imc STUDIO EOS Release

Differences to imc STUDIO 5.2

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Foreword

Thank you for deciding to purchase our product. We wish you total success in accomplishing your measurement assignments with the help of your hardware and software. If you have any open questions about our products, please contact our Hotline (hotline@imc-tm.de).

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 gratefully accept any suggestions for improvements, please contact our Hotline (hotline@imc-tm.de).

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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Update

Along with the PC software imc STUDIO, the software comprises components such as the firmware and devices driver package imc DEVICES. With a firmware update, the firmware can be loaded into the system. Please check regularly whether any new software/firmware versions are available and perform an update if your version of imc STUDIO supports the new firmware. Further information can be obtained from the imc Hotline or the imc website.

Download links:

imc STUDIO	www.imc-tm.com/imc-studio/software/

imc STUDIO EOS Release

With the new imc STUDIO EOS Release, you now possess a version of the software which is specially designed for applications with imc EOS as well as with sound and vibration measurements in general. Joint operation with (combinations of) other devices such as imc CRONOSflex, imc SPARTAN etc. is also possible. imc STUDIO EOS Release is the first version based on 64 bit technology. For this purpose, many key components have been updated, revised or even redesigned from scratch. We have invested much time in improving functions, simplifying workflow procedures and achieving greater system stability. The outcome is a modernized system architecture which provides substantial improvement of performance. To mention a few points up front:

- imc STUDIO is now a multi-threading capable 64-bit version,
- thanks to the new device firmware imc DEVICEcore, communication with and control of the new devices such as imc EOS is many times faster.
- ...

On the following pages, you will find an exact enumeration and description of the changes. There you may find quite a lot which will be pertinent to your work.

In particular, you should read the chapter "*Update-notes and compatibility* 35" before performing the update. It presents all the functional changes and modifications which need to be observed when updating.

The imc team wishes you total success in accomplishing your measurement tasks with imc STUDIO.

1 General Changes in imc STUDIO

64 Bit

imc STUDIO EOS Release has been completely converted to 64-bit and requires a 64-bit operating system.

Advantages:

- Thanks to 64-bit, additional PC-resources become available. Under some circumstances, the demands of imc STUDIO went to the limits of a 32-bit program.
- The file size for measured data and circular buffer memory is no longer limited to 2 GB (does not apply to data storage on devices belonging to the firmware group "imc DEVICES").

The list of operating systems supported has been modified

Supported operating systems
Windows 10 64-bit

This enables us to adapt better to the currently prevalent operating systems. Older component such as those required for Windows 7/8 and 32-bit systems can be deleted, in order to de-clutter the system.

Performance und parallelization

In a variety of applications, imc STUDIO EOS Release offers smoother operation, particularly when using high channel counts. For this purpose, the capabilities provided by modern PCs in the areas of parallelization, multitasking and multi-threading are rigorously exploited.
imc STUDIO is thus able to utilize the available PC resources in a more dynamic and comprehensive way. Additionally, the performance in the setup is significantly increased. This particularly applies to the selection of devices (adding devices to the measurement setup), and to the saving and loading of experiments.

Use of the new data format

The new imc file format (*imc3*) is now supported, applied and generated.

One major advantage of this format is the display of large data volumes in the curve window. It is no longer necessary to load large data volumes completely before they can be viewed. Instead, only so much data are loaded for the curve window as can also be displayed. In this way, you are able to quickly scroll and zoom, no matter how large the volume of data is.

Storage of the data is resilient to interruptions; even incomplete files can be used without the need for repairs. Furthermore, it is possible to save the imc EOS Monitor channels in the envelope curve format in which they are generated.

The prerequisite for loading the files generated is imc FAMOS 2021.

Uniform default file paths

The respective default paths for the various imc-programs have been grouped together under "*C:\Users\Public\Documents\imc*". Thus they are no longer scattered either directly under "*Public Documents*", in their own "*Documents*" or any other paths. Exception: The imc STUDIO database.

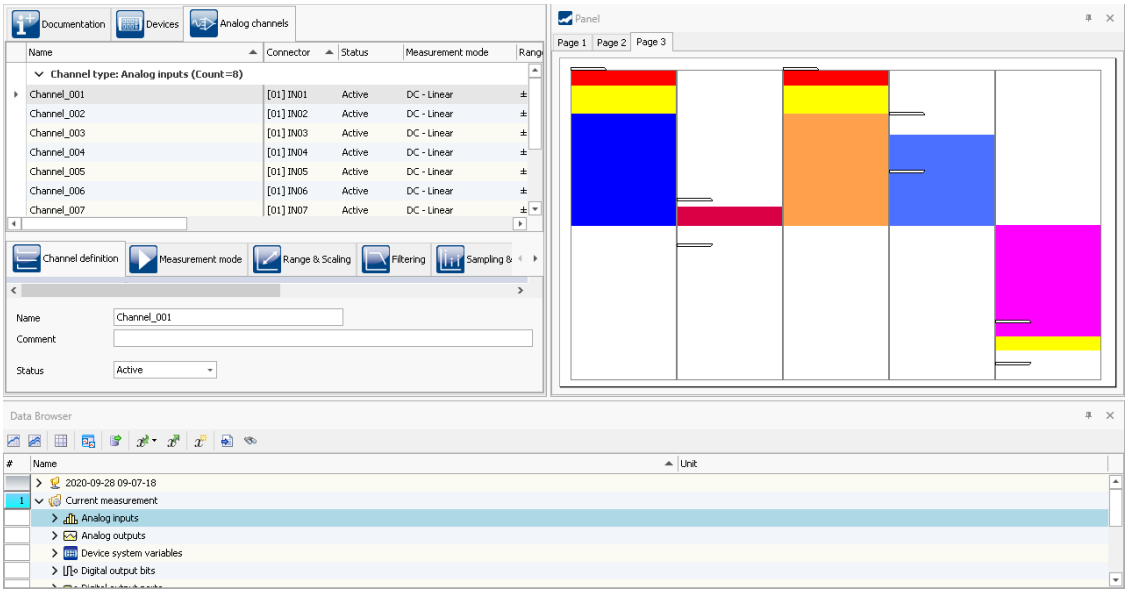
This does not affect update installations, which continue to use the previously specified paths.

2 Style

The user interface now features a new and improved design (device configuration pages, Logbook, progress indicators, options, menu ribbon, ...). The design elements are more flat and modern, the colors have been modified , some icons and dialogs have been revised... Some examples are stated below.

Window arrangement and self-defined window compositions

You can display the tool window and main window on other pages. For instance, you can display the Data Browser in the window of the Automation. Or you can show the Panel in the Setup.



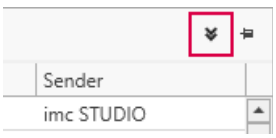
Example: Panel and Data Browser are displayed together in the main window "Setup".

Views optimized for workflow

Certain small improvements provide assistance in reaching the right pages more quickly and getting a better overview. Thus for instance, in the "Compact" view, the Tab-bars are now always arranged at the top and no longer as previously with some below the contents. On the Channel Balance page as well, the tab bar is situated on the top in both the Standard and Complete Views.

