed.
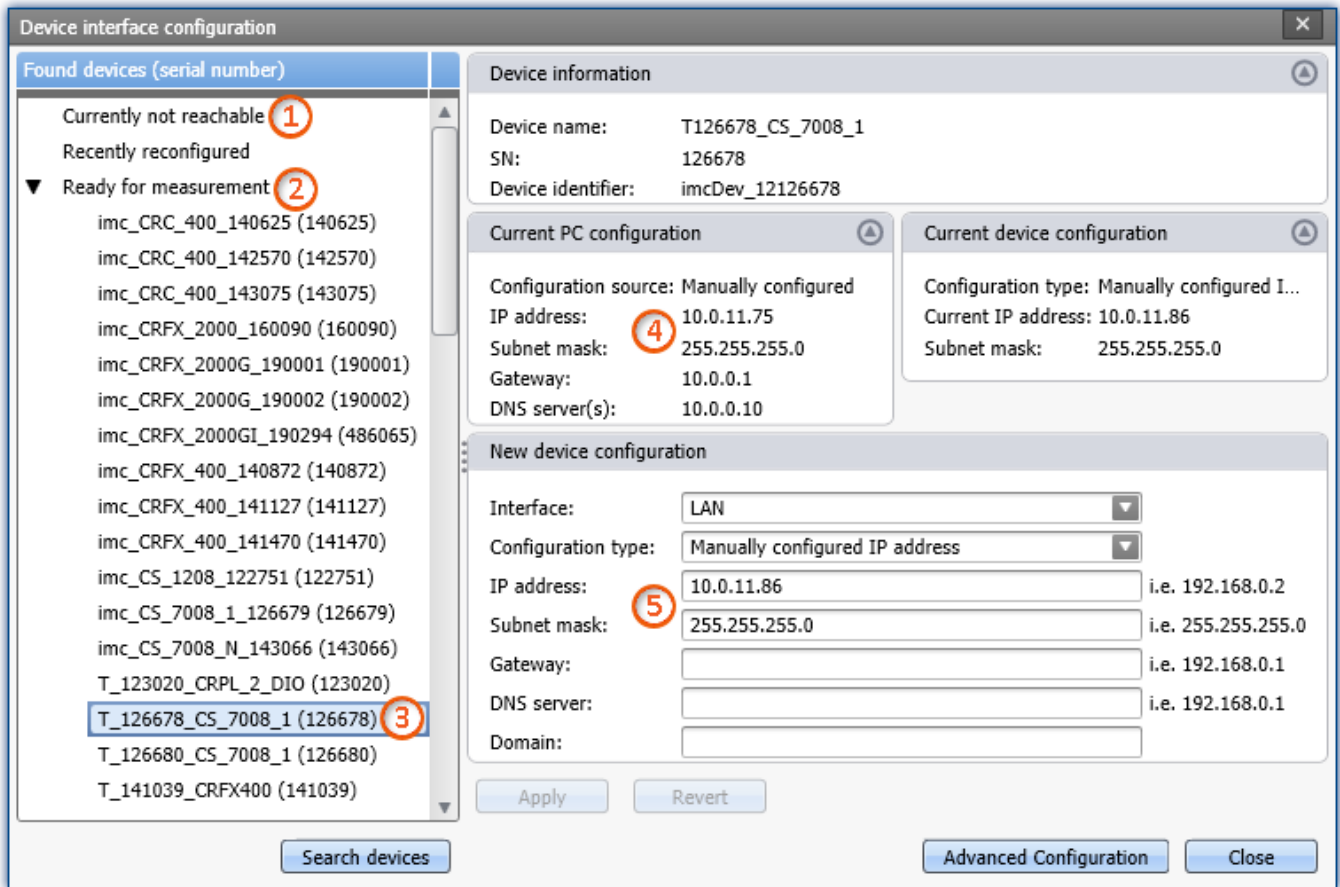
Display of measurement devices found and of the IP address

Set the **IP address manually** if you are not using DHCP. The device's IP address ⑤ must match with the PC's address ④. To conform to the network mask, only the device portion may be different (see example).

💡 Example

In the example shown, the fixed IP 10.0.11.75 with subnet mask 255.255.255.0 is selected for the PC. For measurement devices, any numbers would be suitable which begin with 10.0.11. and then do not contain 0, 75, or 255. The 0 and the 255 should not be used, if possible, due to their special significance. The 75 is the computer's number.

Example for IP settings	PC	Device
IP address	10 . 0 . 11 . 75	10 . 0 . 11 . 86
Network mask	255 . 255 . 255 . 0	255 . 255 . 255 . 0

If the configuration type: "*DHCP*" is used, **the IP address is obtained automatically** from the DHCP-server. If it is **impossible to obtain any setting values** via DHCP, the **alternative values are used**. These could lead to errors in the connection (different networks, same IP addresses, etc.).

If there is a **direct connection** between the device and the PC by a cable, then **DHCP should not be used**.

In order to apply the changes, click on the button "*Apply*". Wait for the device to restart and then close the dialog.

⊗ Note	Connection via modem or WLAN

For devices of the imc DEVICES group:

If the connection to the device is established via a modem or WLAN, start the program "*imc DEVICES Interface Configuration*" by clicking on the button: "*Advanced Configuration*" (see previous figure). An exact description is found in the software manual chapter: "*Setting Up - Connect the device*" > "*Special options for connecting to the device*".

Step 3: Integrating a device into an experiment

Now you are ready to add the device to the imc STUDIO experiment. If your device is unknown to the system, first perform the "*device search*".

Ribbon	View
Home > Search for devices (🔍)	all
Setup-Control > Search for devices (🔍)	Complete

Select the desired device: Once you click in the checkbox "*Selected*" for the desired device, it is ready to use in the experiment (see *Device Search - Known and Selected*).

	Selected	Device name	SN	Device specification
▶	☑	T_124835_C1_1_LEMO_ET	124835	imc C1-1 LEMO
	☐	T_130039_busDAQ_X	130039	busDAQ-X
	☐	T_130311_SPARTAN_U32_CAN	130311	imc SPARTAN

You can also select multiple devices for your experiment.

Now the device is "*known*". After the next program start it is available for selection. For further information, see the documentation on the component "*Setup*".

✦ Reference	Time zone

Now check whether the correct time zone is set for the device: see "*Important settings* [32]".

4.2 The network

Optimize the network

You should observe the following notes for networks with high data rate, to reduce the risk of a data overflow.

1. The network between switches and PC should be 1GBit/s
2. The actual data rate is decreasing with the number of channels. Avoid unnecessary channels.
3. The RAM buffer should be as big as possible, not "*Auto*".
4. Save only channels you need to the internal disk.
5. Avoid curve window setting that need a lot of performance. Choose scroll mode. Avoid the rezoom function after a long measurement duration. Don't set the sample points to symbols. Try to find a curve window configuration, that shows no bucking.
6. Observe the [recommended virus scanner settings] 35 ! It would check every sample written to the hard drive. That takes most of the performance of a PC and the hard drive.
7. Check the processor and network load with the PC task manager

Using a second network

To avoid disturbing data transfer between devices units and PC's, a second network using a second network card per PC can be set up. This second network can be used for transferring data between the PC's.

Example of a Complex Network

Until now, we have only considered networks consisting of a PC and n imc devices units. However, any arbitrary combinations are possible.
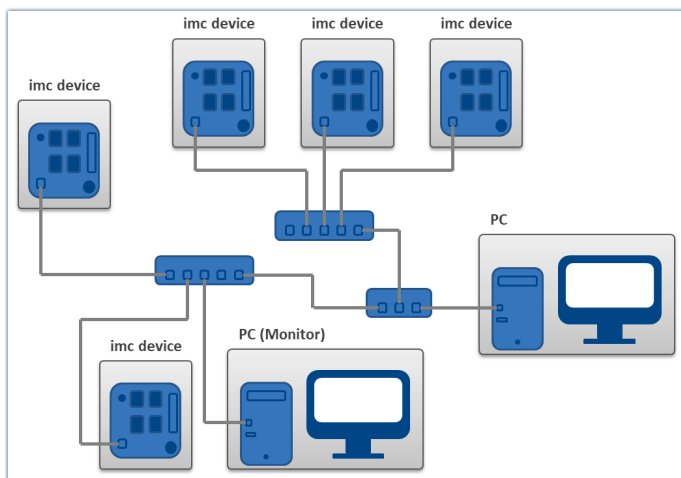
Monitoring

The PC on which imc STUDIO is installed is declared as the Master-PC, which configures the measurement device. Various other clients can access the measuring device via the network (e.g. via imc LINK or, it is set up accordingly, using a browser via imc REMOTE WebServer).

The well-known network restrictions are also valid here. In particular, it is impossible for more than one person to write to the same file. Furthermore, it is impossible for one person to open a file while another writes to it. In general, all network restrictions that apply to files also apply to the individual Devices units.

In consequence, the software con prevent multiple users from configuring the same device.

4.3 Firmware version

The device software (imc STUDIO) provides two different firmware and driver packages

- imc DEVICES: For devices belonging to groups 4-7 (e.g. CRONOS family, C-SERIES, SPARTAN, BUSDAQ)
- imc DEVICEcore: For devices belonging to group 10 or higher (e.g EOS)

Both packages can be installed and operated in parallel. The software and the devices automatically apply the appropriate package.

The software only works with devices having the right firmware. Upon the connection/preparation, the versions are compared. If they don't match, the <u>firmware update</u> 41 is carried out.

> ❗ **Note**   **Parallel firmware versions**
>
> imc DEVICES: You are able to use different imc DEVICES versions in parallel. Additional notes on this subject are provided in the chapter: "*Associated Firmware (imc DEVICES)* 45 "
>
> imc DEVICEcore: The associated firmware- and driver package ships with the software used, and is installed in the software's installation folder. Any other installations are not recognized and thus cannot be used.

4.3.1 Firmware update

Every software version comes with matching firmware for the hardware. The software only works with devices having the right firmware.

Once the program connects up with the unit, the device's firmware is checked. If the software version doesn't match the device's firmware version, you are asked if you want to perform a firmware-update.

> ❗ **Note**
>
> The firmware update is only required if the software was obtained as an update. If you obtained your hardware equipment together with the software, no firmware update is necessary.

> ⚠️ **Warning**   **Do not interrupt the firmware update!**

Be absolutely certain to observe the following:

1. Under no circumstances should the device or its power supply be deactivated during the firmware update!
2. The network connection may not be interrupted. Use a cable connection, not WLAN!

Firmware Update - imc DEVICES

⚠ Hinweis	Firmware and driver package

The following description pertains to the firmware-/driver package imc DEVICES designed for devices belonging to Groups 4-7 (e.g. CRONOS family, C-SERIES, SPARTAN, BUSDAQ).

Depending on the device type, the following components are loaded automatically: Interface-firmware (Ethernet, modem, ...), booting program, amplifier firmware, firmware for the signal processors.

The dialog for the firmware-update looks like this:
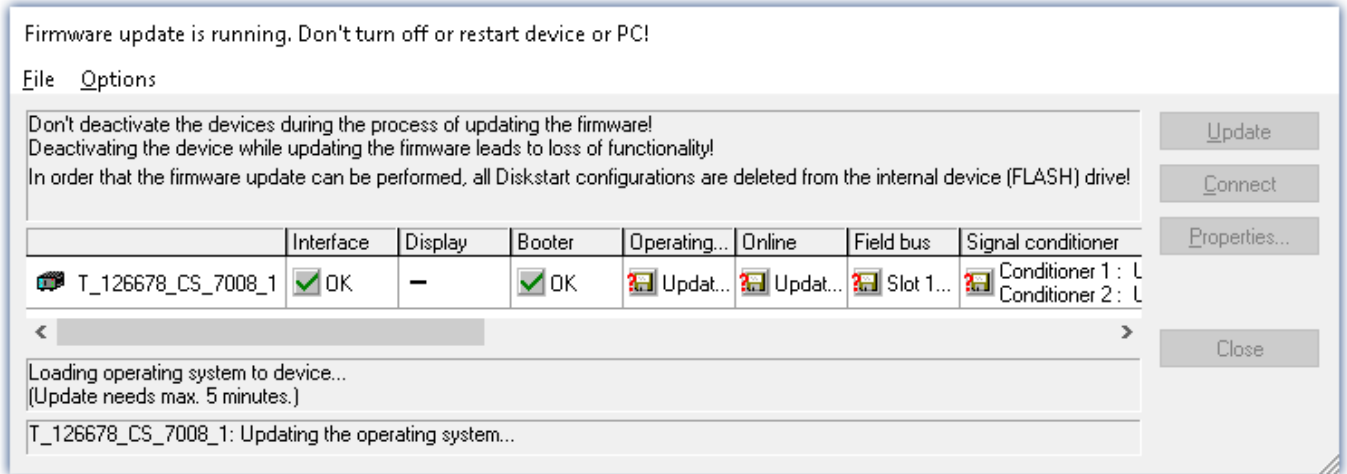
Start of the firmware update (example of a single device)
The state of the components of the firmware is diaplayed in the list.

Component	Description
Interface	Interface-Firmware (Ethernet)
Booter	Start-up program for the device upon switching-on
Operating system	Device operating system
Online	Online-functions and hard drive controller
Display	Operating system of the connected displays
Fieldbus	Fieldbus interfaces (e.g. CAN etc.)
Signal conditioners	Amplifiers

The following symbols for the individual firmware components appear in the list:

Symbols	
💾	not current
✔	firmware conforms to current standards
⚠	error occurred during update procedure
—	this option is not available on the device

If no status indicators are displayed, no connection could be made to the corresponding device.

The duration of the update depends on the amount of amplifiers (can last up to several minutes). You will be informed on the progress.

You are notified when the firmware setup concludes successfully, as shown below:
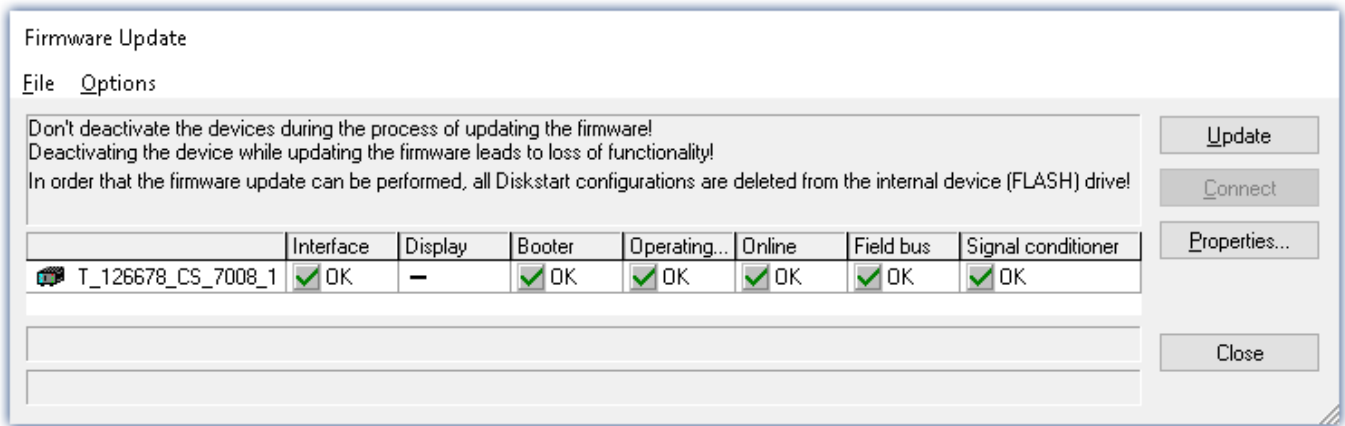
Conclusion of the firmware update (example of a single device)

Choose "*Close*". The device can now be used with the product software.

⚠ Warning	Be sure to observe in case of error

- For a variety of reasons, the firmware update sometimes does not conclude properly, for example due to interruption of the power supply. For instance, the "handshake signal" at the end of the procedure may be missing. In this case, no measurement channels would be displayed initially. However, restarting the device and its software and performing the firmware update again usually restores everything to normal. It may be necessary to call the menu function "Update all components" in the Firmware update dialog's Options menu. This scenario only results in permanent damage in the most rare cases, and it is very worthwhile to repeat the procedure before sending a device in for repair.

- Behaviour under error condition, Windows cuts off the network connection without the user's knowledge; but this can be prevented using the PC's Control Panel.
  Background: During the firmware updates there is no data transfer for a few minutes and thus no network activity; Windows detects inactivity of the connection and the following mechanisms are set in motion:
  a) Windows' energy saving mode switches the LAN adapter off, consequently interrupting the network connection!
  b) Windows switches to the next LAN adapter if there is one (some PCs have multiple adapters in order to, for instance, to access services in parallel that are accessible via separate networks.)
  c) Other scenarios are feasible, e.g. if switches are activated, which can also respond to missing data traffic.

If an error message is posted during the firmware update, leave the device on and contact the imc Hotline. The firmware update may be continued with guidance from the Hotline.

❗ Note

Firmware logbook

The "*File*" menu offers a function for working with the firmware log file. Every action taken during a firmware update plus any errors which may occur are recorded in a log file. This log file can be displayed with menu "*File*" > "*Show log file*".

Firmware Update - imc DEVICEcore

⊕ Hinweis	Firmware and driver package

The following description pertains to the firmware-/driver package imc DEVICEcore designed for devices belonging to Groups 10 and higher (e.g. EOS).

Upon the connection/preparation, the versions are compared. If they do not match, the next dialog notifies you about this, and indicates both which version is being used and which version is required.

```
Updating Firmware                              ×

 ?    The device EOS_4120110 needs a firmware update.
      Should the firmware update be executed?

      Versions
      PC:
              3.3R3
      Device:
              3.3R2

                        Yes            Cancel
```
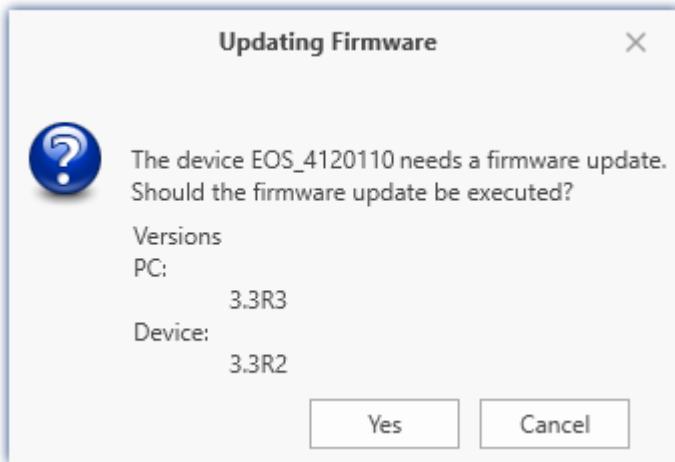
When you click "*Yes*", the firmware update starts. The duration of the update depends on the amount of amplifiers (can last up to several minutes). You will be informed on the progress.

