![imc logo](An Axiometrix Solutions Brand)

imc SPARTAN

Getting Started

Edition 15 - 2025-02-28

imc SPARTAN-4-N

Disclaimer of liability

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

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

Copyright

Open Source Software Licenses

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

A list of the open source software licenses for the imc measurement devices is located on the imc STUDIO/imc WAVE/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.

Notes regarding this document

This document is an excerpt from the manual of the device / the module.

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.

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1 Welcome to imc SPARTAN

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imc

An Axiometrix Solutions Brand

imc SPARTAN
Getting Started

Thank you for deciding to purchase our product. We wish you total success in accomplishing your measurement assignments with the help of your imc measurement instruments and the imc measurement software.

In this manual, you will find a detailed description of how to operate your imc instrument.

Tech support

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

Questions or problems? Contact our Tech support 7 .

Copyright

2   General introduction

2.1   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

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 7 will be happy to receive your feedback.

2.2   Service and maintenance

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

Phone: (Germany):   **+49 30 629396-333** (Mon.-Fri.: 9.00 - 12.00 and 13.00 - 17.00)

E-Mail: service@imc-tm.de

Internet: https://www.imc-tm.com/service

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

2.3   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.

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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 7 .

Notes on radio interference suppression

imc SPARTAN 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[1]) 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 imc SPARTAN 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.

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[1] 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 SPARTAN devices 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/elekrog-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.

2.4 Explanation of symbols

CE Conformity

see CE [chapter 1.2](#) ⌐7¬

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](#) ⌐7¬.

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 7). 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)

2.5 History

Amendments and bug-fix in Edition 15

Section	Amendments
Quarter bridge	Notes added for device-side addition of the quarter bridge [only in the manual].
Service	Link set to the updated imc service form 2025

Amendments and bug-fix in Edition 14

Section	Amendments
Storage media	updated description of recommended handling
Strain gauge measurement modes	wording, formulas and graphics revised [only in the manual]

Amendments and bug-fix in Edition 13

Section	Amendments
Batteries	new battery labeling on the name plate

Amendments and bug-fix in Edition 12

Section	Amendments
Device overview	updated overview [only in the manual]

3 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 SPARTAN 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 SPARTAN device 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 SPARTAN 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 SPARTAN 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.

For repeat tests, a test voltage that is 1.5 times the specified working voltage should be used to test the isolation for the highly isolated inputs (e.g. measurement inputs for high-voltage applications).

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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.

4 Assembly and connection

4.1 After unpacking...

Check the delivered system immediately upon receiving it for completeness 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!

Check that the list of accessories is complete (product package):

- AC/DC-power adaptor with cable and pre-assembled plug
- LEMO plug for DC-powering
- Getting started with your imc measurement device (printed)

> **ℹ 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

Condensation may form on the circuit boards when the device is moved from a cold environment to a warm one. 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.

Ambient temperature

The limits of the ambient temperature cannot be strictly specified because they depend on many factors of the specific application and environment, such as air flow/convection, heat radiation balance in the environment, contamination of the housing / contact with media, mounting structure, system configuration, connected cables, operating mode, etc. This is taken into account by specifying the operating temperature instead. Furthermore, it is not possible to predict any sharp limits for electronic components. Basically, reliability decreases when operating under extreme conditions (forced ageing). The operating temperature data represent the extreme limits at which the function of all components can still be guaranteed.

4.3 Notes on connecting

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 does not work
>   IV. the device has been stored for a long period of time under unfavorable conditions (e.g. outdoors or in high-humidity environments).

1. Observe the data in the chapter "Technical Specifications", 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 protection ground ("CHASSIS") at one end in order to ensure high resistance to interference and noisy transmission.
3. Unused, open channels (having no defined signal) should not be configured with sensitive input ranges since otherwise the measurement data could be affected. Configure unused channels with a broad input range or short them out. The same applies to channels not configured as active.
4. If you are using a removable storage media, observe the notes in the imc software manual.
   Particular care should be taken to comply with the storage device's max. ambient temperature limitation.
5. Avoid prolonged exposure of the device to sunlight.

4.3.2 Power supply

The device is powered by a DC-supply voltage which is supplied via a 2-pole LEMO-plug.

Device	LEMO plug type designation	Size
imc SPARTAN	FGG.**1B**.302.CLAD.52ZN	middle
imc SPARTAN-N, imc SPARTAN-R	FGG.**2B**.302.CLAD.82ZN	big

The permissible supply voltage range is 10 to 32 V (DC) at 130 W max. consumption. The product package includes either a corresponding desktop supply unit with 24 V , DC and a max. power consumption of 150 W or a desktop supply unit with 15 V, DC and a max. power consumption of 60 W. The mains voltage is 110 V to 240 V 50/60 Hz. With regard to EN 61326-1 and EN 61010-1, the DC supply inputs are not specified for connection to a DC mains supply. DC networks are particularly extensive supply installations in the industrial sector. For these, increased safety margins are assumed for expected transient overvoltages in the event of a fault. This is comparable to the safety categories CAT II..IV in AC mains voltage systems.
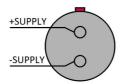
> **🛈 Note**
>
> Please note, that the operation temperature of the desktop supply is prepared for 0°C to 40°C, even if your measurement devices is designed for extended temperature range!

If the LEMO-plug is assembled with an appropriate cable it can be connected to a DC-voltage source such as a car battery. When using this, note the following:

- **Grounding** of the device must be provided. If the supply voltage source has a ground reference (ground connected to the (–) terminal), then the device is automatically grounded via the (–) terminal. The table-top power supply unit is configured in this manner.
- The **feed line** must have low resistance, the cable must have an adequate cross-section. Any interference-suppressing filters which may be inserted into the line must not have any series inductor greater than 1 mH. Otherwise an additional parallel-capacitor is needed.
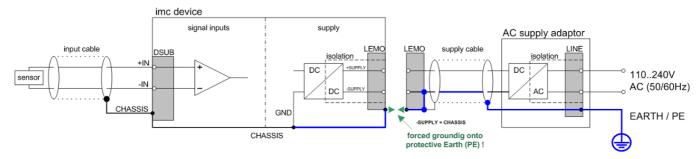
Pin configuration:

The +pin is marked with a red dot.

4.3.3 Grounding, shielding

In order to comply with Part 15 of the FCC-regulations applicable to devices of Class B, the system must be grounded. Grounding is also the condition for the validity of the technical specifications stated.
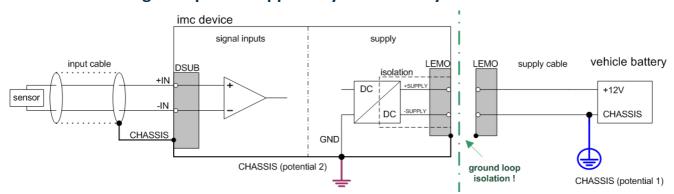
4.3.3.1 Grounding with the use of the included power adaptor

imc SPARTAN system with AC/DC power adapter

Use of the included table-top power adapter is protected by the power plug's protection ground connection: at the adapter's LEMO terminal, both the (-) pole of the supply voltage as well as the shielding and connector pod are connected with the power cable's protection ground.

4.3.3.2 Grounding with power supplied by a car battery

imc SPARTAN system with isolated from the housing (CHASSIS)) input with isolated DC-supply (e.g. battery)

If the power supply (e.g. car battery) and the measurement device are at different voltage levels, then if they were connected by the supply line, it would cause a ground loop. For such cases, the isolated internal device power supply ensures separation of the two voltage levels. The ground reference for the measurement device must then be established in a separate step.

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 connector's housing, thus securing the device's voltage level to protection ground. Additionally, in the AC/DC-adapter'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.

4.3.3.3 Shielding

Also, all signal leads to the device must be shielded and the shielding grounded (electric contact between the shielding and the plug housing "CHASSIS").

