imc

*An Axiometrix Solutions Brand*

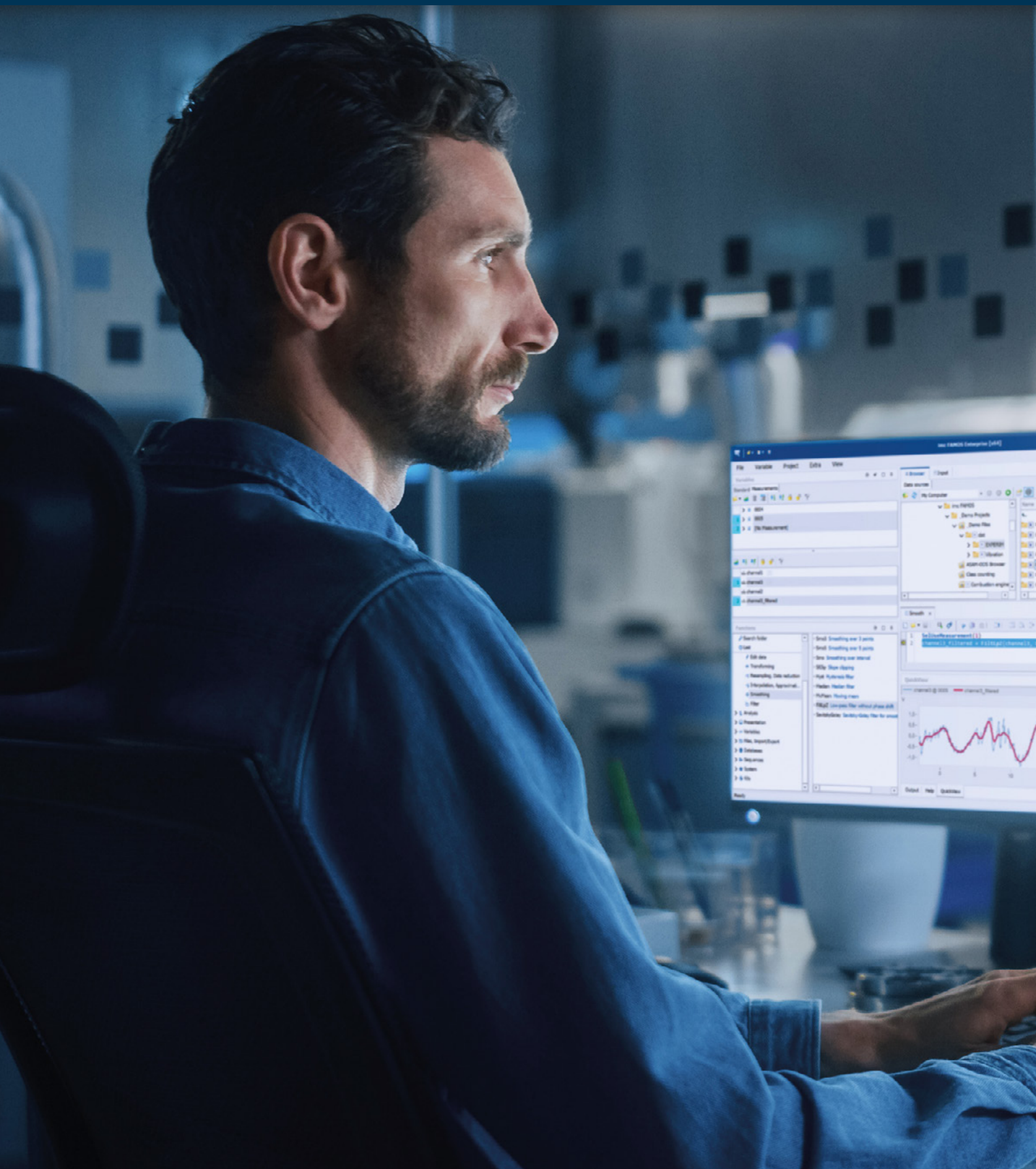




# Product Catalog

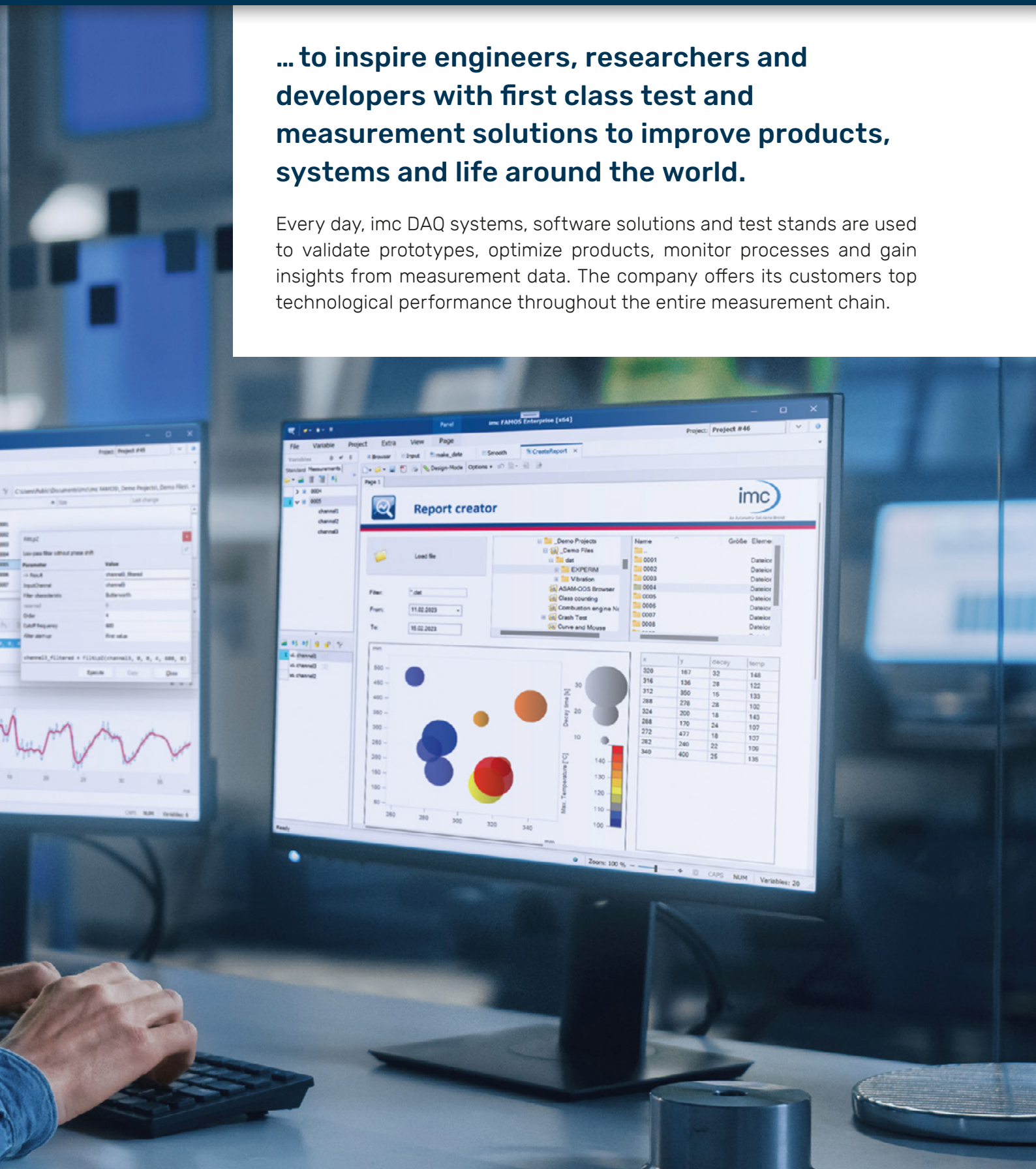
imc Test and Measurement Solutions

# Our Vision is …



## … to inspire engineers, researchers and developers with first class test and measurement solutions to improve products, systems and life around the world.

Every day, imc DAQ systems, software solutions and test stands are used to validate prototypes, optimize products, monitor processes and gain insights from measurement data. The company offers its customers top technological performance throughout the entire measurement chain.



# Contents

# The imc Product Portfolio

## DAQ SYSTEMS

The core of the product portfolio consists of imc's modular data acquisition and control systems that are fit for test stand and laboratory applications as well as mobile data acquisition in harsh environments.

## SENSORS AND TELEMETRY

The imc DAQ hardware can be supplemented by custom-tailored telemetry and automotive sensor systems which enable engineers to capture data, even from rotating parts.

## SOFTWARE

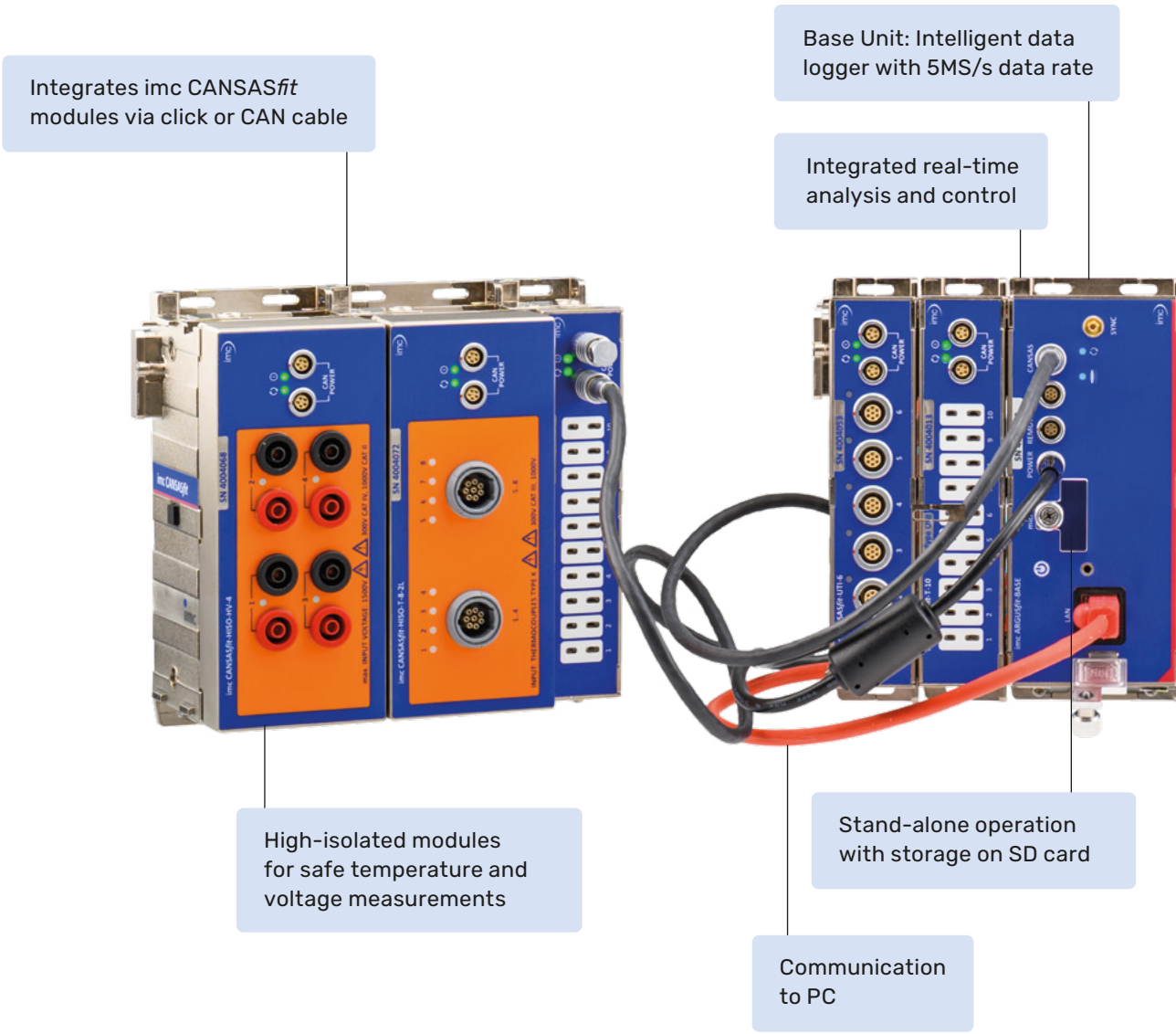
The imc software covers the entire test and measurement process - from data acquisition to live monitoring and test stand automation. Powerful tools help you analyze and manage your test and measurement data and create professional test reports.

## SERVICES

We offer a range of unique services, from consulting and training to customized test solutions and test benches, ensuring that our customers have everything they need to validate prototypes and products, monitor processes and machines, and collect data to gain insights.

# imc ARGUS*fit*

## Powerful, compact and scalable DAQ system




imc ARGUS*fit* is a **POWERFUL, ULTRA-COMPACT** and **FLEXIBLE** DAQ system where you easily connect the modules with a click mechanism. With high channel density, compact design, and stand-alone operation, it enables precise measurements in a wide range of applications – from prototype testing to monitoring machines and equipment.

## APPLICATION

Perfect for highly demanding measurements in the lab and in the field

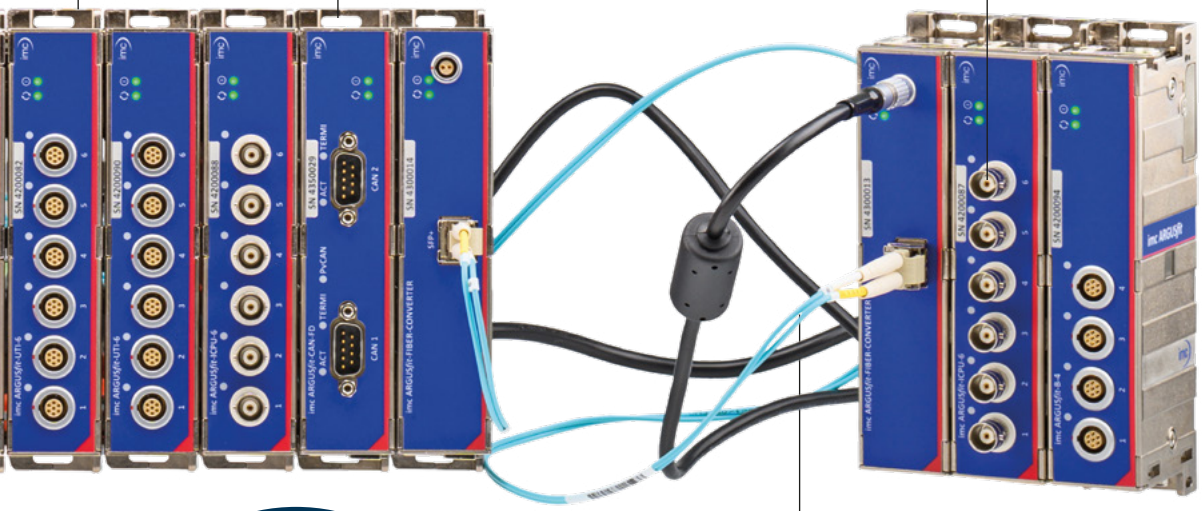
**powerful • ultra-compact • flexible**

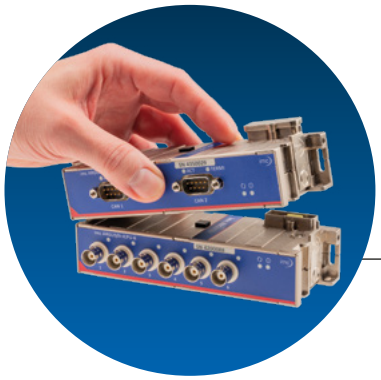
10 year warranty*

Clickable measurement modules for all common sensors

Clickable Fieldbus interface modules such as CAN-FD

Up to 500 kS/s per channel





Distributable via fiber connection over hundreds of meters

Click mechanism connects modules electrically and mechanically

With its **SCALABLE** design the DAQ system can grow with your needs. Expand its capabilities effortlessly with additional modules for analog inputs or fieldbus interfaces. Synchronously capture a wide variety of signals – whether analog sensors or digital data such as CAN-FD – and perform **REAL-TIME ANALYSIS** directly in the device.

* For imc ARGUS*fit* and imc CANSAS*fit*, we offer a 10-year warranty package that protects your investment and lets you benefit from annual device maintenance.

# imc ARGUS*fit* Details

## imc ARGUS*fit* base unit

| | |
|---|---|
| **General** | |
| Total data rate | 5 MS/s |
| **Connectivity** | |
| Ethernet (RJ-45) | Gigabit Ethernet |
| W-LAN (WiFi) | optional (in preparation) |
| GPS connection port | ● |
| Synchronization port | ● |
| Remote controlled main switch | ● |
| CANSAS*fit* port | ● |
| CANSAS*fit* modul connector (click connection) | ● |
| ARGUS*fit* modul connector (click connection) | ● |
| **Data storage** | |
| Internal storage on removable media | micro SD up to 256 GB |
| External storage on PC / network (NAS) | via Ethernet |
| **Stand-alone capabilities** | |
| Stand-alone operation | ● |
| Auto data-saving upon power outage | ● |
| UPS | Super-Caps |
| UPS coverage | ARGFT-BASE |
| **Data Acquisition & Real-Time Fuction** | |
| Max. aggregate sampling rate | 5 MS/s |
| Max. channel sampling rate | depends on modul |
| Max. active channels within a system | 1000 |
| Channel individual sampling rates | selectable in 1–2–5 steps |
| Number of sampling rates | any |
| Monitor channels (for all channels) | ● |
| Pre-processing for monitor channels | ● |
| Intelligent trigger functions | ● |
| Multi triggered data acquisition | max. 8 |
| Real-time data analysis platform (imc Online FAMOS) | ● |
| **Synchronization & clock** | |
| Master-slave between different imc systems | ● |
| NTP network based synchronization | ● |
| PTP network synchronization | in preperation |
| IRIG-B via external signal | ● |
| **Power** | |
| Input supply voltage | 10 - 50 V DC |
| AC/DC power adapter (110 to 230VAC) | ● |
| Shutdown threshold | ≤8.5 V |
| Power consumption | 3.3 W (typ.) |
| Isolation | 60 V |
| **Environmental** | |
| Operating temperature range | -15 °C to +55 °C |
| Shock and vibration resistance | IEC 60068-2, IEC 61373<br>IEC 60062-2-64<br>category 1, class A and B<br>MIL-STD-810<br>Rail Cargo Vibration Exposure<br>U.S. Highway Truck Vibration Exposure |
| IP rating | IP50 |
| **Housing** | |
| Dimensions | 153 x 62 x 53 mm |
| Weight | 0.5 kg |

Key: ● Default

## imc ARGUS*fit* Modules

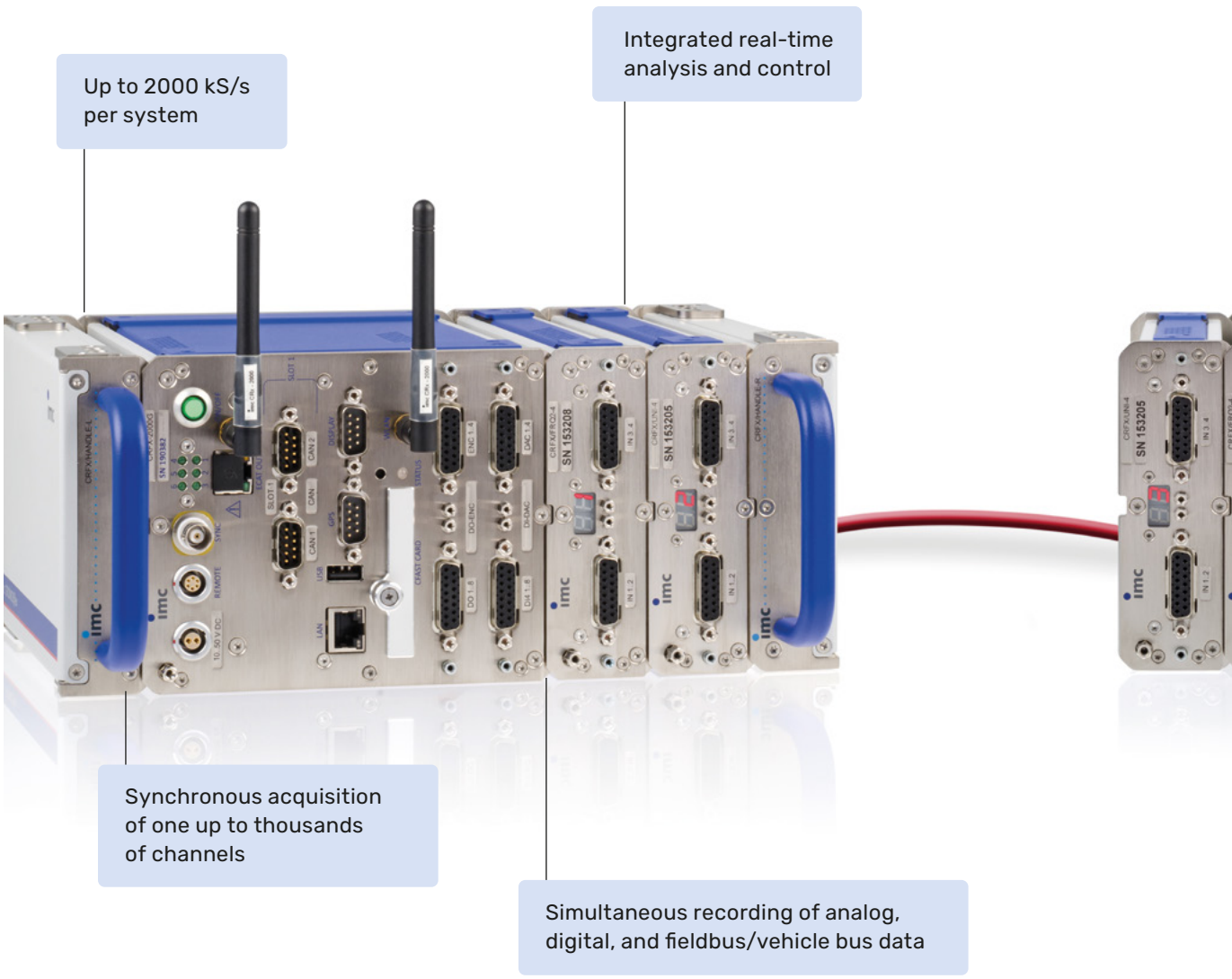
| | |
|---|---|
| **UTI-6** | |
| Isolated universal voltage amplifier with sensor supply | |
| Input types: | Voltage (25 mV to 60 V),<br>Current (20 mA sensors),<br>Temperature (PT100, PT1000)<br>Resistance (e.g. NTC) |
| Channels: | 6 |
| ADC: | 24-bit |
| Sampling rate | 100 kS/s per channel |
| **ICPU-6** | |
| Isolated measuring amplifier for voltage and IEPE sensors | |
| Input types: | IEPE or ICP sensors<br>(current fed sensors 4 mA)<br>Voltage (25 mV to 60 V) |
| Channels: | 6 |
| ADC: | 24-bit |
| Sampling rate | 500 kS/s per channel |
| **CAN-FD** | |
| Isolated fieldbus modul for CAN FD | |
| Number of CAN ports: | 2 |
| Connection: | DSUB-9 |
| Protocols: | CAN FD (ISO 11898-1:2015) 8 MBaud<br>CAN High Speed (ISO 11898) 1 MBaud<br>CAN Low Speed (ISO 11519) 125 KBaud |
| Direction: | sending and receiving |
| **Fiber-Converter** | |
| Extender and media converter for the imc ARGUS*fit* system bus for spatial distributions | |
| Includes: | 2 converter modules,<br>2x SFP+ transceiver,<br>5 m fiber optic cable,<br>AC/DC power adaptor and a power plu |
| **UPS-NiMH** | |
| UPS for imc ARGUS*fit* and imc CANSAS*fit* to bridge short-term power failures | |
| Buffering: | Entire imc ARGUS*fit* system |
| Total Power: | 50 W |
| Battery technology: | Robust NiMH |
| Buffer time: | 30 sec. (several times) |
| External devices: | Buffering via power output |

## Real-time Data Analysis Included

imc Online FAMOS is a powerful extension included in every imc ARGUS*fit* DAQ system as a standard without any additional license required. It offers a variety of real-time functions for pre-processing and signal analysis. The mathematical analysis functions are executed on the signal analysis platform integrated in the measurement device. This means that analysis results are available immediately and also independently of the PC. Such pre-processing can also yield significant data reduction and thus reduce the amount of data to be exchanged between the DAQ system and the PC. The results are available in imc STUDIO as virtual channels.

# imc CRONOS*flex*

## Frameless Modular Data Acquisition System

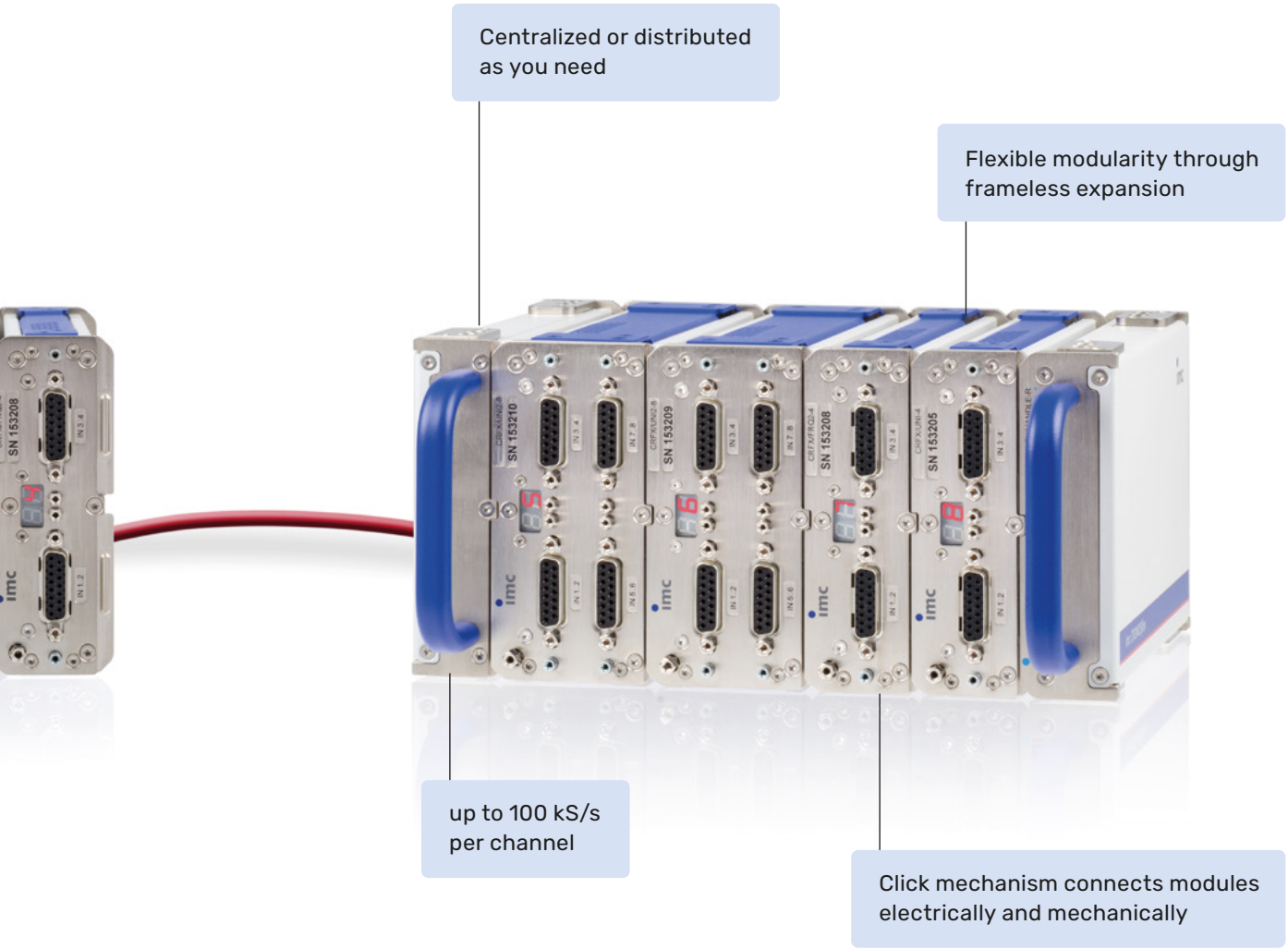



imc CRONOS*flex* offers you more **FLEXIBILITY** for your daily changing test tasks. By clicking imc CRONOS*flex* modules to a base unit, you've created a complete system, with exactly the number of channels you need. No cables between cards, no half empty mainframe rack, and no expansion chassis to squeeze in one more channel.