The system notifies you when the firmware update has been completed successfully. Close the dialog. Subsequently the device can be used with the device software.

🗨 FAQ

What to do in case of an error occurring in a firmware update?

> **Answer:** When a firmware update fails to run correctly, the last active firmware is restored. The device remains operational by means of the previous installed firmware. Repeat the procedure, and if the repeat procedure also fails, please contact the imc-Hotline.

What is an optional update?

> **Antwort:** In some cases, a firmware update is not mandatory. In such cases, the update is available to you as "*optional*". However, we still recommend performing the update, since every update not only implements improvements, but also fixes any bugs. Nevertheless, with the new version of imc STUDIO, you are able to work with the device running the old firmware edition, if you choose.

4.3.2 Associated firmware (imc DEVICES)

If multiple firmware versions are installed on the PC, then a defined version must be selected for each device. The selection strategy is set in the Options: "*Setup*" > "*Device options*" > "*Selection of the imc DEVICES version*".

Ribbon	View
Extra > Options (⚙)	all

Option	Description
Selection of the imc DEVICES version	If multiple imc DEVICES versions are installed on the PC, a specific version must be selected for the operation of each device. This option controls the selection strategy. If only one imc DEVICES version is installed, this setting has no effect. • **Manual:** With "**Manual**", the system always asks which firmware version to use when device are selected or an experiment is loaded. • **Automatic:** "**Automatic**" avoids firmware updates. The version currently running on the device is used preferentially. • **Always use latest:** With this selection, the most current firmware version compatible with this imc STUDIO version is always used.

ⓘ Note	Use of older firmware

Please note that a new firmware version not only contains new functions, but also reflects resolved issues. These changes only take effect if the device is also using the new firmware.

FAQ

Question: Which firmware versions support my imc STUDIO version?

> **Answer:** There is a clear assignment regarding the compatibility with the firmware/firmware group:

imc STUDIO version	assigned firmware group	additionally compatible
5.0 R1	2.8 R5	2.8 R3
5.0 R3	2.8 R7	2.8 R3, 2.8 R5
5.0 R5+	2.9	2.8 R3, 2.8 R5, 2.8 R7
5.2	2.10, 2.11, 2.13	
2022	2.15	2.14
...	...	

For version 5.0, the applicable rule is: the assigned group and all older **groups up to 2.8 R3** are compatible with the imc STUDIO-version used.

For version 5.2, the applicable rule is: the assigned group and all older **groups up to 2.10** are compatible with the imc STUDIO-version used.

As of version 2022, the applicable rule is: the assigned group and all older **groups up to 2.14** are compatible with the imc STUDIO-version used.

Question: Can devices in the same experiment use different firmware versions?

> **Answer:** Yes. If multiple devices are used, each one may use a different firmware version. Prerequisite: The imc STUDIO-version used supports the firmware versions.

Question: Can I install a new firmware version without changing the imc STUDIO version?

> **Answer:** Yes. Prerequisite: The imc STUDIO version used supports the firmware version.

Question: Is there a way to determine what firmware the device is using?

> **Answer:** Yes.
>
> - On the Setup page: "*Devices*", a column can be added: Device firmware
> - In the Device properties.

5   Tutorial

This chapter presents some examples involving the components "*Setup*" and "*Panel*".

5.1   Simple measurement - First steps

Assignment:

Set up an experiment. A measurement on an analog channel is to be started and the measurement results are to be displayed on a Panel page. The signal applied in this example is a ±2 V sawtooth voltage with a 1 Hz base frequency. If you use a different signal, modify the channel settings accordingly.

Learning goals:

- Creating an experiment
- Simple device operation

Elements used:

- Search for devices, device selection , connection with a device, channel settings

Prerequisite:

- imc measurement device with an analog channel

Procedure:

Connect a **signal generator** with "*Channel_001*" on your device. Refer to the device manual to see how to connect a signal with your device (plugs, etc.).

Start imc STUDIO as described in the section "*Start* 28 ".

5.1.1 Setup - Settings

To begin, the measurement device is selected and configured.

- Open the **device configuration page**: "*Setup*".

- Go to the **tab**: "*Devices*" ▦.

Here you will find any devices which are known to the system due to having been used before. Following the first installation of imc STUDIO, the list is empty.

Select your device:

- If the device desired **does not appear in the list**, perform a device search (🔍). Subsequently, the list will display all devices found.

Ribbon	View
Home > Search for devices (🔍)	all
Setup-Control > Search for devices (🔍)	Complete

- Click on the Checkbox-symbol (☐) in order **to select the device**.

	Devices		Analog channels		Digital channels		Variables		Triggers

	Selected	Device name ▲	SN	Device specification	Connection status	Measurem...	Device control	
▶	☑	T_126678_CS...	126678	imc C Series	disconnected	stopped	Connect	▼

Selecting a device

The device is now known and selected, and is available each time imc STUDIO is started.

Configuring a channel

Now the channel used is configured:

- Go to the **tab**: "*Analog channels*" 📈.

Under **Channel type**: "*Analog inputs*", select "*Channel_001*". By default, this is set to "*active*". In order to make settings, click in the respective box and change the entry.

Set "*Channel_001*" in accordance with the input signal from your generator. In this example:

Parameter	Value	Dialog (View: *Standard*)	Dialog (View: *Complete*)
Mode	Voltage	Measurement mode	Measurement mode
Coupling	DC	Measurement mode	Measurement mode
Input range	±2.5 V	Measurement mode	Range & Scaling
Type	AAF	Sampling & Filtering	Filtering
Sampling rate	100 Hz	Sampling & Filtering	Sampling & Preprocessing
Duration	10 s	Sampling & Filtering	Sampling & Preprocessing
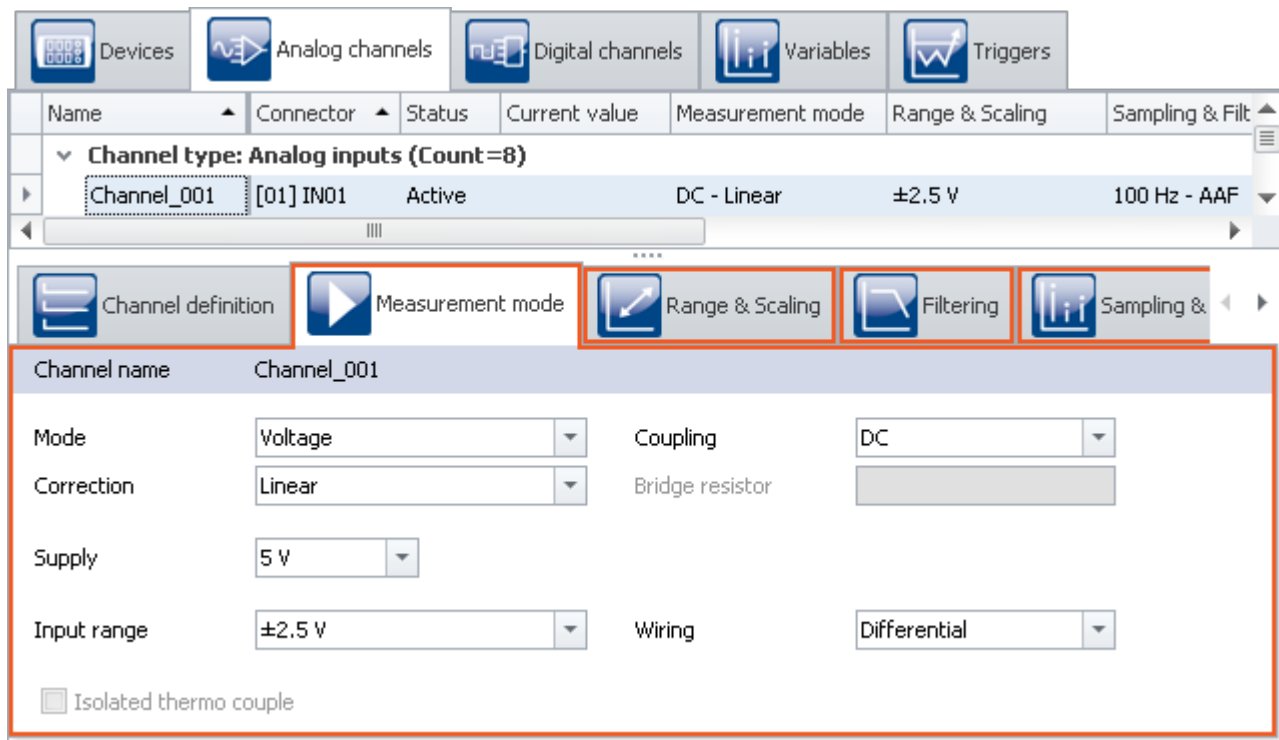
Configuring measurement channel by the dialogs

- To **apply the changes**, click on the button "*Process configuration*" (✔).

Ribbon	View
Home > Process (✔)	all
Setup-Control > Process (✔)	Complete

By this means, the device settings are available to other components.

5.1.2 Panel - Settings / Start measurement

To display measured values, create a Panel page.

- Open the page: "*Panel*".

Reference	Panel description

How the Panel is structured is presented in the manual in the chapter: "*Panel - Data visualization and controls*".

Editing can only be performed in **Design mode** (e.g. add new **Widgets**, change **properties** etc.).

- Activate the Design mode (✏️)

Ribbon	View
Panel-Navigation > Design Mode (✏️)	Complete
Panel-Design > Design Mode (✏️)	Complete
Home > Design Mode (✏️)	Standard

❗ Note	Notes on Data Browser

The "*Panel*" has various **tool windows**. In "*Data Browser*" you can see the **device's channels** as shown in the image below. **Following changes** to the "*Setup*", this list must be updated using the command "*Process configuration*".

- Open the tool window "*Data Browser*" and select the **analog input**: "*Channel_001*".
- Use Drag&Drop to drag this channel to the page, either by grabbing its icon or its name (but do not grab the @-symbol; this will be explained in the next section).

A menu appears offering Widgets appropriate for the analog channel's data type.

- Select one of these Widgets. In the example, a "*standard curve window*" is selected.

✛ Reference	Curve window documentation

This Widget is the curve window, which is also used in other imc software packages. More information is provided in the manual in the section. Chapter:
"*Panel*" > "*Curve window*".
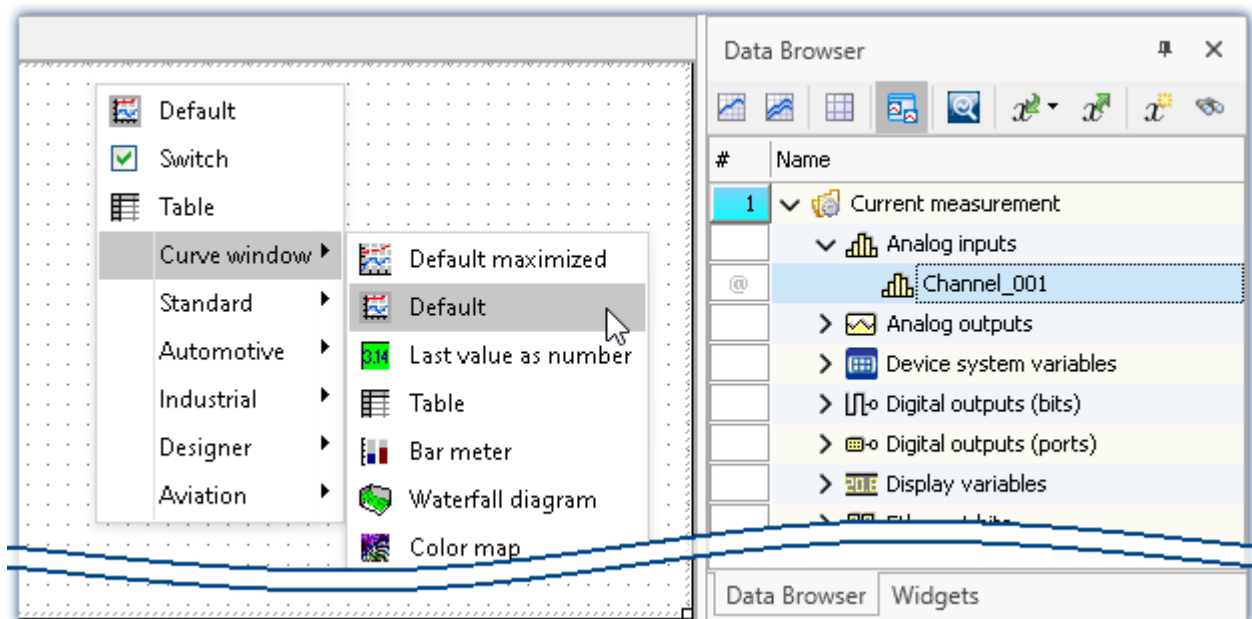
Dragging an analog channel to the Panel page

There are a variety of Widgets available. The example (in the picture above) may differ from your configuration.

Following selection, the selected Widget appears on the Panel page and is linked with the analog input: "*Channel_001*".

As long as the Widget is selected, a cross appears in the center (⊕). This can be used to move the Widget or open a context menu there (by right-clicking).

- Deactivate the Design mode (✏️).

Save experiment

Save the experiment:

- Click on the button: "*Save as*" (💾).
- Save the experiment under the name "*First Steps*".

Ribbon	View
Home > Save as (💾)	all
Project > Save as (💾)	Complete

Starting measurement

- To **transfer** the current **settings to the device**, click on the button "*Prepare*" (⬇️).

Ribbon	View
Home > Prepare (⬇️)	Complete
Setup-Control > Prepare (⬇️)	Complete

❗ Note	Preparation of the device

The menu item "*Prepare*" is not present in the "*Standard*" view. That is because it does not need to be performed manually. Instead, preparation of the devices is performed automatically unless it had already been initiated manually.

- Start the measurement (▶️).

Ribbon	View
Home > Start (▶️)	all
Setup-Control > Start (▶️)	Complete
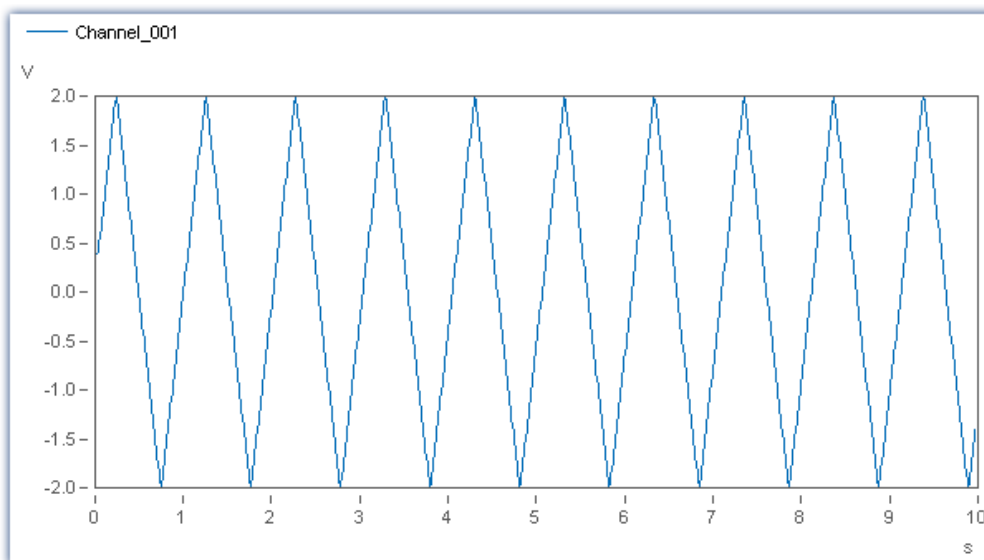
Curve window

After ten seconds, the measurement ends automatically. You can also start measurement multiple times and stop it prematurely using the associated button (🟥).

Ribbon	View
Home > Stop (🟥)	all
Setup-Control > Stop (🟥)	Complete

Using the curve window, you can analyze the data in a wide variety of ways.

Saved measurement data

At the end of measurement, the **measurements** are each saved in a separate subfolder in the **Experiment folder**. The folder is named according to the respective measurement's start-time stamp.

The saved measurement appears in the Data Browser:
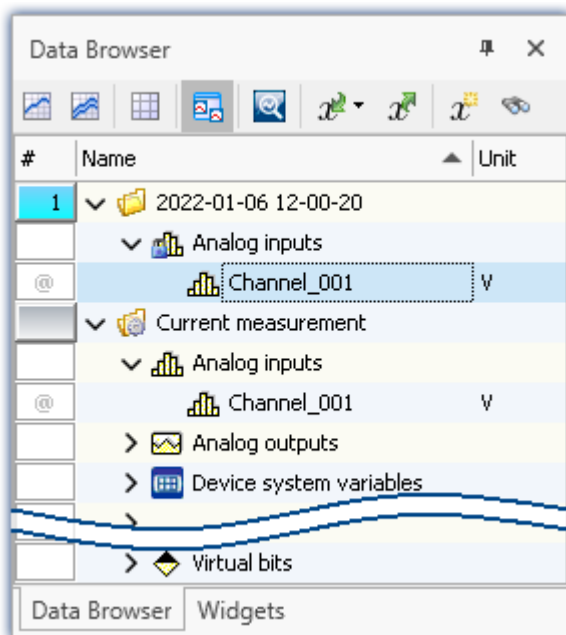
Saved measurement data (example)

- Perform at least **two more measurements** (so that there are at least three measurements).

❗ Note	Permanent data storage

By default, **data saving is activated for all channels**. Activation of data storage ensures that no measured data are lost. Subsequently, it is always possible to delete the measured data once they are no longer required.

It is possible to deactivate saving of the data. The next examples illustrate additional ways to save measured data.

⟷ Reference

More information on **activating the data storage** is provided in the manual in the section:
"*Setup pages - Configuring device*" > "*Configuring channels and variables*" > "*Data transfer*".

5.1.3 Panel - Messungen nacheinander betrachten

The saved measurements also can be displayed on the Panel page. You can link a variable either by its **fixed name** or its **symbolic name** with a Widget.

