

# imc EOS

## Manual

Edition 4 - 2024-04-24



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## 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

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This documentation is the intellectual property of imc Test & Measurement GmbH. imc Test & Measurement GmbH reserves all rights to this documentation. The applicable provisions are stipulated in the "imc Software License Agreement".

The software described in this document may only be used in accordance with the provisions of the "imc Software License Agreement".

## 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/imc STUDIO Monitor installation medium in the folder "*Products\imc DEVICES\OSS*" or "*Products\imc DEVICEcore\OSS*" or "*Products\imc STUDIO\OSS*". If you wish to receive a copy of the GPL sources used, please contact our tech support.

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## Notes regarding this document

This document provides important notes on using the device / the module. Safe working is conditional on compliance with all safety measures and instructions provided. The manual is to be used as a kind of reference book. You can skip the description of the modules you do not have.

Additionally, all accident prevention and general safety regulations pertinent to the location at which the device is used must be adhered to.

These instructions exclusively describe the device, **not how to operate** it by means of **the software!**

If you have any questions as to whether you can set up the device / module in the intended environment, please contact our tech support. The measurement system has been designed, manufactured and unit-tested with all due care and in accordance with the safety regulations before delivery and has left the factory in perfect condition. In order to maintain this condition and to ensure safe operation, the user must observe the notes and warnings contained in this chapter and in the specific sections applicable to the concrete device. Never use the device outside the specification.

This will protect you and prevent damage to the device.

### 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.

# Table of contents

|   |           |
|---|-----------|
| <b>1 General introduction .....</b>                   | <b>6</b>  |
| 1.1 Tech support .....                                | 6         |
| 1.2 Service and maintenance .....                     | 6         |
| 1.3 Legal notices .....                               | 6         |
| 1.4 Explanation of symbols .....                      | 9         |
| 1.5 Last changes in content .....                     | 10        |
| <b>2 Safety .....</b>                                 | <b>11</b> |
| <b>3 Product overview .....</b>                       | <b>14</b> |
| 3.1 imc EOS .....                                     | 14        |
| 3.2 Mechanical dimensions and drawings .....          | 15        |
| 3.3 Included accessories .....                        | 16        |
| 3.4 Optional accessories .....                        | 16        |
| <b>4 Assembly and connection .....</b>                | <b>17</b> |
| 4.1 After unpacking... ..                             | 17        |
| 4.2 Before commissioning .....                        | 18        |
| 4.3 Notes on connecting the device .....              | 18        |
| 4.4 Click mechanism .....                             | 26        |
| 4.5 Powering on .....                                 | 27        |
| 4.6 Powering off .....                                | 27        |
| 4.7 Storage media in the device .....                 | 28        |
| <b>5 Indicators and fault detectors (LEDs) .....</b>  | <b>31</b> |
| 5.1 Operational readiness .....                       | 31        |
| 5.2 Troubleshooting / Restart .....                   | 33        |
| <b>6 Maintenance and servicing .....</b>              | <b>34</b> |
| 6.1 Maintenance and servicing notes .....             | 34        |
| 6.2 Cleaning .....                                    | 34        |
| 6.3 Storage .....                                     | 34        |
| 6.4 Transport .....                                   | 34        |
| <b>7 Start of operation Software / Firmware .....</b> | <b>35</b> |
| 7.1 Installation - Software .....                     | 35        |
| 7.2 Connect the device .....                          | 35        |
| 7.3 Connecting via LAN in three steps .....           | 36        |
| 7.4 Firmware update .....                             | 39        |
| <b>8 imc EOS properties .....</b>                     | <b>41</b> |
| 8.1 Analog inputs .....                               | 41        |
| 8.2 Operating software .....                          | 43        |
| 8.3 Starting measurement .....                        | 45        |
| 8.4 imc EOS in a compound assembly .....              | 47        |
| 8.5 Synchronization .....                             | 48        |

**9 Equipment options ..... 49**

**10 Technical Specs ..... 50**

    10.1 imc EOS U-4 ..... 51

**Index ..... 58**

# 1 General introduction

## 1.1 Tech support

If you have problems or questions, please contact our tech support:

Phone: (Germany): **+49 30 467090-26**  
E-Mail: [hotline@imc-tm.de](mailto:hotline@imc-tm.de)  
Internet: <https://www.imc-tm.com/service-training/>

### 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.

### 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 [tech support](#)  will be happy to receive your feedback.

## 1.2 Service and maintenance

Our service team is at your disposal for service and maintenance inquiries:

E-Mail: [service@imc-tm.de](mailto:service@imc-tm.de)  
Internet: <https://www.imc-tm.com/service>

Service and maintenance activities include, for example calibration and adjustment, service check, repairs.

## 1.3 Legal notices

### Quality Management



imc Test & Measurement GmbH holds DIN EN ISO 9001 certification since May 1995 and DIN EN ISO 14001 certification since November 2023. 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.

Please note that all properties described refer to a closed measurement system and not to its individual slices.

## Guarantee

Each device is subjected to a 24-hour "burn-in" before leaving imc. This procedure is capable of detecting almost all cases of early failure. This does not, however, guarantee that a component will not fail after longer operation. Therefore, all imc devices are granted liability for a period of two years. The condition for this guarantee is that no alterations or modifications have been made to the device by the customer.

Unauthorized intervention in the device renders the guarantee null and void.

## Notes on radio interference suppression

**imc EOS devices satisfy the EMC requirements for an use in industrial settings.**

Any additional products connected to the product must satisfy the EMC requirements as specified by the responsible authority (within Europe<sup>1</sup>) in Germany the BNetzA - "Bundesnetzagentur" (formerly BMPT-Vfg. No. 1046/84 or No. 243/91) or EC Guidelines 2014/30/EU. All products which satisfy these requirements must be appropriately marked by the manufacturer or display the CE certification marking.

Products not satisfying these requirements may only be used with special approval of the regulating body in the country where operated.

All lines connected to the imc EOS devices should not be longer than 30 m and they should be shielded and the shielding must be grounded.

### Note

The EMC tests were carried out using shielded and grounded input and output cables with the exception of the power cord. Observe this condition when designing your setup to ensure high interference immunity and low jamming.

<sup>1</sup> If you are located outside Europe, please refer the appropriate EMC standards used in the country of operation.

## Cables and leads

In order to comply with the value limits applicable to Class B devices according to part 15 of the FCC regulations, all signal leads connected to imc EOS must be shielded..

Unless otherwise indicated, no connection leads may be long leads (< 30 m) as defined by the standard IEC 61326-1. LAN-cables (RJ 45) and CAN-Bus cables (DSUB-9) are excepted from this rule.

Only cables with suitable properties for the task (e.g. isolation for protection against electric shock) may be used.

## ElektroG, RoHS, WEEE, CE

The imc Test & Measurement GmbH is registered with the authority as follows:

**WEEE Reg. No. DE 43368136**

valid from 24.11.2005



Reference

<https://www.imc-tm.com/elektrog-rohs-weee/> and <https://www.imc-tm.com/ce-conformity/>

## FCC-Notice

This product has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment on and off, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult our tech support or an experienced technician for help.

## Modifications

The FCC requires the user to be notified that any changes or modifications made to this product that are not expressly approved by imc may void the user's authority to operate this equipment.



## 1.4 Explanation of symbols



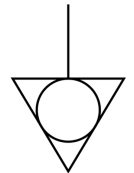
### CE Conformity

see CE [chapter 1.2](#)



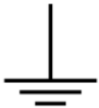
### No household waste

Please do not dispose of the electrical/electronic device with household waste, but at the appropriate collection points for electrical waste, see also [chapter 1.2](#).



### Potential compensation

Connection for potential compensation



### Grounding

Connection for grounding (general, without protective function)



### Protective connection

Connection for the protective conductor or grounding with protective function



### Attention! General danger zone!

This symbol indicates a dangerous situation;  
Since there is insufficient space for indicating the rated quantity at the measuring inputs, refer to this manual for the rated quantities of the measuring inputs before operation.



### Attention! Injuries from hot surfaces!

Surfaces whose temperatures can exceed the limits under certain circumstances are denoted by the symbol shown at left.



### ESD-sensitive components (device/connector)

When handling unprotected circuit boards, take suitable measures to protect against ESD (e.g. insert/remove ACC/CANFT-RESET).




### Possibility of electric shock

The warning generally refers to high measurement voltages or signals at high potentials and is located on devices suitable for such measurements. The device itself does not generate dangerous voltages.




### DC, Direct Current


Supply of the device via a DC voltage source (in the specified voltage range)

- 


**RoHS of the PR China**

The limits for hazardous substances in electrical/electronic equipment applicable in the PRC are identical to those in the EU. The restrictions are complied with (see [chapter 1.2](#)). A corresponding "China-RoHS" label is omitted for formal/economic reasons. Instead, the number in the symbol indicates the number of years in which no hazardous substances are released. (This is guaranteed by the absence of named substances).
- 

**Labeling integrated energy sources**

UxxRxx are integrated in the symbolism. "U" stands for the installed UPS energy sources, if 0 = not installed. "R" stands for the installed RTC energy sources, if 0 = not installed. You can download the corresponding data sheets from the imc website:  
<https://www.imc-tm.com/about-imc/quality-assurance/transport-instructions/>
- 

**Observe the documentation**

Read the documentation before starting work and/or operating.
- 

**On/Off**

On/Off button (no complete disconnection from the power supply)

## 1.5 Last changes in content

### Amendments and bug-fix in Edition 4

| Section       | Amendments          |
|---------------|---------------------|
| Indicators    | new LED blink codes |
| Storage media | updated description |

### Amendments and bug-fix in Edition 3

| Section            | Amendments   |
|--------------------|--|
| Symbols            | Missing symbols added in chapter "Explanation of symbols".   |
| Connecting via LAN | The dialog for configuring the IP address of the device also provides the IP address of the PC. Thus, the first step was removed from the documentation, which presented different possibilities in Windows to determine the IP address. |
| Technical Specs    | We updated the general introduction to this chapter.   |

### Amendments and bug-fix in Edition 2.2

| Section                         | Amendments  |
|---------------------------------|---|
| <a href="#">Technical Specs</a> | All available measurement ranges are now stated for the offset error. |

## 2 Safety

This section provides an overview of all important aspects of protection of the users for reliable and trouble-free operation. Failure to comply with the instructions and protection notes provided here can result in serious danger.

### Responsibility of the operator

imc EOS is for use in commercial applications. The user is therefore obligated to comply with legal regulations for work safety.

Along with the work safety procedures described in this document, the user must also conform to regulations for safety, accident prevention and environmental protection which apply to the work site. If the product is not used in a manner specified by the manufacturer, the protection supported by the product may be impaired.

The user must also ensure that any personnel assisting in the use of the imc EOS have also read and understood the content of this document.

### Operating personnel

This document identifies the following qualifications for various fields of activity:

- *Users of measurement engineering*: Fundamentals of measurement engineering. Basic knowledge of electrical engineering is recommended. Familiarity with computers and the Microsoft Windows operating system. Users must not open or structurally modify the measurement device.
- *Qualified personnel* are able, due to training in the field and to possession of skills, experience and familiarity with the relevant regulations, to perform work assigned while independently recognizing any hazards.



#### Warning

- **Danger of injury due to inadequate qualifications!**
- Improper handling may lead to serious damage to personnel and property. When in doubt, consult qualified personnel.
- Work which may only be performed by trained imc personnel may not be performed by the user. Any exceptions are subject to prior consultation with the manufacturer and are conditional on having obtained corresponding training.

## Special hazards

This segment states what residual dangers have been identified by the hazard analysis. Observe the safety notes listed here and the warnings appearing in subsequent chapters of this manual in order to reduce health risks and to avoid dangerous situations. Existing ventilation slits on the sides of the device must be kept free to prevent heat accumulation inside the device. Please operate the device only in the intended position of use if so specified.

### Danger



#### **Lethal danger from electric current!**

- Contact with conducting parts is associated with immediate lethal danger.
- Damage to the insulation or to individual components can be lethally dangerous.

#### **Therefore:**

- In case of damage to the insulation, immediately cut off the power supply and have repair performed.
- Work on the electrical equipment must be performed exclusively by expert electricians.
- During all work performed on the electrical equipment, it must be deactivated and tested for static potential.

#### **Injuries from hot surfaces!**



- Devices from imc are designed so that their surface temperatures do not exceed limits stipulated in EN 61010-1 under normal conditions.

#### **Therefore:**

- Surfaces whose temperature can exceed the limits under circumstances are denoted by the symbol shown at left.

## Industrial safety

We certify that imc EOS in all product configuration options corresponding to this documentation conforms to the directives in the accident prevention regulations in "Electric Installations and Industrial Equipment" (DGUV Regulation 3)\*. This confirmation applies exclusively to devices of the imc EOS series, but not to all other components included in the scope of delivery.

This certification has the sole purpose of releasing imc from the obligation to have the electrical equipment tested prior to first use (§ 5 Sec. 1, 4 of DGUV Regulation 3). This does not affect guarantee and liability regulations of the civil code.

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\* previously BGV A3.

## Observe notes and warnings

Devices from imc have been carefully designed, assembled and routinely tested in accordance with the safety regulations specified in the included certificate of conformity and has left imc in perfect operating condition. To maintain this condition and to ensure continued danger-free operation, the user should pay particular attention to the remarks and warnings made in this chapter. In this way, you protect yourself and prevent the device from being damaged.

Read this document before turning on the device for the first time carefully.