Collapsing the Logbook

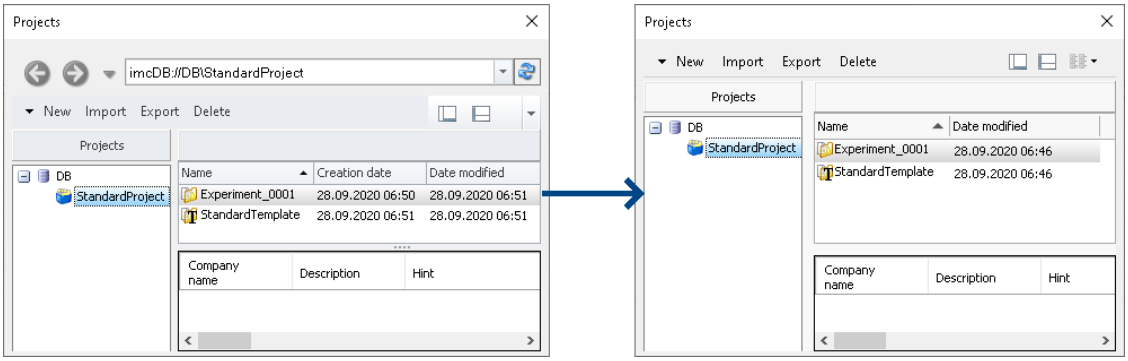
The Logbook is provided with a button for collapsing it when it is not pinned. If the Logbook pops open to show a message, you can use this button to collapse it back out of sight.



As previously, it still also automatically collapses when you take the focus away from it.

Project management

The design of the Project Management dialogs has been made more lean. The internal project path and the Next- and Back-buttons have been removed, and the "*Creation date*"-column has been as well. It is possible to get this column back via the context menu.



left: old dialog
right: new dialog

New menu ribbon icons or designation

Menu item		
	Connect	New icon
	Disconnect	New icon
	Panel Fullscreen	New icon and new name - Previously "Panel Fullscreen mode"
	Panel embedded	New icon and new name - Previously "Panel Embedded Mode"
	CAN	New icon
	Save current data	New name - Previously "Save current measurement data"
	Export current data	New name - Previously "Save current measurement data as"

Notes on compatibility: No modifications are necessary. Any menu actions which were used in the command: "*Execute menu action*" will continue to function as accustomed.

Uniform terminology

Various display texts and terms have been revised and standardized; e.g. the term: "*Download*" has been renamed to "*Prepare*", and also the channel type designations at various locations have been standardized. Here are a few examples:

Old term	New term
Digital inputs	Digital inputs (ports)
Digital input bits	Digital inputs (bits)
Counter inputs	Incremental counter inputs
Net bits	Ethernet bits
Analog fieldbus channels	Fieldbus: Analog inputs
Digital fieldbus ports	Fieldbus: Digital inputs (ports)

Notes on compatibility regarding the channel types in Setup: See "*Setup and device control* 18".

New start menu icon

The start menu now presents large icons for imc STUDIO, Monitor and imc WAVE, equivalently to that for imc FAMOS, in conformity to the Windows 10 style.

3 Measurement management

Placeholders - Path to the last measurement

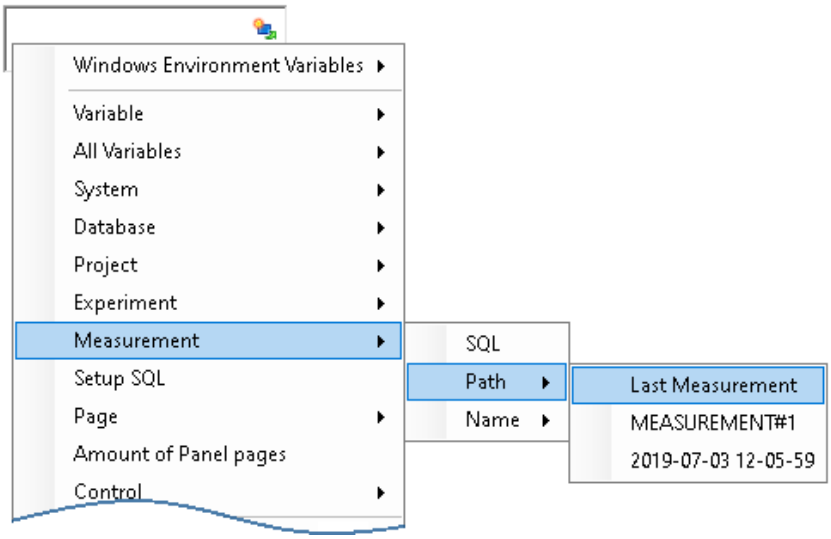
For the purpose of recovering the path to the last measurement, a new dedicated placeholder is now provided.

<MEASUREMENTS["MEASUREMENT#LAST"].PATH>

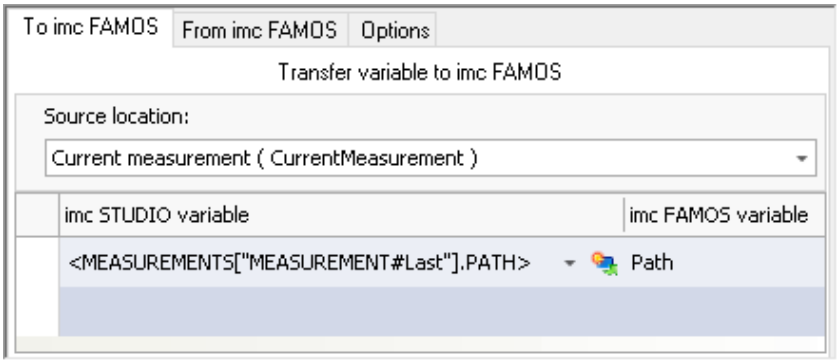
This always will provide you with the path to the last measurement. The following placeholders have been implemented:

Placeholder	Description
<MEASUREMENTS["MEASUREMENT#LAST"].PATH>	Returns the data storage path to the measurement last saved.
<MEASUREMENTS["MEASUREMENT#LAST"].NAME>	Returns the name of the measurement last saved.
<MEASUREMENTS["MEASUREMENT#<Measurement number>"].PATH>	Returns the data storage path of the measurement having the respective measurement number; e.g., you can select a measurement in the Data Browser. For example, it can be assigned the number "1". You now have the ability to find the path to this measurement by means of the placeholder.
<MEASUREMENTS["MEASUREMENT#<Measurement number>"].NAME>	Returns the name of the measurement having the respective measurement number. For an example, see "PATH".
<MEASUREMENTS["<Measurement name>"].PATH>	Returns the data storage path of the measurement having the respective name.

Currently, you can't obtain the placeholder via the Placeholder-symbol, since there is no input support. Instead, use the context menu. In this menu, under "*Measurement*" there are various examples which you can select. Subsequently, you can modify the text according to your requirements.



Creating the placeholder via the context menu



Example: Transferring the data storage path to imc FAMOS

The path to the last measurement saved remains known even when the experiment is re-loaded.

Special cases:

- If the last measurement is deleted, the last measurement performed before it becomes the last measurement.
- Measurement data folders created by different methods: In the Data Browser, only such folders are considered the "Last Measurement" if they were genuinely created by running a measurement. Whenever folders are created in a different way, e.g. imc FAMOS-events or by means of Scripting, etc., they are not treated as the "Last Measurement".
- Data storage using the menu item "*Save current measured data*": This is considered a measurement and can become the "Last Measurement".
- Subsequent adding of files: When imc FAMOS-results are saved to an already existing measurement, this does not count as a "new" "Last Measurement".

Data Browser - Measurements can be viewed without being loaded

You are able to expand the entries of all measurements without needing to open the measurements first. The information on which channels belong to the measurement is also available before the measurement has been loaded.

Automatic loading on demand - Only whatever is required is loaded

When the value of a variable belonging to a saved measurement is required, the entire measurement is no longer loaded; instead, each variable can be loaded individually. This provides advantages regarding speed: since only such variables are loaded which are really required, loading is significantly faster.

When does a variable get loaded? A variable is loaded automatically whenever the associated value is required; e.g. when the variable is displayed in a Widget or is used in a command.

The option for deactivating the function: "*Automatic loading on demand*", is no longer available.

