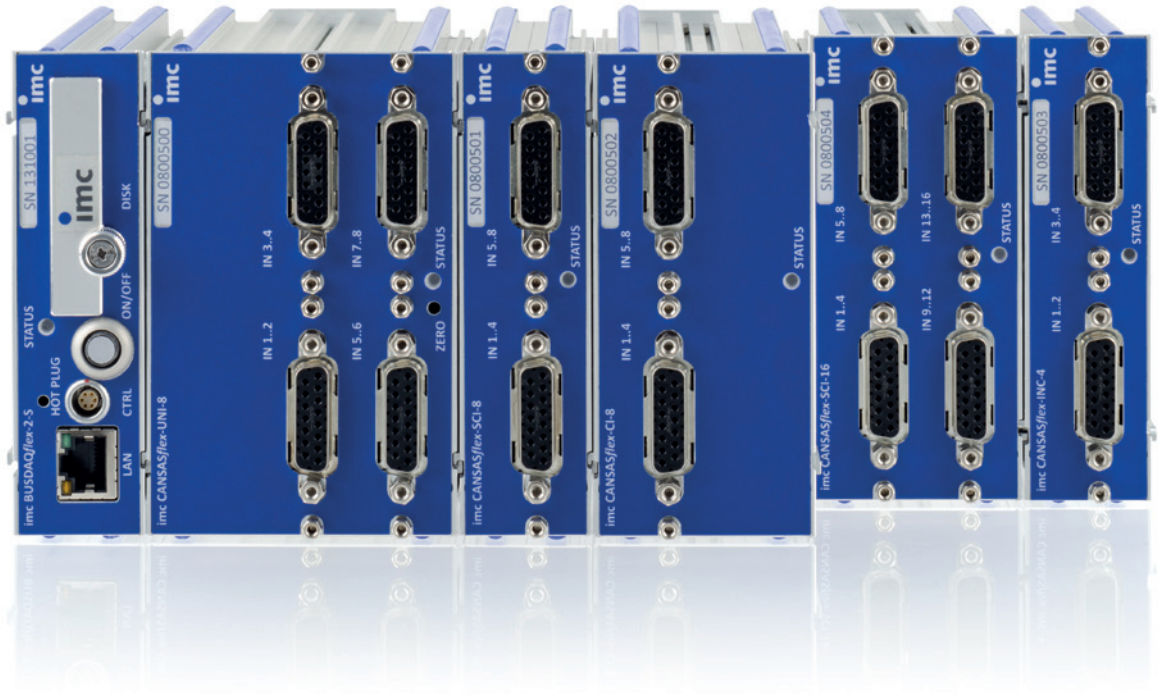
imc CANSAS

flexible • networkable • universal



Intelligent measurement modules for test stands and mobile applications

imc CANSAS at a glance

- Universal measurement and I/O modules for all relevant sensors and signals in mechatronics
- Distributed or centralized operation
- Click mechanism connects modules electrically and mechanically
- Easily integrates into every CAN-based testing thanks to a standard CAN interface
- Configuration software included: allows to export the module configuration in standard DBC format
- Three different module series: suitables types for every environment and application
- imc CANSAS*flex* enables precise synchronization across multiple modules, as well as immediate result calculation and data reduction in the measurement module
- imc CANSAS*flex* offers varieties of connector solutions: DSUB, LEMO, ITT Veam, BNC, thermocouple, ...
- imc CANSAS*fit*: suitable for extreme environmental conditions

imc CANSAS

CAN modules for test stand, vehicle and industrial applications

Whether test stand, on-board vehicle application or industrial environment – when time synchronous, dynamic or decentralized acquisition of large channel counts is required: imc CANSAS modules are ideal. Equipped with high-precision measurement amplifiers, imc CANSAS modules allow for direct connection to all typical sensors and signals in the mechatronic environment. The digitized measurement signals are output as CAN messages and can be read and recorded by any measurement, automation or control system with a CAN interface. imc BUSDAQ*flex* is the perfect choice for CAN data logging: it can directly be connected with a simple click.