To avoid compensation currents, always connect the shielding to one side (potential) only.If the imc DSUB block screw terminal plug is used, the shielding should be connected to the pull-relief clamp on the cable bushing. This part of the conductor-coated plug housing has electrical contact to the device's housing, just as Terminals 15 and 16 (labeled: "CHASSIS", to the left and right of the imc-plug cable bushing) do; but is preferable to the "CHASSIS" terminals for optimum shielding.

4.3.4 Potential difference with synchronized devices

When using multiple devices connected via the **SYNC socket** for synchronization purposes, ensure that all devices are at the same voltage level. Any potential differences among devices may have to be evened out using an additional line having adequate cross section.

If the synchronized devices are at different voltage levels, they should be compensated by means of a lead having the appropriate cross-section. If the SYNC plug at your device is equipped with a yellow ring it is already isolated and it is protected against potential differences.

> 🛈 Note
>
> The yellow ring on the SYNC socket indicates that the socket is shielded from voltage differences.

4.3.5 Fuses (polarity-inversion protection)

The device supply input is equipped with maintenance-free polarity-inversion protection. No fuses or surge protection is provided here. Particularly upon activation of the device, high current peaks are to be expected. When using the device with a DC-voltage supply and custom-designed supply cable, be sure to take this into account by providing adequate cable cross-section.

4.3.6 Powering on

The device's main switch is a power-on button with a built-in "POWER"-LED. In order to activate the device the button must be pressed down for approx. 1 sec. The activation is indicated by the "POWER"-LED flashing. If the device boots correctly, three short beep-tones are emitted.

4.3.7 Powering off

In order to shut down the device the button must be pressed down again for approx. 1 s. During the deactivation the "POWER"-LED is blinking constantly. The measured files on the internal hard drive involved are closed before the device switches off by itself. This process takes up to 10 s. Holding the power-on button down is not necessary.

If no measurement is currently running, it takes only approx. one second for the device to be deactivated.

4.3.8 Remote control

imc SPARTAN measurement devices can be switched on and off remotely, by control signals that are accessible at the device's "REMOTE" terminal. These can be operated by externally installed manual switches, relay contacts or electronic switching elements.

Depending on the different supply unit variants, used by the various imc SPARTAN types, several distinct switching functions and operating modes are available as described in the tables below. The main operating mode, available for all types, is the basic ON/OFF push button action performed with one single temporarily closing contact: Connecting the signals "ON/OFF" (Pin13) and "SWITCH" (Pin2) for at least a short time, activates the device as with the green main switch . Once powered up, the device can be switched off by connecting the two signals once again, that means at least releasing the connection and connecting again.
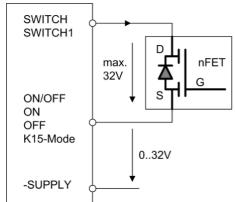
> **Reference**
>

> **Note**
>
> - If pins 2 and 13 are connected via a closed two-way switch, the device remains activated throughout. The devices' green push-button has no effect in such a case!
> - In order to turn the device off, the switch must be opened and then closed again (behavior of a push button switch)
> - When using electronic switching elements (like FET or bipolar transistors), voltage levels and direction of current flow has to be considered:

4.3.9 UPS

Devices with DC supply input are equipped with an uninterruptible power supply (UPS). This allows for a continuous operation unaffected by temporary short-term outage of the main power supply. This type of operation is particularly useful for operation in a vehicle, permanently attached to starter lock and main power switch and thus not requiring manual control. Activation of UPS buffering is indicated by the power control LED (PWR) changing from green to yellow. With many imc measurement devices, active UPS buffering is additionally indicated by an acoustic buzzer signal.

The UPS provides backup in case of power outage and monitors its duration. If the power outage is continuous and if it exceeds the specific device's "buffer time constant", the device initiates an automatic shutdown sequence, which equals manual shutdown procedure: Any current active measurement is automatically stopped, data storage on flash card or internal harddisk is completed by securely closing all data files, and finally the device is actually switched off. This entire process may take a couple of seconds.

Thus, a typical application of this configuration is in vehicles, where the power supply is coupled to the ignition. A buffer is thus provided against short-term interruptions. And on the other hand, deep discharge of the buffer battery is avoided in cases where the measurement system is not deactivated when the vehicle is turned off.

If the power failure is not continuous but only temporary, the timer that monitors blackout duration is reset every time the main supply has returned to valid levels. The buffer time constant is a variable device parameter that can be configured according to system size and battery capacity. It can usually be written into the device under software control and is preconfigured to reasonable default values upon delivery (see description in the software manual).

4.3.10 Rechargeable accumulators and batteries

imc SPARTAN devices contain maintenance-free lead-gel batteries. Charging these batteries is accomplished automatically when the activated device receives a supply voltage. Due to the inevitable leakage of charge we recommend that the device be activated for 6 to 9 hours at least every 3 months to prevent the batteries from dying.

In case the UPS is used a lot (many discharge and recharge cycles), the life time depends on how much (deep) it has been discharged (is the UPS buffering only for a short time or is the UPS discharged completely every time?).

	The rechargeable batteries contained in the device must not be thrown into household waste. Used batteries must be sent to the public collection points.

📍 References

- The technical data of the batteries contained in the device can be found in the manual or data sheet.
- imc SPARTAN devices delivered by imc after November 2022 will have a "battery label" [11] on the nameplate for integrated energy sources.

4.3.11 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.

4.3.11.1 For devices of the firmware group A (imc DEVICES)

Swapping the storage medium

Pressing the button signalizes to the system that you intend to remove the storage medium. Once this is done, the device stops access to the storage medium. If you were to remove the drive without prior announcement, it could produce defective clusters. If the storage medium is removed while a measurement is in progress, the data records are not completed. Therefore, always proceed as follows when swapping the storage medium:

1. **Important!** Before removing the storage medium from the measurement device, first announce the procedure to the system by pushing the button, in order to **avoid damage** to the storage medium.
2. Once the LED blinks, remove the storage medium.
3. Insert the new storage medium. Devices indicate by a short flash that the new drive has been successfully recognized.

Hot-Plug (exchanging the storage medium during a measurement)

It's possible to exchange the storage medium during a running measurement. This makes it possible to carry out a measurement without a PC practically without any limitations. It is only necessary to check the amount of memory available using imc Online FAMOS. To do this, use the function `DiskFreeSpace` belonging to the group "*System*". You can set an LED, for instance, or a digital output or a beeper to be activated when less than the minimum amount remains. One convenient solution would be to have a readout of the remaining space outputted by a display variable, which would indicate by a display on the device how the remaining memory decreases.

While swapping the storage medium during a running measurement, the data are stored in the measurement device's internal memory. If you complete the process within the specified RAM buffer duration, this is certain to work without any loss of data (see in the imc STUDIO manual "*Setup pages - Configuring device*" > "*Storage options and directory structure*" > "*RAM buffer time*"). Note that not only the time for the swap must be buffered, but that the buffered data must also be transferred to the new disk once the swap has been completed.

Swapping the storage medium

1. **Important!** Before removing the storage medium from the measurement device, first announce the procedure to the system by pushing the button, in order to **avoid data loss and damage** to the storage medium. The LED will **shine continuously** in green.
2. Once the device is ready for removal of the storage medium, the LED **blinks**.
3. Remove the already full storage medium.
4. No announcement is necessary for inserting a storage medium.

4.3.11.1.1 Storage media

Storage media	Description
CF Cards (Compact Flash)	For devices of group A4 and A5: The device group exclusively uses CF cards for storage medium.

