

imc CANSAS-C8

8-channel differential amplifier for measuring current, voltage and temperature

imc CANSAS-C8 is a powerful analog input module with 8 differential channels which can be individually filtered, amplified and digitalized. This enables high-precision measurements with thermocouples or PT100s, or voltage or current measurement at a maximum sampling rate of 100 Hz and 16-bit resolution. The high-performance design of the channels enables non-reactive measurement.



General characteristics of imc CANSAS modules

Operating conditions:

- extended temperature range, including humidity / condensation
- mechanically robust

CAN interface:

- configurable baud rate up to 1 MBit/s
- galvanically isolated

Synchronization:

- simultaneous sampling of all module's channels
- synchronizing of multiple imc CANSAS modules and with global CAN logger both via dedicated SYNC signal or based on CAN messages

Power supply and operation:

- galvanically isolated
- wide input voltage range
- supply via CAN cable possible
- automatic self start upon power-up

Onboard signal processing:

- "virtual channels"
- integrated signal processor (DSP) for online processing: data reduction, filtering, scaling, statistics etc.
- programmable multi function status LED (front panel)

Housing and Connectors:

- variety of different housings and connections

Software

Configuration:

- with imc CANSAS Software (free of charge)
- Supports the CANopen® protocol according "CiA® DS 301 V4.0.2" and "CiA® DS 404V1.2"; 4 TPDO (Transmit Process Data Objects) in INT16, INT32, and FLOAT. The supported capabilities, more standards and the settings which can be edited via CANopen® are described in the "CANSAS CANopen®" documentation.

- Capable of automatic start upon power up with preloaded configuration; also available pre-configured ex-factory.
- The module's current configuration can be extracted and exported by the software; this makes it possible to transfer configurations made by others by means of just the module.
- The "-L" and "-K" models, when installed and operated in the 19" subrack backplane, can automatically identify their slot position within the rack and pass this information on to automation software.
- The module can send a CAN-Bus message at intervals ("heartbeat"). This periodic message can serve the purpose of monitoring whether the correct module is being used with the correct configuration.

Measurement operation:

- simple measurement operation with imc CANSAS*pro*
using CAN interface such as imc CAN-USB or any other 3rd party PC CAN interface
- Data logger operation
Software: imc STUDIO or imc DEVICES
Hardware: imc measurement systems with CAN interface such as imc BUSDAQ, imc CRONOS series (CRC, CRFX, CRSI, CRPL), imc C-SERIES, imc SPARTAN
- any 3.rd party CAN data logger systems

Overview of available variants

Order Code	Article No.	Housing	Signal-connector	Extra
CAN/C8	1050107	aluminum profile	DSUB	
CAN/L-C8	1050131	aluminum profile	DSUB	
CAN/L-C8-SUPPLY	1050134	aluminum profile	DSUB	Sensor Supply
CAN/L-C8-2T	1050130	aluminum profile	Thermobuchse	
CAN/K-C8	1050112	cassette	DSUB	
CAN/K-C8-SUPPLY	1050135	cassette	DSUB	Sensor Supply
CAN/K-C8-BNC	1050113	cassette	BNC	
CAN/K-C8-2T	1050114	cassette	Thermobuchse	
CAN/SL-C8-L	1150011	sealed IP65 (SL)	LEMO	
CAN/SL-C8-L-SUPPLY	-	sealed IP65 (SL)	LEMO	Sensor Supply
CAN/SL-C8-D	1150012	sealed IP65 (SL)	DSUB	
CAN/SL-C8-D-SUPPLY	-	sealed IP65 (SL)	DSUB	Sensor Supply