Central or distributed installation

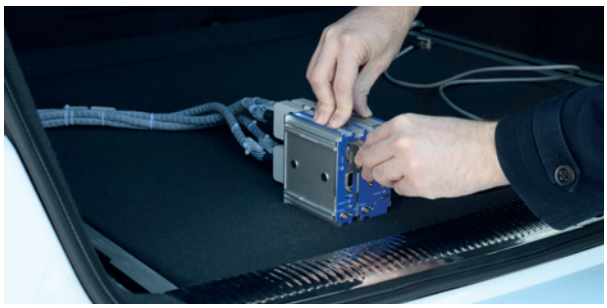
In test stands or industrial environments, a centralized installation of the measurement system is often desired. imc CANSAS*flex* modules are designed to fit into a special 19“ subrack solution.

For widely distributed sensor assessment, the ability to capture and digitize signals near the sensor is quite advantageous. imc CANSAS modules can be placed directly next to the sensor and connected to a network with standard CAN cable – up to 1000m away. Important for mobile applications: imc CANSAS modules operate reliably in extended temperature ranges and withstand severe shock and vibration. imc CANSAS*fit* is particularly suited for harsh environments. With an IP65 rating, they are resistant to dirt, dust and splashing water.

Intelligent functions make the difference

All imc CANSAS*flex* modules are equipped with integrated signal processors that enable local real-time calculations of results, yielding data reduction and reduced bus load for highly prductive testing. imc CANSAS*flex* guarantees precise synchronization for all channels even across multiple modules: using CAN-based clock-synchronization, imc CANSAS accomplishes sync without additional signal lines – just the standard CAN bus cable. Thanks to integrated sensor recognition (TEDS), a secure sensor connection and flawless configuration are guaranteed.

With the heartbeat function, the bus master, such as a control or automation system, can constantly monitor all involved modules. You will know whether the module is still connected, is working with the correct configuration and whether the modules with automatic sensor recognition are connected with the right sensor.



Voltage & high voltage

Current

Temperature

Strain gauge

Pressure

Frequency


Digital input/ output


PWM output

Analog output

Productive testing with imc CANSAS

Universal signal connections

- Direct connection of all typical signals and sensors in electromechanical testing
- Integrated signal conditioning, anti-aliasing filter and optional sensor supply
- Precise digitization with 24 bit A/D converters
- imc CANSAS*flex* supports automatic sensor recognition (TEDS)
- imc CANSAS*flex* offers internal real-time calculation and data reduction

The perfect fit for every application

- Three module series, suited for different applica tions and test environments: from installation in an engine compartment at 125°C up to permanently installed test stand equipment
- Extended temperature range with condensation allowed: imc CANSAS*fit* from -40 to +125°C and imc CANSAS*flex* from -40 to +85 °C
- Compact module design allows for near-sensor placement and reduces potential electrical interference

Easy configuration

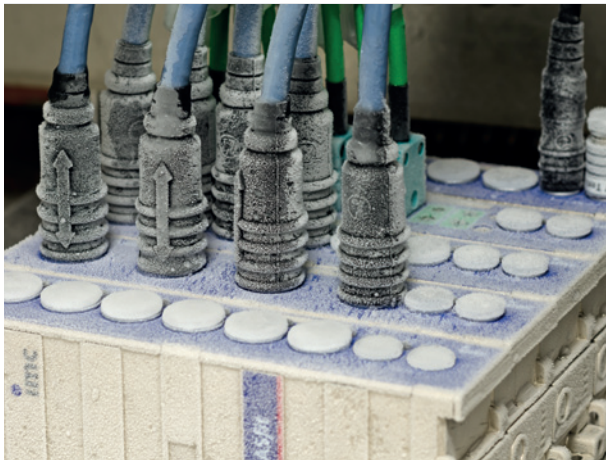
- Configurable with Software imc CANSAS, via imc STUDIO or via CANopen
- Direct access to all relevant CAN parameters (baud rate, ID type, message ID, etc.)
- Configuration of real-time calculations in the module to be output as virtual channels
- Configuration is saved onboard and loaded upon power-up

Easy integration

- Fully supports CAN specification (ISO 11898)
- Extensive configuration options for user-specific CAN settings
- Optional heartbeat function for unattended operation in CAN networks
- Import and export of module configurations using industry standard DBC