Storage media	Description
SSD	Applicable to devices having a hard drive (see "*Device overview*"). • With SSD hard drives, **Hot-Plug** 22 **is not possible**! If the SSD is used in a **frame for removable data carrier**, it can be exchanged while the **device is deactivated**. • SSD hard drives appear in the device software as a hard drive and an be read out via the Explorer-shell 23. • Due to the formatting, the content of the SSD in the PC is **not displayed** when the SSD is connected directly in the PC. SSD hard drives can only be formatted in the device 27. • **In addition to** the SSD, a CF/CFAST-card can be inserted in the measurement device and used **alternatively**.

4.3.11.1.2 Data transfer

The internal 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).

> ⚠️ **Warning**
>
> • Do **not use force** to insert or remove the device storage medium.
> • During a **running measurement** having a high sampling rate, you should **never** try to **access the storage medium in the device** using the Windows Explorer shell. Otherwise, this additional burden could cause a data overflow.

> ❗ **Note**
>
> A tip on **interval saving**: Supposing the system's power supply suffers an outage during a measurement, it would not be possible to guarantee that the data file on the storage medium is terminated properly. This may lead to a failure to record the last measurement taken. Saving at intervals is a way to reduce this risk.
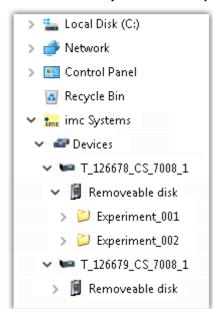
Access via Windows Explorer

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

Access via "*imc Systems*" - an Explorer shell extension

While installing the operating software, if the option "*Extension for Windows-Explorer*" is activated, you are able to copy, display or delete the files of measured data saved within the device (e.g. on the removable storage medium). The method of doing this is the familiar one under Windows.

This function is independent of the device software. As well, selection of the devices in the tree diagram is independent of the device list in the operating software.
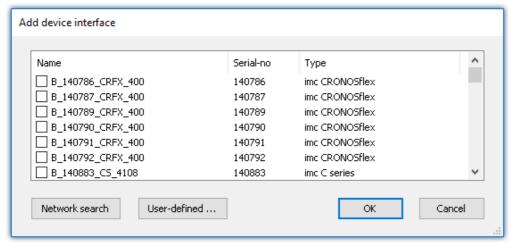
In order to get access to your device's storage medium, you must first add it to the tree diagram (see "*imc Systems - Adding a device* 25"). Subsequently, you are able to navigate to the desired data in the storage medium and thus to work with them.

4.3.11.1.2.1 imc Systems - Adding a device (Add)

Even if you have already been connected with the device by means of the imc STUDIO software, it is still not listed in the Explorer. It's possible to measure with one device while copying data from another.

- Click on "*Devices*" under "*imc Systems*" to highlight that entry.
- Open the context menu over the "*Devices*"-area and select "*Add*".

The "*Add device interface*" dialog appears:

Add Device interface

| Search for devices	Description
Network search	"*Network search*" causes the system to search the network for any suitable devices. How long this will take depends on how many devices are connected and on the network type. Ultimately, the devices found are listed. Select your measurement device and confirm your selection with "*OK*". The measurement device is then available.
User-defined	In a structured network (network with routers, Internet, ...), imc devices could not be integrated by means of a network search. With the knowledge of the IP address or of the domain name (DNS name), it is now possible to integrate a device into the list.

Reference
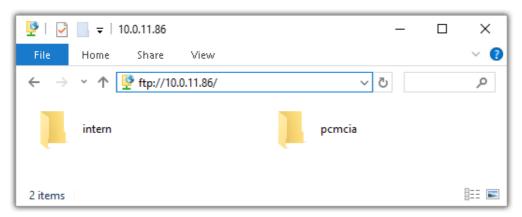
More information is presented in the imc STUDIO manual in the section: "*Setting Up - Connect the device*"

- General: "*Device connection via LAN*"
- "*Connection via a direct address*"

4.3.11.1.2.2 FTP access

It is also possible to access the device's internal data via FTP, as well as to transfer data. Other goals are to change the configuration of devices via FTP and to restart the device for measurement with the altered configuration. Application areas include test drives, where there is no way to connect the devices directly with the device software. The Diskstart/Autostart capabilities are applied and enhanced. For this purpose, the device is usually configured for autostart. Upon activation, the configuration is loaded and the measurement, as well as data transmission, starts automatically.

Start the explorer and enter "*ftp://*" and the IP address of the device:

> ⓘ **Note**
>
> - In general it is a read only operation. If you intend to delete files via FTP, you have to add "*imc@*" between "*ftp://*" and the IP address:
>   *Example:* ftp://imc@10.0.10.219
> - Furthermore, a password can be assigned to protect access via FTP. This password is entered into the device properties.

> ⚠ **Warning**
>
> The following limitations apply when accessing the storage media in a device via an FTP-client:
> - The device can't delete folders, accessed by a FTP-client.
> - It is not possible to replace the storage medium during measurement (Hot-Plug).

4.3.11.1.3 File system and formatting

Storage media with the file systems FAT32 and FAT16 (maximum 2 GB) are supported. It is recommended that a memory card be formatted ⌐27¬ and possibly partitioned 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.

Additional notes

- To select the appropriate file system for the respective application, observe the notes on the data rate and on "*Avoidance of Data Overflow* ⌐27¬".
- No limitations regarding the currently available storage medium volumes are known.
- The maximum filesize is 2 GB. In case a signal would exceed that limit, use interval saving.

✦ Notes	General restrictions applicable to file systems

Please observe the general restrictions regarding the respective file systems.

4.3.11.1.3.1 Formatting

The formatting can be performed directly in the PC's hard drive by the Windows operating system, or in the device using the Explorer shell.

⚠ Note	Recommendation

- **imc recommends formatting in the device:** In comparison to formatting by Windows, this provides higher data writing rates for high-speed channels.
- Only **one(!)** partition may be created. Multiple partitions may cause the measuring device not to recognize the storage medium.

⚠ 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.

ⓘ Note	Cluster size - Avoidance of Data Overflow

The size and number of assignment units (clusters) and thus also the file system [27] used have a substantial effect on the storage medium's speed! Small clusters can dramatically reduce the speed! If high data rates are required, it is normally recommended to have a size of 8 kB/cluster.

The optimum size of the clusters must be determined for each storage medium separately. For all of them, the following applies:

- **Few channels having a high data rate**

    If a few channels having a high data rate are being recorded, then **large clusters** on the data carrier provide better advantage. Formatting with FAT32 on the PC and drive sizes < 8 GB creates disadvantageously small clusters, which in conjunction with the full aggregate sampling rate can lead to a data overflow.
    Whenever using cards of up to 8 GB, always use the formatting by the device.
    In the device, cards larger than 512 MB are formatted with 8 kByte clusters and cards larger than 4 GB are formatted with 16 kByte clusters. Cards of up to 1 GB can alternatively be formatted by the PC with FAT16. With cards of 16 GB onward, there is no difference whether the formatting is done in the PC or in the device.

- **Very many channels with a low data rate**

    If hundreds of channels having a low data rate (e.g. CAN channels) are saved, the exact opposite is rue. Here, **small clusters** are an advantage. This means that drives with up to 8 GB should in such cases be formatted in the PC with FAT32.

Formatting in the device (Recommended)

For **formatting in the device**, navigate via the Explorer shell "*imc Systems* [23]" to the desired device.

There, open the properties of the drive: context menu > "*Properties*" (not via the Navigation pane in the Explorer).

Go to the Property dialog under the tab: "*Tools*".

Start the formatting by clicking on "*Format now!*".

The device performs the formatting according to the following rule:

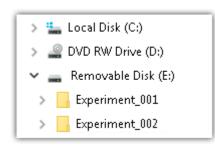| Drive size	Cluster size	File system
<= 512 MB	2 kB	FAT16
<= 4 GB	8 kB	FAT32
> 4 GB	16 kB	FAT32

ⓘ Note	

Formatting the storage medium is not allowed if an experiment whose data are to be saved internally has just been prepared.