Fixed name	<VariableName>@<Measurement Name>
	e.g. **Channel_001**
	In this way, the Widget always indicates the current measurement.
	or **Channel_001@2022-01-06 12-00-20**
	in this way, the Widget is always linked with this concrete measurement
Symbolic name	<VariableName>@Measurement#<Measurement number>
	e.g. **Channel_001@Measurement#1**
	Contains the name of the variable followed by a measurement number. The measurement number can be assigned variably with the Data Browser.
	This enables you to **compare measurements**. After measurement, you can select the saved measurement (it is then assigned the the number "1"). Subsequently, **all Widgets** show the variables belonging to the saved measurement.

If you have opened a measurement in the Data Browser, the **"@" Symbol** (@) appears in the **Numbering column**. To link a variable with a Widget **via a measurement number** (symbolic name), **use Drag&Drop** to move the variable **from the "@"-symbol** to the page.
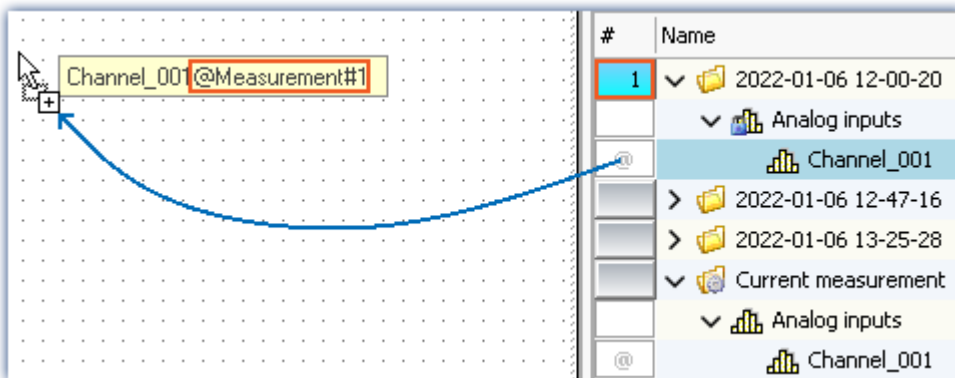
Variable linkage with symbolic name.
Example: "Channel_001@Measurement#1"

To link a variable with a Widget by its **fixed name**, move the variable to the page **from the name column using Drag&Drop**.
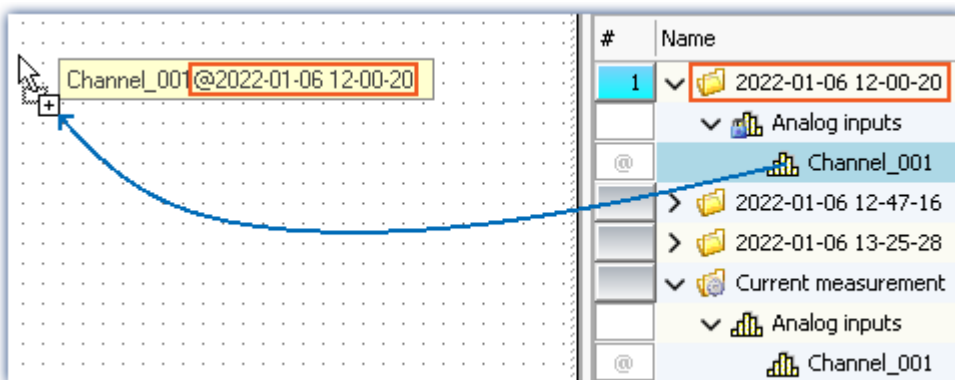
Variable linkage with fixed name.
Example: "Channel_001@2022-01-06 12-00-20"

	Reference	Linkage of variables

More information on linkage of variables is provided in the manual in the section:
"*Panel*" > "*Variable linkage*".

- Create one new curve window for each of the **two ways described**

One of the curve windows is linked with a defined measurement. The other displays the channel belonging to the measurement selected.

- Select a **different measurement**: the measurement is automatically loaded and displayed.

	Note	Always display all data

If you intend for the complete measurement to always be displayed whenever changing measurements, the following settings for the curve window are optimal:

- **Scroll mode**: "*No*"
- **Timeline(x-axis):** "*automatic*"

This causes a similar situation as the "*Stretch*" mode. The difference is that then the complete data set is always shown (the left side also adjusts accordingly.) This mode is suitable for reports when measured data are to be loaded in succession and displayed completely in a curve window.

Attention: In cases of very large data sets, this mode can cause significant performance problems if all data points are displayed.

Save the experiment

You have thus concluded your first experiment. Next, save the experiment again:

- Click on the button: "*Save*" (![save icon]).

5.2 Circular buffer memory for the display

Assignment:

Compare the data which is available during the measurement with the saved measured data.

Learning goals:

- Data flow: from the device to the PC, for display and storage purposes
- the effects of circular buffer memory on the measured data

Prerequisite:

- imc measurement device with an analog channel

Procedure:

Begin by start imc STUDIO.

5.2.1 Background-info: The data stream

Once the measurement starts, the measurement device generates a data stream. The goal in every measurement is to process this data stream and to observe and or save it.
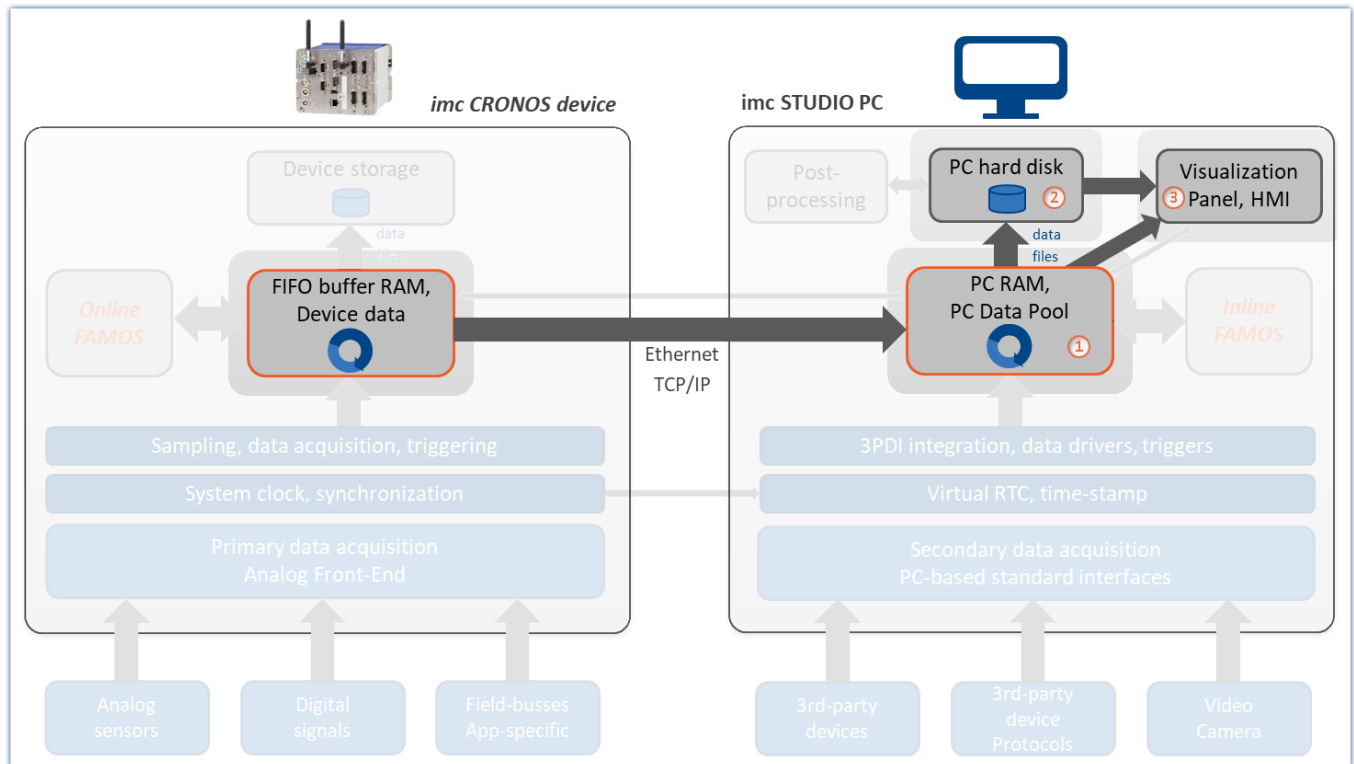
Simplified schematic of the data stream illustrated by the imc CRONOS device

The data stream is first written to FIFO RAM buffer memory in the device.

Once the data have been processed in the device, they can be **transferred to the control PC** ①. The data can be **displayed** on Panel pages ③. Additionally, the measured data which have been transferred can be **saved** on the PC ②.

- By default, the **data for the display** are saved on the PC in a **circular buffer** ①. By using the circular buffer memory, it is possible to temporarily store the data in the higher speed ("rapid access") working memory (RAM). This improves performance and enables continuous data transfer no matter how long the measurement runs.
- For **data storage** purposes, circular buffer memory is not used.

Whether or not data are transferred to the PC and whether they can be saved can be set for each channel separately. By default, data saving on the PC is activated.

5.2.2　Setup - Settings

First, the measurement device is configured.

- Open the **device configuration page**: "*Setup*".
- Go to the **tab**: "*Devices*" ▦ .

Select your device:

- If the device desired **does not appear in the list**, perform a device search (🔍). Subsequently, the list will display all devices found.

Ribbon	View
Home > Search for devices (🔍)	all
Setup-Control > Search for devices (🔍)	Complete

- Click on the Checkbox-symbol (☐) in order **to select the device**.

Selected	Device name ▲	SN	Device specification	Connection status	Measurem...	Device control
☑	T_126678_CS...	126678	imc C Series	disconnected	stopped	Connect ▾

Selecting a device

The device is now known and selected, and is available each time imc STUDIO is started.

Configuring the channels

- Go to the **tab**: "*Analog channels*" ▱▷ .

Under **Channel type**: "*Analog inputs*", select "*Channel_001*". By default, this is set to "*active*". Make settings for "*Channel_001*" in accordance with its input signal. Also ensure that the following settings are applied:

Parameter	Value	Dialog (View: *Standard*)	Dialog (View: *Complete*)
Duration	30 s	Sampling & Filtering	Sampling & Preprocessing
Circular buffer time	10 s	Data transfer	Data transfer
Save data (PC)	Checkbox activated (true)	Data transfer (below "Transfer to PC")	Data transfer (below "Transfer to PC")

- To **apply the changes**, click on the button "*Process configuration*" (✔).

By this means, the device settings are available to other components.

5.2.3　Panel - Settings / Start measurement

Now you can create the Panel page.

- Open the page: "*Panel*".
- Activate the Design mode (🖊)

Create a curve window showing the channel: "*Channel_001*" and start the measurement.

Observe what happens after the first 10 s → The first **data are deleted**. There are always only a maximum of 10 s worth of measured data.

After 30 s, measurement stops automatically and a completed measurement appears in the Data Browser. Also observe "*Channel_001*", which has been saved. It contains all 30 s worth of data.
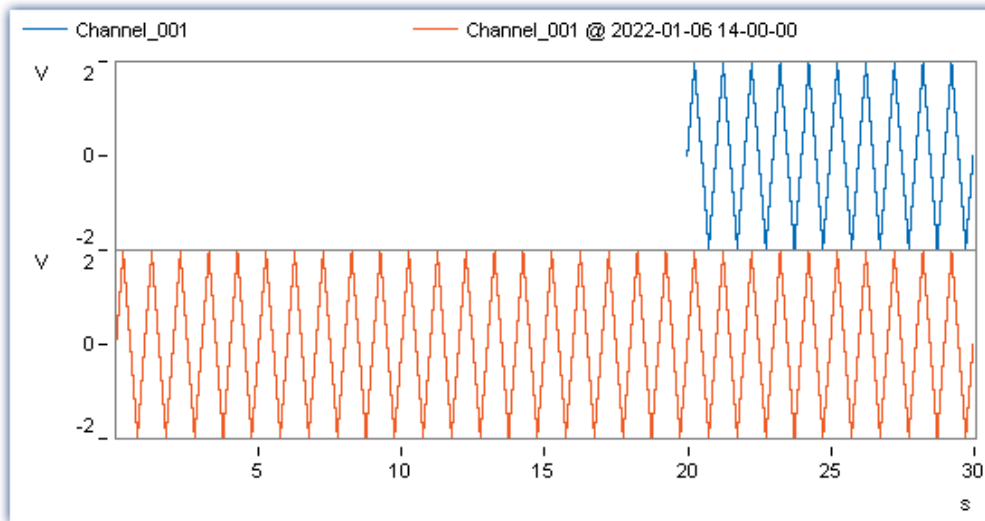
The channel under "Current measurement" contains only the last 10 s of the entire measurement.
*The saved channel contains all 30 s.*

Conclusions

For the purpose of displaying the channel data from indefinitely long measurement runs, use the circular buffer memory. This circular buffer displays the data for a specified duration. Note that many functions directly access the circular buffer; for instance, the imc FAMOS-command (during a measurement), or subsequent data storage in response to the button "*Save current Data* 58 ".

Give careful prior thought to how much circular buffer memory your application will need. If you select a volume which is too large, the performance can be adversely affected, especially when trying to display too much data in a curve window.

If the demands on the PC ever become too great for the data to be processed punctually, data overflow can occur.

Reference	Data overflow

Additional useful notes on the topic of data overflow are provided in the manual in the following sections: "*Setup pages - Configuring device*" > "*Information and tips*"

- "*Avoidance of data overflow*"
- "*Behavior upon data overflow*"

5.3 Subsequent saving of measured data

Assignment:

Perform a measurement without simultaneous data saving, and save the measured data subsequently on the hard drive.

Learning goals:

- Use of subsequent data saving

Elements used:

- Menu action: "*Save current Data*"

Prerequisite:

- imc measurement device with an analog channel

Procedure:

Load the experiment "*First Steps*" from the tutorial "*Simple measurement - First Steps* 47 " or stop the current measurement (🔴) if it is still running.

To load the experiment:

- click on the button: "*Open*" (📁)
- select the experiment "*First Steps*" and confirm by clicking in the dialog on "*Open*"

Save the experiment under a new name: "*First Steps without data saving*"

- To do this, click on the button: "*Save as*" (💾).

5.3.1 Setup - Settings

Deactivate storage of the measured data for the active measurement channel.

- Open the **device configuration page**: "*Setup*".

- Go to the **tab**: "*Analog channels*" .
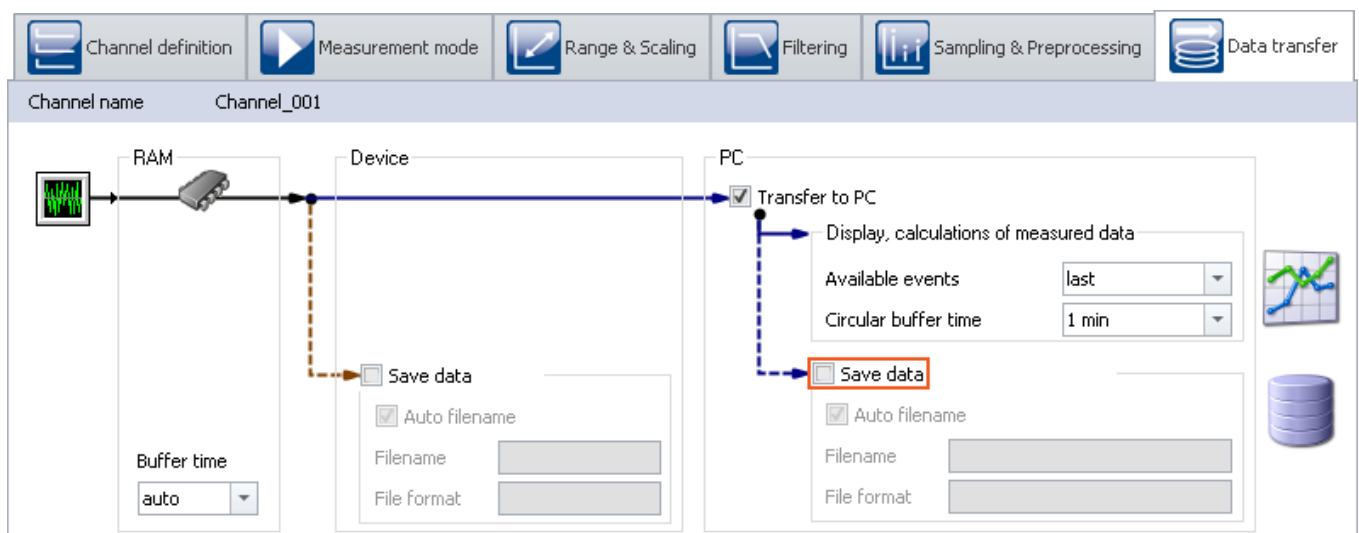
Under **Channel type**: "*Analog inputs*", select "*Channel_001*".

Deactivate storage of the measured data on the PC for the analog input: "*Channel_001*".

Parameter	Value	Dialog (View: *Standard*)	Dialog (View: *Complete*)
Save data (PC)	Checkbox deactivated (false)	Data transfer	Data transfer

---

🛈 **Note**

The option "*Save data*" appears on the "*Data transfer*" page in **two places**. Once where it activates **storage** of the **measured data on the device**, and once for **storage on the PC**.

Deactivating the storage of measured data using the dialogs

🛈 **Note**

By default, **data saving is activated for all channels**.

5.3.2 Panel - Starting measurement

Open the Panel page and perform a measurement.

- To **transfer** the current **settings to the device**, click on the button "*Prepare*" ( ).
- Start the measurement ( ).
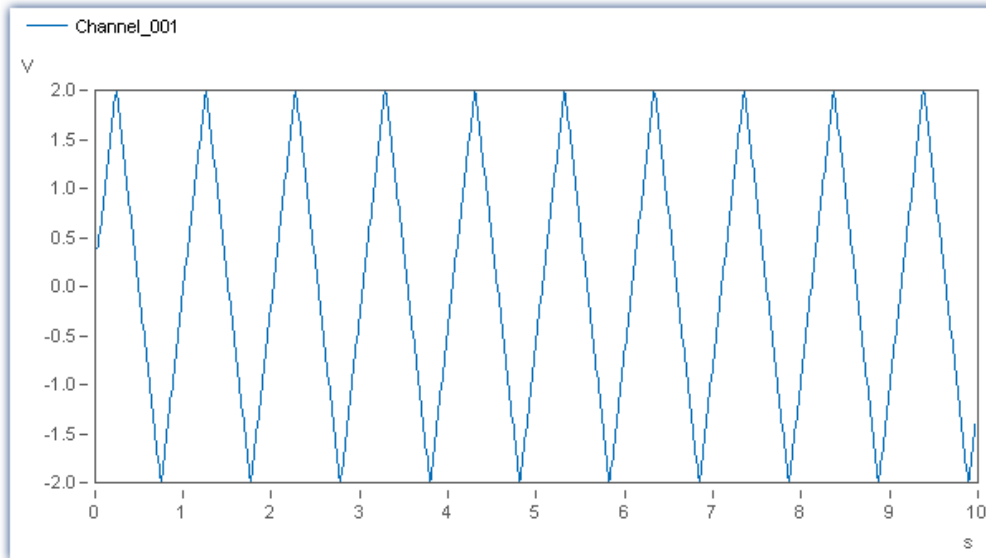
Curve window

After ten seconds, the measurement ends automatically.

