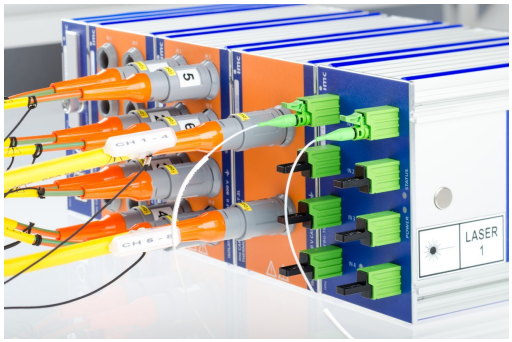
An Axiometrix Solutions Brand

imc CANSAS

Modules and Software - Getting Started

Edition 14 - 2024-02-29

imc CANSASfit (CANFT)



imc CANSASflex (CANFX)

imc CANSASflex (CANFX)

imc Test & Measurement GmbH • Voltastr. 5 • 13355 Berlin • Germany

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.

If you wish to receive a copy of the GPL sources used, please contact our tech support.

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.

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

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

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 6 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

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 CANSAS modules 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 the imc CANSAS modules 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.

[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 the imc CANSAS modules 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.

1.4 Explanation of symbols

CE Conformity

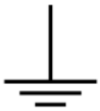
see CE chapter 1.2 6

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 6.

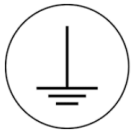
Potential compensation

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 6). 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 Latest changes in this document

Amendments and bug-fix in Getting Started Edition 13

Section	Amendments
Symbols	symbol added (ESD-sensitive components)

Amendments and bug-fix in Getting Started Edition 12

Section	Amendments
General	smaller changes and improvements

Amendments and bug-fix in Getting Started Edition 11

Section	Amendments
CANFT/HISO-HV-4	new module added, pin configuration 62

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 CANSAS modules are 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.

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 CANSAS 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 CANSAS 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).

* 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 Precautions for operation

Certain basic rules of safety are always to be followed, even with 'safe' devices such as imc CANSAS. Unintended and/ or inappropriate usage of the device can be dangerous for the operator and/or surrounding persons and, in the worst case, can damage the test object or imc CANSAS itself. We strongly discourage the user from making any modifications to the measurement system whatsoever. Doing so can be especially dangerous because other users may be unaware of the changes.

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:
the device is visibly damaged,

- loose parts can be heard within the device,
- the device no longer functions properly,
- the device has been stored for a long period of time under unfavorable conditions (e.g. outdoors or high-humidity environments).

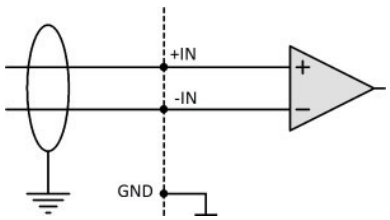
1. Always wait a few seconds before turning the device back on after it has been turned off. A general test of the system (e.g. voltages, operating condition, memory test) is performed during the boot sequence.
2. **WARNING!** Opening the housing or removing any parts not normally removable by hand can expose dangerous voltages. Always turn the device off and unplug the power supply before doing so!
3. It is strictly forbidden to repair or adjust an opened device which is plugged in. And if such work is absolutely necessary, then only specially trained personnel who are fully familiar with the procedures to be used may carry this out.

Reference

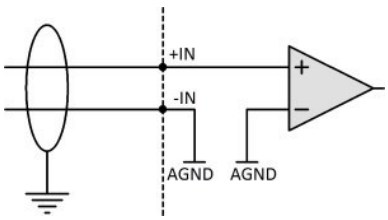
See also "Troubleshooting 17", in this chapter. Please refer to the specifications in the Appendix and the application hints for the different imc CANSAS modules for information on avoiding damage to the device due to inappropriate signal connection.

Note

Be sure to shield and ground the input and output cables properly. Connect the measurement signals as shown below to make measurements in compliance with the EMC guidelines:



Differential measurement



Single-ended measurement

For potential-isolated amplifier inputs it may be necessary to use double shielding.

3.1 After Unpacking...

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 the supplied accessories for completeness (see scope of delivery according to imc data sheet).

Note that a imc CANSAS module must be configured before being taken into operation!

Warning ESD Warning

Despite protective measures, our components are sensitive to electrostatic discharge. Electrostatic charge may accumulate unnoticed and may even cause damage without your being immediately aware of it. Such damage can be avoided by carrying out all work at "safe" work stations and by utilizing packaging with electrostatic shielding when transporting sensitive components.
Always follow ESD precautions!

When handling static sensitive devices, observe the following guidelines:

- Always statically discharge yourself (e.g. by touching a grounded object) before handling static sensitive devices.
- Any equipment and tools used must also be free from static charge.
- Unplug the power cord before removing or inserting static sensitive devices.
- Handle static sensitive devices by their edges.
- Never touch a connection pin or conducting track on static sensitive devices.
- **Always ensure that electrostatic charge does not form at contacts between device sockets and their leads. Any charge which may develop here is to be lead off. Damage resulting from ESD is not covered in the guarantee.**

3.2 Before Starting

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.

We recommend that you allow an approx. 30 min. warm-up phase before starting a measurement.

Unless otherwise specified, the modules are designed for use in clean and dry environments. They are not to be operated in 1) exceedingly dusty and/ or wet environments, 2) in environments where danger of explosion exists nor 3) in environments containing aggressive chemical agents.

Always arrange your cables and signal leads in a safe fashion. Think prevention!

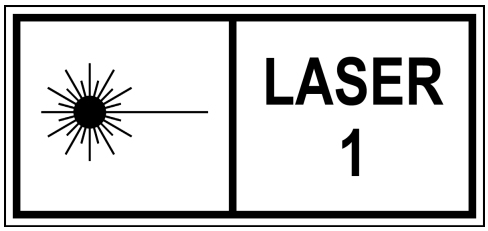
Never connect or disconnect signal leads during thunderstorms.

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.

3.3 Safety notes concerning laser setup

The fiber-optic FBG-T8 measuring device has laser class 1 in the case of maintenance and single faults. During fault-free operation of the measuring device, a maximum of 1.6 mW of accessible radiation is emitted at each connection point. According to Annex B, DIN EN 60825-2:2011-06, laser class 1 means that there are no unrestricted laser safety requirements. According to BGV B2, by complying with laser class 1, the accessible laser radiation can be classified as harmless even in the event of a single error.



The CANFDX/FBG-T8 device works with class 1 lasers, which means that the device is safe during normal operation. Nevertheless, looking directly into the beam of the Class 1 laser device may cause irritation to your eyesight. This is possible, for example, if the protective cover has been removed or if the device has been damaged in such a way that laser radiation can be released.

3.3.1 Optical product properties laser safety

The fiber optic FBG-T8 measuring device has a laser as light source. This is distributed via two splitters to four outputs each, whereby the power is the same on all outputs. The emission power of the light source is again reduced to approx. 1.6 mW by fixed 6 dB and 3 dB fiber couplers connected in series before the light from the fiber laser is directed to the fiber connectors accessible from the outside. Thus, the maximum light output per output fiber emitted by the FBG-T8 is reliably less than 10 mW. The emitted spectrum is between 1520 nm and 1570 nm.

3.3.2 Derivation of the laser class

3.3.2.1 Classification according to table 3 DIN EN 60825-1:2015-07

The emission spectrum of the light source lies between 1520 nm and 1570 nm and thus in the range between 1500 nm and 1800 nm of the standard. As "worst case" consideration, continuous irradiation (10^3 to $3 \cdot 10^4$ s) is assumed to be the emission duration. This results in a limit value of 10 mW optical power.

3.3.2.2 Bundled wires according table D.1 DIN EN 60825-2:2011-06

If the measuring channels are fed into a loose tube by means of a suitable cable, the laser class is evaluated in accordance with Section D.4.4, DIN EN 60825-2:2011-06. In the case of a broken loose tube, the following applies: The hazard class of the broken loose tube does not exceed the hazard class of the most dangerous optical fiber within the cable. The hazard class of the most dangerous optical fiber is 1, so the hazard class of the broken loose tube is also 1. There is a restriction here when considering precision-fractured loose tubes, which can, however, be ruled out as faults in use.

3.3.3 Evaluation according to DGUV-11/BGV B2

The DGUV-11/BGV B2 demands: "When using a class 1 laser device as intended, no further protective measures are required. If the class changes during the maintenance of class 1 laser equipment, the protective measures for the higher class that occurs must be taken". The two maintenance and servicing measures on the CANFDX/FBG-T8 include cleaning the fiber optic connectors and connecting and disconnecting the electrical connectors during replacement. Due to the design, the laser class cannot rise above laser class 1. Therefore, no further protective measures are necessary for the intended use in accordance with BGV B2 and the safety requirements remain fulfilled even with these maintenance and servicing measures.

3.4 Troubleshooting

Only qualified technicians are allowed to make repairs on the device! Unauthorized opening or incorrect repair of the device may greatly endanger the user (electric shock, fire hazard). Devices which have been altered or tampered with no longer comply with their license and may not be used. In case of accident (e.g. damage to housing, terminals, modules or power supply, or exposure to liquids or foreign substances), turn the device off immediately, unplug the power cord and inform our tech support 6.

4 Maintenance and servicing

4.1 Maintenance and Service

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.

4.2 Cleaning

Disconnect imc CANSAS devices from all circuits before cleaning. Only qualified personnel 11 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.

4.3 Transport

When transporting, always use the original packaging or a appropriate packaging which protects the imc CANSAS 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.

5 Startup

5.1 Data Carrier Contents

5.1.1 Setup-Program

The root directory on the Data-Carrier contains the file **SETUP.EXE**. Call this program in order to install the imc CANSAS configuration software.

5.1.2 Driver-software for the PC / CAN-Bus interface

The imc CANSAS application supports different types of interface cards. The driver software corresponding to the card used can be found on the Data-Carrier in the directory \Driver. It reflects the respective latest edition of the driver at the time of the Data-Carrier manufacture. As a rule, the current driver editions are provided by the manufacturer of the circuit boards as a CD or other hard copy, or are offered for download from the Internet.

Note Data carrier

The available driver on the imc CANSAS data carrier are tested and recommended by imc! Driver from the corresponding manufacturer may be newer but may not function correctly.

5.2 System requirements

Supported operating systems	Minimum requirements for the PC
Windows 10*/11*	1 GB RAM
Windows 8.1	100 MB free hard disk drive (NTFS format)

*released in conformance with the version of Windows 10/11 applicable at build date of imc software

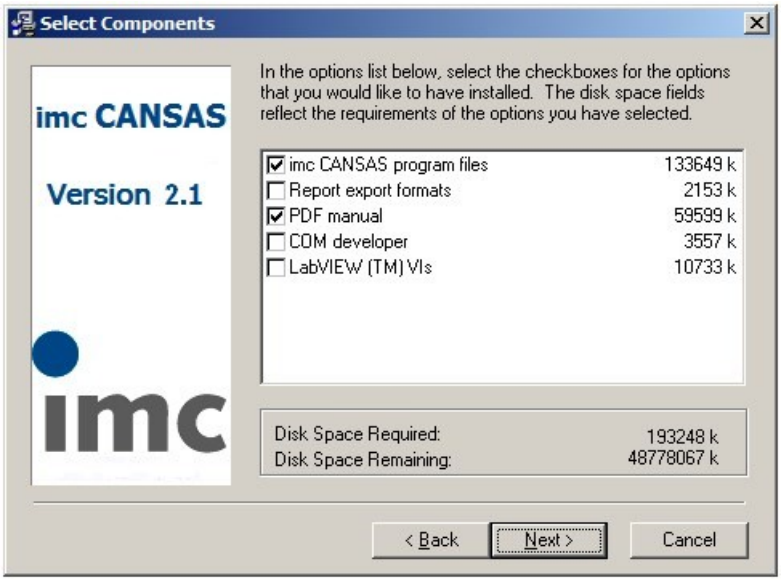
5.3 Installation of imc CANSAS software

The software is started by running the file "Setup.exe". The supported operating systems are listed here 19. The installation process includes updating of the following drivers: MS DAO, MS-Jet Engine, MS OLE Automation, Crystal Records, Microsoft XML Parser.

The installation offers both a German and an English version of the software; make the choice in the first dialog which appears. The Welcome dialog provides in formation in the respective language on applicable legal provisions, as well as certain instructions for proceeding with the system.

The **second dialog** displays legal provisions and instructions on completing the installation procedure. The third dialog prompts the user to specify the installation folder's location. All files needed for running the imc CANSAS-module are then copied into this folder.

The next dialog is for selecting program components to install. The imc CANSAS Program files must be retained as active since they are essential for configuring imc CANSAS.



The component Report Export formats only needs to be installed if a imc CANSAS report on module configurations is to be saved in an extraneous format, such as in the form of an Excel file.

The *COM user* interface offers access to all functions when using a created program, e.g. by Visual Basic or C++. If you are going to develop your own programs, you should select COM developer. This option comes with an online-help and examples. To develop using *LabVIEW* select the option *LabVIEW* ™ Vis.

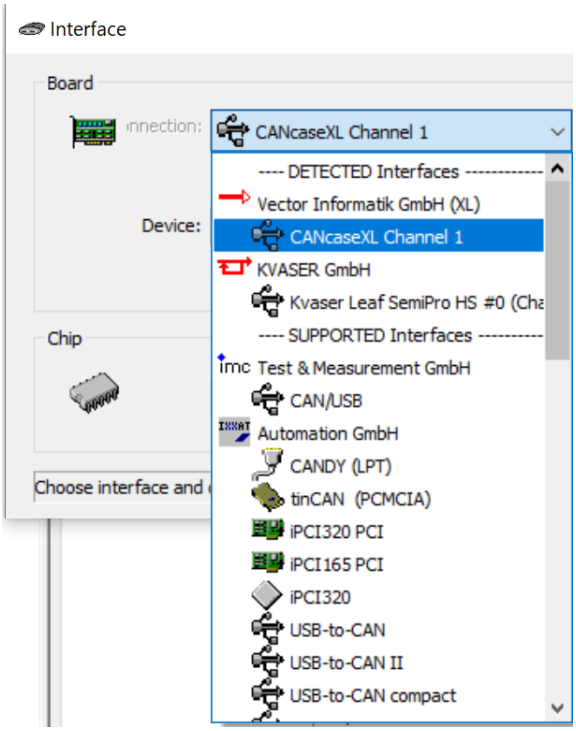
Note

Installation of imc CANSAS does not serve to change a previous installation in terms of simply exchanging selected components. Instead, installation is carried out from scratch, completely. It is recommended to completely uninstall any previously present imc CANSAS software, particularly older versions, before installing new software! However, before uninstalling old software, any user's data stored in the program folder should be saved to other memory space or they will be lost. Such data are located in database files, for instance, under the name Imcan.mdb.

The next dialog is for selecting the program group which contains the shortcut icon for starting the module. A progress indicator bar is displayed during the actual installation process, indicating the extent of progress and which files are currently being copied.

The last dialog announces successful installation. If, however, the "Common Controls" are too old for the imc CANSAS software, the installation continues with the Microsoft installation of the common controls. This may make it necessary to reboot the computer.

5.4 Interface cards



The interface cards supported by imc CANSAS are produced by many companies e.g. imc, KVASER, Vector, PEAK, XXAT and HORIBA. A selection of their installation software is located in the directory *Driver*.