Formatting using the Windows-Explorer

To perform **formatting of a storage medium via the Windows-Explorer** [26], navigate to the desired storage medium. Run the formatting by means of the context menu, for example.

Select one of the following two file systems: "FAT32" or "FAT" ("FAT16").

The file system "FAT32" is designed for media **larger** than 32 MB. Under no circumstances can smaller media can be formatted to "FAT32". With "FAT32", Windows generates 4 kByte clusters when the drive size is up to 8 GB, which is inconvenient for high-speed writing rates.

SSD hard drives are inherently formatted with Ext2 and for that reason **can not be formatted directly in the PC** , but only in the device [27].

However the Ext2 format offers these advantages:

- Mistaken duplicate occupation of individual clusters is not possible.
- Integration into the operating system is accomplished much more quickly than with FAT32.
- Higher writing output than with FAT32.

4.3.11.1.4 Known issues and limitations

| Known issues and limitations	Description
If the memory card can not be read under Windows	The memory cards must first be partitioned (formatted) under Windows. Windows automatically generates the correct partitioning information. Subsequently, the memory card should be formatted again in the device. When in doubt, please contact our tech support 7.
The system won't recognize the data storage drive	• Answer 1: Check the file system: The device supports FAT32/FAT16 27. • Answer 2: If there are two storage media simultaneously plugged into your device, only one media will be detected (e.g. USB and CFast). Only the first plugged media will be detected.
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	Errors can have the following causes, among others: • The data rate is too high, the storage medium can't keep up and data overflow results. • The storage medium is full. The device signalizes any error by flashing this LED. Its further responses depend on whether or not the device is connected to the PC. • If no PC is connected, for instance in cases involving automatic self-start capability, the **button lights continuously**. At the end of an experiment, always check for this if measurements are taken without PC aid. • If the PC is connected to the measuring device, imc STUDIO documents the error with an **message in the Logbook** and switches the LED off. Any one-time data overflow only shows up in the Logbook, since the LED is reset afterwards. If data overflow occurs repeatedly, The LED is activated again, the PC records the message again, and as a result the LED **blinks intermittently**.
Data overflow due to improper cluster size	• With a storage medium formatted by Windows to FAT32 27, data overflow can occur if a high aggregate sampling rate is generated by a few high-speed channels. • With a storage medium formatted in the device 27, data overflow can occur if a high aggregate sampling rate is generated by very many low-speed channels.

4.3.12 Signal connection
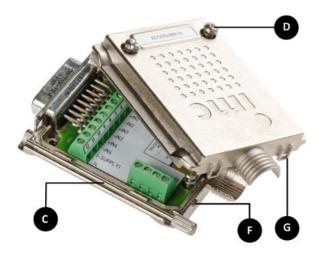
For devices with DSUB-15 connection technology, the convenient imc terminal plugs for solderless screw terminal connection are available as optional accessories.
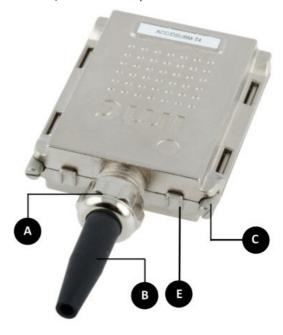
ACC/DSUBM-xxx: snap the nose into the slot

Open the Metal connector:

1. Unscrew the cable fitting (cable gland) [A]
2. Remove the bend protection [B]
3. Unscrew the lid screws [D]
4. Lift the lid in the DSUB connection area and unfasten the nose of the slot

A: Cable fitting (cable gland)
B: Bend protection
C: Fastening screw for the devices' front panel
D: Lid screws
E: Locking key (Nose / Slot)
G: Slot
F: Nose

Close the Metal connector:

1. Assemble the lid by snapping the nose into the slot (see the picture above)
2. Audible click when the lid snaps in the front of the DSUB pod
3. Insert the bend protection
4. The pressure nut must be screwed back on
5. The lid screws can be tightened

	Reference	Pin configuration

Please find the pin configuration of each available plug in the chapter: .

5 Maintenance and servicing

5.1 Maintenance and servicing

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.

5.2 Cleaning

- Always unplug the power supply before cleaning the device. Only qualified personnel 12 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.
- Be certain that the ventilation slits remain unobstructed.

5.3 Storage

As a rule, the measurement device must be stored in a temperature range of -40°C to +85°C.

5.4 Transport

When transporting, always use the original packaging or a appropriate packaging which protects the device against knocks 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.

The represented handling label for lithium ion batteries can be attached also independently printed on the package (e.g. by gluing on the package or in a transparent unlabeled document bag). Note however that the form and the format are accurately given by IATA and the expression has to take place in color. Format: 120 x 110 mm.

Lithium Battery Handling Label:
UN 3480 / UN3481

6 Start of operation Software / Firmware

6.1 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 or 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.

6.1.1 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.

6.2 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* 34 " 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.

6.3 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.

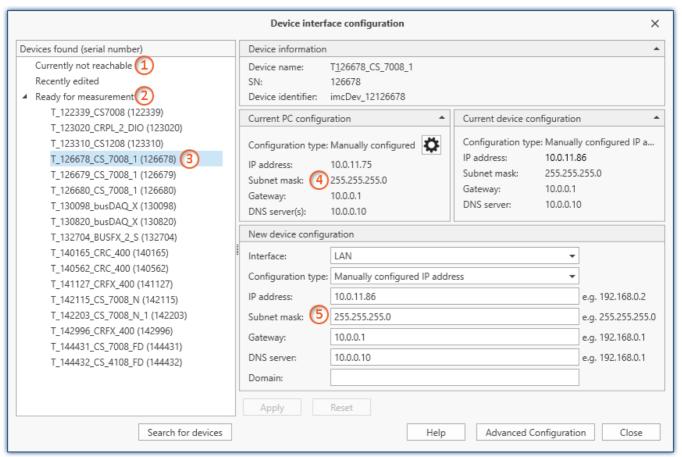| Ribbon	View
Setup-Configuration > Device interfaces (⊞)	Complete

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.

Display of measurement devices found and of the IP address

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

💡 Example

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

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

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

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

In order to apply the changes, click on the button "*Apply*". Wait for the device to restart and then close the dialog.
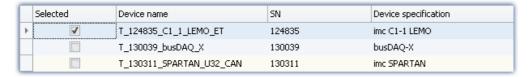
⊙ Note	Connection via modem or WLAN

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

Step 3: Integrating a device into an experiment

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

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

Select the desired device: Once you click in the checkbox "*Selected*" for the desired device, it is ready to use in the experiment.

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

You can also select multiple devices for your experiment.

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

➤ Reference	Time zone

Now check whether the correct time zone is set for the device. For more info, see the description of the software manual under the keyword "*Device properties*".

6.4 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.
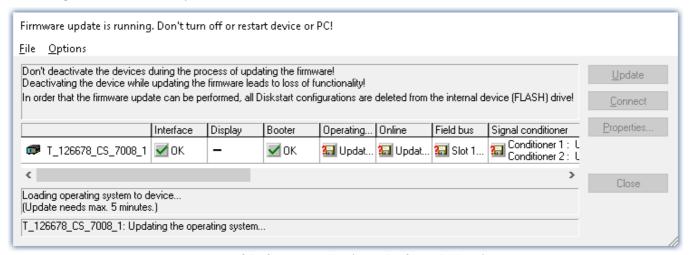
> ⚠ **Warning**   **Do not interrupt the firmware update!**
>
> **Be absolutely certain to observe the following:**
> 1. Under no circumstances should the device or its power supply be deactivated during the firmware update!
> 2. The network connection may not be interrupted. Use a cable connection, not WLAN!