Housing types: imc CANSAS - classic

	CANSAS	CANSAS-L	CANSAS-K	CANSAS-SL
General				
Housing type	Alu profile	Alu profile	cassette	sealed
Size (W x H x D, mm)	W x 111 x 90	W x 111 x 145	W x 128 x 145	W x 113 x 152
Weight (typical: UNI8)	800g	800g	450 g	900 g
Stackable	●	●	●	●
Subrack mounting		●	●	
Subrack slot recognition		●	●	
DIN-rail mounting kit	●	●		
Versatile mounting kit	●	●		●
Operating conditions				
Extended temp. range, incl. condensation	●	●	●	●
Shock and vibration rating	50g pk (5 ms)	50g pk (5 ms)	50g pk (5 ms)	MIL STD810F
IP rating	IP40	IP40	IP20	IP65
Connectivity				
CAN connector (in / out)	2 x DSUB-9	2 x DSUB-9	2 x DSUB-9	2 x DSUB-9 or 2 x LEMO
Power input connector	PHOENIX	PHOENIX	PHOENIX	LEMO.1B
Control LED (front)	●	●	●	●

Operating conditions for Alu profile and cassette

- Operating temperature: -40°C to 85°C condensation allowed
- Shock resistance 50 g pk over 5 ms

Operating conditions for sealed IP65 (SL) profile

- Operating temperature: -40°C to 85°C condensation allowed
- Shock resistance: MIL STD810F
- Ingress Protection rating: IP65

Option ex-factory (ordering option)

- Adjustable supply voltage is available at dedicated pins of the DSUB-15 connectors.

Included accessories

- Calibration certificate as per DIN EN ISO 9001
- Instruction manual (Getting started)
- Suitable power input plug:
PHOENIX plugable terminal block (aluminum profile housing)
LEMO.1B plug (SL housing)

Optional accessories

DSUB-15 plugs

- | | | |
|-------------------------|---|---------|
| • ACC/DSUBM-U4 | DSUB-15 plug with screw terminals for 4-channel voltage measurement | 1350166 |
| • ACC/DSUB-U4-IP65 | sealed version, suitable for SL series | 1350056 |
| • ACC/DSUBM-TEDS-U4 | DSUB-15 plug with screw terminals for 4-channel voltage measurement | 1350189 |
| • ACC/DSUB-TEDS-U4-IP65 | sealed TEDS version | 1350066 |

• ACC/DSUBM-I4	DSUB-15 plug with screw terminals for 4-channel current measurement of up to 50 mA (50 Ω shunt, scaling factor: 0.02 A/V)	1350168
• ACC/DSUB-I4-IP65	sealed version, suitable for SL series	1350058
• ACC/DSUBM-TEDS-I4	version with TEDS support, according to IEEE 1451.4 for use with imc Plug & Measure	1350192
• ACC/DSUB-TEDS-I4-IP65	sealed TEDS version	1350068
• ACC/DSUB-ICP4	DSUB-15 plug with screw terminals for conditioning of 4 IEPE/ICP inputs	1350032
• ACC/DSUBM-T4	DSUB-15 plug with screw terminals for 4-channel measurement of voltages as well as temperatures with PT100 and thermocouples with integrated cold junction compensation (CJC).	1350167
• ACC/DSUB-T4-IP65	sealed version, suitable for SL series	1350057
• ACC/DSUBM-TEDS-T4	version with TEDS support, according to IEEE 1451.4 for use with imc Plug & Measure	1350190
• ACC/DSUB-TEDS-T4-IP65	sealed TEDS version	1350067

Mounting brackets for fixed installations of CANSAS modules with Alu profile housing

• CAN/BRACKET-90	mounting bracket 90°	1050319
• CAN/BRACKET-DIN-S	mounting bracket for DIN-Rail	1050324
• CAN/BRACKET-DIN-M	mounting bracket for DIN-Rail	1050325

Mounting brackets for fixed installations of CANSAS-SL modules

• CAN/SL-BRACKET-CON	interconnect bracket	1150048
• CAN/SL-BRACKET-90	mounting bracket 90°	1150047
• CAN/SL-BRACKET-180	mounting bracket 180°	1150049