5.3.3 Subsequent saving of measured data

In this example, the data were not saved permanently. No data are on the hard drive, but these can be saved retroactively.

- Click on the button: "*Save current Data*".

Ribbon	View
Project > Save current Data ( )	Complete
Home > Save current Data ( )	Standard

- If the action has not been configured otherwise, a dialog appears which prompts you to enter a folder name. The suggested default value is the current time stamp. Close the dialog by selecting "OK".
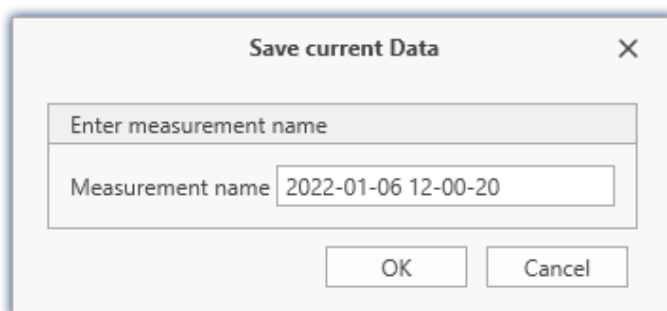
Dialog: Save current Data

Subsequently, all channels (including analog channels, virtual channels, ...) belonging to the experiment are saved to the hard drive. Within the experiment folder, a folder having the specified name is created, in which the data are then stored.

In the Data Browser, a folder corresponding to the folder name appears, which contains the saved measurement data. You can load and view it using the Panel.
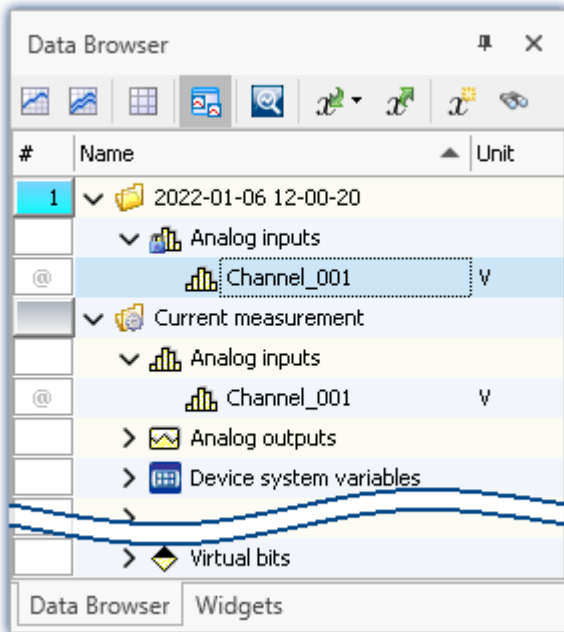
Saved measurement data (example)

> **ⓘ Note**
>
> - The measurement folder created represents a complete measurement. It is treated in the same way as any folder created by means of normal measurement data saving.
> - **No single values can be saved in this way.** These include, for instance, Display variables.
> - The measured data saved by means of "*Save current Data*" are always stored in the experiment folder. If you wish to save them to a freely selectable folder, use the button: "*Export current Data*". Be aware that measured data saved in this way are not recorded in the Data Browser and can thus not appear there.

> **⚠ Warning**   Constraints
>
> Be aware that with this function, only such variables are saved, which are found in the Data Browser under "*Current measurement*". For these variables, a **circular buffer memory** is usually activated, so that not all results since the measurement start are available.
> For device-variables, therefore, the Data Transfer Settings are applicable. The storage type: "*Display, calculation of measured data*" is used.
> See the tutorial: "*Circular buffer memory for the display* 53 "

> **◆ Reference**
>
> More information on the function: "*Save current Data*" is presented in the manual in the section: "*Setup pages - Configuring device*" > "*Storage options and directory structure*" > "*..*" > "*Targeted Data Saving, or Saving Subsequent to Measurement*".

5.4 Simple triggering

Assignment:

Display a measurement on an analog channel. Use a switch on the Panel page in order to interactively start and stop measurement on this channel.

Learning goals:

- Creating an experiment
- Simple device operation
- Use of a trigger

Elements used:

- Trigger

Prerequisite:

- imc measurement device with an analog channel

Procedure:

Begin by starting imc STUDIO.

5.4.1 Setup - Settings

First, the measurement device is configured and an appropriate name is assigned to the variables.

- Open the **device configuration page**: "*Setup*".
- Go to the **tab**: "*Devices*" .

Select your device

Configuring the channels

- Go to the **tab**: "*Analog channels*" .

Under **Channel type**: "*Analog inputs*", select "*Channel_001*". By default, this is set to "*active*".

- In order to set a measurement of unlimited duration, in the **column** "*Sampling & Filtering*", on the **row** "*Duration*" set the **value** "*Undefined*" by means of the pop-down symbol ( ).
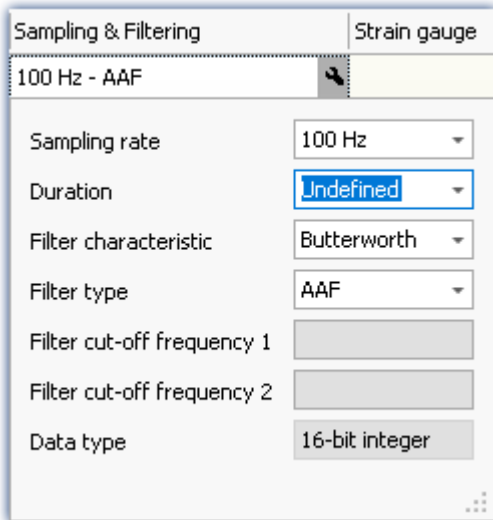
Unlimited measurement duration

- Go to the **tab**: "*Variables*" .
- Under **Channel type**: "*Virtual bits*", click on "*Virt_Bit01*" and **rename** it to "*Switch_position*". If desired, you can enter a comment ("*Measurement to display/stop*").
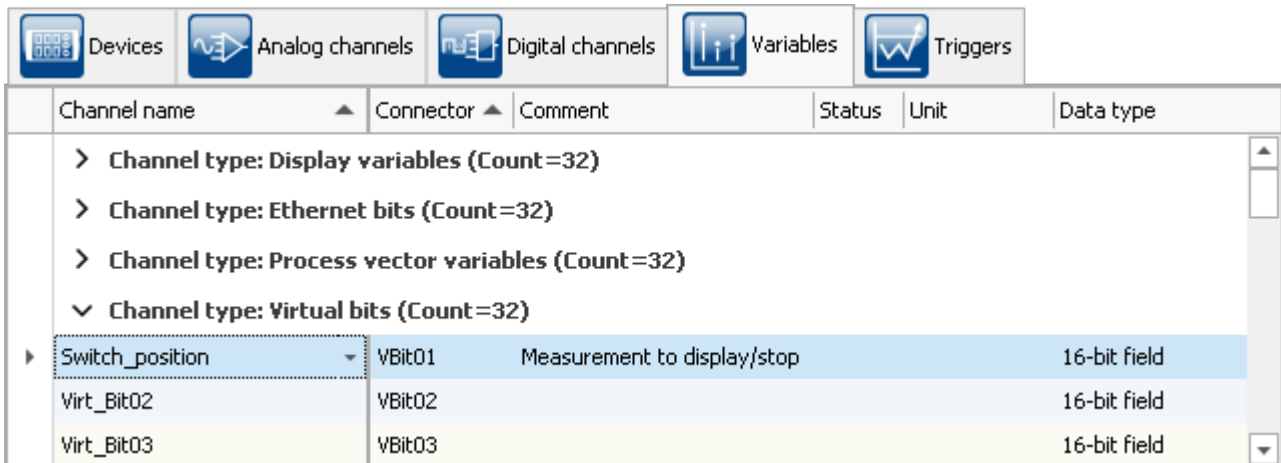
Channel type "Virtual bits"

Defining triggers

- Go to the **tab**: "*Triggers*" .
- To define the **virtual bit** "*Switch_position*" as a source, click in the **column** "*Sources and Events*" on the plus-sign symbol (+).
- Select "*Switch_position*".
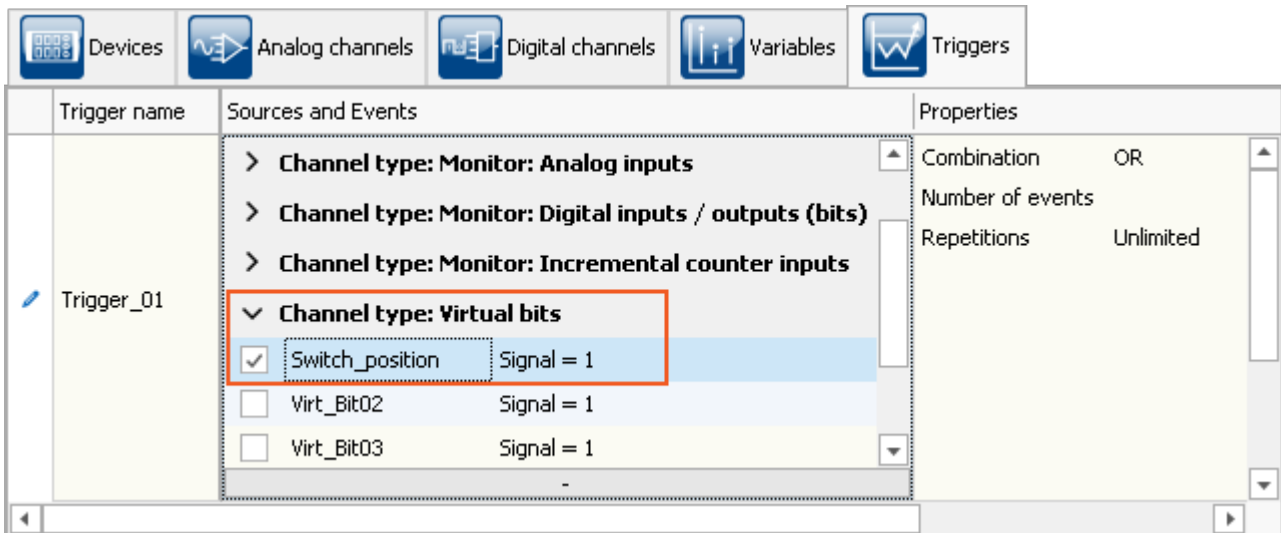
Trigger source

In order to be able to **release the trigger multiple times**, in the column "*Properties*" the "*Repetitions*" is set to "*Unlimited*".

- As the **target**, specify "*Channel_001*"

The measurement is to start when `Switch_position = 1` and stop when `Switch_position = 0`. To accomplish this, set the "*Begin action*" and "*End action*" as shown in the picture below.

Parameter	Value
Trigger begin action	start
Trigger end action	stop
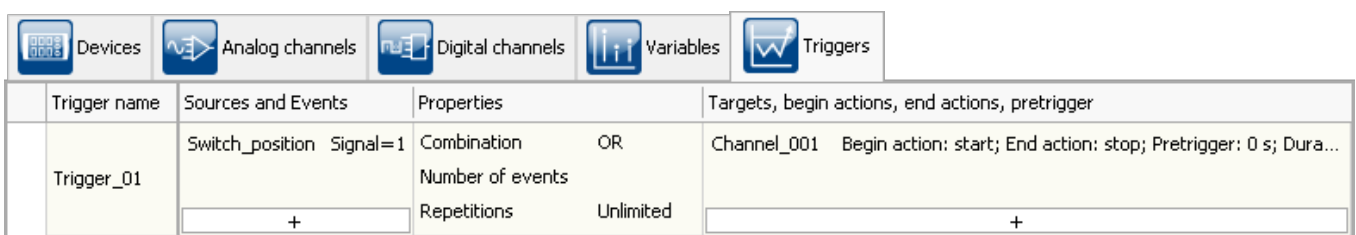
Settings for the trigger

- To **transfer** the current **settings to the device**, click on the button "*Prepare*" ( ).

5.4.2 Panel - Settings / Start measurement

Now you can create the Panel page.

- Open the page: "*Panel*".
- Activate the Design mode (🖊)

Switch

- From the Data Browser, you can now drag the "*Switch_position*" (found under **Channel type**: "*Virtual bits*") to the Panel page.
- After releasing the mouse button (Drag&Drop technique), a context menu appears. From this context menu, select "*Switch*".
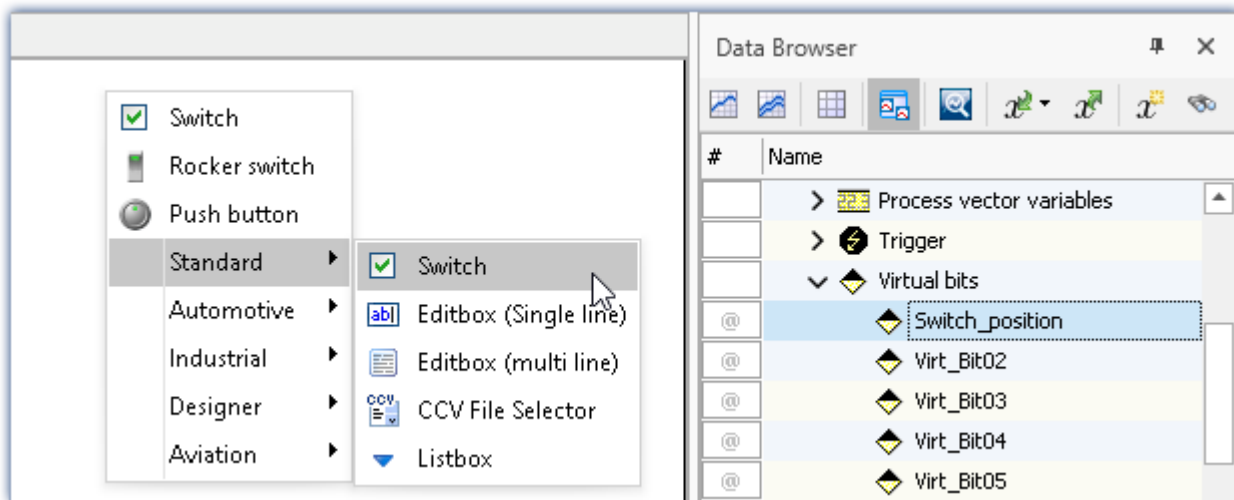
Dragging a virtual bit to the Panel page

A wide variety of Widgets are now available. Please note that the image below is only an example and may not correspond to the Widgets available to you.
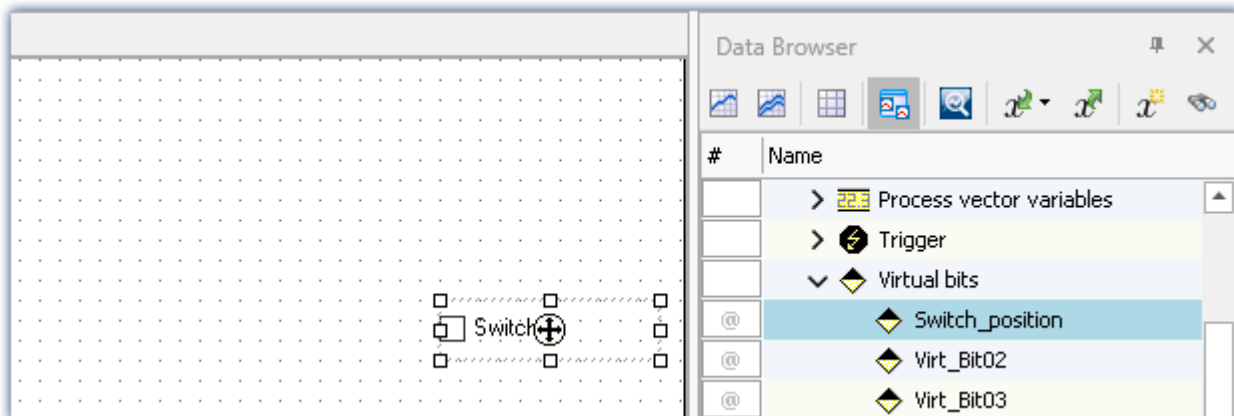
Now the switch on the Panel-page is **linked with** the **virtual bit** in the device named "*Switch_position*". Using the switch, you can interactively switch the virtual bit on and off.

By means of the Widget-property: "*Text*", you can label the switch; e.g. "*Trigger start*". To do this, open the context menu over the crosshairs (⊕) within the selected Widget and select the entry: "*Properties*".

ⓘ Note	Additional Widgets

Depending on the product configuration, additional Widgets are available. Instead of a simple switch, you could select a "*Rocker switch*", for example, under the heading "*Automotive*".