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

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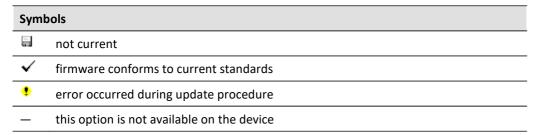
Start of the firmware update (example of a single device)
The state of the components of the firmware is diaplayed in the list.

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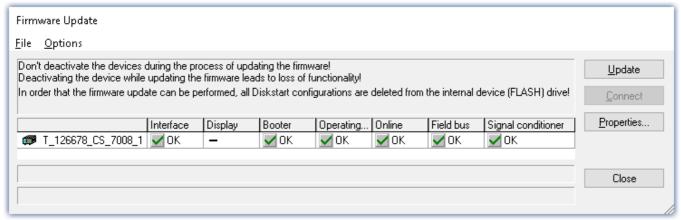
The following symbols for the individual firmware components appear in the list:

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

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

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

You are notified when the firmware setup concludes successfully, as shown below:

Conclusion of the firmware update (example of a single device)

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

⚠️ Warning	Be sure to observe in case of error

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

- Behaviour under error condition, Windows cuts off the network connection without the user's knowledge; but this can be prevented using the PC's Control Panel.
  Background: During the firmware updates there is no data transfer for a few minutes and thus no network activity; Windows detects inactivity of the connection and the following mechanisms are set in motion:

  a) Windows' energy saving mode switches the LAN adapter off, consequently interrupting the network connection!

  b) Windows switches to the next LAN adapter if there is one (some PCs have multiple adapters in order to, for instance, to access services in parallel that are accessible via separate networks.)

  c) Other scenarios are feasible, e.g. if switches are activated, which can also respond to missing data traffic.

If an error message is posted during the firmware update, leave the device on and contact our tech support 7. The firmware update may be continued with guidance from the tech support.

❗ Note

Firmware logbook

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

7 Pin configuration

DSUB Connector plugs overview

Type / Description	Article #	Order Code	TEDS	T16	U16	B16	BC16 •	BCF16	LVDT16	LVDTC16 •
Screw terminal plugs for signals										
DIO-ENC-DAC DSUB-15 (all device types)										
Plug with screw terminals for 8 digital inputs: DI4-8	13500174	ACC/DSUBM-DI4-8								
Plug with screw terminals for 8 digital outputs: DO-8	13500173	ACC/DSUBM-DO8								
Plug with screw terminals for 4 pulse counter input: ENC4	13500171	ACC/DSUBM-ENC4								
Plug with screw terminals for 4 analog outputs: DAC4	13500177	ACC/DSUBM-DAC4								
Analog Inputs DSUB-15 (depending on device type)										
Plug with screw terminals for 4 temperatures (incl. CJC) or volt.: T4	13500167	ACC/DSUBM-T4		●	●					
Plug with screw terminals for 4 voltages: U4	13500166	ACC/DSUBM-U4		●	●					
Plug with screw terminals for 2 bridges/strain gauge: B2	13500170	ACC/DSUBM-B2					●	●	●	
Plug with screw terminals and shunts for 4 currents (20 mA): I4	13500168	ACC/DSUBM-I4		●	●					
Plug with screw terminals and shunts for 2 currents (20 mA): I2	13500180	ACC/DSUBM-I2					●	●		
Analog Inputs DSUB-26-HD (for compact versions "C")										
Plug HD with screw terminals and shunts for 4 currnets (20mA): I4	13500195	ACC/DSUBM-HD-I4					●			
Plug HD with screw terminals for 4 bridges/strain gauge: B4	13500197	ACC/DSUBM-HD-B4					●			●
DSUB-HD-26 plug male (for soldering, no screw terminals)	13500132	ACC/DSUB-HD26M					●			●
Screw terminal plugs for signals (with TEDS)										
Analog inputs with TEDS (plug & measure) DSUB-15										
Plug with screw terminals for 4 temp. (incl. CJC) or volt.: T4 (TEDS)	13500190	ACC/DSUBM-TEDS-T4	✓	●	●					
Plug with screw terminals for 4 voltages: U4 (TEDS)	13500189	ACC/DSUBM-TEDS-U4	✓	●	●					
Plug with screw terminals for 2 bridges/strain gauge: B2 (TEDS)	13500191	ACC/DSUBM-TEDS-B2	✓				●	●	●	
Plug with screw terminals, shunts for 4 currents (20 mA): I4 (TEDS)	13500192	ACC/DSUBM-TEDS-I4	✓	●	●					
Plug with screw terminals, shunts for 2 currents (20 mA): I2 (TEDS)	13500193	ACC/DSUBM-TEDS-I2	✓				●	●		
Extension plugs										
DSUB-Extension plugs for IEPE/ICP DSUB-15										
Extension plug for 4 IEPE/ICP transducers: ICP4 (screw terminals)	13500032	ACC/DSUB-ICP4			●					
Extension plug for 2 IEPE/ICP transducers: ICP2I (isolated, 2 x BNC), slow	13500293	ACC/DSUBM-ICP2I-BNC-S	✓				●	●		
Extension plug for 2 IEPE/ICP transducers: ICP2I (isolated, 2 x BNC), fast	13500294	ACC/DSUBM-ICP2I-BNC-F	✓				●	●		
Push-In clamp plugs (for strain gauge quarter bridge)										
DSUB-15 plug with Push-In clamps for quarter bridge (3 wire strain gauge) with SPAR/B-16	13500268	ACC/DSUBM-QB2-PH					●			
Filter-Plug for ESD suppression DSUB-15										
In-line filter plug ESD (compatible with all amplifier types)	13500211	ACC/DSUBM-ESD		●	●	●		●	●	

Module types: compatible (●)

7.1 Connecting DSUB-15 adaptor plug

The **Standard plug** is a 1:1 DSUB-15 to screw terminal adapter. It can be used for all modules which come with the corresponding pin configuration.

The **Special plugs** do not offer direct adaption from the DSUB pins to the screw terminals, but instead come with extra functions:

- For current measurement (up to 50 mA) with voltage channels the **Shunt plug** (ACC/DSUBM-I2 and I4) have a built-in 50 Ω shunt. The scaling factor 0.02 A/V must be set in order to display the current value.
- For temperature measurements, a special, patented **Thermo plug** (ACC/DSUBM-T4) is available. This DSUB-15 plug is suited for measurement of voltages as well as temperatures with PT100 and thermocouples with integrated cold junction compensation (CJC). Any types of thermocouples can be connected at the differential inputs (+IN and -IN). It also has additional "auxiliary contacts" for connecting PT100 in 4-wire configurations, where the reference current loop is already pre-wired internally.The Thermo plug can also be used for normal voltage measurement.
- The **IEPE/ICP plug** (ACC/DSUB-ICP2 and ICP4) provide a current supply source as well as a capacitive coupling.
- The **TEDS plugs** store sensor information according to IEEE1451.4 for use with imc Plug & Measure (integrated TEDS chips DS 2433).

! Note	The screw terminals of the plug

- To connect the measurement leads with the screw terminals, suitable leads should have a maximum cross section of 1.5 mm^2 incl. cable end-sleeve.
- The terminals' screw heads only have secure electrical contact once they are tightened to a connection wire. For this reason, a control measurement (for instance with multimeter probe tips) at "open" terminals can falsely mimic a missing contact!
- Cable shielding must be connected at CHASSIS (DSUB frame) as a rule. At some plugs, V_{CC} (5 V) is available, with a maximum load current of typically 135 mA per plug.

7.2 DSUB-15 pin configuration

In general: DSUB pin 1 is internally reserved.

