

CANSAS-C8

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

Version 1.4



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.

Order code:	Article #
CANSAS-C8	1050107
CANSAS-L-C8	1050131
CANSAS-L-C8-SUPPLY	1050134
CANSAS-K-C8	1050112
CANSAS-K-C8-SUPPLY	1050135
CANSAS-K-C8-BNC	1050113
CANSAS-K-C8-2T	1050114
CANSAS-SL-C8-L	1150011
CANSAS-SL-C8-D	1150012
CANSAS-SL-C8-L-SUPPLY	-
CANSAS-SL-C8-D-SUPPLY	-

11 different models available:

CANSAS-C8

Fan-less extruded aluminum housing (Short model, 2x DSUB signal terminals)
35 x 111 x 90 (W x H x D in mm)
Weight typ. 300 g

CANSAS-L-C8

Fan-less extruded aluminum housing (Long model, 2x DSUB signal terminals)
35 x 111 x 145 (W x H x D in mm)

CANSAS-L-C8-SUPPLY

Fan-less extruded aluminum housing (Long model, 2x DSUB signal terminals)
55 x 111 x 145 (W x H x D in mm)
with built-in supply module

CANSAS-K-C8

Fan-less cassette, 3U/8HP (Cassette model, 2x DSUB signal terminals)
For installation in the imc 19" subrack
CAN-Bus and supply are connected to the module via the 19" subrack
Weight typ. 900 g

CANSAS-K-C8-SUPPLY

Like CANSAS-K-C8 (Cassette model, 2x DSUB signal terminals)
but: 3U/16HP
with built-in sensor supply

CANSAS-K-C8-BNC

Like CANSAS-K-C8 (Cassette model)
Signal terminals: 8x BNC
designed for voltage measurement only

CANSAS-K-C8-2T

Like CANSAS-K-C8 (Cassette model)
Signal terminals: 8x 2-pin TK sockets as per IEC 584 (green, "Rössel")
only designed for temperature measurement with Type K thermocouples

CANSAS-SL-C8-L

Fan-less IP65 extruded aluminum housing (SL model, Lemo signal terminals)
58 x 112.5 x 152 (W x H x D in mm)

CANSAS-SL-C8-D

Fan-less IP65 extruded aluminum housing (SL model, DSUB-15 signal terminals)
38 x 112.5 x 152 (W x H x D in mm)

CANSAS-SL-C8-L-SUPPLY

Fan-less IP65 extruded aluminum housing (SL model, Lemo signal terminals)
78 x 112.5 x 152 (W x H x D in mm)
with built-in sensor supply

CANSAS-SL-C8-D-SUPPLY

Fan-less IP65 extruded aluminum housing (SL model, DSUB-15 signal terminals)
58 x 112.5 x 152 (W x H x D in mm)
with built-in sensor supply

Refer also to the document "CANSAS Installation and Assembly" for information on the models and module racks.

Connections at standard extruded aluminum housing and cassette modules

- CAN-Bus connected via 2 DSUB-9 terminals; CAN IN (male), CAN OUT (female) ¹
CAN-Bus Interface for sending measurements on the CAN-Bus at rates of up to 1Mbit/s,
(equipped in accordance with the CiA® Draft Standard 102 Version 2.0, CAN Physical Layer for Industrial Applications)
- Signal terminals on the module: 2x 15-pin DSUB-screw terminal blocks (for 4 channels per terminal)
- Power supply via PHOENIX (MC1, 5/4STF-3,81) socket (CAN/Power-Plug) ¹
- For the cassette model, two additional terminal types are available for connecting signals:
 - Signal connection via BNC-sockets (CANSAS-K-C8-BNC)
designed for voltage measurement only
 - Signal terminals: 8x 2-pin TK sockets as per IEC 584 (green, "Rössel") (CANSAS-K-C8-2T)
only designed for temperature measurement with Type K thermocouples

Connections at SL extruded aluminum housing**CANSAS-SL-C8-D(-SUPPLY)**

- CAN-Bus connected via 2x DSUB-9 terminals, CAN IN and CAN OUT
CAN-Bus Interface for sending measurement channel signals on the CAN-Bus at up to 1Mbit/s,
(equipped according to the CiA® Draft Standard 102 Version 2.0, CAN Physical Layer for Industrial Applications)
- Voltage supply via 6-pin LEMO 1B (HGA.1B.306) connector
- Signal terminal at module:
 - 2x DSUB-15 with 4 channels per DSUB-15 connector for CANSAS-SL-C8-D(-SUPPLY)

¹ not with Cassette model

CANSAS-SL-C8-L(-SUPPLY)

- CAN-Bus connected via 2x 10-pin LEMO 1B (HGA.1B.310) terminals, CAN IN and CAN OUT CAN-Bus Interface for sending measurement channel signals on the CAN-Bus at up to 1Mbit/s, (equipped according to the CiA® Draft Standard 102 Version 2.0, CAN Physical Layer for Industrial Applications)
- Voltage supply via 6-pin LEMO 1B (HGA.1B.306) connector
- Signal terminal at module:
 - 8x 7 pin LEMO 1B (HGG.1B.307) connectors for CANSAS-SL-C8-L(-SUPPLY) for different measurement modes see table

Power supply for standard extruded aluminum housing and cassette modules

- Supply voltage: 10 V to 50 V DC² via (4-pin) PHOENIX plug or via CAN-Bus plug
- Automatic independent start upon application of supply voltage
- Power consumption <4.0 W (typ.)