### Warning

---

Before touching the device sockets and the lines connected to them, make sure static electricity is diverted to ground. Damage arising from electrostatic discharge is not covered by the warranty.

---

## 3 Product overview

### 3.1 imc EOS

#### The fast compact measurement instrument for direct connection of IEPE sensors and voltage signals

The EOS U-4 model of the imc EOS series is a 4-channel measurement instrument for applications in the fields of noise and vibration, materials testing and component testing, ballistics and e-mobility. It is equipped with high bandwidth amplifiers to which any IEPE/ICP™ sensors can be connected directly via BNC, such as DeltaTron® accelerometers and microphones as well as piezoelectric sensors for dynamic measurements (AC) of force and pressure.

#### imc EOS – 4 MS/s fast, compact and portable measurement instruments

The EOS U-4 system of the imc EOS device series has a fixed configuration. The measurement instruments work computer-aided via network connection to a PC. As standard equipment, all devices have fully conditioned input channels and a large internal data memory.

imc EOS can be cascaded and synchronized with other imc systems. Maximum flexibility is guaranteed as the operating mode can be configured individually and via software for each system.



imc EOS systems can be easily connected mechanically by means of the robust imc click mechanism, whereby a common supply voltage is electrically coupled at the same time. A PTP-compatible network switch and a buffered UPS solution and a sensor supply for current transducers are also offered in these housings which are compatible with the imc CRONOSflex family.

Fig. 1: imc EOS – Cascading of several devices and in combination with further components of the imc CRONOSflex device series

#### Overview

| Order Code     | Signal inputs                                 | article no. |
|----------------|---|-------------|
| EOS/U-4        | IEPE / ICP via BNC<br>Voltage via BNC or LEMO | 12800001    |
| EOS/U-4-SUPPLY | with additional sensor supply (SUPPLY)        | 12800000    |

## 3.2 Mechanical dimensions and drawings

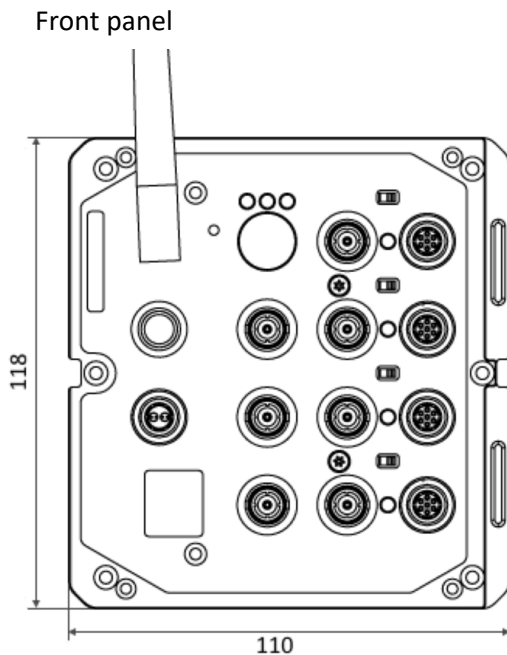


Fig. 2: Front with dimensions

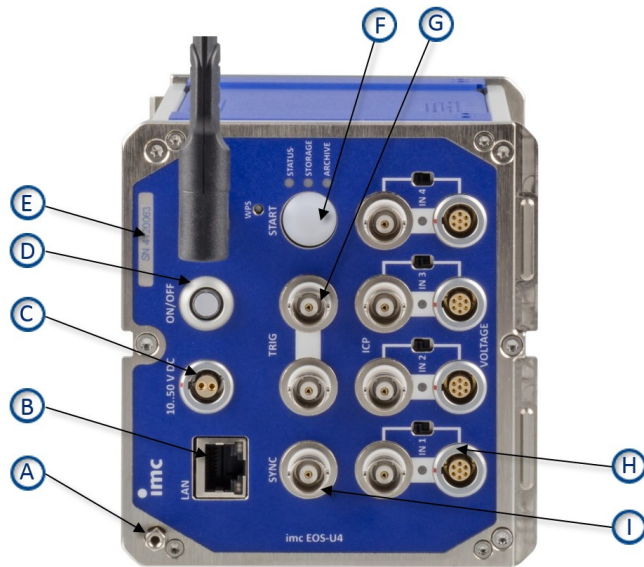


Fig. 3: Front side with items A through I

These illustrations 2 to 4 show the imc EOS device in the standard operating orientation.

### Legend:

- A: Ground terminal
- B: PC / network socket
- C: Power supply
- D: Main switch On/Off
- E: Label for the serial number (SN) of the device
- F: Action-Button "START"
- G: External trigger (2 x BNC)
- H: Analog inputs and switch for BNC or LEMO
- I: Synchronization

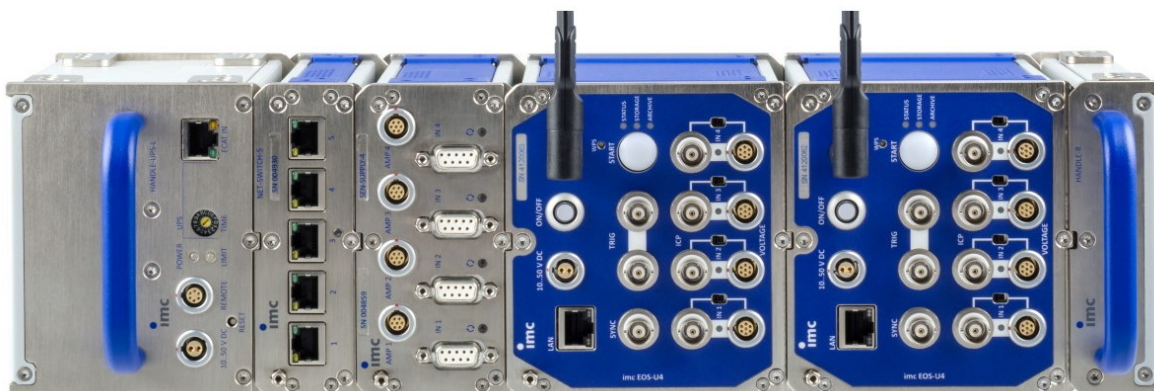


Fig. 4: CRFX/HANDLE-UPS-L, CRFX/NET-SWITCH-5, CRFX/SEN-SUPPLY-4, 2x EOS-U-4 and CRFX/HANDLE-R

### 3.3 Included accessories

| AC/DC power adaptor 110-230V AC (with appropriate LEMO plug)     |  |          |
|--|--|----------|
| ACC/AC-ADAP-48-150-1B  | 48 V DC / 150 W LEMO.1B.302  | 13500148 |
| Power plug   |  |          |
| ACC/POWER-PLUG5  | DC supply plug LEMO FGG.1B.302, with solder contact, max. 0.34 mm <sup>2</sup> | 13500150 |
| Documents  |  |          |
| Device certificate   |  |          |
| Miscellaneous  |  |          |
| 1x Ethernet network cable with latch protection (uncrossed, 2 m) |  |          |

### 3.4 Optional accessories


- Protokollsatz (PDF) pro Gerät mit Werkskalibrierschein und Einzelwerten sowie der Liste der verwendeten Prüfmittel. Entspricht den Anforderungen der DIN EN ISO 17025.

| Supply module in left handle ("Power-Handle") |   |          |
|---|---|----------|
| CRFX/HANDLE-POWER-L                           | handle with system power supply<br>50 V 100 W, without UPS  | 11900058 |
| CRFX/HANDLE-UPS-L                             | handle with system power supply<br>50 V 100 W, USV with lead-gel battery  | 11900043 |
| CRFX/HANDLE-LI-IO-L                           | handle with system power supply<br>50 V 100 W, USV with Li-Ion battery  | 11900010 |
| Plug  |   |          |
| ACC/REMOTE-1B                                 | Remote plug, LEMO.1B.306  | 13500153 |
| ACC/REMOTE-1B-12                              | Remote plug CRFX/HANDLE, with bridged contacts (pin 1-2).<br>Required to power on and off a combination of EOS and CRFX/HANDLE. | 13500370 |
| Passive handle                                |   |          |
| CRFX/HANDLE-L                                 | standard unpowered left handle  | 11900008 |
| CRFX/HANDLE-R                                 | standard unpowered right handle   | 11900007 |
| Mounting brackets for fixed installations     |   |          |
| CRFX/BRACKET-90                               | mounting bracket 90°  | 11900068 |
| CRFX/BRACKET-180                              | mounting bracket 180°   | 11900069 |
| CRFX/BRACKET-BACK                             | rear panel mounting element   | 11900070 |
| CRFX/BRACKET-CON                              | assembly element for two modules  | 11900071 |
| CRFX/RACK                                     | 19" RACK for imc CRONOSflex modules   | 11900066 |
| CRFX/BRACKET-RACK                             | mounting element in the RACK  | 11900072 |



## 4 Assembly and connection

### 4.1 After unpacking...

Check the delivered system immediately upon receiving it for completeness ([see included accessories](#) ) and for possible transport damage. In case of damage visible from outside, proceed as follows

- Do not accept the delivery or only accept it with reservations,
- Note the extent of the damage on the packing documents or on the delivery service's packing list,
- Begin the claims process.

Please check the device for mechanical damage and/or loose parts after unpacking it. The supplier must be notified immediately of any transportation damage! Do not operate a damaged device.



#### Note

File a claim about every fault as soon as it is detected. Claims for damages can only be honored within the stated claims period.

## 4.2 Before commissioning

If the device is brought into its operational setting from a cold environment, condensation may occur. In these situations, always wait until the device warms up to room temperature and is completely dry before turning it on. The acclimatization period should take about 2 hours. This is especially recommended for devices without ET (extended environmental temperature range). We recommend a warm-up phase of at least 30 min prior to measure.

Existing ventilation slits must be kept unimpeded to avoid heat buildup in the device interior.

The devices have been designed for use in clean and dry environments. It is not to be operated in exceedingly dusty and/ or wet environments, in environments where danger of explosion exists nor in environments containing aggressive chemical agents.

## 4.3 Notes on connecting the device



### 4.3.1 Precautions for operation

Certain ground rules for operating the system, aside from reasonable safety measures, must be observed to prevent danger to the user, third parties, the device itself and the measurement object. These are the use of the system in conformity to its design, and the refraining from altering the system, since possible later users may not be properly informed and may ill-advisedly rely on the precision and safety promised by the manufacturer.

#### Note

If you determine that the device cannot be operated in a non-dangerous manner, then the device is to be immediately taken out of operation and protected from unintentional use. Taking this action is justified under any of the following conditions:

- I. the device is visibly damaged,
- II. loose parts can be heard within the device,
- III. the device is no longer working,
- IV. the device has been stored for a long period of time under unfavorable conditions (e.g. outdoors or in damp areas).

1. Observe the data in the chapter "Technical Specs", in order to prevent damage to the unit through inappropriate signal connection.
2. Note when designing your experiments that all input and output leads must be provided with shielding which is connected to the ground ("CHASSIS") at one end in order to ensure high resistance to interference and noisy transmission (see [Shielding](#)  24).
3. Avoid prolonged exposure of the device to sunlight.
4. Please operate your EOS device only in the standard operating orientation (see [chapter drawings](#)  15). Be certain that the ventilation slits remain unobstructed.
5. Note that parts that are not explicitly intended to be carried may be warmer than the handles. The use of handles is recommended for safe use. In the event of deviations, other suitable methods must be used to ensure acceptable protection against burns. Under normal conditions, the surface temperature of the enclosure/housing does not exceed the limits for accidental contact according to IEC 61010-1. The handles also prevent the lateral plug contacts from being touched during a measurement, thus preventing accidental discharge (ESD) into the lateral plug contacts. ESD in the lateral plug contacts can lead to a crash of a running measurement (destruction does not take place).

### 4.3.2 Power supply

An imc EOS device is powered by a DC supply voltage which is supplied via a 2-pin LEMO socket, see [Fig. 3 Front side with items: C](#)<sup>15</sup>.

|  |
|--|
| <b>LEMO-plug type designation</b>                      |
| FGG.1B.302.CLAD.52ZN with two coding keys (see Fig. 5) |

The permitted supply voltage range is 10 to 50 V DC (ultra wide range).  
The included AC/DC-adapter ("table-top power supply unit") requires a rated input voltage of 110 V.. 240 V at 50/60 Hz. The DC power supply inputs are not designed for connection to a DIN EN 61326-1 compliant DC grid.

! Note

Desktop supply unit (power adaptor)

Please note, that the operating temperature range of the power adapter is specified for 0 °C to 40 °C, even if your measurement device is designed for an extended temperature range.

- When connecting, ensure that:
- The supply line must be a cable of low impedance and sufficient cross section. Any additional interference suppression filters connected in the supply circuit may not have series inductance above 1 mH, otherwise an additional parallel capacitor is required.

LEMO pin configuration

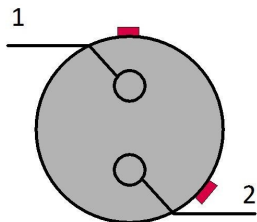


Fig. 5: power supply  
(view to the socket)

| PIN | Signal  |
|-----|---------|
| 1   | +Supply |
| 2   | -Supply |

There is a red marking on the side of the positive pole.

### 4.3.2.1 Power-Handle

Optionally, imc EOS can be equipped with UPS.