## APPLICATION

Ideal for comprehensive test and measurement tasks in test bench and mobile applications - in centralized or distributed installations

**flexible • expandable • fast**




A perfect fit for daily changing requirements on test stands and bench tops, to mobile testing environments, the **MODULAR DAQ & CONTROL** system provides you with the versatility you need, over a diverse range of measurement and control tasks, but without the need to make any sacrifices of performance or ease of use.

# imc CRONOS*flex* Details

## imc CRONOS*flex* base unit

| | CRFX-400 | CRFX-2000GP |
|---|---|---|
| **General** | | |
| Aggregate sampling rate | 400 kSps | 2000 kSps |
| **Operating conditions** | | |
| Standard operating temp. range | ● | ● |
| Extended temp. range (incl. condensation) | ○ | ○ |
| Shock and vibration rating | MIL 810F (40g) | |
| **Connectivity** | | |
| Ethernet | 100 MBit | 1 GBit |
| W-LAN (WiFi) IEEE 802.11.g (54 Mbit/s) | ○ | ○ |
| Dual band IEEE 802.11.n (300 Mbit/s) | | ○ |
| EtherCAT distributable system bus | ● | ● |
| GPS connection port | ● | ● |
| Display connection port | ● | ● |
| Remote controlled main switch | ● | ● |
| Programmable status feedback (LEDs) | ● | ● |
| Isolated SYNC signal | ● | ● |
| **Data storage** | | |
| CF card slot (Compact Flash) | ● | |
| CFast card slot | | ● |
| USB 2.0 host port (external removable storage) | | ● |
| Storage on PC / network drive (NAS) | ● | ● |
| SSD (internal) | ○ | ○ |
| **Stand-alone capabilities** | | |
| PC independent complex trigger functionality | ● | ● |
| Onboard real-time data analysis (imc Online FAMOS) | ● | ● |
| Autarkic PC-less operation, self start | ● | ● |
| **Synchronization & clock** | | |
| Master-slave between different imc systems | ● | ● |
| NTP network based synchronization | ● | ● |
| PTP network synchronization (precision) | | ● |
| Via external GPS signal, IRIG-B or DCF-77 | ● | ● |
| **Field bus extensions** | | |
| CAN, CAN FD | ○ | ○ |
| LIN | ○ | ○ |
| FlexRay | ○ | ○ |
| MVB, IPTCom | ○ | ○ |
| Profinet, Profibus | ○ | ○ |
| Modbus (RTU, TCP) | ○ | ○ |
| ARINC | ○ | ○ |
| XCPoE (Master, Slave) | ○ | ○ |
| EtherCAT Slave | ○ | ○ |
| **Multi-functional I/O extension of base unit** | | |
| Digital in/out, pulse counter, analog out | ○ | ○ |
| **Power supply** | | |
| DC input 10V to 50V | ● | ● |
| AC/DC adapter (110 to 230VAC) | ● | ● |
| Supply of remote modules via Power-over-EtherCAT | ● | ● |
| Data integrity upon power fail | ● | ● |
| UPS (NiMH battery) | ○ | ○ |
| UPS (extended capacity Li-Ion) | ○ | ○ |


CRFX-400


CRFX-2000GP


HANDLE-LI-IO-L


DI-16-HV


ICPU2-8


ISO2-16-2T


UNI-4


UNI2-8


HV-2U2I


HV-4U

## imc CRONOS*flex* analog amplifier modules

| module name CRFX/xxx | size: channels | size: width (type) | connector: standard connector | connector: LEMO version available | connector: TEDS | speed: max. sampling rate (per channel) | speed: signal bandwidth (-3dB) | voltage mode: isolated voltage mode | voltage mode: min. voltage range (mV) | voltage mode: voltage up to 10 V | voltage mode: voltage up to 50/60 V | voltage mode: voltage up to 1000 V | current: 20 mA internal shunt | current: 20mA shunt plug | temp: Thermocouple (TC) | temp: RTD (PT100) | ICP, charge, supplies: IEPE mode integrated | ICP, charge, supplies: IEPE plug | ICP, charge, supplies: sensor supply | ICP, charge, supplies: (per channel) | bridge mode: full bridge | bridge mode: half bridge | bridge mode: quarter bridge | bridge mode: DC excitation | bridge mode: AC excitation (CF) | bridge mode: single SENSE | bridge mode: double SENSE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Voltage measurement** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| LV3-8 | 8 | 1 | DSUB-15 | ○ | ● | 100 kHz | 48 kHz | | 5 | ● | ● | | | ● | | | | ○ | ○ | | | | | | | | |
| **Voltage & temperature measurement** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ISO2-8 | 8 | 1 | DSUB-15 | ○ | ● | 100 kHz | 11 kHz | ● | 50 | ● | ● | | | ● | ● | ● | | ○ | ○ | | | | | | | | |
| ISO2-8-2T | 8 | 2 | Thermo | | | 100 kHz | 1 kHz | ● | | | | | | | ● | | | | | | | | | | | | |
| ISO2-16-2T | 16 | 2 | Thermo | | | 100 kHz | 1 kHz | ● | | | | | | | ● | | | | | | | | | | | | |
| ISO2-8-L | 8 | 2 | LEMO.1B | ● | ● | 100 kHz | 11 kHz | ● | 50 | ● | ● | | ● | | | ● | | | ○ | | | | | | | | |
| ISOF-8 | 8 | 1 | DSUB-15 | ○ | ● | 100 kHz | 48 kHz | ● | 50 | ● | ● | | | ● | ● | ● | | ○ | ○ | | | | | | | | |
| HISO-8-L | 8 | 3 | LEMO.1P REDEL | ● | | 100 kHz | 11 kHz | ● | 50 | ● | ● | | ● | | | ● | | | | | | | | | | | |
| HISO-8-T-L | 8 | 3 | LEMO.2P REDEL | ● | | 100 kHz | 1 kHz | ● | | | | | | | ● | | | | | | | | | | | | |
| **High voltage measurement 600V CAT III** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HV2-4U | 4 | 3 | Banana | | | 100 kHz | 48 kHz | ● | 2,500 | ● | ● | ● | | | | | | | | | | | | | | | |
| HV-2U2I (I-chan) | 4 | 3 | Banana/ Terminal blocks | | ● | 100 kHz | 48 kHz | ● | 2,500/ 50 | ● | ● | ● | | | | | | | | | | | | | | | |
| **Audio & vibration measurements** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ICPU2-8 | 8 | 2 | BNC | | ● | 100 kHz | 48 kHz | | 5 | ● | ● | | | | | | ● | | | | | | | | | | |
| AUDIO2-4 | 4 | 2 | BNC | | ● | 100 kHz | 48 kHz | ● | 5 | ● | ● | | | | | | ● | | | | | | | | | | |
| **Bridge & strain gauge measurements** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| BR2-4 | 4 | 1 | DSUB-15 | ○ | ● | 100 kHz | 14 kHz | | 5 | ● | ● | | | ● | | | | ○ | (●) | | | ● | ● | ● | ● | ● | ● | ● |
| B-8 | 8 | 2 | DSUB-15 | ○ | ● | 100 kHz | 48 kHz | | 5 | ● | | | ● | ● | | | | ○ | ● | | | ● | ● | ● | ● | | ● | |
| BC-8 | 8 | 1 | DSUB-26-HD | | | 100 kHz | 48 kHz | | 5 | ● | | | ● | ● | | | | | ● | | | ● | ● | ● | ● | | ● | |
| DCB2-8 | 8 | 2 | DSUB-15 | ○ | ● | 100 kHz | 5 kHz | | 5 | ● | | | ● | ● | | | | ○ | ● | | | ● | ● | ● | ● | | ● | |
| DCBC2-8 | 8 | 1 | DSUB-26-HD | | | 100 kHz | 5 kHz | | 5 | ● | | | ● | ● | | | | | ● | | | ● | ● | ● | ● | | ● | |
| **For universal use** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| UNI2-8 | 8 | 2 | DSUB-15 | ○ | ● | 100 kHz | 48 kHz | | 5 | ● | ● | | ● | ● | ● | ● | | ○ | ● | | | ● | ● | ● | ● | | ● | |
| UNI-4 | 4 | 1 | DSUB-15 | ○ | ● | 100 kHz | 48 kHz | ● | 2.5 | ● | ● | | ● | ● | ● | ● | | ○ | ● | ● | | ● | ● | ● | ● | | ● | ● |

## imc CRONOS*flex* DIO, pulse counter, DAC modules

| module name CRFX/xxx | size: width | connector: standard connector | digital I/O: input Bits | digital I/O: high voltage | digital I/O: output Bits | digital I/O: high current | DAC: analog outputs | pulse counter: counter inputs | pulse counter: quadrature mode chan | pulse counter: counter frequency | pulse counter: analog sin/ cos mode |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Base unit extension** | | | | | | | | | | | |
| DI16-DO8-ENC4 | +40mm | DSUB-15 | 16 | | 8 | | | 4 | 2 | 32 MHz | |
| DI8-DO8-ENC4-DAC4 | +40mm | DSUB-15 | 8 | | 8 | | 4 | 4 | 2 | 32 MHz | |
| **flex modules: pulse counter** | | | | | | | | | | | |
| HRENC-4 | 1 | DSUB-15 | | | | | | 4 | 4 | 256 MHz | ● |
| **flex modules: digital I/O, DAC** | | | | | | | | | | | |
| DI2-16 | 1 | DSUB-15 | 16 | | | | | | | | |
| DI2-32 | 2 | DSUB-15 | 32 | | | | | | | | |
| DO-16-HV (110V) | 2 | Terminal blocks | 16 | ● | | | | | | | |
| DO-16-HC | 1 | DSUB-15 | | | 16 | ● | | | | | |
| DO-32-HC | 2 | DSUB-15 | | | 32 | ● | | | | | |
| DI2-16-DO-16-HC | 2 | DSUB-15 | 16 | | 16 | ● | | | | | |
| DAC-8 | 1 | DSUB-15 | | | | | 8 | | | | |
| DO-16-HC-DAC-8 | 2 | DSUB-15 | | | 16 | ● | 8 | | | | |
| **Real-time control modules (PID, simulation, custom solutions)** | | | | | | | | | | | |
| SYNTH-8 | 1 | 8 independent PID controller, arbitrary signal generator (synthesizer) | | | | | | | | | |
| APP-MOD | 1 | custom programmable real-time applications, HW-interface integrations | | | | | | | | | |

**TEDS support (Transducer Electronic Data Sheet)**

imc CRONOS*flex* modules support direct read/write of TEDS sensors, including imc's TEDS Clip. Connectors: TEDS interfaces require either the ACC /DSUBTEDS-x variants of our connectors or per-channel connectors such as Lemo. "IEPE" type TEDS is supported in audio modules with direct BNC input connectors.

**Digital I/O**

galvanically isolated,
configurable to 24V/5V (TTL/CMOS ) Level,
output: 0.7A sink, high current: sink and source 0.7A

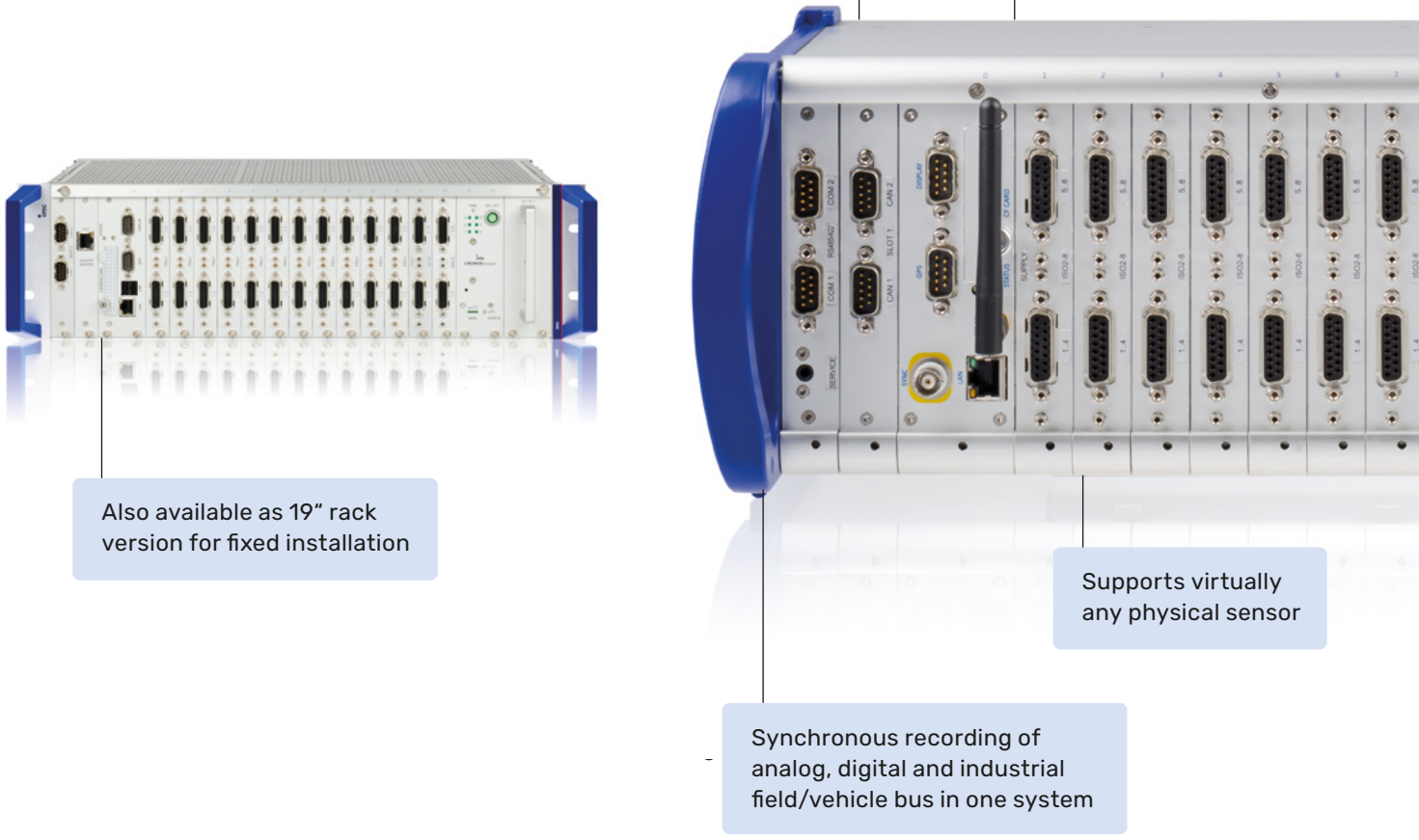
**Pulse Counter**

full analog input conditioning:
500 kHz analog bandwidth, differential input,
analog filter, software adjustable threshold levels
Modes: event counter, time, frequency, speed, RPM
differential and absolute angle and displacement

Key: ● Default, ○ Optional, (●) Restricted

# imc CRONOS*compact*

## Adaptable Data Acquisition and Control System




The imc CRONOS*compact* is the single **MOST COMPREHENSIVE** DAQ and control system for electromechanical testing on the market today. Integrating measurement and real-time control into one housing provides you with the reliability of absolute synchronization, and the convenience of having all of your tools in one place.

## APPLICATION

Perfectly tailored for test bench and laboratory applications as well as for mobile use

**comprehensive • modular • reconfigurable**

Modular reconfigurable hard-ware adaptable to changing testing requirements

Expandable via plug-in modules or distributed synchronous CRFX modules (EtherCAT based)

Portable version with optional battery pack

Standalone, remote or interactive operation

Incorporating the complete range of modular I/O choices and **INTEGRATED SIGNAL CONDITIONING**, imc CRONOS*compact* provides the versatility and broad range of capabilities that allow you to achieve the highest levels of productivity in your testing. All this capability is available in **MODULAR AND RECONFIGURABLE** compact housings or 19“ rack systems.

# imc CRONOS*compact* Details

## imc CRONOS*compact* mainframe/housing

| | CRC-400 & rack variants | CRC-400GP & rack variants |
|---|---|---|
| **General** | | |
| Housing type | portable & 19“ rack | portable & 19“ rack |
| Extension module slots | 8/11/13/17 | 7/10/12/16/17 |
| Aggregate sampling rate | 400 kSps | 400 kSps |
| external imc CRONOS*flex* moduls (CRFX) | | ○ |
| aggregate sampling rate (incl. ext. CRFX modules) | | 2000 kSps |
| **Operating conditions** | | |
| Standard operating temp. range | ● | ● |
| Extended temp. range (incl. condensation) | ○ | ○ |
| Shock vibration rating | MIL 810F (40g) | |
| **Connectivity** | | |
| Ethernet | 100 MBit | 1 GBit |
| int. WiFi adapter IEEE 802.11.g (54 Mbit/s) | ○ | ○ |
| Dual Band IEEE 902.11.g (300 Mbit/s) | | ○ |
| GPS connection port | ● | ● |
| Display connection port | ● | ● |
| Remote controlled main switch | ● | ● |
| Programmable status feedback (LEDs) | ● | ● |
| **Data storage** | | |
| CF card slot (Compact Flash) | ● | |
| Storage on PC / network drive (NAS) | ● | ● |
| CFast, USB host | 400GP | |
| SSD (internal) | ○ | ○ |
| **Stand-alone capabilities** | | |
| PC independent complex trigger functionality | ● | ● |
| Onboard real-time data analysis (imc Online FAMOS) | ● | ● |
| Autarkic PC-less operation, self start | ● | ● |
| **Synchronization & clock** | | |
| Master-slave between different imc systems | ● | ● |
| NTP network based synchronization | ● | ● |
| PTP network synchronization (precision) | | ● |
| Via external GPS signal | ● | ● |
| Via external IRIG-B & DCF-77 signal | ● | ● |
| **Field bus extensions** | | |
| CAN, CAN FD | ○ | ○ |
| LIN | ○ | ○ |
| FlexRay | ○ | ○ |
| MVB, IPTCom | ○ | ○ |
| ARINC | ○ | ○ |
| XCPoE (Master, Slave) | ○ | ○ |
| EtherCAT Slave | ○ | ○ |
| **Power supply** | | |
| DC input 10V to 50V | ● | ● |
| Isolated power supply input | ● | ● |
| AC/DC adapter (110 to 230VAC) | ● | ● |
| AC input (110 to 230VAC) | for AC RACK | for AC RACK |
| Data integrity upon power fail | ● | ● |
| UPS | ● | ● |
| UPS (extended range Li-Ion) | ○ | ○ |

CRC module with DSUB-15 connectors

CRC module with BNC connectors

CRC module with thermocouple connectors

portable system CRC-400-8

19“ subrack system CRC-400-AC-Rack

## imc CRONOS*compact* analog amplifier modules

| | size | | connector | | | speed | | voltage mode | | | | current | | temp | | ICP, supply | | | | bridge mode | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| module name CRC/xxx | channels | slots (1 slot = 4 HP) | standard connector | LEMO version available | TEDS | max. sampling rate (per channel) | signal bandwidth (-3dB) | isolated voltage mode | min. voltage range (mV) | voltage up to 10 V | voltage up to 50 / 60 V | voltage up to 1000 V | 20 mA internal shunt | 20mA shunt plug | Thermocouple (TC) | RTD (PT100) | ICP mode integrated | ICP plug | sensor supply | (per channel) | full bridge | half bridge | quarter bridge | DC excitation | AC excitation (CF) | single SENSE | double SENSE |
| **Voltage measurement** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| LV-16 | 16 | 2 | DSUB-15 | | ● | 20 kHz | 6.6 kHz | | 250 | ● | | | | ● | | | | ○ | ○ | | | | | | | | |
| LV3-8 | 8 | 1 | DSUB-15 | ○ | ● | 100 kHz | 48 kHz | | 5 | ● | ● | | | ● | | | | ○ | ○ | | | | | | | | |
| **Voltage & temperature measurement** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| OSC-16 | 16 | 2 | DSUB-15 | | ● | 5 Hz | 1 Hz | ● | 50 | ● | ● | | | ● | ● | ● | | | ○ | | | | | | | | |
| OSC-16-2T | 16 | 2 | Thermo | | | 5 Hz | 1 Hz | ● | | | | | | | ● | | | | | | | | | | | | |
| C-8 | 8 | 1 | DSUB-15 | | ● | 20 kHz | 20 Hz | | 2.5 | ● | ● | | | ● | ● | ● | | | ○ | | | | | | | | |
| C8-2T | 8 | 1 | Thermo | | | 20 kHz | 20 Hz | | | | | | | | ● | | | | | | | | | | | | |
| ISO2-8 | 8 | 1 | DSUB-15 | ○ | ● | 100 kHz | 11 kHz | ● | 50 | ● | ● | | | ● | ● | ● | | ○ | ○ | | | | | | | | |
| ISO2-8-2T | 8 | 1 | Thermo | | | 100 kHz | 1 kHz | ● | | | | | | | ● | | | | | | | | | | | | |
| ISO2-8-L | 8 | 2 | LEMO.1B | | ● | 100 kHz | 11 kHz | ● | 50 | ● | ● | | ● | | | ● | | | ○ | | | | | | | | |
| ISOF-8 | 8 | 1 | DSUB-15 | ○ | ● | 100 kHz | 48 kHz | ● | 50 | ● | ● | | | ● | ● | ● | | ○ | ○ | | | | | | | | |
| **High voltage measurement 600V CAT III** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HV2-4U | 4 | 2 | Banana | | | 100 kHz | 48 kHz | ● | 2,500 | ● | ● | ● | | | | | | | | | | | | | | | |
| HV2-2U2I | 4 | 2 | Banana / Terminal blocks | | ● | 100 kHz | 48 kHz | ● | 2,500/ 50 | (●) | | | | | | | | | | | | | | | | | |
| **Audio & vibration measurements** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ICPU2-8 | 8 | 2 | BNC | | ● | 100 kHz | 48 kHz | | 5 | ● | ● | | | | | | ● | | | | | | | | | | |
| ICPU-16 | 16 | 4 | BNC | | ● | 20 kHz | 6.6 kHz | | 250 | ● | | | | | | | ● | | | | | | | | | | |
| **Bridge & strain gauge measurements** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| BR2-4 | 4 | 1 | DSUB-15 | | ● | 20 kHz | 8.6 kHz | | 5 | ● | ● | | | ● | | | | ○ | (●) | | ● | ● | ● | ● | ● | ● | ● |
| B-8 | 8 | 2 | DSUB-15 | ○ | ● | 100 kHz | 48 kHz | | 5 | ● | | | ● | ● | | | | ○ | ● | | ● | ● | ● | ● | | ● | |
| BC-8 | 8 | 1 | DSUB-26-HD | | | 100 kHz | 48 kHz | | 5 | ● | | | ● | ● | | | | | ● | | ● | ● | ● | ● | | ● | |
| DCB2-8 | 8 | 2 | DSUB-15 | ○ | ● | 100 kHz | 5 kHz | | 5 | ● | | | ● | ● | | | | ○ | ● | | ● | ● | ● | ● | | ● | |
| DCBC2-8 | 8 | 1 | DSUB-26-HD | | | 100 kHz | 5 kHz | | 5 | ● | | | ● | ● | | | | | ● | | ● | ● | ● | ● | | ● | |
| **For universal use** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| UNI2-8 | 8 | 2 | DSUB-15 | ○ | ● | 100 kHz | 48 kHz | | 5 | ● | ● | | ● | ● | ● | ● | | ○ | ● | | ● | ● | ● | ● | | ● | |
| UNI-4 | 4 | 1 | DSUB-15 | ○ | ● | 100 kHz | 48 kHz | ● | 2.5 | ● | ● | | ● | ● | ● | ● | | ○ | ● | ● | ● | ● | ● | ● | | ● | ● |

## imc CRONOS*compact* DIO, pulse counter, DAC modules

| | size | connector | digital I/O | | | | DAC | pulse counter | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| module name | slots (1 slot = 4 HP) | standard connector | input Bits | high voltage | output Bits | high current | analog outputs | counter inputs | quadrature mode chan | counter frequency | analog sin/ cos mode |
| **Multi functional modules** | | | | | | | | | | | |
| DI16-DO8-ENC4 | 2 | DSUB-15 | 16 | | 8 | | | 4 | 2 | 32 MHz | |
| DI8-DO8-ENC4-DAC4 | 2 | DSUB-15 | 8 | | 8 | | 4 | 4 | 2 | 32 MHz | |
| **Pulse counter modules** | | | | | | | | | | | |
| HRENC-4 | 1 | DSUB-15 | | | | | | 4 | 4 | 256 MHz | ● |
| FRQ-4 | 1 | DSUB-15 | | | | | | 4 | | 256 MHz | |
| **Digital I/O modules** | | | | | | | | | | | |
| DI2-16 | 1 | DSUB-15 | 16 | | | | | | | | |
| DO-16 | 1 | DSUB-15 | | | 16 | | | | | | |
| DO-16-HC | 1 | DSUB-15 | | | 16 | ● | | | | | |
| DIO-HV-4 (250V) | 2 | Terminals | 4 | ● | 4 | ● | | | | | |
| **Analog out modules (DAC)** | | | | | | | | | | | |
| DAC-8 | 1 | DSUB-15 | | | | | 8 | | | | |
| **Real-time control modules (PID, simulation, custom solutions)** | | | | | | | | | | | |
| SYNTH-8 | 1 | 8 independent PID controller, arbitrary signal generator (synthesizer) | | | | | | | | | |
| APP-MOD | 1 | custom programmable real-time applications, HW-interface integrations | | | | | | | | | |

### TEDS support

(Transducer Electronic Data Sheet)
imc CRONOS*compact* modules 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. „IEPE" type TEDS is supported in direct IEPE/ICP input modules.