Technical Specs - C8

Channels, measurement modes, terminal connection		
Parameter	Value	Remarks
Inputs	8	
Measurement modes DSUB	voltage measurement current measurement temperature measurement thermocouples PT100	voltage plug (ACC/DSUBM-U4) shunt plug (ACC/DSUBM-I4) thermo plug (ACC/DSUBM-T4)
Measurement modes LEMO	voltage measurement current measurement RTD	with external shunt
Measurement mode Thermocouple terminal socket (-2T)	thermocouple type-K	miniature thermocouple terminal
Terminal connection	2x DSUB-15 / 4 channels or 8x BNC or 8x 2-pin thermocouple terminal sockets 2x DSUB-9 PHOENIX (MC 1.5/4STF-3.81)	inputs only for voltage measurement only for type K thermocouple measurement CAN (in / out), supply (alternatively) supply
Terminal connection for SL Inputs CAN (in / out)	2 x DSUB-15/ 4 channels 2x DSUB-9	CANSAS-SL-C8-D, (-SUPPLY) power supply (alternatively)
inputs CAN (in / out)	8x 7-pin LEMO (HGG.1B.307) 2x 10-pin LEMO (HGA.1B.310)	CANSAS-SL-C8-L, (-SUPPLY) power supply (alternatively)
DC power supply	1x 6-pin LEMO (HGA.1B.306)	for all SL models

Sampling rate, bandwidth		
Parameter	Value	Remarks
Sampling rate	≤100 Hz	per channel
Bandwidth	20 Hz 10 Hz	-3 dB (voltage measurement) -3 dB (temperature measurement)

General			
Parameter	Value typ.	min. / max.	Remarks
Isolation CAN-Bus power supply input analog input	±60 V ±60 V no isolation		output to case (CHASSIS) nominal; testing voltage:300 V (10 s) nominal; testing voltage:300 V (10 s) analog reference ground:CHASSIS
Ovvolt protection	±250 V	±80 V	permanent channel to chassis <1 ms

Voltage measurement			
Parameter	Value typ.	min. / max.	Remarks
Input range	$\pm 60 \text{ V}$, $\pm 20 \text{ V}$, $\pm 10 \text{ V}$, $\pm 5 \text{ V}$, $\pm 2 \text{ V}$, $\pm 1 \text{ V}$, $\pm 500 \text{ mV}$, $\pm 200 \text{ mV}$, $\pm 100 \text{ mV} \dots \pm 5 \text{ mV}$		
Input impedance	1 M Ω 492 k Ω 79 k Ω	$\pm 1\%$ $>135 \text{ k}\Omega$ $>75 \text{ k}\Omega$	differential $\pm 60 \text{ V to } \pm 2 \text{ V}$ $\pm 1 \text{ V to } \pm 50 \text{ mV}$ $\pm 20 \text{ mV to } \pm 5 \text{ mV}$
Gain error	0.01%	$\leq 0.05\%$ $\leq 0.02\%$ $\leq 0.05\%$	of reading $\pm 60 \text{ V to } \pm 200 \text{ mV}$ $\pm 100 \text{ mV to } \pm 20 \text{ mV}$ $\pm 10 \text{ mV to } \pm 5 \text{ mV}$
Gain drift	5 ppm/K· ΔT_a	$\pm 20 \text{ ppm/K}\cdot\Delta T_a$	$\Delta T_a = T_a - 25^\circ\text{C} $; ambient temperature T_a
Offset error	0.005% 0.005% 0.02%	$\leq 0.05\%$ $\leq 0.01\%$ $\leq 0.06\%$	of input range $\pm 60 \text{ V to } \pm 200 \text{ mV}$ $\pm 100 \text{ mV to } \pm 20 \text{ mV}$ $\pm 10 \text{ mV to } \pm 5 \text{ mV}$
Offset drift	$\pm 4 \mu\text{V/K}$ $\pm 0.07 \mu\text{V/K}$	$<\pm 12 \mu\text{V/K}$ $<\pm 0.16 \mu\text{V/K}$	$\pm 60 \text{ V to } \pm 2 \text{ V}$ $\pm 1 \text{ V to } \pm 5 \text{ mV}$
Common mode voltage $\pm 50 \text{ V to } \pm 2 \text{ V}$ $\pm 1 \text{ V to } \pm 5 \text{ mV}$	50 V 2 V	$<30 \text{ V}$ $<1 \text{ V}$	with differential input voltage: $\pm 50 \text{ V}$ $\pm 1 \text{ V}$
Common mode rejection ratio (CMRR) $\pm 60 \text{ V to } \pm 2 \text{ V}$ $\pm 1 \text{ V to } \pm 5 \text{ mV}$	70 dB 120 dB	$>54 \text{ dB}$ $>100 \text{ dB}$	common mode test voltage $\pm 50 \text{ V}$ $\pm 1 \text{ V}$
Noise	51 nV _{rms} 305 nV _{pkpk}		range $\pm 5 \text{ mV}$, sampling rate 100 Hz, $R_{\text{source}} = 50 \Omega$