7.2.1 Standard plug

ACC/DSUBM-		B2	U4
DSUB Pin	Terminal	BRIDGE	VOLTAGE
9	1	+VB1	(RES.)
2	2	+IN1	+IN1
10	3	-IN1	-IN1
3	4	-VB1	(+SUPPLY)
11	5	[+SENSE1_1/4B1]	+IN2
4	6	-SENSE1	-IN2
12	7	+VB2	(-SUPPLY)
5	8	+IN2	+IN3
13	9	-IN2	-IN3
6	10	-VB2	(GND) *
14	11	[+SENSE2_1/4B2]	+IN4
7	12	-SENSE2	-IN4
15	15	GND	(GND)
8	18	+5V	(+5V)
	13		
	14		
⏚	16	CHASSIS	CHASSIS
⏚	17	CHASSIS	CHASSIS

[ ] : 1/4 Bridge with B16 and +SENSE with BCF16   * if special version with ±15 V option, then this pin 6 is the reference

Metal plug

ACC/DSUBM-		ENC4, ENC4-IU	DI4-8	DO-8	DAC4
DSUB Pin	Terminal	INC.-ENCODER	DIGITAL IN	DIGITAL OUT	ANALOG OUT
9	1	+INA	+IN1	BIT1	
2	2	-INA	+IN2	BIT2	DAC1
10	3	+INB	+IN3	BIT3	AGND
3	4	-INB	+IN4	BIT4	
11	5	+INC	-IN1/2/3/4	BIT5	DAC2
4	6	-INC	+IN5	BIT6	AGND
12	7	+IND	+IN6	BIT7	
5	8	-IND	+IN7	BIT8	DAC3
13	9	+INDEX	+IN8		AGND
6	10	-INDEX	-IN5/6/7/8		
14	11	+5V	+HCOM	HCOM	DAC4
7	12	GND *	LCOM	LCOM	AGND
15	15	(-SUPPLY)	LCOM	LCOM	
8	18	(+SUPPLY)	LEVEL	OPDRN	
	13				
	14				
⏚	16	CHASSIS	CHASSIS	CHASSIS	CHASSIS
⏚	17	CHASSIS	CHASSIS	CHASSIS	CHASSIS

* if special version with ±15 V option, then this pin is reference

7.2.2 Special plug

Metal plug

ACC/DSUBM-		T4
DSUB Pin	Terminal	TH-COUPLE/RTD
9	1	+I1
3	2	(+SUPPLY)
2	3	+IN1
10	4	-IN1
11	5	+IN2
4	6	-IN2
5	7	+IN3
13	8	-IN3
14	9	+IN4
7	10	-IN4
12	11	(-SUPPLY)
6	12	-I4 (GND) *
	15	-I3
	18	+I2
15	13	GND
	14	+I3
	16	+I4
	17	-I1
	19	-I2
	20	CHASSIS

Metal plug

ACC/DSUBM-		I4	I2
DSUB Pin	Terminal	CURRENT	CURRENT
9	1	(RES.)	+SUPPLY1
2	2	+IN1	+IN1
10	3	-IN1	-IN1
3	4	(+SUPPLY)	-SUPPLY1
11	5	+IN2	
4	6	-IN2	
12	7	(-SUPPLY)	+SUPPLY2
5	8	+IN3	+IN2
13	9	-IN3	-IN2
6	10	(GND)	-SUPPLY2
14	11	+IN4	
7	12	-IN4	
15	15	(GND)	(GND)
8	18	(+5V)	(+5V)
	13		
	14		
⏚	16	CHASSIS	CHASSIS
⏚	17	CHASSIS	CHASSIS

DSUB-	ICP4	ICP2
Terminal	ICP	ICP
1	+ICP1	+ICP1
2	-ICP1	-ICP1
3	+ICP2	
4	-ICP2	
5	+ICP3	+ICP2
6	-ICP3	-ICP2
7	+ICP4	
8	-ICP4	
9		
10		
11		
12		
13		
14	CHASSIS	CHASSIS
15	CHASSIS	CHASSIS
16	CHASSIS	CHASSIS
17	+5V	+5V
18	AGND	AGND

   * if the special version of the amplifier is equipped with the ±15 V option, then this pin 6 is the reference

7.2.3 TEDS plug

ACC/DSUBM-TEDS-		B2	U4
DSUB Pin	Terminal	BRIDGE	VOLTAGE
9	1	+VB1	(RES.)
2	2	+IN1	+IN1
10	3	-IN1	-IN1
3	4	-VB1	(+SUPPLY)
11	5	[+SENSE1_1/4B1]	+IN2
4	6	-SENSE1	-IN2
12	7	+VB2	(-SUPPLY)
5	8	+IN2	+IN3
13	9	-IN2	-IN3
6	10	-VB2	GND
14	11	[+SENSE2_1/4B2]	+IN4
7	12	-SENSE2	-IN4
15	15	(GND), TEDS_GND	TEDS_GND
8	18	(+5V)	(+5V)
	13	TEDS1	TEDS1
	14	TEDS2	TEDS2
⏚	16	CHASSIS	CHASSIS
⏚	17	CHASSIS	CHASSIS
	19		TEDS3
	20		TEDS4

(1) if the special version of the amplifier is equipped with the ±15 V option, then this pin = -15 V

(2) if special version with ±15 V option, then this pin 6 is the reference   [ ] : 1/4 Bridge with B16 and +SENSE with BCF16
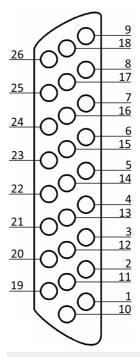
ACC/DSUBM-TEDS-		T4
DSUB	Terminal	TH-COUPLE/RTD
9	1	+I1
3	2	(+SUPPLY)
2	3	+IN1
10	4	-IN1
11	5	+IN2
4	6	-IN2
5	7	+IN3
13	8	-IN3
14	9	+IN4
7	10	-IN4
12	11	(-SUPPLY)
6	12	-I4
	15	-I3
	18	TEDS4
15	13	TEDS_GND
	14	+I3
	16	+I4
	17	TEDS3
	19	TEDS2
	20	TEDS1
	21	-I1
	22	+I2
	23	-I2
	24	CHASSIS

ACC/DSUBM-TEDS-		I4	I2
DSUB Pin	Terminal	CURRENT	CURRENT
9	1	(RES.)	+SUPPLY1
2	2	+IN1	+IN1
10	3	-IN1	-IN1
3	4	(+SUPPLY)	-SUPPLY1
11	5	+IN2	
4	6	-IN2	
12	7	(-SUPPLY)	+SUPPLY2
5	8	+IN3	+IN2
13	9	-IN3	-IN2
6	10	GND	-SUPPLY2
14	11	+IN4	
7	12	-IN4	
15	15	TEDS_GND	TEDS_GND
8	18	(+5V)	(+5V)
	13	TEDS1	TEDS1
	14	TEDS2	TEDS2
	16	CHASSIS	CHASSIS
	17	CHASSIS	CHASSIS
	19	TEDS3	
	20	TEDS4	

7.3 DSUB-26 Pin configuration (High Density)

ACC/DSUBM-		HD-I4	HD-B4
DSUB	Terminal	CURRENT	BRIDGE
13	1	+IN2	+IN2
4	2	-IN2	-IN2
14	3		[+SENSE2_1/4B2]
5	4		-SENSE2
15	5	+IN3	+IN3
6	6	-IN3	-IN3
16	7		[+SENSE3_1/4B3]
7	8		-SENSE3
23	9	+SUPPLY3	+VB3
24	10	-SUPPLY3	-VB3
25	11	+SUPPLY4	+VB4
26	12	-SUPPLY4	-VB4
17	13	+IN4	+IN4
8	14	-IN4	-IN4
18	15		[+SENSE4_1/4B4]
9	16		-SENSE4
21	17	+SUPPLY2	+VB2
22	18	-SUPPLY2	-VB2
19	19	+SUPPLY1	+VB1
20	20	-SUPPLY1	-VB1
11	21	+IN1	+IN1
2	22	-IN1	-IN1
12	23		[+SENSE1_1/4B1]
3	24		-SENSE1

For contact with the chassis use
the screw of the strain relief.