When operating a combination of EOS units and a Power-Handle, you will usually [switch the system on/off using the REMOTE-socket](#) <sup>27</sup> on the Power-Handle. A switch connected at the Power-Handle's REMOTE-socket switches the system on/off, while the (latching) main switch on the EOS-component meanwhile remains pressed down.

In this regard, there is a distinction in how the Power-Handles is operated between the cases of imc CRONOS (CRFX) and imc EOS: While the pushbutton (not latching) main switch of a CRFX base unit switches the overall system consisting of the Handle and base unit on/off, with an imc EOS, an external switch connected to the Handle's REMOTE-socket is required!

The Remote-contact can be achieved in any of the following ways:

#### 1) Remote-plug with permanently bridged Contacts 1-2 (ON/OFF = SWITCH1)

This ready-made connector is available as an [accessory](#) <sup>16</sup> (ACC/REMOTE-1B-12, #135500370)

Plugging it in switches the device on, unplugging switches it off.

#### 2) Remote-plug with connected cabling and switch, assembled by the user.

The separate connector is available as an accessory (ACC/REMOTE-1B, #13500153)

##### 2a) with latching contact: Switch connected between Contacts 1-2 (ON/OFF = SWITCH1)

"Static" switch-on/off

If the switch remains permanently pressed, then the device switches on exactly when a power supply is applied. If the power supply is withdrawn, it switches off, or if applicable it continues running on battery power (in conjunction with the optional and in accordance with the respective buffer duration) and subsequently switches off.

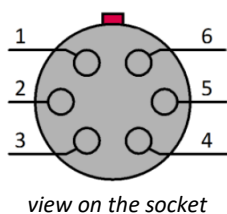
##### 2b) with not latching switch: Switch connected between Contacts 3-4 (ON/OFF = SWITCH)

Brief actuation switches the device on, the next brief actuation switches it off.

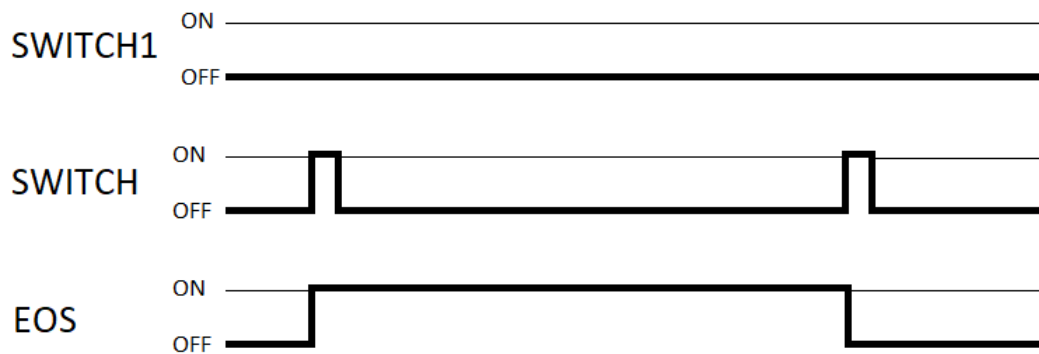
#### 4.3.2.1.1 Remote-control Power-Handle

When a **Power-Handle is used**, the overall system is switched on via the Remote socket of the Power-Handle. In this case, be aware of the following:

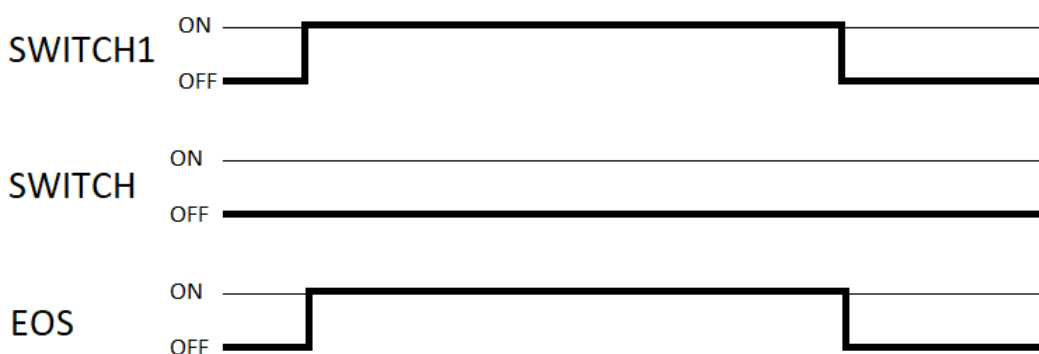
- imc EOS' **ON/OFF** switch must **snap in to the ON** position.
- In order for the system to be **switched on/off**, use a appropriate connector with switch, which is plugged into the Power-Handle's **Remote socket**.



| PIN | CRFX/HANDLE-POWER | CRFX/HANDLE-UPS-L<br>CRFX/HANDLE-LI-IO-L |
|-----|-------------------|--|
| 1   | ON / OFF          | ON / OFF                                 |
| 2   | SWITCH1           | SWITCH1                                  |
| 3   | ON / OFF          | ON / OFF                                 |
| 4   | SWITCH            | SWITCH                                   |
| 5   | n.c.              | <b>REFERENCE</b> (for MUTE)              |
| 6   | housing           | MUTE                                     |

**Activation/deactivation with pushbutton:**

*A pushbutton on the remote connector switches pins 3 (ON/OFF) to pin 4 (SWITCH) on and off.*

**Activation/deactivation with switch:**

*With a switch between pin 1 (ON/OFF) and pin 2 (SWITCH1) the device switches on and off.*

If the system is to be activated by means of applying the power supply, a permanent bridge from **ON/OFF** to **SWITCH1** must be established. Then whenever the power supply is stopped, the device remains activated until the Power-Handle is discharged.

#### 4.3.2.1.2 Charging the internal rechargeable battery in conjunction with the Power Handle and the UPS function

System power supply units (Power-Handles) having additional UPS functionality, i.e. an internal buffer battery, only charge up the battery if they are switched on. This is by intentional design, in particular for purposes of in-vehicle applications, in order to prevent accidental draining of a vehicle battery due to the considerable current draw for charging.

Therefore, if a Power-Handle having a UPS battery is to be charged separately from its measurement system, for instance in preparation for the buffer or in order to refresh it, by means of an AC/DC adaptor, while the rest of the system remains in the vehicle, then this Power-Handle module must be activated in "Stand Alone" mode. Since it doesn't have its own manual main switch, this can be accomplished by means of its REMOTE-terminal's remote control signals, for instance by bridging Pins 1 and 2.

**Terminal connection Power-Handle:****(CRFX/HANDLE-POWER, CRFX/HANDLE-UPS-L, CRFX/HANDLE-LI-IO-L)**

- Power supply LEMO.EGE.1B.302 (female) multicoded
- Auxiliary output 5x LEMO.1B.304 (female)  
( rear side of the handle)
- System bus (EtherCAT):<sup>1</sup> RJ45 Buchse (EtherCAT IN)
- Remote control: LEMO.1B.306 (female)
- Module socket: 20 pin (System bus <sup>1</sup>and power supply)

The Power Handle provides the functioning of the overall system including all additional modules even during a power outage, thanks to battery buffering. UPS buffering is available with either lead batteries (CRFX-HANDLE-UPS-L) or Li-ion batteries as well as with extended battery capacity (CRFX-HANDLE-LI-IO-L). The supply module is protected by a non-resetable 20 A fuse at its input.



Both handles (CRFX-HANDLE-LI-IO-L and the CRFX-HANDLE-UPS-L) are equipped with a switch to set the buffer duration (table).

| Position | Buffer duration |
|----------|-----------------|
| 0        | none            |
| 1        | 1 sec           |
| 2        | 2 sec           |
| 3        | 5 sec           |
| 4        | 10 sec          |
| 5        | 30 sec          |
| 6        | 1 min           |
| 7        | 2 min           |
| 8        | 5 min           |
| 9        | 10 min          |
| A        | 30 min          |
| B        | 1 h             |
| C        | 2 h             |
| D        | 5 h             |
| E        | 10 h            |
| F        | maximum         |

<sup>1</sup> no use with imc EOS

**Short-circuit proof**

Since theoretically any amount of imc EOS and imc CRONOSflex Modules could be connected to the supply module, the supply module comes with a power limiting circuit with long-term short-circuit protection. This circuit limits the power consumed to approx. 100 W.

When this limit is surpassed, the output voltage is cut, and then is enabled again after about 4 seconds. If the overload or short-circuit has still not subsided by that time, the system wait another 4 seconds etc. During the "waiting period", the supply module's Power-LED flashes at one-second intervals. The LED, designated "**LIMIT**" at the front of the Power Handle, is yellow if the output power consumption is more than 80 W and the LED will be red if the power consumption is more than 95 W.

**Note**

- The LED, designated "POWER" at the front of the Power Handle, is yellow in case of an operation in battery mode.
- If the Power Handle is connected to a imc EOS or a CRFX base unit please make sure that the LEMO supply socket is connected with the Power Handle! The supply of a block of modules always comes from the leftmost module (first module).

## 4.3.3 Grounding

In order to comply with the pertinent value limits for Class B devices as per Part 15 of the FCC-regulations, the device must be grounded. The grounding is established via the ground terminal

[Fig. 3 Front side: item A](#)  on the front panel.

### 4.3.3.1 Grounding with the use of the included power adaptor

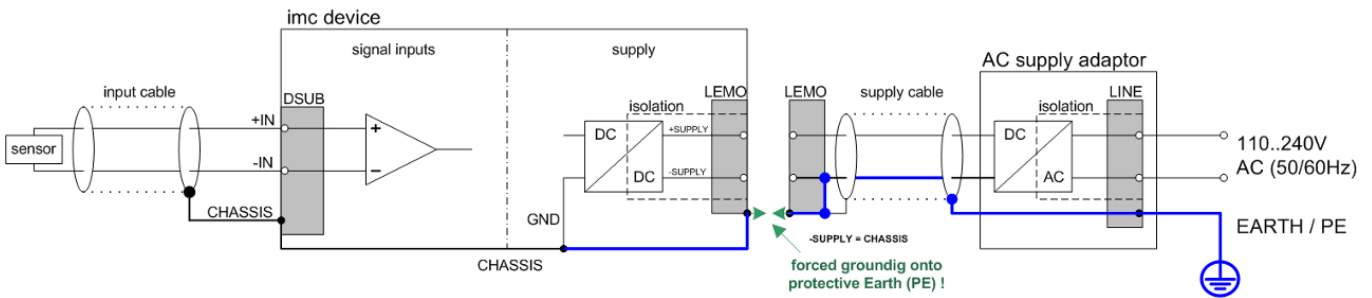


Fig. 6 imc EOS with desktop power supply unit

Use of the desktop power supply unit, included in the package, ensures proper grounding via the plug's protective earth terminal: in the supply unit's LEMO socket, the supply voltage's (-) pole as well as the shield and plug enclosure are connected to the cable's ground.

### 4.3.3.2 Grounding with power supplied by a vehicle battery

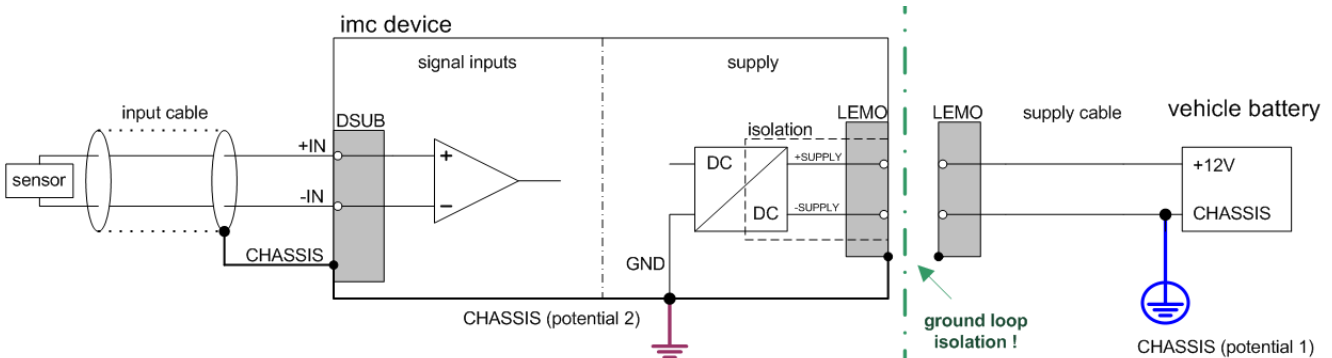


Fig. 7 imc EOS powered by an isolated DC-voltage source (e.g. battery)

If the power supply (e.g. automobile battery) and the measurement device are at different voltage levels, connecting them via the power supply connection would cause a ground loop. For such a case, the potential-isolating design of the internal device power supply keeps these two different voltage levels separated. The user must independently take steps to provide the measurement device's ground reference.

For running on an isolated DC power supply source (e.g. battery), either the grounding socket terminal, a grounding contact on the device ("CHASSIS"), or the CHASSIS contact on the imc signal plugs must be used.

#### Isolated power inputs avoids ground loops in distributed topologies

With stationary installations and the use of (already isolated) AC/DC adapters, any system ground differentials between the device and the central or local power supplies may not be relevant. The big issue in such a case, in contrast to mobile, in-vehicle applications, is from where to obtain a reliable ground voltage. Since it is convenient to use the AC power supply's protection ground line as the ground voltage, the LEMO-terminated AC/DC adapters for imc measurement devices are designed so that the protection ground line is connected all the way through to the LEMO plug's housing, thus securing the device's voltage level to protection ground. Additionally, in the AC/DC-adaptor's LEMO-terminal (not the device's LEMO-socket!), the reference ground of the power adapter is connected with the housing's (CHASSIS) protection ground: Since the AC/DC power adapter is already isolating, as is the power input, this supply voltage's reference would not initially be defined and can be set arbitrarily. In particular for reasons of suppressing HF (high-frequency) interference signals stemming from the AC/DC switching power adapter, direct grounding is normally advisable.