### Digital I/O

galvanically isolated, configurable to 24V/5V (TTL/CMOS) Level, output: 0.7A sink, high current: sink and source 0.7A

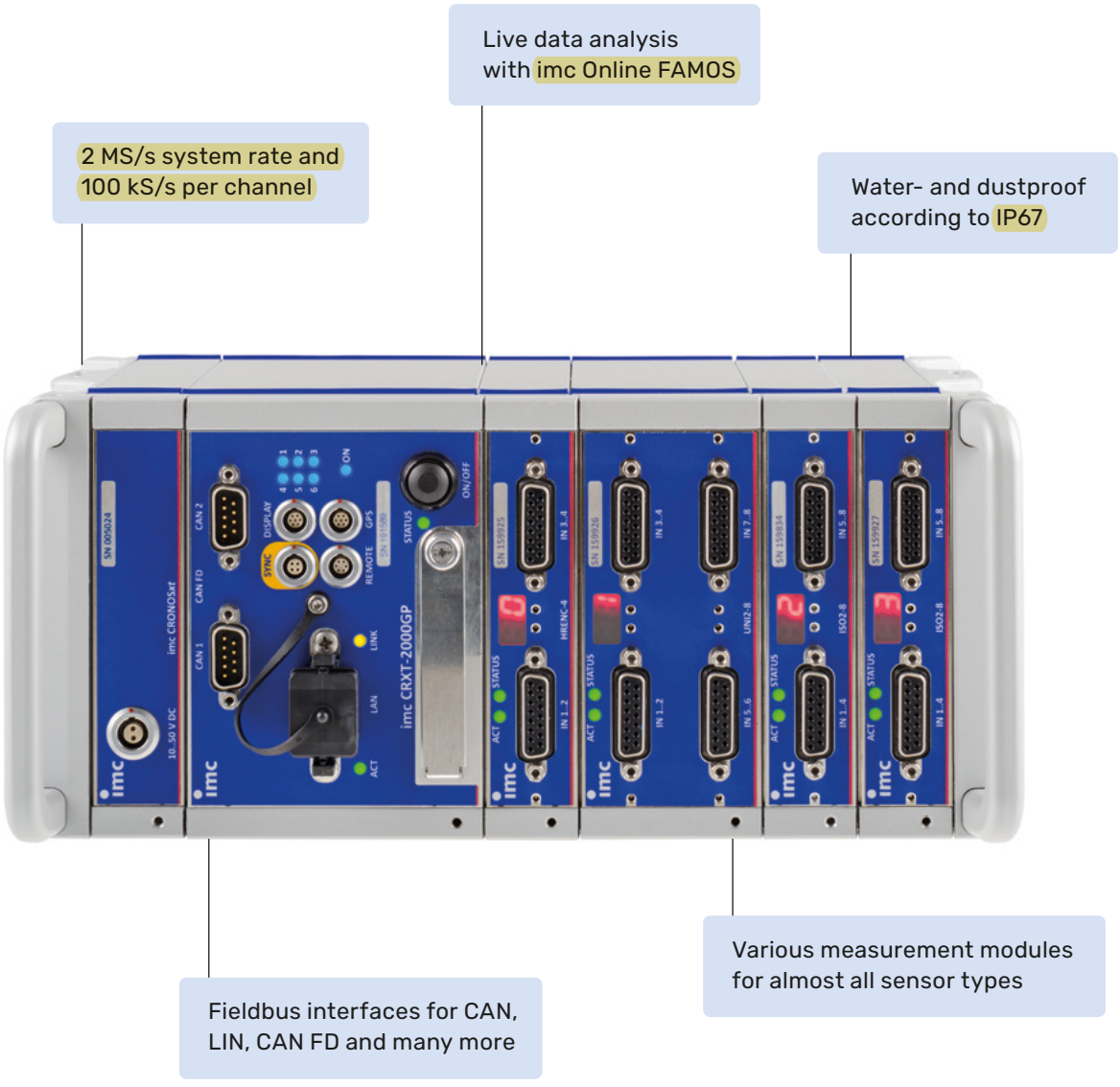
### Pulse Counter

full analog input conditioning
500 kHz analog bandwidth, differential input, analog filter, software adjustable threshold levels
Modes: event counter, event counter, time, frequency, speed, RPM, differential and absolute angle and displacement

Key: ● Default, ○ Optional, (●) Restricted

# imc CRONOS-XT

## Rugged Data Acquisition System

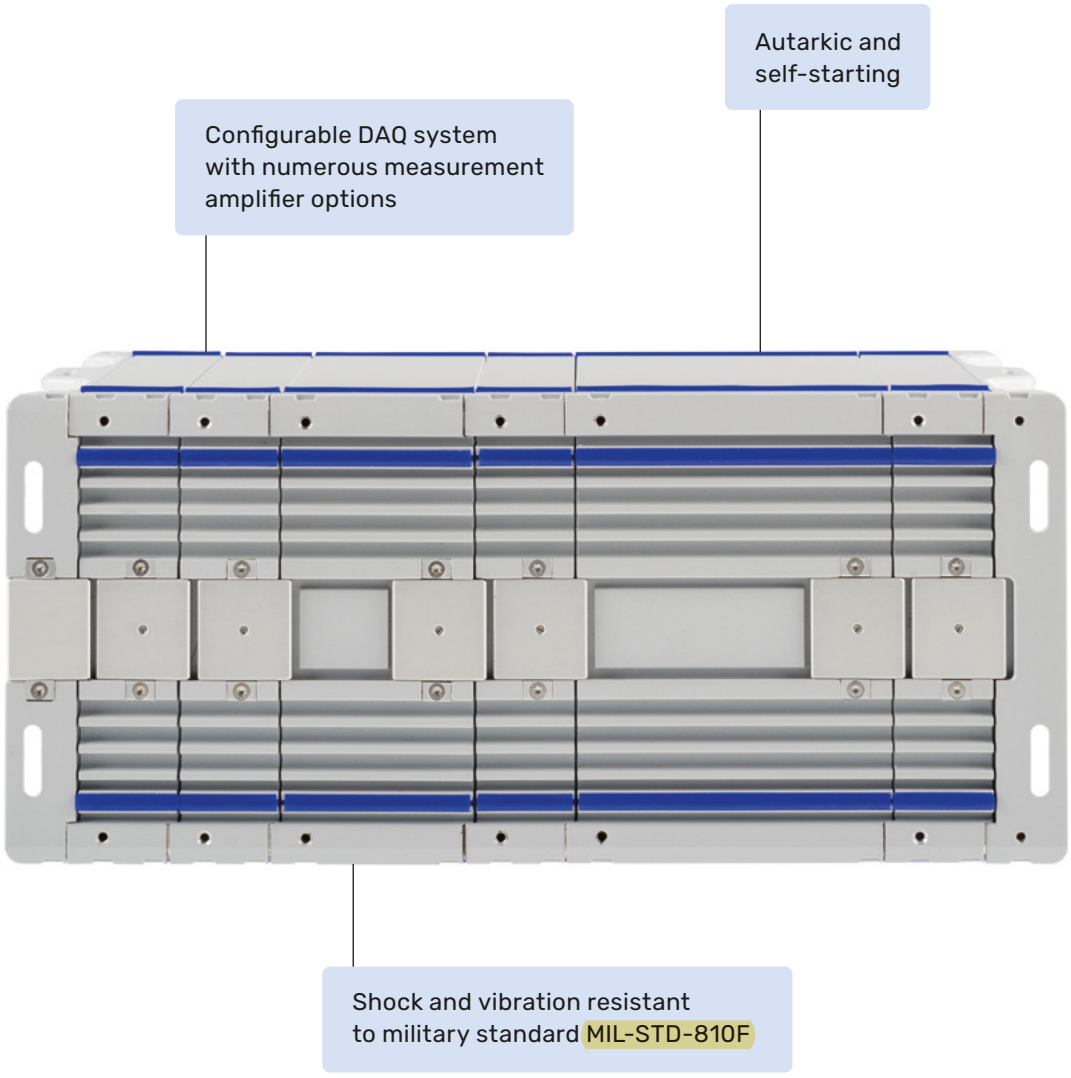



No more compromises: With the imc CRONOS-XT, imc is offering an **ULTRA-ROBUST DAQ** system in a configurable platform. Customize your data acquisition system. In addition to the base unit (data logger), you can choose from numerous universal and specialized precision measuring amplifiers. With protection class **IP67** and **MIL-STD810F**, the system is protected against dirt, dust and water as well as severe shocks and vibrations.

## APPLICATION

Ideal for mobile measurements on machinery and vehicle testing in harsh environments

**robust • mobile • scalable**




Thanks to the configurable technology, the DAQ system can be ideally adapted to the measurement task at hand. A broad selection of high-precision universal and special measurement amplifiers allow the direct connection of almost all sensor types. The **PRECISE** and low-noise measurement amplifiers digitize with 24 bits and have high bandwidth and range dynamics.

# imc CRONOS XT Details

## Base unit

| | CRXT-2000 |
|---|---|
| **General** | |
| System sampling rate | 2000 kSps |
| **Operating conditions** | |
| Temperature range | -40 .. +85°C |
| Condensation-proof | ● |
| Shock and vibration | MIL 810F |
| **Connectivity** | |
| Ethernet | 1 GBit |
| Internal Wi-Fi adapter IEEE 802.11.n (300 Mbit/s) | ○ |
| EtherCAT connection for distributed CRXT blocks | ○ |
| GPS connector | ● |
| imc handheld display | ● |
| Remote control main switch | ● |
| Programmable LEDs for status indication | ● |
| Isolated synchronization signal | ● |
| **Data storage** | |
| CFast card slot | ● |
| Storage on PC / network drive (NAS) | ● |
| SSD hard drive (internal) | ○ |
| **Autonomous device capabilities** | |
| Complex trigger functionality PC-independent | ● |
| Onboard real-time data analysis (imc Online FAMOS) | ● |
| Autarkic operation without PC, self-start (timer, absolute time) | ● |
| **Synchronization & clock** | |
| Master-Slave between imc systems | ● |
| NTP and PTP network-based synchronization | ● |
| Via external GPS signal | ● |
| Via external IRIG-B & DCF-77 signal | ● |
| **Field bus extensions** | |
| CAN, CAN FD | ○ |
| LIN | ○ |
| FlexRay | ○ |
| MVB, IPTCom | ○ |
| Profinet, Profibus | ○ |
| Modbus (RTU, TCP) | ○ |
| ARINC | ○ |
| XCPoE (Master, Slave) | ○ |
| EtherCAT Slave | ○ |
| **XCPoE (Master, Slave)** | |
| EtherCAT Slave | ● |
| AC/DC adapter (110 to 230VAC) | ● |
| Supply of external modules via Power-over-EtherCAT | ○ |
| Data integrity in case of power failure | ● |


Base Unit CRXT-2000


CRXT/POWER


CRXT/HANDLE-R


CRXT/HANDLE-L


CRXT/HRENC-4


CRXT/ICPU2-8


CRXT/DCB2-8


CRXT/DCBC2-8


CRXT/UNI2-8


CRXT/ISO2-8

## Analog amplifier modules

| | size | | connector | | speed | | voltage mode | | | | current | | temp | | ICP, supply | | | | bridge mode | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| module name CRXT/xxx | channels | slots | standard connector | TEDS | max. sampling rate (per channel) | signal bandwidth (-3dB) | isolated voltage mode | min. voltage range (mV) | voltage up to 10V | voltage up to 50/60V | 20mA internal shunt | 20mA shunt plug | thermocouple | PT100 | ICP mode integrated | ICP plug | sensor supply | (per channel) | full bridge | half bridge | quarter bridge | DC excitation | AC excitation (5 kHz) | single SENSE | double SENSE |
| **Voltage measurement** | | | | | | | | | | | | | | | | | | | | | | | | | |
| LV3-8 | 8 | 1 | DSUB-15 | ● | 100 kHz | 48 kHz | | 5 | ● | ● | | ● | | | | ○ | ○ | | | | | | | | |
| **Voltage and temperature** | | | | | | | | | | | | | | | | | | | | | | | | | |
| ISO2-8 | 8 | 1 | DSUB-15 | ● | 100 kHz | 11 kHz | ● | 50 | ● | ● | | ● | ● | ● | | ○ | ○ | | | | | | | | |
| ISO2-8-L | 8 | 2 | LEMO.1B | ● | 100 kHz | 11 kHz | ● | 50 | ● | ● | ● | | | ● | | | ○ | | | | | | | | |
| ISO2-16-2T | 16 | 2 | Thermo | | 100 kHz | 1 kHz | ● | | | | | | ● | | | | | | | | | | | | |
| ISOF-8 | 8 | 1 | DSUB-15 | ● | 100 kHz | 48 kHz | ● | 50 | ● | ● | | ● | ● | ● | | ○ | ○ | | | | | | | | |
| ISOF-8-L | 8 | 2 | LEMO.1B | ● | 100 kHz | 48 kHz | ● | 50 | ● | ● | ● | | | ● | | | ○ | | | | | | | | |
| **Audio & vibration measurement** | | | | | | | | | | | | | | | | | | | | | | | | | |
| ICPU2-8 | 8 | 2 | BNC | ● | 100 kHz | 48 kHz | | 5 | ● | ● | | | | | ● | | | | | | | | | | |
| **Bridge and strain gauge measurement** | | | | | | | | | | | | | | | | | | | | | | | | | |
| BR2-4 | 4 | 1 | DSUB-15 | ● | 100 kHz | 14 kHz | | 5 | ● | ● | | ● | | | | ○ | ● | | ● | ● | ● | ● | ● | ● | ● |
| B-8 | 8 | 2 | DSUB-15 | ● | 100 kHz | 48 kHz | | 5 | ● | | ● | ● | | | | ○ | ● | | ● | ● | ● | ● | | ● | |
| DCB2-8 | 8 | 2 | DSUB-15 | ● | 100 kHz | 5 kHz | | 5 | ● | | ● | ● | | | | ○ | ● | | ● | ● | ● | ● | | ● | |
| **For universal use** | | | | | | | | | | | | | | | | | | | | | | | | | |
| UNI2-8 | 8 | 2 | DSUB-15 | ● | 100 kHz | 48 kHz | | 5 | ● | ● | ● | ● | ● | ● | | ○ | ● | | ● | ● | ● | ● | | ● | |
| UNI-4 | 4 | 1 | DSUB-15 | ● | 100 kHz | 48 kHz | ● | 2,5 | ● | ● | ● | ● | ● | ● | | ○ | ● | ● | ● | ● | ● | ● | | ● | ● |

**TEDS-support:**
All imc CRONOS-XT amplifiers support TEDS (Transducer Electronic Data Sheet) for automatic sensor recognition and configuration (Plug & Measure functionality). Simply connect the sensor, access TEDS and the channel configuration is ready.

Key: ● standard, ○ optional

## Digital inputs and outputs and counter/encoder inputs

| | size | connector | digital I/O | | DAC | pulse counter | | | |
|---|---|---|---|---|---|---|---|---|---|
| module name CRXT/xxx | slots | standard connector | digital input Bits | digital output Bits | analog outputs | counter inputs | quadrature mode chan | counter frequency | analog sin/cos mode |
| **Pulse counter** | | | | | | | | | |
| HRENC-4 | 1 | DSUB-15 | | | | 4 | 4 | 256 MHz | ● |
| **Digital I/O, DAC** | | | | | | | | | |
| DI2-16 | 1 | DSUB-15 | 16 | | | | | | |
| DO-16-HC | 1 | DSUB-15 | | 16 | | | | | |
| DAC-8 | 1 | DSUB-15 | | | 8 | | | | |

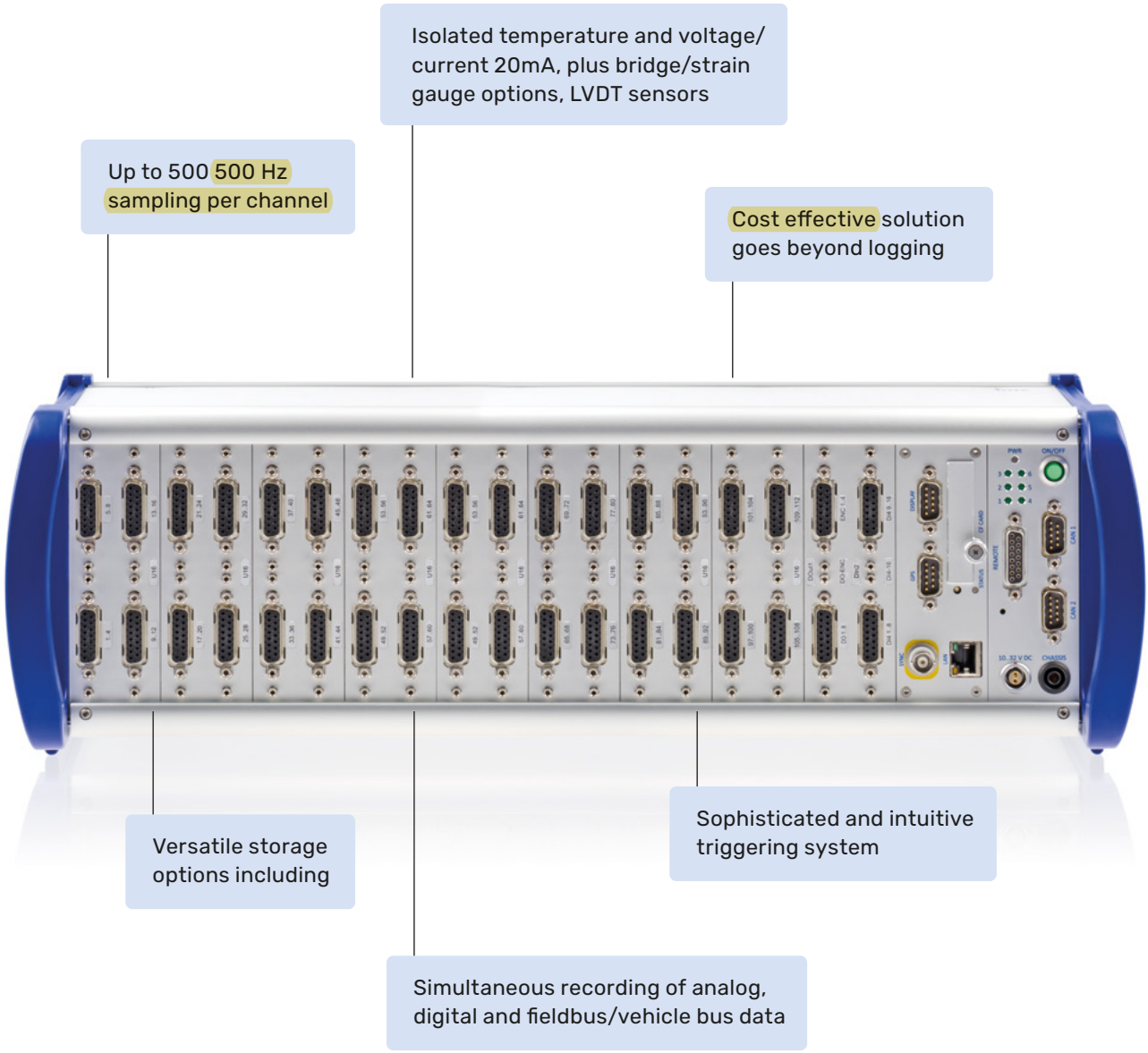
Waterproof DSUB connector plug for universal signal connection

**Digital I/O:** The digital inputs and outputs are galvanically isolated and configurable for 24V / 5V (TTL/COMOS) with a maximum output current of 0.7 A.

**Counter:** The counter inputs have full analog input conditioning with 500 kHz analog bandwidth (differential input), analog filter and software adjustable switching thresholds. The supported measurement modes are event counter, time, frequency, speed, rpm, angle and distance.

# imc SPARTAN

## Affordable Multi-Channel Data Acquisition System




Developed for demanding test applications, imc SPARTAN offers a comprehensive package at surprisingly **LOW PRICE** and even goes far beyond pure data recording. In addition to precision measurement amplifiers with integrated signal conditioning it features multiple sampling rates powerful trigger logic and multiple data storage options as well as an optional real-time computing platform.

## APPLICATION

Ideal for the monitoring tasks, for instance, in civil engineering or transportation applications.

**low-cost • conditioned • capable**

Multiple sample rates and synchronous data processing

Integrated real-time capabilities for analysis, data reduction and control

With up to 500 Samples/second per channel, imc SPARTAN offers a dynamic range, well-suited for most physical and mechanical signals. With **UP TO 128 CHANNELS IN ONE SYSTEM** and the possibility to operate several imc devices cascaded and synchronized in one measurement, imc SPARTAN is the perfect choice especially for **MULTI-CHANNEL APPLICATIONS**.

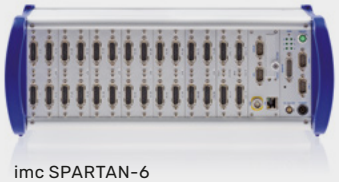
# imc SPARTAN Details

## imc SPARTAN general specs and housing types

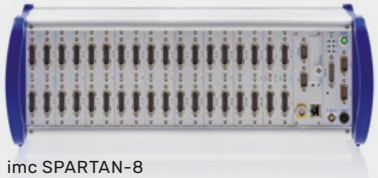
| | imc SPARTAN -2 / 4 / 6 / 8 | imc SPARTAN -R |
|---|---|---|
| **General** | | |
| Aggregate sampling rate | 400 kSps | |
| Max. channel sampling rate | 500 Sps / chan | |
| Housing type | portable | 19" rack |
| Max. number of channels configurable | 32/64/96/128 | 112 (128) |
| Configurable module slots (1 slot = 4 HP) | 4/8/12/16 | 14 (16) |
| **Operating conditions** | | |
| Standard operating temp. range | ● | ● |
| Extended temp. range (incl. condensation) | ○ | ○ |
| Shock and vibration rating | 30g pk (3 ms) | |
| **Connectivity** | | |
| Ethernet | 100 MBit | |
| W-LAN (WiFi) | ○ | ○ |
| GPS connection port | ● | ● |
| Display connection port | ● | ● |
| Remote controlled main switch | ● | ● |
| Programmable status feedback (LEDs) | ● | ● |
| **Data storage** | | |
| CF card slot (Compact Flash) | ● | ● |
| Storage on PC / network drive (NAS) | ● | ● |
| SSD (internal) | ○ | ○ |
| **Stand-alone capabilities** | | |
| PC independent complex trigger functionality | ● | ● |
| Onboard real-time data analysis (imc Online FAMOS) | ○ | ○ |
| Autarkic PC-less operation, self start | ● | ● |
| **Synchronization & clock** | | |
| Master-slave between different imc systems | ● | ● |
| NTP network based synchronization | ● | ● |
| Via external GPS signal, IRIG-B or "DCF-77 | ● | ● |
| **Pulse counter and process control (digital I/O)** | | |
| 16 Bit digital in, 8 Bit digital out | ● | (●) |
| 4 pulse counter (2 chan quadrature mode) | ● | (●) |
| **Fieldbus extensions** | | |
| Field bus extensions | ○ | ○ |
| CAN, CAN FD | ○ | ○ |
| LIN | ○ | ○ |
| FlexRay | ○ | ○ |
| MVB, IPTCom | ○ | ○ |
| Profinet, Profibus | ○ | ○ |
| Modbus (RTU, TCP) | ○ | ○ |
| ARINC | ○ | ○ |
| XCPoE (Master, Slave) | ○ | ○ |
| EtherCAT Slave | ○ | ○ |
| **Power supply** | | |
| DC input 10V to 32V | ● | ● |
| Isolated power supply input | ● | ● |
| AC/DC adaptor (110 to 230VAC) | ● | ● |
| Data integrity upon power fail | ● | ● |
| UPS | ● | ● |
| **Software** | | |
| imc STUDIO Standard | ○ | ○ |
| imc REMOTE WebServer | ○ | ○ |

imc SPARTAN-2
with 2 CAN nodes and standard equipment
of pulse counter and digtal I/O

imc SPARTAN-4



imc SPARTAN-6



imc SPARTAN-8
with 2 CAN nodes and standard equipment
of pulse counter and digtal I/O

imc SPARTAN
module with
DSUB-15 connectors

imc SPARTAN module
with thermocouple
connectors

## imc SPARTAN analog amplifier modules

| | size | | connector | | speed | | voltage mode | | | | mA | temp | | ICP, supply | | bridge mode | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| module name SPAR/xxx | channels | slots (1 slot = 4 HP) | standard connector | TEDS | max. sampling rate (per channel) | signal bandwidth (-3dB) | isolated voltage mode | min. voltage range (mV) | voltage up to 10 V | voltage up to 50 / 60 V | 20 mA shunt plug | Thermocouple (TC) | RTD (PT100) | ICP plug | sensor supply | full bridge | half bridge | quarter bridge | DC excitation | AC excitation (CF) | single SENSE | double SENSE |
| **Voltage & temperature measurement** | | | | | | | | | | | | | | | | | | | | | | |
| T16 | 16 | 2 | DSUB-15 | ● | 5 Hz | 1 Hz | ● | 50 | ● | ● | ● | ● | ● | | ○ | | | | | | | |
| T16-TC-K | 16 | 2 | Thermo | | 5 Hz | 1 Hz | ● | | | | | ● | | | | | | | | | | |
| T16-TC-UNI | 16 | 2 | Thermo | | 5 Hz | 1 Hz | ● | 50 | ● | ● | | ● | | | | | | | | | | |
| U16 | 16 | 2 | DSUB-15 | ● | 500 Hz | 200 Hz | ● | 50 | ● | ● | ● | ● | ● | ○ | ○ | | | | | | | |
| U16-TC-K | 16 | 2 | Thermo | | 500 Hz | 200 Hz | ● | | | | | ● | | | | | | | | | | |
| **Bridge & strain gauge measurements** | | | | | | | | | | | | | | | | | | | | | | |
| B16 | 16 | 4 | DSUB-15 | ● | 500 Hz | 200 Hz | | 5 | ● | | ● | | | ○ | ● | ● | ● | ● | ● | | ● | |
| BC16 | 16 | 2 | DSUB-26-HD | | 500 Hz | 200 Hz | | 5 | ● | | ● | | | | ● | ● | ● | ● | ● | | ● | |
| BCF16 | 16 | 4 | DSUB-15 | ● | 500 Hz | 200 Hz | | 5 | ● | ● | ● | | | ○ | ● | ● | ● | ● | ● | ● | ● | ● |
| LVDT16 | 16 | 4 | DSUB-15 | | 500 Hz | 50 Hz | | | | | | | | | ● | ● | ● | | | ● | | ● |
| LVDTC16 | 16 | 2 | DSUB-26-HD | | 500 Hz | 50 Hz | | | | | | | | | ● | ● | ● | | | ● | | ● |

## imc SPARTAN DIO, counter, DAC modules

| | size | connector | digital I/O | | DAC | pulse counter | | |
|---|---|---|---|---|---|---|---|---|
| module name SPAR/xxx | slots (1 slot = 4 HP) | standard connector | input Bits | output Bits | analog outputs | counter inputs | quadrature mode chan | counter frequency |
| **Multi functional modules** | | | | | | | | |
| DI16-DO8-ENC4 | 2 | DSUB-15 | 16 | 8 | | 4 | 2 | 32 MHz |
| DI8-DO8-ENC4-DAC4 | 2 | DSUB-15 | 8 | 8 | 4 | 4 | 2 | 32 MHz |
| **Digital I/O modules** | | | | | | | | |
| DI-16 | 1 | DSUB-15 | 16 | | | | | |
| DO-16 | 1 | DSUB-15 | | 16 | | | | |
| **Analog out modules (DAC)** | | | | | | | | |
| DAC-8 | 1 | DSUB-15 | | | 8 | | | |

## imc SPARTAN software options

| | Features | Licensing | |
|---|---|---|---|
| Software product | Functionality | License model | incl. |
| **Operating software** | | | |
| imc STUDIO Standard | Operating software, integrated test & measurement suite | PC | ○ |
| imc STUDIO Professional / Developer | Customized operation, scripting, application development | PC | ○ |
| imc CANSAS | In-situ configuration of imc CANSAS modules | | ● |
| imc SENSORS | Sensor data base | PC | ○ |
| **Real-time data analysis** | | | |
| imc Online FAMOS | Real-time calculations, immediate results | Device | ○ |
| imc Online FAMOS Professional | Real-time control extensions, PID control etc. | Device | ○ |
| imc Online FAMOS Kits | Class counting (fatigue analysis), order tracking | Device | ○ |
| **Post processing** | | | |
| imc FAMOS Reader | Data visualisation | PC | ● |
| imc FAMOS Standard / Professional / Enterprise | Data visualisation, analysis, reporting, scripting | PC | ○ |
| **Remote access** | | | |
| imc LINK | Remote device access, automatic data transfer | PC | ○ |
| imc REMOTE | Web Server, secure https device access | Device | ○ |
| **CAN** | | | |
| Vector database | Vector database interface | Device | ○ |
| ECU protocols | ECU protocol support (KWP 2000, CCP, OBD-2) | Device | ○ |
| **Development** | | | |
| LabVIEW™ VI's | LabView VI components | | ● |

**Digital I/O**

galvanically isolated, configurable to 24V/5V (TTL/CMOS) Level, output: 0.7A sink current

**Pulse counter**

full analog input conditioning: 500 kHz analog bandwidth, differential input, analog filter, software adjustable threshold levels

Modes: event counter, time, frequency, speed, RPM, differential and absolute angle and displacement

**TEDS support**

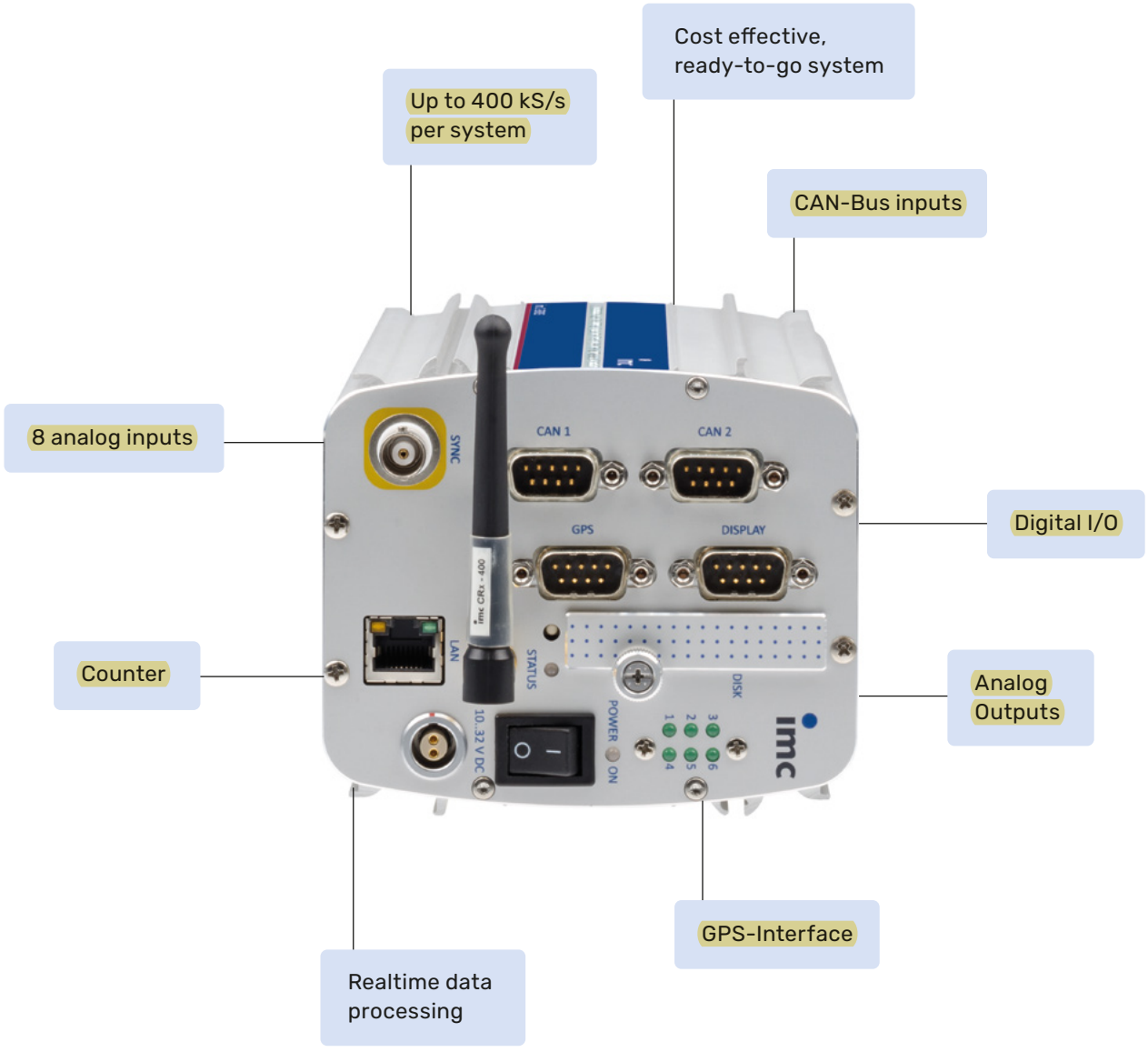
(Transducer Electronic Data Sheet) imc SPARTAN support direct read/write of TEDS sensors, including imc's TEDS Clip.