New events for the measurement management

Conclusion of measurement, new measurement, measurement deleted and measurement updated - see "*Sequencer* 30"

4 Experiment- and Project Management

Copying experiments to different projects

You are able to copy experiments to a different project. This can be done either by means of Drag&Drop or via the context menu. Doing this affects all files included in the experiment-folder: measured data, saved measurement settings, parameter set files or even personally created folders for metadata.

Modifiable experiment template

When you create a new experiment, should a certain device already be selected? Do you use configurations or Setup pages which should already be available upon creation of the new experiment? This is all possible with the help of the experiment templates. The procedure for creating these templates has now been simplified. When you select the menu item "*Save as Template*", the current configuration is used as the basis for all subsequent new experiments.

When you click on the button, a new template is generated which the system then uses automatically (keyword "*Preferred experiment template*").

5 Firmware and new hardware

Notes imc DEVICES Firmware-Version as of 2.14

With this version of imc STUDIO, only imc DEVICES firmware versions as of 2.14 are supported. Please perform a firmware update of your devices in case these are still running version 2.13 or any older one.

The firmware update from Versions 2.7 through 2.13 to Version 2.14 is free of charge.

This imc STUDIO version has been released along with the following firmware and devices driver packages (imc DEVICES and imc DEVICEcore).

5.1 Firmware imc DEVICES 2.14R1

Alongside minor bug fixes, the following important improvements have also been implemented:

A time zone must be set

In order to make it possible to assign a time to measured data, the measurement can only be prepared when a time zone is set for every imc device used.

Reference

Additional changes regarding the device configuration are noted in the section: *Setup and Device Control* 14.

Miscellaneous optimization

Alongside minor bug fixes, the following important improvements have also been implemented:

Area	Description
Clock change	Some devices have determined an incorrect date of the next day when: • the time was adjusted in the last hour of the last day before switching to Daylight Saving Time. • the time was adjusted during the first hour of the day of the switch back to Standard Time.
CAN assistant	In the CAN-Assistant, AUTOSAR (ARXML) import was conditional on enabling of the ECU-protocols. This is no longer applicable as long as no ECU protocols are imported by that means.

5.2 Firmware imc DEVICEcore 3.3R4

Our measurement device series imc CRONOS, which many customers have been using for over a decade for reliable recording and processing of multi-channel measurements at test stands or in mobile settings, has now been supplemented with a new generation of devices: imc EOS now breaks through to new dimensions of capability by providing channel data rates of up to 4 MHz.

For the configuration and control of the new measurement devices, a new driver package with new firmware is available: imc DEVICE*core*.

You are able to operate devices belonging to both firmware groups in parallel and to configure them to jointly perform an imc STUDIO-experiment. Using imc DEVICE*core*, you can communicate with and control the new devices at many times higher speed.

imc EOS-U4

6 Setup and Device Control

Calibrating the amplifiers

At delivery, the amplifiers are freshly calibrated. Routine calibration ensures reliable measurement. Along with the information on the amplifier type, the calibration date is now also displayed. (This change does not take effect on existing views.)

If you have any questions about your measurement amplifier's calibration, please contact the imc Hotline.

Reading out TEDS and defining the channel color directly at "Channel definition"

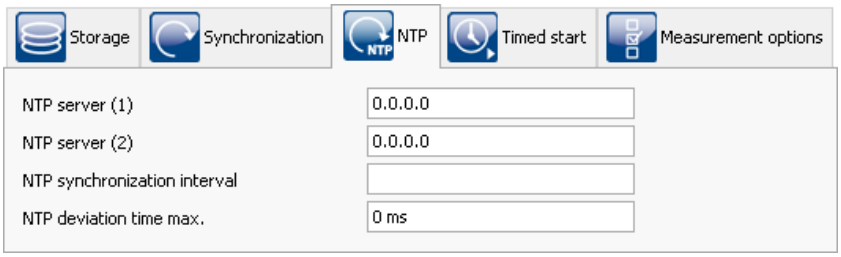
"*Complete*" view: There are now new parameters on the dialog "*Analog channels*" > "*Channel definition*": "*Color*" for the channel color in the curve window, and "*Sensor*" for reading out the information in TEDS . (This change does not take effect on existing views)

Synchronization - NTP-settings parameters in the user interface

On the Setup page "*Devices*", the NTP-settings parameters listed below are available in the table description. Thus you can insert these into the table:

- Synchronization NTP server 1 and 2
- Synchronization NTP deviation time max.
- NTP synchronization interval
- Synchronization waiting time on self start max. (applies to all synchronization types)

In addition, an NTP tab for the configuration is displayed:



Trigger - Trigger_48 omitted from the user interface

Why is the trigger for starting measurements actually the last trigger?

"*Trigger_48*" has been replaced by "*BaseTrigger*" and retains this permanent name. Wherever it is not required, it is hidden. The can no longer be displayed on the Setup page "*Trigger*".

Is there anything to be aware of when converting old experiments? No. The triggers are not renamed in existing experiments; they keep their names. Only newly selected devices obtain the new trigger name.

Notes: In imc Inline FAMOS, it will be possible to use both trigger names for the control commands. The only one which the system will still offer will be "*BaseTrigger*". However, if you load a source code having "Trigger_48", this will also work.

Interval data storage ignores the folder "Meta"

Interval data storage no longer deletes any existing folder having the name "Meta". If the count of intervals is limited, the metadata folders are successively deleted once the amount specified has been reached. The folder "Meta" is now ignored. This applies even if the folder contains measured data.

Display of measured data and data storage upon re-connection

When imc STUDIO connects with a running measurement, no more event-based data are generated. A new measurement folder with a new time stamp is created. X0 (X-offset) is entered accordingly, so that the two measurement folders can be evaluated correctly even in the relative display mode.

If no gap in the data is detected (data overflow: e.g. RAM buffer time elapsed), the data in the RAM-buffer is read out. Even if imc STUDIO has closed in the meantime.

Compatibility: Default values saved in the projects

The default values are now saved with the project. In this way, you can easily transfer the default values to other computers along with the project. Additionally, you can define varying default values for each project.

Previously, the default values were saved with the application and were applicable to all projects.

Compatibility: If your imc STUDIO EOS Release installation is an update installation from Version ≤ 5.2, then upon forst starting, a message appears in the logbook. Please note the following:

- Upon installation, the default values are temporarily copied from the application settings of the older version to the application settings of the current version.
- After first starting, these are moved to the current project. After this, they no longer exist in the application.
- Be certain to save the project. Otherwise, the default values will be lost.
- If you use multiple projects, export the default values and import them to the projects in which the are to apply.

In the application settings for 5.2, the default values will continue to exist, if the version had not been uninstalled. There, you can still export the default values as accustomed.

Compatibility: Discontinuation of imc HiL

Due to the discontinuation of imc HiL, the Setup page "*HiL + Application module*" has been renamed to "*Application module*". Additionally, the page has been assigned a new icon. (This change does not take effect on existing views)

Compatibility: Data storage - Equal treatment of "Save trigger events in individual files"

Behavior when the option: "*Save trigger events in individual files*"is activated: The measured data are saved separately in individual subfolders. The names of the subfolders correspond to the respective assigned trigger names. This now also applies to the "*1-Trigger*" (Start-trigger without any defined source). Previously, all channels associated with a "1-Trigger" were saved together in the folder "*Trigger_48*" when saving data to the PC.

Compatibility: Data storage - "Continuous numbering" eliminated

Previously, you could use the option: "Path naming" to set whether data storage is performed either with a "time stamp" or "Continuous numbering". This selection is now omitted.

By means of the "Measurement Storage Area" ("Options" > "Project Management") you can design any desired setup of how to save your measured data. However, as of now, data storage to the device only supports the time stamp option.