### 4.3.4 Shielding

All signal leads connected to the device must be shielded and the shielding must be grounded (galvanic contact between the shielding and the connector housing "CHASSIS"). In order to avoid compensation currents, the shielding may only be referenced to a voltage level on one side.

### 4.3.5 Connecting the analog inputs

#### Analog inputs

##### LEMO.1B

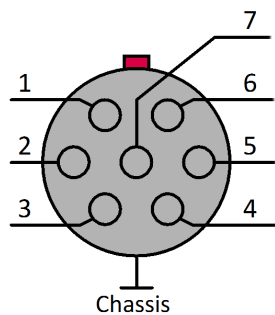


Fig. 8: IN1...IN4  
(view towards the socket)

| PIN | Signal   |
|-----|----------|
| 1   | +IN      |
| 2   | -IN      |
| 3   | +SUPPLY  |
| 4   | -SUPPLY  |
| 5   | reserved |
| 6   | GND*     |
| 7   | n.c.     |

\*GND of the measurement inputs (Signal-GND as well as Power-GND of the optional sensor power supply) appears with a simplified universal designation and symbol, however it is actually individually isolated from each of the device's power supply, the housing frame (CHASSIS) and adjacent channels.



## BNC



Coupling: DC, differential

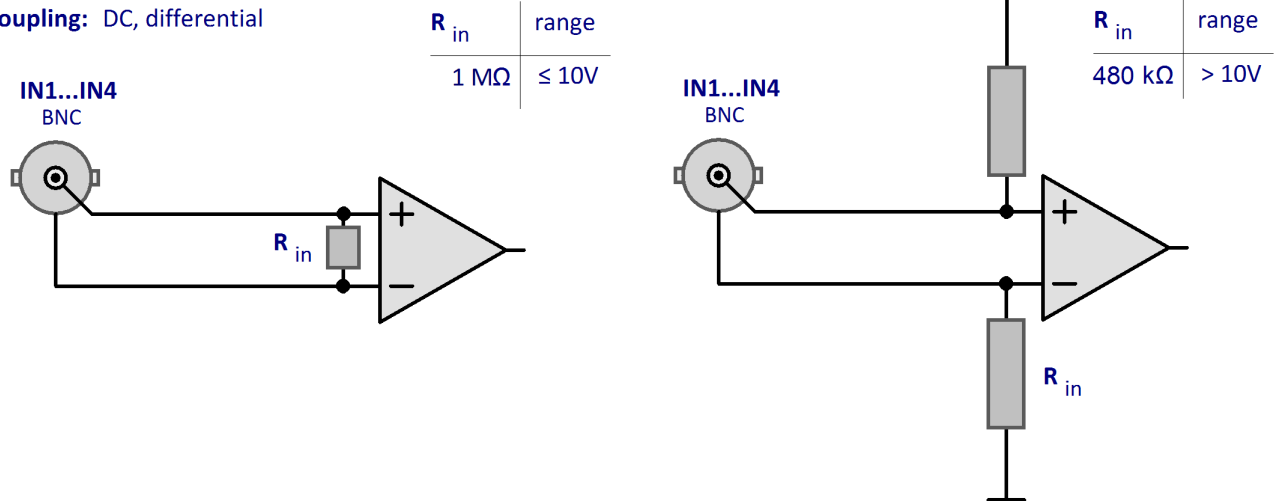


Fig. 9: DC input coupling



Coupling: IEPE

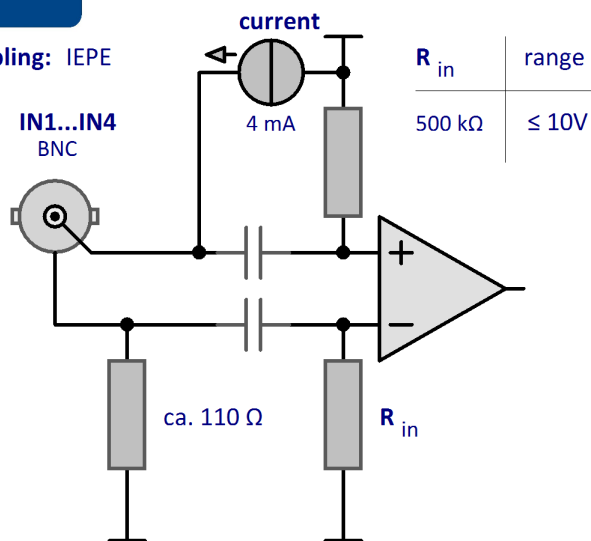


Fig. 10: AC input coupling with current feed

## Notes

## Measurement modes

The voltage measurement can be performed either via BNC or LEMO. A small slide switch which shifts between BNC- and LEMO-terminals determines for each channel separately which signal path is applied.

Measurement with an IEPE-sensor is performed via BNC.

The chapter "[Technical Specs](#)" <sup>51</sup> presents details on the measurement modes.

## 4.4 Click mechanism

imc EOS devices can be connected either together with others or with imc CRONOSflex (CRFX) modules by means of their clicking mechanism. The complete system is supplied with power from a shared voltage source.

See also [imc EOS in a compound assembly](#) <sup>47</sup>.

### Click mechanism

#### Stacking

1. Position the tongues of the module (front of the device) into the groove of the second module
2. Press modules together

After successful clicking together you should hear a "click sound".

#### Detaching devices from the stack

1. Unlock the modules  
press the "unlock button"
2. Pull the tongues out of the groove

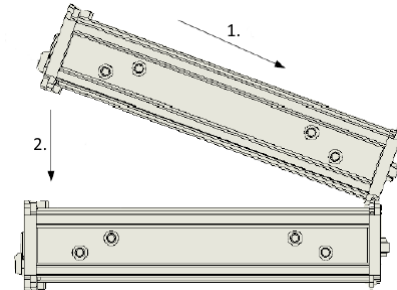


Fig. 11: stacking



Fig. 12: detaching

## 4.5 Powering on

**Activation** is accomplished by using the device's main switch. The main switch of the device is a latching Power-On switch with integrated "POWER" LED, whose activation switches the device on as soon as a supply voltage is applied. For this it doesn't matter whether the voltage is applied to the power supply input ([Fig.: Front side with items: C](#)<sup>[15]</sup>) via the [LEMO-socket](#)<sup>[19]</sup>, or via a module connected at the left side by the click mechanism.

When a **Power-Handle is used**, the system is switched on via the Remote socket. For detailed information, please see the [chapter Power-Handle](#)<sup>[20]</sup>.

## 4.6 Powering off

Switching off is done by pressing the Power-On button again for approx. 1 sec, which is indicated by a steady blinking of the "POWER" LED. The device does not switch off immediately during a running measurement. First, associated files on the internal hard disk are completed before the device switches itself off automatically. This process takes about 10 seconds at most. It is not necessary to press the Power-On button constantly during this process. If no measurement is running, the switch-off process takes about one second.

By contrast, deactivating imc EOS when using the Power-Handle (with or without additional UPS-function) is accomplished by means of the [REMOTE contact on the Power-Handle](#)<sup>[20]</sup>.

In this case, the output voltage of this power supply unit is deactivated, which triggers the connected EOS device's automatic switch-off mechanism in response to power outage: any measurement still running is automatically stopped and saved to the device memory, and next Auto-Shutdown is performed. This process is safeguarded by internal buffering mechanisms (SupeCaps).

### Note


Previously tripping the EOS device's main switch circumvents the Auto-Shutdown.

## 4.7 Storage media in the device

This section describes how to handle the storage media of the imc measurement devices and how to use them with imc STUDIO.

The storage media are exclusively for data acquisition with imc STUDIO.

Storage media with verified performance can be purchased as accessories from imc. Hard drives are ordered with the device and can only be installed subsequently by imc.

 **Note**

Manufacturer and Age of the storage medium

- imc has no way to affect the quality of the removable storage media provided by the various manufacturers.
- Storage media which come with newly purchased devices have been inspected in the framework of quality assurance and have passed the relevant tests.
- We expressly declare that the use of removable storage media is at the user's own risk.
- imc and its resellers are only liable within the framework of the guarantee and only to the extent of providing a substitute.
- imc expressly declines any liability for any damages resulting from loss of data.

### 4.7.1 For devices of the firmware group B (imc DEVICEcore)

#### Swapping the storage medium


The microSD card may only be changed when the **device is switched off**.

##### 4.7.1.1 Storage media

| Storage media      | Description  |
|--------------------|--|
| Internal hard disk | <ul style="list-style-type: none"><li>• The hard drive has been formatted with the file system "Ext2". Re-formatting is not possible.</li><li>• The hard drive is permanently installed.</li><li>• The specified operating temperature range of the media is relevant.</li></ul> |

##### 4.7.1.2 Data transfer



The storage medium can be accessed **directly via Windows Explorer**. Alternatively, the storage medium can be inserted into a **card reader** on the PC (suitable for large amounts of data due to faster transfer).

 **Warnung**

Do **not use force** to insert or remove the device storage medium.

Access via Windows Explorer


The menu item "Data (Device)" () causes the Windows-Explorer to start while indicating the device selected.

| Ribbon  | View     |
|---|----------|
| Extra > Data (Device) (  ) | Complete |
| Home > Data (Device) (  )  | Standard |

Using this menu item, a separate Windows-Explorer is opened for each device, providing direct access to the internal memory.

For the purpose of accessing the tool, it is necessary to log in. The factory default settings are:

- User: "imc"
- Password: device serial number


Note

Manual entry

The device is called by reference to either its IP address or its internal name. The device's name is constructed as follows: "imcDev" + SerialNumber; e.g.  
\\imcDev4120110  
\\10.0.12.70

4.7.1.3 Memory cards - File system and formatting

Memory cards (microSD) with the file system FAT32 are supported. It is recommended that a memory card be [formatted](#) <sup>29</sup> before use.

Note


Routine formatting protects the memory card

**Routine formatting is recommended**

Take every opportunity to format the storage medium. **Recommendation:** at least every **six months**. In this way, any **damaged storage medium** can be detected and repaired if possible. A damaged file system may cause **data loss**. Or the **measurement system may fail to start** correctly. In order to avoid data loss, any data still needed should first be saved!

**Using a data storage medium in different devices**


There are no known limitations. But it is recommended to always format the medium whenever transferring it in order to avoid data loss.

Notes

General restrictions applicable to file systems

Please observe the general restrictions regarding the respective file systems.

4.7.1.3.1 Formatting

Warning

Please back up the data first

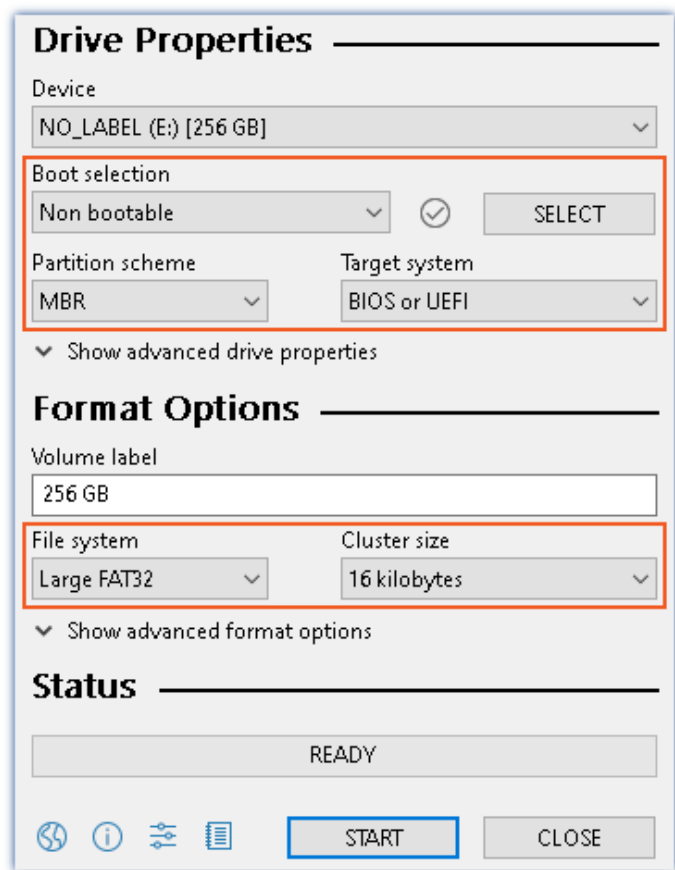
Formatting causes all data on the storage medium to be deleted. Before performing the formatting, ensure that all data have been saved on a different storage medium.

The memory card (microSD) **can not be formatted in the device**.

For this purpose, please use an appropriate tool. Such a tool is provided on the installation medium for imc STUDIO in the folder "*Tools\RemoveableDriveFormatter*":

- "*rufus-4.1p.exe*"


This program can be used for the purpose of formatting the data volume.



Make the **following settings** for the memory card:

- Boot selection: "*Not bootable*"
- Partition scheme: "*MBR*"
- File system: "*Large FAT32*"
- Cluster size: "*16 kilobytes*"

*Settings required for formatting by means of Rufus 4.1*

 **Note**

Only **one(!)** partition may be created. Multiple partitions may cause the measuring device not to recognize the storage medium.