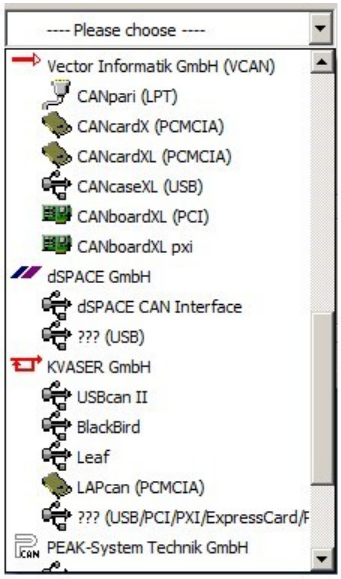
The functionality is provided by the manufacturer of the interface card or adapter. Please check the internet page of the manufacturer for driver updates also.

After correct installation and connected interface card, the device appears at the top of the list under *DETECTED Interfaces*.

Note imc CANSAS and imc STUDIO

When using imc CANSAS from imc STUDIO, the CAN nodes of the imc devices are used as interface. No further settings are necessary for this in imc CANSAS.

5.4.1 KVASER interface cards



imc CANSAS works with the KVASER -driver without problems for Win 10, 11.

After the driver has been installed, the computer must be re-started. Some FAQs about this subject can be found here 22.

5.4.1.1 FAQ for the KVASER interface

- **Which version of imc CANSAS supports Kvaser Leaf SemiPro HS?**
  The interface is supported by the imc CANSAS Version 1.9 R4.

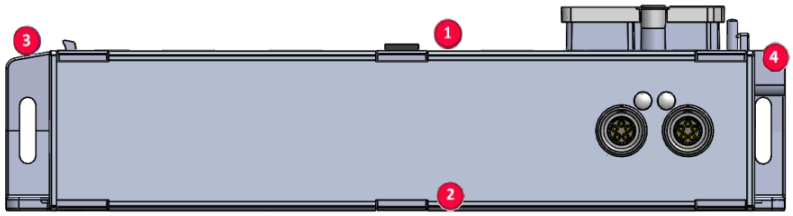
- **How do I install my Kvaser interface (supplied by imc) so I can use it with imc CANSAS?**
  Insert the supplied driver CD and follow the installation instructions. Alternatively, you can also download the driver at the following link:
  http://www.kvaser.com/downloads/
  Only **after** the driver is installed should you connect the interface to the PC. After the connection to the PC, the Windows Wizard will appear and display "*Found New Hardware*". Since you have already installed all the necessary driver data, you need only click through the menu. Windows detects and connects the driver data in this step automatically.
  In the last step, the interface in the imc CANSAS software can be found under Tools -> Interface Activate. Then, click on "*Card*": *KVASER GmbH ???(USB/PCI/PXI/ExpressCard/PCMCIA)* 22 Then, check the box next to "*(Re)Activate interface*"

- **I installed the driver for the imc CAN/USB adapter, but my interface is not detected! Why?**
  Up to the end of 2014, the imc CAN/USB adapter was supplied. At the end of the imc CANSAS installation, the dialog refers to the driver of this interface.
  How you set up the *Kvaser Leaf SemiPro HS* interface for the imc CANSAS is described in the FAQ below.

- **I ordered an *imc USB Interface* and I received a *Kvaser Leaf SemiPro HS Interface* for my imc CANSAS. Is this a mistake?**
  No. At the end of 2014, the *imc CAN/USB* interface was replaced by the *Kvaser Leaf SemiPro HS* Interface.

5.5 Attachment mechanism CANSASfit (CANFT) modules

imc CANSAS*fit* (CANFT) modules can be mechanically and electrically connected via a click mechanism, without using any tool or cable.



Stacking the modules

1. Hook tongues into the grooves 3
2. Press modules together
3. To finish mechanical connection, press on the imc logo on the locking latch 4.
   You will hear a click.

Now the modules are mechanically locked and electrically connected!

locking latch

Detaching modules

1. Press the circle on the locking latch 4.
   You will hear a click.
2. Pull tongues 3 out of the grooves.

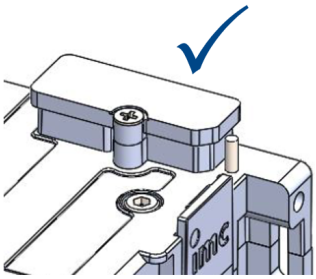
Protection

For technical reasons, the imc CANSAS*fit* modules are uncovered where the module connectors are made. When used in a controlled, dry environment, this should cause no problems.

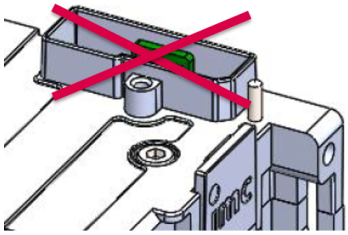
In order for an imc CANSAS*fit* module (or a group of modules attached in a substack) to be protected against foreign objects and moisture, please take the following steps:

Attach coverings to the module connectors on top 1 and bottom 2 sides of the module.

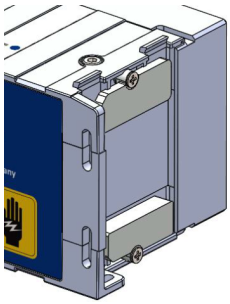
On the left side 3 of each module, there are two covers attached (parked position).



module connector protected



module connector not protected



parking position for the two covers

Explanation:

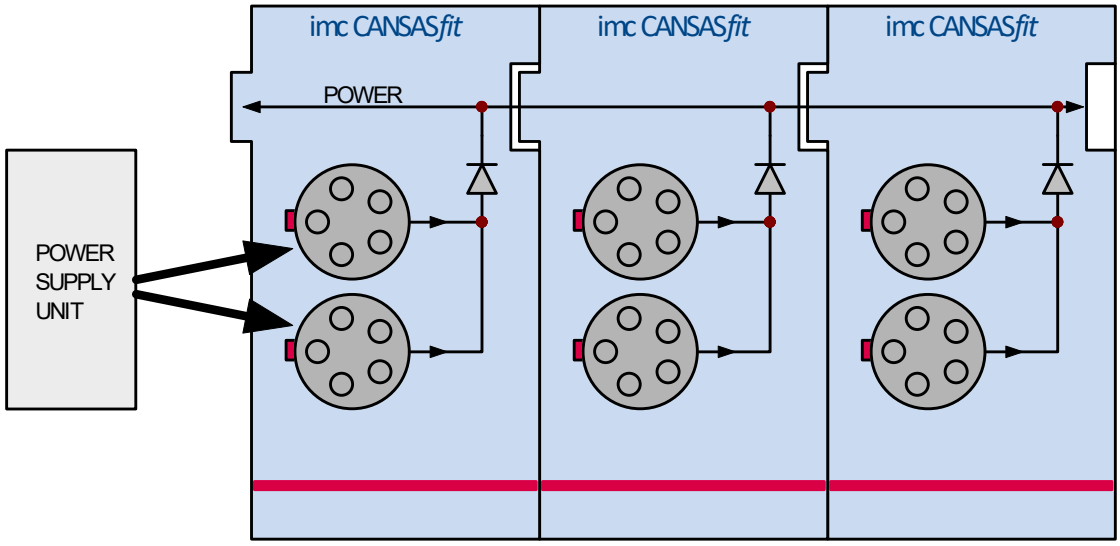
1. upper side of the module (side with USB-service connection*)
2. lower side of the module
3. "tongues", left side
4. locking latch, right side

* The Micro-USB-connection is only for service- and diagnostic purposes.

5.5.1 Power supply options with CANFT

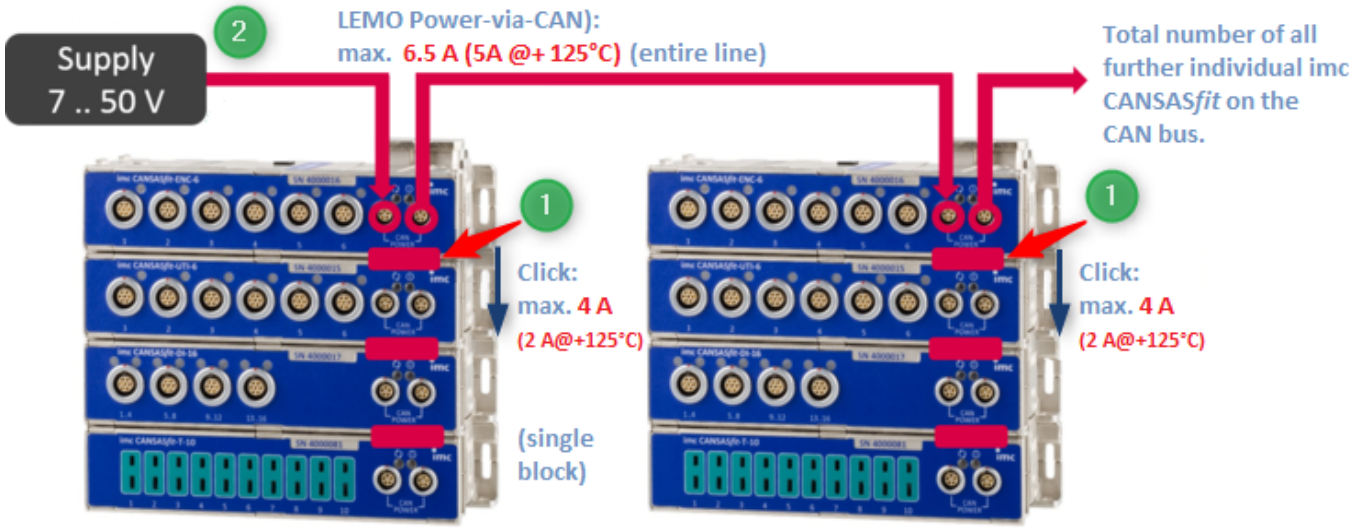
1. **Individual power supply**
   - DC 7 V to 50 V via LEMO.0B.305 (CAN/POWER, galvanically isolated input)
   - Activation / deactivation by connection of the power supply.

2. **Common supply of a module substack**
   The two CAN/POWER sockets (LEMO.0B.305) of one CANSAS*fit* module are **connected in parallel** and concerning power and CAN they can be handled like Y-cable.



Note Power supply

The supply can only be taken from a CAN / POWER socket that is supplied via the other CAN / POWER socket of the module.



pass through power limits and available power, see following example

In addition to the maximum number of modules in a block (8 modules) resulting from the termination, the maximum current that may flow through the first module must be taken into account. The following tables can be found in the technical data sheets of the modules:

Max. number of modules for direct coupling (block size with click mechanism)		
Parameter	**Value**	**Remarks**
Max. number of modules	8	limited by termination of internal CAN-Bus backbone (click junction)
Pass through power limits for directly connected modules (click-mechanism) 1		
Parameter	**Value**	**Remarks**
Max. current	4 A	at 25°C current rating of click connector
	-20 mA/K·ΔT_a	derating with higher operating temperatures T_a $\Delta T_a = T_a - 25°C$
Max. power	48W at 12 V DC 96 W at 24V DC	equivalent pass through power at 25°C typ. DC vehicle voltage AC/DC power adaptor and installations
	24 W at 12 V DC 48 W at 24 V DC	at +125°C
Available power for supply of additional modules via CAN-Kabel (LEMO.0B, "down stream") 2		
Parameter	**Value**	**Remarks**
Max. current	6.5 A	at 25°C current rating of LEMO.0B connection (CAN-IN, CAN-OUT); assuming adequate wire cross section!
	-15 mA/K·ΔT_a	derating with higher operating temperatures T_a $\Delta T_a = T_a - 25°C$
Max. power	78 W at 12 V DC 156 W at 24 V DC	equivalent pass through power at 25°C typ. DC vehicle voltage AC/DC power adaptor and installations
	60 W at 12 V DC 120 W at 24 V DC	at +125°C

1. The internal supply line for the module block may be loaded with a maximum of 4 A.
2. The two CAN/POWER sockets (LEMO.0B.305) of one CANSAS*fit* module are **connected in parallel** and concerning power and CAN they can be handled like Y-cable. This cable may be loaded with a maximum of 6.5 A.

Example

One module block consisting of **6x** *UTI-6-SUP* (2.2 W / 7 W), **1x** *ENC-6* (1.5 W/3.5 W) and **1x** *T-10* (1 W / 1.3 W). Data in brackets (typical/maximum). Operating temperature inside = 125 °C

Max. current per block = 4 A - (0.02 A/K*(125-25)K= 4 A-2 A= **2 A**

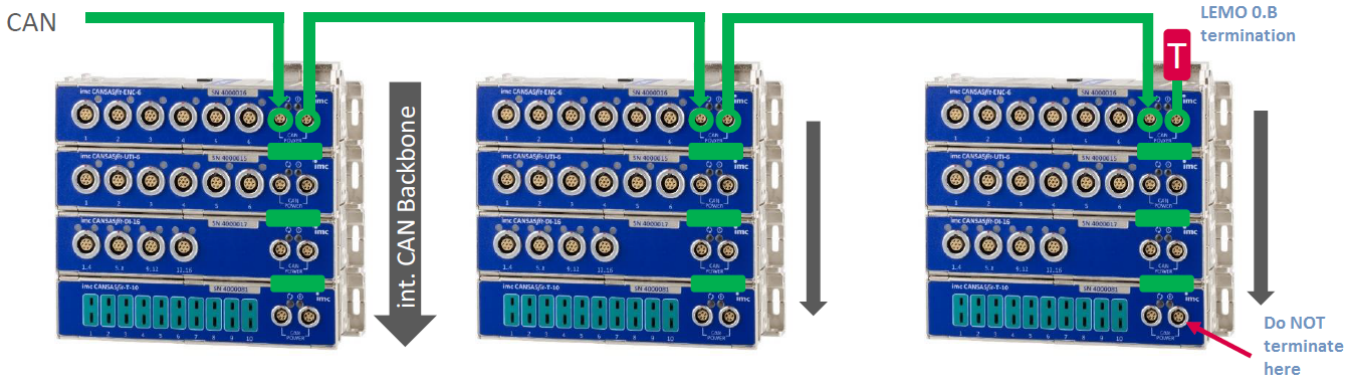
Max. total power= 6 x 7 W+ 3.5 W+1.3 W = **46.8 W**

AC/DC power supply 24 V	current = 46.8 / 24 V= 1.9 A	< 2 A-> OK
car battery 12 V	current =46.8 / 12 V= 3.9 A	> 2 A -> Not OK

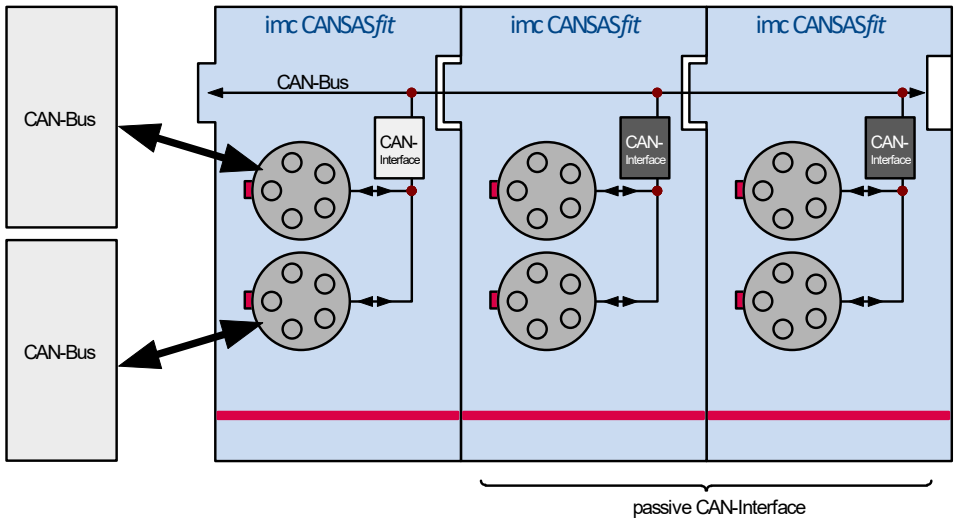
5.5.2 CAN Terminator with CANFT

The **modules in a CANSAS*fit* block** are connected via click connectors:

- The modules are electrically isolated and **internally terminated**
- The modules are designed for blocks of max. **8 modules**
- The **end of a block** may **NEVER be terminated** externally!
- If several blocks are interconnected, termination takes place at the bus end, at the first module of the last block.