Note the following if you load experiments having the setting "Continuous numbering" from Version 5.2 or older:

No information is posted to indicate that this setting is no longer used. The selection is still set to "Continuous numbering"

- When saving to the PC: Data storage with time stamp is used automatically. No special notes to observe in this case.
- When saving to the device: At this time, data storage is performed with "Continuous numbering". Therefore, please set the parameter manually. In future, this will no longer be supported or tested.

In the new view, this parameter is no longer displayed. However, if you use an existing database, the parameter remains visible as long as you continue to use your views.

If you use the new views and wish to correct the setting, you can still insert the parameter in the top device table and modify it there.

Compatibility: Data storage - Measurement number has been eliminated

The measurement folder generated no longer is assigned the so-called "Measurement number" (example: "*2020-03-31 10-00-00* ***(1)***"). This number had served to indicate when device settings had been changed, and this when the measurement had to be "re-prepared".

Since there are now substantially more ways to make changes to the experiment, the "device" is no longer the only determining feature which indicates to which series a measurement belongs. For this reason, the number is no longer stated.

If you wish to generate a measurement number, use the option "Measurement Storage Area". Here, you can specify your own counter variable which you can iterate either upward or downward at suitable locations.

Compatibility: Data storage - "Circular buffer memory in the file" has been eliminated

The new file format doesn't support circular buffer memory for the data storage. If this is active in your experiments, you are notified accordingly upon loading, indicating that this setting is no longer effective.

Compatibility: Channel type designations

Due to changes to the channel type designations 9, some modifications may become necessary if these parameters are used as the target of a "*Parameter set import*". If you have defined any custom assignment instructions which do not use a "*Connection*" or "*Name*", but rather the "*Channel type*": e.g. all "*Counter inputs*", then please modify the instruction and if necessary also the existing parameter sets.

The following channel type designations have been modified:

Old term	New term
Field bus: Analog inputs	Fieldbus: Analog inputs
Digital inputs/ outputs (ports)	Digital inputs / outputs (ports)
Field bus: Digital inputs / outputs (ports)	Fieldbus: Digital inputs (ports)
Field bus: Digital inputs / outputs (bits)	Fieldbus: Digital inputs (bits)
Counter inputs	Incremental counter inputs
Monitor: Counter inputs	Monitor: Incremental counter inputs
Display-variables	Display variables
Net bits	Ethernet bits

7 imc Online FAMOS and imc Inline FAMOS

Editor – Autocomplete can be switched on/off

Via the context menu in the Editor, it is possible to activate/deactivate the Autocomplete function.

Function: FFTAverage

For the "*Overlapping*", the values 33.33% and 66.66% are now also available.

Channels originating in different time zones

In imc Inline FAMOS, it is possible to apply calculation operations to combinations of channels even from different devices located in different time zones (as long as these channels are assigned to "*BaseTrigger*" [previously designated "*Trigger_48*"]).

8 Inline Analysis - imc WAVE

The channel-based calculations familiar from imc WAVE are now also available in imc STUDIO.

Die Inline-Analysen "imc WAVE Noise", "imc WAVE Vibration" und "imc WAVE Rotation" bieten zahlreiche Möglichkeiten für spektrale Untersuchungen im Bereich der Akustik, Schwingungsanalyse und Ordnungsanalyse. Hierbei können für gemessene Signale im Zeitbereich, welche typischerweise von Mikrofonen und Beschleunigungssensoren geliefert werden, spektrale Frequenzanalysen in Echtzeit durchgeführt werden, wie z.B. Fast Fourier Transformation oder Terz- und Oktavspektren. Hierfür steht eine umfassende Vielzahl von Einstellmöglichkeiten zur Verfügung, um diese normgerecht zu parametrieren. Dazu gehören Zeit und Frequenzbewertungen mit Standard-Verfahren und Filtern, Fensterfunktionen etc.

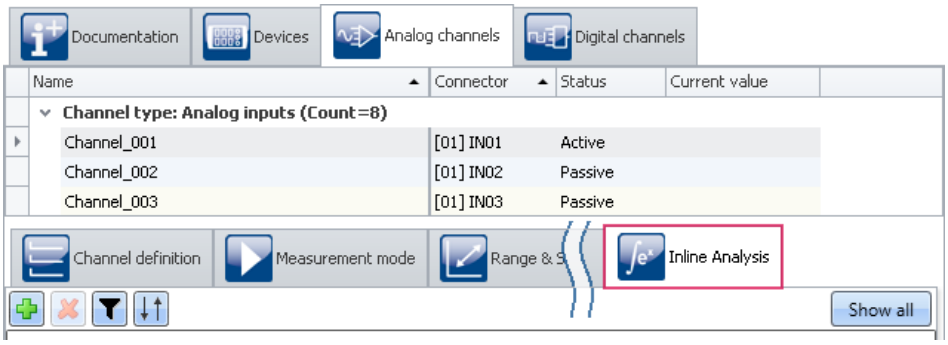
With the corresponding license, you are able to activate the following analyzers:

Name and license required	Description
imc WAVE Noise	Functions for sound analysis, e.g. sound pressure level, sound intensity, linear spectra, 1/3-octave and octave spectra • sound level meter according to IEC 61672-1 • octave and 1/3-octave analysis compliant to IEC 61260 • FFT-analysis
imc WAVE Rotation	Functions for the analysis of rotating parts, e.g. Order Tracking Analysis, RPM-presentation
imc WAVE Vibration	Functions for vibration analysis, e.g. filters with optional integration/differentiation, Human Vibrations filter as per ISO 2631-1, vibration spectra • Vibration level measurement according to, for example, ISO 2631-1, ISO 8041, EN 12299 • octave and 1/3-octave analysis compliant to IEC 61260 • FFT-analysis

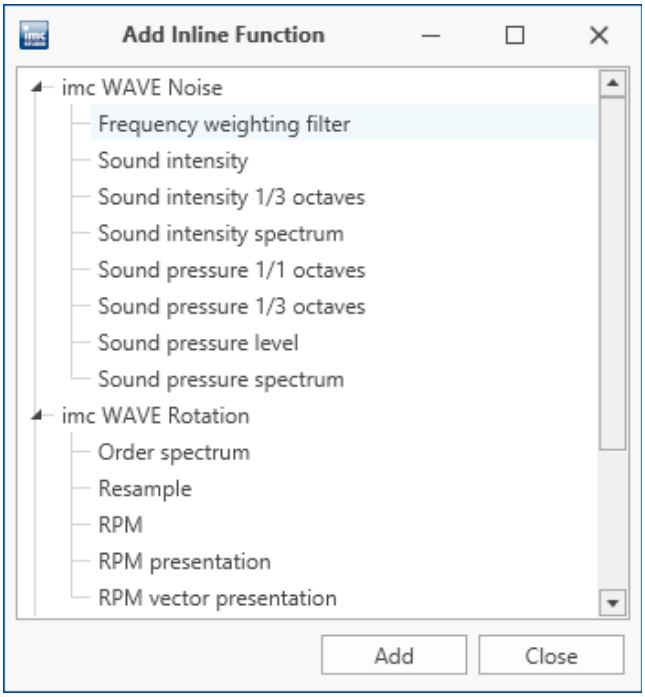
Using the "*Inline Analysis*"-dialog, you can calculate/derive additional channels from a measured channel.

Setup page: Analog channels

Dialog: Inline Analysis



Here you can activate and parameterize Inline Functions specific to individual channels.