Connectors: TEDS interfaces require either the ACC/DSUBTEDS-x variants of our connectors

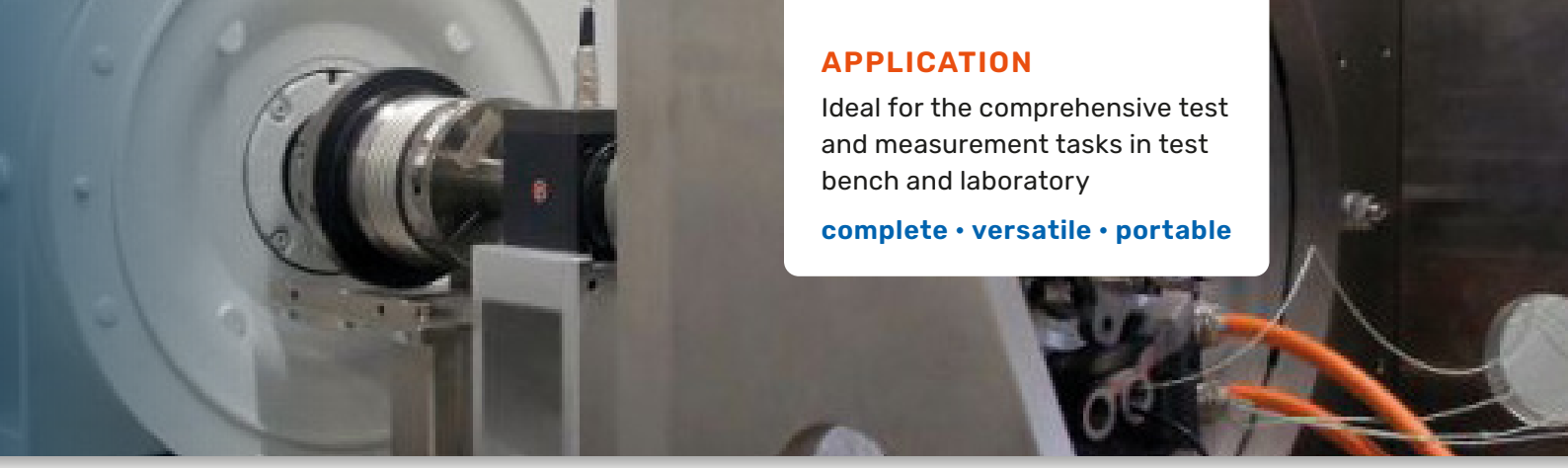
Key: ● Default, ○ Optional

# imc C-SERIES

## Handy all-in-one Data Acquisition System




Sized to be **EASILY PORTABLE**, yet surprisingly **VERSATILE**, the imc C-SERIES is also a powerhouse of capability: from the analog inputs with integrated signal conditioning, to the digital I/O, counter inputs, analog outputs and CAN FD interface to the integrated real-time data processing and control platform imc Online FAMOS – everything you need for your test is literally in the palm of your hand!



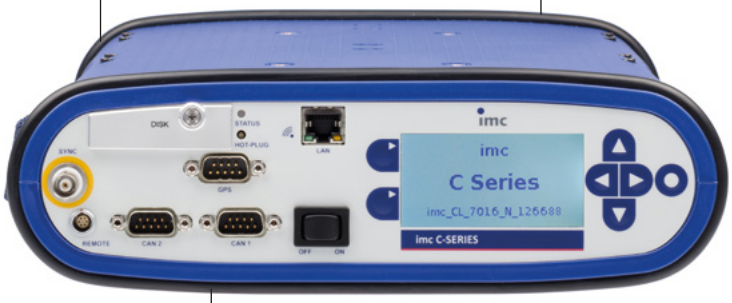
## APPLICATION

Ideal for the comprehensive test and measurement tasks in test bench and laboratory

**complete • versatile • portable**

Most portable imc data acquisition system

Versatile storage options including onboard removable flash media




Universal signal conditioner

16 analog inputs

Stand-alone or networked operation via Ethernet

Simultaneous recording of analog, digital, and CAN/vehicle bus data

up to 100 kS/s per channel

Regardless of where your testing takes you – from the field to the lab – the **ALL-IN-ONE** concept of the imc C-SERIES systems means that you will always have everything you need at your fingertips. And since onboard flash storage gives you the freedom to run interactively or stand-alone, you can easily setup an overnight test and won't have to worry about leaving your laptop behind.

# imc C-SERIES Details

## imc C-SERIES housing types

| | CS | CL |
|---|---|---|
| **General** | | |
| Aggregate sampling rate | 400 kSps | |
| Housing type | alu profile | portable polymer |
| Weight | 2 kg | 3.5 kg |
| **Operating conditions** | | |
| Standard operating temp. range | ● | ● |
| Extended temp. range (incl. condensation) | ○ | ○ |
| Shock and vibration rating | MIL 810F (40g) | |
| **Connectivity** | | |
| Ethernet | ● | ● |
| WLAN (WiFi) internal | ○ | ○ |
| GPS connection port | ● | ● |
| Display connection port | ● | |
| Display integrated | | ● |
| Remote controlled main switch | | ● |
| Synchronization signal (isolated) | BNC | BNC |
| Programmable status feedback (LEDs) | ● | |
| **Data storage** | | |
| CF card slot (Compact Flash) | ● | ● |
| Storage on PC / network drive (NAS) | ● | ● |
| SSD (internal) | | ○ |
| **Stand-alone capabilities** | | |
| PC independent complex trigger functionality | ● | ● |
| Onboard real-time data analysis (imc Online FAMOS) | ● | ● |
| Autarkic PC-less operation, self start | ● | ● |
| **Synchronization & clock** | | |
| Master-Slave between different systems | ● | ● |
| NTP network based synchronization | ● | ● |
| Via external GPS signal | ● | ● |
| Via externem IRIG-B & DCF-77 signal | ● | ● |
| **Field bus extensions** | | |
| CAN (2 nodes) incl. CAN FD (max. 8 MBaud) | ● | ● |
| **Pulse counter and process control (digital I/O, analog out)** | | |
| 8 bit digital in, 8 bit digital out | ● | ● |
| 4 pulse counter (2 chan quadrature mode) | ● | ● |
| 4 channel analog out (DAC) | ● | ● |
| **Power supply** | | |
| DC input 10V to 32V | ● | ● |
| AC/DC adaptor (110 to 230VAC) | ● | ● |
| Data integrity upon power fail | ● | ● |
| Short-term UPS | Supercaps | NiMH |
| Automatic shutdown after power failure | 1 s | 30 s |
| Isolated power supply input | | ● |
| **Software** | | |
| imc STUDIO test & measurement software | ○ | ○ |
| imc REMOTE WebServer | ○ | ○ |


CS housing: front and backside


CL housing: front and backside

## imc C-SERIES device models analog channels

| size | connector | | speed | voltage mode | | current | temp | | ICP, supply | | | | bridge mode | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| device name | housing | channels | connectors | max. sampling rate (per channel) | signal bandwidth (-3dB) | isolated voltage mode | min. voltage range (mV) | voltage up to 10V | voltage up to 50/60V | 20mA internal shunt | 20mA shunt plug | thermocouple (TC) | RTD (PT100) | ICP mode integrated | ICP plug | sensor supply | full bridge | half bridge | quarter bridge |
| Voltage measurement | | | (C$^x$-1xxx) | | | | | | | | | | | | | | | | |
| CS-1016 | S | 16 | DSUB-15 | 20 kHz | 6.6 kHz | | 250 | ● | | | ● | | | | ○ | ○ | | | |
| CS-1208 | S | 8 | DSUB-15 | 100 kHz | 48 kHz | | 5 | ● | ● | | ● | | | | ○ | ○ | | | |
| Voltage & temperature measurement | | | (C$^x$-41xx) | | | | | | | | | | | | | | | | |
| CS-4108 | S | 8 | DSUB-15 | 100 kHz | 11 kHz | ● | 50 | ● | ● | | ● | ● | ● | | ○ | ○ | | | |
| CL-4124 | L | 24 | DSUB-15 | 100 kHz | 11 kHz | ● | 50 | ● | ● | | ● | ● | ● | | ○ | ○ | | | |
| Audio & vibration | | | (C$^x$-30xx) | | | | | | | | | | | | | | | | |
| CS-3008 | S | 8 | BNC | 100 kHz | 48 kHz | | 5 | ● | ● | | | | | ● | | | | | |
| Bridge & strain gauge | | | (C$^x$-50xx) | | | | | | | | | | | | | | | | |
| CS-5008 | S | 8 | DSUB-15 | 100 kHz | 5 kHz | | 5 | ● | | ● | ● | | | | ○ | ● | ● | ● | ● |
| CL-5016 | L | 16 | DSUB-15 | 100 kHz | 5 kHz | | 5 | ● | | ● | ● | | | | ○ | ● | ● | ● | ● |
| For universal use | | | (C$^x$-70xx) | | | | | | | | | | | | | | | | |
| CS-7008 | S | 8 | DSUB-15 | 100 kHz | 48 kHz | | 5 | ● | ● | ● | ● | ● | ● | | ○ | ● | ● | ● | ● |
| CL-7016 | L | 16 | DSUB-15 | 100 kHz | 48 kHz | | 5 | ● | ● | ● | ● | ● | ● | | ○ | ● | ● | ● | ● |

## imc C-SERIES software options

| | Features | Licensing | |
|---|---|---|---|
| Software product | Functionality | License model | included |
| Operating software | | | |
| imc STUDIO Standard | Operating software, integrated test & measurement suite | PC | ○ |
| imc STUDIO Professional / Developer | Customized operation, scripting, application development | PC | ○ |
| imc SENSORS | Sensor data base | PC | ○ |
| Real-time data analysis | | | |
| imc Online FAMOS | Real-time calculations, "immediate results" | Device | ● |
| imc Online FAMOS Professional | Real-time control extensions, PID control etc. | Device | ○ |
| imc Online FAMOS Kits | Class counting (fatigue analysis), order tracking | Device | ○ |
| Post processing | | | |
| imc FAMOS Reader | Data visualization | PC | ● |
| imc FAMOS Standard / Professional / Enterprise | Data visualization, analysis, reporting, scripting | PC | ○ |
| Remote access | | | |
| imc LINK | Remote device access, automatic data transfer | PC | ○ |
| imc REMOTE | Web Server, secure https device access | Device | ○ |
| CAN | | | |
| Vector data base | Vector data base | Device | ○ |
| ECU protocols | ECU protocol support (KWP 2000, CCP, OBD-2) for CAN interface | Device | ○ |
| Development | | | |
| LabVIEW™ VI's | LabVIEW VI components | | ● |
| imc API | .net programming interface | PC | ○ |

**TEDS support (Transducer Electronic Data Sheet)**

imc C-SERIES supports direct read/write of TEDS sensors, including imc's TEDS Clip.

Connectors: TEDS interfaces require the ACC/DSUB-TEDS-x variants of our connectors. "IEPE" type TEDS is supported in audio modules with direct BNC input connectors.

**Digital I/O**

galvanically isolated, configurable to 24V/5V (TTL/CMOS) Level, output: 0.7A sink, high current: sink and source 0.7A

**Pulse counter**

full analog input conditioning: 500 kHz analog bandwidth, differential input, analog filter, software adjustable threshold levels

Modes: event counter, time, frequency, speed, RPM, differential and absolute angle and displacement

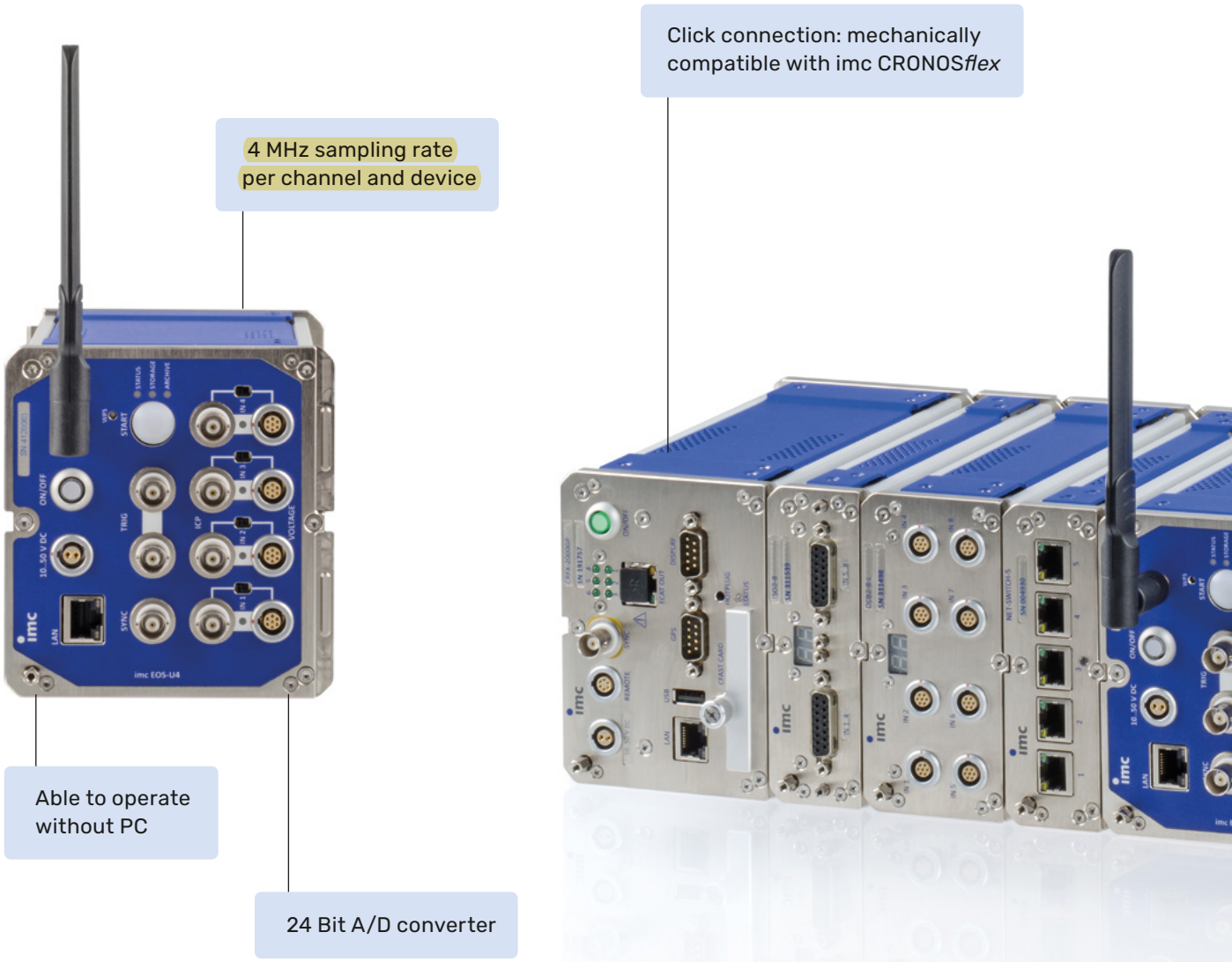
Key: ● standard, ○ optional

DSUB-15 screw terminal plug

Expansion plug for IEPE/ICP

# imc EOS

## High-Speed Data Acquisition and Transient Recorder




Thanks to **HIGH-SPEED DAQ** technology and versatile measurement inputs, imc EOS enables very fast and precise measurements of voltage, current transducers and IEPE sensors for acceleration, sound or force with up to 4 MHz. imc EOS is thus particularly suitable for the analysis of very dynamic processes in blast tests, material and component testing or vibration analysis.

## APPLICATION

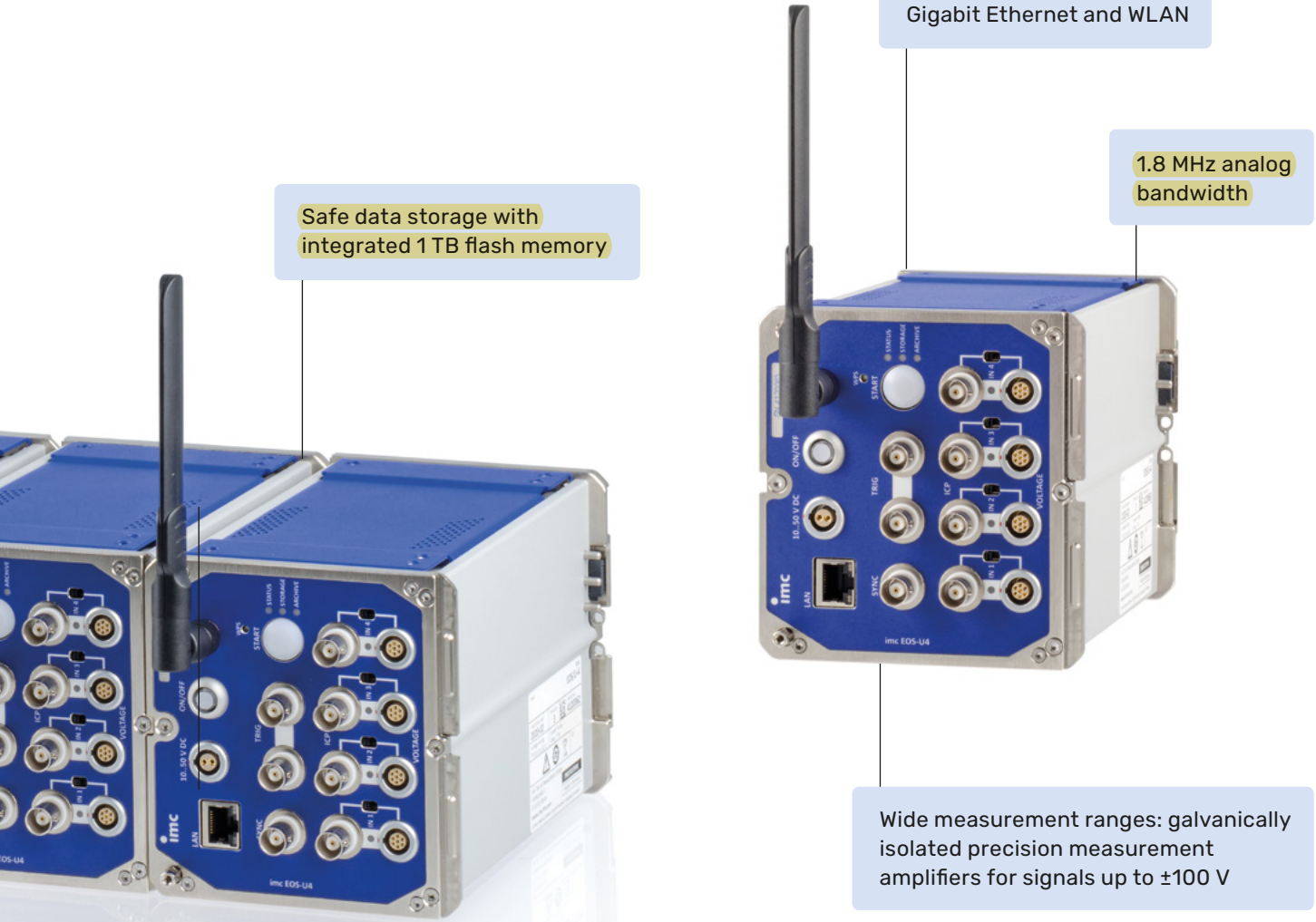
Ideal for blasting tests, turbine and rocket tests, through to e-mobility analyses

**fast • precise • versatile**

Can be networked via Gigabit Ethernet and WLAN

1.8 MHz analog bandwidth

Safe data storage with integrated 1 TB flash memory



Wide measurement ranges: galvanically isolated precision measurement amplifiers for signals up to ±100 V

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

# imc EOS Details

| | imc EOS U-4 |
|---|---|
| **General** | |
| System data rate | 4 MS/s (1x4 MHz, 2x2 MHz, 4x1 MHz) |
| **Analog inputs** | |
| Analog inputs (BNC/LEMO) | 4 |
| Sampling rate per channel | 1 kS/s to 4 MS/s |
| Analog bandwidth | 1,8 MHz |
| Operation modes | Voltage measurement, AC- and DC coupling<br>IEPE sensors (AC with current feed) |
| Measurement ranges | ±100 mV ... ±60 V (max. 100 V) |
| Isolation | channel-wise galvanically isolated |
| Selectable digital filters | 200 Hz ... 500 kHz and<br>Automatic Anti-Aliasing-Filter (digital AAF):<br>max. 800 kHz @ 2 MSps/s |
| Resolution | 24 Bit ADC |
| **Sensor supply (optional)** | |
| Output voltage | ±15 V ... ±2.5 V |
| Selectable | channel-wise configurable |
| Isolation | channel-wise galvanically isolated |
| Output power | 1.5 W/channel, overload and short circuit proof |
| **Connectivity** | |
| Ethernet | 1 x GBit-LAN (RJ45) |
| WLAN (optional) | WLAN adapter (802.11 g/n/ac, 300 Mbit/s) |
| Synchronization | 1 x BNC (IRIG-B) |
| External Trigger | 2 x BNC (IN/OUT) |
| Action-Button (manual start, trigger, etc.) | ● |
| **Data storage** | |
| Onboard Flash memory | 480 or 960 GByte |
| Storage to PC (network streaming) | ● |
| Arbitrary memory depth with pre- and post-trigger | ● |
| **Autonomous operation** | |
| Autarkic operation (without PC) | ● |
| Auto data saving upon power failure | ● |
| Trigger function (PC independent) | ● |

| | imc EOS U-4 |
|---|---|
| **Synchronization & clock** | |
| Master-Slave between imc systems | ● |
| Network based synchronization:<br>NTP and PTP (in preparation) | ● |
| via external IRIG-B signal | ● |
| **Power supply** | |
| DC supply input 10 to 50 V (isolated) | ● |
| AC/DC adapter (110 to 230 VAC) | ● |
| Data integrity (saving) upon power fail | ● |
| Long term UPS (Li-Ion battery) | ○ |
| **Operating conditions** | |
| Operating temperature range (standard), non-condensating | -10°C to +55°C |
| Operating temperature range (extended), condensation allowed | -40°C to +85°C (optional) |
| Shock and vibration | MIL-STD-810<br>Rail Cargo Vibration Exposure<br>U.S. Highway Truck Vibration Exposure |

Key: ● Default, ○ Optional

## Suitable Accessories

**Active and passive handles**

Practical handles for clicked-together module blocks

**HANDLE-LI-IO-L**

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

**NET-SWITCH-5**

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

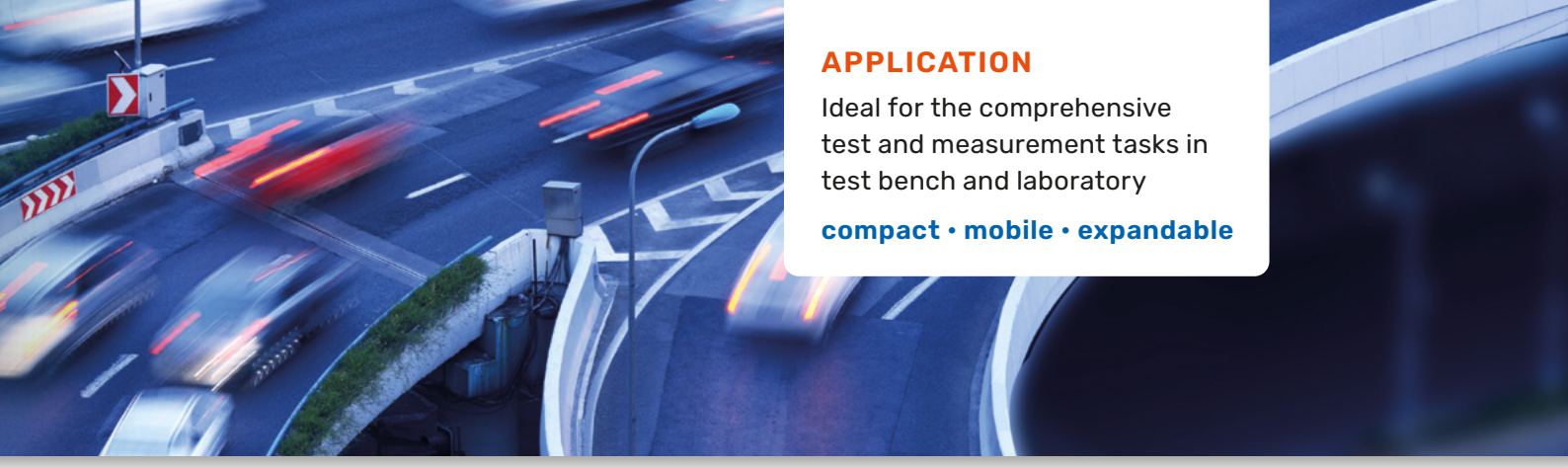
**SEN-SUPPLY-4**

Powerful sensor supply modul for current transducers and current clamps

# imc BUSDAQ*flex*

## Intelligent Multi-Bus Data Logger


With the imc BUSDAQ*flex* data logger series you can acquire data from all common bus systems of the automotive, railway, aircraft and machine industry. The standard basic configuration of 2 CAN nodes can be extended to 12 nodes for different field and vehicle buses with the larger device variants.