Always in sync

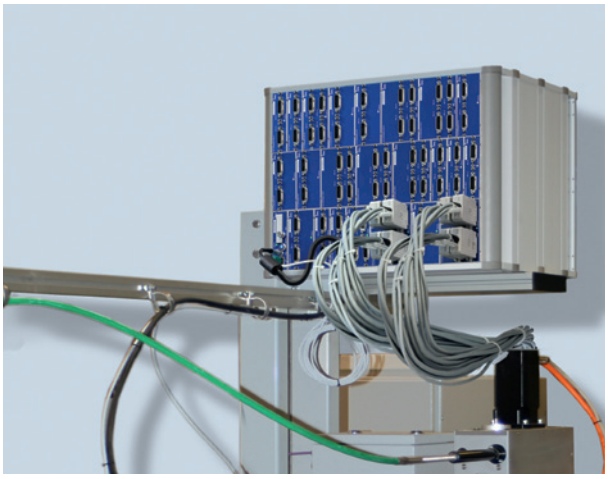
- imc CANSAS*flex* offers CAN-based synchronization for precise sample timing across multiple modules
- No additional cables or signals required



In Practice

Flexible in test stand applications

On test stands, adaptable and easy to integrate measurement hardware is required. The flexible, modular design of imc CANSAS is the ideal solution. From universal modules that can measure voltage, current, temperature or strain, up to special modules for pressure, high voltage or high isolation – the choice is yours. Depending on the task, the chosen measurement module can easily be plugged into the rack. This automatically powers the module and connects it to the CAN bus. Hot-Plugging allows modules to be added or replaced, even during operation.



Robust in mobile applications

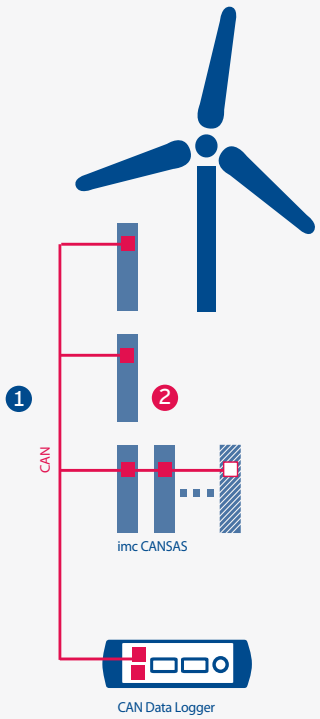
Even under harsh environmental conditions in mobile applications, imc CANSAS modules measure precisely throughout a wide temperature range and can tolerate condensation from passing through the dew point. For operations in the engine compartment, the particularly compact and robust imc CANSAS*fit* modules are well-suited and can work from -40° to +125°C. These modules are built according to IP65 and MIL-STD-810F and tolerate dirt, splashing water, vibrations and shocks. Once configured, imc CANSAS systems automatically provide data when power is applied.

Distributed tests and measurements

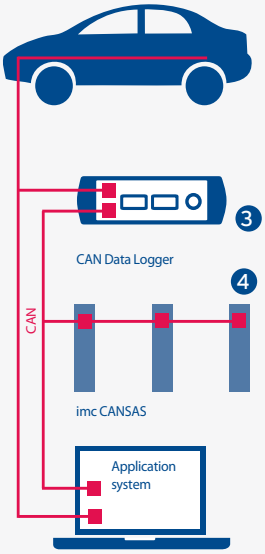
For widely distributed measurement equipment, such as on trains, ships, aircraft, cranes, wind turbines or construction sites, the cost of sensor wiring is high. In addition, long, multi-core test cables are expensive and prone to interference and signal noise.
Here, imc CANSAS shows its advantages. Thanks to the compact housing and autarkic operation and supply design, each measurement module can be placed close to the sensor. The acquired signals are transmitted digitally and galvanically-isolated via CAN (up to 1000m) and are synchronously recorded with, e.g., an imc data acquisition system.