The CAN-Bus is only at the left most module active (side with the visible USB service connection):

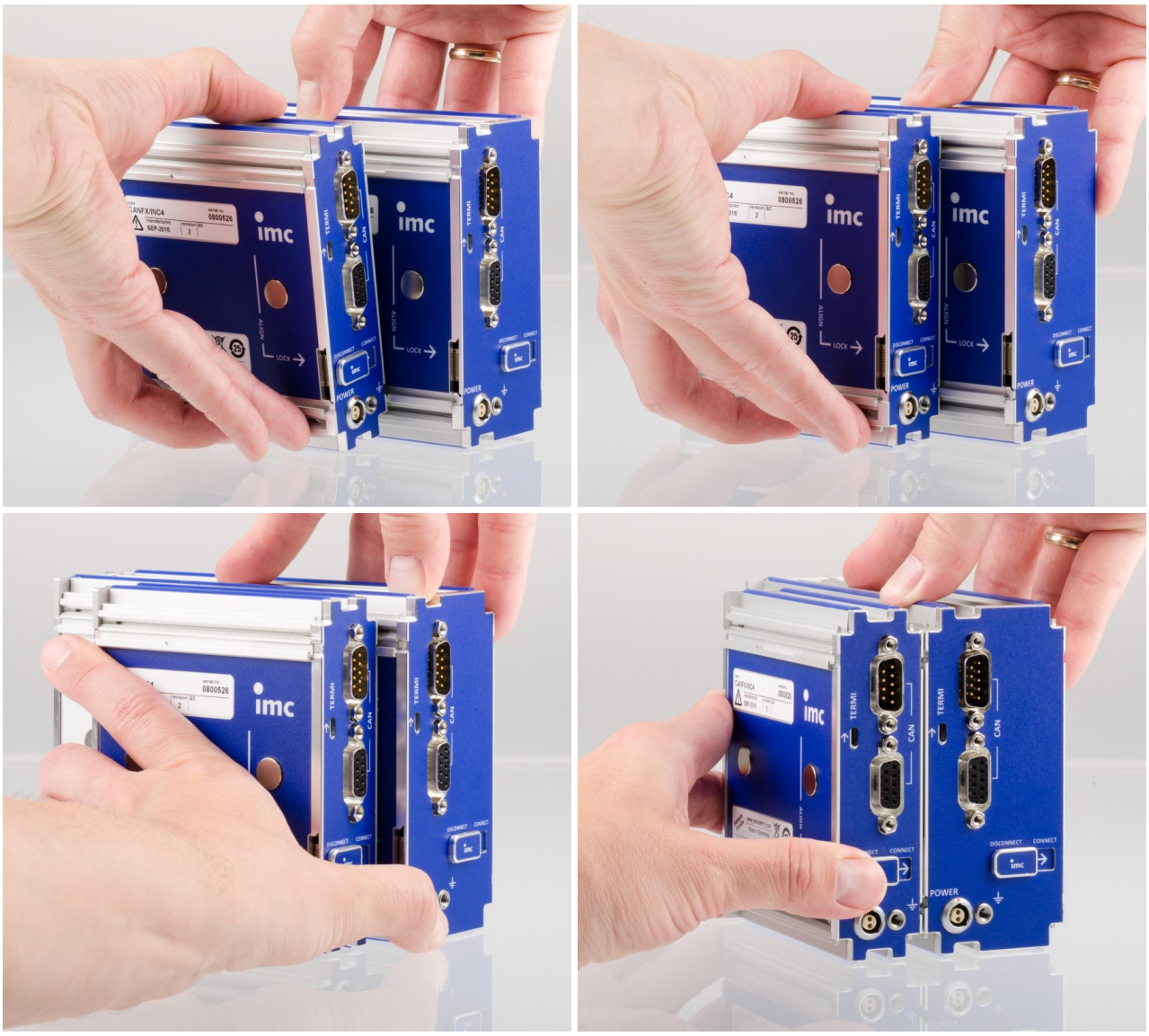


5.6 Attachment mechanism CANSASflex (CANFX) modules

imc CANSAS*flex* (CANFX) modules can be mechanically and electrically connected via a click mechanism, without using any tool or cable.

1. Insert the guide stub of the first module into the guide slot of the second module.

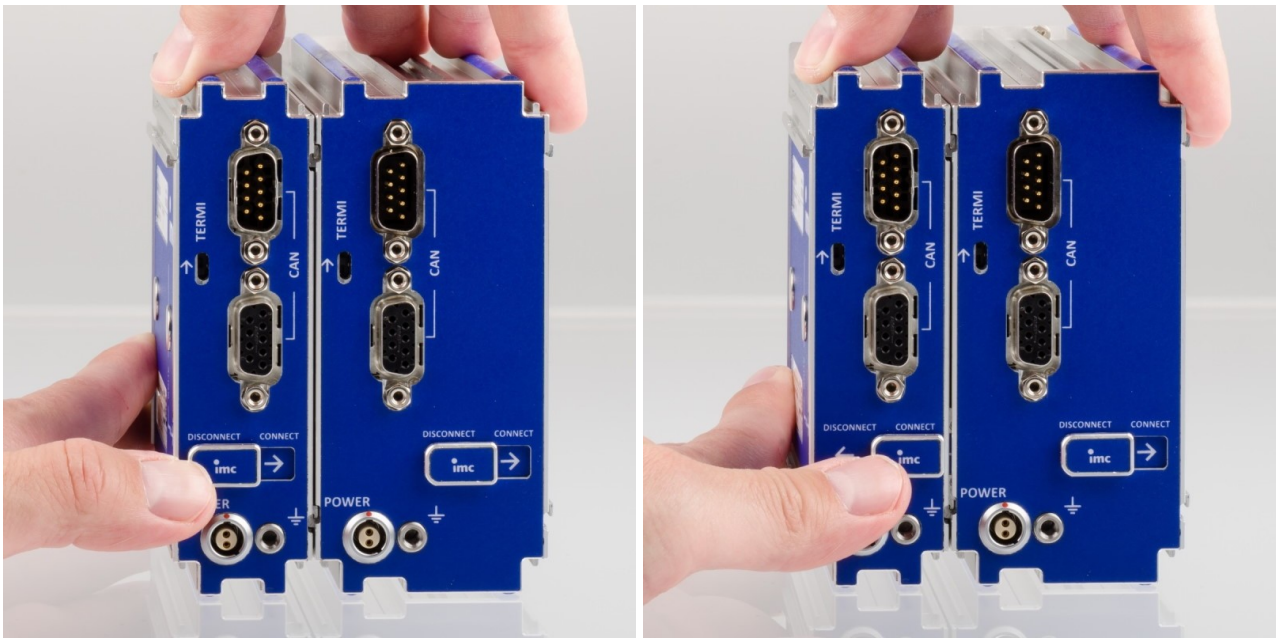
   The white arrow on the side of the module shows the position (**ALIGN**) at which you need to hook the module in. The engagement magnets aid in achieving the correct positioning (**LOCK**).



2. In order to be able to join the modules, the rear sides must be flush.

Reference Housing

The different available module variants are specified and listed in the data sheets. You can find in the manual in the chapter "Properties"



3. Slide the locking latch to the "**CONNECT**"-position.
Now the modules are electrically connected and mechanically fastened. In order to separate the modules from each other again, slide the latch to the "**DISCONNECT**"-position.

Note

- The locked modules are assigned to node **CAN1**.
- Make sure that the locking latch engages beyond the mechanical resistance. Otherwise the power supply is connected, but not the CAN bus.
- During the running measurement, modules must not be disconnected from the system and reconnected (hot-plug during a running measurement is not supported). To avoid damage: Disconnect the supply lines before clicking or removing modules and turn off the system to ensure that the system is disconnected from the supply voltage.

Warning Magnetic fields

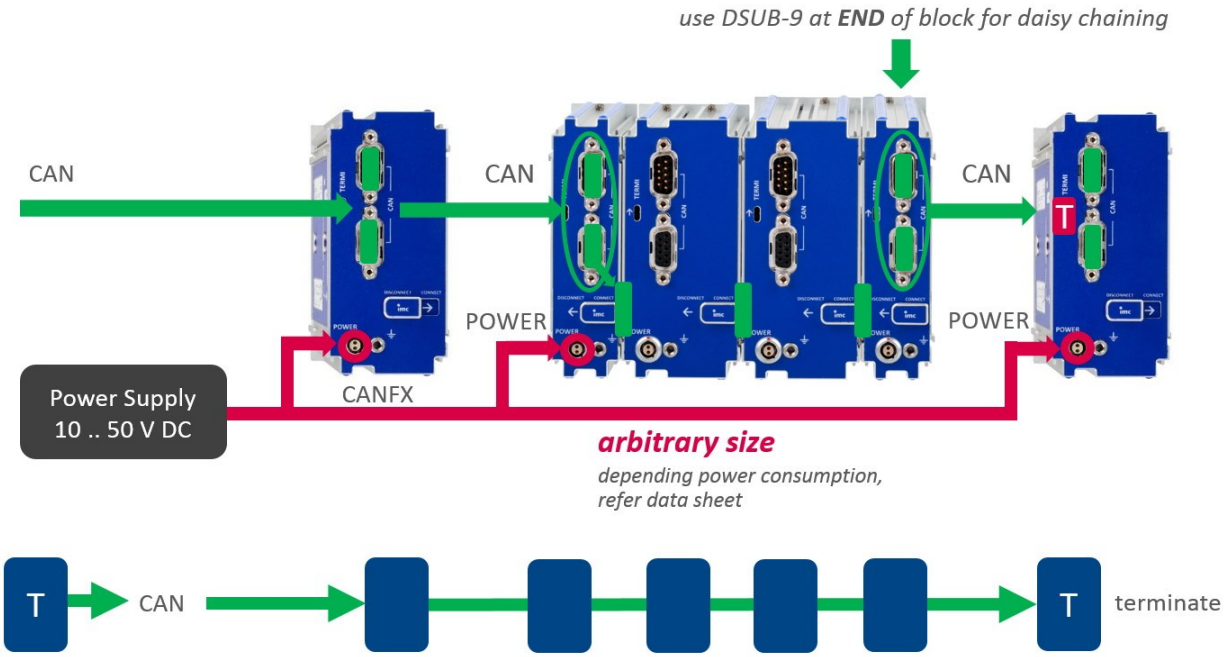
- In order to secure the mechanical handling and avoid displacement, the locking slider of each module in a block of modules should be closed (locking slider in "CONNECT" position).
- According to current scientific knowledge, **magnetic fields** of permanent magnets do not affect human health. For this reason, **health hazards due to the magnetic field are unlikely**. However, the functioning of heart pacemakers and implanted defibrillators can be affected (e.g. a heart pacemaker may be switched into test mode). Persons wearing such devices should maintain adequate distance.
  The magnetic fields are so strong in the immediate vicinity that sensitive electronic equipment such as data carriers, credit and debit cards, hearing aids, loudspeakers or sensitive ferromagnetic mechanical equipment such as pocketwatch mechanisms can also be affected or damaged.
  Contact with the magnets by food should be avoided. The magnets are protected with a coating (Ni, Au, Zn) to which some persons can have an allergic reaction (Nickel allergy).

5.6.1 Power supply options with CANFX

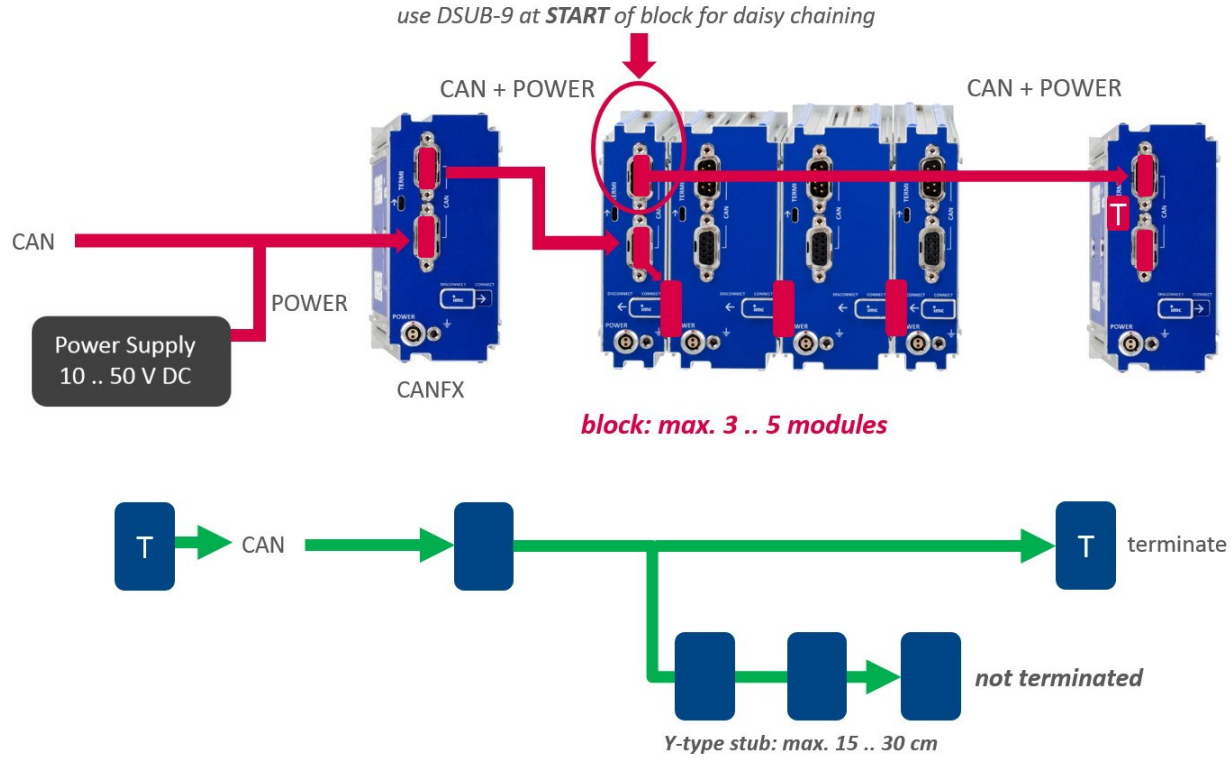
Power via CAN

The following figures: A) and B) show connection possibilities, depending on the use of power via CAN. If your device has the **Power via CAN** functionality, the **DSUB connection** on your device is labeled.