Power supply for SL extruded aluminum housing

- Supply voltage: 10 V to 50 V DC via 6-pin LEMO connector or via CAN-Bus plug
- Automatic startup upon applying supply voltage
- Power consumption <4.0 W (typ.)

Operating conditions for standard extruded aluminum housing and cassette modules

- Operating temperature: -30°C to 85°C condensation allowed
- Shock resistance 50 g pk over 5 ms (without plug)
- With extruded aluminum housing: voltage supply connected via Phoenix socket

Operating conditions for SL extruded aluminum housing

- Operating temperature: -30°C to 85°C condensation allowed
- Shock resistance: MIL STD810F (without plug)
- Protection class : IP65
- With extruded aluminum housing: voltage supply connected via LEMO socket

Included accessories

- Calibration certificate as per DIN EN ISO 9001
- Instruction manual
- With extruded aluminum housing: Connection terminal for power supply via Phoenix socket or via LEMO socket with gum sealing ring at SL models

Measurement properties

- Sampling rates can be set to up to 100 Hz per channel in steps of 1, 2, 5
- 20 Hz bandwidth (-3 dB)
- 16-bit resolution (with internal 24-bit processing)
- Integrated DSP for online signal processing: data reduction, filtering, scaling, statistics etc.

Measurement channels

- 8 differential analog channels individually filtered and conditioned for measurement of: voltage, thermocouples, Pt100, current
- Synchronized sampling of all measurement channels
- Synchronized sampling with measurement systems or appropriate modules possible both with additional synchronization line and via CAN-bus only.

² modules build before April 2011: 9 V to 32 V see specification label

Special characteristics

- 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.
- The module's configuration can be exported by the software; this makes it possible to transfer configurations made by others by means of just the module.
- With the Long and Cassette models, the module can import slot data from the rack and pass it to automation software.

Optional accessories

- Supply voltage for external sensors optionally available

Connection terminals:

- **ACC/DSUB-U4** 15-pin DSUB connector for each 4 channel group: voltage measurement
- **ACC/DSUB-T4** 15-pin DSUB connector for each 4 channel group: for voltage measurement as well as temperature measurement (Pt100 or thermocouple) Inside of the terminal pod, there is an isothermal plate and a Pt1000 unit for cold-junction compensation.
- **ACC/DSUB-I4** 15-pin DSUB connection terminals for each 4-channel group (50 Ω shunt). For measurement of currents of up to 40 mA
- **ACC/DSUB-U4-IP65** 15-pin DSUB connection terminal for each 4-channel group: voltage measurement adapted for CANSAS-SL.
- **ACC/DSUB-T4-IP65** 15-pin DSUB connector for each 4 channel group: voltage measurement as well as temperature measurement (Pt100 or thermocouple) Inside of the terminal pod, there is an isothermal plate and a Pt1000 unit for cold-junction compensation adapted for CANSAS-SL.
- **ACC/DSUB-I4-IP65**, 15-pin DSUB connection terminals for each 4-channel group (50 Ω shunt). For measurement of currents of up to 50 mA adapted for CANSAS-SL.

Additional options and accessories

- Depending on the model, the modules can be either attached together to form stacks or installed in racks; see the document "*CANSAS Installation and Assembly*" for more on these options.
- The connectors necessary for the signals are described in "*Signal Connection Terminals*".
- The modules can be configured for CAN-network applications either -by order- at factory, or by the customer using appropriate configuration software. The necessary software as well as cables and additional accessories are presented in the documentation "*Integrating CANSAS in CAN Networks*".

C8

Datasheet Version 1.4 (8 differential analog inputs, individually filtered and conditioned)

Parameter	Value (min./ max.)	Remarks
Inputs	8	
Measurement modes (DSUB):	voltage thermocouples, RTD current	ACC/DSUB-I4
Measurement modes (LEMO):	voltage RTD current	with external shunt
Sampling frequency/ Channel	≤100 Hz	
Connection terminals	2x DSUB-15 / 4 channels or 8x BNC or 8x 2-pin TK 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
Connection terminals for SL	2 plug DSUB-15/ 4channels 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)
inputs CAN (in / out)		
DC power supply	1x 6-pin LEMO (HGA.1B.306)	for all SL models