Curve window

After positioning the switch on the Panel page, next create the curve window:

- Drag the **analog channel** "*Channel_001*" from the Data Browser to the Panel page.
- Upon releasing the mouse button, you see a context menu where you will select the entry "*Standard*". This creates a standard curve window.
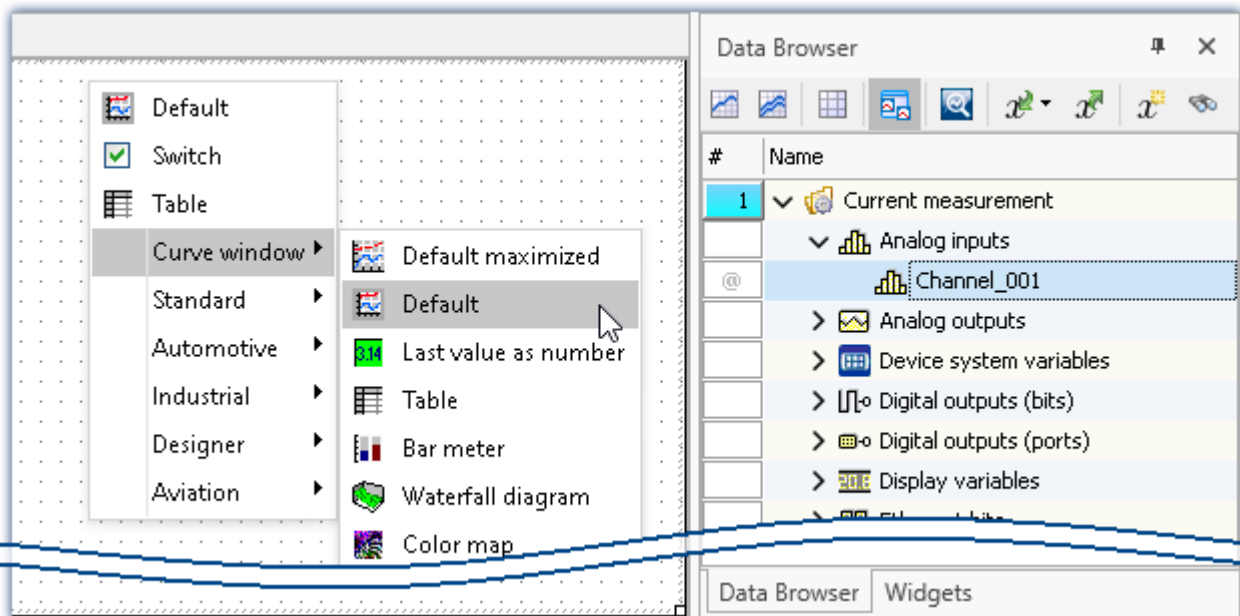
Dragging an analog channel to the Panel page
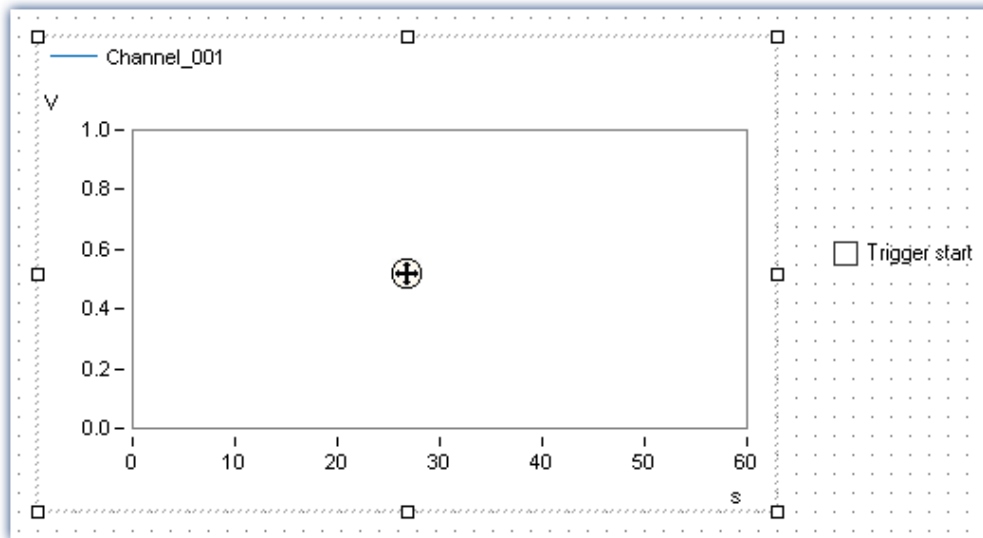
Example: Completed Panel page with two Widgets

As long as the Widget is selected, a cross appears in the center (⊕). This can be used to move the Widget or open a context menu there (by right-clicking).

- Deactivate the Design mode (✏️).

Starting measurement, clicking buttons, stopping

- Start the measurement (▶).

"*Channel_001*" is triggered by the virtual bit "*Switch_position*". This means that when you click on the switch, data capture on "*Channel_001*" starts/stops.

- Click on the switch multiple times.

Save experiment

With this, you have concluded the experiment. Save the experiment:

- Stop the measurement (■).
- Click on the button: "*Save as*" (💾).
- Save the experiment under the name "*Simple Triggering*".

✈	Reference

For an additional display of text on the Panel page to indicate the status of the measurement, please read about the enhancement: "*Einfache Triggerung - Erweiterung* 68 ".

5.5 Simple triggering - Enhanced: Trigger status

Assignment:

A text box on the Panel page displays the **trigger's state**. The states are ("*running*", "*stopped*").

Learning goals:

- Using trigger-variables

Elements used:

- Listboxes, Zones, Trigger variables

Prerequisite:

- This is an enhancement of the experiment: "*Simple Triggering* 62 ", which must already exist.
- The same conditions apply as for the experiment: "*Simple Triggering*"

Procedure:

Begin by starting imc STUDIO.

- Load the experiment "*Simple Triggering*" or stop the current measurement (🟥) if it is still running.
- Save the experiment under a new name: "*Simple Triggering - Enhanced*"
  - To do this, click on the button: "*Save as*" (💾).

5.5.1 Panel - Settings / Start measurement

> **❗ Note**   **Widgets**
>
> The status of the trigger can be displayed using a variety of Widgets. In this example, a simple list is used which is able to display texts. Other Widgets from the advanced groups offer more display options, but these are not available in all Editions.
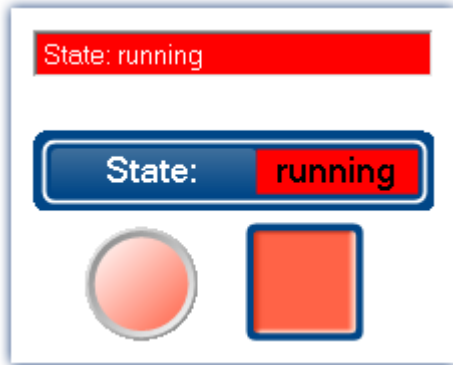
Top Widget from the group: "*Standard*".

Other Widgets, belonging to the groups "*Automotive*", "*Industrial*" and "*Designer*"

- Open the page: "*Panel*".
- Activate the Design mode (✏)
- Drag the Widget: "*Listbox*" to the Panel page:
    - Tool Window: "*Widgets*" - Group: "*Standard*" > "*Listbox*".

The "*Listbox*" is configured in the **Widget-properties**. To do this, open the context menu over the crosshairs (⊕) within the selected Widget and select the item: "*Properties*".

- Under the **property**: "*Variable*", select the trigger's status-variable: "*Trigger*" > "*Trigger_01*" > "*State*".

> **❗ Note**   **Trigger status indication**
>
> This provides an indirect linkage between the switch and the selection box. When the switch is actuated, the trigger releases. Once the trigger releases, the selection box indicates the operative status.
>
> Conversely, the Widget also provides an indication when the trigger release failed. As a simple example, this can happen if the measurement had not previously been started.

Setting up and adapting states (zones)

The states displayed are to be adapted. For this purpose, some of the Widgets have the property: "*Zones*".

- Click on the symbol ⬚ as shown in the following picture:
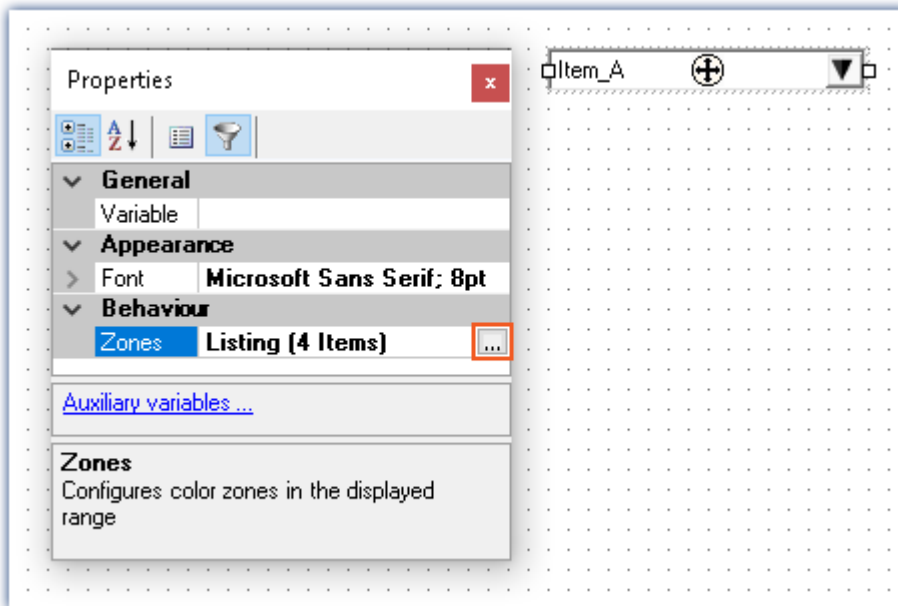
States (zones) defined for the selection box

In the dialog window, it is now possible to define the zones. The measurement has two possible states: "*stopped*" and "*running*".

- Only two zones are required; begin by deleting all but two zones
- Enter the zones as shown in the following picture:
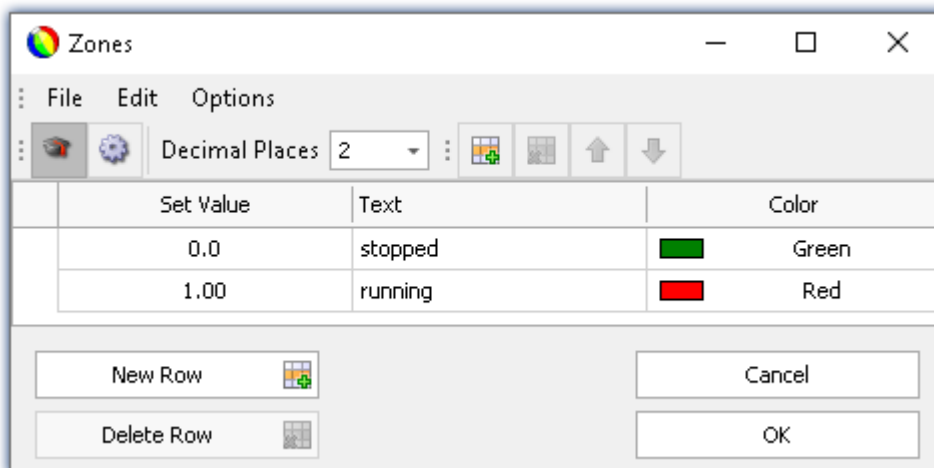
Zones

- Deactivate the Design mode (✏️).
- Start the measurement (▶).
- then click on the switch on the Panel page

The listbox changes (running, stopped) in response to the switch position:

Optional settings:
Button: "*Hide*"
Foreground color: "*White*"

Saving

With that, you have completed this example and can save it. Since the experiment has already been saved under a new name, it is sufficient to save the changes.

- Stop the measurement (⬛).
- Click on the button: "*Save*" (💾).

> ❗ Note   Possible enhancements and additional exercises

- Indicate the count of previous trigger-releases. For this purpose, use the trigger-variable: "*Trigger*" > "*Trigger_01*" > "*EventNumber*".
- Indicate whether the measurement is running. For this purpose, use the device system variable: "*System*" > "*Experiment*" > "*Measurement status*".

5.6 Triggered measurement

Assignment:

The analog channel is to measure for 5 ms if the input signal exceeds the threshold 3 V. Apply a signal at the measurement device's analog input, with adjustable amplitude, e.g. by means of a function generator.

Learning goals:

- Use of a trigger
- Setting a channel according to the expected input signal

Elements used:

- Trigger event
- Monitor channel (this element can only be used with a device belonging to the firmware-group imc DEVICES).

Prerequisite:

- imc measurement device with an analog channel
- A function generator or other signal source

Procedure:

Setting a function generator: Set up a sine function with a frequency of 1 kHz and initial amplitude of 2 V, for example.

Next, start imc STUDIO.

5.6.1 Setup - Settings

To begin, the measurement device is configured.

- Open the **device configuration page**: "*Setup*".

- Go to the **tab**: "*Devices*" .

Select your device

Configuring the channels

- Go to the **tab**: "*Analog channels*" .

Under **Channel type**: "*Analog inputs*", select "*Channel_001*". Make the following settings for the channel's parameter configuration:

Parameter	Value
Status	Active
Mode	Voltage
Coupling	DC
Input range	± 5 V
Sampling rate	100 kHz
Duration	5 ms

Under **Channel type**: "*Monitor: Analog inputs*", select "*Mon_Chan_001*". Make the following settings for the channel's parameter configuration:

Parameter	Value
Status	Active
Sampling rate	10 kHz
Duration	Undefined

> **Note**
>
> - The monitor channel's sampling rate can only be set to a value less than the analog input's sampling rate.
> - The monitor channel can only be used with devices belonging to the firmware-group imc DEVICEcore.

Defining triggers

- Go to the **tab**: "*Triggers*" .

In the column "*Sources and Events*" set "*Channel_001*" as the source, with the following event:

Parameter	Value
Event type	Threshold
Event	Signal > Threshold
Event threshold	3 V

In the column "*Properties*" set the following:

Parameter	Value
Combination	Or
Repetitions	1

In the column "*Targets, begin actions, end actions, pretrigger*" set "*Channel_001*" as well as a target, since it is to be used as a triggered event and measurement channel.

Parameter	Value
Begin action	start
End action	-
Pretrigger	0 s

Settings for the trigger

Prepare

- To **transfer** the current **settings to the device**, click on the button "*Prepare*" ( ).

5.6.2 Panel - Settings / Start measurement

Now you can create the Panel page.

- Open the page: "*Panel*".
- Activate the Design mode ( )

Create a curve window containing "*Channel_001*":

- From the Data Browser drag the variable: "*Analog inputs*" > "*Channel_001*" to the Panel page.
- In the Widget selection list, select: "*Curve window*" > "*Standard*".

Curve window properties

More Channels

In a curve window it is possible to display more than one channel.

- Right-click the mouse over the curve window (not over the cross ( ) in the center).
- In the context menu which then appears, select "*Configuration*" and subsequently the command "*More Channels*"

A dialog appears, in which you can **select additional channels** which are then displayed in the same curve window.

All data sets available for selection are displayed in the list at right: "*Available Channels*". The **data sets already displayed** in the curve window are indicated in the list at left: "*Axes List*".

- Drag "*Mon_Chan_001*" from "*Available Channels*" to the box "*Axes List*".
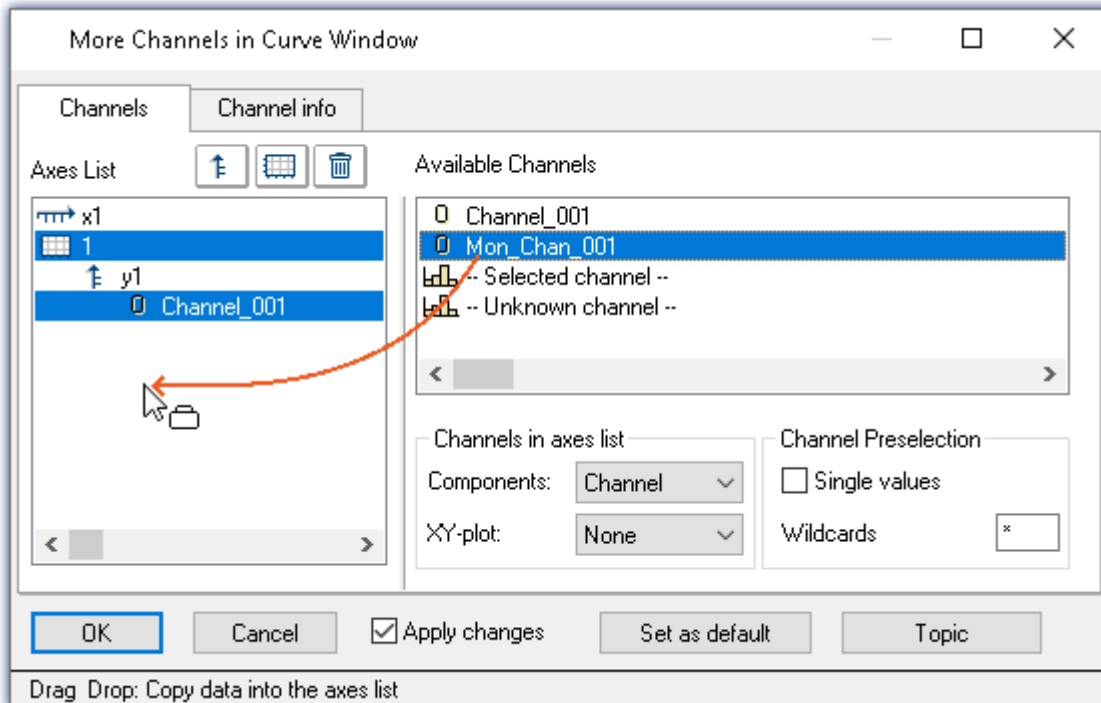
Channels for the curve window

- In order to display the two channels on different Y-axes, click on the coordinate-system symbol (⊞).
- Next, select the channel "*Mon_Chan_001*". This now contains a single coordinate system.
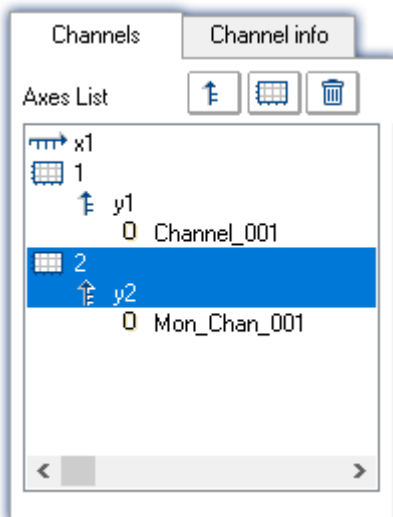
To apply the settings, click on the button "*OK*".

Saving

With that, you have completed this example and can save it:

- Save (💾) the experiment under the name "*Triggered measurement*".

Starting measurement, observing results

- Deactivate the Design mode (✏️).
- At the input: "*Channel_001*", for example, apply a sinusoidal signal with an amplitude of < 3 V an
- Start the measurement (▶️).
- after a while, change the amplitude to a value > 3 V.

As soon as the amplitude exceeds 3 V, "*Channel_001*" is recorded for 5 ms duration. "*Mon_Chan_001*" records the data already upon the measurement's start.

- Stop the measurement (⏹️).

Evaluating measured data

Observe the **complete measurement**. To do this, perform a rezoom in the curve window (context menu item: "*Edit*" > "*Rezoom*").

Notice that both channels start at the time point "0 s".