## APPLICATION

Ideal for the comprehensive test and measurement tasks in test bench and laboratory

**compact • mobile • expandable**

Interfaces for CAN, CAN FD, LIN, FlexRay, J1587, XCPoE, ARINC 429, PROFIBUS, PROFINET, Modbus, MVB

GPS-Interface for synchronous recording of geo position data

Features a CAN module with 2 nodes, extendable by up to 5 fieldbus modules based on housing


Extensive intelligent trigger functions

Versatile storage options including removable flash media

Sending of CAN messages

In addition to the acquisition of raw data streams and protocol channels, the **REAL-TIME DECODING** of individual channels as well as complex protocols such as CCP, KWP2000, XCP, OBD2, etc. are supported. The data logger is perfectly complemented by the imc CANSAS*flex* measurement modules.

# imc BUSDAQ*flex* Details

## General facts & features

| | imc BUSLOG*flex* & imc BUSDAQ*flex*-2S | imc BUSDAQ*flex*-2 | imc BUSDAQ*flex* -4,-6,-8,-12 |
|---|---|---|---|
| **Operating conditions** | | | |
| Operating temperature | -40 to +85 °C | -40 to +85 °C | -40 to +85 °C |
| Shock vibration rating (pk over 5 ms) | 50 g | 50 g | 50 g |
| Protection rating (with opt. protective cover) | IP40 | IP40 | IP40 |
| **Data storage** | | | |
| Ring buffer memory | ● | ● | ● |
| SSD (internal) | | | ○ |
| CF card slot (Compact Flash) | ● | ● | ● |
| **Stand-alone capabilities** | | | |
| Autarkic PC-less operation, self-start | ● | ● | ● |
| Sleep/Standby, Wake-up-on-CAN | ● | ● | ● |
| Remote-controllable main switch | ● | ● | ● |
| Programmable status display (LEDs) | | ● | ● *1 |
| **Synchronization & clock** | | | |
| Master-slave between different imc systems | ● | ● | ● |
| Via external GPS signal, IRIG-B or DCF-77 | ● | ● | ● |
| Via external NTP signal | ● | ● | ● |
| **Power supply** | | | |
| DC input | 10 - 50 V DC | 10 - 50 V DC | 10 - 50 V DC |
| AC/DC adaptor (110 - 230V AC) | ● | ● | ● |
| Data integrity upon power failure | ● | ● | ● |
| UPS (Supercaps) | ● | ● | ● |
| Power consumption in sleep-mode | 200 mW | 200 mW | 200 mW |
| **Connectivity** | | | |
| Ethernet (100 MBit) | ● | ● | ● |
| WiFi adapter internal | | | ○ |
| Wireless UMTS, 3G, 4G (external) | ○ | ○ | ○ |

*1: only with pure CAN/LIN equipment

Key: ● default, ○ optional


imc BUSLOG*flex*
imc BUSDAQ*flex*-2-S

imc BUSDAQ*flex*-2

imc BUSDAQ*flex*-4

imc BUSDAQ*flex*-6

imc BUSDAQ*flex*-8

imc BUSDAQ*flex*-12

## Inputs and outputs

| | imc BUSLOG*flex* & imc BUSDAQ*flex*-2S | imc BUSDAQ*flex*-2 | imc BUSDAQ*flex* -4,-6,-8,-12 |
|---|---|---|---|
| **Bus interfaces** | | | |
| CAN nodes | 2 | 2 | 2 (max. 12) |
| Expandable | no | no | yes |
| **Supported expansion modules** | | | |
| CAN | | | ○ |
| CAN FD | | | ○ |
| LIN | | | ○ |
| FlexRay | | | ○ |
| J1587 | | | ○ |
| ARINC | | | ○ |
| XCPoE (Master, Slave) | | | ○ |
| MVB | | | ○ |
| APPMOD (Ethernet/RS232/RS485) | | | ○ |
| **Inputs and outputs** | | | |
| Digital inputs | | | 4 |
| Digital outputs | | | 4 |
| Analog / digital in and outputs (via imc CANSAS*flex*) | ○ | ○ | ○ |
| **Additional connections** | | | |
| GPS connection | | ● | ● |
| Display connection | | ● | ● |

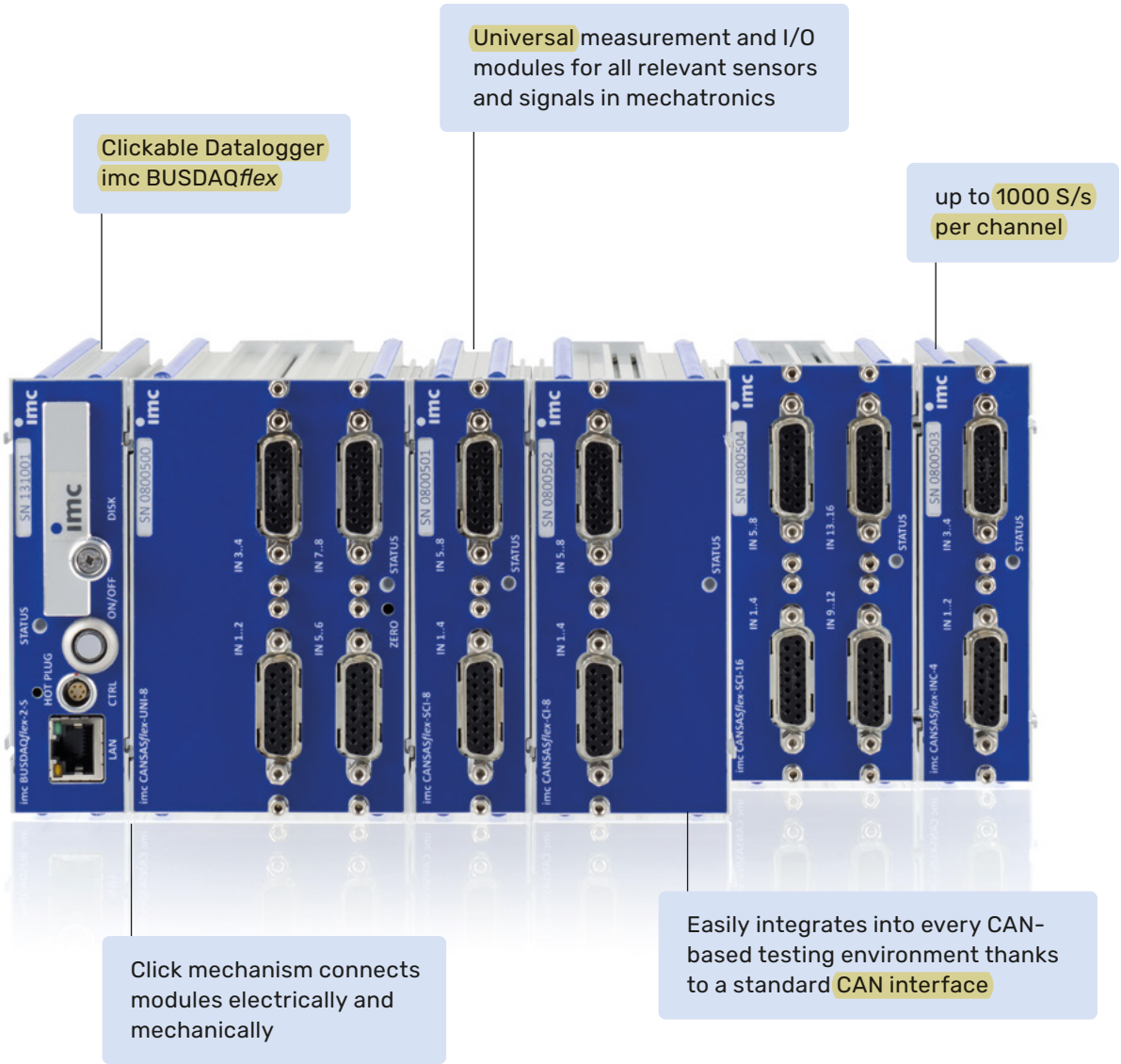
## Software options

| Software product | Functionality | License-model | Included |
|---|---|---|---|
| **Operating software** | | | |
| imc STUDIO Standard *2 | Operating software, integrated test &measurement suite | PC | ○ |
| imc STUDIO Professional / Developer | Customized operation, scripting, application development | PC | ○ |
| **Real-time data analysis** | | | |
| imc Online FAMOS | Real-time calculations, immediate results | device | ○ |
| imc Online FAMOS Professional | Real-time control functions, PID controller, etc. | device | ○ |
| imc Online FAMOS Kits | Class counting (durability analysis), order tracking | device | ○ |
| **Post Processing** | | | |
| imc FAMOS Reader | Data visualization | PC | ● |
| imc FAMOS Standard / Professional / Enterprise | Data visualization, analysis, reporting, scripting | PC | ○ |
| **Remote Access** | | | |
| imc LINK | Remote device access, automatic data transfer | PC | ○ |
| imc REMOTE | Web Server, secure https device access | device | ○ |
| **CAN** | | | |
| Vector database | Vector database interface | device | ○ |
| ECU protocols | ECU Protocol support for CAN interface (KWP 2000, CCP, XCP, OBD-2, UDS, GMLAN, TP 2.0, DiagOnCAN) | device | ○ |
| **Applications development** | | | |
| LabVIEW™ VI's | LabVIEW VI-components | | ● |
| imc API | .NET Programmierschnittstelle (API) | PC | ○ |

*2: not available for imc BUSLOG*flex*

# imc CANSAS*flex*

## Intelligent Measurement Modules based on CAN-Bus




The imc CANSAS*flex* series offers a wide selection of can-based DAQ modules, which cover all typical sensors and signals from heavy machinery, industrial installations and vehicles. The modules can be **DISTRIBUTED SPATIALLY VIA CAN** cable or clicked together as a central unit. imc CANSAS*flex* modules are designed to fit into a special 19" subrack solution.

## APPLICATION

Ideal for the comprehensive test and measurement tasks in test bench and laboratory

**flexible • networkable • universal**

Distributed or centralized installation

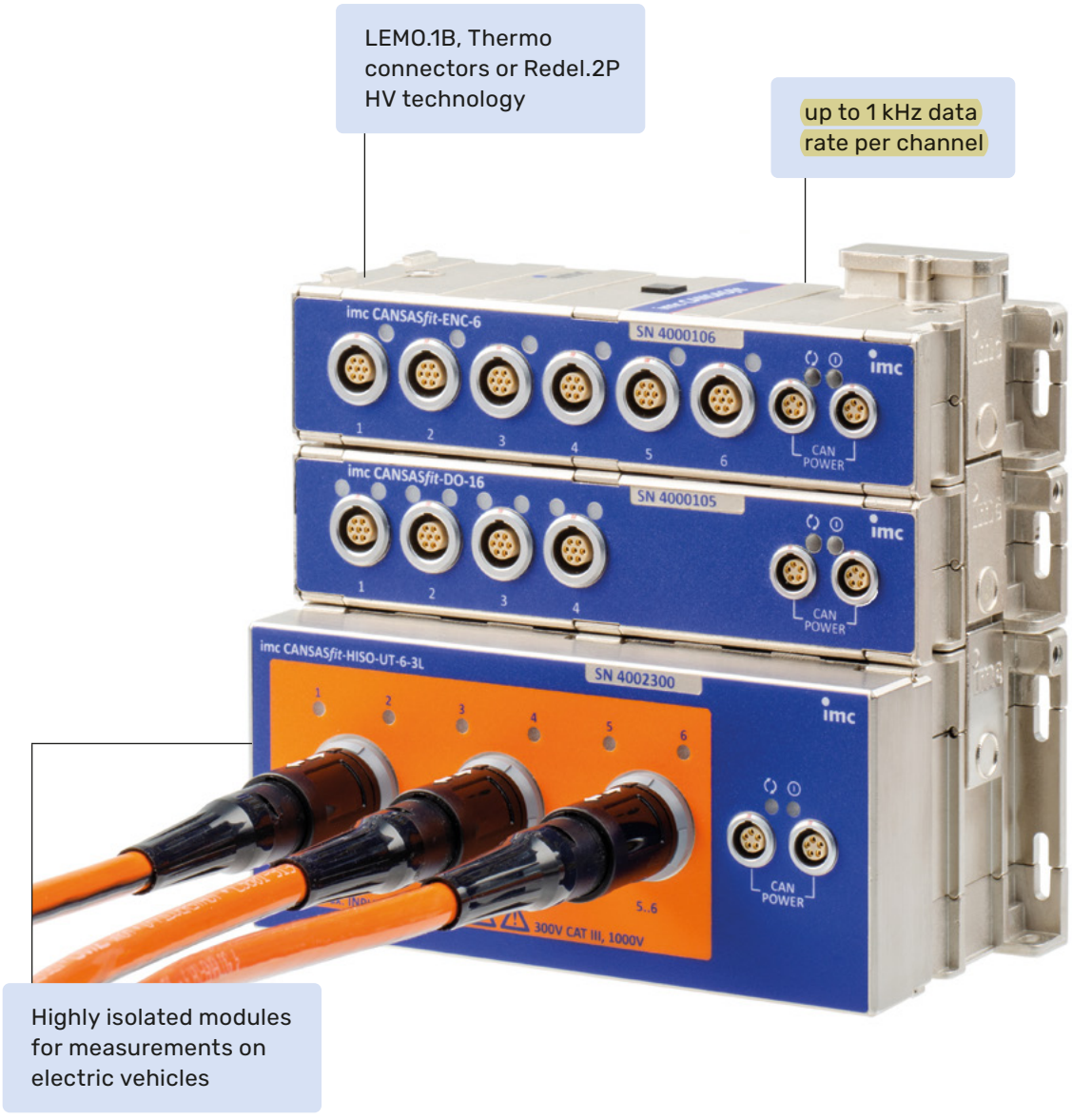
Highly isolated modules for measurements on electric vehicles, batteries, charging infrastructure, etc.


Configuration software included

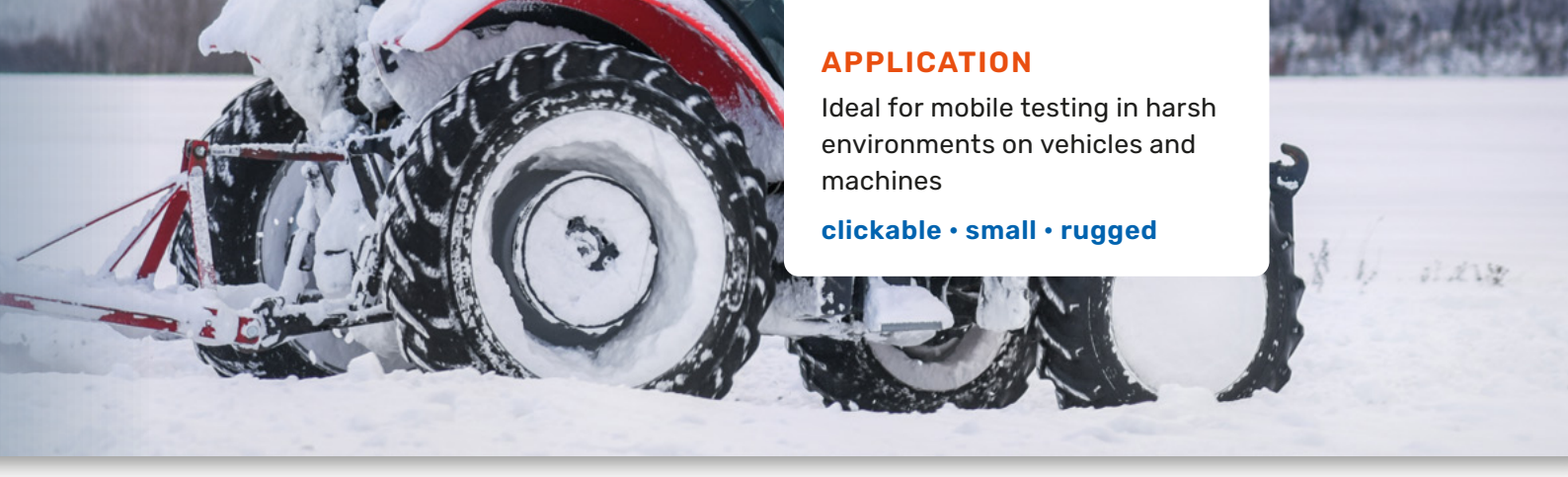
imc CANSAS*flex* offers not only precise and versatile signal conditioning and digitization for CAN based data acquisition but can also deliver immediate results: with virtual channels, calculated directly in the measurement module up to full and comprehensive live analysis with imc Online FAMOS, provided in conjunction with imc CAN loggers such as BUSDAQ*flex*.

# imc CANSAS*fit*

## Robust Measurement Modules




Measurement modules used for DAQ in mobile testing must be **ROBUST** and **COMPACT** because they are often placed in areas such as the engine compartment where space is limited and temperatures can be high. The imc CANSAS*fit* series works reliably from -40° to +125° C, has a protection rating of IP65 and, due to their small form factor, can be placed almost anywhere.



## APPLICATION

Ideal for mobile testing in harsh environments on vehicles and machines

**clickable • small • rugged**

Click mechanism - connecting modules without cables or tools

Robust housing with IP65 protection



Operates from -40°C to +125°C

Vibration resistant according to MIL STD-810F

data output to CAN

The user can simply click modules together to create blocks. Wiring between the modules is not necessary. The modules allow for direct connection to all typical sensors such as voltage, current, temperature, rpm, displacement and velocity. The digitized signals are output on CAN and can be read or recorded by any datalogger, PC or control system with a CAN interface.

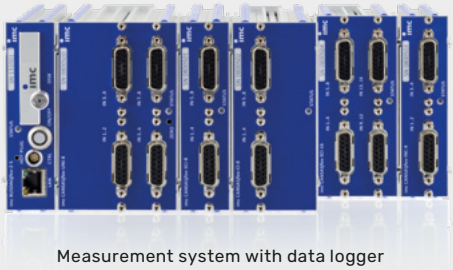
# imc CANSAS family Details

## General specifications and functions

| Function | | *flex* | *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 | ● | |
| 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) | | ● | |
| RELAIS8 | | ● | |
| pressure | | ● | |
| SENT | | ● | |

Incremental encoder module: imc CANAS*flex* series

UNI-8 module: imc CANAS*flex* series



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

temperature module of the imc CANAS*fit* series

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

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

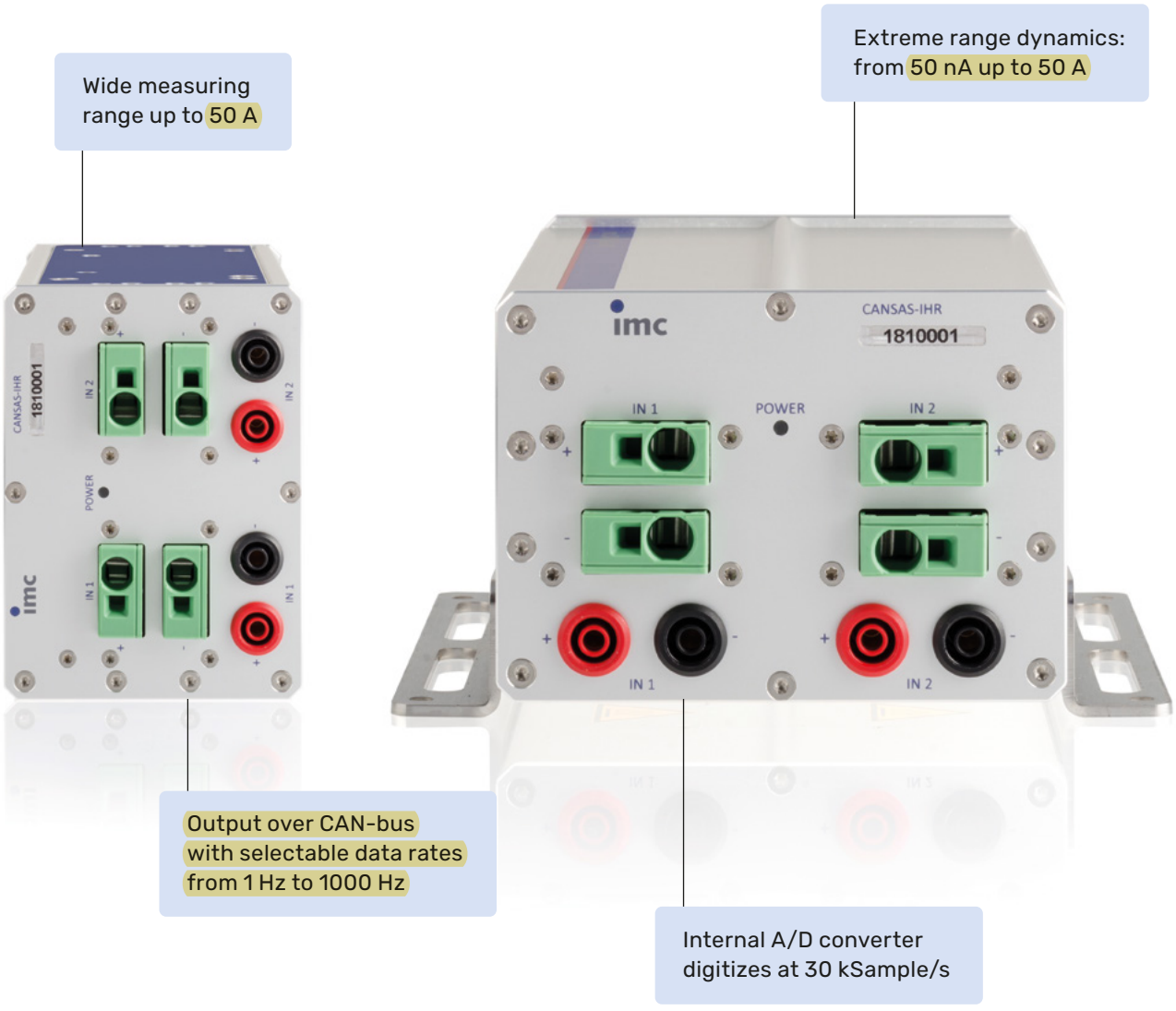
## Measurement modules: imc CANSAS*flex* / imc CANSAS*fit*

| type | series | | | features | | | connector options | | | | | speed | | isolation | | voltage | | current | | temp | | | bridge mode | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| modul name | imc CANSAS*flex* (short) | imc CANSAS*flex* (long) | *CANFT* | channels | TEDS (with DSUB, LEMO) | Sensor Supply | DSUB | LEMO | Thermo | ITT-Veam | Banana | "max. sampling rate (per channel)" | signal bandwidth (-3db) | indivdually isolated | Isolation Voltage | min. voltage rate (mV) | max. voltage rate (mV) | 20mA internal shunt | 20mA shunt plug | thermocouple | PT100 | PT1000 | full bridge | half bridge | quarter bridge (120 Ohm) | quarter bridge (350 Ohm) |
| **imc CANSAS*flex* modules** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| temperature measurement | | | | | | | | | | | | | | | | | | | | | | | | | | |
| C8-2T | | ● | | 8 | | | | | ● | | | 100 Hz | 20 Hz | | | | | | | ● | | | | | | |
| CI8-2T | | ● | | 8 | | | | | ● | | | 1000 Hz | 440 Hz | ● | 60 V | | | | | ● | | | | | | |
| SC16-2T | | ● | | 16 | | | | | ● | | | 1 Hz | 0.5 Hz | | | | | | | ● | | | | | | |
| SCI8-2T | | ● | | 8 | | | | | ● | | | 2 Hz | 1 Hz | ● | 60 V | | | | | ● | | | | | | |
| SCI16-2T | | ● | | 16 | | | | | ● | | | 1 Hz | 0.5 Hz | ● | 60 V | | | | | ● | | | | | | |
| voltage and temperature measurement | | | | | | | | | | | | | | | | | | | | | | | | | | |
| C8 | ● | ● | | 8 | ● | ○ | ● | ● | | | | 100 Hz | 20 Hz | | | 2.5 mV | | | ● | ● | ● | | | | | |
| CI8 | | ● | | 8 | ● | ○ | ● | ● | | ● | | 1000 Hz | 440 Hz | ● | 60 V | 20 mV | 60 V | | ● | ● | ● | | | | | |
| SC16 | ● | ● | | 16 | ● | ○ | ● | ● | | | | 500 Hz | 28 Hz | | | 100 mV | 10 V | | ● | ● | ● | | | | | |
| SCI8 | ● | ● | | 8 | ● | ○ | ● | ● | | | | 1000 Hz | 42 Hz | ● | 60 V | 100 mV | 60 V | | ● | ● | ● | | | | | |
| SCI16 | ● | ● | | 16 | ● | ○ | ● | ● | | | | 500 Hz | 23 Hz | ● | 60 V | 100 mV | 60 V | | ● | ● | ● | | | | | |
| high isolated voltage and temperature measurement | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HISO8-L | | ● | | 8 | | | | ● | | | | 1000 Hz | 440 Hz | ● | 800 V | 20 mV | 100 V | ● | | | ● | ● | | | | |
| HISO8-4L | | ● | | 8 | | | | ● | | | | 1000 Hz | 440 Hz | ● | 800 V | 20 mV | 100 V | ● | | | ● | ● | | | | |
| HISO8-T-8L | | ● | | 8 | | | | ● | | | | 1000 Hz | 440 Hz | ● | 800 V | | | | | ● | | | | | | |
| HISO8-T-2L | | ● | | 8 | | | | ● | | | | 1000 Hz | 440 Hz | ● | 800 V | | | | | ● | | | | | | |
| HISO-HV4 | | ● | | 4 | | | | | | | ● | 1000 Hz | 440 Hz | ● | 800 V | 10 V | 800 V<br>1000 V (trans.) | | | | | | | | | |
| Bridge & strain gauge measurement | | | | | | | | | | | | | | | | | | | | | | | | | | |
| DCB8 | | ● | | 8 | ● | ● | ● | ● | | | | 1000 Hz | 200 Hz | | | 5 mV | 10 V | (●) | ● | | | | ● | ● | ● | ○ |
| Universal use | | | | | | | | | | | | | | | | | | | | | | | | | | |
| UNI8 | | | | 4 | ● | ● | ● | ● | | ● | | 1000 Hz | 200 Hz | | | 5 mV | 50 V | (●) | ● | ● | ● | | ● | ● | ● | ○ |
| Digital & counter | | | | | | | | | | | | | | | | | | | | | | | | | | |
| INC4 | ● | | | 4 | | | | | | | | 1000 Hz | 500 kHz | | | | | | | | | | | | | |
| DI16 | ● | | | 16 | | | | | | | | 10 kHz | | | | | | | | | | | | | | |
| DO16 | ● | | | 16 | | | | | | | | 11 kHz | | | | | | | | | | | | | | |
| DO8R | ● | | | 8 | | | | | | | | 12 kHz | | | | | | | | | | | | | | |
| DO16R | ● | | | 16 | | | | | | | | 13 kHz | | | | | | | | | | | | | | |
| SENT | ● | | | 8 | | | | | | | | | | | | | | | | | | | | | | |
| Analog out & PWM | | | | | | | | | | | | | | | | | | | | | | | | | | |
| DAC8 | ● | ● | | 8 | | | ● | | | ● | | 5 kHz | 5 kHz | | | | | | | | | | | | | |
| PWM8 | ● | ● | | 8 | | | ● | | | ● | | 10 kHz | | ● | | | | | | | | | | | | |
| **imc CANSAS*fit* modules** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| voltage and temperature measurement | | | | | | | | | | | | | | | | | | | | | | | | | | |
| T-10 | | | ● | 10 | | | | | ● | | | 100 Hz | 20 Hz | | | | | | | ● | | | | | | |
| UTI-6 | | | ● | 6 | | ● | | ● | | | | 1000 Hz | 400 Hz | ● | 60 V | 25 mV | 60 V | ● | | | ● | ● | | | | |
| high isolated voltage and temperature measurement | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HISO-T-8-2L | | | ● | 8 | | | | ● | | | | 100 Hz | 15 Hz | ● | 1000 V CAT I | | | | | ● | | | | | | |
| HISO-UT-6-3L | | | ● | 6 | | ● | | ● | | | | 1000 Hz | 400 Hz | ● | 1000 V CAT I | | 100 V | | | | ● | ● | | | | |
| HISO-HV-4 | | | ● | 4 | | | | | | | ● | 1000 Hz | 400 Hz | ● | 1000 V CAT II | 25 mV | 1500 V | | | | | | | | | |
| Digital & counter | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ENC-6 | | | ● | 6 | | | | ● | | | | 1000 Hz | 2 MHz | ● | | | | | | | | | | | | |
| DI-16 | | | ● | 16 | | | | ● | | | | 1000 Hz | | ● | | | | | | | | | | | | |

