imc EOS

Fast • Precise • Versatile

High-speed data acquisition and transient recorder

imc – productive testing

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imc EOS – At a glance

- **4 MHz sampling rate** per channel and device
- **1.8 MHz analog bandwidth**
- **24 Bit** A/D converter
- **Wide measurement ranges:** galvanically isolated precision measurement amplifiers for signals up to ±100 V
- **Safe data storage** with integrated 1 TB flash memory
- **Able to operate without PC**
- **Can be networked** via Gigabit Ethernet and WLAN
- **Click connection:** mechanically compatible with imc CRONOS*flex*
- **Operates synchronously** in conjunction with all imc measurement systems (via IRIG-B, NTP/PTP)
- **Easy to use** thanks to modern imc STUDIO software, uniform for all imc systems

imc EOS

High-speed measurement devices for the MHz range

imc EOS stands for speed! With sampling rates of up to 4 MHz, imc EOS allows the precise analysis of very fast dynamic processes. Voltage, current transducers and IEPE sensors for acceleration, sound or force can be measured at four isolated inputs.

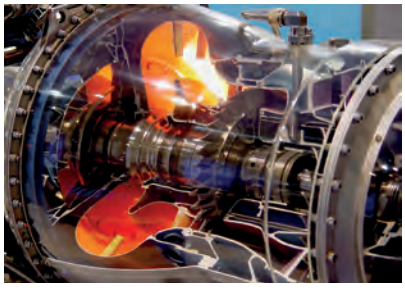
Thanks to high-speed data acquisition technology and versatile measurement inputs, imc EOS is suitable for the analysis of very dynamic processes in material testing, vibration analysis and component testing. Along with crash tests, ballistics testing, pyrotechnics and blasting tests, typical application areas are rocket propulsion, turbines and jet engines.

In automotive applications imc EOS is able to analyze fuel injection and ignition processes, acquire data on high-frequency vibration of motors, transmissions and suspension and investigate switching action and highly dynamic actuators. In the field of e-mobility, the system can be used for characterizing inverter-driven e-motors.

imc EOS systems can be operated with direct interactive PC control or as autarkic systems. The devices are equipped with integrated flash memory, allowing data storage of up to 1 TB independently of a PC. Networking imc EOS via Ethernet allows data transfer to a PC as well as archiving to Network Attached Storage (NAS).

imc EOS is compatible with all other imc data acquisition systems and can be operated synchronously with these systems in one single comprehensive measurement tasks. This is especially attractive for users who are already working with imc systems and wish to extend their existing equipment with high-speed channels.

As with all imc systems, configuration and data visualization is performed using the comprehensive test and measurement software imc STUDIO.



Your benefits – Our goal

Extremely fast

- Up to 4 MHz sampling rate per channel and system
- Up to 1.8 MHz analog signal bandwidth
- Individual channel sampling rates

Precise and high-resolution

- 24 bit high-resolution A/D converter
- Galvanically isolated precision amplifiers with a wide measurement range of up to ±100 V
- Direct connection of voltage, precision current transducers and IEPE/ICP sensors such as accelerometers, microphones or piezoelectric force sensors
- Optional channel-specific sensor supply of 2 Watts per channel

Autarkic and mobile

- Data logging operation even without a PC
- Safe data storage on integrated flash memory
- SuperCap UPS ensures data integrity during power outage
- Also available in extended temperature range of -40 to 85 °C

Networked and synchronous

- Gigabit Ethernet interface for real-time data transfer and live visualization
- Synchronization with multiple imc devices: µs precision via IRIG-B, NTP, PTP
- Optional remote access via WLAN