Temperature measurement - thermocouples			
Parameter	Value typ.	min. / max.	Remarks
Measurement mode	J, T, K, E, N, S, R, B		
Measurement range	-50°C to 400°C -50°C to 150°C -270°C to 1370°C		type K
Resolution	0.025 K 0.0031 K		type K -270°C to 1370°C -50°C to 150°C
Error thermocouples	$\pm 0.2 \text{ K}$	$<\pm 0.5 \text{ K}$	types J, T, K, E, L (for all other types, the voltage measurement error applies)
drift	$\pm 0.02 \text{ K/K}\cdot\Delta T_a$		$\Delta T_a = T_a - 25^\circ\text{C} $ ambient temperature T_a
Error of cold junction compensation		$<\pm 0.15 \text{ K}$ $<\pm 0.5 \text{ K}$	C8-2T
Drift of cold junction	$\pm 0.001 \text{ K/K}\cdot\Delta T_j$		$\Delta T_j = T_j - 25^\circ\text{C} $; could junction T_j

Temperature measurement - thermocouples

Parameter	Value typ.	min. / max.	Remarks
Input impedance	100 kΩ		differential
Signal-noise ratio		>85 dB	bandwidth 10 Hz

Temperature measurement - RTD (PT100)

Parameter	Value typ.	min. / max.	Remarks
Measurement range	-200°C to 850°C, -50°C to 150°C		resolution: ≈0.016 K, ≈0.003 K
Error		<±0.2 K <±0.1 K <±0.05%	-200°C to 850°C, four-wire connection -50°C to 150°C, four-wire connection corresponding resistance
Drift		±0.01 K/K·ΔT _a	ΔT _a = T _a - 25°C ambient temperature T _a
PT100 sensor feed	625 µA		
Input impedance	20 MΩ	±1%	differential

Optional sensor supply (CAN-xx-SUPPLY)

Parameter	Value			Remarks
Configuration options	7 selectable settings			
Output voltage	voltage +2.5 V +5.0 V +7.5 V +10 V +12 V +15 V +24 V	current 580 mA 580 mA 400 mA 300 mA 250 mA 200 mA 120 mA	net power 1.5 W 2.9 W 3.0 W 3.0 W 3.0 W 3.0 W 2.9 W	set globally for all channels of a module
Isolation standard	non isolated			output to case (CHASSIS)
optional, upon request	isolated			nominal rating: 50 V, test voltage (10 sec): 300 V
Short-circuit protection	unlimited duration			to output voltage reference ground
Accuracy of output voltage	<0.25% (typ.) / <0.5% (max.) <0.9% (max.)			at terminals, no load 25°C; 2.5 V to 24 V over entire temperature range
Max. capacitive load	>4000 µF >1000 µF >300 µF			2.5 V to 10 V 12 V, 15 V 24 V

Power supply of the module

Parameter	Value		Remarks
Supply voltage		10 V to 50 V DC	
Power consumption		<2.5 W	

Operating conditions

Parameter	Value	Remarks
Operating temperature	-40°C to 85°C	
Dimensions (W x H x D)	35 x 111 x 90 mm 75 x 111 x 145 mm 41 x 128 x 145 mm 81 x 128 x 145 mm 58 x 112.5 x 152 mm 38 x 112.5 x 152 mm 78 x 112.5 x 152 mm 58 x 112.5 x 152 mm	CANSAS-C8 CANSAS-L-C8, -L-C8-SUPPLY CANSAS-K-C8 (8 HP cassette) CANSAS-K-C8-BNC, -K-C8-2T CANSAS-K-C8-SUPPLY CANSAS-SL-C8-L CANSAS-SL-C8-D CANSAS-SL-C8-L-SUPPLY CANSAS-SL-C8-D-SUPPLY