7.4 DSUB-9 pin configuration

7.4.1 Display

DSUB-PIN	Signal	Description	Use in device
1	DCD	Vcc 5V	connected
2	RXD	Receive Data	connected
3	TXD	Transmit Data	connected
4	DTR	5V	connected
5	GND	ground	connected
6	DSR	Data Set Ready	connected
7	RTS	Ready To Send	connected
8	CTS	Clear To Send	connected
9	R1	Pulldown to GND	connected

Supply for the graphical display

Connector	+9 V to 32 V	- (0V)	nc
Binder	1	2	3
Souriau	B	C	A

7.4.2 GPS

DSUB-9		GPS 18 LVC	GPS 18 - 5Hz
Pin	Signal	Color	Color
1	Vin	Red	Red
2	RxD1*	White	White
3	TxD1	Green	Green
5	GND, PowerOff	2x Black	2x Black
7	PPS (1 Hz clock)	Yellow	Yellow
4,6,8 and 9	-	-	-

* Pin configuration at measurement device. At the GPS-mouse Rx and Tx are interchanged.

7.5 Pin configuration of the fieldbusses

7.5.1 CAN, CAN FD Interface

DSUB-PIN	Signal	Description	Use in device
1	+CAN_SUPPLY	optional supply	unused as per standard* (supply I < 1 A)
2	**CAN_L**	**dominant low bus line**	connected
3	**CAN_GND**	**CAN Ground**	connected
4	nc	reserved	do not connect
5	-CAN_SUPPLY	optional supply	unused as per standard* (supply I < 1 A)
6	**CAN_GND**	**optional CAN Ground**	connected
7	**CAN_H**	**dominant high bus line**	connected
8	nc	reserved (error line)	do not connect
9	nc	reserved	do not connect

* The CAN and the CAN FD Interface can be equipped ex-factory with the option "**Power via CAN**".

The DSUB-9 sockets are labled.

CAN, CAN FD Interface with Power via CAN

The special option Power via CAN includes the internal connection of the unbuffered supply voltage of the device to the first two nodes "CAN1" and "CAN2" of the CAN interface of a device. This makes it possible to supply connected CANSAS modules (or CAN-based sensors) via the CAN cable. A cable with sufficient cross-section is required. The load current is a maximum of 1 A per node and is limited by a current limiter, which does not provide safe short-circuit protection.

Direction of electric current and fuse

- The direction of current flow is unidirectional, protected by diodes: the device supplies CAN bus participants. Current flow into the device is blocked.
- The diodes also decouple the supply lines of the two CAN nodes from each other.
- Overload protection is provided by an over current protection in the form of inert PTC components ("PolySwitch"). These will be reset in case and the operational again.
- The **fuse does not provide complete protection against destruction in the event of a short circuit**! Rather, it serves to limit the current at a slowly increasing load, such as the successive connection of a large number of imc CANSAS modules. On the other hand, it is not always possible to protect against very fast increasing currents, such as a hard short-circuit on the cable, safely and quickly enough!

- The current limit depends on the operating temperature (internal temperature of the unit):
  - 2.2 A   (0°C)
  - 1 A   (+70°C)
  - 0.74 A   (+85°C)

The corresponding maximum power in the event of a fault (short circuit) then depends on the supply voltage used.

Guaranteed power available via CAN (Spec: 1 A) up to 70°C indoor temperature

Power consumption reserves:

- This design guarantees a current of 1 A per node (up to 70°C). In addition, the PTC fuse then slowly starts limiting the current and "disconnecting" the loads. The generally low consumption of the CANSAS modules should not be underestimated, since the power is achieved by the current at a low supply voltage. Even a UNI8 with a power consumption of max. 15 W (with connected sensors) achieves this limit with a current of 1 A at 15 V. In addition, there is the voltage drop for long cables and small cross-sections. It is always necessary to first calculate the power consumption and the expected currents.
- Due to its technology, the CAN bus is ideally suited for retrofitting a system. It can easily happen that the current load and the cross-section have been designed correctly at first, but then modules are added which do not comply with the specification.

USV-buffering:

- The CAN-supply is not buffered. It is not tapped at the output of the device UPS but directly at the LEMO power supply. For this reason, this power is not included in any limits for the total device power, as long as these are decisively determined by the UPS. Since a current and no power limitation is provided, a UPS buffering would also not be possible without further ado, because with 2 nodes with 1 A current limit (typically!) and a maximum input voltage of 30 V or even 50 V, considerable power results.
- Since Power-via-CAN is not coupled to UPS or startup logic, this CAN supply is not deactivated when the device is switched off, but is always active as soon as the main supply (LEMO) is powered.

Reference:

- The CAN supply voltage is identical to the main power supply (wide range, LEMO) and has corresponding potential reference. The pins on the DSUB-9 are marked with ±CAN_SUPPLY.
- In contrast, the pin "CAN-GND" has nothing to do with this: This is rather the electrical and logical completely independent reference of the CAN bus signals. It is electrically isolated from the rest of the system (housing, power supply, system electronics). CAN_GND should always be used independently of the power supply so that the CAN_H and CAN_L levels are reliably detected.

7.5.2 LIN-Bus (DSUB-9)

DSUB-PIN	Signal	Description
3	**LIN_GND**	LIN Ground
6	**LIN_GND**	Optional LIN Ground
7	**LIN_INPUT/OUTPUT**	LIN bus line
1, 2, 4, 5, 8 and 9	n.c.	

7.5.3 FlexRay-Bus (DSUB-9)

imc standard: One DSUB-9 socket with two channels

DSUB-Pin	Signal	Description
1	nc	
2	BM channel A	negative bus line channel A
3	GND	FlexRay ground
4	BM channel B	negative bus line channel B
5	GND	FlexRay ground
6	nc	
7	BP channel A	positive bus line channel A
8	BP channel B	positive bus line channel B
9	nc	

Option: Two DSUB-9 sockets (CON1 and CON2) with one channel each

DSUB-Pin	CON1	CON2
1	nc	nc
2	BM channel A (negative bus line channel A)	BM channel B (negative bus line channel B)
3	GND	GND
4	nc	nc
5	GND	GND
6	nc	nc
7	BP channel A (positive bus line channel A)	BP channel B (positive bus line channel B)
8	nc	nc
9	nc	nc

7.5.4 XCPoE (RJ45)

Standard Ethernet 1x RJ45.

7.5.5 ARINC-Bus (DSUB-15)

CON 1					
ARINC-Interface with 8 Rx channels			**ARINC-Interface with 8 Rx and 4 Tx channels**		
DSUB Pin	Signal	Description	DSUB Pin	Signal	Description
Standard 4x Rx			**Standard 4x Rx; 2x Tx**		
1	Rx1A	receiving channel 1A	1	Rx1A	receiving channel 1A
9	GND	GND	9	Tx1A	sending channel 1A
2	Rx1B	receiving channel 1B	2	Rx1B	receiving channel 1B
10	GND	GND	10	Tx1B	sending channel 1B
3	Rx2A	receiving channel 2A	3	Rx2A	receiving channel 2A
11	GND	GND	11	GND	GND
4	Rx2B	receiving channel 2B	4	Rx2B	receiving channel 2B
12	GND	GND	12	GND	GND
5	Rx3A	receiving channel 3A	5	Rx3A	receiving channel 3A
13	GND	GND	13	Tx2A	sending channel 2A
6	Rx3B	receiving channel 3B	6	Rx3B	receiving channel 3B
14	GND	GND	14	Tx2B	sending channel 2B
7	Rx4A	receiving channel 4A	7	Rx4A	receiving channel 4A
15	GND	GND	15	GND	GND
8	Rx4B	receiving channel 4B	8	Rx4B	receiving channel 4B