A) Power via CAN not used: no stubs, unlimited block size



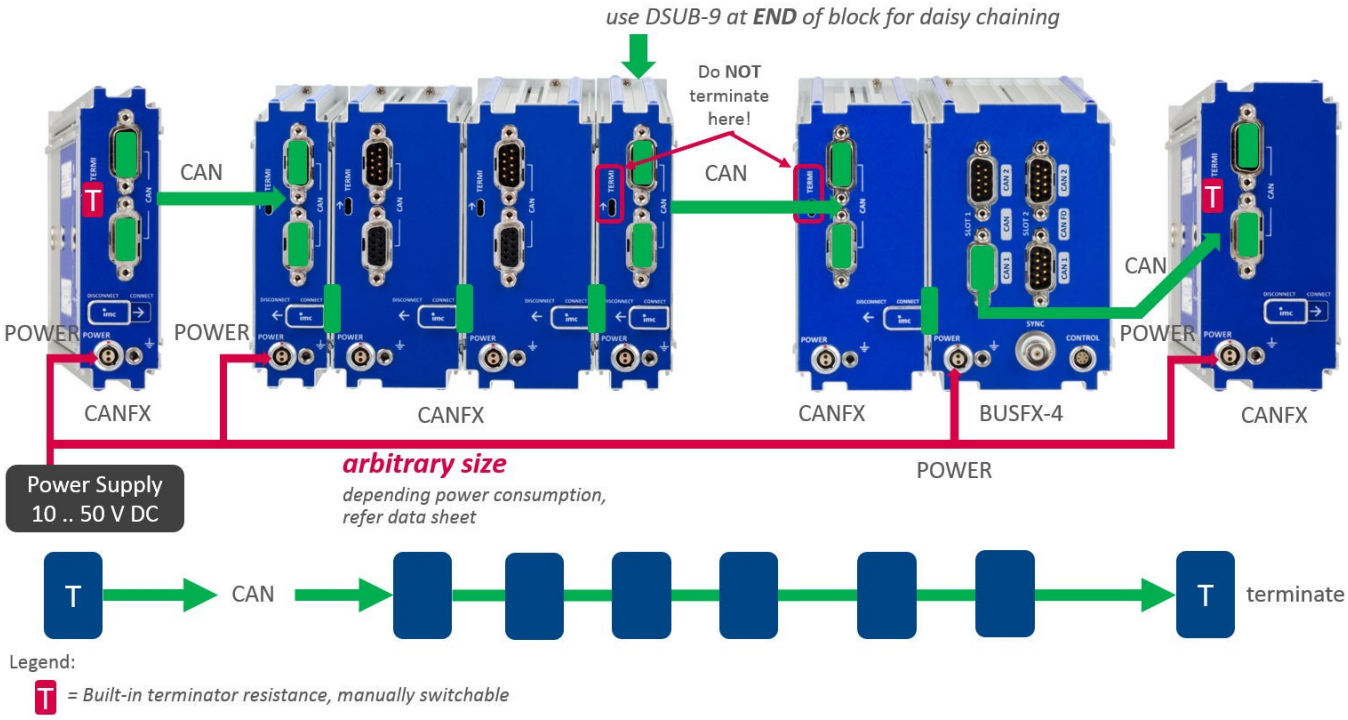
B) Use of Power via CAN: max. size of stub blocks (Y-type stub), according CiA®



5.6.2 CAN Terminator with CANFX

Each imc BUSDAQ*flex* (BUSFX) offers 2 CAN nodes as basic equipment. The imc CANSAS*flex* modules (CANFX), which are connected to the BUSFX device via the click connection 27, are located at the **CAN 1 node of slot 1** (see labeling on the device, *CAN 1*).

Terminators must be provided at the end of the CAN bus. The BUSFX device has internal terminators that can be activated by software. These can be activated individually for each node. If the BUSFX device is connected to one end, the termination can be activated in the CAN Assistant. As soon as CAN modules are connected to the CAN 1 node and additional clicked modules are connected 27 to the BUSFX device, no additional termination is allowed in the CAN Assistant.



Notes — CAN Terminator

- A ***Y-type stub*** cannot be terminated. Only the **bus end** has to be terminated: last module or **end** (not beginning) of the last block!
- A ***Y-type stub*** must not exceed a maximum length of 30 cm.

- **Connection of the terminators:**
  - **CANFX modules** are equipped with built-in terminator resistances which are **manually switchable**. Alternatively, terminator resistances can be connected between pin 2 and 7, using resistances of 120 Ω according to the CiA® standard.
  - **Terminate end of entire CAN bus** only. Otherwise, no further terminators may be connected.
  - Termination resistors, which are **activated via software to the BUSDAQ*flex* nodes**, remain active even if the device is set into sleep mode.

6 Pin configuration

6.1 CAN-Bus connectors

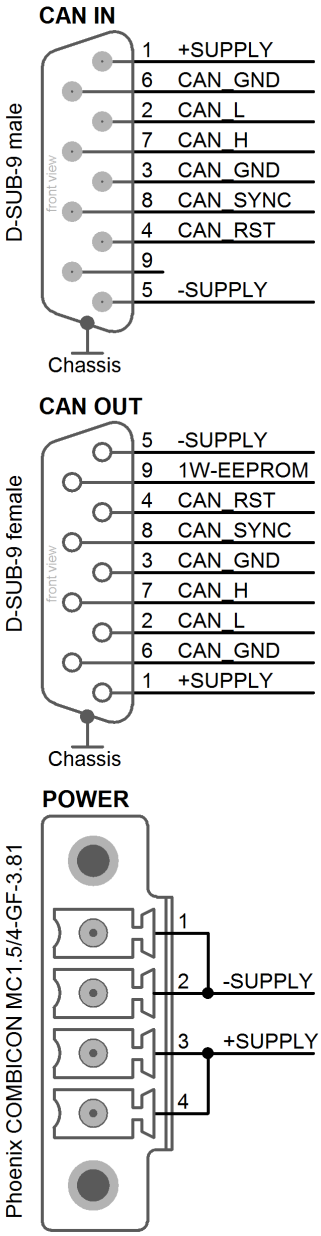
By default, the CAN connection is made with DSUB-9 31.

imc CANSAS-SL modules are equipped with LEMO connectors 34.

imc µ-CANSAS modules are equipped with Autosport 35 or LEMO connectors 36.

imc CANSAS*fit* modules are equipped with LEMO 0B connectors 36.

6.1.1 Standard module with DSUB-9



The following overview shows the pin configuration of the CAN-bus sockets (CAN IN and CAN OUT).

You can find a general CAN-bus description in the CANSAS manual.

PIN	Signal	CiA description	Use in imc CANSAS
1	+CAN_SUPPLY		imc CANSAS-specific: + imc CANSAS voltage supply. The module can be supplied via this connector (and Pin 5).
2	CAN_L	dominant low bus line	connected as per CiA®
3	CAN_GND	CAN Ground	connected as per CiA®. CAN-Bus reference ground.
4	CAN_RST		imc CANSAS-specific: imc CANSAS Reset (for startup with Reset Connector). The Reset plug has a shortcut to PIN 3 (GND).
5	-CAN_SUPPLY		imc CANSAS-specific: - imc CANSAS voltage supply (Negative pole of supply respectively. 0 V).
6	GND	CAN Ground	connected to Pin 3, as per CiA®
7	CAN_H	dominant high bus line	connected as per CiA®
8	CAN_SYNC		imc CANSAS-specific: Additional line for a sync signal (1 Hz). Generally 5 V to CAN Ground.
9	1Wire EEPROM		imc CANSAS-specific: EEPROM information about mounting position (when used in a rack) Exists only at female CAN-OUT plug P212. Pin 9 at male CAN-In plug is "not connected". Pin 9 is the positive pin of the EPROM. The corresponding minus-pole must be connected to the chassis/shield (10/11) of the DSUB-plug. The EPROM is not inside the module, but can be connected externally.

The two 9-pin plugs are connected to each other 1:1; thus, all connections can be fed through to the next imc CANSAS module, but not Pin 9.

6.1.1.1 CAN-Bus wiring

Unless 9-line cables are used for the CAN-Bus, observe the following: Pins 2 and 7 are absolutely necessary for transfer on the CAN-Bus. The CAN-Bus ground is also necessary. This may not be obvious, but consider that differentially transmitted signals require a reference, for which reason a line connected to the CAN-Bus ground must also be included. Either Pin 3 or Pin 6 can be used for this purpose. Situations can also arise in which the CAN-ground is not needed: for instance, in a vehicle, where it is possible to access Chassis potential anywhere, instead of using a line to Pin 3. In this case, Chassis simply replaces the line to Pin 3.

Other lines can be included as required, for example a synchronization line or supply line.

Note also when using DSUB-plugs and the cables that there is a maximum current which DSUB-plugs can carry. This particularly applies to the DSUB-plugs on the imc CANSAS-modules and the internal connection of all of this plug's pins. The current should not exceed approx. 1A. It may be necessary to use a correspondingly high supply voltage for the modules, or the separate green terminal for the supply.

Also give regard to the cables' cross-sections. The CAN-cables with 9-pin, DSUB-plug which are included in the standard package are not designed to carry large currents.

6.1.1.2 Notes for the use of CANcabs

Problem: Pins 4 and 9 are used in imc CANSAS for Reset and OneWire EEPROM. When a CANcabs extra cable from any of the companies Vector, dSPACE or KVASER is used, it results in duplicate pin assignment, since these pins are also used in those cases.

Remedy: The contacts Pin 4 and Pin 9 in the CAN-connector must be disconnected from their leads to the CANcabs!

This applies to the following CANcabs:

Pin	251 1050	251opto 1050opto DNopto	251 fiber	1041 opto	252 1053 1054	1054 opto	10011 opto	5790c (single wire)	5790c opto
1									
2	CAN Low	CAN Low	CAN Low	CAN Low	CAN Low	CAN Low	CAN Low	N.C.	N.C.
3	GND	VGND	VGND	VGND	GND	VGND	VGND	GND	VGND
4	RL	N.C.	N.C.	Split	RL	N.C.	RL	R100	R100
5	Shield								
6									
7	CAN High								
8									
9	N.C.	N.C.	VB+ 6-36V	VB+ optional 11-18V	N.C.	VB+ optional 11-18V	VB+ optional 16-32V	V_Batt	VB+ optional 11-18V

RL: reserved, may not be connected

6.1.1.3 Specification of components used

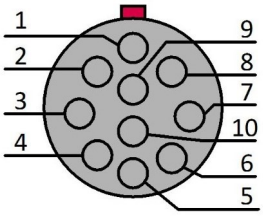
In imc CANSAS, the following components are used for the CAN-connection. Use this as a reference for the purpose of especially critical applications, e.g. in connection with bit-timing.

CAN-Controller: DSP TMS320LF2407A (Texas Instruments)
Oscillator Type: SG8002JFPCM-10M Hz (Epson, crystal oscillator, 10 MHz, -40 +85°C,±100ppm);
CAN transceiver: PCA82C250 (Philips)
Slope resistor: 1 kΩ

6.1.2 CANSAS-SL with LEMO

The following overview shows the pin configuration of the CAN-bus sockets (CAN IN and CAN OUT) of the imc CANSAS-SL housings. The differences to the standard imc CANSAS modules are described here.

6.1.2.1 CAN-Bus pin configuration and contact wiring



LEMO.HGA.1B.310 (10-pin)

view on the socket

PIN	Signal	CiA®-description	Use in imc CANSAS
1	CAN_HIGH	dominant high bus line	connected as per CiA®
2	CAN_LOW	dominant low bus line	connected as per CiA®
3	CAN_GND	CAN Ground	connected as per CiA®. CAN-Bus reference ground.
4	CAN_RST_STECK		imc CANSAS-specific: imc CANSAS Reset (for startup with Reset plug). The Reset plug has a shortcut to PIN 3 (GND).
5	CAN_SYNC		imc CANSAS-specific: additional wire for a sync signal (1 Hz) generally 5 V to CAN Ground
6	CAN_GND	CAN Ground	connected to Pin 3, as per CiA®
7, 8	+CAN_SUPPLY		imc CANSAS-specific: + pin for imc CANSAS power supply (+10 V..+50 V)
9, 10	-SUPPLY		imc CANSAS-specific: - pin for power supply (negative pole respectively 0 V)

Both 10-pin sockets are directly connected. In that way all circuit points can be connected through to the next imc CANSAS module.

Unless 10-line cables are used for the CAN-Bus, observe the following: Pins 1 and 2 are absolutely necessary for the transfer on the CAN-Bus. The CAN-Bus ground is also necessary. This may not be obvious, but consider that differentially transmitted signals require a reference, for which reason a line connected to the CAN-Bus ground must also be included. Either Pin 3 or Pin 6 can be used for this purpose. Situations can also arise in which the CAN-ground is not needed: for instance, in a vehicle, where it is possible to access Chassis potential anywhere, instead of using a line to Pin 3. In this case, Chassis simply replaces the line to Pin 3. Other lines can be included as required, for example a synchronization line or supply line.

Note

Note also when using LEMO-plugs and the cables that there is a maximum current which LEMO-plugs can carry. This particularly applies to the LEMO-plugs on the imc CANSAS-modules and the internal connection of all of this plug's pins. The current should not exceed approx. 4.5 A. It may be necessary to use a correspondingly high supply voltage for the modules, or the separate terminal for the supply. Also give regard to the cables' cross-sections.

6.1.3 µ-CANSAS with Autosport or LEMO

Below is the pin configuration of the imc µ-CANSAS modules' CAN-Bus connector. Connections of -AS modules are made via 6-pin Autosport terminals 35 of the type AS208-35SA (CAN IN) and AS208-35PA (CAN OUT). Special tools exist for the purpose of assembling the Autosport connectors. Connections of µ-CANSAS-XX-L modules are made via 5-pin LEMO terminals 36 of the type HGG.0B.305.

Note Default configuration

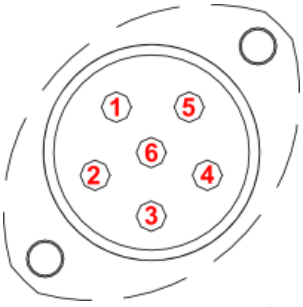
Per default imc µ-CANSAS modules imc µ-CANSAS-V1, imc µ-CANSAS-T1 and imc µ-CANSAS-B1 come **without an internal terminator resistor**.

If the modules with integrated terminating resistor were ordered, you do not need any additional terminators. In this case such a module can only be used as the last module in the CAN-Bus, since it necessarily terminates the CAN-Bus.