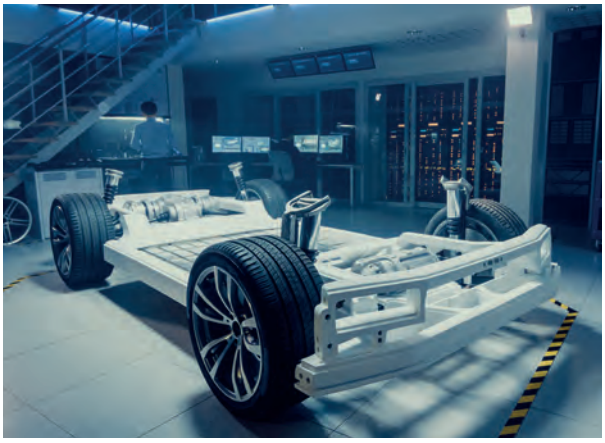
Click connection and extendable

- Multiple imc EOS devices can be click connected and powered from one single source
- imc EOS is mechanically compatible with imc CRONOS*flex* with direct click connection
- imc CRONOS*flex* accessories can also be click connected, such as network switch, battery pack and power supply module for current transducers

In Practice

Modern vehicle components in test

With the use of modern vehicle components, the border between "slow" and "fast" signal acquisition in measurement technology is rapidly vanishing. For example, in order to measure voltage signals in electronic control systems, actuators, ignition or fuel injection processes, it is necessary to apply sampling rates in the Megahertz range. imc EOS bridges the gap when slow and fast signals coexist and need to be correlated when analyzing dynamic processes.



Measurements on advanced e-mobility systems

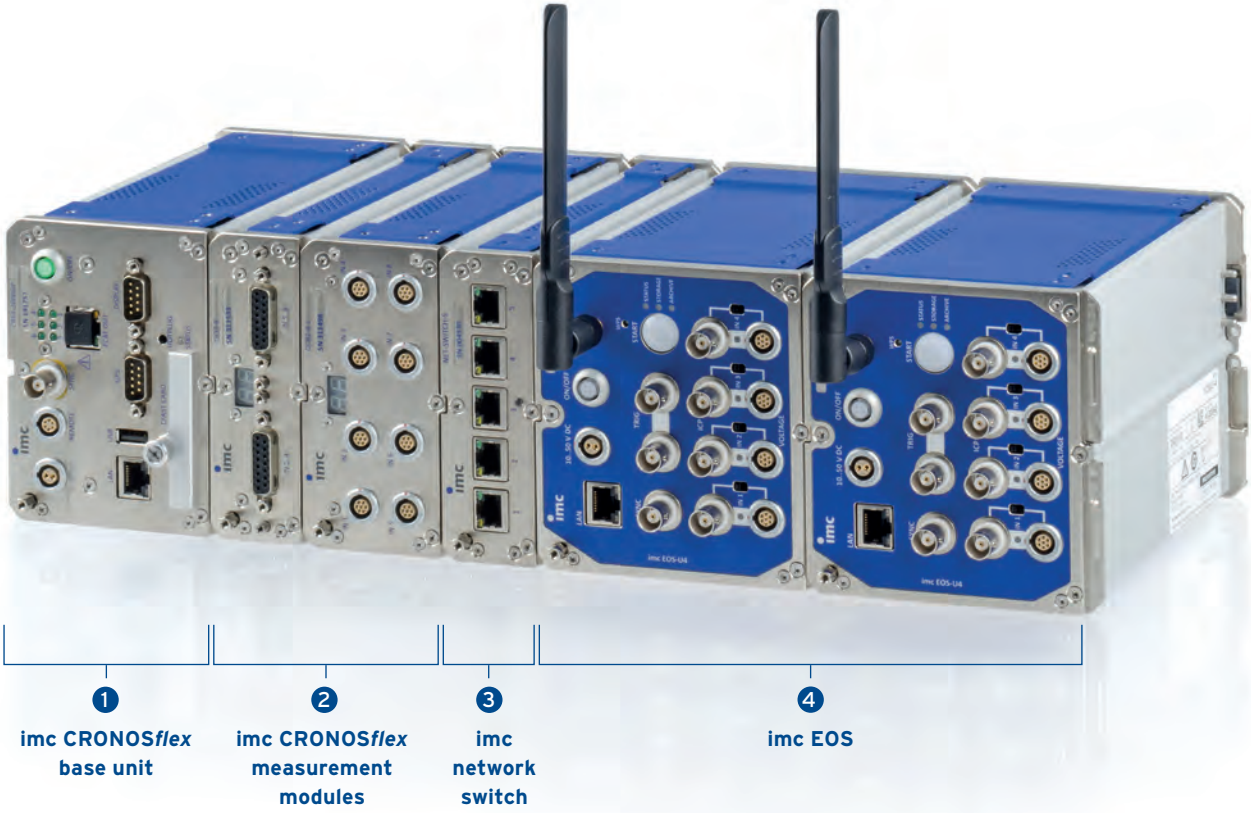
Modern mobility design concepts are diverse: from mild-hybrid through to e-cars, and from pedelecs to e-scooters. In all these vehicles, the interplay of electronic control, battery, inverter and e-motor plays a decisive role. High sampling rates are necessary especially when it comes to analyzing inverter controlled drives with switched PWM power pulses. This is ideal for imc EOS, which delivers precise 24 bit high resolution signals.