Adding a new Inline Functions

Function modifications

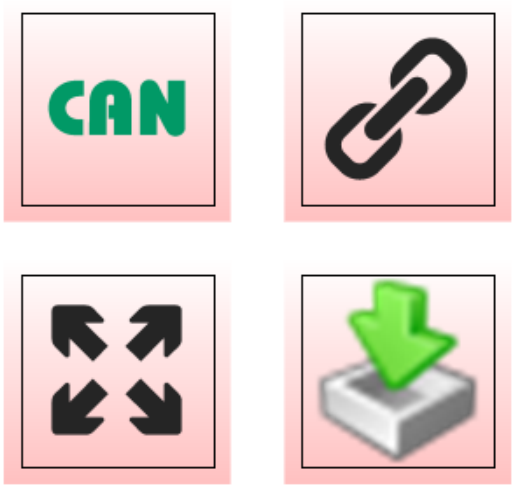
Sound pressure spectrum, Sound intensity spectrum, Vibrations spectrum, Order spectrum:

For the selection of the overlapping, the values 10%, 33.33%, 66.67% and 90% are now also available (previously: 0%, 25%, 50%, 75%).

9 Panel, Widgets and Data Browser

"Execute menu action" Widget - Larger icons

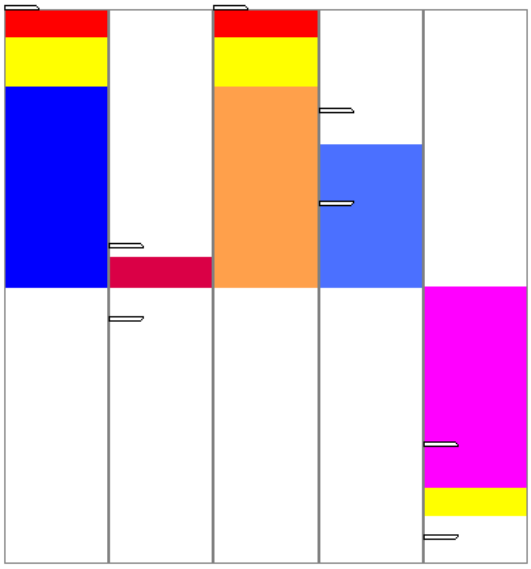
The menu ribbon icons are displayed according to scale in the Widget "*Execute menu action*". This means the icons adjust their size to the Widget's size. This makes these icons easier to recognize. The icons adjust their size while retaining high resolution; the old ones only were stretched out.



"Execute menu action" Widgets

Curve window - Level indicator

The level indicator now features a three-level color display.



Level indicator with five channels

Float-variable on the DIO-Widget

The DIO-Widget is implemented as the preferred choice for the device's DIO-ports and Integer pv-variables. Float-variables can also be displayed. The handling for the Float-variables has been improved.

1. pv-Float - The bit count has been limited to 22 bits.
2. If the Widget is linked with Float variables, then boundary violation symbols are displayed if the number is either too small or too large for 22 bits.

Inserting Widget - Commonly used Widgets

When you drag a variable to the Panel, a choice of Widgets is offered. The list is automatically modified according to your previous selection. Widgets which you had recently inserted frequently have priority among the choices available.

In the subgroups, all Widgets are available for selection, as accustomed.

Data Browser - Transfer to imc FAMOS

You can conveniently transfer the variables/measurements selected to imc FAMOS by means of the context menu, and analyze and evaluate the channels measured there.

Data Browser - Event time

When a measurement has multiple different channel starting times (event times), one entry for each different event time appears in the column "*Event time*". The selection is available if the individual channels' **start times** are **different**. For instance, this is the case when in a triggered measurement the individual channels are triggered in succession by different events.

Display All

The selection list now provides a new entry: "*All available*". This entry is selected by default. It causes all channels and their associated events to be displayed, even if these were started at different points in time.

Exception: "*Save trigger events in individual files*". In this case, only the channel of the first applicable event is displayed.

Extended relationships

When a defined event is selected, the system will make every attempt to display as many channels as possible. What is new is that all channels which have any time overlap are displayed.

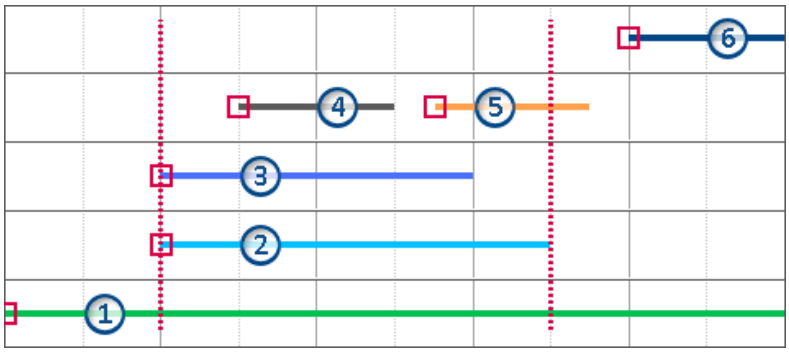
Example: One channel starts at 14:00 and ends at 15:00.

New behavior: If this channel's event time is selected, all channels are displayed which have measured data from the time between 14:00 and 15:00.

Old behavior: When this event time is selected, all channels are displayed which have any measured data at the point in time 14:00, no matter when the channel ends.

Exception: "*Save trigger events in individual files*". In this case, only the channel of the first applicable event is displayed.

Example Event time



Dotted lines: Start and stop-times of channel 2; e.g. 14:00 and 15:00 from the above example

5 channels are recorded. Counting from the bottom to the top:

- Event 1: The first channel is associated with "*Trigger_48*" (Start-button).
- Events 2 and 3: The second and third channel are associated with the same trigger (e.g. "*Trigger_01*"). This generates one event time.
- Events 4 and 5: The fourth channel has two events. This generates 2 event times when "*Save trigger events in individual files*" is activated. Otherwise, only one event time.
- Event 6: The fifth channel is triggered once measurement has concluded on all other triggered channels (except the first channel).

Thus, the Events list shows either 4 or 5 event times, depending on the setting applicable for "*Save trigger events in individual files*".

In accordance with the respective selection, the individual channels are loaded and displayed.

New behavior: The second event time is selected (Channels 2 and 3). The time frame of the longest channel associated with the event is used for selecting the other channels (2). All channels for which there are measured data within this time frame are displayed (1, 2, 3, 4 and possibly 5, depending).

Channel 5 is displayed when "*Save trigger events in individual files*" is not activated. If this option is activated, then only one event channel can ever be displayed at a time. In that case, only the first channel is displayed (4).

Old behavior: All channels which contain vales at the event time are displayed (1, 2, 3).

Data Browser - Miscellaneous

- Measurements can be viewed without previous loading
- Automatic loading on demand - Only whatever is required is loaded

The following functions are no longer supported:

- "*Filter list*" in the Data Browser. You are still able to assemble a filter.
- "*Navigation mode*" in the Data Browser. Navigating by button through the measurement or event is no longer possible. You are still able to select any measurement using the mouse and keyboard.
- "*Shows comparison measurement*" in the Data Browser. The function is currently hidden.

Discontinued: "*Audio-Widget*"

The following Widget is no longer supported: "*Audio-Widget*". It was only needed for the channel type "*Audio-Report channel* 26" which was also discontinued.

If you load an experiment belonging to the predecessor version which contains a Widget, the Widget is displayed empty and the corresponding message is displayed.

10 Variables

Display of user name and role on Report-pages

New system variables are available: User name ("*Name*") and user role "*Role*". By means of these variables, you are able to have the user who is logged in automatically indicated in the Report.