6.1.3.1 CAN-Bus pin configuration and contact wiring

6.1.3.1.1 Autosport (µ-CANSAS-XX-AS)

PIN	Signal	CiA® description	Use in imc CANSAS
1	+CAN_SUPPLY	dominant high bus line	imc CANSAS-specific: + pin for µ-CANSAS power supply
2	-SUPPLY		imc CANSAS-specific: - pin for power supply (negative pole respectively 0 V)
3	CAN_LOW	dominant low bus line	connected as specified by CiA®
4	CAN_HIGH	dominant high bus line	connected as specified by CiA®
5	CAN_RESET		imc CANSAS-specific: imc CANSAS Reset. Must be jumpered with CAN_GND for a reset.
6	CAN_GND	CAN Ground	Connected as per CiA®. CAN-bus reference ground



6-pin Autosport terminal type AS208-35

view on the socket

Pins 3 and 4 are absolutely necessary for transmission on the CAN-Bus, as well as the CAN-Bus ground. According to specifications, the differential signals require a reference, for which reason a CAN-Bus ground connection is also needed. For this purpose pin 6 can be used. There are situations where the CAN ground is not necessary: for example, on board vehicles, if instead of a line to pin 6 it is possible to make contact with anywhere on the chassis. In that case, the chassis is a substitute for the line to pin 6.

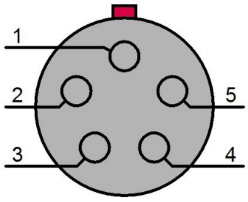
Other lines can be used for the purpose if necessary, for instance the power supply line.

Note

Note when using Autosport plugs and cables, that there is a limit on the maximum current through the Autosport-plug. The current should not exceed approx. 5 A. An accordingly high power supply voltage for the modules may need to be used. Check the cross-section of the cables.

6.1.3.1.2 LEMO 0B plug (µ-CAN-x1-L)

PIN	Signal	CiA® description	Use in imc CANSAS
1	+CAN_SUPPLY	dominant high bus line	imc CANSAS-specific: + pin for imc CANSAS voltage supply
2	-SUPPLY		imc CANSAS-specific: - pin of imc CANSAS power supply (minus contact: 0 V)
3	CAN_HIGH	dominant high bus line	connected as specified by CiA®
4	CAN_LOW	dominant low bus line	connected as specified by CiA®
5	CAN_GND	CAN Ground	connected as per CiA®, CAN-bus reference ground
CHASSIS			cable shielding



5-pin LEMO terminal type HGG.0B.305

view on the socket

Pins 3 and 4 are absolutely necessary for transmission on the CAN-Bus, as well as the CAN-Bus ground. According to specifications, the differential signals require a reference, for which reason a CAN-Bus ground connection is also needed. For this purpose pin 5 can be used. There are situations where the CAN ground is not necessary: for example, on board vehicles, if instead of a line to pin 5 it is possible to make contact with anywhere on the chassis. In that case, the chassis is a substitute for the line to pin 5. Other lines can be used for the purpose if necessary, for instance the power supply line.

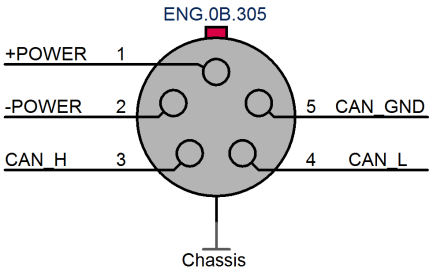
Note when using LEMO plugs and cables, that there is a limit on the maximum current through the LEMO-plug. An accordingly high power supply voltage for the modules may need to be used. Check the cross-section of the cables.

6.1.4 CANFT with LEMO

The following overview shows the CAN IN and CAN OUT that are also used for the power supply.

Note Default configuration

- Per default imc CANSAS*fit* modules come without an internal terminator resistor.
- Pin 3 and pin 4 are absolutely necessary for transmission on the CAN-Bus, as well as the CAN-Bus ground. According to specifications, the differential signals require a reference, for which reason a CAN-Bus ground connection is also needed. For this purpose pin 5 can be used. There are situations where the CAN ground is not necessary: for example, on board vehicles, if instead of a line to pin 5 it is possible to make contact with anywhere on the chassis. In that case, the chassis is a substitute for the line to pin 5.



view on the socket

- Note when using LEMO plugs and cables, that there is a limit on the maximum current through the LEMO-plug. An accordingly high power supply voltage for the modules may need to be used.

6.2 Power Supply

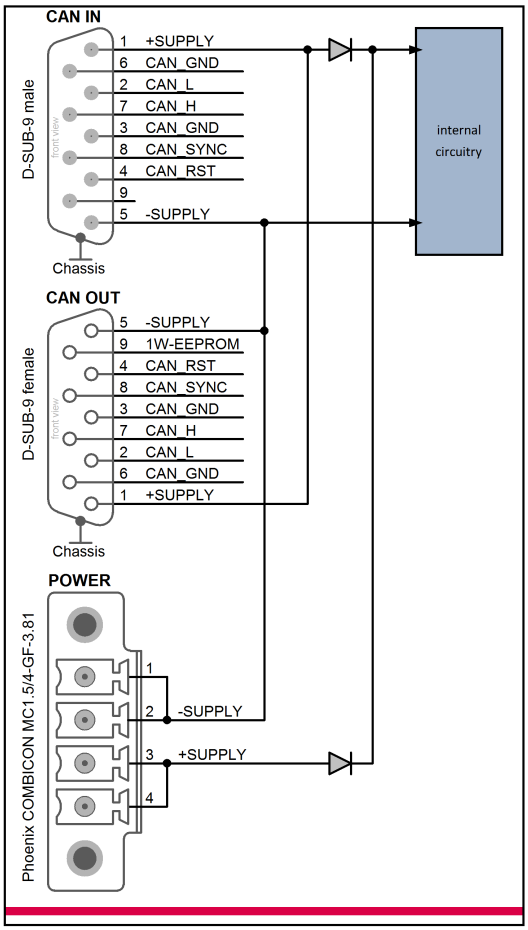
6.2.1 CANSAS

There are two possibilities for supplying imc CANSAS modules with power:

- via the green Phoenix-jack labeled "POWER",
  or
- via the CAN-Bus (+SUPPLY / -SUPPLY).

Supplying power via the CAN-Bus connectors has the advantage that it can be conducted further down the CAN-bus through the module and thus drive a cascade of modules as the sole supply.

imc CANSAS



Phoenix - socket

pin (front view)	**name**	**remarks**
1 (left)	-SUPPLY	0 V
2	-SUPPLY	0 V
3	+SUPPLY	+10 V...+50 VDC*
4 (right)	+SUPPLY	+10 V...+50 VDC*

* for all types build from 2010. Before 9 V to 32 V. (See identification plate of the module also.)

Notes

- Note that the cumulative current for all connected devices flows through the CAN-Bus power supply lines. Since DSUB plugs are nominally designed to take 1 A rated current per pin, a maximum of three imc CANSAS modules should be supplied via the CAN-Bus connection (with 12 V supply voltage and approx. 4 W consumption per module, 1 A cumulatively flows in the 3 modules). If commercially available 9pin DSUB-cables are used, which tend to have high impedance, voltage loss in the lines must be taken into consideration (the input voltage measured at the module must not be less than 9 V!). To avoid that problem, choose a higher voltage, e.g. 24 V.

- Note when arranging the power supply that the starting current is greater than the long-term current. Also observe the remarks on CAN-Bus wiring above.
- The imc CAN-Bus connectors made for imc devices do not meet imc CANSAS module specs, but can under certain circumstances be modified by imc to do so. Please contact our customer support 6 if interested.

6.2.2 CANSAS-SL

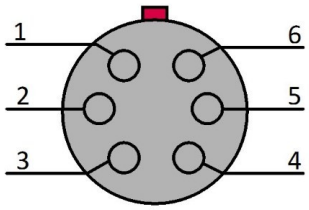
There are two possibilities for supplying imc CANSAS-modules with power:

- via the 6-pin LEMO socket labeled "POWER", or
- via the CAN-bus (+SUPPLY / -SUPPLY).

Supplying power via the CAN-bus-connectors has the advantage that it can be conducted further down the CAN-bus through the module and thus drive a cascade of modules as the sole supply.

LEMO - socket

LEMO Pin (front view)	Name	Remarks	color of wire
1 (left)	+SUPPLY	+10 V...+50VDC	red
2	+SUPPLY	+10 V...+50VDC	
3	-SUPPLY	0 V	black
4 (right)	-SUPPLY	0 V	
5	---	n.c.	
6	---	n.c.	



6-pin LEMO (HGA.1B.306)

Notes

- Note that the cumulative current for all connected devices flows through the CAN-Bus power supply lines. Since LEMO plugs are nominally designed to take 2A rated current per pin, a maximum of 12 imc CANSAS modules should be supplied via the CAN-Bus connection (with 12 V supply voltage and approx. 4 W consumption per module, 1 A cumulatively flows in the 3 modules). If commercially available 10-pin LEMO-cables are used, which tend to have high Ohm-counts, voltage loss in the lines must be taken into consideration (the input voltage measured at the module must not be less than 10 V!). To avoid that problem, choose a higher voltage, e.g. 24 V.
- The connectors at the 6-pin LEMO socket and those for the CAN-Bus are not connected internally but are separated from each other by diodes. Therefore, make sure that the imc CANSAS module is supplied with power via only one of the two possible ways!
- The DC-supply inputs on the device itself (LEMO-socket) are galvanically isolated, i.e. isolated from the housing! If a imc CANSAS-SL is powered by an isolated DC-voltage source (e.g., battery), use the shielding of the supply plug or CAN-Bus plug to ground the device.
- Also, all signal leads to imc CANSAS-SL must be shielded and the shielding grounded (electric contact between the shielding and the plug housing).
- Note when arranging the power supply that the starting current is greater than the long-term current. Also observe the remarks on CAN-Bus wiring above.
- The imc CAN-Bus connectors made for imc devices do not meet imc CANSAS-module specs, but can under certain circumstances be modified by imc to do so. Please contact our customer support 6 if interested.

6.2.3 µ-CANSAS

The imc µ-CANSAS modules are supplied via the CAN-Bus terminals +SUPPLY and -SUPPLY (see image in previous section for pin configuration). The permitted supply voltage range for the imc µ-CANSAS modules is **9 V to 50 V DC**.

Notes

- Be aware that the total current of all connected devices flows through the CAN-Bus supply lines. When a commercially available 6-pin cable is used, the voltage drop along the supply lines must additionally be taken into consideration, since they have relatively high resistance (the input voltage, measured at the module, may not be less than 9 Volts!). So, to avoid problems select a higher power supply voltage, e.g. 24 V.
- When dimensioning the current supply, note that the power-on current is higher than the long-term current. Also make note of the information presented above on the CAN-Bus' wiring.
- imc devices' CAN-Bus terminals are not rated for the supply of imc CANSAS modules, but under certain circumstances they can be modified at imc for this purpose. If interested, please contact our customer support 6.

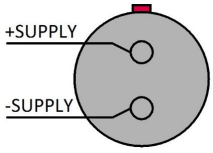
6.2.4 CANFT

The imc CANSAS*fit* modules are supplied via the CAN-Bus terminals +POWER and -POWER (see image in previous section for pin configuration 36). The permitted supply voltage range for the imc CANSAS*fit* modules is **7 V to 50 V DC**.

Notes

- Be aware that the total current of all connected devices flows through the CAN-Bus supply lines. When a commercially available cable is used, the voltage drop along the supply lines must additionally be taken into consideration, since they have relatively high resistance (the input voltage, measured at the module, may not be less than 7 Volts!). So, to avoid problems select a higher power supply voltage, e.g. 24 V.
- When dimensioning the current supply, note that the power-on current is higher than the long-term current. Also make note of the information presented above on the CAN-Bus' wiring.

6.2.5 CANFX



The +Pin is marked with a red dot.

The imc CANSAS*flex* modules can be powered by a DC supply voltage which is supplied via a 2-pole **LEMO.EGE.0B compatible socket** (multicoded 2 notches). The permissible supply voltage range is: **10 V to 50 V**.

Note

Alternatively it is possible to supply the imc CANSAS*flex* module via a CAN-plug (DSUB-9) or via a clicked module connection.

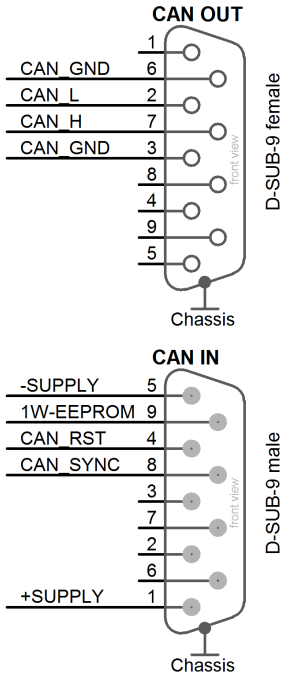
6.3 19" RACK

The 19" subrack is only for accommodating up to 10 imc cassette modules with 8 HP (horizontal pitches), having built-in slot recognition.

Parameter	CAN/19BGT	CAN/19BGT-D	CAN/19BGT-MMH	CANFX/RACK
for imc CANSAS housing	CANSAS-K cassette	CANSAS-L alu-profile	CANSAS-L alu-profile	CANFX-L housing
Slot: level (tier) / position	10	10	10	10
Connection Supply	LEMO.2B 2-pin 10 .. 36 V / <100 VA pin 1 (red point): +Supply pin 2: -Supply	LEMO.2B 2-pin 10 .. 36 V / <100 VA	XH pol (4-pin) 10 .. 36 V / <100 VA pin 1+2: +Supply pin 3+4: -Supply	Phoenix (4-pin) MC 1.5/4STF-3.81 10 .. 50 V DC
Connection CAN	DSUB-9 m/w			
Drop down locking mechanism	no	yes	yes	no
Side panel	angular	angular	round	angular
Contact pin for grounding	no	yes	yes	yes
imc article number	10500069	10500141	10500320	12500094
Included accessories	CAN-Bus terminator (10500028), LEMO.FGG.2B plug for power supply (13500024) and modem cable for extended temperature range		-	CAN/POWER-PLUG (10500024)
Weight				2 kg
Dimension rack (W x H x D)	483 x 133 x 180 mm			

Slot recognition

imc RACKs are equipped with an integrated slot recognition. There is an EPROM for each slot integrated in the Backplane of the RACK. The imc CANSAS software is able to interpret the content of this EPROM. Using multiple RACKs it is possible to define for each RACK a level number ("X", see slot: level (tier) / position). The module's exact position in a specific RACK can be guaranteed.