CON 2					
ARINC-Interface with 8 Rx channels			**ARINC-Interface with 8 Rx and 4 Tx channels**		
DSUB Pin	Signal	Description	DSUB Pin	Signal	Description
Standard 4x Rx			**Standard 4x Rx; 2x Tx**		
1	Rx5A	receiving channel 5A	1	Rx5A	receiving channel 5A
9	GND	GND	9	Tx3A	sending channel 3A
2	Rx5B	receiving channel 5B	2	Rx5B	receiving channel 5B
10	GND	GND	10	Tx3B	sending channel 3B
3	Rx6A	receiving channel 6A	3	Rx6A	receiving channel 6A
11	GND	GND	11	GND	GND
4	Rx6B	receiving channel 6B	4	Rx6B	receiving channel 6B
12	GND	GND	12	GND	GND
5	Rx7A	receiving channel 7A	5	Rx7A	receiving channel 7A
13	GND	GND	13	Tx4A	sending channel 4A
6	Rx7B	receiving channel 7B	6	Rx7B	receiving channel 7B
14	GND	GND	14	Tx4B	sending channel 4B
7	Rx8A	receiving channel 8A	7	Rx8A	receiving channel 8A
15	GND	GND	15	GND	GND
8	Rx8B	receiving channel 8B	8	Rx8B	receiving channel 8B

7.5.6 PROFIBUS (DSUB-9)
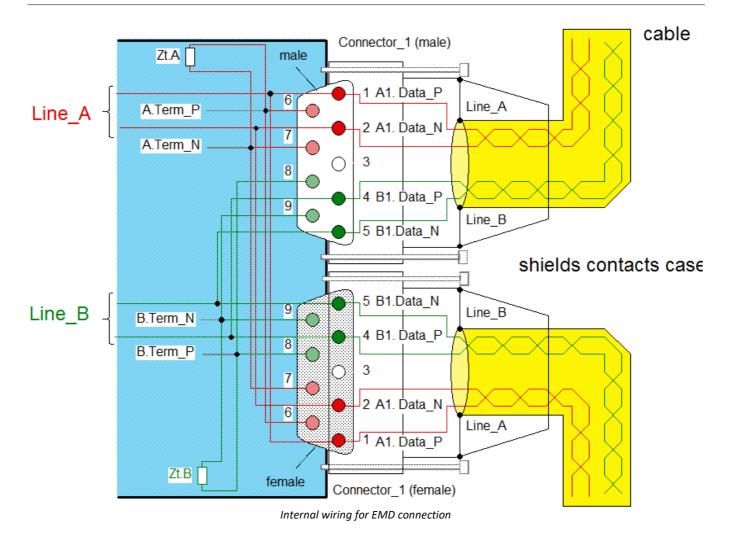
DSUB-PIN	Signal	Description
3	DATA+	B-Line
5	GND	PROFIBUS Ground
8	DATA-	A-Line
1, 2, 4, 6, 7 and 9	n.c.	

7.5.7 MVB-Bus (DSUB-9)

7.5.7.1 EMD Pin configuration - DSUB-9

EMD connection with double-occupancy. Standard DSUB-9 terminals are used.
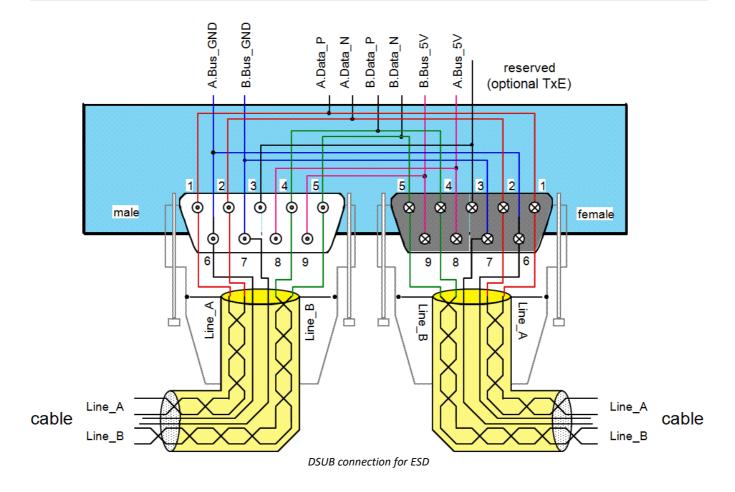
DSUB-PIN	Signal	Description	as termination terminal
1	A1. Data_P	data line A	jumper to 6
2	A1. Data_N	data line A	jumper to 7
3	NC	not connected	
4	B1. Data_P	data line B	jumper to 8
5	B1. Data_N	data line B	jumper to 9
6	Terminator A	internal	jumper to 1
7	Terminator A	interna	jumper to 2
8	Terminator B	interna	jumper to 4
9	Terminator B	interna	jumper to 5

Internal wiring for EMD connection

7.5.7.2 ESD Pin configuration - DSUB-9

ESD Connection. Standard DSUB-9 terminals are used.

DSUB-PIN	Signal	Description	Termination
1	A. Data_P	Data lead A	
2	A. Data_N	Data lead A	
3	NC	not connected	
4	B. Data_P	Data lead B	
5	B. Data_N	Data lead B	
6	A.Bus_GND	Ground A	
7	B.Bus_GND	Ground B	
8	A.Bus_5V	5V Supply A	
9	B.Bus_5V	5V Supply B	

$Rm = 143\ \Omega;\ Ru = Rd = 383\ \Omega$

DSUB connection for ESD

7.6 REMOTE plug

Signal	Function	Connection	Remarks	DSUB
ON	activation	connect pin 10 with SWITCH or SWITCH1	permanently jumpered to SWITCH1: automatic start with external power supply e.g. in vehicle	10
OFF	deactivation	connect pin 9 with SWITCH	brief connection will deactivate the device	9
ON/OFF	push button for start / shutdown	connect pin 13 with SWITCH	brief connection will initiate activation/deactivation as with the green main switch	13
SWITCH	switch signal / reference	connect pin 2 with ON/OFF, ON or OFF	Brief connection via a push button will initiate activation/deactivation. Note: power up from internal battery is supported!	2
SWITCH1	activation only from external power supply	connect pin 3 with ON	static, permanently jumpered: for automatic activation upon application of an external supply	3
K15-mode	controlling activation with an external low power control signal	jumper pin 12 to SWITCH	K15-mode=SWITCH provides K15 control mode: control voltage to be applied to "ON": · startup: >9 V · shutdown: <2 V (do not leave floating!) (no significant current drawn)	12
MUTE	muting the UPS buzzer	connect pin 5 with CHASSIS	e.g. for acoustic applications	5
RESET	immediate shutdown without saving	connect pin 1 with CHASSIS	**Will cause a lost of measurement data!** in case of malfunction, only	1
RESET_GND			reference for MUTE and RESET	CHASSIS

◆▶   Reference

Please find here the [description of the REMOTE control](#)[20].

Index

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E-Mail: info@imc-tm.de

Internet: https://www.imc-tm.com

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

Internet: https://www.imc-tm.com/service-training/

Service and maintenance

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

Phone: (Germany):   +49 30 629396-333

E-Mail: service@imc-tm.de

Internet: https://www.imc-tm.com/service

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.

E-Mail: schulung@imc-tm.de

Internet: https://www.imc-tm.com/service-training/imc-academy

International partners

You will find the contact person responsible for you in our overview list of imc partners:

Internet: https://www.imc-tm.com/imc-worldwide/

imc @ Social Media

https://www.facebook.com/imcTestMeasurement
https://www.youtube.com/c/imcTestMeasurementGmbH
https://x.com/imc_de
https://www.linkedin.com/company/imc-test-&-measurement-gmbh