Boom, Bang, Boom

When analyzing explosions, ignition processes and ballistic or crash tests, generally only a few milliseconds are relevant. It is all the more important, therefore, that the test is recorded reliably and in high resolution. Thanks to its high sampling rate, versatile trigger logic and safe flash memory storage, imc EOS makes every detail available for later analysis.

Integrated System Solution

imc EOS uses the same housing technology as imc CRONOS*flex*. This allows multiple imc EOS modules to be clicked together into blocks and even extended with imc CRONOS*flex* systems. Networking and synchronization is simple via Ethernet, for example using the click connectable imc NET-SWITCH. In just the simple step of clicking together the devices, classic and high speed measurement data acquisition is unified into one integrated system solution for a comprehensive range of test scenarios.



1. **imc CRONOS*flex* base unit:** Logger module or system base for imc CRONOS*flex* measurement modules – incl. integrated memory card slot, synchronization, networking and optional field bus interfaces.

2. **imc CRONOS*flex* measurement modules:** Versatile modules with analog precision amplifiers for almost all types of sensors, with sampling rates up to 100 kHz per channel.

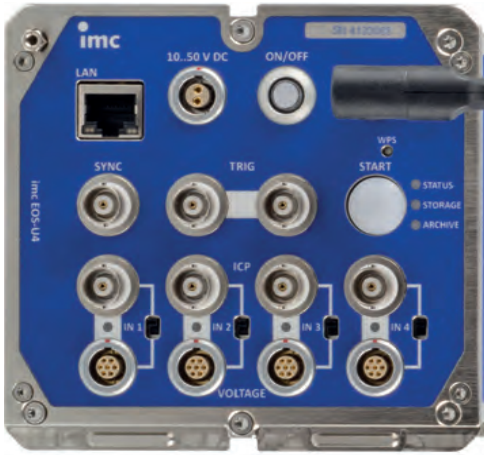
3. **imc network switch** for networking up to four imc systems.

4. **imc EOS:** 4 MHz high-speed data acquisition system with four isolated inputs for voltage and ICP signals up to 1.8 MHz analog bandwidth.

Distributed system design with imc instruments

Fast and flexible measurement amplifier

Four **galvanically isolated** precision amplifiers ensure perfect signal quality even in demanding electromagnetic environments. Each signal input provides both BNC or LEMO connection, which can be used according to sensor technology. **Voltage signals up to ±100 V** and **IEPE/ICP sensors** such as accelerometers, microphones or piezoelectric force sensors can be measured. **Precision current transducers** are also supported. The acquired signals are digitized with **24 bits** and at up to **4 MHz per channel** – the **analog bandwidth** extends to **1.8 MHz.** An optional channel-wise sensor supply of 2 Watts per channel for feeding active sensors leaves nothing to be desired.