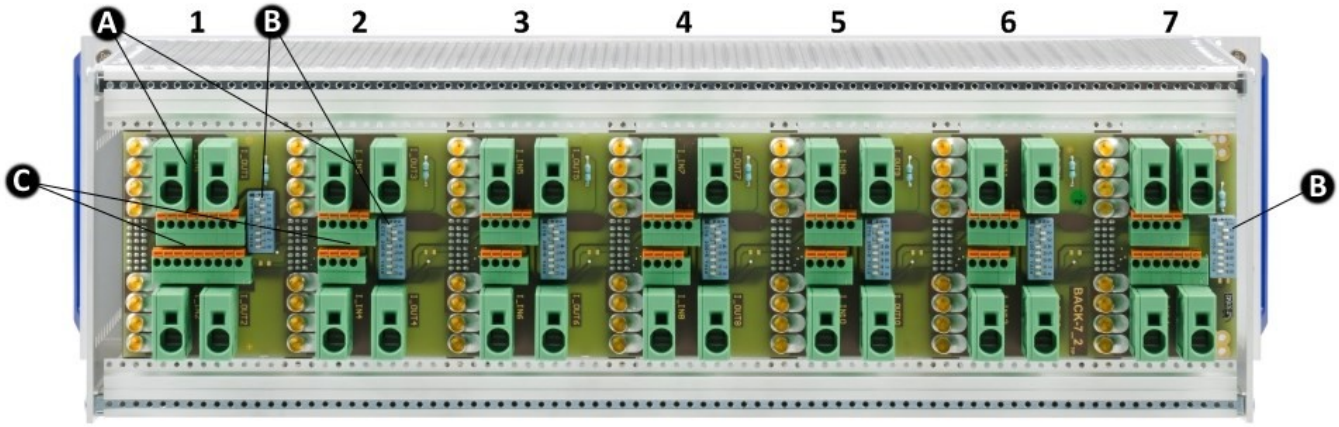


Pin configuration - 19" RACK CAN IN and CAN OUT

PIN	CAN IN	CAN OUT	Remarks
1	+SUPPLY	n.c.	
2	n.c.	CAN_L	dominant low bus line
3	n.c.	CAN_GND	CAN Ground, CAN-Bus reference ground
4	CAN_RST	n.c.	
5	-SUPPLY	n.c.	
6	n.c.	CAN_GND	verbunden mit Pin 3
7	n.c.	CAN_H	dominant high bus line
8	CAN_SYNC	n.c.	imc specific: Additional line for a sync signal (1 Hz).
9	1Wire EEPROM	n.c.	

IHR-RACK

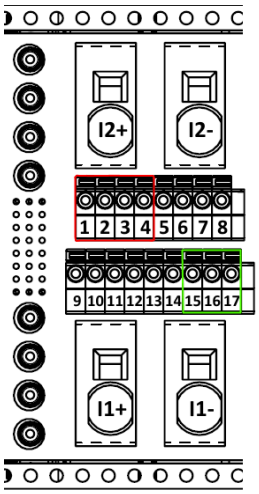
The 19" rack (CAN/IHR RACK, article no. 10500452) is per standard equipped with a backplane with high-current capable "push-in" displacement terminals for up to seven IHR plug-in modules. **The power supply** of the measurement technology itself (rack and modules) is uniformly designed **9-32 V DC** and **is exclusively provided via** the terminals at **slot 1**.



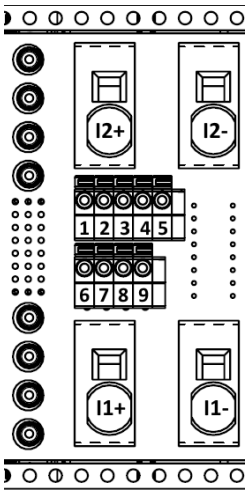
rear view with slot numbering 1 to 7

Legend: A: power connectors B: DIP Switch C: spring-loaded terminals, for CAN and power supply

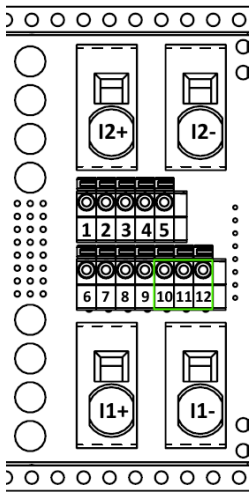
Slot 1



Slot 2 to 6



Slot 7



Pin configuration: spring-loaded terminals

Pin	Slot 1		Slot 2..6	Slot 7
1	-SUPPLY	power supply of the entire IHR-RACK including modules only via slot 1	—	—
2	+SUPPLY		—	—
3	-SUPPLY		—	—
4	+SUPPLY		—	—
5..9	—		—	—
10	—			CAN H
11	—			CAN L
12	—			CAN GND
13..14	—			
15	CAN H			
16	CAN L			
17	CAN GND			

Please find notes for the CAN termination in the manual chapter "connecting the terminators".

6.4 Signal connection

Note General

Channels whose signal is to be measured must always be connected to a sensor or at least shorted at the input. Open inputs can cause the amplifier to be overmodulated, which can lead to interference or measurement uncertainty on the other channels. In such cases, the values of the technical specifications may not be reached.

6.4.1 Modules with DSUB-15

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

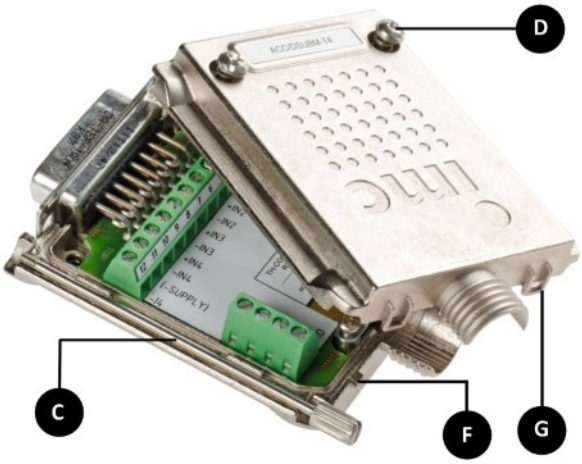
- To connect the measurement leads with the screw terminals, suitable leads should have a maximum cross section of 1.5 mm^2 incl. cable end-sleeve.
- The terminals' screw heads only have secure electrical contact once they are tightened to a connection wire. For this reason, a control measurement (for 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.

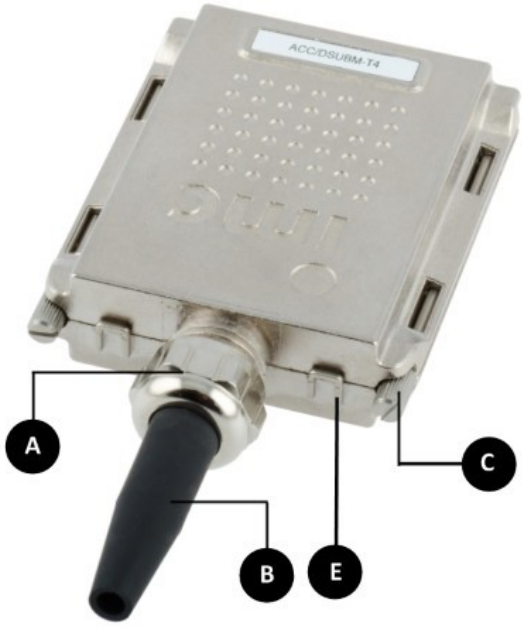
For devices with DSUB-15 connection technology, the convenient imc terminal plugs for solderless screw terminal connection are available as optional accessories.

ACC/DSUBM-xxx: snap the nose into the slot

Open the Metal plug:

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 plug:

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

6.4.1.1 ACC/DSUBxx plugs

Plastic

ACC/DSUB-		UNI2
DSUB Pin	Terminal	UNIVERSAL
9	1	+VB1
2	2	+IN1
10	3	-IN1
3	4	-VB1
11	5	I1_1/4B1 (1)
4	6	-SENSE1
12	7	+VB2
5	8	+IN2
13	9	-IN2
6	10	-VB2
14	11	I2_1/4B2 (1)
7	12	-SENSE2
15	14	GND
8	17	+5V
	13	
	18	
	15	CHASSIS
	16	CHASSIS

Metal connector

ACC/DSUBM-		UNI2
DSUB Pin	Terminal	UNIVERSAL
9	1	+VB1
3	2	-VB1
2	3	+IN1
10	4	-IN1
11	5	I1_1/4B1 (1)
4	6	-SENSE1
5	7	+IN2
13	8	-IN2
14	9	I2_1/4B2 (1)
7	10	-SENSE2
12	11	+VB2
6	12	-VB2
15	15	(GND)
8	18	(+5V)
	13	
	14	
	16	CHASSIS
	17	CHASSIS

The abbreviation VB stands for the bridge sensor supply and can be equated with the sensor supply, abbreviation: SUPPLY.

(1) if the sensor supply of the module is equipped with option ±15 V, then this pin = -15 V

Plastic Metal connector

ACC/DSUB-		ACC/DSUBM-		B2	B1	U4	UD4
DSUB Pin	Terminal	DSUB Pin	Terminal	BRIDGE	BRIDGE	VOLTAGE	SC16 V.-DEVIDER
9	1	9	1	+VB1	+SENSE1	(RES.)	
2	2	2	2	+IN1	+VB1	+IN1	+IN1
10	3	10	3	-IN1	+IN1	-IN1	-IN1
3	4	3	4	-VB1	-IN1	(+SUPPLY)	(+SUPPLY)
11	5	11	5	[+SENSE1_1/4B1]	-VB1	+IN2	+IN2
4	6	4	6	-SENSE1		-IN2	-IN2
12	7	12	7	+VB2		(-SUPPLY)	(-SUPPLY)
5	8	5	8	+IN2		+IN3	+IN3
13	9	13	9	-IN2		-IN3	-IN3
6	10	6	10	-VB2		(GND) *	(GND)
14	11	14	11	[+SENSE2_1/4B2]	+5V	+IN4	+IN4
7	12	7	12	-SENSE2	GND	-IN4	-IN4
15	14	15	15	GND	HB	(GND)	
8	17	8	18	+5V	CAL	(+5V)**	
	13		13				
	18		14				
	15		16	CHASSIS	CHASSIS	CHASSIS	CHASSIS
	16		17	CHASSIS	CHASSIS	CHASSIS	CHASSIS

[ ] : if SEN SUPPLY with option ±15V, then this pin = -15V

[ ] : 1/4 Bridge with UNI8, DCB8

* if the SEN SUPPLY of the module is equipped with option ±15 V, then this pin 6 is the reference

** not with C8

Plastic

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

Metal connector

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

* if SEN SUPPLY with option ±15 V, then this pin 6 is reference

Plastic Metal connector

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

Plastic Metal connector

ACC/DSUB-		ACC/DSUBM-		ENC4, ENC4-IU	DO-8	DAC4	PWM	REL4	DI2-8
DSUB Pin	Terminal	DSUB Pin	Terminal	INC.-ENCODER	DIGITAL OUT	ANALOG OUT	TTL PULSE	RELAIS	DIGITAL IN
9	1	9	1	+INA	BIT1		PWM1_OPDRN	IN1	+IN1
2	2	2	2	-INA	BIT2	DAC1	PWM2_OPDRN	IN2	+IN2
10	3	10	3	+INB	BIT3	AGND	PWM1_TTL	IN3	-IN1/2
3	4	3	4	-INB	BIT4		PWM2_TTL	IN4	+IN3
11	5	11	5	+INC	BIT5	DAC2	PWM3_OPDRN	OFF1	+IN4
4	6	4	6	-INC	BIT6	AGND	PWM4_OPDRN	OFF2	-IN3/4
12	7	12	7	+IND	BIT7		PWM3_TTL	OFF3	+IN5
5	8	5	8	-IND	BIT8	DAC3	PWM4_TTL	OFF4	+IN6
13	9	13	9	+INDEX		AGND		ON1	-IN5/6
6	10	6	10	-INDEX				ON2	+IN7
14	11	14	11	+5V	HCOM	DAC4	+5V	ON3	+IN8
7	12	7	12	GND *	LCOM	AGND	GND	ON4	-IN7/8
15	14	15	15	(-SUPPLY)	LCOM		GND	(GND)	LEVEL
8	17	8	18	(+SUPPLY)	OPDRN			(+5V)	LCOM
	13		13						
	18		14						
	15		16	CHASSIS	CHASSIS	CHASSIS	CHASSIS	CHASSIS	CHASSIS
	16		17	CHASSIS	CHASSIS	CHASSIS	CHASSIS	CHASSIS	CHASSIS

* ENC4: INDEX only at first socket (CON1)

** OPDRN is reserved and is not to be connected

6.4.1.2 TEDS plugs

Plastic

ACC/DSUB-TEDS-		UNI2
DSUB Pin	Terminal	UNIVERSAL
9	1	+VB1
2	2	+IN1
10	3	-IN1
3	4	-VB1
11	5	I1_1/4B1 *
4	6	-SENSE1
12	7	+VB2
5	8	+IN2
13	9	-IN2
6	10	-VB2
14	11	I2_1/4B2 *
7	12	-SENSE2
15	14	(GND)
8	17	(+5V)
	13	TEDS1
	18	TEDS2
	15	CHASSIS
	16	CHASSIS

Metal connector

ACC/DSUBM-TEDS-		UNI2
DSUB Pin	Terminal	UNIVERSAL
9	1	+VB1
3	2	-VB1
2	3	+IN1
10	4	-IN1
11	5	I1_1/4B1 *
4	6	-SENSE1
5	7	+IN2
13	8	-IN2
14	9	I2_1/4B2 *
7	10	-SENSE2
12	11	+VB2
6	12	-VB2
15	15	TEDS_GND
8	18	(+5V)
	13	TEDS2
	14	TEDS1
	16	CHASSIS
	17	CHASSIS

* if SEN SUPPLY with option ±15 V, then this pin is = -15 V

Plastic

ACC/DSUB-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	14	GND	TEDS2
8	17	+5V	TEDS3
	13	TEDS1	TEDS1
	18	TEDS2	TEDS4
	15	CHASSIS	CHASSIS
	16	TEDS_GND	TEDS_GND

Metal connector

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

* if the SEN SUPPLY of the module is equipped with option ±15 V, then this pin 6 = -SUPPLY and Pin 12 the reference

[ ] : 1/4 Bridge with UNI8 and DCB8

** not for imc CANSAS C8

Plastic

ACC/DSUB-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	14	TEDS2	TEDS_GND
8	17	TEDS3	(+5V)
	13	TEDS1	TEDS1
	18	TEDS4	TEDS2
	15	CHASSIS	CHASSIS
	16	TEDS_GND	CHASSIS

Metal connector

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	

Plastic

ACC/DSUB-TEDS-		T4
DSUB	Terminal	TH-COUPLE/RTD
9	1	+IREF
2	2	+IN1
10	3	-IN1
3	4	
11	5	+IN2
4	6	-IN2
12	7	
5	8	+IN3
13	9	-IN3
6	10	-IREF
14	11	+IN4
7	12	-IN4
15	14	TEDS2
8	17	TEDS3
	13	TEDS1
	18	TEDS4
	15	CHASSIS
	16	TEDS_GND

Metal connector

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

6.4.1.3 CI8-PT

The terminal connection of the CANFX/L-CI8-PT (1250000) is optimized for a 4-wire PT-measurement with individual soueces.

Signal	DSUB Pin
+I_PT1	9
+IN1	2
-IN1	10

Signal	Pin
+I_PT3	12
+IN3	5
-IN3	13

+I_PT2	3
+IN2	11
-IN2	4

+I_PT4	6
+IN4	14
-IN4	7

-I_PT1..4	15

(+5V)	8

One pin (solder cup) for common contacting of all 4 individual return conductors.

Note Software minimum requirement / measurement modes

Operation of the CANFX/L-CI8-PT module requires at least imc CANSAS software version 2.2 R2. A thermocouple measurement and a current measurement are not supported.