Ideal for centralized and distributed measurements in mobile or stationary testing

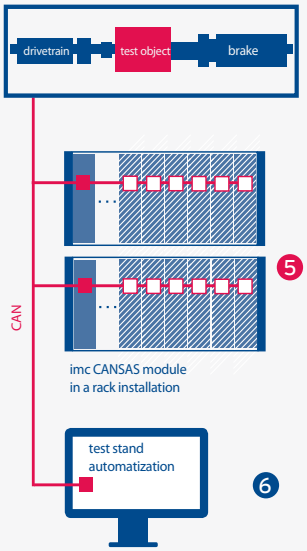
Distributed testing



Mobile testing



Stationary testing



1. CAN network up to 1000m
2. Spatially-distributed imc CANSAS modules
3. CAN data logger (e.g., imc BUSDAQ) for autarkic data acquisition without a PC
4. Individual modules can be powered via CAN
5. imc CANSAS 19“ rack with integrated CAN-backplane for power supply and data communication
6. Connects to all data acquisition systems or automation systems with CAN interface

System design

The imc CANSAS product family

imc CANSAS is designed for test and measurement tasks on test stands, industrial installations, vehicles and buildings. A variety of input and output modules cover the full range of electromechanical testing requirements. With three different module series and numerous specialty modules available, there is a suitable imc CANSAS product for every application and environment.

The versatile imc CANSAS*flex* series

The imc CANSAS*flex* series offers a wide selection of measurement modules, which cover all typical sensors and signals from heavy machinery, installations and vehicles. The modules can be installed in both a spatially-distributed arrangement or as a central unit. Combining modules couldn't be easier: with the innovative imc click mechanism, the modules are electrically and mechanically connected to each other – without the need for tools or cabling. On test stands, in factories or plants, wherever multiple modules are permanently installed as one central unit for long-term testing, the use of a 19" rack is often recommended. This allows modules to be conveniently inserted with automatic supply and connection to the CAN bus.

The compact imc CANSAS*fit* series

The imc CANSAS*fit* series is distinguished by its particularly compact design and robust housing which provides reliable protection against splashes, dust and vibration. The module's wide temperature range from -40° to +125°C, allows for outdoor operation, as well as testing performed in climate chambers. Due to its small form factor, imc CANSAS*fit* is ideal for testing in confined spaces, such as in the engine compartment or under a vehicle's interior trim. The modules acquire typical analog signals such as temperature and voltage, but also rpm, displacement or velocity, as well as digital status information.

The classic imc CANSAS series

The classic series offers a wide range of modules for use with all typical measurement and control signals on the test bench, in vehicles and in industrial settings. With different housing designs, imc CANSAS can be optimally adapted to various testing environments: whether using a standard variant in a vehicle or a cassette module on a test stand or stationary structure.

imc CANSAS module types

Suitable modules for every task

Universal

Measurement modules for universal testing

- Voltage and current
- Thermocouples
- PT100
- Strain gauge / bridges
- Resistance

Strain gauges & measurement bridges

Precision strain testing

- Quarter-, half- and full-bridge
- 120 Ohm or 350 Ohm quarter bridge completion
- Integrated sensor supply

Digital inputs & outputs

Detect and set conditions

- 16 galvanically-isolated inputs and outputs
- Inputs configurable for 24 V and 5V logic levels (TTL/CMOS)
- Outputs can be configured as open-drain or totem-pole
- Output current max. 0.7A
- Alternative: relay contacts

Outputs

Open- and closed-loop control

- Analog outputs +/- 10 V, 0 ... 20 mA
- Integrated function generator for, e.g., square wave, sawtooth, etc.
- PWM outputs with TTL and open-drain output stage

Counter inputs

Incremental encoder measurements for determining:

- Frequency
- RPM
- Velocity
- Position and angle
- Time

Gateways

Digital interfaces over CAN

- RS232 gateway for conversion to CAN
- SENT gateway with 8 inputs to connect SENT sensors and output their data to CAN

Specialty modules

Temperature (HV)

Highly-isolated temperature measuring

- Thermocouples on high common-mode voltage levels of up to 800 V
- E-mobility and hybrid applications
- Individual HV-suited sockets

Pressure

Integrated pressure sensors

- 8 pressure inputs of different types
- Absolute and relative pressure measurements
- Gases and liquids

High isolation

Testing with high potentials

- Isolation: 800 V CAT I, 300 V CAT II
- Measure low voltages and temperatures on high common-mode levels
- High-voltage measurement up to 800 V