4.7.1.4 Known issues and limitations

| Known issues and limitations           | Description   |
|--|---|
| File system becoming gradually slower  | As the count of folders increases, so does the time required by the system to access the data. In consequence, the data saving procedure becomes slower and data loss becomes possible. For this reason, creating more than 1000 folders is to be avoided.  |
| Errors in accessing the storage medium | <p>Errors can have the following causes, among others:</p> <ul style="list-style-type: none"><li>• The data rate is too high, the storage medium can't keep up and data overflow results.</li><li>• The storage medium is full.</li></ul> <p>If the PC is connected to the measuring device, imc STUDIO documents the error with a <b>message in the Logbook</b>.</p> |

## 5 Indicators and fault detectors (LEDs)

### 5.1 Operational readiness

When the device is operationally functional, the Power ON-LED shines to indicate this [Fig. 0 item D](#)<sup>15</sup>. As control element ("Action Button") a single button may be sufficient. The concrete function of the START button ([Fig. 0 item F](#))<sup>15</sup> is determined by the state the device is in. The states can be indicated by blinking patterns. There are five LEDs:

|   |                  |                            |  |
|---|------------------|----------------------------|--|
|  | • Power          | <b>ON/OFF</b>              | LED inside the Power button ON / OFF         |
|   | • Action-Status  | <b>START</b> <sup>45</sup> | LED inside the Action Button*                |
|   | • Measure-Status | <b>STATUS</b>              | LED for device status                        |
|   | • Storage-Status | <b>STORAGE</b>             | internal SSD or NAS streaming                |
|   | • NAS-Status     | <b>ARCHIVE</b>             | Status of the background archiving (on NAS)* |

\*in preparation

#### ① Status LED for device state

| Module state                                | Status LED                 |   |
|---|----------------------------|---|
| Power up                                    |                            |   |
| Switch on                                   | white                      | ○ |
| Starting                                    | blue - flashing            | ⊕ |
| Ready                                       | blue                       | ● |
| Measure                                     |                            |   |
| Prepare                                     | blue/green - flashing fast | ⊕ |
| Ready to measure                            | green                      | ● |
| Run<br>Trigger armed                        | green - flashing           | ⊕ |
| Measurement completed                       | green                      | ● |
| Power off                                   |                            |   |
| Switch off                                  | blue - flashing fast       | ⊕ |
| Switched off                                | off                        | ● |
| Miscellaneous                               |                            |   |
| Power Fail<br>(stop recording, close files) | red                        | ● |
| Firmware Update                             | magenta - flashing         | ⊕ |
| Firmware required                           | magenta                    | ● |
| Error                                       | red - flashing fast        | ⊕ |

## ② STORAGE LED

| Module state                                | STORAGE LED (microSD) - depending on fill level |                   |                   |                   |
|---|---|-------------------|-------------------|-------------------|
|   | no local storage                                | 0..89%            | 90..99%           | >99%              |
| <b>Power up</b>                             |   |                   |                   |                   |
| Switch on                                   | ●   | ●                 | ●                 | ●                 |
| Starting                                    | ●   | ●                 | ●                 | ●                 |
| Ready                                       | ●   | ●                 | ●                 | ●                 |
| <b>Measure</b>                              |   |                   |                   |                   |
| Prepare                                     | ●   | ●                 | ●                 | ●                 |
| Ready to measure                            | ●   | ● green           | ● yellow          | ● red             |
| Run<br>Trigger armed                        | ●   | ⊖ ● green         | ⊖ ● yellow        | ⊖ ● red           |
| Measurement completed                       | ●   | ● green           | ● yellow          | ● red             |
| <b>Power off</b>                            |   |                   |                   |                   |
| Switch off                                  | ●   | ●                 | ●                 | ●                 |
| Switched off                                | ●   | ●                 | ●                 | ●                 |
| <b>Miscellaneous</b>                        |   |                   |                   |                   |
| Power Fail<br>(stop recording, close files) | ●   | as previous state | as previous state | as previous state |
| Firmware Update                             | ●   | ●                 | ●                 | ●                 |
| Firmware required                           | ●   | ●                 | ●                 | ●                 |
| Error                                       | ●   | ⊖ ● rot           | ⊖ ● rot           | ⊖ ● rot           |



## 5.2 Troubleshooting / Restart

If the device is not returning plausible results or the Power ON LED ([Fig. Front side: item D](#)<sup>15</sup>) does not indicate operational readiness (see [Operational readiness / Fault state](#)<sup>31</sup>), re-starting the device may contribute to resolving the malfunction. Proceed as follows to restart:

- Switch the device **off** by pushing the ON/OFF button (Power LED will stop shining, see [Powering off](#)<sup>27</sup>)
- Leave the device **disconnected** from any external voltages or signal leads for approx. 10 seconds.
- Switch the device **on** by pushing the ON/OFF button (Power LED is shining, see [Powering on](#)<sup>27</sup>).
- The device's operational readiness (see [Powering on](#)<sup>27</sup>) is indicated by continuous shining of the Power ON LED ([Fig. Front side: item D](#)<sup>15</sup>).

If the device still does not return plausible results, or the Power ON LED does not indicate operability, the device must be shipped to imc Test & Measurement GmbH for repair work. In this case, please contact our tech support hotline (see "[Customer Support](#)"<sup>6</sup>).

## 6 Maintenance and servicing

### 6.1 Maintenance and servicing notes

imc recommends performing a service check every 12 months. An imc service check includes system maintenance in accordance with the service interval plan as specified by the manufacturer and a complete function test (maintenance, inspection and revision).

Maintenance (*repair*) work may only be carried out by qualified personnel from imc Test & Measurement GmbH.

For service and maintenance work, please use the [service form](#) that you download from our website and fill out: <https://www.imc-tm.com/service>



#### Reference

#### Device certificates and calibration protocols

Detailed information on certificates, the specific contents, underlying standards (e.g. ISO 9001 / ISO 17025) and available media (pdf etc.) can be found on [our website](#), or you can contact us directly.

### 6.2 Cleaning

Disconnect imc EOS devices from all circuits before cleaning. Only [qualified personnel](#)<sup>[11]</sup> are permitted to clean the housing interior.

Do not use abrasive materials or solutions which are harmful to plastics. Use a dry cloth to clean the housing. If the housing is particularly dirty, use a cloth which has been slightly moistened in a cleaning solution and then carefully wrung out. To clean the slits use a small soft dry brush.

Do not allow liquids to enter the housing interior.

### 6.3 Storage

In general, the measurement device can be stored in a dry environment in the specified temperature range. After four years of storage the device must be connected to a power supply. Persist in this process until the device connected signals operational readiness (see [Powering on](#)<sup>[27]</sup>). Then switch the device off again (see [Powering off](#)<sup>[27]</sup>) and re-package it for storage.

### 6.4 Transport

When transporting, always use the original packaging or a appropriate packaging which protects the imc EOS devices against shocks and impacts. If transport damages occur, please be sure to contact our tech support. Damage arising from transporting is not covered in the manufacturer's guarantee. Possible damage due to condensation can be limited by wrapping the device in plastic sheeting.



#### Reference

#### imc energy sources (batteries)

imc ARGUSfit devices will have a ["battery label"](#)<sup>[10]</sup> on the nameplate for integrated energy sources.

## 7 Start of operation Software / Firmware

### 7.1 Installation - Software

The associated measurement engineering software imc STUDIO, the configuration and operating interface for all imc instruments, provides the devices with exceedingly versatile functionality. It achieves comprehensive total solutions for everything from laboratory tests through mobile data logger application all the way to complete industrial test stations.

Use of the software requires a license, subject to the purchase order and configuration (see e.g. imc STUDIO manual product configuration / license).

In order to be able to install or uninstall imc STUDIO products, you must be registered with a user account possessing administrator rights to the PC. This applies to the overwhelming majority of all installations of Windows. However, if you are only logged on to your PC without administrator rights, log off and log back on with an administrator user account. If you do not possess an administrator user account, you will need the support of your system administrator or IT department.

You will find a detailed description to the installation of the software in the adequate manual or getting started.

#### 7.1.1 System requirements

The minimum requirements of the PC, the recommended configuration for the PC, the supported operating system are mentioned in the data sheets and the imc STUDIO manual.

### 7.2 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 section "[Connecting via LAN in three steps](#)"<sup>36</sup> 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 chapter in the software manual: "*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.

#### Recommended network configuration

The latest and high-performance network technologies should be used to achieve the maximum transfer bandwidth. This means especially 1000BASE-T (GBit Ethernet). GBit Ethernet network devices (switches) are downward compatible, so that imc devices that only support 100 MBit Fast Ethernet can also be operated on them.

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.

### 7.3 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. Click the "Device interfaces" button (  ) to open the dialog for configuring the IP address of the device.

| 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.

If there is any IP-conflict, devices affected will not be listed.

Select the device for making modifications ③.

The screenshot shows the 'Device interface configuration' window. On the left, a tree view lists devices. Under 'Ready for measurement' (②), the device 'T\_126678\_CS\_7008\_1 (126678)' is selected (③). The right pane displays 'Device information' and 'Current PC configuration' (④). The PC configuration shows a manually configured IP of 10.0.11.75 and a subnet mask of 255.255.255.0. Below, the 'New device configuration' section shows the same settings for the selected device, with the IP address field highlighted (⑤).

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.

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.

| Selected                            | Device name              | SN     | Device specification |
|-------------------------------------|--------------------------|--------|----------------------|
| <input checked="" type="checkbox"/> | T_124835_C1_1_LEMO_ET    | 124835 | imc C1-1 LEMO        |
| <input type="checkbox"/>            | T_130039_busDAQ_X        | 130039 | busDAQ-X             |
| <input type="checkbox"/>            | 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".

## 7.4 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.



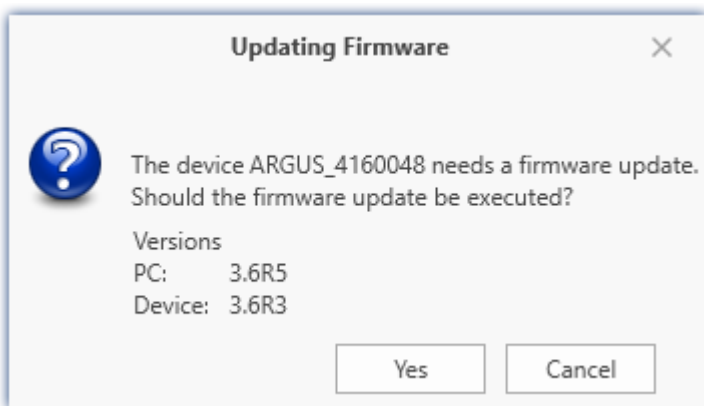
### Warning

**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!

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.



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

If the firmware update was successful, the dialog will close automatically after a few seconds. 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 our tech support.

**What is an optional update?**

**Answer:** 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.

---



## 8 imc EOS properties

imc EOS is a measurement device whose data recording speed is up to 4 MSamples, in conjunction with 24 bit precision.

### Cascadability

- Multiple imc EOS units can be joined together by means of a clicking mechanism, for the purpose of usage in multi-channel applications.
- A shared trigger line connects the system's elements with each other and enables synchronized starting of measurements.

### Utilizing multiple imc EOS and imc DEVICES systems

- It is possible to operate a compound system comprising either only multiple imc EOS units, or such units in combination with imc CRONOS devices, with the various modules synchronized via IRIG-B or NTP (PTP in preparation).

### Data storage

- For internal data storage, imc EOS is equipped with bulk memory of up to 960 GB. For the purpose of accessing the internal data storage through STUDIO (menu: *Extra\Data(Device)*) a user (*imc*) and a password (serial number of the device) is required.
- The data can also be saved to a PC or an NAS server via a 1 GBit network connection.

## 8.1 Analog inputs

The measurement amplifiers of the imc EOS/U4 device are designed primarily for voltage measurement and IEPE measurements.



Reference

Technical specs

The chapter "Technical Specs" presents details on the measurement modes.

## 8.1.1 Measurement variables

### IEPE / ICP (via BNC)

- **acceleration** sensors
- air- and solid-borne sound **microphones**
- **piezo**-electric sensors for dynamic measurements (AC) of **power** and **pressure**

### Voltage (via BNC or LEMO)

- voltage signals of **devices**
- **active** sensors (integrated sensor supply)

### Current transducers (via SEN-SUPPLY-4)

- separate high-performance supply module specially designed for current transducers (CRFX/SEN-SUPPLY-4)
- capable of mechanically compatible docking
- compatible current transducers and current probes (in Hall and Fluxgate technology) available as imc accessories.

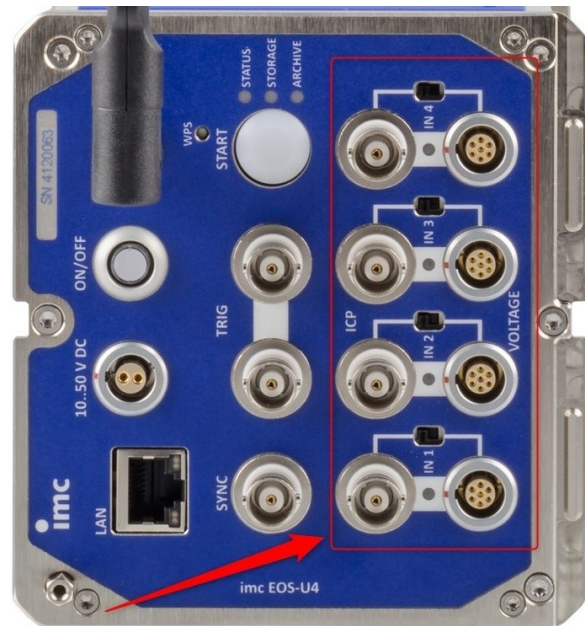


Fig.13 analog inputs

## 8.2 Operating software

**imc EOS** is integrated into the operating software **imc STUDIO** under Microsoft Windows, and can alternatively be controlled using an **app** (in preparation) under either Android or IOS from Apple.