6.4.2 Modules with DSUB-9

imc CANSAS-K-INC4				
DSUB Pin	**CON1**	**CON2**	**CON3**	**CON4**
1	+IN1X	+IN2X	+IN3X	+IN4X
6	-IN1X	-IN2X	-IN3X	-IN4X
2	+IN1Y	+IN2Y	+IN3Y	+IN4Y
7	-IN1Y	-IN2Y	-IN3Y	-IN4Y
3	+INDEX [2]	+INDEX	+INDEX	+INDEX
8	-INDEX	-INDEX	-INDEX	-INDEX
4	NC	NC	NC	NC
9	GND	GND	GND	GND
5	+5V	+5V	+5V	+5V

[2] *The incremental counter inputs have a common index track, which is connected in parallel to the other inputs in each DSUB.*

6.4.3 Modules with ITT VEAM

Round socket: ITT-VEAM (MIL-C-26482)

ITT VEAM	-UNI8	-L-CI8-V-(SUPPLY*)
A	+IN	+IN
B	-IN	-IN
C	+SUPPLY	(+SUPPLY)
D	-SUPPLY	GND (-SUPPLY)
E	TEDS	TEDS (OneWire)
F	SENSE/ RTD current source	I_PT (RTD current source)
G	Quarter bridge completion, Sense-lead for RTD 3-wire configuration	+I (positive measurement input for current measurement)

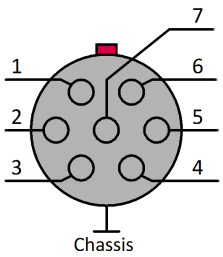
* sensor supply voltages available with optional sensor supply module

CAN/L-UNI8	CAN/L-CI8-V	CAN/L-CI8-V-SUPPLY
1050051	1050293	1050364

imc CANSAS -L-DO8R-V, -L-DI16-V, -L-DAC8-V, -L-PWM8-V

ITT VEAM	-L-DO8R-V	-L-DI16-V	-L-DAC8-V	L-PWM8-V
A	IN	+IN		PWM Open Drain
B	ON	-IN		
C	OFF		OUT	Vcc
D			GND	GND
E				
F				PWM TTL
G	CHASSIS	CHASSIS	CHASSIS	CHASSIS

6.4.4 Modules with LEMO



The imc CANSAS modules of the housing model SL which are equipped with LEMO connectors have certain limitations regarding measurement possibilities. The exact limitations are stated in the technical data sheet of the respective module.

Figure shows: view on the LEMO.1B socket

6.4.4.1 DCB8, UNI8 and INC4

PIN	-DCB8	-UNI8
1	+IN	+IN
2	-IN	-IN
3	+SUPPLY	+SUPPLY
4	-SUPPLY (GND)	-SUPPLY (GND)
5	TEDS (OneWire)	TEDS (OneWire)
6	SENSE	SENSE/PT100 current source*
7	Quarter bridge completion	Quarter bridge completion / Sense for PT100 3-wire

-INC4-L(-SUPPLY*)
+IN X
-IN X
+SUPPLY
-SUPPLY (GND)
+INDEX
+IN Y
-IN Y

*Note that when measuring with thermocouple, a **PT100 must be integrated in the plug as cold junction compensation**. In addition, the ACC/TH-LEM-150 connector is available as an accessory: a LEMO. 1B lug with integrated cold junction compensation.

* - reference of +INDEX is -SUPPLY
- Sensor supply voltage 5 VDC/ 100 mA (optional 300 mA)
- other sensor supply voltages available with optional supply

6.4.4.2 C8, CI8, SCI8, SCI16, SC16

LEMO PIN	-C8-L-(SUPPLY*)	-CI8-L-(SUPPLY*)	-SCI8-L	-SCI16-L	-SC16-L
1	+IN	+IN	+IN	+IN	+IN
2	-IN	-IN	-IN	-IN	-IN
3	(+SUPPLY)	(+SUPPLY)	+SUPPLY	+SUPPLY	+SUPPLY
4	GND (-SUPPLY)	GND (-SUPPLY)	-SUPPLY (GND)	-SUPPLY (GND)	-SUPPLY (GND)
5	n.c.	TEDS (OneWire)	TEDS (OneWire)	TEDS (OneWire)	TEDS (OneWire)
6	PT100 current source				
7	+I (positive measurement input for current measurement)				

* sensor supply voltage with optional sensor supply module

6.4.4.3 µ-CAN-B1-L and µ-CAN-V1-L

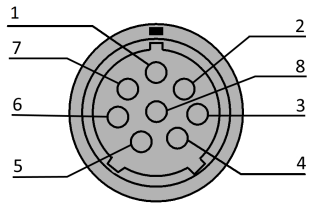
LEMO Pin	µ-CAN-B1-L
1	+IN
2	-IN
3	+SUPPLY
4	-SUPPLY (GND)
5	HB
6	-SENSE
7	+SENSE

LEMO Pin	µ-CAN-V1-L
1	+IN_60V with divider (MR: 2 to 60 V)
2	-IN
3	+SUPPLY
4	-SUPPLY
5	n.c.
6	n.c.
7	+IN_1V without divider (MR: 0.1 to 1 V)

Note Manufacture of measuring cables

To ensure that the working voltages specified for the channel isolation are reliably maintained, the cores must not be stripped too far during the manufacture of the measuring cables. The isolation of the cores must reach up to the solder cups. For a shielded cable, the exposed cable shield must be completely removed. As a rule, only suitable cables with sufficient isolation should be used.

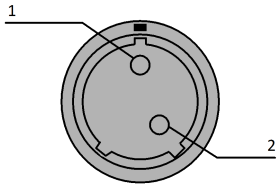
6.4.4.4 HISO8-T-2L



view on LEMO.2P socket

PIN	IN1..4 / Material	IN5..8 / material
1	+IN1 / NiCr	+IN5 / NiCr
2	-IN1 / Ni	-IN5 / Ni
3	+IN2 / NiCr	+IN6 / NiCr
4	-IN2 / Ni	-IN6 / Ni
5	+IN3 / NiCr	+IN7 / NiCr
6	-IN3 / Ni	-IN7 / Ni
7	+IN4 / NiCr	+IN8 / NiCr
8	-IN4 / Ni	-IN8 / Ni

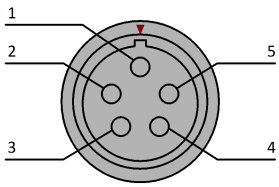
6.4.4.5 HISO8-T-8L



view on the LEMO.2P socket

LEMO PIN	Signal 1 to 8 / Material
1	+IN / NiCr
5	-IN / Ni

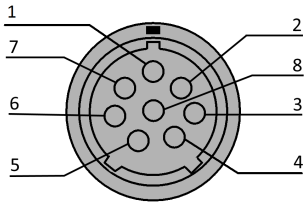
6.4.4.6 HISO8-L



view on LEMO.1P socket

LEMO PIN	HISO-8-L
1	+IN
2	-IN
3	+I
4	+PT
5	-PT

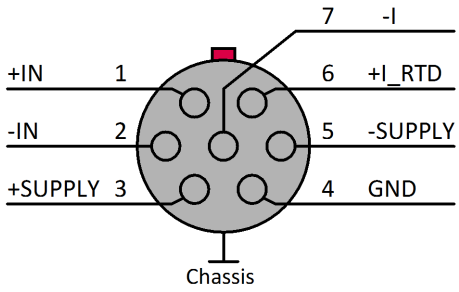
6.4.4.7 HISO8-4L



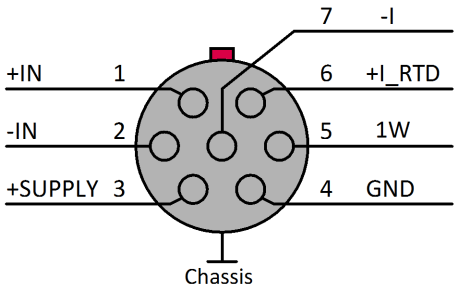
view on the LEMO.2P socket

PIN	Channel 1	Pin	Channel 2
1	+IN1	5	+IN2
2	-IN1	6	-IN2
3	+I1	7	+I2
4	-I1	8	-I2

6.4.4.8 UTI-6

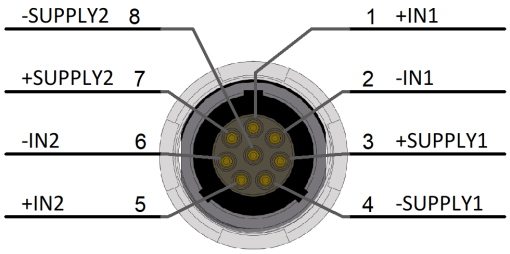


CANFT/UTI-6-SUP



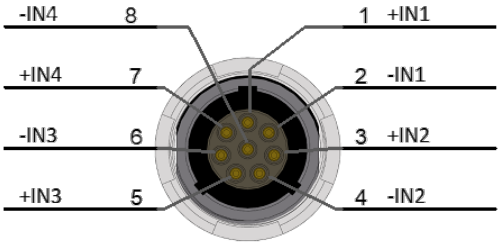
CANFT/UTI-6-TEDS

6.4.4.9 HISO-UT-6



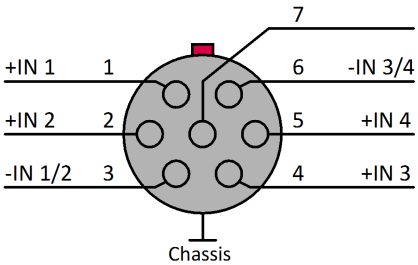
LEMO Redel 2P, 8-pin, Code C

6.4.4.10 HISO-T-8



LEMO Redel 2P, 8-pin, Code B

6.4.4.11 DI-16



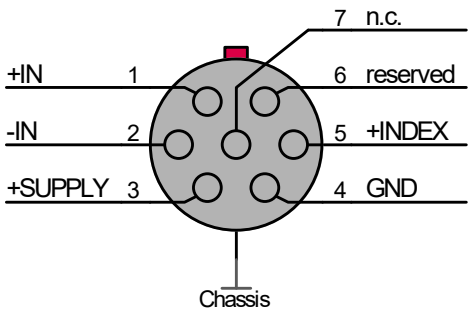
view on LEMO.1B terminal

Pin	input 1 - 4 (5-8, 9-12, 13-16)	8 isolated groups with 2 channels each 2 groups with 4 channels per terminal
1	+IN 1	isolated group A IN 1
2	+IN 2	isolated group A IN 2
3	-IN 1/2	isolated group A GND 1/2
4	+IN 3	isolated group B IN 1
5	+IN 4	isolated group B IN 2
6	-IN 3/4	isolated group B GND 1/2
7	n.c.	

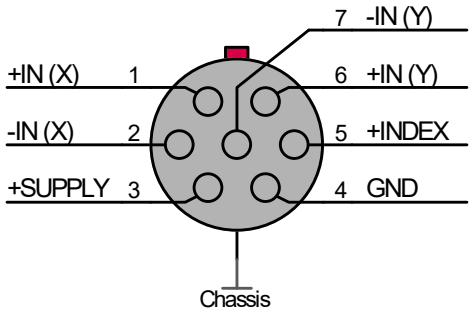
6.4.4.12 ENC-6

Pin	input 1, 4	input 2, 3, 5 und 6	inputs 1...3: isolated group A with INDEX_A, SUPPLY_A, GND_A inputs 4...6: isolated group B with INDEX_B, SUPPLY_B, GND_B for inputs 1, 4 apply: also for dual-track encoder (X, Y) INDEX: single-ended connection (reference: GND_A/B)
1	+IN (X)	+IN	
2	-IN (X)	-IN	
3	+SUPPLY	+SUPPLY	
4	GND	GND	
5	+INDEX	+INDEX	
6	+IN (Y)	reserviert	
7	-IN (Y)	n.c.	

Single-track encoder



Dual-track encoder



6.4.5 Modules with Phoenix terminal block (-PH)

6.4.5.1 CI8-PH

Signal	Pin	for channel
+PT	1	IN1, IN3, IN5, IN7
+IN	2	
-IN	3	
-PT	4	
+PT	5	IN2, IN4, IN6, IN8
+IN	6	
-IN	7	
-PT	8	

6.4.5.2 DI16-PH

Signal	left terminal block	right terminal block	Signal
1+	+IN 1 (BIT 1)	+IN 9 (BIT 9)	9+
1-	-IN 1 (BIT 1)	-IN 9 (BIT 9)	9-
2+	+IN 2 (BIT 2)	+IN 10 (BIT 10)	10+
2-	-IN 2 (BIT 2)	-IN 10 (BIT 10)	10-
3+	+IN 3 (BIT 3)	+IN 11 (BIT 11)	11+
3-	-IN 3 (BIT 3)	-IN 11 (BIT 11)	11-
4+	+IN 4 (BIT 4)	+IN 12 (BIT 12)	12+
4-	-IN 4 (BIT 4)	-IN 12 (BIT 12)	12-
5+	+IN 5 (BIT 5)	+IN 13 (BIT 13)	13+

Signal	left terminal block	right terminal block	Signal
5-	-IN 5 (BIT 5)	-IN 13 (BIT 13)	13-
6+	+IN 6 (BIT 6)	+IN 14 (BIT 14)	14+
6-	-IN 6 (BIT 6)	-IN 14 (BIT 14)	14-
7+	+IN 7 (BIT 7)	+IN 15 (BIT 15)	15+
7-	-IN 7 (BIT 7)	-IN 15 (BIT 15)	15-
8+	+IN 8 (BIT 8)	+IN 16 (BIT 16)	16+
8-	-IN 8 (BIT 8)	-IN 16 (BIT 16)	16-
5 VDC	Sen-Supply	Sen-Supply	5 VDC
5 VDC	Sen-Supply	Sen-Supply	5 VDC
Ground	GND	GND	Ground
CHASSIS	CHASSIS	CHASSIS	CHASSIS

6.4.5.3 DO16-PH

Signal	left terminal block	right terminal block	Signal
1+	BIT 1	BIT 9	9+
1-	LCOM 1	LCOM 2	9-
2+	BIT 2	BIT 10	10+
2-	LCOM 1	LCOM 2	10-
3+	BIT 3	BIT 11	11+
3-	LCOM 1	LCOM 2	11-
4+	BIT 4	BIT 12	12+
4-	LCOM 1	LCOM 2	12-
5+	BIT 5	BIT 13	13+
5-	LCOM 1	LCOM 2	13-
6+	BIT 6	BIT 14	14+
6-	LCOM 1	LCOM 2	14-
7+	BIT 7	BIT 15	15+
7-	LCOM 1	LCOM 2	15-
8+	BIT 8	BIT 16	16+
8-	LCOM 1	LCOM 2	16-
OD 1	NC	NC	OD 2
GND 1	LCOM 1	LCOM 2	GND 2
5 V 1	HCOM1	HCOM2	5 V 2
GND 1	LCOM 1/CHASSIS	LCOM 2/CHASSIS	GND 2

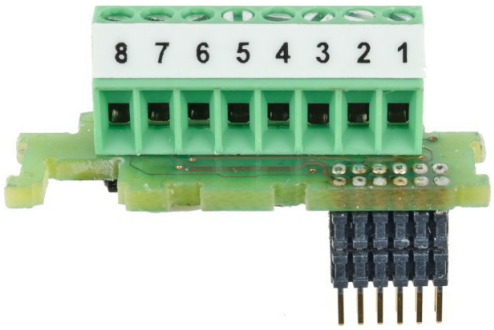
6.4.5.4 DO8R-PH

socket	1	2	3	4	5	6	7	8
IN	IN1	IN2	IN3	IN4	IN5	IN6	IN7	IN8
ON	ON1	ON2	ON3	ON4	ON5	ON6	ON7	ON8
OFF	OFF1	OFF2	OFF3	OFF4	OFF5	OFF6	OFF7	OFF8
CHASSIS	-	-	-	CHASSIS	-	-	-	CHASSIS