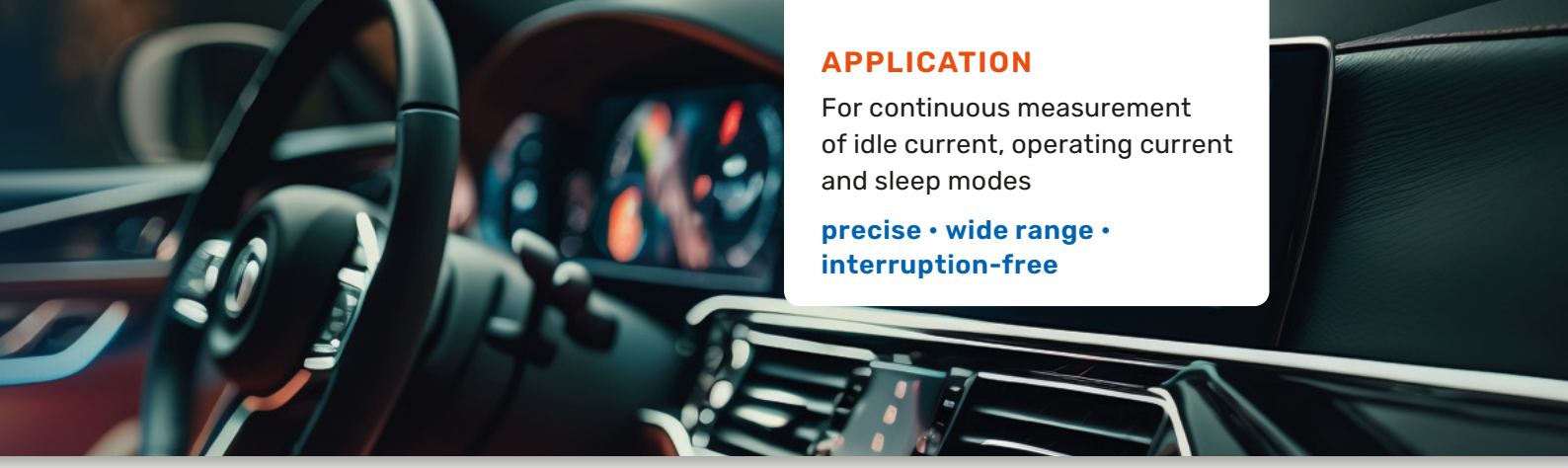
TEDS Support (Transducer Electronic Data Sheet)
imc CANSAS devices support direct read/write of TEDS sensors, including imc's TEDS Clip. TEDS interfaces require either the ACC/DSUB-TEDS-x variants of our connectors (2-wire TEDS), or per-channel connectors such as Lemo or ITT-VEAM.

# imc CANSAS-IHR

## Wide-range Current Measurement Module




With the imc CANSAS-IHR developers have a unique tool at hand that allows current measurement across a very wide range, When examining quiecent and sleep-mode currents as well as full power loads you can now capture the entire power-up and power-down sequences of electrical components and systems without loosing any details – in one single measurement!



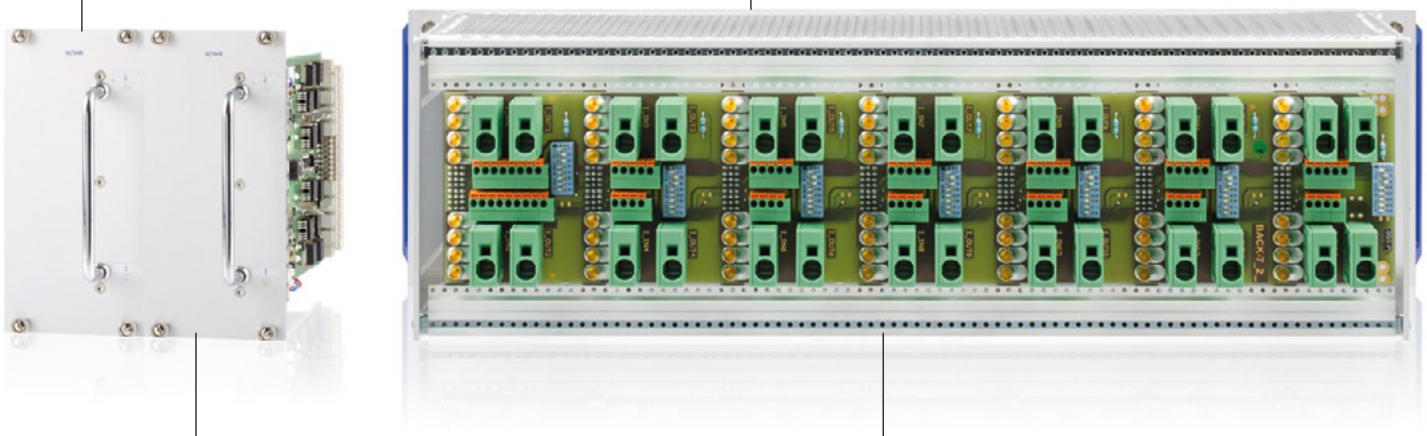
## APPLICATION

For continuous measurement of idle current, operating current and sleep modes

**precise • wide range • interruption-free**

Directly calculated output variables: minimum, maximum & mean value

As a rack system for up to 7 plug-in modules with 2 channels



Rack version for laboratory and test stand

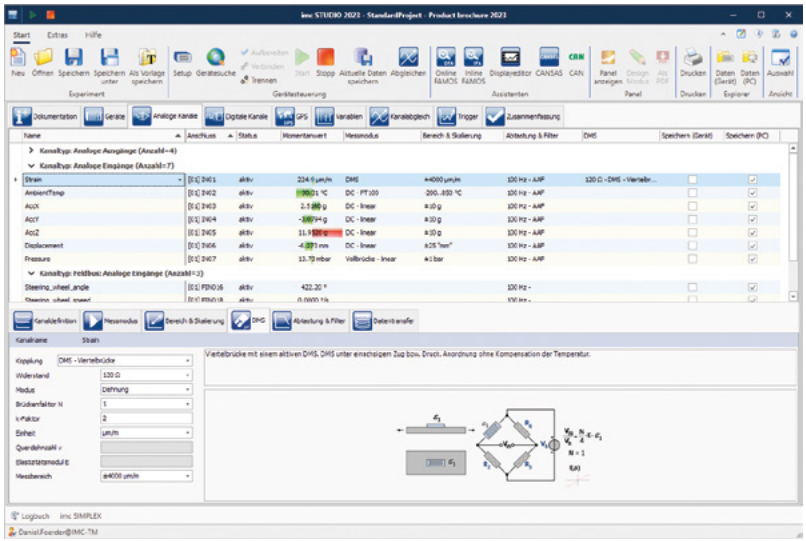
Two autonomous, isolated channels for current measurement with automatic range switching

The CANSAS-IHR high resolution measurement module applies auto-ranging by shunt switching, Sophisticated yet plug&play technology supports this high range dynamics in an interruption-free measurement! Capture currents that vary from 50nA to 50A in a single continuous acquisition without interrupting the current path!

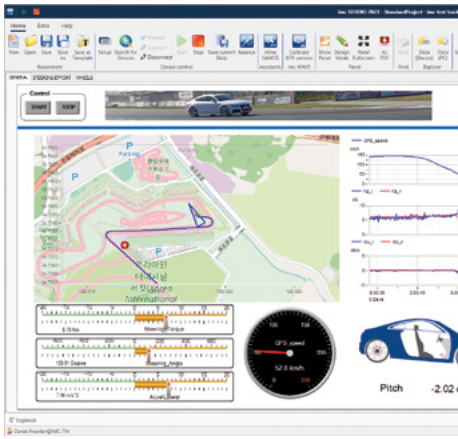
# imc STUDIO

## Integrated Software for the Entire Testing Process

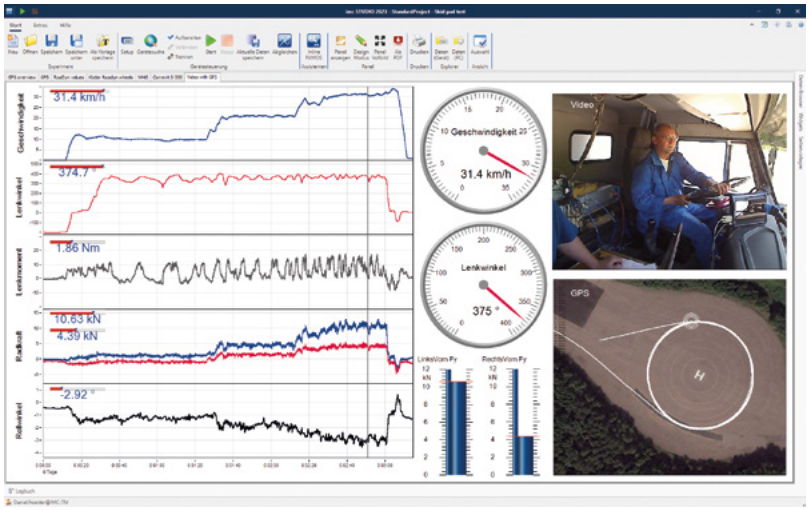
### CONFIGURE AND MEASURE



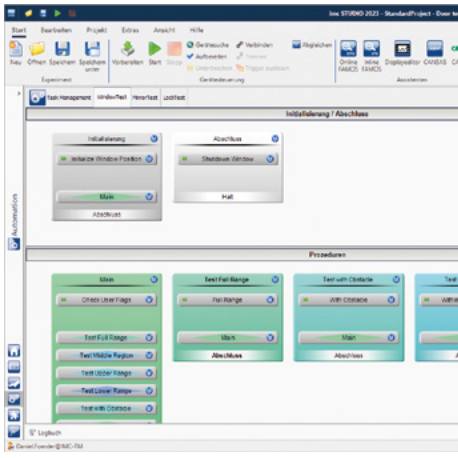
### DISPLAY AND OPERATE



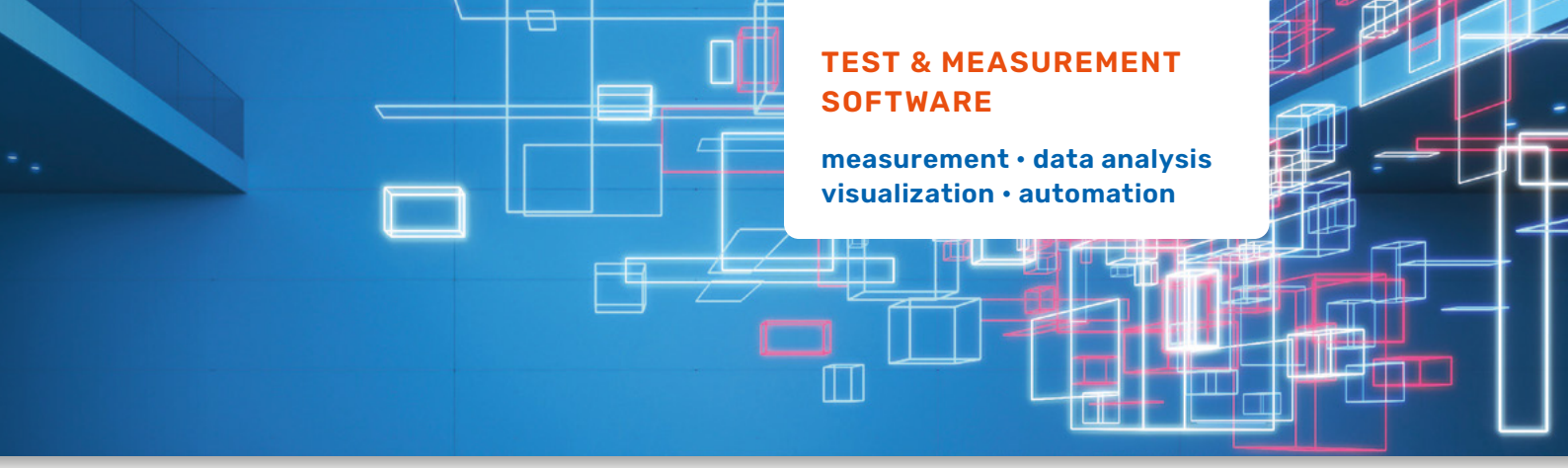
### RECORDING OF VIDEO




### AUTOMATE TEST STANDS

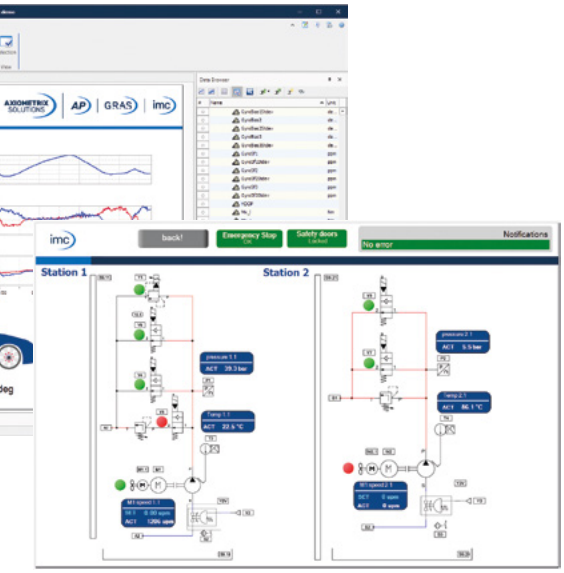


imc STUDIO is a **MODULAR TEST AND MEASUREMENT SOFTWARE** that combines many separate tools in one seamless and integrated environment. Within this framework, users are able to quickly perform measurements, **ANALYZE** data in real-time and create sophisticated tests.

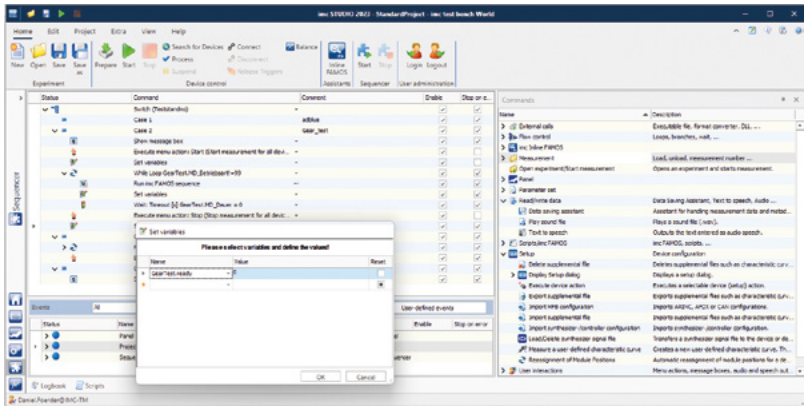


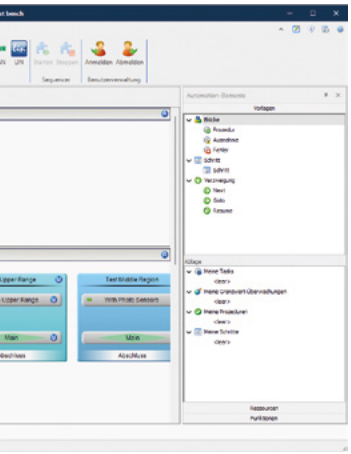
## TEST & MEASUREMENT SOFTWARE

**measurement • data analysis**
**visualization • automation**

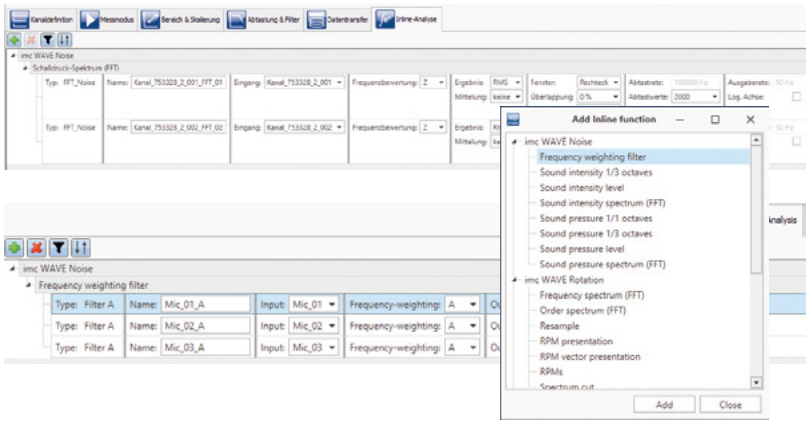



## CREATE TEST SEQUENCES





## REAL-TIME ANALYSIS

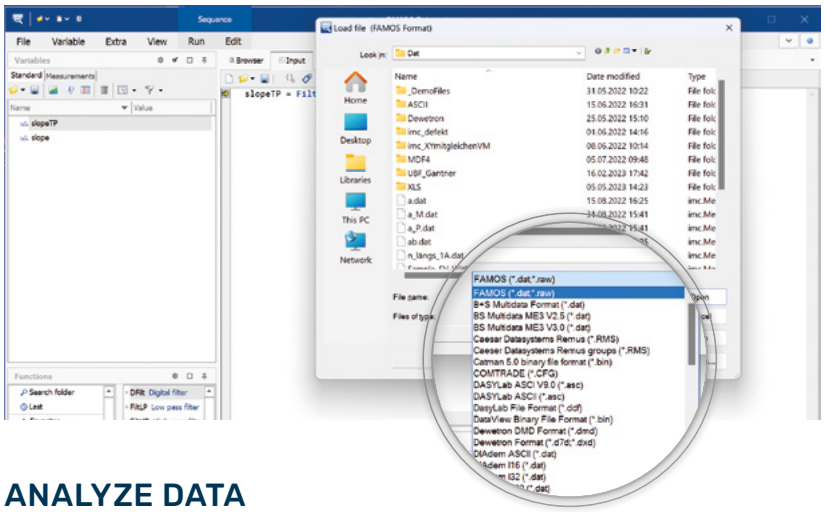



With just a few mouse clicks, you can **SETUP** you DAQ system, **DESIGN** your own screens (Panels), **AUTOMATE** test sequences using drag & drop, **RECORD** GoPro videos and create real-time automation and **CONTROL** for your test bench without programming a single line of code.

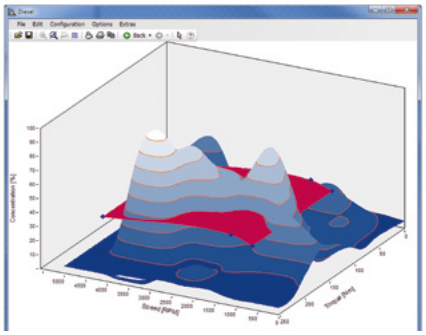
# imc FAMOS

## Software for Data Analysis

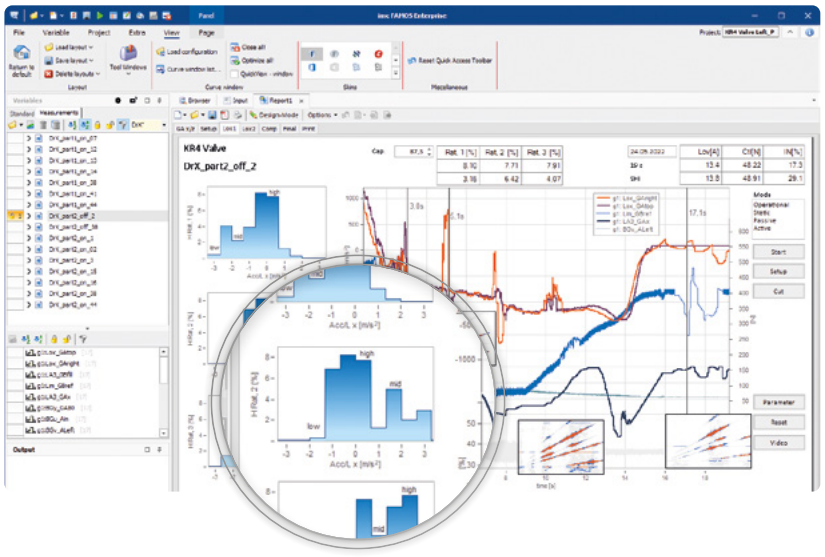
### IMPORT & EXPORT DATA



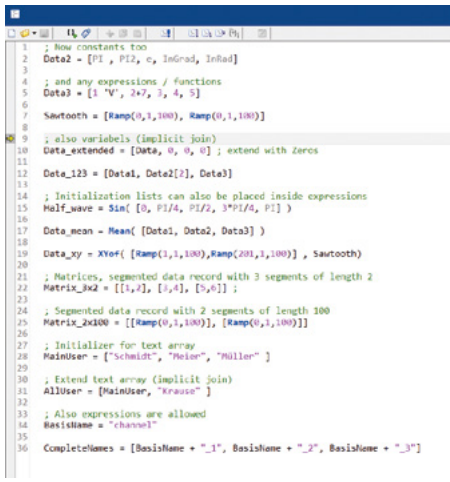
### VIEW DATA



### ANALYZE DATA



### AUTOMATE



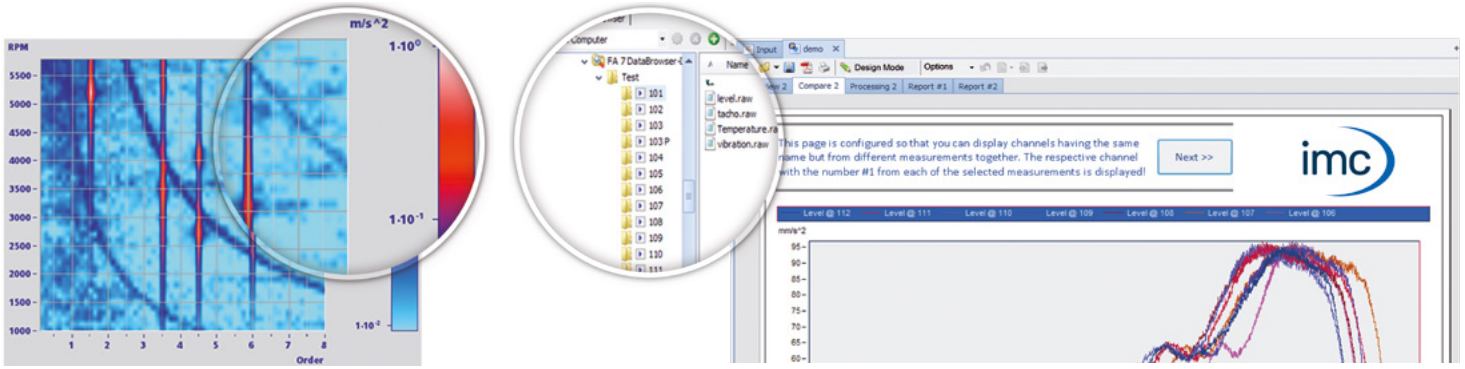
The **ANALYSIS SOFTWARE** imc FAMOS provides engineers with the versatile tools necessary to visualize and analyze their data, automating routines and complex tasks – from data import to test report. No matter from where your data originates - besides the imc data format, many other data formats are supported and import converetrs can even be easily customized by the user.

## APPLICATION

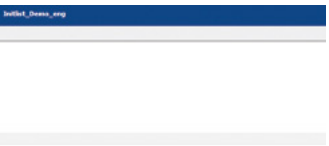
For analyzing and reporting of test and measurement data

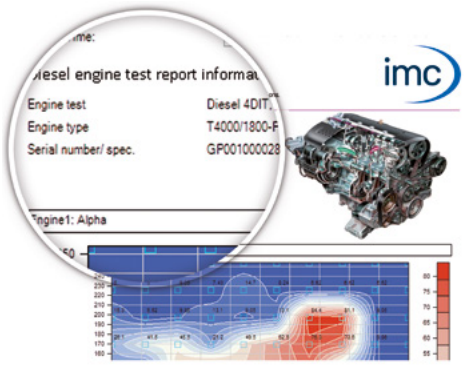
**professional • fast • efficient**

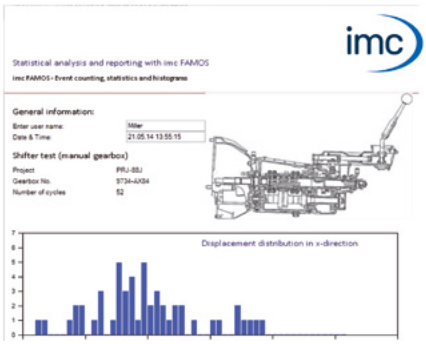
## COMPARE DATA




## DOCUMENT





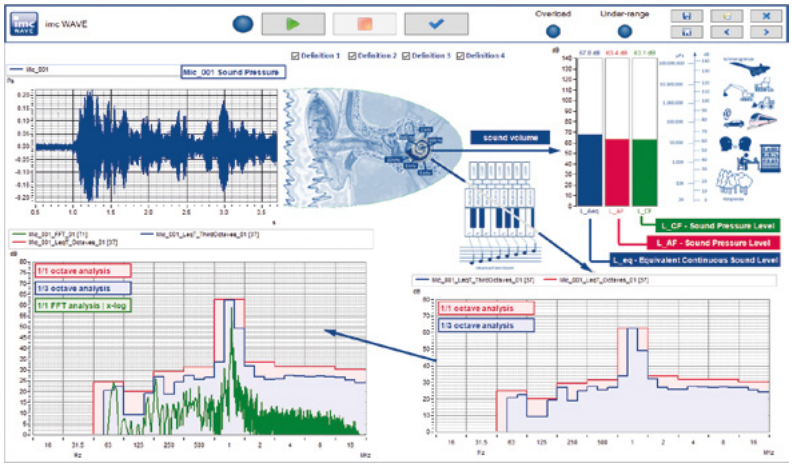

Specifically designed for analyzing test and measurement data, imc FAMOS is ideal for engineers and technicians who wish to solve their analysis tasks more efficiently. With a vast number of analysis functions and powerful automation capabilities, imc FAMOS provides quick results. And with the imc FAMOS Reader, you can quickly and easily view data on every PC, for free.

