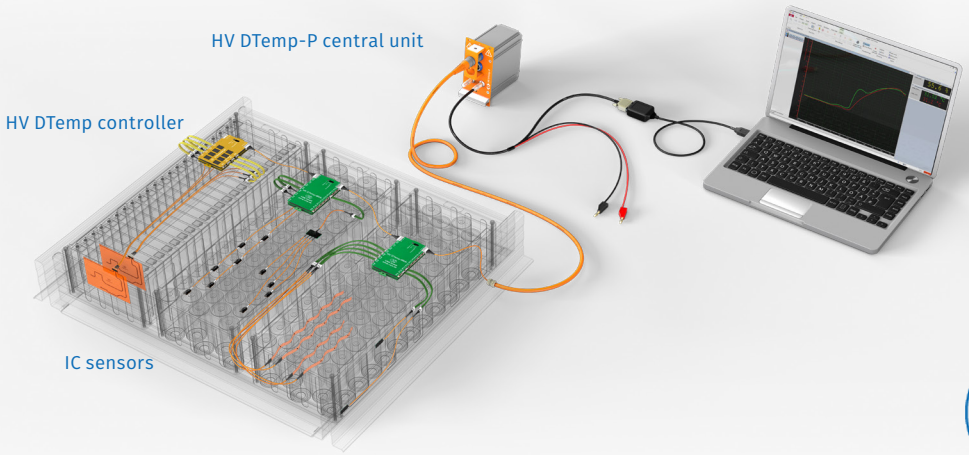
HV DTemp
Measurement system



PATENT PENDING

Product Description

With the **HV DTemp** measurement system from CSM, precise temperature and humidity measurements can be reliably performed at several hundred points in the HV environment. The miniaturized and interference-free IC temperature sensors not only offer high measurement accuracy but can also be applied as needed. Depending on the application, there are individual options for implementing the sensors, for example, mounted on an ultra-thin flexible circuit.

The measurement system can be scaled up to 512 measurement points. Up to 64 sensors (temperature and humidity) can be connected to one controller, and up to eight controllers can be connected to the central unit. The **HV DTemp** controllers are designed to provide addressing and power supply for the sensors and transmit all signals via a single, HV-safe cable to the central unit, which controls the entire system.

Since only one cable needs to be routed from the high-voltage to the low-voltage environment, safety for the user is increased. This makes the system particularly suitable for applications within an HV battery. The compact components easily fit into the space available, while only a single cable entry is required in the housing.

All signals are transmitted digitally, minimizing the risk of interference. The measurement data is transferred via CAN, for example to a measurement computer or a data logger.

Furthermore, the **HV DTemp** measurement system can be easily integrated into a larger measurement setup for the acquisition of additional parameters.

Key features

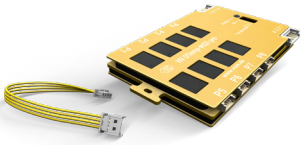
Digital temperature measurement system

- Up to 512 sensors (temperature and humidity) per measurement system
- Only one cable from the high-voltage to low-voltage environement
- Measurement accuracy (entire system): ±0.1 K to ±0.25 K
- HV-safe up to 1,000 V DC
- Individual design of the sensor flexible circuit