New variables for measurement status, connection status and synchronization status

New system variables are avaiable:

Device system variable	Description
Measurement status	Returns the state of the measurement: measurement running (1), measurement stopped (0), unclear (-1) • 1: Measurement running applies when **at least one device** is performing a measurement • 0: Measurement stopped applies when **all devices** are known not to be performing measurement • -1: Unclear applies when **at least one device** is not connected, and **no connected device** is running
Synchronization status	Returns the device's synchronization status: Synchronized (1), not synchronized (0) • 1: Synchronized, when **all devices** are synchronized • 0: Not synchronized, when **at least one device** is not synchronized Devices which are not intended to be synchronized are not included in the status check.
Connection status	Returns the status of the device's connection with imc STUDIO: connected (1), not connected (0) • 1: Connected, when **all devices** are connected • 0: Not connected when **at least one device** is not connected

Custom variables created in custom main category

When you create a variable having no category, it is automatically placed among the "*User-defined variables*". When you create a variable having a category, this variable is now no longer created under "*User-defined variables*" but instead in parallel with that category. This allows you to create your own custom folder structures.

If you wish to create a category within the category "*User-defined variables*", you can still do so. Just write a "\" before the category name.

Example

Category: "MeasurementPoint_1". A category called "MeasurementPoint_1" is created in **parallel with** the other categories, such as "*Analog Inputs*". It contains the variable.

Category "\MeasurementPoint_1". This creates a category "MeasurementPoint_1" **within the category** "*User-defined variables*". It contains the variable.

This applies, for example, to variables created by means of the command: "*Load variable*" or to generating a user-defined variable by means of the Data Browser.

Category-editing - No category

Category editing for user-defined variables and imported variables has been revised.

- The state "*No category*" no longer exists. Anything which previously had "*no category*" is now "*user-defined*".
- The internal identifier "*__USER__*" is no longer used for identifying the "*user-defined variables*".
- You are able to create variables outside of the category "*user-defined variables*".

Compatibility:

- Configured commands work in the same way as previously. Here, you will not need to make any changes.
  The exception are commands which have loaded variables previously created under "*no category*". The variables are now created under "*User-defined variables*".
- If you are accessing the internal identifier "*__USER__*" in any form (e.g. with imc FAMOS), please make modifications accordingly.

Compatibility: "Data table" - variable type no longer supported

User-defined variables of the type "*Data table*" can no longer be created. When an experiment having such a variable is loaded, a corresponding message is posted in the logbook. The variable is no longer present in the experiment. These variables had been needed for the SQL-command 30.

Compatibility: "Channel" - variable type no longer supported

User-defined variables of the type "*Channel*" can no longer be created. When an experiment having such a variable is loaded, a corresponding message is posted in the logbook. The variable is no longer present in the experiment.

These variables are no longer needed for initialization since variables can now be created and replaced using "*Load Variable*".

Compatibility: Audio-Report channel - variable type no longer supported

User-defined variables of the type "*Audio-Reportkanal*" can no longer be used. The Audio-Widget 24 and the Audio-commands 30 have been eliminated. When an experiment having such a variable is loaded, a corresponding message is posted in the logbook.

The variable type "*Text-Report channel*" is not affected.

11 Import and export - Variable, measurement, parameter set

Replacing variables from files has been simplified

You now have the ability to **create** new variables and **replace** existing variables in the **same action**. Existing variables could previously only be overwritten using "*Import Variables*", and new variables could only be created using "*Load Variables*". These two actions have been combined.

- Now you can use the action "*Load variable*" to either create new variables from a file or to overwrite existing ones. When you overwrite, all properties of the target variable are also overwritten.
- The action "*Import Variable*" has been renamed to "*Refill variable*": With this action, you are still able to fill existing variables with new values without changing their properties.

Both actions are available in the Data Browser and as a command.

Note Background information

A function "Load Variable" is now implemented, which resembles "Load Data" in imc FAMOS. Therefore in contrast to Version 5.2, in the new version it is permitted to overwrite existing variables. A confirmation prompt appears for each conflict of variables. If any of the confirmation prompts is canceled, the entire import automatically cancels. In this way, the system prevents the loading of an incomplete set of controller parameters, for example.

When an existing variable is overwritten in the process of loading, then it is effectively completely replaced, including all of its properties. In consequence, the old variable is neither deleted nor is any new one created, so that no "events" are triggered by the deletion or creation. This is important for scripts, curve windows, etc.

In contrast to imc FAMOS, there are variables which cannot be overwritten, e.g. channels or pv-variables. The reason is that, for instance, these variables belong to the specific device, or possess specific data formats and other properties which must be retained. If the user attempts to overwrite them, an error message is posted indicating that they can't be overwritten.

It is also not allowed to overwrite any user-defined variables whose validity range is not "temporary". These variables are assumed to have been explicitly created as having a certain data type, which must be retained. The validity range as well must be retained. Temporary user-defined variables, by contrast, are similarly volatile to data returned by imc FAMOS-sequences. For this reason, they may be overwritten by "Load Variable" and can thus, under some circumstances, take a completely different type, etc.

With the "Load Variable" command, there is an option for determining whether existing variables can be overwritten with or without a confirmation prompt. By default, this option is activated, meaning that there is no confirmation prompt for overwriting.

By using "Refill Variable", it is possible to change the content of existing variables. This resembles "Import Variable " in version 5.2. In this way it is possible, for instance, to change the content of pv-variables or user-defined variables. Since this only changes the variables' content and not their type, the target variable and the variable to be loaded must have the same properties, including, for example, the unit. This is managed more strictly than in 5.2; thus, only values and the sample count may be different. Therefore, please always use "Load Variable" in cases where changes are possible.

"*Load Variable*" - Loading into a saved measurement

When a variable was loaded from a file to a saved measurement, the variable is copied as a file to the measurement folder. The variable is now also available after loading the measurement.

The following components are affected: Command: Load Variable, loading by means of the Data Browser.

Menu action: "*Save current data*" now is equivalent to a full-featured measurement (previously "*Save current measurement data*")

Saved measurement data are secure

Any measured data which are already saved can no longer be overwritten by the menu action "*Save current data*". If a repeat attempt is made to perform "Save" to an existing file, the system refuses to perform this action. It is also not possible to perform in conjunction with measured data belonging to a continually saved measurement.

Compatibility: Only the dat-format remaining

This action only saves data in dat-format now. It does not adopt the formats which are set in the Options for the action "*Export current data*". Conversion of the measured data to other formats is possible by means of "*Export current data*" or by means of the imc Format Converter. This provides a clear separation between "*Measurement*" and "*Export*" in the Options.

Compatibility: Export Variable: imc's custom csv-format no longer supported for variables

The imc custom csv-format has been removed, which contained a csv with a specified link to a Raw/Dat-file. In the command "*Export Variables*", this format was denoted by "*.csv".

When an experiment having an existing csv-exporter is loaded, a corresponding message is posted in the Logbook. As a precaution, the export type is converted to "*dat*". Please correct this selection later if appropriate, for instance to a different csv-format.

The following components are affected: Command: Export Variable, export via the Data Browser, options for "Export current Data".

Note: "*Export parameter set*" (e.g. export of the device configuration as a parameter set) is possible in this format without any restrictions.

Compatibility: Export parameter set: xml-format no longer supported

The xml-format has been eliminated.

When an experiment having an existing xml-exporter is loaded, a corresponding message is posted in the Logbook. As a precaution, the export type is converted to "*csv*". Please correct this selection later if appropriate, for instance to a different format.