Adjusting the axes

The two channels have differing Trigger-times, but by default they are both displayed in the curve window stacked one above the other at x = 0. Thus in this example, each channel begins at x = 0, even if the triggered channel: "*Channel_001*" is started later.

In order that the two channels' **time coordinates to be synchronized**, the scale of the x-axis must be adjusted.

- Right-click he mouse over the curve window (not over the cross (✛) in the center).
- In the context menu which then appears, select "*Configuration*" and subsequently the command "*Axes*"

A dialog appears in which you can adapt the curve window's axes.

- In order to see the x-axis' settings, select the axis "*x1*" from the list at left: "Axes *List*".

Then make the following setting:

Parameter	Value
Scale	Date/time: absolute
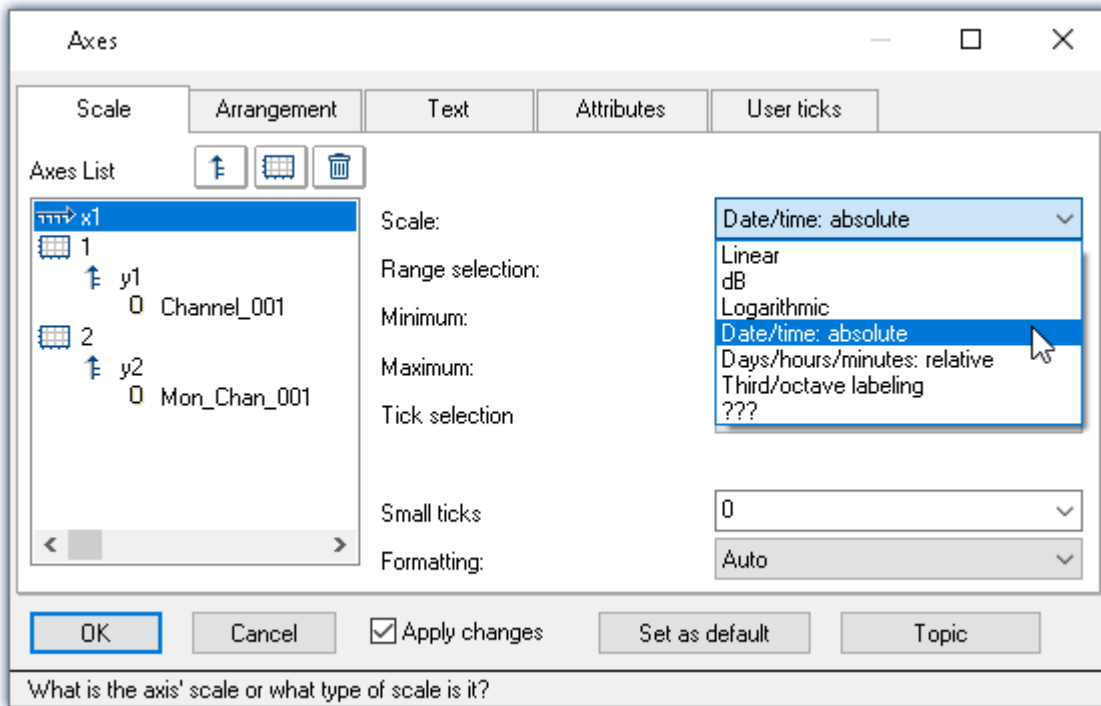
Setting the axis for the curve window

To apply the settings, click on the button "*OK*".

Now the two **channels are displayed in parallel with correct reference to time**. To investigate the data, you need to zoom in on the correct location in the curve window.

- Use the context menu item "*Edit*" > "*Zoom*"
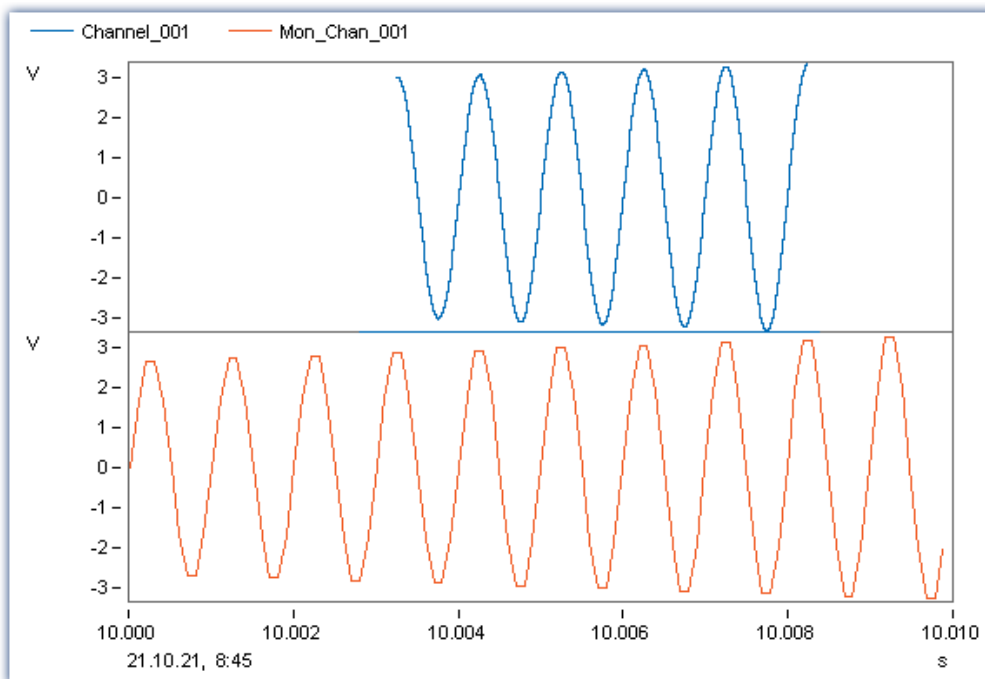
Measurement of the channel's signal only starts once the trigger event occurs

Save the experiment

Save the experiment again:

- Click on the button: "*Save*" (💾).

5.7 Thermocouple measurement

Assignment:

A temperature is to be measured by thermocouple.

Learning goals:

- Advanced channel settings

Element used:

- Sensor & scaling
- Pre-processing of data

Prerequisite:

- imc measurement device with an amplifier for temperature measurement
- Type K Thermocouple
- An appropriate connector with which to connect the thermocouple with the imc measurement device

Procedure:

Connect the thermocouple to "*Channel_001*" of the imc measurement device.

Next, start imc STUDIO.

5.7.1 Setup - Settings

To begin, the measurement device is configured.

- Open the **device configuration page**: "*Setup*".
- Go to the **tab**: "*Devices*" ⊞.

Select your device

Configuring the channels

- Go to the **tab**: "*Analog channels*" .

Under **Channel type**: "*Analog inputs*", select "*Channel_001*". Make the following settings for the channel's parameter configuration:

Parameter	Value	Dialog (View: *Standard*)	Dialog (View: *Complete*)
Name	Thermocouple	Channel definition	Channel definition
Status	Aktive	Channel definition	Channel definition
Mode	Voltage	Measurement mode	Measurement mode
Coupling	DC	Measurement mode	Measurement mode
Correction	Type K	Measurement mode	Measurement mode
Input range	-270..500 °C	Measurement mode Range & Scaling	Measurement mode Range & Scaling
Filter type	AAF	Sampling & Filtering	Filtering
Sampling rate	1 kHz	Sampling & Filtering	Sampling & Preprocessing
Duration	Undefined	Sampling & Filtering	Sampling & Preprocessing
Function	Arith. Mean	-	Sampling & Preprocessing
Points	50	-	Sampling & Preprocessing

By means of the **correction** , the **input range** and the **unit** are automatically adapted.

The **arithmetic mean** of 50 sampled points produces a **resulting sampling rate** of 20 Hz, since groups of 50 points each are summarized by one point.

Prepare

- To **transfer** the current **settings to the device**, click on the button "*Prepare*" ( ).

5.7.2 Panel - Settings / Start measurement

Now you can create the Panel page.

- Open the page: "*Panel*".
- Activate the Design mode ( )

Create a curve window containing *Thermocouple*:

- From the tool window: **Data Browser**, drag the variable: *Analog inputs > Thermocouple* to the Panel page.
- In the Widget selection list: **Standard** (curve window).

Curve window properties

Adjusting axes

Adapt the axis settings:

- Right-click the mouse over the curve window (not over the cross (⊕) in the center).
- In the context menu then appears, select **Configuration** and subsequently the command **Axes...**

A dialog appears in which you can adapt the curve window's axes.

- In order to see the y-axis settings, select the axis *y1* from the list at left (**Axes List**).

Now make these settings:

Parameter	Value
Scale	Linear
Range selection	Fixed range: min, max
Minimum [°C]	0
Maximum [°C]	40
Tick selection	Ticks at fixed distances
Tick distance [°C]	5
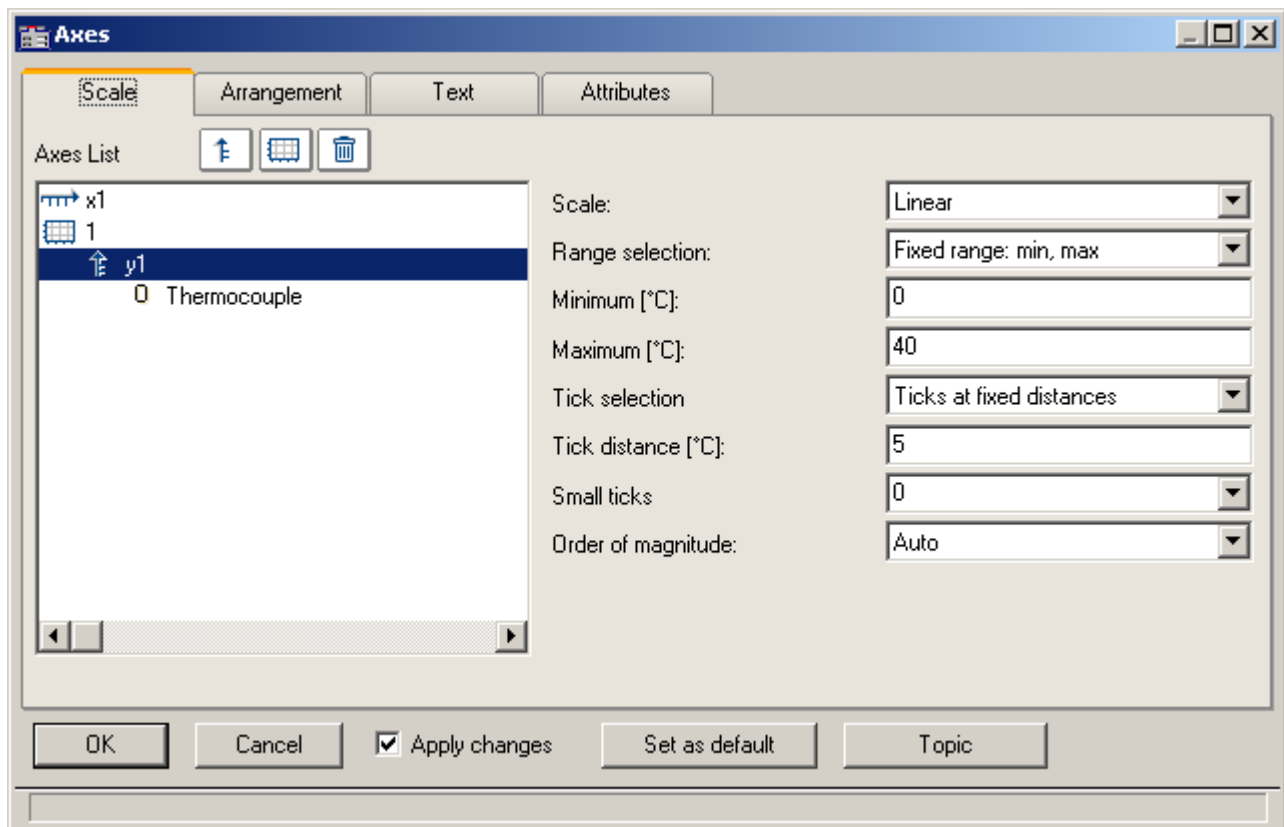
Settings for the y-axes

In order to apply the settings, click on the button "*OK*".

- Display a grid by means of the curve window's context menu item **Configuration > Grid**.
- Insert a **text box** with the text: *Measurement Thermocouple* and adjust the font size and the Widget-size.
- Deactivate the Design mode (✎).

Starting measurement, observing results

- Start the measurement (▶).

The following picture illustrates one possible display of the course of the temperature signal.
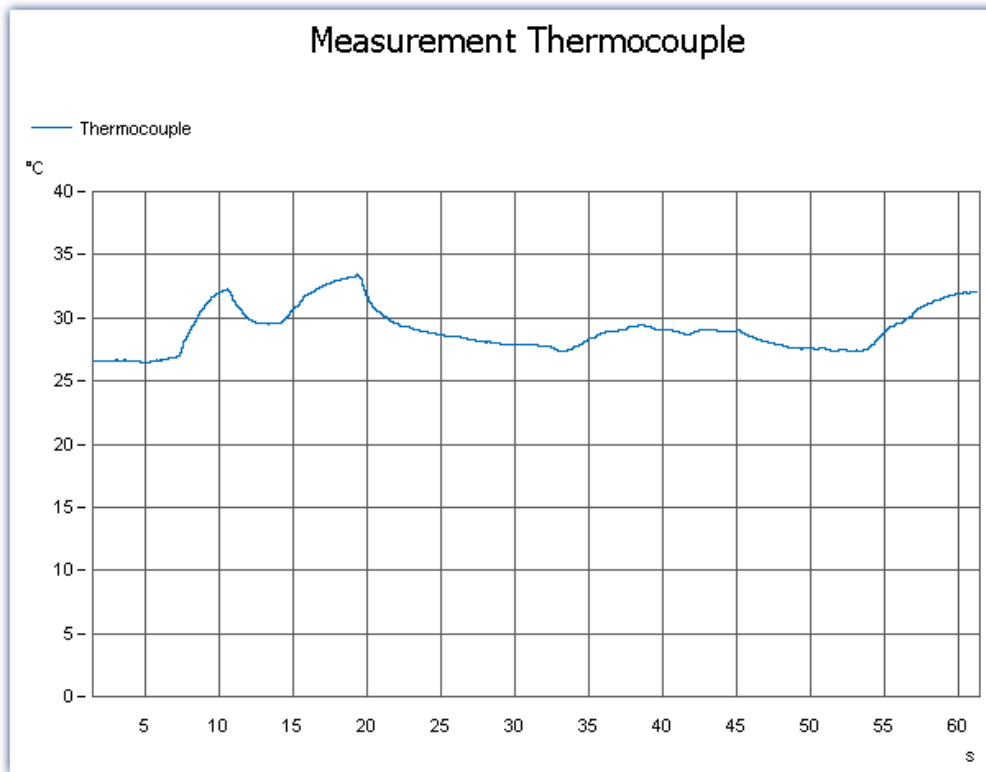
Curve window with plot of temperature

Saving

With that, you have completed this example and can save it:

- Stop the measurement (■).
- Save (💾) the experiment under the name "*Thermocouple measurement*".

5.8 Artificial sine - signal generation using imc Online FAMOS

Assignment:

Generate an artificial sinewave imc Online FAMOS and display it on the Panel page. The frequency and amplitude are to be adjustable by Widgets.

Learning goals:

- Use of imc Online FAMOS
- Exercising control via the Panel

Element used:

- Connection with a device
- Channel settings
- imc Online FAMOS

Prerequisite:

- imc measurement device with an analog channel

Procedure:

Begin by start imc STUDIO.

5.8.1 Setup - Settings

First, the measurement device is configured and the variables used are assigned an appropriate name.

- Open the **device configuration page**: "*Setup*".
- Go to the **tab**: "*Devices*" .

Select your device

Configuring the channels

- Go to the **tab**: "*Analog channels*" .

Under **Channel type**: "*Analog inputs*", select "*Channel_001*". Make the following settings for the channel's parameter configuration:

Parameter	Value
Name	Clock
Status	Active
Mode	Voltage
Coupling	DC
Input range	± 5 V
Sampling rate	1 kHz
Duration	Undefined

- Go to the **tab**: "*Variables*" .
- Under the **Channel type**: "*Display variables*", rename the following variables:
  - *DisplayVar_01 > Amplitude*
  - *DisplayVar_02 > Frequency*

imc Online FAMOS

- Open imc Online FAMOS ( )

Ribbon	View
Start > Online FAMOS ( )	all
Setup-Configuration > Online FAMOS ( )	Complete

- Enter the following source code in the imc Online FAMOS Editor:

```
t = integral(Clock * 0 + 1)
Oscillation = Amplitude * Sin(6.283185 * Frequency * t)
```
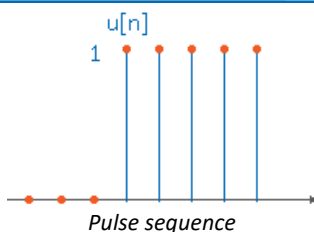
❗ Note	Explanation
Pulse sequence	The expression `Clock * 0 + 1` generates the sequence of unit pulses `u[n]` after the measurement starts. Since the channel's sampling frequency is 1 kHz, the pulse sequence consists of 1000 values per second. By integrating the unity pulses, one obtains a straight line with slope 1. The time "t" thus increases linearly.

The general shape of the sine: `x(t)=A*sin(u*t)` with `u=2*Pi*f=6.283185*f`.

Here it is to be noted that the signal is also discrete and has 1000 values per second. In order to change the resolution, you simply need to change the channel's sampling frequency.

The virtual channels you defined, "*t*" and "*Oscillation*" are generated automatically by this assignment.

- Select the Syntax Check ( ) and exit imc Online FAMOS.

Prepare

- To **transfer** the current **settings to the device**, click on the button "*Prepare*" (⬇).

5.8.2 Panel - Settings / Start measurement

Now you can create the Panel page.

