



# THMM pro



## Measurements at high operating temperatures

THMM pro measurement modules are equipped with 8 or 16 signal inputs for temperature measurements with thermocouples and are designed for applications used under extreme operating temperatures, like e.g. in engine compartments. The measurement inputs are equipped with NiCr-Ni mini thermo connectors and two-color status LEDs. The maximum measurement data rate per channel is 200 Hz. THMM pro measurement modules are also available with type J or type T measurement inputs.

Measurement module **THMC 16** provides 16 measurement inputs and is equipped with two LEMO 2B NiCr-Ni multi-connectors. The usage of **THMC 16** measurement modules with multi connectors is recommended if the devices need to be changed frequently and rapidly.

## Shipping content

- ▶ MiniModule THMM pro
- ▶ Configuration software CSMconfig
- ▶ Documentation
- ▶ Calibration certificate (type J and T), Calibration certificate in accordance with DIN EN ISO/IEC 17025 (type K)

## Key features

CAN

- ▶ *Internal cold junction compensation per channel*
- ▶ *Median11 filter for interference pulse suppression*
- ▶ *LEDs per channel, e.g. to indicate broken sensors*
- ▶ *Very good measurement accuracy under difficult temperature ranges and environmental conditions*
- ▶ *Very low power consumption*




## Maintenance

- ▶ Calibration every 12 months recommended

## Accessories

- ▶ See datasheet "CAN Accessories"

## Technical data

Type designation	THMM 8 pro	THMM 16 pro	THMC 16
			
Technical data valid as of revision	G1xx	D0xx	D0xx
<b>Measurement inputs</b>			
Type K	8 NiCr-Ni	16 NiCr-Ni	
Type J	8 Fe-CuNi	16 Fe-CuNi	-
Type T	8 Cu-CuNi	16 Cu-CuNi	-
<b>Measurement ranges</b>			
Type K	-100 °C to +1372 °C		
Type J	-100 °C to +1200 °C		
Type T	-100 °C to +400 °C		
Internal resolution	16 bit		
Internal sampling rate per ch.	1 kHz		
Measurement data rate / sending rate per channel	1, 2, 5, 10, 20, 50, 100, 200 Hz adjustable per module or per channel via configurable CAN identifier		
HW input filter	low-pass filter 250 Hz		
SW input filter	FIR filter (Finite Impulse Response), averaging automatically adjusted to measurement data rate		
	median11 filter, single or double internal clock rate		
Channel-specific comments	free text consisting of up to 100 characters per channel		
Input protection <sup>1)</sup>			
Operational safety	±60 V permanent		
Device safety	±100 V permanent, additional ESD protection		
Broken sensor detection	yes		
Cold junction compensation	internal reference per channel		
<b>Measurement deviation (type K) <sup>2)</sup></b>			
Gain error at 25 °C	max. ±0.05 % of measured value		
Offset and scaling error	typ. ±0.1 K max. ±0.3 K ±12 µV	typ. ±0.2 K max. ±0.3 K ±12 µV	
Gain drift	max. ±10 ppm/K		
Zero drift	max. ±4 mK/K		
<b>Galvanic isolation <sup>3)</sup></b>	no safety isolation in terms of high-voltage applications		
Channel / channel	500 V		
CAN / channel	500 V		
CAN / power supply	500 V		
<b>CAN interface</b>	CAN 2.0B (active), High Speed (ISO 11898-2:2016) 125 kbit/s to max. 1 Mbit/s, data transfer "free running"		
Configuration	via CAN bus with CSMconfig or CSM INCA AddOn settings and configurations are stored in the device		

Type designation	THMM 8 pro	THMM 16 pro	THMC 16
<b>Power supply</b>			
Minimum	6 V DC (-10 %)		
Maximum	50 V DC (+10 %)		
Power consumption	typ. 1.0 W	typ. 1.4 W	
<b>LED indicators</b>			
CAN	power / status		
Measurement channels			-
Configuration	Open channel (red flashing) / sensor connected (green flashing)		
Operation	Open channel or broken sensor (red) / Sensor detected (off)		
<b>Housing</b>	aluminium, gold anodized		
Protection class	IP65		IP67
Weight	approx. 300 g	approx. 500 g	
Dimensions (w × h × d)	approx. 120 × 33 × 50 mm / approx. 120 × 37 × 50 mm (Slide Case)	approx. 200 × 36 × 50 mm / approx. 200 × 40 × 50 mm (Slide Case)	
<b>Connectors</b>			
CAN / power supply	LEMO 0B, 5-pole, code G <sup>4)</sup>		
Signal inputs	miniature thermo connectors		LEMO 2B NiCr-Ni multi-connector
<b>Operating and storage conditions</b>			
Operating temperature range	-40 °C to +125 °C		
Relative humidity	5 % to 95 %		
Pollution degree	3		
Storage temperature	-55 °C to +150 °C		
<b>Conformity</b>	<b>CE</b>		

<sup>1</sup> Observe information regarding the intended use. See CSM document "Safety Instructions MiniModules".

<sup>2</sup> Further information can be found in the Technical Information document on the subject of "Deviation of Measurement".

<sup>3</sup> These MiniModules are designed for measurements in vehicles with 12 V, 24 V, or 48 V on-board power supply systems. The maximum operating voltage at the measurement inputs is 60 V. Not suitable to be directly connected to systems with higher operating voltages, e.g. high-voltage batteries of hybrid or electric vehicles.

<sup>4</sup> Optionally available in other variants.

## additional products

### PT4 evo

PT4 evo MiniModules are designed for temperature measurements with PT100 and PT1000 elements and are available in different housings.



### HV TH4 evo

HV TH4 evo MiniModules are especially designed for safe temperature measurements on high-voltage components and are excellently suited for applications in the field of e-mobility.





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