# imc WAVE

## Software for Sound & Vibration Measurement & NVH Analysis

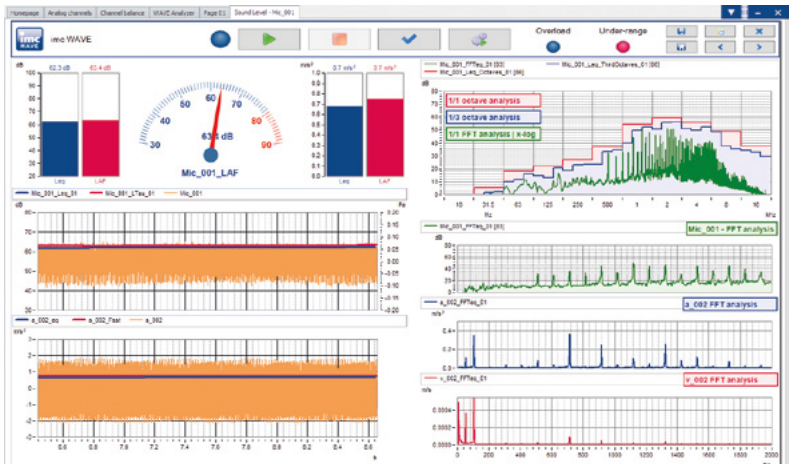
### imc WAVE noise

Measuring sound power and sound pressure

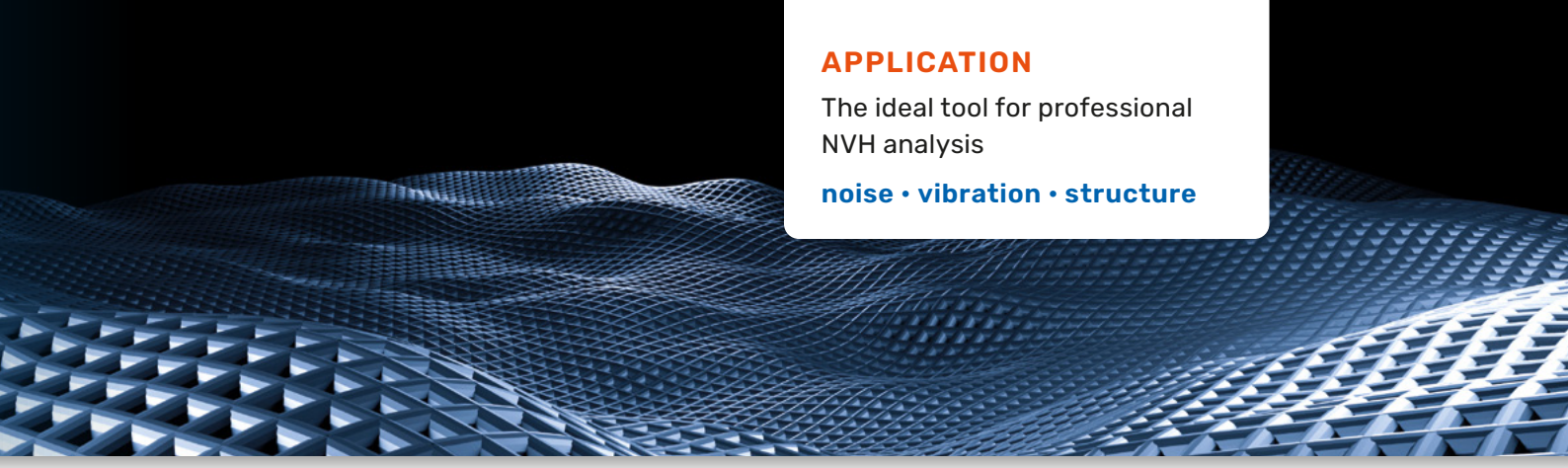



### imc WAVE vibration

Vibration analysis for machine diagnosis & human vibration




imc WAVE is a modular and powerful software platform for **SOUND AND VIBRATION MEASUREMENT** and **NVH ANALYSIS**. With its analyzers you can evaluate a wide range of applications without having to be an expert yourself: From acoustic measurements in road tests to structural analyses on the test bench and vibration tests on machines.



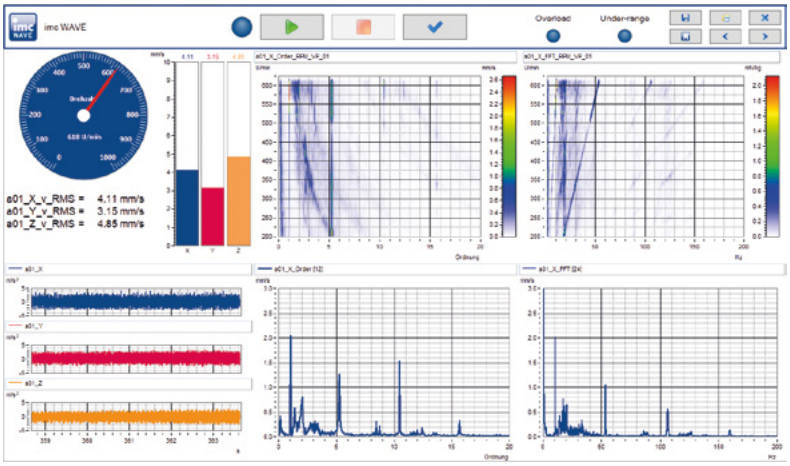
## APPLICATION

The ideal tool for professional NVH analysis

**noise • vibration • structure**

## imc WAVE rotation

Order analysis on rotating machines




## imc WAVE structure

Structural analysis by impact hammer measurements


The imc WAVE analyzers provide you with **STANDARD-COMPLIANT ANALYSIS** from the fields of sound pressure and sound power analysis, structure analysis as well as vibration analysis on non-rotating and rotating machines. imc WAVE guides you step by step through the settings, from configuration to calibration and measurement. At the end, you receive a professional, print-ready report.

# imc Telemetry Solutions

## Digital Telemetry Systems from Single- to Multi-Channel

### TEL1-PCM

12 bit single channel telemetry for strain gauge or thermocouple type K measurement

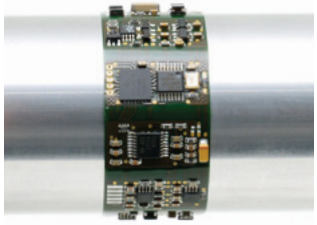

### T1

16 bit single channel telemetry for strain gauge or PT100 temperature measurement


### TEL1-PCM-FLEX

Bendable single channel telemetry for strain gauge measurement

The TEL1-FLEX is a compact telemetry designed for tight spaces, featuring thin and flexible transmitter electronics for torque measurements in narrow installations. Its pliable film substrate enables effortless application on rotating shafts or machine components.



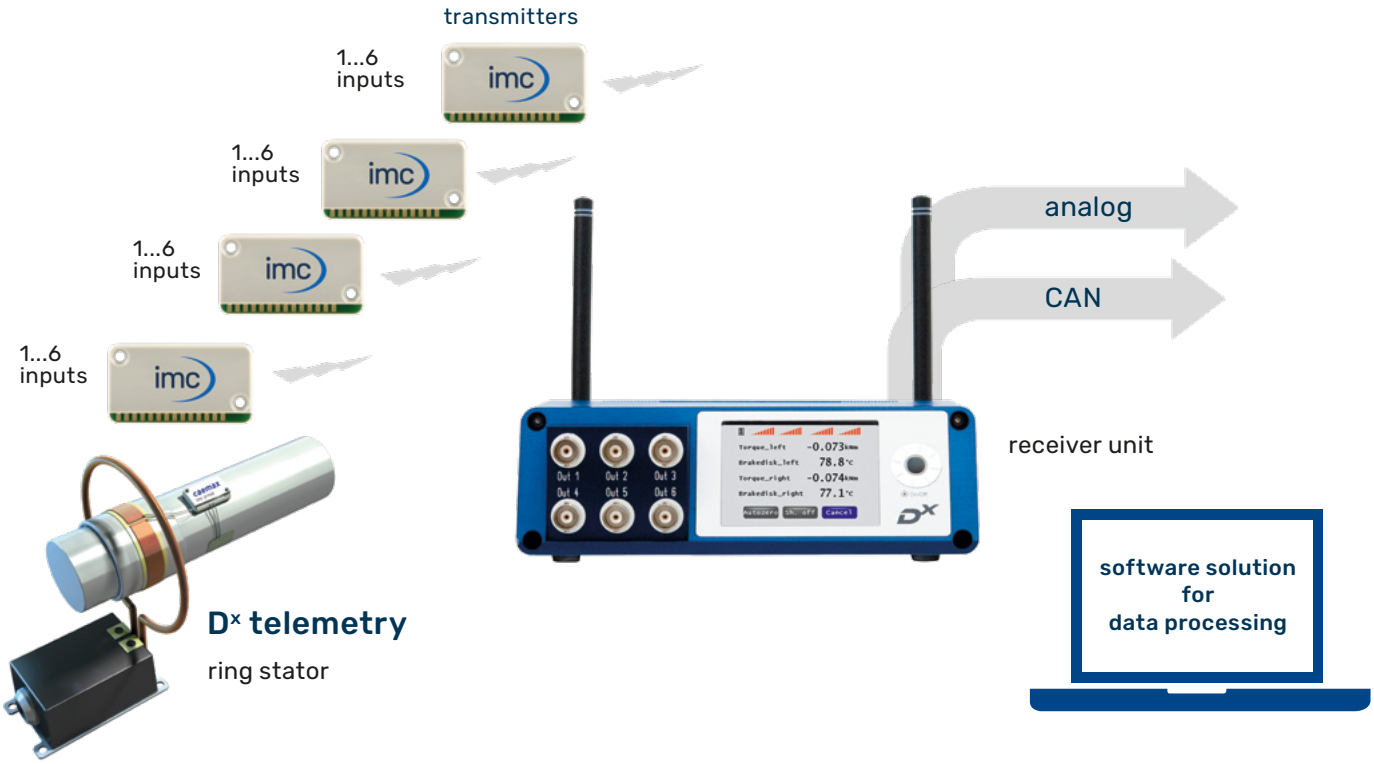
For **MEASUREMENTS ON ROTATING COMPONENTS** and moving machinery, imc offers modern telemetry systems for a wide variety of tasks: whether single-channel torque monitoring of a rotating shaft, multi-channel strain gauge and temperature measurements on a train wheelset or mechanical power measurement on a vehicle drivetrain in harsh environments. There are telemetry modules available for a large variety of sensors, such as strain gauge, thermocouples, PT100/1000, as well as IEPE sensors and voltage signals. The telemetry systems are characterized by their robust and compact design, digital and interference proof data transmission and their clever supply and installation options.

**APPLICATION**

Ideal for the wireless measurement data transmission in machinery, facilities and vehicles

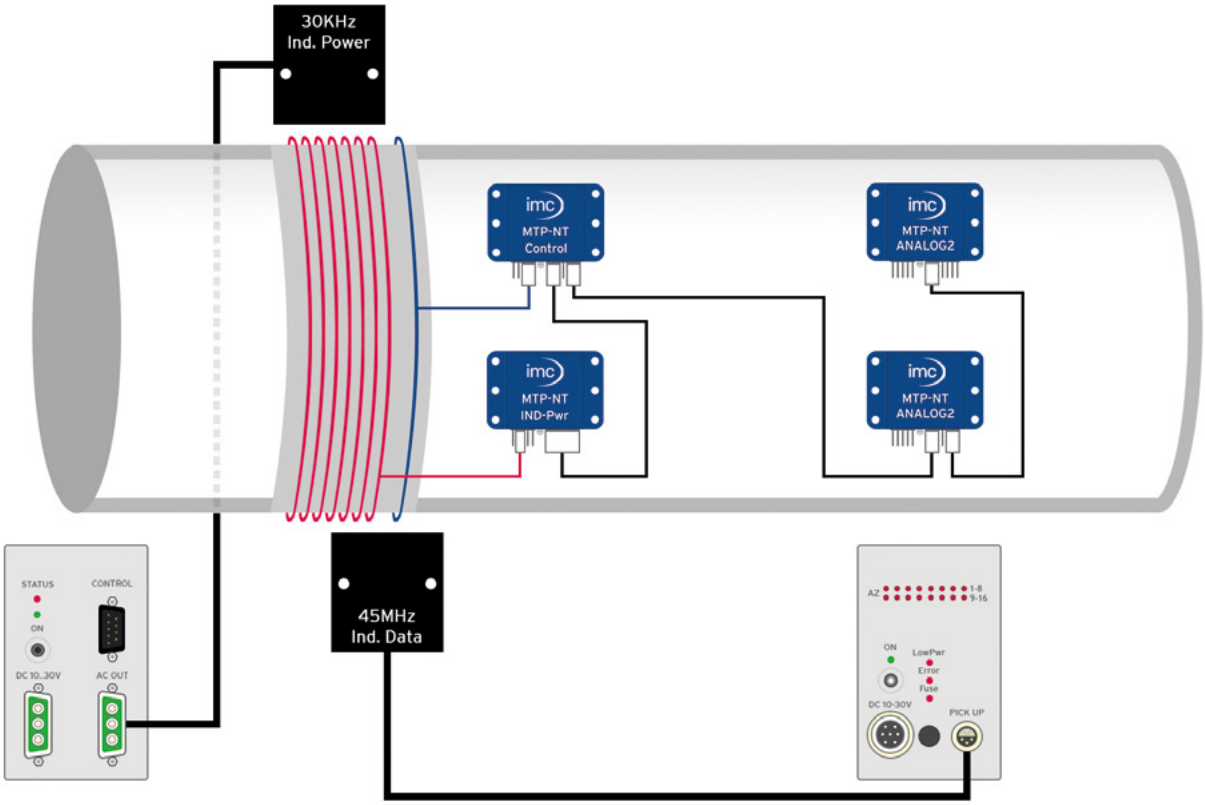
**integrated • flexible • reliable**

## Dˣ – Universal telemetry for up to 24 channels



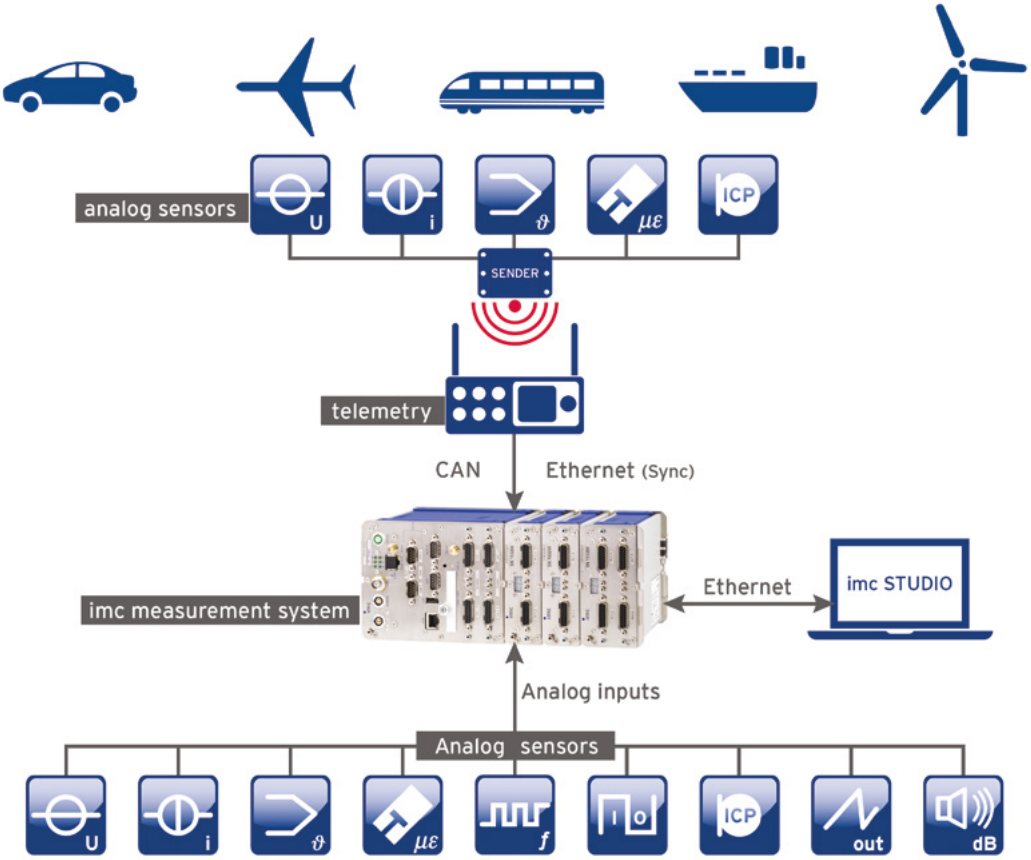

Dˣ telemetry is a compact and lightweight **MULTI-CHANNEL TELEMETRY SYSTEM** that enables flexible wireless measurements with varying numbers of channels and sensor assignments. The 14 g transmitter unit supports up to 6 channels and different sensor types, including voltage signals up to +/- 22.5 V, thermocouples and strain gauges in half-bridge and full-bridge circuits. The receiver unit synchronously acquires data via radio transmission from up to 4 transmitter modules, allowing for the simultaneous acquisition and transmission of **UP TO 24 CHANNELS**. Outputs include CAN, and analog interfaces, with easy configuration via Ethernet and a standard web browser.

## Modular Telemetry MTP-NT





MTP-NT telemetry is a small and **FLEXIBLE TELEMETRY** system that has a modular design. It consists of freely selectable sensor modules, a controller module and an inductive transmitter unit. Depending on the needs of the user, the telemetry system can be freely assembled and subsequently adapted.




## Variant for Rotor and Propeller Applications

The **CTP-NT-ROTATE** telemetry system enables the acquisition and transmission of 8, 16, 32 or 64 parallel measurement signals from helicopter rotors or aircraft propellers. The integrated battery unit eliminates the need for an external power supply and simplifies installation. The radio telemetry enables data transmission over distances of up to 20 metres in free field. The weatherproof housing (IP65) is designed for outdoor use.

# imc Telemetry Solutions Details

| | | T1 | TEL1 | TEL1-FLEX |
|---|---|---|---|---|
| application | | one channel | one channel | one channel |
| distinction | | economical | economical | flexible |
| max. channels per transmitter | | 1 | 1 | 1 |
| max. channels per decoder / system | | 1 | 1 | 1 |
| **technology** | | | | |
| data transfer | | inductive | inductive | inductive |
| reach | | 35 mm | 35 mm | 35 mm |
| resolution | | 16 bit | 12 bit | 12 bit |
| **power supply** | | | | |
| inductive | | ● | ● | ● |
| battery | | | | |
| DC supply voltage | | | | |
| **output (decoder)** | **data acquisition with imc** | | | |
| analog +/- 10V | via voltage input | ● | ● | ● |
| CAN | via CAN interface | | | |
| Ethernet | via TELDEC interface | | | |
| **configuration (parameterization)** | | | | |
| Ethernet | | | | |
| USB/RS232 | | | | |
| **data rate per transmitter** | | | | |
| max. signal bandwidth | | 1.2 kHz | 1.2 kHz | 1.2 kHz |
| max. sampling rate | | 6.4 kHz | 7 kHz | 7 kHz |
| max. data rate | | | | |
| **measured quantities and sensors** | | | | |
| voltage | | ● | ● | |
| IEPE | | | | |
| strain gauge bridges | | full / half | full / half | full / half |
| thermocouple | | | ● | |
| PT100/PT1000 | | ● | | |
| **operating conditions** | | | | |
| transmitter | | -40 … +85 °C | -40 … +85 °C | -40 … +85 (125) °C |
| receiver | | -20 … +70 °C | -20 … +70 °C | -20 … +70 °C |

| | | $D^X$ | $D^X$ - HT | MTP-NT | CTP-NT-Rotate |
|---|---|---|---|---|---|
| application | | multi-channel | | multi-channel | multi-channel |
| distinction | | modular | | modular | mobile & rotating |
| max. channels per transmitter | | 4+2 | | 2/4 | 4, 8, 16, 32, 64 |
| max. channels per decoder / system | | $D^x$ = 22 \| $D^x$-HT = 24 | | 256 | 64 |
| **technology** | | | | | |
| data transfer | | radio | | inductive / radio | radio |
| reach | | 10 m | | 50 mm | 20 m |
| resolution | | 16 bit | | 16 (18) bit | 16 bit |
| **power supply** | | | | | |
| inductive | | ● | | ● | |
| battery | | ● | | ● | ● |
| DC supply voltage | | 7 - 39 V DC | | 12 - 50 V DC | |
| **output (decoder)** | **data acquisition with imc** | | | | |
| analog +/- 10V | via voltage input | ● | | ● | ● |
| CAN | via CAN interface | ● | | | |
| Ethernet | via TELDEC interface | | | ● | ● |
| **configuration (parameterization)** | | | | | |
| Ethernet | | ● | | | ● |
| USB/RS232 | | | | ● | |
| **data rate per transmitter** | | | | | |
| max. signal bandwidth | | 920 Hz | 1 kHz | 24 kHz | 24 kHz |
| max. sampling rate | | 4.6 kHz | 5 kHz | 100 kHz | 62.5 kHz |
| max. data rate | | | | 10 Mbit/s | 5 Mbit/s |
| **measured quantities and sensors** | | | | | |
| voltage | | ● | | ● | ● |
| IEPE | | | | ● | ● |
| strain gauge bridges | | full / half | | full / half/ quarter | full / half/ quarter |
| thermocouple | | ● | | ● | ● |
| PT100/PT1000 | | ○ | | ●/● | ●/● |
| **operating conditions** | | | | | |
| transmitter | | -40 ... +85 °C | -40 ... +125 °C | -40 ... +85 (125) °C | -40 ... +70 °C |
| receiver | | -20 ... +65 °C | -20 ... +65 °C | -20 ... +70 °C | -20 ... +70 °C |

Legend: ● standard, ○ optional

# Automotive Sensor Solutions

Enhancing Precision and Efficiency

## Dˣ-BrakeTemp

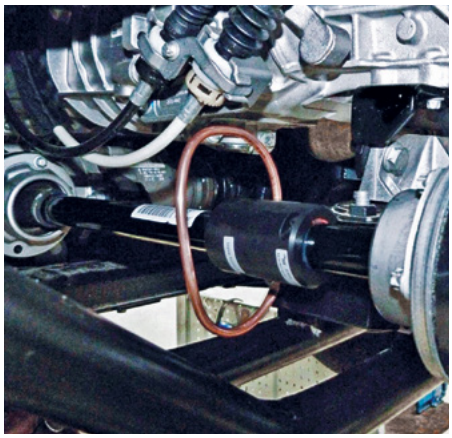
Measuring Temperatures on the Brake Disc


## Dˣ-Speed

Wireless Wheel Speed Acquisition

## Dˣ-Power

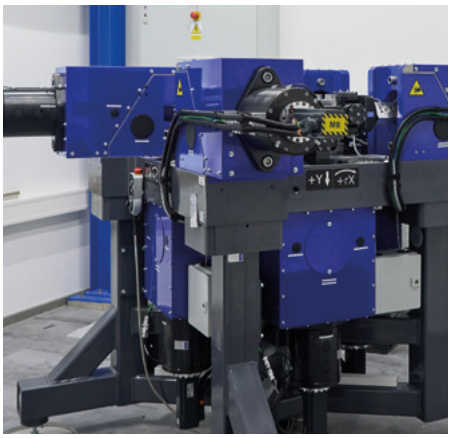
Mechanical Power Measurements on Shafts



When it comes to comprehensive solutions, our commitment goes far beyond data acquisition hardware and software. Welcome to imc's innovative sensor solutions designed for a wide range of automotive applications. Whether you're engaged in vehicle dynamics tests, brake testing, or road load data acquisition, our portfolio includes a range of high-quality sensor solutions.

## WFT-C$^{x}$

Robust Wheel Force Transducers

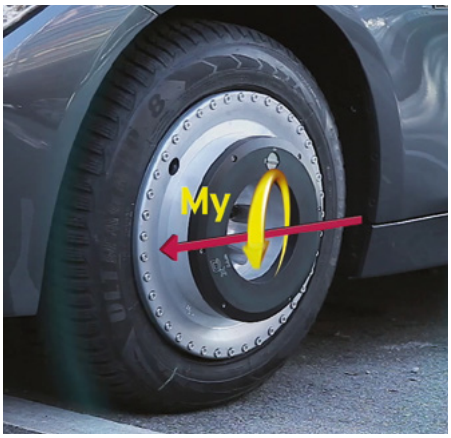


## WTT-D$^{x}$

Wireless Wheel Torque Transducer

## CLS$^{x}$

High-Precision Steering Effort Sensor




imc's sensors are specifically designed to simplify your work, from easy mounting and calibration to wireless data transmission to maximize your efficiency. Seamless integration with our DAQ platforms means you no longer have to worry about data synchronization and formats. Our sensors redefine excellence by optimizing your processes with every measurement.

# Dˣ-BrakeTemp

## Measuring Temperatures on the Brake Disc


The Dˣ-BrakeTemp is a high-precision tool for measuring temperatures on the wheels of road vehicles. All measurement signals, such as the temperatures at the brake disc, are **DIGITIZED DIRECTLY AT THE WHEELS** and transmitted telemetrically via vehicle mirror antennas to the receiver unit inside the vehicle. With its robust design, the system is also well-suited for harsh environments and road driving.

### Dˣ-BrakeTemp Details

| | |
|---|---|
| Accuracy | ±1 K |
| Temperature range | -40 °C to 60 °C |
| Sensor inputs | 3 or 6 thermocouples type J or K per wheel |
| Sampling rate | Up to 200Hz per channel with 3 channels per wheel |
| Measurement range | Typ K: to 1300 °C<br>Typ J: to 1200 °C |
| Resolution | 16 bit |
| Dimensions | Height: 50 mm<br>Diameter: 100 mm |
| Mounting on the wheel | Collets on the wheel bolts |
| Power Supply | Rechargeable battery (up to 80 h) |

# Dˣ-Speed

## Wireless Wheel Speed Acquisition without reference point

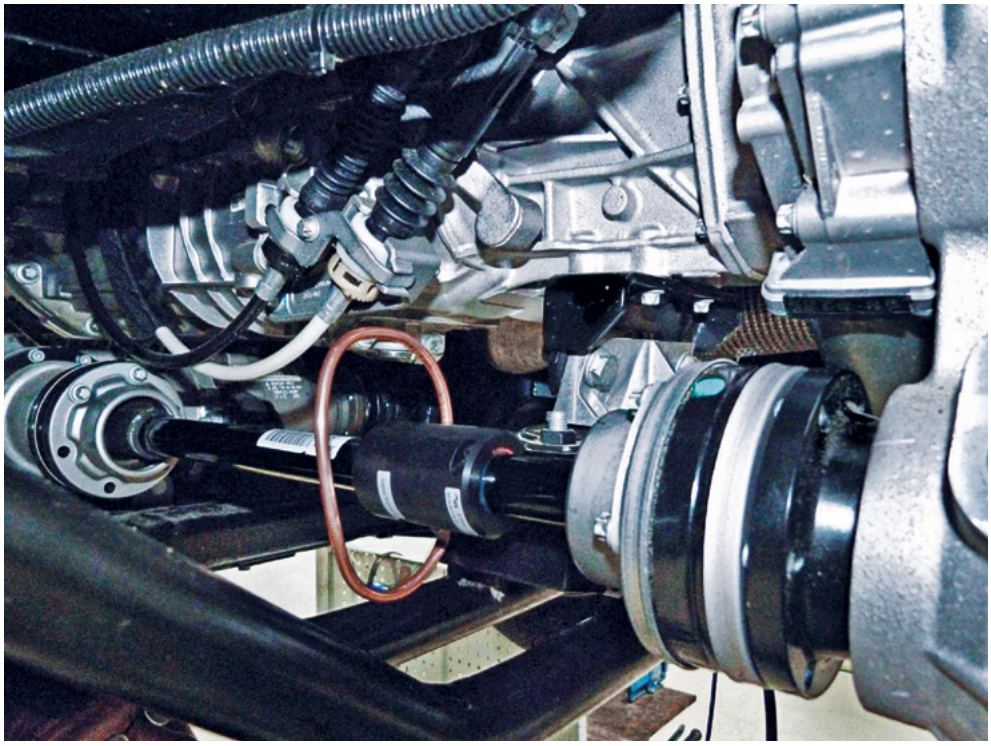

The Dˣ-Speed system conveniently acquires the wheel speed directly on vehicle wheels. The system does not require a stator or additional reference point and delivers measurement results – both on the test bench and outdoors – even in **HARSH CONDITIONS** such as mud, snow and dust. The accouracy ist typically better than 0.5%. Impacts against the axle also will not affect the results. This means that even driving on rough roads is possible!