Parameter	typ.	min. / max.	Remarks
Voltage measurement			
Input range	±60 V, ±20 V, ±10 V, ±5 V, ±2 V, ±1 V, ±500 mV, ±200 mV, ±100 mV ... ±5 mV		
Input impedance	1.00 MΩ 492 kΩ 79 kΩ	±1% >135 kΩ >75 kΩ	differential ±60 V to ±2 V ±1 V to ±50 mV ±20 mV to ±5 mV
Gain uncertainty	0.01 % 5 ppm/K·ΔT _a	≤0.05 % ≤0.02 % ≤0.05 % ±20 ppm/K·ΔT _a	of reading ±60 V to ±200 mV ±100 mV to ±20 mV ±10 mV to ±5 mV ΔT _a = T _a -25°C ; ambient temp: T _a
Offset uncertainty	0.005 % 0.005 % 0.02 % ±4 μV/K ±0.07 μV/K	≤0.05 % ≤0.01 % ≤0.06 % <±12 μV/K < ±0.16 μV/K	of input range ±60 V to ±200 mV ±100 mV to ±20 mV ±10 mV to ±5 mV ±60 V to ±2 V ±1 V to ±5 mV
Common mode rejection Range ±60 V to ±2 V ±1 V to ±5 mV	70 dB 120 dB	> 54 dB >100 dB	common mode test voltage ±50 V ±1 V
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
Overvoltage protection	±80 V		permanent channel to chassis

Parameter	typ.	min. / max.	Remarks
Voltage measurement			
	±250 V		<1 ms
Noise	51 nVrms 305 nVpkk		range ± 5 mV bandwidth 100 Hz $R_{source} = 50 \Omega$
Bandwidth	0 Hz to 20 Hz		-3 dB

Parameter	typ.	min. / max.	Remarks
Temperature measurement			
Signal-noise ratio		>85 dB	bandwidth 10 Hz
Bandwidth	0 Hz to 10 Hz		-3 dB

Thermocouples			
Input ranges	J, T, K, E, N, S, R, B		per IEC 584
Resolution	0.025 K 0.0031 K		type K -270°C to 1370°C -50°C to 150°C
Uncertainty thermocouples	±0.2K	<±0.5 K	Types J, T, K, E, L (for all other types, the voltage measurement uncertainty applies)
drift	±0.02 K/K·ΔT _a		ΔT _a = T _a - 25°C ambient temperature T _a
Uncertainty of cold junction compensation		< ±0.15 K < ±0.5 K	CAN-C8-DSUB (standard) CAN-C8-K2
Drift of cold junction	±0.001 K/K·ΔT _j		ΔT _j = T _j - 25°C ; cold junction T _j
Input impedance	100 kΩ		differential
RTD (Pt100)			
Input range	-200°C to 850°C, -50°C to 150°C		≈0.016 K, ≈0.003 K (resolution)
Uncertainty		<±0.2 K <±0.1 K <±0.05 %	-200°C to 850°C, four-wire connection -50°C to 150°C, four-wire connection plus of range
Drift		±0.01 K/K·ΔT _a	ΔT _a = T _a - 25°C ambient temperature T _a
Pt100 sensor feed	625 μA		
Input impedance	20.0 MΩ	±1 %	differential

General			
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
Supply voltage	10 V to 50 V DC		
Sensor supply		2.5 V to 24 V	
Operating temperature	-30°C to 85°C		

Sensor SUPPLY module

Version 1.1

For CANSAS C8, CI8, SCI8, SC16, SCI16 and INC4-V-SUPPLY optional

(Optional for model long and cassette CANSAS-SC16)

Order code: CAN/SEN-SUPPLY

The sensor supply module always makes only 7 of 8 selectable voltage ranges available:

- default case: all voltage ranges not isolated (standard ranges: +2.5 V to +24 V; ± 15 V optional)
- upon request: all voltage ranges isolated, but only if the range ± 15 V is not included (only for SL with LEMO connectors)
- upon request: with range ± 15 V instead of one other range, however all voltage ranges not isolated (only for C8, CI8, not for SL with LEMO-connectors)

Parameter	Value (typ. / max.)			Remarks
Configuration options	8 ranges			
Output voltage	voltage	current	net power	globally selected, isolated on request (not for LEMO)
	+2.5 V	580 mA	1.5 W	
	+5.0 V	580 mA	2.9 W	
	+7.5 V	400 mA	3.0 W	
	+10 V	300 mA	3.0 W	
	+12 V	250 mA	3.0 W	
	+15 V	200 mA	3.0 W	
	+24 V	120 mA	2.9 W	
	± 15 V	190 mA	3.0 W	available on request for C8, CI8 (then only non isolated; not for LEMO)
Short-circuit protection	unlimited duration			to output voltage reference ground
Output voltage accuracy	<0.25 % (typical) <0.5 % (max.) < 0.9 % (max.) <1 % (max.)			at terminal plugs, no load 25°C; 2.5 V to 24 V 25°C; 2.5 V to 24 V full temperature range ± 15 V
Deviation control of lead impedance	3-wire control: SENSE lead as feedback (-VB is supply ground)			available for 5V and 10V requirements: 1) balanced cables 2) identical cables on all channels 3) representative measurement with channel 1
Efficiency	typ. 55 % typ. 50 % typ. 70 % min. 40 %			5V, to 15 V 24 V ± 15 V 2.5 V
Capacitive load (max.)	>4000 μ F >1000 μ F >400 μ F			2,5 V, 10 V, ± 15 V 12 V, 15 V 24 V
Operating temperature	-30°C to 85°C			