Technical data

Type designation	**HV DTemp-P central unit**
	
Inputs	2 galvanically isolated digital inputs for a total of max. 8 controllers (512 measurement points)
Options	Basic license: Support for 1 HV DTemp controller Optional: Activation for 2, 4, or 8 controllers
Field of application [1]	for measurement in HV environments[2]
Nominal voltage	up to 1,000 V DC
Routine test	HV-isolation test according EN 61010-2-030
Reinforced insulation[2]	
Input/Output	1,000 V DC
Input/CAN	1,000 V DC
Input/power supply	1,000 V DC
Functional insulation	
CAN/power supply	designed for 12 V and 24 V supply voltages
CAN interfaces	CAN 2.0B (active), High Speed (ISO 11898-2:2016), 125 kbit/s to 1 Mbit/s, up to 2 Mbit/s with suitable CAN interface
Configuration	via CAN bus with CSMconfig, settings and configuration data stored in the device
LED indicators	
CAN	power/status
Measurement channels	status of connected controllers
Power supply	
Minimum	6 V DC (-10 %)
Maximum	30 V DC (+10 %)
Measurement channels	480 mW (without connected DTemp Mx controllers)
Housing	aluminum with HV designation on the front-side (RAL2003)
Protection class[3]	IP65
Ground connection	M6 threaded hole
Mounting	19 inch
Weight (device)	appox. 500 g
Dimensions (w × h × d)	12 HP (approx. 61 mm) 3 U (approx. 129 mm) 100 mm (+ 25 mm protective bracket)

Type designation	**HV DTemp-P central unit**
Connectors	
CAN/power supply	LEMO 0B, 5-pole, code G
Signal inputs	LEMO Redel 2P, 8-pole, code C (blue)
Operating and storage conditions	
Operating temperature range	-40 °C to +125 °C
Relative humidity	5 % to 95 % (non-condensing)
Operating altitude	max. 5,000 m above sea level
Pollution degree [3]	3
Storage temperature	-40 °C to +125 °C
Conformity	CE
Device safety	EN 61010-1:2020+COR1:2022, +COR2:2023 with EN 61010-2-030:2022

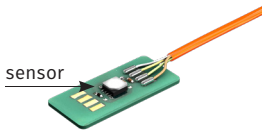
Type designation	HV DTemp-M32i pro controller (isolated)	HV DTemp-M64i controller (isolated)	HV DTemp-M64 controller
			
Function	adressing and grouping of IC sensors		
Ports	8 digital ports for 4 sensors each	16 digital ports for 4 sensors each	
Number of supported sensors (temperature and humidity)	max. 32	max. 64	
Dimensions (w × h × d)	approx. 80 mm (92 mm with mounting eyelets) × 10 mm × 56 mm	approx. 88 mm (100 mm with mounting eyelets) × 10 mm × 56 mm	approx. 75 mm (87 mm with mounting eyelets) × 8 mm × 45 mm
Color	yellow	green	
Measurement data rate/ send rate	1, 2, 5, 10, 20 Hz		
Operating temperature range	-40 °C to +125 °C (from Rev. B)	-40 °C to +125 °C	
Power supply	power supply via HV DTemp-P central unit		
Galvanic isolation	yes		-
Port/bus	1,000 V DC	560 V DC	-
Port/port	1,000 V DC	560 V DC	-
Pollution degree [3]	2		
Routine test [2]	1,500 V DC	840 V DC	-

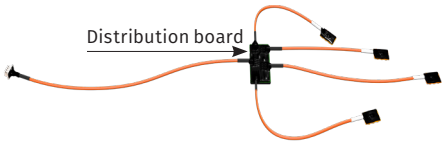
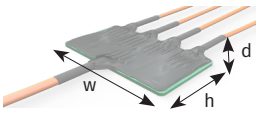
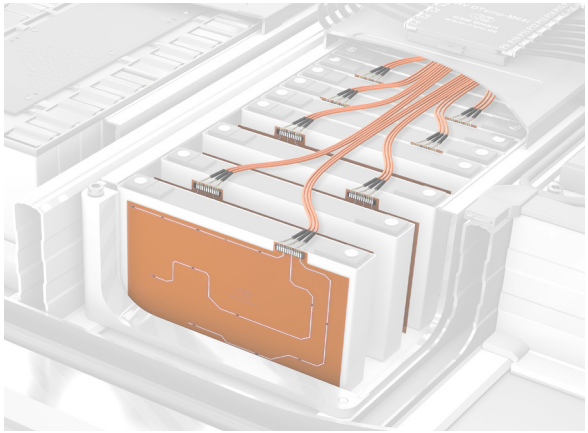
[1] Please also read the CSM document "Safety Instructions HV DTemp“

