

Precise. Rugged. Universal.

# MiniModules



Image greatly enlarged



**CSM** – Innovative Measurement and Data Technology

# Many measurement tasks - one solution: MiniModules from CSM

► Whether it's on the test stand, during road trials, calibration, endurance tests or in the wind tunnel: comprehensive measurements are required during the entire process of vehicle development. Typically, these include numerous temperature measurements around the engine or HVAC system, and a large number of pressure measurements. On-board and switching voltages, frequencies, and speeds must also be recorded.

The MiniModules from CSM offer measurement technology of the highest quality for all of these data acquisition tasks. It is versatile

equipment that provides reliable measurement results even in the toughest environments.



## Convincing features:

- Designed for use in extreme environments, e.g. in the engine compartment.
- CAN bus for a reliable, decentralized cabling. Short connection cables to sensors reduce line interferences and set-up times.
- Extremely compact dimensions for installation even in locations with very limited space.
- Each channel is galvanically isolated.
- Cold junction compensation for thermal channels per channel for highest measurement precision.
- Unmatched low power consumption.
- High-performance software tool for easy configuration.
- INCA AddOn for configuration directly in ETAS INCA.
- Configuration data is saved in the module and in a CANdB signal database for fast reconfiguration.
- Supports all current DAQ and application software as well as data loggers for cross-division applications.
- Excellent price-performance ratio.

**Example of a decentralized cabling concept - only ONE cable runs from the engine compartment to the data recording system in the passenger compartment**



### **Guaranteed quality thanks to DKD calibration**

► Our calibration laboratory is accredited according to DIN EN ISO/IEC 17025 and the guidelines of the Deutschen Kalibrierdienst (DKD). For us, this confirms our constant efforts to achieve the highest level of quality and precision. If you make regular use of the CSM calibration and maintenance service, the precision of your measurement results is assured and permanently guaranteed.



DKD-K-36201

## Decentralized measurement technology for vehicle and test stand - easy installation, simple configuration

▶ Maximum performance, miniature dimensions: CSM's MiniModules deserve their name. Quickly and easily fixed via cable ties or solidly attached to assembly brackets or retaining plates, the MiniModules can be installed even in the tightest, hard-to-reach areas.

Short signal cables to the sensors and the digital processing of the measurement signals significantly reduce interference. Connected sensors can be supplied with voltage directly from the measurement modules.

The simple cabling with only one connection cable for CAN bus and supply voltage reduces set-up times and costs considerably. Thick cable harnesses

running from the engine to the passenger compartment are a thing of the past. A small opening in the firewall is all that's needed.

The CSM measurement modules can be combined for various measured parameters and numbers of channels. This gives you the option to simply and reliably solve measurement tasks with hundreds of measuring points, or only a few. The measurement modules are configured with the powerful, easy CSM Config Tool.

ETAS INCA users can configure CSM MiniModules directly in the INCA software environment by using the CSM INCA AddOn software.

### CSM Config Tool Range of functions

- ▶ Searches all CSM measurement modules on the CAN bus
- ▶ Reads, checks, saves CANdB files
- ▶ Complete module configuration
- ▶ Saves all configuration data in the module
- ▶ Overview table with online display
- ▶ Firmware update via CAN, etc.

## AUTOMOTIVE or INDUSTRIAL - tailored to different demands

▶ The MiniModules were developed especially for use inside the engine compartment. One focus was keeping power consumption as low as possible, which resulted in the MiniModules' unmatched low intrinsic heating. This is a key prerequisite for precise measurement results at high operating temper-

atures of up to +125 °C and for a long service life.

The MiniModules may be used with all current on-board electrical systems and are resistant to large voltage dips, during cold starts in winter, for example.

CSM offers its MiniModules in two versions: as AUTOMOTIVE modules,

for extreme environments, and as INDUSTRIAL modules. The latter are just as precise under the specified environmental conditions – and are easy on your budget.