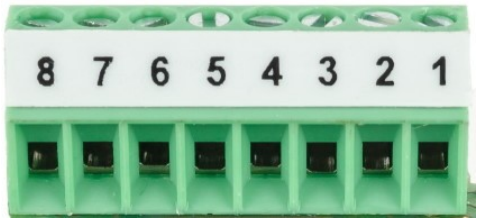
Function	label version Phoenix (-Ph)	label version DSUB
closed in idle state (normally closed)	NC	ON
opened in idle state (normally open)	NO	OFF
common reference (common)	COM	IN

6.4.5.5 µ-CANSAS Phoenix strip terminal

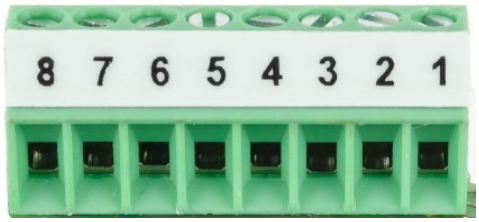
Pin configuration of the Phoenix strip terminal for imc µ-CANSAS-V1-AS

Phoenix MPT0,5/8	Pin	Signal
 *8-pin Phoenix strip terminal*	8	+IN with divider (MR 2..60V)
	7	+IN without divider (MR 0,1..1V)
	6	-IN_COM
	5	reserved
	4	-SUPPLY
	3	+SUPPLY
	2	reserved
	1	reserved

Pin configuration of the Phoenix strip terminal for imc µ-CANSAS-B1-AS

Phoenix MPT0,5/8	Pin	Signal
 *8-pin Phoenix strip terminal*	8	reserved
	7	+IN
	6	-IN_COM
	5	HB
	4	-SUPPLY
	3	+SUPPLY
	2	-Sense
	1	+Sense

Pin configuration of the Phoenix strip terminal for imc µ-CANSAS-T1-AS

Phoenix MPT0,5/8	Pin	Signal
 *8-pin Phoenix strip terminal*	8	reserved
	7	+IN
	6	-IN_COM
	5	reserved
	4	reserved
	3	reserved
	2	reserved
	1	reserved

6.4.5.5.1 Mounting instructions

Within a imc µ-CANSAS module there is a Phoenix strip terminal (model: MPT0.5/8) for connecting signals. This strip terminal is located on a connector junction which can be detached from the front of the module. The cable grommet is a *UNI EMC* screwed cable gland of model *UNI ENTSTÖR DICHT* from the company Pflitsch. When threading the cable, please adhere to the manufacturer's instructions. The following section explains step-by-step how to access the connector junction and how to make the necessary connections.

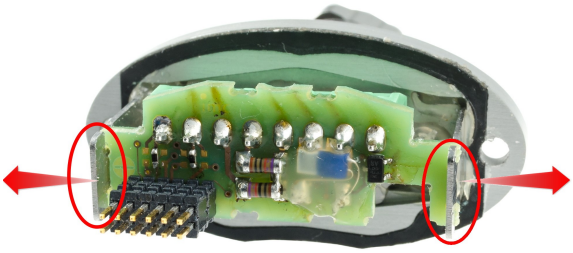
Step 1: Unfasten the grounding bolt and the **outer** Torx screw from the housing face.

Warning

The two inner screws must not be loosened, see photo.

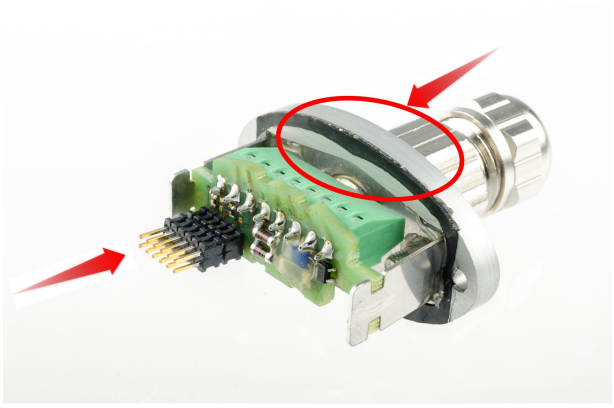
Step 2: Carefully pull the housing face out until the connections are exposed.

Step 3: Detach the connector junction with its Phoenix strip terminal from the housing face by gently bending the clamping brackets at the sides outward.

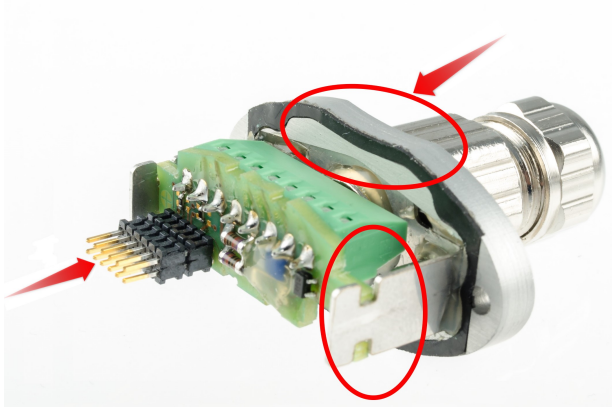


Step 4: Feed the cable through the gland in accordance with the manufacturer's instructions and connect the leads according to the pin configuration for connector pins 56.

Step 5: Re-attach the connector junction into its former position by means of the clamping brackets. Gently tug the cable back outwards through the gland in order to straighten out the individual leads, to prevent them from possibly becoming bent or stuck. When installing the connector junction, ensure that it is not positioned upside down. The recess in the profile of the housing face is an indication of whether the connector junction is installed correctly.



Correct connection junction position



Incorrect connection junction position

Step 6: Check that the cable and leads are not under strain or tension and then close the cable gland, which is designed for cables of 4 – 6 mm in diameter. If the cable used is thinner, then its diameter in the section passing through the gland must be made correspondingly wider by means of heat-shrinkable tubing.

Step 7: Carefully insert the housing face into the housing. Make absolute certain that the housing and its face are attached together in the correct position. This can be ascertained on the basis of the grooves in the connector junction's plate which are shaped to accommodate the guide rails inside the housing (see photos below). Also, the correct position is distinguished by the recess in the profile of the housing face, which fits over one side of the housing.

Step 8: Once the housing face is placed flush on the housing, the module can be closed tight with the Torx screws.

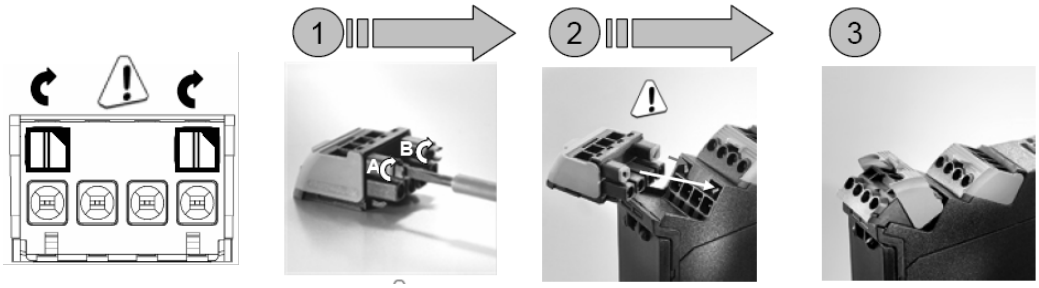
Correct position

Incorrect position

Possible troubleshooting:

If the front of the case (the inside) is not completely inside the case (see the "incorrect position" photo), the back can also be loosened to look for the problem.

6.4.6 Terminal block (Weidmüller)

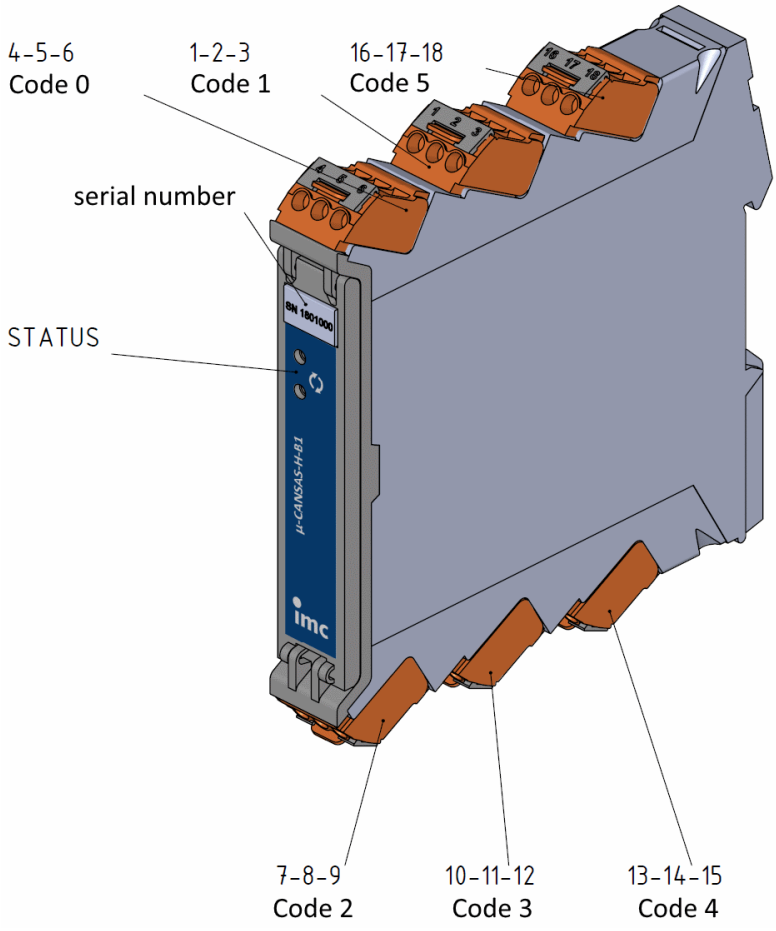


The coding of this terminal block is done by imc!

Note

Each terminal block will be coded by imc ex-factory in a way that each block can only be connected to the corresponding plug (female). This makes sure that a incorrect connection is not possible at all.

6.4.6.1 µ-CAN-H-B1, µ-CAN-H-B1-2.5V



Terminal block	Pin	Configuration
upper block	1	CAN High
middle	2	CAN GND
Code 1	3	CAN Low
upper block	4	+SUPPLY
front	5	-SUPPLY
Code 0	6	CAN Reset
block below	7	+SENSE
front	8	+VB
Code 2	9	+IN
block below	10	-IN
middle	11	-VB
Code 3	12	-SENSE
block below	13	-IN
back	14	HB
Code 4	15	n.c.
upper block	16	CAN High
back	17	CAN GND
Code 5	18	CAN Low

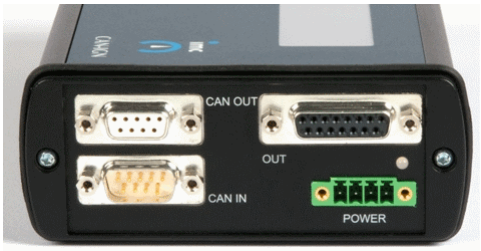
Note

µ-CAN-H-B1 modules, delivered **after October 2016**, are equipped with **6 terminal blocks**!
µ-CAN-H-B1 modules, delivered before October 2016, are equipped with only 4 terminal blocks!

Which terminal blocks?
Upper terminal blocks: middle and front - Code 1 and 0
Terminal blocks below: middle and front - Code 2 and 3

6.4.7 IGN

CANSAS-IGN: BNC inputs



CANSS-IGN: CAN-connector and analog/digital outputs

4 isolated BNC sockets for
4 isolated input channels:

- SPARK: connector for the ignition signal
- ANGLE: connector for the crankshaft sensor
- REF: If an incremental encoder is used as the crankshaft sensor, the incremental encoder's zero-output is connected here.
- CAM: The camshaft sensor is only connected to this input in the case of Monitoring of Selected Cylinders. This returns one pulse per revolution of the camshaft.

Uniform conditioning is provided for all 3 signals: voltage isolation, bandwidth approx. 600 kHz, 40 V input range.

This terminal provides the analog and digital outputs and auxiliary power supply. The outputs and power supply are not isolated against the module's power supply.

Pin	Signal	Reference
1	TTL1 (Spark)	Pin 9
2	TTL2 Crankshaft	Pin 10
3	TTL3 (Ref)	Pin 11
4	TTL4 (CAM)	Pin 12
5	+5 V (max. 200 mA)	Pin 13
6	+12 V (max. 100 mA)	Pin 13
7	DAC1 AngleOut (ignition angle)	Pin 15
8	DAC2 SpeedOut (RPMs)	Pin 15
9, 10 11, 12	Digital Ground 0 V	
13	Ground 0 V	
14	not connected	
15	Analog Ground 0 V	

6.4.8 IHR

The CAN/IHR (article no. 10500398) and the CAN/IHR-48V (article no. 10500398) measuring module is equipped on the front panel with laboratory sockets 4 mm (banana) and with spring terminals 0.75 mm²...16 mm². On the back of the measuring module (desktop device) the standard connection technology 31 is available.

The IHR plug-in module (the CAN/IHR-R, article no. 10500450 and the CAN/IHR-48V-R, article no. 10500451) for the 19" IHR RACK has no connectors on the front panel. The measurement connections have to be connected on the rear side of the plug-in module and with the backplane of the IHR-RACK.

Reference

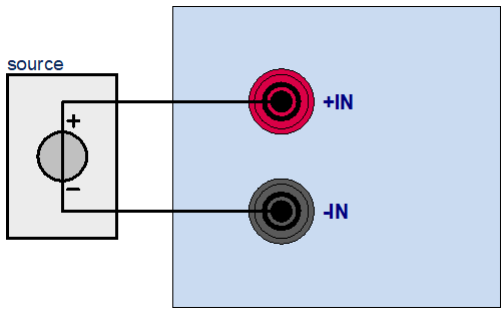
Please find here the 19" IHR RACK description 41.

6.4.9 SENT

DSUB-15 plugs (female): IN 1..4 for inputs 1..4 and IN 5..8 for inputs 5..8.

Pin	plug (female) IN 1..4	plug (female) IN 5..8
1	imc internal use, service departure not for common use.	
2	V Supply (5 V) Input 1	V Supply (5 V) Input 5
3	SIG Signal Input 2	SIG Signal Input 6
4	GND Input 2	GND Input 6
5	V Supply (5 V) Input 3	V Supply (5 V) Input 7
6	SIG Signal Input 4	SIG Signal Input 8
7	GND Input 4	GND Input 8
8	Not used	Not used
9	SIG Signal Input 1	SIG Signal Input 5
10	GND Input 1	GND Input 5
11	V Supply (5 V) Input 2	V Supply (5 V) Input 6
12	SIG Signal Input 3	SIG Signal Input 7
13	GND Input 3	GND Input 7
14	V Supply (5 V) Input 4	V Supply (5 V) Input 8
15	Not used	Not used

6.4.10 HISO-HV-4



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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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International partners

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