- Open the page: "*Panel*".
- Activate the Design mode (✏)

In the tool window: Data Browser you should find the **virtual channel** "*Oscillation*" created in imc Online FAMOS.
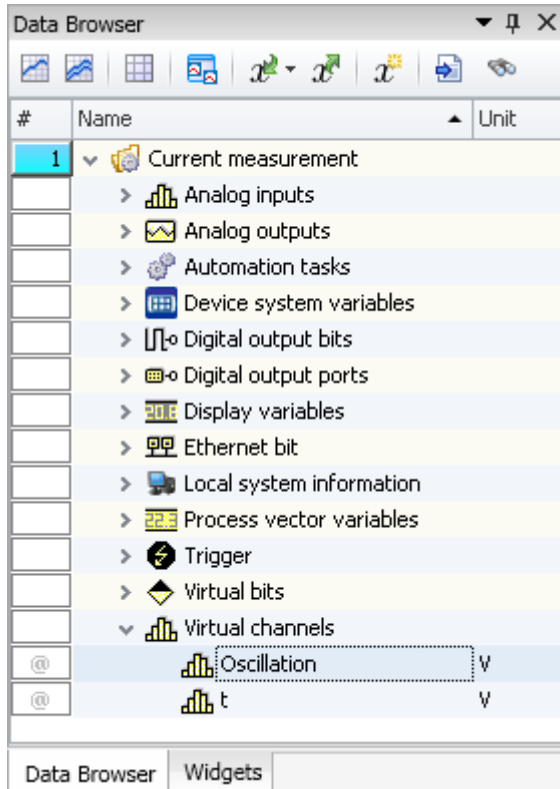
- From the tool window: **Data Browser** drag the variable: *Virtual channels > Oscillation* to the Panel page.
- In the Widget-selection list, select: **Standard** (curve window).

In order to change the values of variables *Frequency* and *Amplitude*, these are displayed on the Panel page with suitable Widgets.
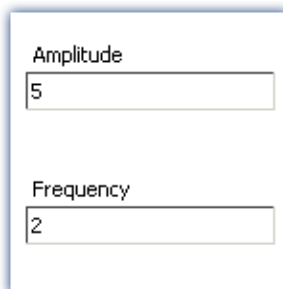
- Drag the variable: *Display variables > Amplitude* to the Panel page.
- In the Widget selection list, select: group **Standard** > **Editor box (Single line)**.
- Drag the Widget: "**Label**" to the Panel page:
  - Tool Window: *Widgets* - Group: *Standard > Report > Label*.

To adapt the **Text**, open the label's Properties.

- In the box **Text**, enter "*Amplitude*".

Display the variable *Frequency* in the same way.

Start measurement, observe results

- Deactivate the Design mode (✎).
- Start the measurement (▶).
- change the *Amplitude* and the *Frequency* and observe how the curve window changes:
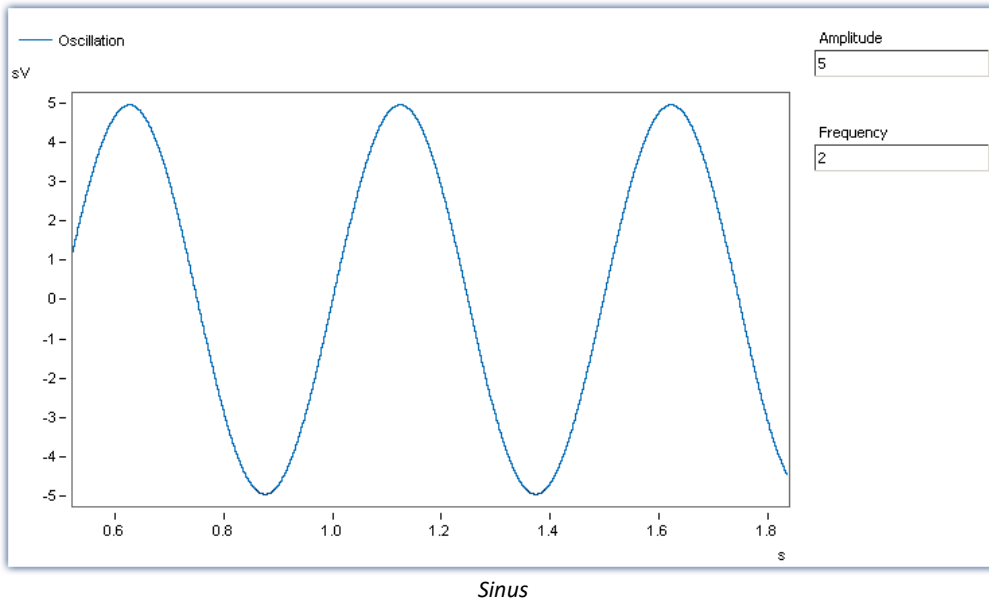
Sinus

Saving

With that, you have completed this example and can save it:

- Stop the measurement (■).
- Save (💾) the experiment under the name "*Artificial Sine*".

6 Experiments, projects and the database

This chapter describes the interdependencies among the "*database*", "*projects*", "*experiment templates*" and "*experiments*".

Experiment

The experiment includes a record of all settings needed for generating the measurement data as well as viewing and evaluating them. The actual measured data are saved with the "experiment" to which they belong.

You can create a variety of experiments to accomplish a corresponding variety of measurement tasks. imc STUDIO always works with exactly one experiment and all changes are saved to it.

Among others, the following settings are saved:

- the experiment file (filename extension: "*.imcStudio"),
- measurement files and metadata,
- various backup files and administration files

Among other things, the experiment file contains all the settings configured in the main windows and in the Setup-Assistants.

Each experiment has a unique name which is set when it is saved 90.

Measurement data

By default, the measured data are saved in the Experiment folder. They belong to the experiment. You specify the data structure in the Device-settings under "*Storage*" (Setup page: "*Devices*" > "*Storage*").

Project

A project is primarily a collection of various experiments. The factory settings of imc STUDIO are configured in such a way that only one project is present and that you are aware of it to the minimum extent possible.

All of your experiments are saved in this project ("*StandardProject*").

Some options and configurations are not saved along with the experiment. For instance, they might be saved along with the project and apply to all experiments belonging to the project. In some cases, you can define what has to be saved where. E.g. when generating variables, you can change the validity scope and, for instance, save it not just for that experiment but for all experiments in the project.

Whatever is saved at the Project level (and thus not with the specific experiment) is correspondingly denoted at the locations affected. A project can include:

- one or more experiments
- one or more experiment templates 90
- project settings (e.g. views, user administration and project-events)

After the first start of imc STUDIO, a standard project is set up in which your experiments are saved.

Project view - working with multiple projects

When you activate "*Project view*", there is a project-based tree diagram in the Open- and Save-dialogs 89. Here, you can create additional projects and load experiments from other projects.

ⓘ Note	Creating a project resets variables
When you create a new project, the status of the experiment currently open is saved temporarily and reloaded later after the new project has been set up. In consequence, the values of the variables are reset to the condition they would have if the experiment were re-loaded.	
In the process, the event "*Experiment_Loaded*" is not triggered. If you need this to happen for your experiment, please re-load it manually. If you save your experiment with the new project ("*Save As*"), something similar happens. Here, too, the variables are reset, but additionally the event "*Experiment_Loaded*" is triggered.	

You can activate the "*Project view*" in the options (under "*Project Management*" > "*General options*"):

Ribbon	View
Extra > Options (⚙)	All

Option	Description
Project view activated	To create more projects, you must activate the **Project view**. This option is deactivated by default. (Information on Projects 85). There is an extended view available of some dialogs 88. Multiple projects can be created and used. ⓘ Only activate the **Project view** if you wish to use and manage multiple experiments in separate projects. If this function is deactivated, some dialogs are displayed in **simplified form** (e.g. "*Save experiment*" and "*Open experiment*" are **missing Project selection**, for instance).

Database

The database is the data repository for imc STUDIO. Here, the projects and their associated experiments are saved. The database does not have its own settings and configurations.

The folder path for the **database can be freely selected** (in the Options under: "*Project Management*" > "*HDD Settings*").

Ribbon	View
Extra > Options (⚙)	All

Option	Description
Database folder	Here you set where the "**Database**" is to be saved. (Information on "*Data management*") ⓘ The database is not user-dependent. Note that every user who is set up in the system has writing and reading rights for this path.

Database conversion

If the database structure has been changed, you are subsequently notified. One way this can happen is as a result of updating to a new version.

A **conversion-dialog** appears. You can convert the database or have it copied beforehand. After the conversion, the entire **database can no longer be used with the older version**.

In the upper region, the reason why the database does not fit with the current version is noted. E.g., the database may be too new or too old. In the list below, all databases found in the folder selected are listed. The "Status"-bar contains information on the database.

The following approaches are available:

Approach	Description
Select an existing database	Select the appropriate database and click on the button "*Apply*".
	If it is necessary to **convert the database**, an additional dialog appears. Here, the user is prompted to decide whether to **use the database under a new name**. If you choose:
	• **no:** the existing database is converted. It can no longer be used with the older version.
	• **yes** (*recommended*)**:** the database is copied. Enter a name for the new database. Now you have two databases. You will have a backup copy and can continue to use the old database with the old version.
Create a new database	Click on "*Create new*". Enter an appropriate name for the database. It will be created in the folder selected (parallel to any already existing databases).
Change the database's folder	Click on the button "..." next to where the folder is indicated. Select an appropriate folder.
	Here, select a folder where the database folder is to be created later. Not the database itself. E.g. the default folder: "*C:\Users\Public\Documents*". The database will be created in this folder, e.g. "*DB*".

Experiment Template

See: ""

Creating one's own files on an experiment - in the folder "Meta"

You can **create your own files on the experiment**, such as metadata, imc FAMOS-sequences, info-files. To do this, use the **folder: "*Meta*"** in the experiment path. If you save or export the experiment under a different name, all files from the folder "*Meta*" come along with it.

The folder "*Meta*" is now ignored in all components.

- The content is not recognized as a measurement although containing measured data. This means that there is no entry in the Data Browser.
- Interval saving does not delete the folder. When the number of intervals is limited, the folders of measured data are deleted in succession once the specified count has been reached. The folder "*Meta*" is ignored, even when the folder contains measured data.

6.1 Dialogs: Project and Experiment

The Project Management dialogs are described below:

- with "**Project view**" and
- with "**Experiment templates**".

By default, these options are deactivated, in consequence of which not all functions are available. Options-dependent functions are mentioned explicitly below.

The dialogs following the functions "**Manage Project**", "**New Experiment**", "**Save As**" and "**Open**" are structured similarly. The dialog is described below on the basis of "*Project Management*" as an example. Not all dialogs feature the complete scope of functionality.
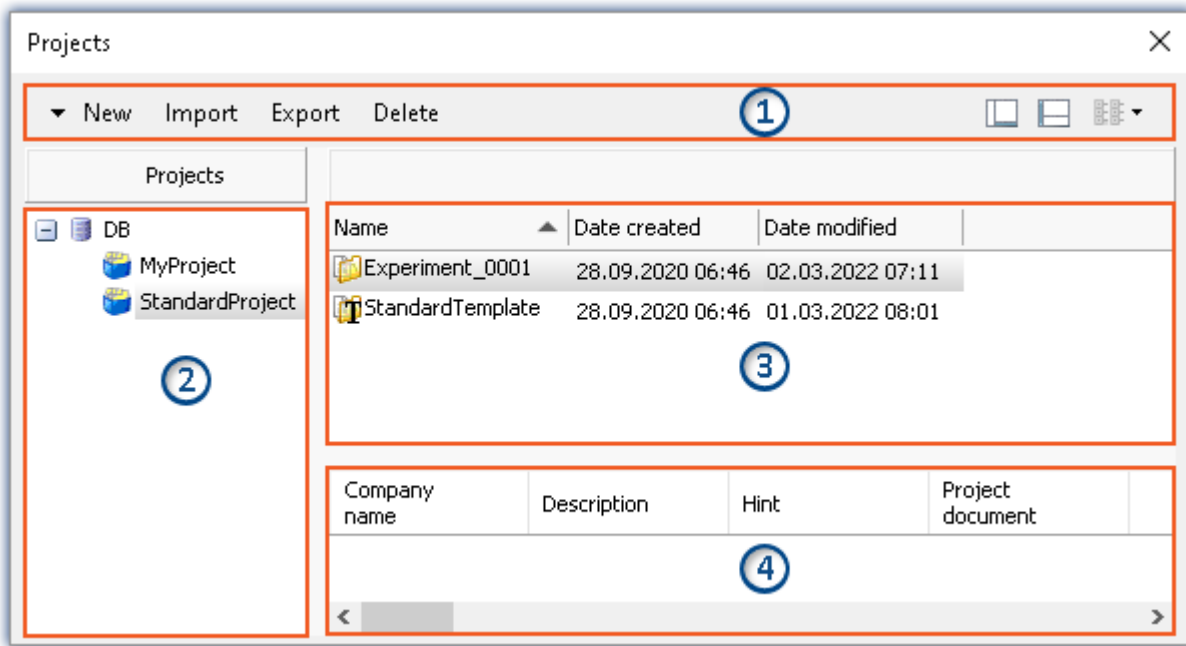
Example: Manage project

The dialog is subdivided into four regions (from top to bottom):

1. Menu bar
2. List of all projects
3. List of all experiments and experiment templates in the selected project
4. Linked metadata information belonging to the selected experiment

By default, the regions 1 and 3 are displayed; the others can be activated if desired.

Region 1: Menu bar

Function	Description
New	**Create new project:** Creates a new project in the selected database (a database must be selected). **Create new experiment template:** Creates a new experiment template ⌐90⌐ (a project must be selected).

Function	Description
Import	Imports elements (projects, experiments and or experiment templates) from a file in the selected entry.
	The file can contain multiple elements. You can select either all or individual elements for import. Additionally, the target name can be changed.
	Be sure to first select the target correctly. You can only import a project if the database is selected. You can only import experiments and experiment templates if a project is selected.
	You can only import projects if the Project view is activated.
Export	Exports the selected entries to a file.
	Whole projects and individual/multiple experiments and experiment templates can be exported to a file.
	ⓘ Manually created folders are not included with the export. The exception is a folder in the experiment path named: "*Meta* ⁡87⌐".
Delete	Deletes the selected entries.
	Complete projects and individual experiments/experiment templates can be deleted. If you select delete an experiment with saved measurement data, a prompt appears for confirmation that you wish to delete the data.
⊟/⊟	Show/Hide Region 2 (list of all projects)
⊟/⊡	Show/Hide Region 4 (metadata information)

Regions 2 and 3: List of all projects / experiments / experiment templates

In these two regions, the projects/the experiment and experiment templates are listed. When you select a project, all elements of the project selected are displayed in the region at right.

Region 2 is only displayed if the project view is activated and the region is shown (via the menu button: ⊟).

Region 2 only shows the experiment templates if these are activated.

Region 4: Linked metadata information

The metadata saved with the selected experiment are displayed in this region. When an experiment is saved, the metadata can be saved automatically along with it. In the Options "*Metadata*" > "*Experiment - Metadata*" > "*Setup page*", you can select which source to use for the metadata.

Only shown if the region is shown (via the menu button: ⊟).

6.2 Creating/Saving/Copying an experiment

Each experiment has an identifying name which is specified when it is created/saved. Each name may be used only once per project.

When you create an experiment (ribbon menu item: "*Home*" or "*Project*" > "*New*"), or when you save an experiment under a new name, you are asked for a name. In this case, enter a unique name.

If the "Project view" is activated, you can additionally select the **target project**.

Action	Description
New Experiment	When you create a **new experiment**, it is generated from an experiment template (see "*Experiment template* 90 "). • If experiment templates are displayed 90 , select an experiment template. • If they are not displayed, the **preferred experiment template** 91 is used automatically (at default: "***StandardTemplate***"). All changes since the last save are discarded if a new experiment is created.
Save experiment as	When you save an experiment under a new name, a new experiment having the current settings is created. • Measurement data from the existing experiment are not transferred along to the new experiment (exception: if the experiment was previously never saved; in that case a prompt appears to ask whether to include these measured data). • Files from the folder "Meta" 87 are copied and are available in the new experiment.
Copying an experiment to a different project	You can copy experiments to a different project by means either of Drag&Drop or of the context menu. This means that all files located in the Experiment-folder are included: Measured data, saved measurement settings, parameter set files or user-made folders of metadata.

6.3 Experiment templates

When you create a new experiment, it is generated from an experiment template. The new experiment contains all properties of the selected template. In templates, all settings which are saved will be saved also in an experiment.

After the first installation or after creating a new project, the project contains an "empty" experiment template.

Making experiment templates visible

You can activate the "*Experiment templates*" in the options (under "*Project Management*" > "*General options*"):

Ribbon	View
Extra > Options (⚙)	All

Option	Description
Show experiment template	In order to be able to use experiment templates, you must previously make the **experiment templates visible**. This option is deactivated by default. (Information on Experiment templates [85])
	An extended view of certain dialogs [88] is available. Experiment templates can be created and used.
	⚠ Only activate this function if you wish to create multiple similar experiments.
	If this function is deactivated, some dialogs are displayed in **simplified form** (e.g. "*New experiment*" and "*Edit project*" appear **without experiment template selection**).

Creating experiment templates

Ensure that experiment templates are visible. You can generate experiment templates from a variety of sources:

Source	Description
From present settings	The configuration currently set is used for the template. (see also "*Save as template* [92]")
From existing experiment	Select an experiment from which to generate the template.
From default settings	An empty template is created.

- Click on the button: "*Manage Projects*"

Menu ribbon	View
Project > Manage Project (✏)	Complete

- Select the project (if the projects are not displayed, click on the white background, in order to avoid selecting an experiment)
- In the dialog, click on the menu item: "*New*" > "*Add experiment template*"
- Select a source

The experiment template is created from the source and and is available when creating an experiment [90].

Preferred experiment template

You can **mark** an experiment template **as preferred** (template context menu > "*Set as preferred experiment template*"). If the experiment templates are no longer displayed, the new preferred experiment template is automatically used when a new experiment is created.

7 Ribbon

7.1 Project menu

The "*Project*" menu is available in every plug-in.

Some of the dialogs offer an extended view. By default, the dialogs are displayed without "**project view**" and "**experiment templates**".

Project

Menu item	Description
Manage Projects 88	Managing projects and experiment templates
Save Project	Saves the current project

Experiment

Menu item	Description
New 90	Creates a new experiment
Open	Opens an existing experiment
Save	Saves the current experiment
Save as 90	Saves the current experiment under a new name. Additionally, the experiment is reset. The variables are assigned the respective initial value (e.g. device variables = "0", or user-defined variables are assigned the respective initial value specified). The event "*Experiment_Loaded*" is triggered.
Save as template	When you click on the button, a new template 90 is generated which the system then uses automatically (keyword "*Preferred experiment template* 91 "). (from the edition "imc STUDIO Professional")

Im-/Export

Menu item	Description
Import / Export	In this dialog you can import and export various components.