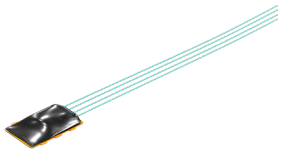
[2] According to EN 61010-1:2020+COR1:2022, +COR2:2023 with EN 61010-2-030:2022

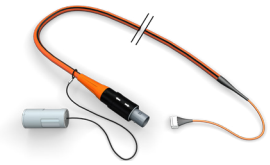
[3] Correct installation assumed! Be sure to observe the mounting instructions in the installation manual.

Type designation	HV DTemp IC temperature sensors	
IC temperatur sensor		
Dimensions (w × h × d)	approx. 1,5 mm × 0,5 mm × 1 mm (sensor)	approx. 8 mm × 0,7 mm × 12 mm
Measurement range	-40 °C to +125 °C	
Internal resolution	16 bit	
Measurement uncertainty	max. ±0,1 °C (operating temperature range -20 °C to +50 °C) max. ±0,15 °C (operating temperature range -40 °C to +70 °C) max. ±0,2 °C (operating temperature ranger -40 °C to +100 °C) max. ±0,25 °C (operating temperature range -55 °C to +125 °C)	
Calibration	calibrated by the manufacturer; metrological traceability according to NIST	
Operating temperature range	-40 °C t0 +125 °C	

Type designation	HV DTemp IC humidity sensors	
IC humidity sensor		
Dimensions (w × h × d)	approx. 2,5 mm × 1,25 mm × 2,5 mm (sensor)	approx. 8 mm × 1,9 mm × 12 mm
Measurement range	0 to 100 %	
Internal resolution	16 bit	
Measurement uncertainty	max. ± 2 % at 10 % to 70 % RH max. ± 2,5 % at 10 % to 80 % RH max. ± 3 % at10 % to 90 % RH	
Calibration	calibrated by the manufacturer; metrological traceability according to NIST	
Operating temperature range	-40 °C to +125 °C	

Type designation	HV DTemp sensor assemblies	
Sensor assemblies		
Sensor assemblies consisting of up to 4 individual sensors (temperature and humidity)	connected via distribution board	connected via cable in series
Distribution board		
Dimensions distribution board (w × h × d)	approx. 30 mm × 2 mm × 17 mm	
Individual sensor solution Number of sensors and layout of the sensor flexprint circuit according to customer requirements Sensors connected via conductor tracks		

Type designation	Connection cable IC sensors	
		
Cable type	4 x single wire AWG 28/7 in silicone outer sheath cable diameter: 2.8 ±0.3 mm cable diameter single wire:0.7 ±0.1 mm	4 x single wire AWG 36 in FEP (Teflon) sheath each, green cable diameter: 0.42 ±0.05 mm
Lengths	specified according to customer requirements	
Peak operating voltage	1,000 V DC at -20 °C to +130 °C	

Type designation	HV DTemp-P Cable
	
Function	connection cable between an HV DTemp-P central unit and an HV DTemp controller
Diameter	7.2 ± 0.2 mm
Color	orange
Peak operating voltage	1,000 V DC

Type designation	HV DTemp Controller Cable
	
Function	connection cable between two HV DTemp controllers
Diameter	2.8 ±0.3 mm
Color	orange
Peak operating voltage	1,000 V DC at -20 °C to +130 °C

Scope of delivery

- HV DTemp measurement system
- Configuration software CSMconfig
- Documentation
- HV isolation test certificate for HV DTemp-P central unit
- HV isolation test certificate for isolated HV DTemp controller (Mxi/Mxi pro)

Maintenance

- HV isolation test according to EN 61010 at least every 12 months

Accessories

- See datasheet "CAN Accessories"

Further in-depth information can be found in our brochure **CSM HV DTemp Measurement System**..

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