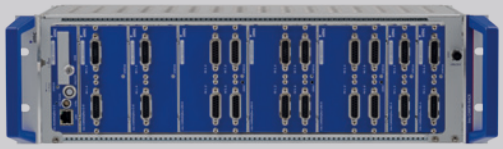
Quiecent & operating currents

Auto-Range measurement from 50 nA to 50 A

- Two independent, isolated channels for current measurement with automatic range switching
- Wide measuring range up to 50 A
- High resolution down to 50 nA and 30 Bit effective range dynamics

Rack

For test stands and stationary installations



Miniature measurement modules

imc µ-CANSAS

- 1 channel modules for measuring voltage, temperature or strain
- Wide temperature range up to 120 °C
- Particularly light-weight and robust
- Also for DIN rail

imc CANSAS family

General specifications and functions

Function		*flex* / classic	*fit*
main features		full flexibility universal, special	vehicle tests, „under the hood“
Application			
mobile testing		★★	★★★
test stand		★★★	★
laboratory		★★★	★
mobile machinery		★★	★★★
System			
clickable		●	●
mechanically compatible logger		●	
19“ rack	with slot detection	●	
DIN-rail	mounting kit	●	
CAN terminator	internal, switchable	●	
desktop compatible	rubber buffer	●	
Signal processing			
ADC, processing	24 Bit	●	●
CAN messages	16 Bit integer	●	●
	32 Bit float		●
virtual channels	min/max/mean, linearization math, filter, logic	●	
sync		●	
heartbeat		●	
CANopen		●	
FindMe		●	
configuration read-back		●	
user status LED	freely programmable	●	
Operating conditions			
high temperature		85°C	125°C
sealed		IP40	IP65
shock & vibration resitant	MIL Standard	MIL810	MIL810
DC supply	automotive	10..50 V	7..50 V
	isolated	●	●
Connectors			
I/O connectors	DSUB-15	●	
	LEMO.1B	●	●
	custom (BNC, ITT-Veam...)	●	
CAN + supply	combi socket	DSUB-9	LEMO.0B
supply	separate	LEMO.0B.302	
Portfolio			
diversity	module types	★★★	★
isolation	isolated I/O	★★	★★★
HV modules		●	
TEDS	plug & measure	●	
temperature		●	●
current, 20 mA		●	●
bridge, strain gauge		●	○
pulse counter		●	●
DI		●	●
DO		●	●
analog out (DAC, PWM)		●	
IEPE / ICP			
pressure		●	
SENT		●	

Incremental encoder module: imc CANSAS*flex* series

UNI-8 module: imc CANSAS*flex* series

Measurement system with data logger imc BUSDAQ*flex* and imc CANSAS*flex*

temperature module of the imc CANSAS*fit* series

UTI-6 module of the imc CANSAS*fit* series

TEDS Support (Transducer Electronic Data Sheet)
imc CANSAS devices support direct read/write of TEDS sensors, including imc's TEDS Clip. TEDS interfaces require either the ACC/DSUB-TEDS-x variants of our connectors (2-wire TEDS), or per-channel connectors such as Lemo or ITT-VEAM.

Legend: ● standard, ○ optional, (●) limited
★★★ ideally suited ★★ well suited ★ suited