### 8.2.1 imc STUDIO (PC)

imc EOS, imc BUSDAQflex, imc SPARTAN, imc C-SERIES and devices belonging to the imc CRONOS series are operated by means of the operating software **imc STUDIO**. This program provides the comprehensive ability to make settings either manually or automatically for the measurement parameters, real-time functions, trigger machines and data storage modes. Display of the measurement plot in the curve window and documentation in the Report Generator are integral components of the operating software. A wide range of triggering options and customized data saving options are available.

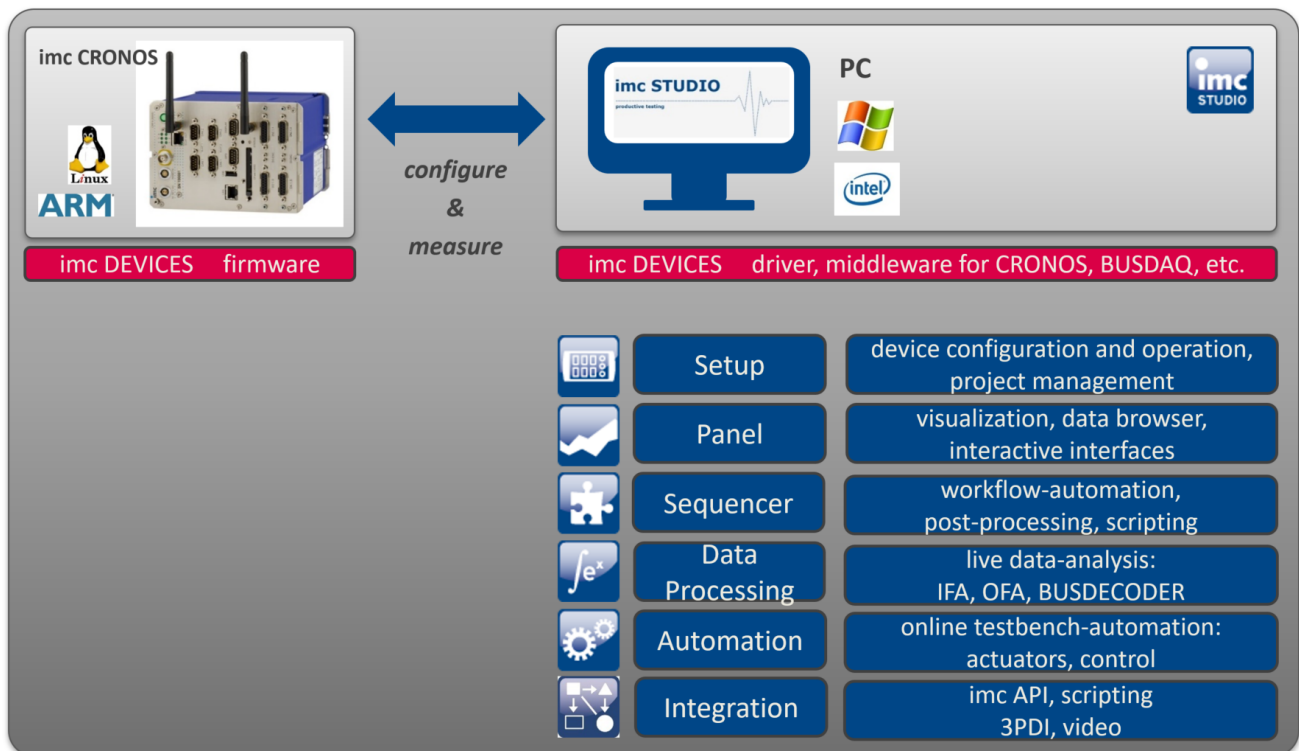


Fig. 14 Operating software imc STUDIO



#### Notes

#### Minimum software requirements

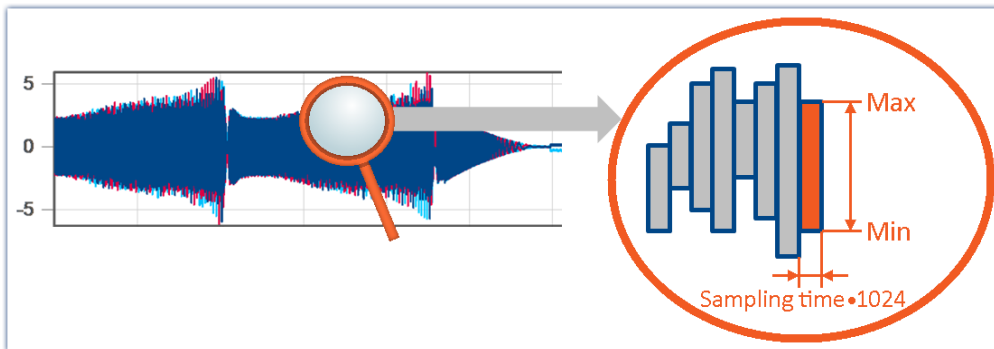
Operation of imc EOS requires the minimum operating software from:  
imc STUDIO 5.2 R20 in conjunction with imc DEVICEcore 3.3 firmware and drivers

## 8.2.2 Channels with envelope curve display

Every analog channel can **additionally return a data-reduced** envelope type monitor channel (min-/max-channel).

This provides a comprehensive overview of the measurement in a smooth flowing display, without making excessive demands on the network even at a high data rate. In particular, the envelope type monitor channels reduce the bandwidth requirements for data transfer, as long as the original channel is saved only in the device. The channel is generated within the device, thus avoiding making demands on the PC.

For **every group of 1024 consecutive samples**, one **minimum value** and one **maximum value** are calculated cyclically. These values are then displayed as an envelope curve:



*Envelope type monitor channels - Example*

Envelope type monitor channels are available on the Setup page: "Analog Inputs" under the channel type: "Monitor Channels".



### Note

### Signal processing

The envelope type monitor channels are not suitable for signal processing computations in, for example, imc Inline FAMOS!

## 8.3 Starting measurement

imc EOS comes with **two** configurable triggers, Trigger\_01 and Trigger\_02. The "*BaseTrigger*" is of the type "*immediate trigger*", which starts and stops the experiment and can not be configured. In the user interface it is hidden by default.

An detailed description of the trigger machine is presented in the imc STUDIO manual.

### Note

- The maximum *Event dwell time* of a trigger event results from  $2^{16}/\text{sample rate}$  of the channel.

### 8.3.1 START button and external trigger

EOS comes with 2 BNC-terminals for **external trigger** signals ① and a **START button** ② for initiating a measurement.

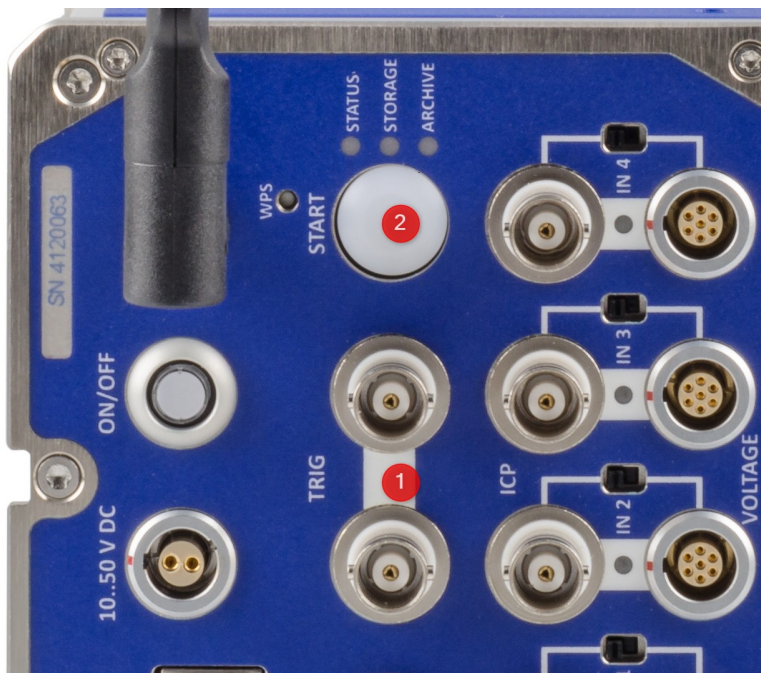


Fig. 15 Trigger connections and START button

#### START button

The START button ② can be used as an alternative to a defined trigger event. If the recording is to be triggered only with the START button, the data recording of the channels must be additionally prevented by a trigger condition, e.g. with the exceeding of a threshold that is not reached. The measurement is then started (armed) by imc STUDIO and the data recording is triggered with the START button.

#### External trigger

The two BNC sockets TRIG ① can be used both for inputs and output. This means the measurement can be initiated externally if the level is set to 0 V at one of the TRIG sockets. Simultaneously, the the voltage level is briefly to set to 0 V at the sockets when the measurement begins. In this context, it doesn't matter whether the measurement is initiated by a defined trigger event or by the START button ②.

The two BNC sockets are directly connected with each other internally and can be used both as inputs and outputs. This allows the connection of multiple imc EOS devices without external T-couplings.

**Trigger-dialog**

In the Trigger-dialog, the **START-button** and the **external trigger** are **not** displayed.

Both the START button and the external trigger input are in a disjunctive logical combination with the trigger machine, i.e. the start the measurement independently of a defined trigger event.

**Multiple EOS-devices in an experiment**

If one wishes to use multiple EOS in an experiment, all EOS units can be connected via the TRIG sockets. This ensures a synchronously triggered starting of all devices.

## 8.4 imc EOS in a compound assembly

imc EOS can be combined with other EOS and with devices of the CRONOSflex (CRFX) family of devices. See also [Installation instructions](#).<sup>14</sup>

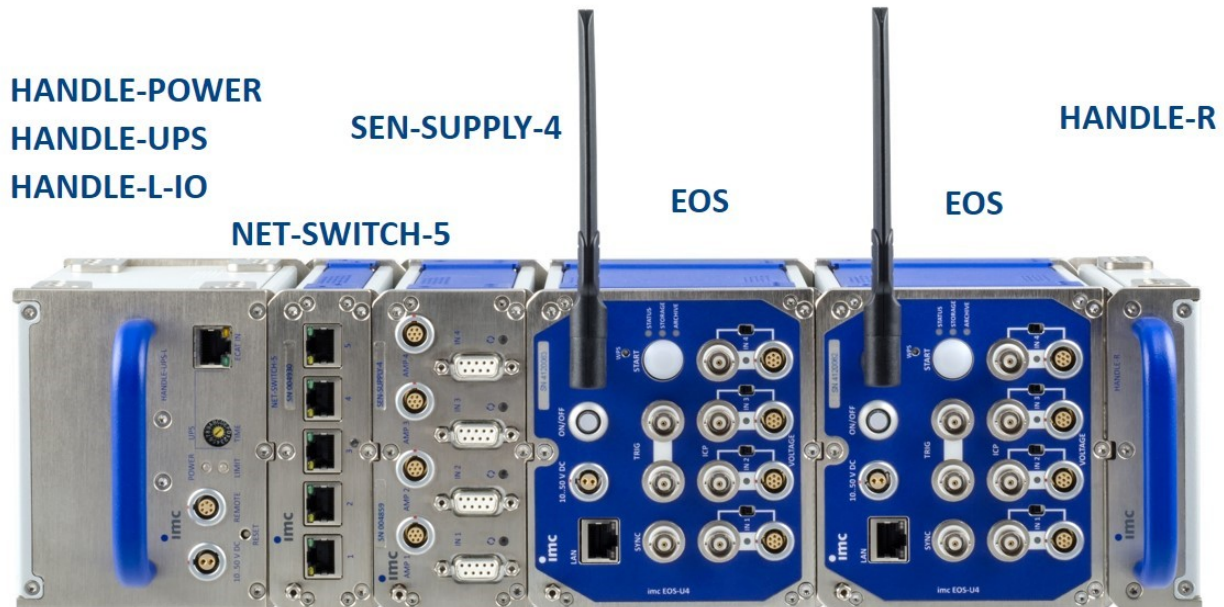


Fig. 16 imc EOS with USV, SEN-SUPPLY-4 and NET-SWITCH-5.