12 Sequencer and commands

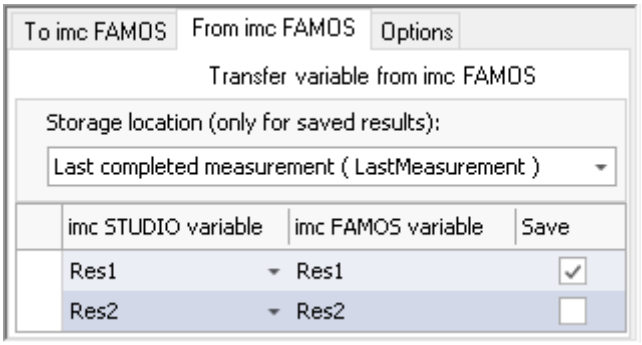
Command "*Delete Variable*" revised

Variables can be deleted from any category: Previously the command could only delete variables belonging to the category "*User-defined*". Since user-defined variables can now be created in their own categories, this limitation no longer applies.

The option "*Treat error as warning*" has been eliminated. Now a warning is categorically issued and no longer an error message. If it is not possible to delete a variable upon running, such as device variables and system variables, an appropriate warning is posted.

Command "*Run imc FAMOS sequence*" - saving of results modified

When the sequence results are transferred back to imc STUDIO, they can be saved along with an existing measurement. Results which are not saved now land under "*Current Measurement*", even when a measurement is selected as the target.



Res1 is saved as a file and as a variable in the last completed measurement.
Res2 is saved as a temporary variable under "Current Measurement".

Compatibility: Command "*Run imc FAMOS Sequence*" - return values

As the target variable in imc STUDIO, an appropriate data type is now expected. A channel can no longer be transferred to a "*User-defined Variable*" of the type "*Numeric*" (Single Value). Previously the system assumed that the last value would be the one to expect. But it could also be an error in the implementation. Now a message is posted to indicate when the data type is not appropriate.

Please modify the type in imc FAMOS if you wish to obtain a single value. If you need a channel, use as the target a variable created by imc FAMOS. This will then always be assigned the appropriate data type.

Compatibility: Command "*Run imc FAMOS Sequence*" - Only the dat-format remaining

This command only saves data in dat-format now. It does not adopt the formats which are set in the Options for the action "*Export current data*".

Compatibility: A variable can no longer possible be deleted using the command "*Set variable*"

The option/column "*Delete*" is no longer available. As previously recommended in the user's manual, for such a case the command "*Delete Variable*" is to be used.

When you load an experiment created in the predecessor version, in which the delete function was performed, a corresponding entry is made in the logbook. This entry records the variables which had been deleted by means of the command.

Alternative solution: You can add the command "*Delete Variable*" at the corresponding location. The existing command "*Set Variable*" no longer contains the variables to be deleted.

Discontinued: "*SQL-Command*"

The following command is no longer supported: "*SQL-Command*". It no longer meets the current requirements of SQL-communication.

When you load an experiment created in the predecessor version which contains an SQL-command, a corresponding message appears in the logbook. An "empty" command as a placeholder is inserted into the sequence where you use the command, in order to indicate the location.

Alternative solution: In such a case, please use the imc FAMOS Database Kit or the component Scripting in order to incorporate a custom solution (license required).

Discontinued: "*Playback audio channel*" and "*Record audio channel*"

The following commands are no longer supported: "*Playback audio channel*" and "*Record audio channel*". They were only needed for the equally discontinued channel type "*Audio-Report channel* 26".

When you load an experiment belonging to the predecessor version which contains either of these commands, a corresponding error message appears in the logbook. In the sequence in which you use one of these commands, an "empty" command is inserted as a placeholder in order to mark its position.

New events for the measurement management

There are now new Events which are triggered upon changes to the measurements in the Data Browser.

- Upon conclusion of a measurement (or of an interval), the "*MeasurementFolder_Closed*"-event is triggered.
- When a new measurement appears in the Data Browser, the "*MeasurementFolder_New*"-event is triggered.
- When a measurement is deleted, the "*MeasurementFolder_Deleted*"-event is triggered.
- When the measurement is updated, the "*MeasurementFolder_Updated*"-event is triggered.

Compatibility: The event "*Storage_DirectoryUpdate*" is no longer supported. It has been replaced with "*MeasurementFolder_Closed*". Any appended commands are automatically moved accordingly. Please save the automatic change. A corresponding message is posted in the logbook.

User-defined events: Initialization / first value no longer counts as a change

There can only be a change to a trigger, variable or channel if a previous value had already been present. Thus for instance, if during the "*Prepare*" process for a measurement, a trigger's status changes from "*not defined*" to "*not released*", this is not a change. In consequence, no event will be triggered in this case.

This also applies if the event is defined as "*Channel < 5*". If the channel's value is < 5 already at the beginning of the measurement, the event is not triggered. This had already been the system's behavior previously, if for instance at the end of the first measurement the channel's value was already < 5.

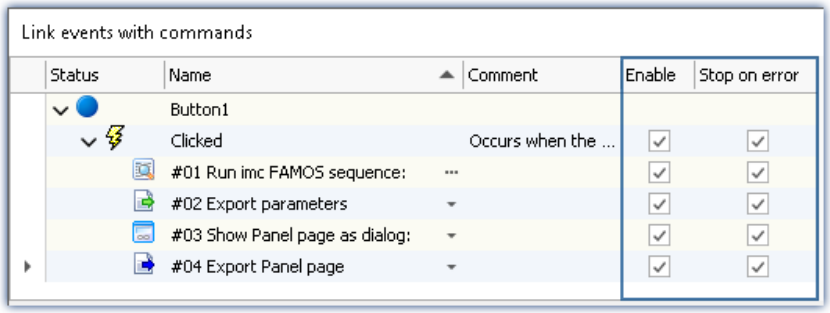
If you wish to apply the condition at the start of the measurement, then link the event to an appropriate trigger (AND conjunction), for example.

Events have been enhanced with the functions: "*Stop on error*" and "*De-/activation*"

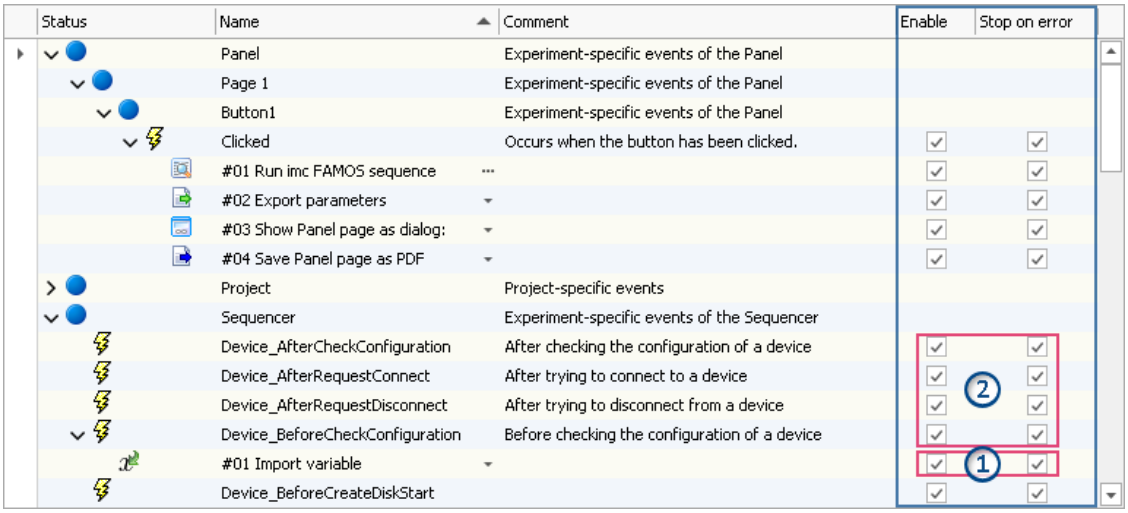
In the Sequencer-sequence, you are able to activate/deactivate individual commands. Additionally, you are able to make a setting there which governs whether the sequence should be interrupted if an error occurs.

This is now also possible for event-sequences. You are able to deactivate complete events along with their commands, or only individual commands.