## Temperature measurement - high precision without compromise

▶ For high-precision temperature measurement with thermocouples, we use plug connectors made of thermal material (NiCr-Ni). The temperature of each cold junction is separately measured and individually compensated.

This prevents undesirable thermoelectric voltage at material junctions and keeps large temperature gradients, which occur in the engine compartment in a small space, from influencing the measurement results.

Thermo-Scan MiniModules represent the highest level of measurement precision – don't settle for less.

## Versatile for a broad range of applications

▶ Increasingly, various divisions within companies use a common measurement equipment pool. In other asset management concepts, vehicles are centrally equipped with measuring technology which is then accessed by different users.

With CSM MiniModules and CAN as a bus system you are well-equipped in either case. After power-on, the MiniModules send the measurement data "free running" to the CAN bus. The measurement data description is stored in a CANdB signal database. This allows

you to use almost any type of CAN bus hardware and all current standard programs, such as: DIAdem, LabVIEW, INCA, CANape, CANalyzer, CalDesk and VISION. Of course, you can also record the data using a CAN data logger, e.g. the CSM UniCAN Professional.

# A Typical CSM Measurement System



## PC Software

DIAdem, INCA, CANape, CalDesk, VISION, LabVIEW, CANalyzer, EDWinCAN, DiagRA, etc.

PC Card, USB, or Ethernet

## CAN Bus Interface

Kvaser, Vector, ETAS, dSPACE, Softing, National Instruments, IXXAT, or Peak



Thermo-Scan MiniModules



AD-Scan MiniModules



PT-Scan MiniModule



CNT-Scan MiniModule

CAN Bus



xx-Scan Modules



SMB4CAN

SMB



ETAS LA3/LA4



UniCAN Professional Data Logger

# Overview of MiniModules

Application	Module	Meas. inputs	Meas. connections	Measurement ranges	Meas. data rates per channel
Temperature measurement with type K thermocouples	Thermo-Scan 8	8	Mini-Thermo	-100 °C to +1372 °C	1 Hz to 10 Hz
	Thermo-Scan 16	16			
	Thermo-Scan MC	8	Lemo Multi Connector		
Temperature measurement with PT100 or PT1000 RTDs	PT-Scan	4	Lemo	-50 °C to +500 °C	1 Hz to 10 Hz
Voltage measurement with sensor excitation	AD-Scan 4	4	Lemo, Fischer	±0.1 V, ±0.5 V, ±10 V, ±20 V, ±60 V	1 Hz to 2 kHz
	AD-Scan 8	8			
Voltage measurement without sensor excitation	AD-Scan 8 BNC	8	BNC	±0.1 V, ±0.5 V, ±10 V, ±20 V, ±60 V	1 Hz to 2 kHz
Universal counter with sensor excitation, frequency, PWM, ...	CNT-Scan	4	Lemo, Fischer	0,1 Hz to 300 kHz	1 Hz to 1 kHz

## Technical Data

	Automotive	Industrial
Supply voltage	Approx. 5 VDC to 60 VDC	
Power consumption	Typically 1 W to 1.6 W (depending on module type)	
CAN interface	High-speed CAN (ISO 11898), CAN 2.0B (active), 125 kBit/s to 1 MBit/s	
Measurement data transfer	Free running or, alternatively, CANopen	
Galvanical isolation	500 VDC between channel/channel, CAN/channel, CAN/supply	
Operating temperature ranges	-40 °C to +125 °C	-40 °C to +85 °C
IP protection classes	IP65 / IP67	IP50
Relative humidity	0% to 100%	5% to 95%

For detailed technical data, please see the corresponding data sheets.

**Scope of delivery:** CAN-Bus MiniModule, CSM ConfigTool, documentation, ISO 17025 or factory calibration certificate

**Accessories:**

- CAN and power supply cables, available in various lengths, temperature range -40 °C to +150 °C, highly resistant to chemicals (incl. fuel and oil), highly immune to interference, very low internal resistance
- Fitting accessories



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