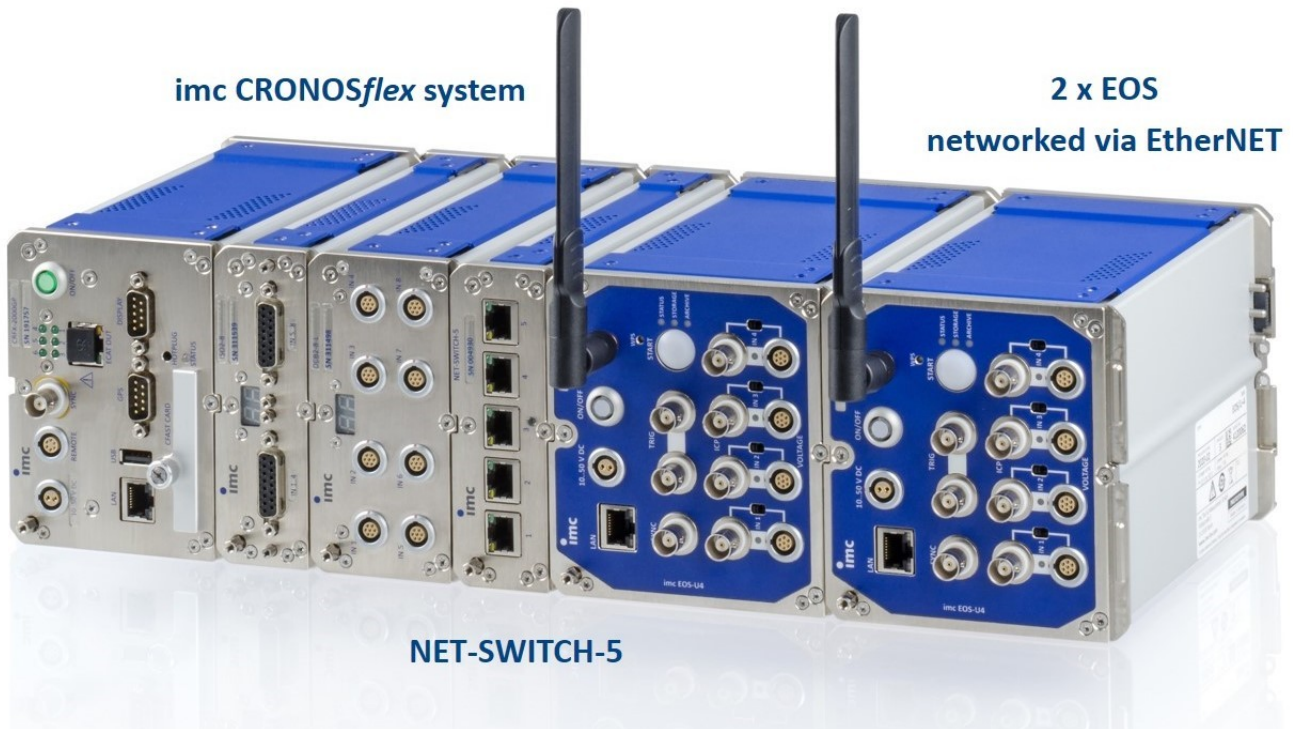
- **Power-Handle:**  
Voltage transducer and UPS (lead-acid and Li-ion)
- **Gbit / PTP network switch:**  
imc NET-SWITCH-5
- **Power supply for current transducers:**  
SEN-SUPPLY-4: LEM, current probes

### ! Notes

### imc EOS in a compound assembly

- The imc EOS devices' **Ethernet connections** to be provided via **LAN-sockets through cables** (Switch to EOS)
- Systems clicked together are operated with a **shared power supply**.
- CRONOSflex modules should be attached directly to the CRONOSflex base device using the clicking mechanism. If they are located to the right of the imc EOS, such modules will be supplied with power, but they will not have any connection with the CRONOSflex base device's system bus.
- When the **Power-Handle is used**, the power supply is connected to the Power-Handle and EOS is supplied exclusively through the Power Handle. **Activation** of imc EOS is performed via the [PPS Remote socket](#).<sup>20</sup>





### ! Note

### imc EOS in a compound assembly without Power Handle

**Without Power-Handles**, the power supply is connected at the outer left module. **Activation** of each imc EOS unit is accomplished using its respective On/OFF switch.

## 8.5 Synchronization

For the purpose of synchronizing measurements, a SYNC socket (BNC, isolated) is provided. It is to be connected with other imc devices in order to synchronize with them. Using the software it is possible to configure one device as the IRIG-B Master. Alternatively, imc EOS can be synchronized via LAN with NTP.

### ! Notes

An exact description of the manner of functioning is provided in the chapter Synchronization in the imc Software User's Manual.



## 9 Equipment options

### Ex factory order options

When ordering the device, one of the two memory volumes must be selected.

| Order Code      | internal Onboard Flash Storage for imc EOS | article no. |
|-----------------|--|-------------|
| EOS/FLASH-480GB | 480 GB TLC, industrial (-40 °C to +85 °C)  | 12800002    |
| EOS/FLASH-960GB | 960 GB TLC, industrial (-40 °C to +85 °C)  | 12800003    |

| Order Code |  | article no. |
|------------|--|-------------|
| EOS/WLAN-I | internal WiFi (WLAN) adaptor: Dual Band (802.11n) (-20 °C to +85 °C) | 12800004    |

## 10 Technical Specs

All devices described in this manual are intended at least for normal ambient conditions according to IEC 61010-1. In addition, the extended ambient conditions apply according to the explicitly stated technical data.

The data sheets in this chapter "Technical Specs" correspond to the separately managed data sheets. In addition to the tables, the separate data sheet contains module and device photos, drawings with dimensions, accessories and imc part numbers. This additional information would go beyond the scope of this manual. In individual cases it may happen that we publish a new data sheet before there is a new manual edition. The valid data sheets are always available on the imc website:

[www.imc-tm.com/download-center/product-downloads](http://www.imc-tm.com/download-center/product-downloads)

The specified technical data refer to the reference conditions, such as the specified preferred position of use (see respective technical data sheet) and an ambient temperature of 25 °C as well as compliance with the specifications for use (see chapter "Precautions for operation") and for grounding and shielding.

For device variants with BNC connection technology in particular (established for certain measurement tasks), gapless shielding is not initially guaranteed due to the design, as the negative pole of the measurement input is directly connected out as a coaxial outer conductor. Any interference coupled to the measuring lines thus has an asymmetrical effect on the measuring input. As a result, the accuracy specifications specified in the tables may be exceeded during the fault. Appropriate measures are taken to meet the EMC requirements for these devices as well. For the acceptance criterion A, a measuring accuracy of 2 % is assumed in the unshielded case for the reasons mentioned. If significant RF interference is to be expected in the measurement environment and if the limited accuracy is insufficient, the shielding measures shall be implemented in accordance with the above sections, i.e. the coaxial test lead shall be shielded.

## 10.1 imc EOS U-4

| Terminal connections            |  |  |
|---------------------------------|--|--|
| Parameter                       | Value  | Remarks  |
| Analog inputs                   | 4 x BNC<br>4 x LEMO.1B (7-pin)               | voltage / IEPE<br>alternatively: voltage<br>recommended plug: FGG/FEG.1B.307   |
| PC / network<br>Ethernet TCP/IP | RJ45<br>Gigabit Ethernet                     | PC/network, NAS-storage<br>synchronization   |
| Synchronization                 | BNC  | IRIG-B, isolated   |
| External trigger                | 2 x BNC                                      | In / Out<br>differential / isolated  |
| Action-Button                   | "START"                                      | manual start of the measurement, trigger   |
| Power supply                    | LEMO.1B (2-pin)                              | compatible with LEMO.EGE.1B.302 multicoded 2<br>notches<br>compatible with plugs<br>FGG.1B.302 (standard) or<br>FGE.1B.302 (E-coded, 48 V) |
| Module connector                | 2 x 20-pin<br>compatible with imc CRONOSflex | mechanical coupling<br>common DC power supply,<br>expandable by UPS module   |
| Internal WiFi (WLAN) adaptor    | 802.11 g/n/ac (1 antenna)                    | optional equipment, software support in<br>preparation   |
| Weight                          | approx. 1.57 kg                              |  |
| Dimensions (B x H x T)          | 110 x 118 x 180 mm                           |  |
| Power supply                    |  |  |
| Parameter                       | Value  | Remarks  |
| Power supply                    | 10 V to 50 V DC                              |  |
| Power-on threshold (typ.)       | 9.2 V  | min. input voltage required for power-on (open<br>circuit)   |
| Shutdown threshold (typ.)       | 8.0 V  | input voltage at which the automatic<br>deactivation is triggered (data backup protected<br>by internal UPS buffering)                     |
| Power consumption               | 30 W   |  |
| Isolation                       | 60 V   |  |
| AC/DC power adaptor             | 110 V to 230 V AC                            | included in delivery   |

| Power outage and Data integrity               |            |   |
|---|------------|---|
| Parameter                                     | Value      | Remarks   |
| Auto data-saving upon power outage            | ✓          | buffering (short time UPS) with following "auto-shutdown" auto-stop of measurement, data storage and automatic shutdown   |
| Buffering during data-saving (short time UPS) | integrated | Super-Caps  |
| Charging time of the Super-Caps               | <60 s      | minimum required active operation for full buffer functionality   |
| Response time in case of power outage         | 0 s        | "buffer time constant":<br>required duration of a continuous outage that will trigger auto shutdown procedure<br>fix parameter: not changeable in device configuration! |

| Data acquisition, trigger           |  |  |
|-------------------------------------|--|--|
| Parameter                           | Value                                    | Remarks  |
| Max. aggregate sampling rate        | 4 MS/s                                   | Sum of the sampling rates of all active channels   |
| Channel individual sampling rates   | selectable in 1–2–5 steps                | max. 4 MS/s  |
| Number of sampling rates per system | arbitrary                                |  |
| Intelligent trigger functions       | ✓  | logical combination of multiple channel events (threshold, transition) to create triggers that start and stop acquisition of assigned channels |
| Multi triggered data acquisition    | ✓  | Multi-shot (with automatic re-arming of the measuring system).<br>A global device trigger with configurable start and stop condition.          |
| Multi trigger                       | max. 8                                   | independent trigger definitions with arbitrary channel assignments (start/stop)  |
| Trigger definitions                 | as logical AND/OR combinations of events | events: threshold value, edge, range   |

| Storage, signal processing                        |  |   |
|---|--|---|
| Parameter   | Value  | Remarks   |
| Onboard Flash mass storage                        | 480 GByte ... 960 GByte<br>(equipment options) | not changeable<br>Status-LED "STORAGE"  |
| Storage on NAS (network storage)                  | ✓  | in preparation:<br>alternatively to onboard Flash storage<br>With data streaming, high-speed networks with 1Gbit / 10 Gbit are recommended. |
| Arbitrary memory depth with pre- and post trigger | ✓  | pretrigger limited by the RAM of device:<br>up to 30 s @ 4 MS/s<br>posttrigger only limited by available mass storage (Flash)               |
| Synchronization                                   | IRIG-B<br>NTP<br>(PTP)                         | TTL<br>via LAN<br>IEEE 1588 PTPv2 (in preparation)<br>Hardware PTP-ready,<br>future software updates  |

| Operating conditions                     |   |   |
|--|---|---|
| Parameter                                | Value   | Remarks                                       |
| Operating environment                    | dry, non corrosive environment within specified operating temperature range   |   |
| Rel. humidity                            | 80 % up to 31 °C,<br>above 31 °C: linear declining to 50%   | according IEC 61010-1                         |
| Ingress protection rating                | IP20  |   |
| Pollution degree                         | 2   |   |
| Operating temperature (standard)         | -10 °C to +55 °C  | without condensation                          |
| Shock- and vibration resistance          | IEC 61373, IEC 60068-2-27<br>IEC 60062-2-64<br>category 1, class A and B<br>MIL-STD-810<br>Rail Cargo Vibration Exposure<br>U.S. Highway Truck Vibration Exposure |   |
| Extended shock- and vibration resistance | upon request  | specific tests or certifications upon request |

| Synchronization and time base: single device without external synchronization |              |                             |  |
|---|--------------|-----------------------------|--|
| Parameter   | Value (typ.) | min. / max.                 | Remarks  |
| Accuracy RTC  |              | ±50 ppm<br><br>1 µs (1 ppm) | not calibrated (standard devices),<br>at 25 °C<br><br>calibrated devices (upon request),<br>at 25 °C |
| Drift   | ±20 ppm      | ±50 ppm                     | -40 °C to +85 °C operating temperature   |
| Ageing  |              | ±10 ppm                     | at 25 °C; 10 years   |

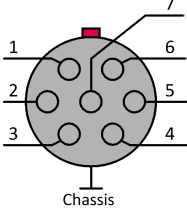
| External synchronization  |                          |  |                      |
|---------------------------|--------------------------|--|----------------------|
| Parameter                 | IRIG-B                   | NTP                                      | PTP (in preparation) |
| Supported formats         | B002, B006               | Version ≤4                               | Version 2            |
| Precision                 | <1 µs                    | <5 ms<br>after approx. 12 h <sup>1</sup> | <1 µs                |
| Jitter (rms) <sup>2</sup> | <100 ns                  | ---                                      | <100 ns after 2 min  |
| Input connection          | BNC "SYNC"<br>(isolated) | RJ45 "LAN"                               | RJ45 "LAN"           |

| Synchronization via multiple devices with IRIG-B (Master/Slave) |              |               |   |
|---|--------------|---------------|---|
| Parameter   | Value (typ.) | min. / max.   | Remarks   |
| Common mode<br>SYNC isolated                                    |              | max. 50 V     | BNC socket: isolated; for reliable operation even<br>with different voltage level (ground loops). |
| Voltage level   |              | 5 V TTL level |   |
| Input impedance   |              | 20 kΩ         |   |

| Ext. Trigger (in/out) |                              |   |
|-----------------------|------------------------------|---|
| Parameter             | Value                        | Remarks   |
| Socket                | 2 x BNC<br>direct connection | 2 sockets for an easier connection without T-<br>coupling |
| Level                 | TTL, isolated                | bidirectional   |

- <sup>1</sup> Max. value, concerning the following condition: first-synchronization
- <sup>2</sup> Statistical mean variation. Also dependent on signal quality with IRIG-B (e.g. direct connection to imc master device) respectively the specific network configuration with PTP (e.g. point-to-point connection via PTP-capable network switch such as imc NET-SWITCH-5).