Analog measurement modules: imc CANSAS*flex* / imc CANSAS*fit*

type	series				I/O connector options						speed		iso	voltage mode			current			temp	aux	bridge			
module name: CANFX-xxx CANFT-xxx	imc CANSAS*flex* (short)	imc CANSAS*flex* (long)	imc CANSAS*fit*	channels	connector variant	TEDS (bei DSUB, LEMO)	DSUB-15	LEMO.1B	Thermo	ITT-Veam	max. sampling rate (per channel)	signal bandwidth (-3dB)	indivdually isolated	min. voltage rate (mV)	voltage up to 10V	voltage up to 50/60V	20mA internal shunt	20mA shunt plug	thermocouple	PT100	sensor supply	full bridge	half bridge	quarter bridge 120 Ohm	quarter bridge 350 Ohm
temperature measurement																									
C8-2T		●		8	thermo				●		100 Hz	20 Hz							●						
CI8-2T		●		8	thermo				●		1000 Hz	440 Hz	●						●						
SC16-2T		●		16	thermo				●		1 Hz	0,5 Hz							●						
SCI8-2T		●		8	thermo				●		2 Hz	1 Hz	●						●						
SCI16-2T		●		16	thermo				●		1 Hz	0,5 Hz	●						●						
T-10			●	10	thermo				●		100 Hz	20 Hz	●						●						
voltage and temperature measurement																									
C8	●	●		8	options	●	●	●			100 Hz	20 Hz		2.5 mV	●	●		●	●	●	○				
CI8		●		8	options	●	●	●		●	1000 Hz	440 Hz	●	20 mV	●	●		●	●	●	○				
SC16	●	●		16	options	●	●	●			500 Hz	28 Hz		100 mV	●			●	●	●	○				
SCI8	●	●		8	options	●	●	●			1000 Hz	42 Hz	●	100 mV	●	●		●	●	●	○				
SCI16	●	●		16	options	●	●	●			500 Hz	23 Hz	●	100 mV	●	●		●	●	●	○				
UTI-6			●	6	LEMO.1B			●			1000 Hz	400 Hz	●	25 mV	●	●	●			●	●				
bridge & strain gauge measurement																									
DCB8		●		8	options	●	●	●			1000 Hz	200 Hz		5 mV	●		(●)	●			●	●	●	●	○
for universal use																									
UNI8		●		8	options	●	●	●		●	1000 Hz	200 Hz		5 mV	●	●	(●)	●	●	●	●	●	●	●	○

Process control & specialties: imc CANSAS*flex* / imc CANSAS*fit*

	series				I/O connector variant						speed				
module name CANFX-xxx CANFT-xxx	imc CANSAS*flex* (short)	imc CANSAS*flex* (long)	imc CANSAS*fit*	channels / Bits	connector variant	DSUB-15	LEMO.1B	BNC	connector blocks, Push-In	ITT-Veam	max. sampling rate (per channel)	signal band width (-3dB)	galvanically isolated	isolated groups	
pulse counter															
INC4	●	●		4	options	●	●			●	1000 Hz	500 kHz			Modes: displacement, angle, time, frequency, speed, RPM; Input: diff, filter, threshold
ENC-6			●	6	LEMO.1B		●				1000 Hz	2 MHz	●	2	Modes: displacement, angle, time, frequency, speed, RPM; Input: diff, filter, threshold
digital I/O															
DI16	●	●		16	options	●			●	●	10 kHz		●	2	Digital input: 2 x 8 Bit, config: 24V / 5V (TTL/CMOS) level
DO16	●			16	options	●			●		10 kHz		●	2	Digital output: 2 x 8 Bit, config: open-drain / totem pole, max. 0.7A
DO8R	●			8	options	●				●	10 kHz		●	8	Relais output: changeover contacts, 1A @30VDC, 0.3A @125VAC
DO16R	●			16	options	●			●		10 kHz		●	16	Relais output: changeover contacts, 1A @30VDC, 0.3A @125VAC
DI-16			●	16	LEMO.1B		●				1000 Hz		●	4	Digital input: 4 x 4 Bit, config: 24V / 5V (TTL/CMOS) level
DO-16			●	16	LEMO.1B		●				1000 Hz		●	4	Digital output: 4 x 4 Bit, config: open-drain / totem pole, max. 0.7A
analog out, PWM															
DAC8	●	●		8	options	●		●		●	5 kHz	5 kHz			Analog outputs: voltage/current (10V/20mA) individually configurable
PWM8	●	●		8	options	●				●	10 kHz		●	2	PWM outputs: 2 galvanically isolated groups of 4 channels
DAC-6			●	6	LEMO.1B		●				1000 Hz	200 Hz	●	6	Analog outputs: voltage/current (10V/20mA) individually configurable
PWM-6			●	6	LEMO.1B		●				1000 Hz		●	4	PWM outputs: 4 galvanically isolated groups of 2 channels
SENT digital sensors, GPS															
SENT	●			8	DSUB-15	●							●	8	SENT-CAN gateway: (SAE J2716), individually isolated channels
GPS	●			1	DSUB-9										GPS receiver - CAN converter: for RS232 GPS mouse

imc Test & Measurement GmbH
Voltastraße 5
13355 Berlin
Germany

Tel.: +49 (0)30 - 46 70 90 0
Fax: +49 (0)30 - 463 15 76
hotline@imc-tm.de
www.imc-tm.com