For comprehensive tests

An integrated, comprehensive solution is called for whenever it is necessary not only to record individual signals, but also to perform complex tests with a wide variety of mechanical and physical quantities – such as strain, pressure, temperature and voltage – as well as process quantities from controllers, field buses and the like. This is child's play with imc EOS as it operates with all imc measurement systems together, synchronously. In addition to IRIG-B, the device supports network based synchronization such as NTP and PTP. Furthermore, as with all imc data acquisition systems, imc EOS is operated and run using the uniform test and measurement software imc STUDIO.

App control

imc EOS devices can be extended with additional operational options by providing access via apps. Users can start and stop measurements using a smartphone or tablet, release triggers and view the data live. Thanks to intelligent processing and transfer mechanisms, even with a slow WLAN connection the app can display low resolution process overviews as well as high resolution trigger events.

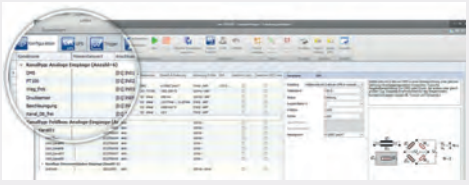
One software for the entire testing process

imc STUDIO combines data acquisition, visualization, analysis and automation

No matter whether you want to configure your imc EOS for a fast mobile measurement in "black box" mode or set up a comprehensive test with several imc systems and hundreds of channels including synchronous video acquisition – with imc STUDIO you have full control over your complete measurement process: from channel configuration to report.

Configure and measure

With imc STUDIO, you are ready to start your measurement in a few minutes. A clearly organized channel configuration list, extensive sorting and filtering functions, numerous assistants, built in sensor management and support of TEDS are just some of the useful functions that will help you reach your goal faster.

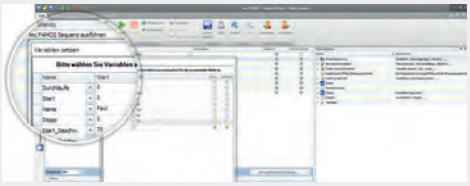


Data display and system operation

With just a few mouse clicks, you can design tailor made user interfaces with the imc STUDIO Panel and link them to the system's inputs and outputs. Choose from over 100 predefined instrument templates and elements (widgets) to create your own personal test and measurement interface.

Automating routine tasks

Save time by automating routine measurement processes using imc STUDIO. Use the drag&drop technique to create your own personal test sequence by selecting from a wide variety of functions – such as channel balancing, entering test object data, starting measurements, saving data, running analyses and printing out a report. That's it!



Recording and playback of videos

Synchronous video recording in addition to your measurement data Is child's play. Simply connect a video camera, and imc STUDIO will take care of the rest. Like any measurement channel, the video channel is synchronized, and offers pre- and post-triggering and even two independent instances (entities) with different data rates and trigger settings ("monitor channels") for each camera.

Easy test stand automation

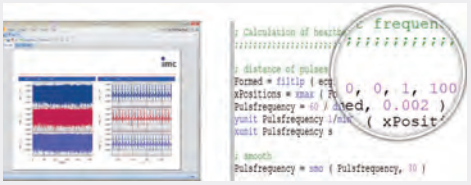
Take control. With imc STUDIO you independently create complete real-time automations for test benches and test setups – without programming a line. You define the individual process steps and add ready-made functions to set points, logical controls or complex multi-variable control via drag&drop.

Live analyzing

Save time and analyze your measurement data live with imc Online FAMOS (device-based) or imc Inline FAMOS (PC-based). If you carry out statistical evaluations, mathematical calculations or complex analyses while the measurement is still running, you will receive meaningful results in real time and can react immediately – even during the test.

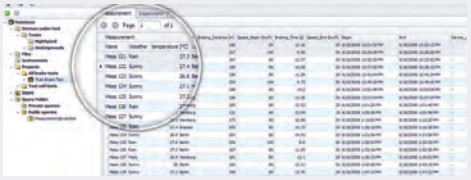
Post-process data analysis

imc FAMOS combines all the tools you need for professional visualization and evaluation of your measurement data: from importing the data to printable reports. Numerous ready-to-use analysis functions and powerful workflow automation options ensure professional data evaluation and fast results.