## Measurement inputs imc EOS U-4

| Measurement channels      |  |  |
|---------------------------|--|--|
| Parameter                 | Value  | Remarks  |
| Analog inputs             | 4  |  |
| Isolation                 | yes<br>60 V  | channel - channel; channel - chassis<br>nominal working voltage                    |
| Measurement modes         | voltage measurement<br>IEPE sensors<br>(AC with current feed)                              | via BNC or LEMO (connected in parallel)<br>via BNC                                 |
| Pin configuration LEMO.1B | 1 +IN<br>2 -IN<br>3 +SUPPLY<br>4 -SUPPLY<br>5 reserved<br>6 GND (Signal)<br>7 GND (Supply) |  |

| Sampling rate, bandwidth, filter   |   |             |   |
|--|---|-------------|---|
| Parameter  | Value typ.  | min. / max. | Remarks   |
| Sampling rate  | 1 kS/s to 4 MS/s  |             | individually selectable per channel<br>(intermediate settings in 1, 2, 5 steps)<br>max. aggregate sampling rate: 4 MS/s for entire device |
| Bandwidth  | DC/ 0 Hz to 1.8 MHz<br>3 Hz to 1.8 MHz<br>3 Hz to 1.8 MHz   |             | -3 dB, for DC voltage measurement<br>-3 dB, for AC voltage measurement<br>-3 dB, for IEPE measurement                                     |
| Filter (digital)<br>cut-off frequency<br>type<br>characteristic<br>order<br>Anti-aliasing Filter | 100 Hz to 500 kHz<br>low pass or deactivated<br>Butterworth, Bessel, AAF<br>low pass 8th order<br>Cauer 8th order |             | with $f_{\text{cutoff}} = 0.4 f_s$  |
| Resolution   | 24 Bit  |             | output format: 32 Bit (24 Bit Mantissa)   |

| General   |  |                  |                                  |
|---|--|------------------|----------------------------------|
| Parameter   | Value typ.   | min. / max.      | Remarks                          |
| Overvoltage protection                            |  | ±200 V<br>±100 V | transient<br>static (continuous) |
|   | transient protection:<br>ESD 2 kV<br>automotive load dump ISO 7637 |                  | human body model                 |
| Input coupling                                    | DC<br>AC<br>IEPE   |                  | AC with current feed             |
| Input configuration                               | differential, isolated   |                  |                                  |
| Input impedance<br>range: ≤±10 V<br>range: >±10 V | 1 MΩ / 140 pF<br>480 kΩ / 60 pF                                    |                  | AC /DC (differential)            |

| Voltage measurement  |   |   |   |  |
|--|---|---|---|--|
| Parameter  | Value typ.  |   | min. / max.   | Remarks  |
| Voltage input ranges   | $\pm 60\text{ V}$ , $\pm 50\text{ V}$ , $\pm 25\text{ V}$ ,<br>$\pm 10\text{ V}$ , $\pm 5\text{ V}$ , $\pm 2.5\text{ V}$ ,<br>$\pm 1\text{ V}$ , $\pm 0.5\text{ V}$ , $\pm 0.25\text{ V}$ ,<br>$\pm 0.1\text{ mV}$                  |   |   | for $\pm 60\text{ V}$ range setting the following applies:<br>nominal working voltage: $60\text{ V}$<br>(according to the low voltage directive SELV)<br>linear operation and valid measured values: up to $100\text{ V}$                                      |
| Gain error   | 0.02 %  |   | 0.05 %  | of the measured value, at $25\text{ }^{\circ}\text{C}$ , with DC   |
| Gain drift   | 30 ppm/K· $\Delta T_a$  |   | 50 ppm/K· $\Delta T_a$  | $\Delta T_a =  T_a - 25\text{ }^{\circ}\text{C} $ ; with $T_a$ = ambient temperature   |
| Offset error   | 0.02 %  |   | 0.05 %<br>0.07%   | of the range, at $25\text{ }^{\circ}\text{C}$<br>range $\pm 60\text{ V}$ to $\pm 0.5\text{ V}$<br>range $\leq \pm 0.25\text{ V}$   |
| Offset drift<br>range = $60\text{ V}$<br>ranges $> \pm 10\text{ V}$<br>ranges $\leq \pm 10\text{ V}$ | $\pm 0.5\text{ }\mu\text{V/K}\cdot\Delta T_a$<br>$\pm (100\text{ }\mu\text{V} + 4\text{ ppm} \cdot \text{range})/\text{K}\cdot\Delta T_a$<br>$\pm (1\text{ }\mu\text{V} + 8\text{ ppm} \cdot \text{range})/\text{K}\cdot\Delta T_a$ |   | $\pm 1.3\text{ }\mu\text{V/K}\cdot\Delta T_a$<br>$\pm (250\text{ }\mu\text{V} + 10\text{ ppm} \cdot \text{range})/\text{K}\cdot\Delta T_a$<br>$\pm (4\text{ }\mu\text{V} + 14\text{ ppm} \cdot \text{range})/\text{K}\cdot\Delta T_a$ | example: max. $\pm 500\text{ }\mu\text{V/K}\cdot\Delta T_a$ in range $25\text{ V}$<br>example: max. $\pm 18\text{ }\mu\text{V/K}\cdot\Delta T_a$ in range $1\text{ V}$<br>$\Delta T_a =  T_a - 25\text{ }^{\circ}\text{C} $ ; with $T_a$ = ambient temperature |
| Non linearity  | 50 ppm<br>30 ppm  |   | 100 ppm<br>60 ppm   | ranges $\pm 5\text{ V}$ and $\pm 10\text{ V}$<br>all the other ranges  |
| IMR (isolation mode rejection)<br>ranges $\leq \pm 10\text{ V}$<br>ranges $> \pm 10\text{ V}$        |   |   | $> 100\text{ dB}$<br>$> 80\text{ dB}$<br>$> 75\text{ dB}$<br>$> 55\text{ dB}$   | 10 kHz<br>100 kHz<br>10 kHz<br>100 kHz   |
| Signal noise (SNR)<br>50 V range<br>10 V range<br>1 V range<br>0.1 V range                           | 1 MSps<br>-90 dB<br>-98 dB<br>-95 dB<br>-79 dB  | 100 kSps<br>-100 dB<br>-107 dB<br>-105 dB<br>-88 dB | 10 kSps<br>-107 dB<br>-112 dB<br>-111 dB<br>-95 dB  | at specified sampling rate (with AAF)<br>(all typ. values)   |
| Crosstalk  |   |   | 95 dB<br>65 dB  | 100 kHz<br>$\leq \pm 10\text{ V}$<br>$> \pm 10\text{ V}$   |
| Phase matching between channels  | <10 ns  |   |   |  |

| IEPE/ICP Sensor     |   |  |                   |  |
|---------------------|---|--|-------------------|--|
| Parameter           | Value typ.                                      |  | min. / max.       | Remarks                                    |
| IEPE-current source | 4 mA, 8 mA,<br>12 mA, 16 mA                     |  | $\pm 10\text{ }%$ | channel individually selectable            |
| Voltage swing       | 25 V  |  | $> 24\text{ V}$   |  |
| Source impedance    | $> 100\text{ k}\Omega$<br>$> 40\text{ k}\Omega$ |  |                   | 4 mA<br>other IEPE-current source settings |



| Sensor supply EOS/U-4-SUPPLY        |  |             |   |
|-------------------------------------|--|-------------|---|
| Parameter                           | Value typ.   | min. / max. | Remarks   |
| Output voltage                      | $\pm 15\text{ V}$ , $\pm 12\text{ V}$ , $\pm 10\text{ V}$ , $\pm 7,5\text{ V}$ ,<br>$\pm 5\text{ V}$ , $\pm 4\text{ V}$ , $\pm 3,5\text{ V}$ , $\pm 3,3\text{ V}$ ,<br>$\pm 3\text{ V}$ , $\pm 2,5\text{ V}$ |             | channel individually selectable and isolated  |
| Short-circuit protection            | unlimited duration   |             |   |
| Overvoltage protection              | $\pm 50\text{ V}$  |             |   |
| Error of output voltage             | $\pm 2\text{ \%}$  |             |   |
| Power of output voltage per channel | typ. $1.5\text{ W}$<br>max. $300\text{ mA}$  |             | e.g.<br>unipolar $3\text{ V}$ , $300\text{ mA}$ , $0.9\text{ W}$<br>unipolar $5\text{ V}$ , $300\text{ mA}$ , $1.5\text{ W}$<br>unipolar $12\text{ V}$ , $125\text{ mA}$ , $1.5\text{ W}$<br>bipolar $\pm 5\text{ V}$ , $150\text{ mA}$ , $1.5\text{ W}$<br>bipolar $\pm 15\text{ V}$ , $50\text{ mA}$ , $1.5\text{ W}$ |
| Output impedance                    | $0.3\text{ }\Omega$  |             |   |



Note

Sensor supply

Only the device variants with the suffix -SUPPLY is equipped with a sensor supply.

## Index

### A

AC-adaptor 23  
Accessing the data carrier 30  
Accessories  
    included 16  
    optional 16  
Action-Button 31  
Add device 38  
adjustment 6  
analog inputs 24, 41  
article no. 14

### B

blinking codes 31  
BNC 42  
BNC-terminals 45

### C

Cables 8  
calibration 6  
CE 8  
CE Certification 6  
Certificates 6  
Change requests 6  
CHASSIS 23  
Cleaning 34  
Cluster size  
    FAT32 29  
Commissioning 18  
connect device 36  
Connecting via LAN 36  
Copy data to the PC 28  
Current transducers 42  
Customer support  
    Tech support 6

### D

data storage  
    password 41  
Data transfer 28  
    Password 28  
    Storage medium 28  
Device  
    add 38  
    connect 36  
device software  
    imc STUDIO 43  
devices properties 41

Dimensions 15  
DIN-EN-ISO-9001 6  
Drawings 15

### E

ElektroG 8  
EMC 7  
energy sources 10  
Envelope type monitor channels 44  
Ex factory order options 49  
external trigger signals 45

### F

FCC 8  
File System  
    FAT32 29  
Firmware update 39  
formatting 29

### G

General terms and conditions 6  
Grounding 22  
    concept 23  
    supply 23  
    vehicle battery 23  
Guarantee 6, 7

### H

Hard drive 28  
Highlights 14  
Hotline  
    Tech support 6

### I

IEPE 42  
imc EOS in a compound assembly 47  
imc STUDIO  
    operating software 43  
imc STUDIO 35  
    operating system 35  
imc STUDIO (PC) 43  
Industrial safety 12  
Industrial safety regulation 12  
Installation 26  
    imc STUDIO 35  
Internal storage media 28  
IP address  
    configure 36  
    of the devices 36  
    of the PCs 36  
ISO-9001 6

Isolation  
    supply 23  
Issues  
    Storage medium 30

## L

Leads 8  
LEDs 31  
LEMO 42  
Liability restrictions 7  
Limitations  
    Storage medium 30  
Limited Warranty 6

## M

Maintenance 6, 34  
Mechanical Drawings 15  
Memory card 28  
Monitor channels 44  
Mounting 26

## O

Operating orientation 15  
Operating personnel 11  
operating software  
    imc STUDIO 43  
Operational readiness 31  
Order Code 14

## P

partition 29  
password  
    data storage 41  
    Data transfer 28  
pin configuration  
    analog inputs 24  
    BNC 24  
    LEMO 24  
    REMOTE plug 20  
Pinout  
    Power 19  
    Supply 19  
power adaptor 23  
Power Handle and the UPS function 21  
Power supply 19  
Power-Handle  
    connectors 20  
    Remote plug 20  
    UPS 20  
Powering off 27  
Powering on 27

Precautions for operation 18  
Problems  
    Storage medium 30  
Product improvement 6  
product overview 14

## Q

Quality Management 6

## R

RACK 26  
REMOTE plug  
    Pin configuration 20  
repair 6  
Restart 33  
Restriction of Hazardous Substances 8  
RoHS 8

## S

Select device with explorer 28  
Service 34  
    Tech support 6  
service and maintenance 6  
service check 6  
Shielding 24  
Software installation 35  
Special hazards 12  
SSD Storage medium 28  
START button 45  
Starting measurement 45  
Storage 34  
storage device  
    formatting 29  
    partition 29  
Storage media 28  
Storage medium  
    Cluster size 29  
    Data transfer 28  
    FAT32 29  
    File system 29  
    Filesize (maximum) 29  
    Issues 30  
    Limitations 30  
    Problems 30  
    SSD 28  
Swapping the storage medium 28  
Symbols 9  
SYNC 48  
System requirements 35

**T**

- Tech support 6
- Telephone numbers
  - Tech support 6
- transporting the device 34
- Troubleshooting 33

**U**

- USB 28

**W**

- Warranty 6
- Waste on Electric and Electronic Equipment 8
- WEEE
  - Restriction of Hazardous Substances 8



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## imc ACADEMY - Training center

The safe handling of measurement devices requires a good knowledge of the system. At our training center, experienced specialists are here to share their knowledge.

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