### Dˣ-Speed Details

| | |
|---|---|
| Maximum RPM | ±7200 1/min |
| Accuracy | < 0.5 % at 10 °C to 50 °C |
| Temperature range | -40 °C to 60 °C |
| Weight | 400 g |
| Dimensions | Height: 36 mm<br>Diameter: 140 mm |
| Mounting on the wheel | Collets on the wheel bolts |
| Power Supply | Rechargeable battery (up to 80 h) |

# Dˣ-Power

## Mechanical power measurements



Dˣ-Power in operation with ring stator for inductive supply

The Dˣ-Power system allows making mechanical power measurements as easy as child's play. The transmitter unit (Dˣ-SCT) is **MOUNTED DIRECTLY ON THE VEHICLE AXLE** by means of a half-shell housing. There it acquires the torque (via strain gauges) as well as the speed via an integrated rpm sensor. The measured data is transmitted telemetrically to the Dˣ-receiver unit (RCI) inside the vehicle. This receiver unit calculates the synchronous values of the two signals in real time according to the formula, power = torque x rpm, and displays all values as physical variables.

## Dˣ-Power Details

| | |
|---|---|
| Maximum RPM | ±7200 1/min |
| Accuracy | < 0.5 % at 10 °C to 50 °C |
| Signal frequency | 16 Hz (others on request) |
| Temperature range | -40 °C to 85 °C (105 °C) |
| Torque measurement | Strain gauge |
| Power Supply | Rechargeable battery or inductive |

## Automotive Sensor Services


imc offers comprehensive services around its telemetry and sensor systems. We support you with the set-up of measurements, help with short processing times for calibrations and provide practical training. In addition, we offer our customers our in-depth know-how even in challenging applications.

You need a wheel force transducer, but only for a short period of time? Or do you simply want to get to know the WFT-C$^{X}$ and experience its capabilities in practice? imc can provide you a **RENTAL OPPORTUNITY** for the appropriate device. In addition, our specialists will be happy to assist you if required.

### Calibration

imc calibrates each WFT-C$^{x}$ on its own specifically developed test bench. Each force and torque is measured separately. Interactions (crosstalk) between the measured variables can thus be detected and compensated for. This results in an unprecedented precision of the measured values (crosstalk, non-linearity, hysteresis: all below 0.2 %).

# WFT-C$^{X}$

## Wheel Force Transducer

saves time: 1 h set-up time for four wheels no calibration after assembly

Angular resolution 0.072°

operates in all weathers and performs all off-road testing

Precise over a wide temperature range, even at high temperatures as with brake testing

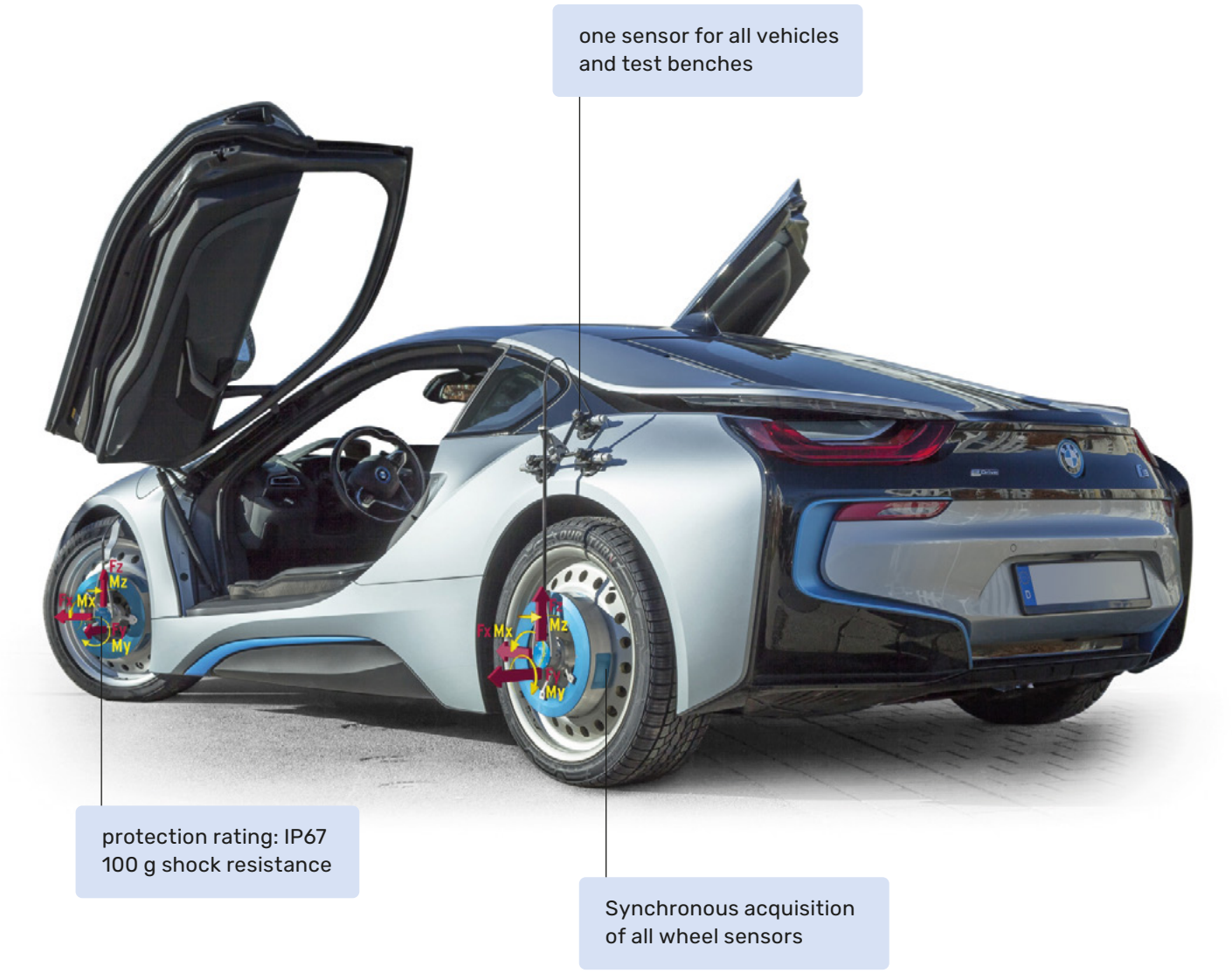
Crosstalk, hysteresis, non-linearity < 0.2 %

Whether vehicle dynamic tests, brake tests or determination of load spectra - the 6-component **WHEEL FORCE TRANSDUCER** WFT-C$^{x}$ acquires all forces and torques acting on the vehicle with high precision. The robust housing reliably protects against dirt, water and snow and allows applications in any weather.

## APPLICATION

Ideal for road testing and test stands

**precise • robust • quick setup**

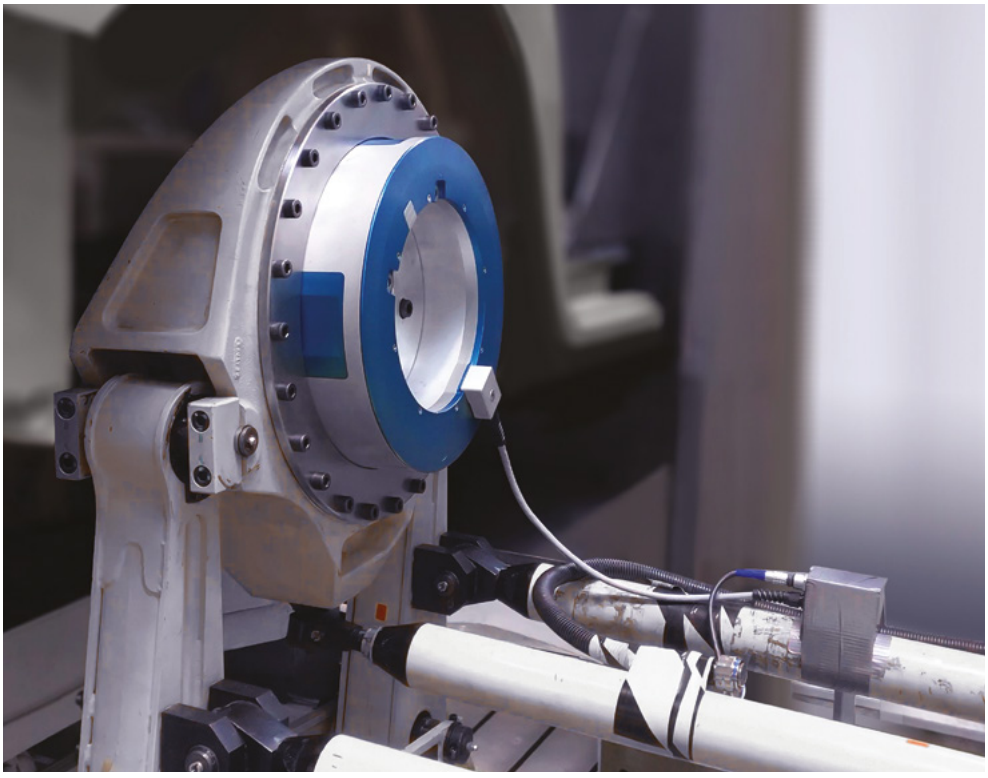



With the flexible adapter system, the WFT-C$^{x}$ can be used with minimal effort on a variety of vehicle types - **FROM COMPACT CARS TO SUVS** and light trucks - even on the test bench. A quick system setup and convenient software functions, such as zero calibration, allow the system to be test-ready within a very short time

# WFT-C$^{X}$

## Wheel Force Transducer


Our Wheel Force Transducers are built to withstand challenging environmental conditions. With a wide temperature range of -40°C to +105°C and a waterproof design, they excel in adverse weather conditions, including ice, snow, and meltwater. The robust construction and impact resistance of up to 100 g make them ideal for testing on rough terrains.



A WFT for component lifetime **TESTING ON THE TEST STAND** must be durable. Especially for these applications, imc offers WFT sensors made of titanium or steel. If a rotating measurement is carried out on a chassis dyno or on a road test, the wired signal transmission to the control unit is simply replaced by a stator. Since all of the WFT sensor housing types have the same dimensions, existing adapters can be used for all types.

## APPLICATION

Ideal for road testing and test stands

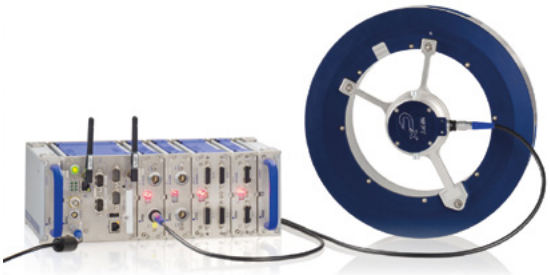
**precise • robust • quick setup**

## WFT-C$^{x}$ wheel force transducer

| Parameter | Value | | | |
|---|---|---|---|---|
| | WFT-C$^{x}$ | | | WFT-C$^{xs}$ |
| Material | Aluminium | Titanium | Steel PH17-4 | Aluminium |
| Measurement principle | temperature compensated strain gauge application | | | |
| Measurement range: forces | Fx, Fz = ± 45 kN<br>Fy = ± 25 kN | Fx, Fz = ± 60 kN<br>Fy = ± 30 kN | Fx, Fz = ± 60 kN<br>Fy = ± 30 kN | Fx, Fz = ± 25 kN<br>Fy = ± 20 kN |
| Measurement range: torques | Mx, My, Mz = ± 8,75 kNm | Mx, My, Mz = ± 10 kNm | Mx, My, Mz = ± 10 kNm | Mx, My, Mz = ± 6 kNm |
| Protection rating | IP66, IP67 | | | |
| Sampling rate per channel | up to 5 kHz | | | |
| Angular resolution with 5000 increments | 0,072 ° | | | |
| Linearity | < 0.2 % FS | | | |
| Hysteresis | < 0.2 % FS | | | |
| Crosstalk | < 0.2 % FS | | | |
| Low pass filter | 6-pol Butterworth filter, cut-off frequency 1200 Hz | | | |
| Weight without adapter (ca.) | 7.5 kg | 10.5 kg | 17.5 kg | 5.9 kg |
| Rim diameter | min. 14" (356 mm), 13" upon request | | | |
| Hub diameter with adapter | max. 5.5" | | | |
| Operating temperature sensor | - 40 °C to + 150 °C | | | |
| Operating temperature electronics | - 40 °C to + 105 °C | | | |
| Mechanical load | Stress analysis according to BMW QV 36026 | | | |
| Shock proof | max. 100 g | | | |
| Rotational speed | max. 2300 rpm (ca. 278 km/h) | | | |
| Safety | mechanical breakage protection | | | |
| Dimensions: | | | | |
| - Outer diameter (w/o adapter) | 317.5 mm | | | |
| - Inner diameter (w/o adapter) | 203 mm | | | |
| - Height | 76 mm | | | 61.5 mm |
| Temperature drift | 0.005 % / °C | | | |
| Mounting bolts | 32 Pieces | | | |
| Adaption | customer-specific adaption for any vehicle possible | | | |

### Synchronized Data Acquisition with imc CRONOS*flex*

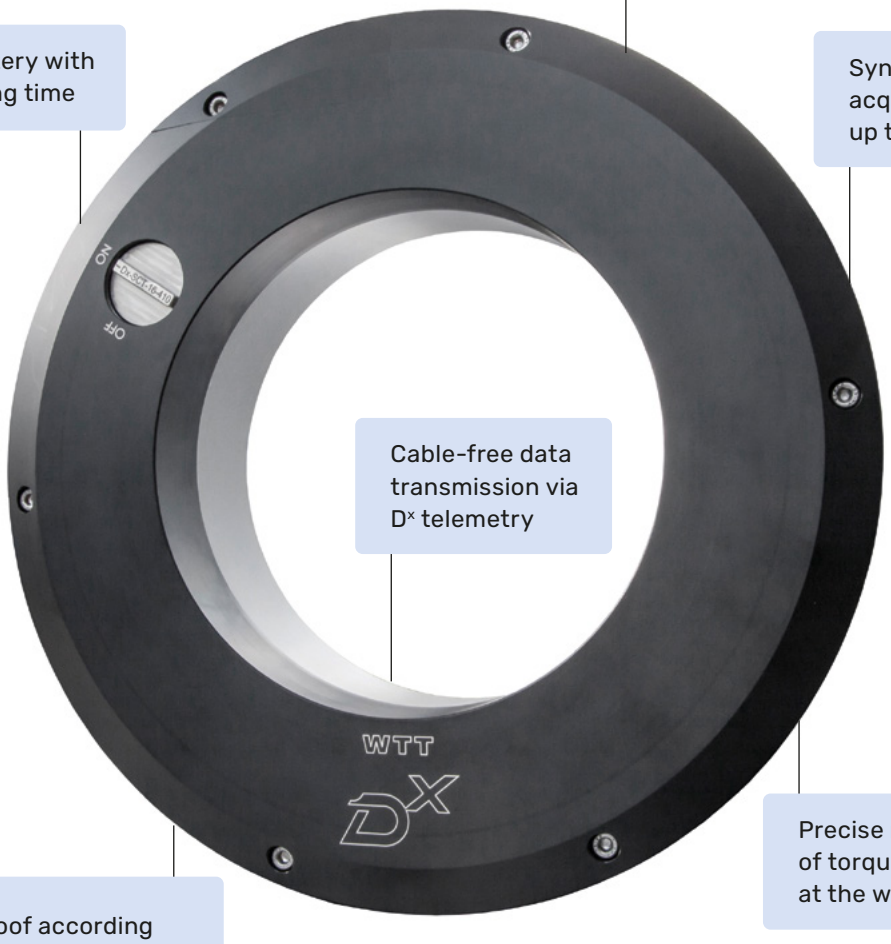
Facilitate seamless data aquisition from two WFT-C$^{x}$ wheel force transducers through the WFT-2 Module. It is simply clicked on an imc CRONOS*flex* system and is automatically synchronized with all other connected sensors, field buses, GPS systems, etc. Configuration, calibration and zeroing is effortless with the imc STUDIO software. A CRONOS*flex* supports up to three WFT-2 modules, accommodating a total of six wheel force transducers. This modular setup provides a compact, comprehensive solution for diverse vehicle applications.



# WTT-Dˣ

Wheel Torque Transducer

## Acquire drive and output torques directly at the wheel




In automotive development, it is important to know the **EXACT TORQUES** acting on the vehicle – especially under acceleration and braking maneuvers. With the WTT-Dˣ wheel torque transducer, a high-precision tool is available for making such measurements. The WTT detects the mechanical load directly where it is produced: the wheels that form the interface between the vehicle and the road.


## APPLICATION

Ideal for precise measuring of drive and braking torque directly at the wheel

**weatherproof • robust • wireless**

## WTT-D$^x$ wheel torque transducer Details

| Parameter | Value |
|---|---|
| Measurement value | torque in axial direction My |
| Signal transmission | digital-telemetric |
| Measurement range | My = ±6000 Nm, optional, My = ±3000 Nm |
| Bandwidth | max. 1 kHz |
| Linearity | < 0.5 % |
| Hysteresis | < 0.5 % |
| Crosstalk | < 0.5 % |
| Sensor diameter | 300 mm |
| Sensor weight | ca. 4.75 kg (incl. telemetry unit)<br>ca. 6.3 kg (with battery) |
| Sensor housing material | aluminum |
| Mechanical load | stress analysis according to AK-LH-08 4.34 |
| Rim diameter | min. 13“ |
| Hub diameter with adapter | max. 6“ |
| Operating temperature | -40°C to 60°C |
| max. driving speed | 250 km/h |
| max. rpm | 2300 rpm |
| Shock proof | 100 g |
| Protection rating | IP67 (waterproof) |
| Mounting and balancing | Yes (wheel bolts accessible) |
| Power supply | Up to 50 h |
| Interfaces | Analog and CAN |

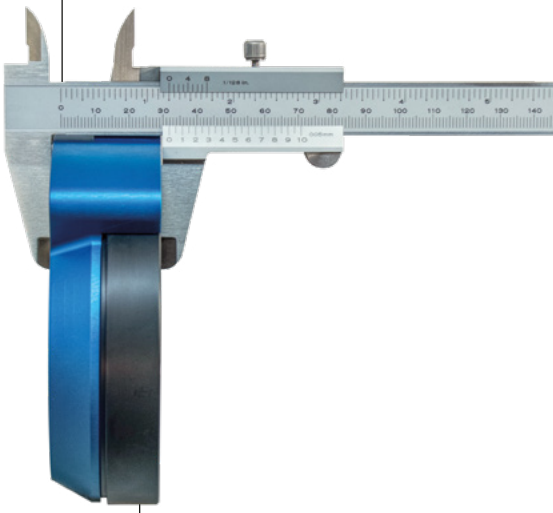
# CLS$^{X}$ steering effort sensor

## High-Precision Steering Effort Sensor

World's smallest and lightest steering effort sensor

Steering torque range ±100 Nm or ±200 Nm (up to ±250 Nm as option)

Ultra slim sensor body design for seamless integration with minimal extension of steering column

Acceleration measurement in X, Y & Z directions

Detects torque, angle and rotational velocity

Optimized for autonomous driving tests

Measuring angle range ±1440 °

With the innovative CLS$^{x}$ steering effort sensor, the original steering wheel of your vehicle becomes a high-precision instrument that measures steering torque, angle, steering velocity and acceleration in x, y and z directions. The **ULTRA-SLIM SENSOR** can be placed between the steering column and steering wheel in just a few simple steps. High-resolution A/D converters with 24 bits ensure especially good signal quality and noise-free results even at small moments below 3 Nm. This is particularly important when testing advanced driver assistance systems and autonomous driving to determine the overpressure torque.

## APPLICATION

Ideal for testing steering systems, driver assistance systems and autonomous driving

**precise • ultra-slim • quick setup**

## CLS$^{x}$ Details

| Steering torque | | |
|---|---|---|
| Parameter | Value | Remarks |
| Measuring principle | temperature compensated strain gauge application | |
| Measurement range | ±100 Nm, ±200 Nm, ±250 Nm | others upon request |
| Accuracy | 0.1% FS | Combined (gain error and non-linearity) |
| Bandwidth | 0 to 800 Hz | sampling rate 5 kHz |
| **Steering angle** | | |
| Parameter | Value | Remarks |
| Measuring principle | incremental angle encoder | |
| Measurement range | ±1440 ° | |
| Accuracy | 0.045 ° | |
| Bandwidth | 0 to 800 Hz | sampling rate 5 kHz |
| **Steering velocity (angular velocity)** | | |
| Parameter | Value | Remarks |
| Measuring principle | calculated from angle | |
| Measurement range | ±2048 °/s | |
| Bandwidth | 0 to 800 Hz | sampling rate 5 kHz |
| **Vibration and acceleration** | | |
| Parameter | Value | Remarks |
| Vibration | in the center of the steering column, measurement range up to 5 g in x, y and z direction | |
| Rotational acceleration | measurement range ±10000 °/s² | |
| **General data** | | |
| Parameter | Value | Remarks |
| Sensor height | approx. 30 mm | without adapter |
| Sensor weight | approx. 0.6 kg | without adapter |
| Overload | >100% of the measurement range | |
| Mech. breaking torque | >500 Nm | |
| Adaption | special adaption sets for any car or truck manufacturer available | |
| Moment of inertia Sensor<br>Steering wheel or column adapter | approx. 3000 g cm²<br>typ. approx. 500 g cm² | |
| Working temperature | -20°C to +80°C | |
| **Control unit** | | |
| Parameter | Value | Remarks |
| Supply | 9 to 36 V DC | |
| CAN output | freely configurable | |
| Analog output | freely configurable, max. ±10 V | |
| Auto zero | Via remote control or push-button for torque and angle on the control unit | |

# imc SERVICES

From Experts for Experts

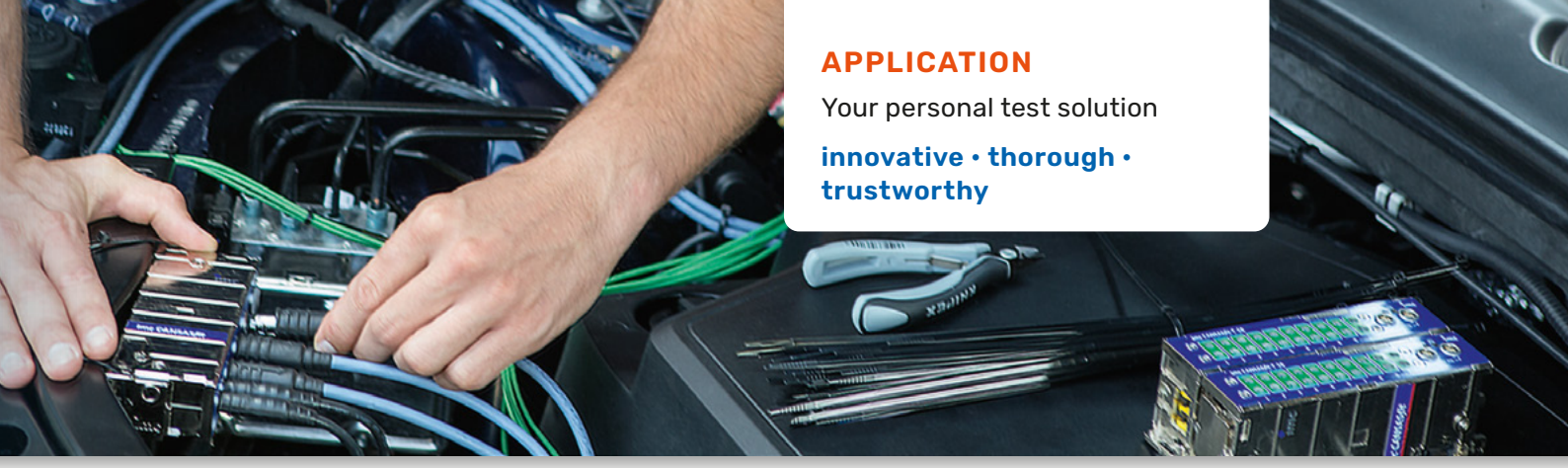
## CONSULTING & TRAINING

With our global team of measurement experts, we support you in all phases of your testing tasks with consulting and training.

## MEASURING SERVICE

For occasional tests, it is often not worthwhile to purchase your own test equipment. For this purpose, we offer contract measurements as a service.

As a **SOLUTION PROVIDER**, imc provides an additional range of services. These include project consulting, contract measurements, data evaluation, outsourcing of specialists and customer-specific software development through to system integration and test bench automation.



## APPLICATION

Your personal test solution

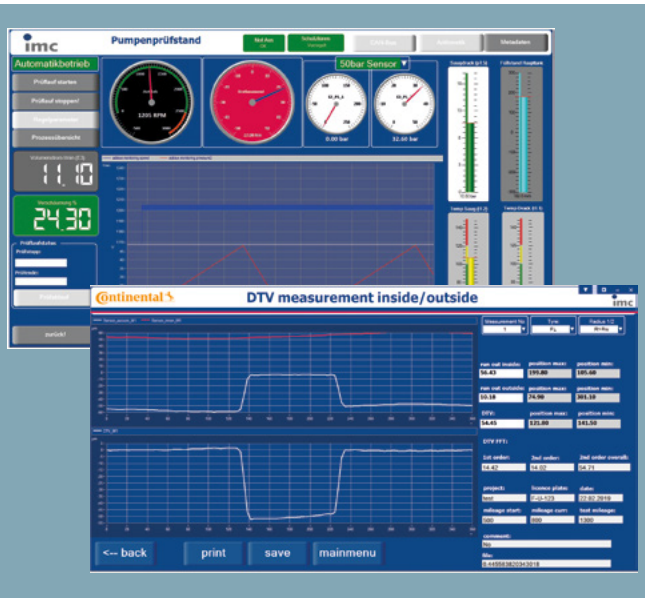
**innovative • thorough • trustworthy**

## SOFTWARE DEVELOPMENT

We develop tailor-made software for you - whether customer-specific analyses, connecting databases, integrating third-party devices or complex test bench controls.

## TEST STANDS

We develop customized test benches for research, development and production - whether for component testing, quality assurance or life cycle testing.





Our **GLOBAL TEAM OF ENGINEERS** is dedicated to working with you throughout all phases of project development - including planning, construction, configuration, and implementation. By our extensive project experience and a high level of competence in solving test and measurement tasks, we want users to reach their testing goals faster and more efficiently.

## About imc Test & Measurement

imc Test & Measurement GmbH is a manufacturer and solution provider of productive test and measurement systems. Together with its customers from the fields of automotive engineering, mechanical engineering, railway, aerospace and energy, imc implements metrological solutions for research, development, service and production.

Our customers use imc measurement devices, software solutions and test stands to validate prototypes, optimize products, monitor processes and gain insights from measurement data.

imc Test & Measurement is part of Axiometrix Solutions, a leading test solutions provider comprised of globally-recognized measurement brands like GRAS Sound & Vibration and Audio Precision.

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