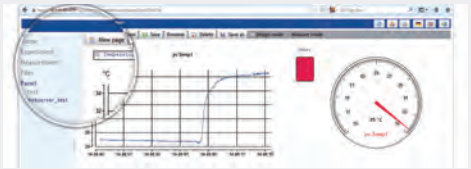
Find instead of search

With the imc FAMOS-based data base solutions, you can store and manage all your measurement and test data in a central data base. Data can be globally searched, filtered, sorted and automatically evaluated together with the analysis software imc FAMOS.



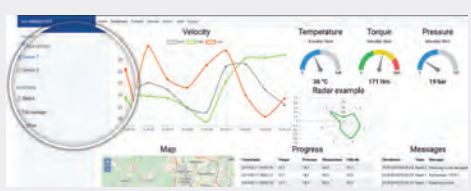
Mobile access via smartphone

Use your smartphone or tablet as a mobile display for your DAQ system. With the imc REMOTE Webserver your imc device has a configurable homepage, which can have control elements for starting, stopping, triggering, etc. besides the pure data display.



Cloud-Services

The imc WEBDEVICES cloud platform allows remote, unmanned and fully automatic monitoring of vehicles, machines, plants and buildings, recording status data and carrying out remote tests over long distances.



Technical data

	imc EOS U-4
General	
System data rate	4 MS/s
Analog inputs	
Analog inputs (BNC/LEMO)	4
Sampling rate per channel	1 kS/s to 4 MS/s
Analog bandwidth	1,8 MHz
Operation modes	Voltage measurement, AC- and DC coupling IEPE sensors (AC with current feed)
Measurement ranges	±100 mV ... ±60 V (max. 100 V)
Isolation	channel-wise galvanically isolated
Selectable digital filters	200 Hz ... 500 kHz and Automatic Anti-Aliasing-Filter (digital AAF): max. 800 kHz @ 2 MSps/s
Resolution	24 Bit ADC
Sensor supply (optional)	
Output voltage	±15 V ... ±2.5 V
Selectable	channel-wise configurable
Isolation	channel-wise galvanically isolated
Output power	2 W/channel, overload and short circuit proof
Connectivity	
Ethernet	1 x GBit-LAN (RJ45)
WLAN (optional)	WLAN adapter (802.11 g/n/ac, 300 Mbit/s)
Synchronization	1 x BNC (IRIG-B)
External Trigger	2 x BNC (IN/OUT)
Action-Button (manual start, trigger, etc.)	●
Data storage	
Onboard Flash memory	480 oder 960 GByte
Storage to PC (network streaming)	●
Arbitrary memory depth with pre- and post-trigger	●
Autonomous operation	
Autarkic operation (without PC)	●
Auto data saving upon power failure	●
Trigger function (PC independent)	●

Synchronization & clock	
Master-Slave between imc systems	●
Network based synchronization: NTP and PTP (in preparation)	●
via external IRIG-B signal	●
Power supply	
DC supply input 10 to 50 V (isolated)	●
AC/DC adapter (110 to 230 VAC)	●
Data integrity (saving) upon power fail	●
Long term UPS (Li-Ion battery)	○
Operating conditions	
Operating temperature range (standard), non-condensating	-10°C bis +55°C
Operating temperature range (extended), condensation allowed	-40°C bis +85°C (optional)
Shock and vibration	MIL-STD-810 Rail Cargo Vibration Exposure U.S. Highway Truck Vibration Exposure

Suitable Accessories

Active and passive handles

Practical handles for clicked-together module blocks

HANDLE-LI-IO-L

UPS-Solution for imc EOS and imc CRONOS*flex*

NET-SWITCH-5

5-Port GBit-Ethernet-Switch with PPT-Synchronization

SEN-SUPPLY-5

Powerful sensor supply modul for current transducers and current clamps

Key: ● Default, ○ Optional

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