Current Measurement

Menu item	Description
Save current Data	In addition to the optional automatic data saving, you can also perform targeted saving of the data currently in the PC (Current measurement) either during or subsequent to the measurement.
Export current Data	See also Setup pages - Configuring device: "*Storage options and directory structure*" > "*Controlling Data Storage*" > "*Targeted Data Saving, or Saving Subsequent to Measurement*"

> **❗ Note**   **Without imc STUDIO Project Management**
>
> In the product configuration, the component "**imc STUDIO Project Management**" can be deactivated. This is always the case in imc STUDIO Monitor, for example.
>
> If "**imc STUDIO Project Management**" is deactivated, a number of limitations apply.
>
> Among others, there is no longer any database. The dialogs for saving and opening experiments match the standardized "Save As"- or "Open"-dialogs. Experiments can be saved at any desired location. The saved measurement data are stored in the designated experiment folder.
>
> The functions of the Project Management are listed in the Technical Spec Sheet.
>
> The description of the Project- and Experiment-dialogs n the following pages pertain to imc STUDIO with activated Project Management.

Changes in the menu without imc STUDIO Project Management:

Project - without Project Management

Menu item	Description
Save Project	Saves the current project. In this case, all "Project"-settings are saved as "Application"-settings and apply for all experiments.

Experiment - without Project Management

Menu item	Description
New experiment	Creates a new experiment. The storage location is first determined by means of "*Save experiment/Save experiment as*".
	The device currently selected remains selected. However, the device's configuration will be reset.
Open experiment	Opens an existing experiment. The experiment can be be saved anywhere in the file system.
Save experiment	Saves the current experiment at the storage location previously set using "*Save experiment as*"; if no storage location had been determined yet, "*Save experiment as*" is run automatically.
Save experiment as	Saves the current experiment under an arbitrary name at any location in the file system

8 Navigation pane and Quick access toolbar

Navigations pane

In the **Navigation pane**, the main windows of the installed plug-ins are displayed as a tree diagram. To open/change the main window, click on its corresponding entry.

The Navigation pane can be opened or closed, maximized and minimized.

- To **maximize/minimize** the Navigation pane, click in its top bar on the arrow symbol.
- To **open/close** the Navigation pane, click on the upper region of it below the arrow.

If the Navigation pane is maximized or opened, the main windows are additionally displayed as a tree diagram (see example shown).

Via the tree diagram, it is possible to jump to different main windows or directly to the pages containing the main windows.

You can hide the Navigation pane.

If you hide the Navigation pane, please note that your ability to navigate between the main windows. For this case, you should add the command: "*Browse workspace*" at suitable locations, for instance in the ribbon menu ("*User-defined buttons*").

To show or hide the Navigation pane use the dialog: "*Tool windows chooser* 96 ".

Maximized Navigation Pane (example)

Quick access toolbar

The "Quick access toolbar" can be supplemented with various menu items. Which actions are available for this purpose doesn't depend on what tab is currently displayed in the menu ribbon.

Using the context menu, you can either add or remove menu actions.

- Adding: context menu of the menu item in the menu ribbon (note: the menu ribbon may not be minimized)
- Removing: context menu of the menu item in the toolbar

You may place the toolbar either above or below the menu ribbon.

> **ⓘ Note**   **Saving the configuration**
>
> The **configuration of the "Quick access toolbar"** is saved with the respective **view**.
> The configuration **is only saved** whenever the **project is saved**.

9 Tool windows

Tool windows contain special elements for operating/viewing a main window. (For information on operating the tool window: "*Operation* |95⌐")

| Logbook | Data Browser | Widgets | Page templates | Properties |
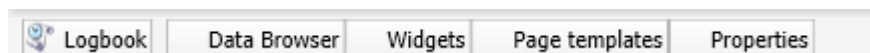
Five tool windows
- The imc STUDIO frame's log book
- Four additional windows from the main window imc STUDIO Panel

One tool window belongs to the imc STUDIO frame and is always available:

- **Logbook** |97⌐

The *Logbook* is always displayed and can be minimized. The other main windows' tool windows (e.g. for the Panel) are displayed as soon as the respective main window is opened.

❗ Note	Not all tool windows are visible

By default, all necessary tool windows are displayed. All others can be displayed |95⌐, if you need them.

9.1 Operation

Tool windows contain special elements for operating and editing a main window.

Details	▾ ⇥
Connection status	disconnected
Device control	Connect ▾
Device is selected …	☑
Device name	T_121582_PL2_UNI8
Device SN	121582
Device specification	imc Cronos PL
Measurement status	stopped

| Details | Dependency Tree | Column Finder |
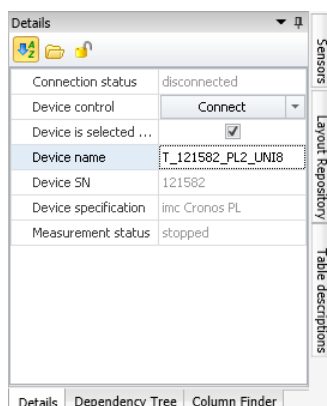
Tool window (example)

Each main window has its own tool window, which is described in the documentation of the respective component. Tool windows can be moved and deleted.

By default, the tool windows are pinned to the main window (e.g. at the bottom or right margin).

The picture shows an opened tool window ("**Details**"). It is pinned and contains two additional tabs. If you click on one of these tabs, the corresponding tool window opens ("**Dependency Tree**" and "**Column Finder**").

Three other collapsed tool windows are seen at the right margin ("**Sensors**", "**Layout Repository**" and "**Table descriptions**").

A tool window is opened when the mouse is swiped over it.

As long as a tool window is selected, or if the mouse is located over the tool window, the tool window remains open. Otherwise, it collapses to the side.

Showing/hiding the tool window

You can either show or hide tool windows. To do this, open the dialog: "*Tool Window Chooser*".

Ribbon	View
View > Choose Tool Windows (⬚)	Complete
Extra > Choose Tool Windows (⬚)	Standard
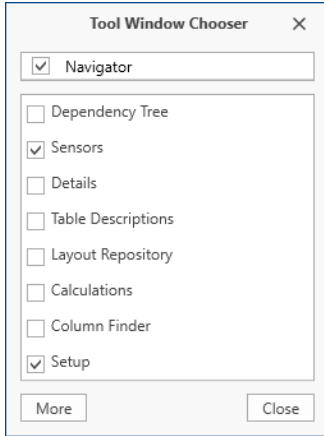
The dialog: "*Tool Window Chooser*" opens.

Set a checkmark in front of the tool windows which you wish to have displayed.

Selecting "*More*" provides you with comprehensive layouting capabilities for the view. You are able to place any tool window belonging to other components on the current page. For instance, you can display the Data Browser in the window of the Automation. Or you can show the Panel in the Setup.

Dialog: Tool windows chooser

Other actions

Action	Description
Pinning the tool window	Tool windows can be pinned. Pinned tool windows remain open even when no longer selected. In order to pin a tool window, click on the thumbtack-button (📌).
Freely positioning the tool window	In order to freely position the pinned tool window, move the tool window's title bar using drag&drop to the desired position.
Docking the tool window	In order to dock the tool window, use the drag&drop technique by grabbing the tool window's by its title bar and moving it to the desired position. A Dock-symbol will appear at the locations which are possible. In the center of the targeted window (main window or tool window), a cross appears. To dock the tool window, release the mouse button with the mouse over the desired position. Dock at the top/bottom margin Dock at the left/right margin Insert as a tab in a different window (see example)

9.2 Logbook

In the tool window "**Logbook**", messages of the categories: "*Fatal*" (⛔), "*Error*" (🛑), "*Warning*" (⚠️) and "*Information*" (ℹ️) are entered. The logbook entries indicate what problems and errors exist and provide hints on where to find them and how to remedy them. Some actions performed are documented.

E.g., a note is entered in the logbook for every command performed:

- performed successfully ("*Information*") or
- otherwise "*Error*" or "*Warning*"

By default, the Logbook is opened when an entry any of the categories "*Fatal*", "*Error*" or "*Warning*" occurs. By default "*Information*" category notes are entered into the logbook without any further effect.
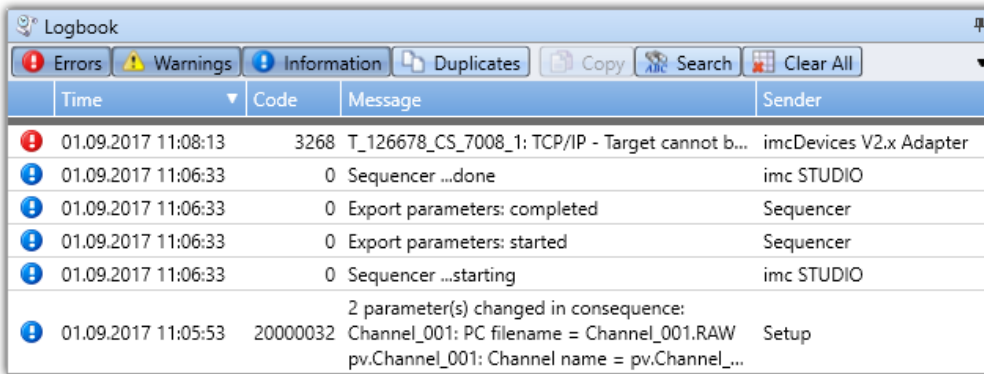
Example of logbook entries

Each logbook entry consists of:

Parameter	Description
Symbol for the category	*Fatal* (⛔), *Error* (🛑), *Warning* (⚠️) and *Information* (ℹ️)
Time	Time the logbook entry occurred
Code	Logbook entry's error code
Message	Exact description of the logbook entry
Sender	The origin of the logbook entry

After a new imc STUDIO start, the logbook is empty. The logbook itself only displays messages which occurred since the last start. Older messages can be opened with the "*Logbook-Viewer*".

10 Views

The program's GUI is adaptable, so that for example the windows and columns can be positioned and displayed according to the user's desires. **The layout of the GUI is** saved in so-called "*Views*". It is possible to create separate views for various requirements.

The following settings are saved along with a view:

Region	Description
Window arrangement	The imc STUDIO window's and the tool window's **position and size**
Menus	Layout of the **menu ribbon** and the **Quick access toolbar** 94
Layout	- The last main window opened - The tool window's layout (e.g. what metadata columns are displayed in the Data Browser) - The arrangement and configuration of the Setup pages (e.g. arrangement of columns, such as metadata columns)

> ❗ **Note**   Views and projects

The relationship between saving the view and saving the project

The views are saved with their respective project. When a view is saved, it is necessary for the project to be saved. The system will notify the user accordingly.

Conversely, when a project is saved, the view is not automatically saved. Views are only saved whenever the action "*Save View (as)*" is intentionally selected. In order to avoid every little change to a view being saved whenever the project settings are saved, the views are ignored when specifically the project is saved.

Settings which apply globally to all views are saved with the Project

Please note that only the positions of individual elements is saved along with the views. The existence and configuration, for instance, of the Setup-columns (tables- and column descriptions) is saved along with the respective project. (see also "*What is saved where?*")

Since the project is always saved whenever the view is saved, the current configuration of the columns is also included when saving.

Overview of settings saved with the project, which affect the views

- Setup table descriptions and column descriptions (these include, for example, additional columns, such as metadata-columns, parameter set columns, ...) (tool window: Table Descriptions)
- saved Setup complete layouts (tool window: Layout Repository)

> ❗ **Note**   Detecting changes to a view

If any major changes (columns added, menu changed, etc.) are made, the system explicitly recognizes this as a change to the view. When you exit the project by switching to a different project or by closing imc STUDIO, you are prompted to select whether to save the changes.

Minor changes, such as changed size of tool windows, are ignored.

Saving views

In order to save the current view, select the menu item "*Save View (as)*":

Ribbon	View
View > Save View / Save View as (/)	Complete
Extra > Save View / Save View as (/)	Standard

All settings belonging to the current view are saved. These include the items named above.

> **❗ Note**   **The views are saved with the project**
>
> The views are saved with their respective project. When a view is saved, it is necessary for the project to be saved. The system will notify the user accordingly.

Loading views

In order to load a saved view, select the menu item "*View*" in the drop-down list of the respective view. Here, all views available to the project are displayed.

After the selection the view is loaded.

The record of an experiment includes the view in which the experiment was saved. When the experiment is loaded, the view also loads automatically.

Deleting views

To delete a saved view, select the menu item "*Delete View*".

Ribbon	View
View > Delete View ( )	Complete
Extra > Delete View ( )	Standard

In the dialog which then opens, select the view to delete from the drop-down list. Confirm your selection by clicking on "*Save project*".

Restoring views

Views are not write-protected. They can be restored to their original state. The factory settings come with a copy of all views created as part of the program installation.

To restore a view from the factory settings, select the menu item "*Restore*".

Ribbon	View
View > Restore ( )	Complete
Extra > Restore ( )	Standard

In the dialog which then opens, select the desired views. They are imported from the factory settings. Conform your selection by clicking on "*OK*".

10.1 Exporting/importing views

When you export the view settings, a variety of project settings are stored in the export file.

Settings	Description
Saved views 98	• table descriptions and column descriptions (these include, for example, additional columns, such as "metadata columns", "parameter set columns", ...) (tool window: "*Table Descriptions*") • saved complete layouts (tool window: "*Layout Repository*")
Sensors	• user-defined characteristic curves/sensors (tool window: "*Sensors*")

Export of views, metadata columns, sensors, ...

By means of the menu item "*Import/Export*", you can export the view settings:

Ribbon	View
Project > Import/Export ( )	Complete
Extra > Import/Export ( )	Standard

- Choose option "*Export*" and then the list item "**Export views, meta data columns, sensors, ...**"
- Choose an appropriate file name and path for the view settings file

> **❗ Note**   **Save the view beforehand**
>
> Save the view beforehand if you have made any changes (see "*Views* 99 ").

Import of views, metadata columns, ...

Using the menu item "*Import/Export*", you can **import the view settings to the current project**:

Ribbon	View
Project > Import/Export ( )	Complete
Extra > Import/Export ( )	Standard

- Choose option "*Import*" and then the list item "**Import views, meta data columns, ...**"
- In the file selection dialog, selected the saved view settings file

Thereafter you will see a dialog allowing you to import either all or individual view settings.
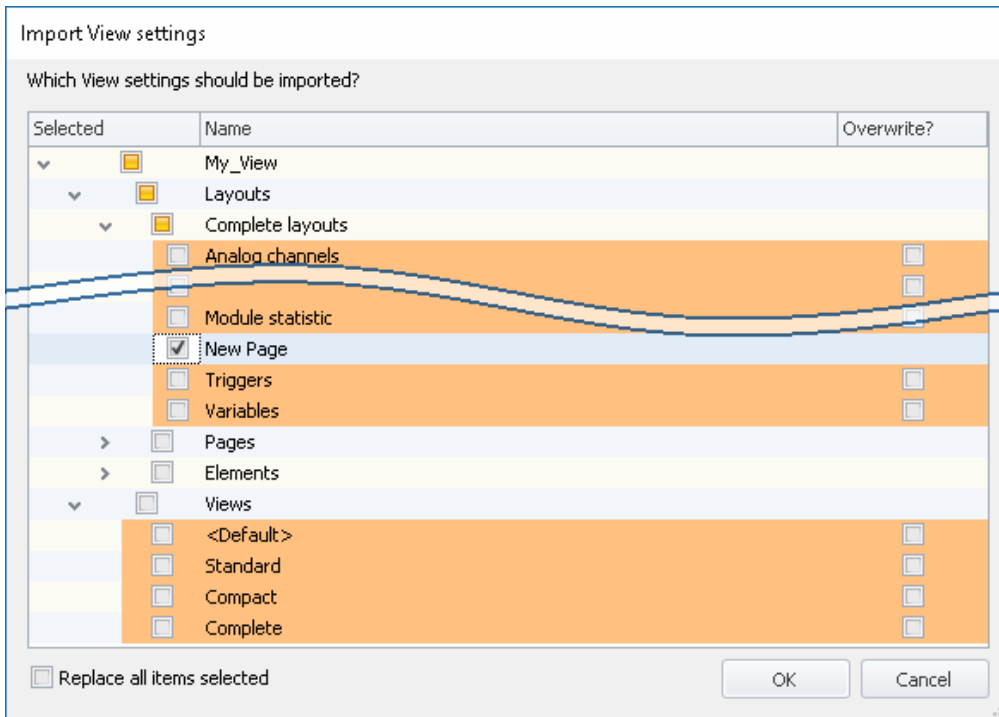
Entries having **colored shading already exist** in the current project. In this example, the complete layout "*New Page*" is not yet present there.

Checkbox	Description
Selected (left)	Check this box if you wish to **import the element**.
Overwrite? (right)	Check this box if the element in the project is to be **overwritten without any confirmation prompt**. If the box is not check-marked, a prompt appears to inquire the name for the element to be imported. (Unless "*Replace all items selected*" is check-marked.)
Replace all items selected	Corresponds to "*Overwrite?*" for all entries: Check this box if you want to **replace all elements without any confirmation prompt**.

You can select the following elements:

Element	Description
Layouts	All these elements belong to the Setup pages. Saved pages and saved designs, which can be displayed on the pages. For more information on the complete layouts, see the chapter: "*Table Description and Complete Layout*".
Views	Her you find the imc STUDIO-views. The views [98] apply for all components of imc STUDIO.

❗ Note	**New functions can be overwritten**

Be aware that when making replacements, new functions may be lost if you import old views/columns.

Importing defined additional columns

An additional prompt appears if

- discrepancies between existing **Setup columns** were detected or
- the file contains **additional columns**.
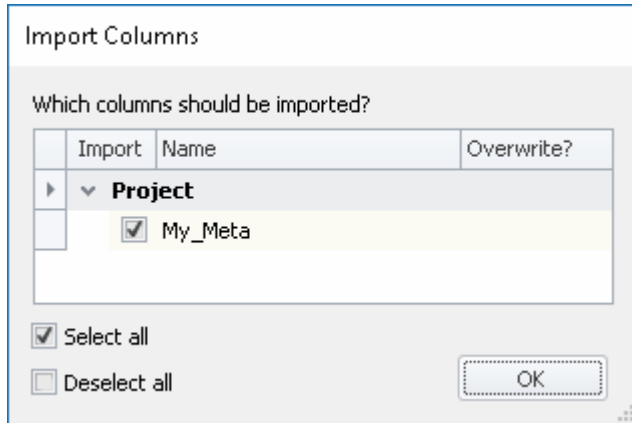
Select which columns to import and/or any to replace.

If the **column already exists**, a checkbox appears under "*Overwrite?*". If the box is not check-marked, the **column is automatically renamed**. You can edit the name afterward. For more information, see the chapter: "*Creating and configuring additional columns*".

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