Example: A Timer-event is intended to start only once its configuration has been completed. Now you can deactivated it and re-activate it at the desired moment in time.



Commands associated with a button's event



Commands in the Sequencer associated with the events
1: Applies to the respective command
2: Deactivation applies to all commands associated with the event

If the option is deactivated for the event, this applies to all associated commands. If the option is activated for the event, the setting applied to the respective command.

Compatibility: Converted experiments from older versions work as familiar from previously. Previously, the event-sequences did not halt upon appearance of errors. In consequence, with existing experiments the checkmark for "*Stop on error*" is not set automatically.

13 Installation

imc DEVICES - Fieldbus selection

In the selection of components for imc DEVICES, all Fieldbusses are now automatically included in the installation. It is no longer necessary to make a selection. Thus any Fieldbus which is available in the device can always be used.

Installation medium

- The 3rd-party device "Agilent" has been discontinued. In consequence, it has been removed from the installation medium.
- Only such system updates are still included in the product package which are required for operation of the imc products on a Windows 10 computer 5.

14 Miscellaneous optimization

Alongside minor bug fixes, the following important improvements have also been implemented:

Area	Description
Widgets	• Table: When something was entered in the property "*Text*", it was no longer possible to edit the value of a linked variable by means of the entry. • Curve window: The property "*Operable*" is now located among the "*Important properties*".
Data Browser	• When a channel name contained one of the following characters (' and &), it was not possible to load the measurements. Now the characters can be processed correctly. • Feedback to the user - If a measurement can not be loaded, for instance because the files are defective, a message is now posted. • The context menu function "*Update Data Browser*" has been eliminated. In imc STUDIO, this function is no longer needed.
Current value window	• When a variable is deleted from the Data Browser, it is automatically deleted from the "*Current value window*". • User-defined text variables having a decimal point were interpreted and displayed as a number in the "*Current value window*". • In case of an invalid value entry for a numerical variable, the variable is no longer set to 0 but retains its previous value.
Commands	• "*Export parameter set / variables*": When exporting variables in the csv/dat-format, the unit is included in the export. • "*Set Variable*": Numbers having a comma "," as the separator character for the decimal positions can now be subjected to calculations using the command; e.g. "Displayvar_01 + 0,1". Previously, only a period was possible "Displayvar_01 + 0.1".
Project management	In the project management dialogs, many small improvements have been implemented which, among other things, provide assistance in operation or feedback about actions. For example, menu items such as "*Add experiment template*" are only still offered if they are also activated. The Import-button would be displayed or not depending on the selection. Following import, the experiment was not always selected.

Area	Description
User management and access privileges	There are new access privileges designed to prevent opening the Assistant; e.g. for the imc Online FAMOS Editor, or the CAN-Assistant or the like.
Variables	• Variables which are created by means of "*Load Variable*" can now also be edited. Previously, they were always write-protected, so that values could not be changed. • After loading/importing of variable, the files were still in use, or blocked. Thus, the files on the hard drive could for instance no longer be overwritten using imc FAMOS. Now imc STUDIO releases the file for editing after the action.
Save view	When one saved the view on a 4K monitor with adjusted font scaling, the view was subsequently defective for smaller monitors.
imc Online FAMOS and imc Inline FAMOS	• Autocomplete in the Editor - you are able to switch the autocomplete on/off via the context menu. • imc Inline FAMOS: Synchronized writing of single values The option "*Synchronized writing of single values*" has been eliminated. Activation (for special handshake procedures) is no longer required with the current data handling.
Setup - Export	Setup/Export configuration: With "Export balancing values", the monitor channels were always also included in the export.
Guardian and Watchdog	There is a separate Guardian and a separate Watchdog for the 64-bit version. In case of parallel installation with a Version 5 system, two services now run. The 64-bit variant has the suffix "*V2*".
Options	The options for the RAM-size of curve windows and FIFOs have been eliminated. They are no longer relevant for the 64-bit system.
Documentation	• The program "*imc Help and Documentation*" now also lists the documentation for imc FAMOS (as of Version 2021) and imc Shared Components.

15 Update-notes and compatibility

If you plan to update from Version 5.2 to EOS Release, there are a few things which you may need to observe regarding any existing databases. In particular, be aware of the following points:

Bereich	Funktion
Sequencer	• It is no longer possible to delete a variable using the command "Set Variable" 30 . • Discontinued: "*SQL-command* 30" • The event "Storage_DirectoryUpdate" is no longer supported. It has been replaced by "*MeasurementFolder_Closed* 30".
Measurement management	• Automatic loading on demand 11 - Only what is required is loaded.
Variables	• Category processing - "*No category* 25" no longer exists • User-defined variables: The types "*Channel* 26", "*Audio-Report channel* 26" and "*Data table* 26" are no longer supported. • Menu action: "*Save current data* 28" (previously "*Save current measurement data*"): This action only saves the data in dat-format from now on. • Export Variable 28: The csv-format is no longer supported for variables. • Export parameter set 28: The xml-format is no longer supported.
Setup	• Data storage - "*Continuous numbering* 17" has been eliminated • Data storage - "*Measurement number* 17" has been eliminated • Data storage - "*Circular buffer memory in the file* 17" has been eliminated • *Default values* 16 are saved along with the projects • imc HiL 16 is no longer supported • Channel type designations 18 have been modified
Data Browser	• "*Filter list* 23" has been eliminated • "*Navigation mode* 23" has been eliminated • "*Shows comparison measurement* 23" has been eliminated
Widget	• The "*Audio-Widget* 24" are no longer supported
Commands	• The commands: "*Playback audio channel* 30" and "*Record audio channel* 30" are no longer supported • The command "*Run imc FAMOS sequence* 29" - Channel return values can no longer be transferred back to a "*User-defined variable*" of the type "*Numeric*" (Single value). • The command "*Run imc FAMOS sequence* 29" - This command only saves data in dat-format now.
Scripting	• imc.Studio.Interfaces.V2.dll has been integrated into imc.Studio.Interfaces.dll.
Options	The option for hiding the measurements in the Data Browser has been moved. It is now located as follows: Options: "*Variables*" > "*Measurement Administration*" > "*Access to stored measurements*" Due to the extra internal separation between the components "*Project Management*" and the display of the measurements in the Data Browser, the option cannot be ported over when updating from older versions. If you wish not to see any measurements in the Data Browser, deactivate the option again.

Bereich	Funktion
3PDI - Function Simulator	The device needs to be de-selected once and then re-selected when you load an experiment from imc STUDIO 5.2.

Additional missing components and functions belonging to Version 5.2

Warning Existing databases

If possible, avoid using existing databases belonging to an older version. Since not all functions are accessible yet, problems might occur. Some settings, such as "measurement storage area" settings, may not be accessible but still affect the experiment.

All components of the imc STUDIO Developer Edition

- Automation, Scripting, Setup-Layout-Designer, ...

Optional components:

- Third Party Device Interface (except AudioDevice, ChannelLoader, FunctionSimulator)
- Power Quality and Powertrain Monitoring
- Bus Decoder
- Video
- imc STUDIO Monitor
- imc STUDIO API

Individual functions:

- Metadata-Assistant (metadata in conjunction with saving of measured data and Data Browser)
- User-defined measurement storage area
- Compression of Digital-In-Port channels (and other reduced channels)
- Textual Report channels (Report channels are deleted from the experiment when it is loaded)
- Text variables
- Data Browser - Deactivation of grouping according to category
- Data Browser - Check-in and Checkout of measurements in the Data Browser
- imc Inline FAMOS: Code modification while measurement is in progress
- Load measurement settings / Traceability of measurements
- Profinet-IRT
- Panel - Navigation Bar