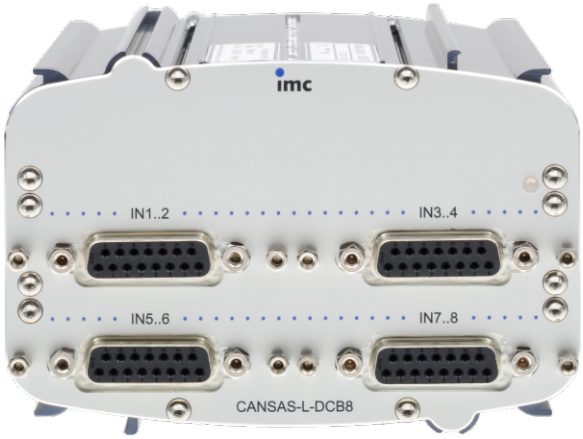
imc CANSAS-DCB8

Bridge amplifier module with 8 channels for voltage, measurement bridges and strain gauge

The CAN-Bus measurement module imc CANSAS-DCB8 is an analog input module with 8 channels which are individually filtered, amplified and digitized; the module is ideal for the measurement of:

- Voltage (5 mV to 10 V)
- Bridge and strain gauge measurements (full-, half- and quarter bridge (120 Ω, optional 350 Ω)
- Current (20 mA, via shunt-plug)

For the supply of external sensors and bridge measurement a sensor supply with adjustable voltages 2.5 V to 24 V is included.



imc CANSAS-L-DCB8

Highlights

- Support of all configurations for bridge and strain gauge measurements including internal quarter bridge completion
- Internal switchable shunt impedance for a comfortable check of the measurement chain (shunt calibration)
- Bridge offset balancing and shunt calibration upon push of a button, via CAN bus or automatically upon power-up
- 200 Hz bandwidth with max. 1 kSps/channel sampling rate
- Measurement range and sampling rates can be set per channel in steps of 1, 2, 5
- 24 Bit digitization and internal handling, CAN-output format: 16 Bit
- Support of imc Plug & Measure: TEDS (Transducer Electronic Data Sheets, IEEE 1451)

Typical applications

Strain gauges, load cells, pressure sensors, voltage measurements

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, CRSL, CRPL), imc C-SERIES, imc SPARTAN
- any 3.rd party CAN data logger systems

Models and Options

Overview of the available variants

Order Code	Article No.	Housing	Signal	CAN socket	Extra
CANSAS-L-DCB8	1050222	aluminum profile	DSUB-15	DSUB-9	
CANSAS-L-DCB8-350	1050300	aluminum profile	DSUB-15	DSUB-9	350 Ω internal *
CANSAS-SL-DCB8-L	1150003	sealed IP65 (SL)	LEMO	LEMO	
CANSAS-SL-DCB8-L-350	1150042	sealed IP65 (SL)	LEMO	LEMO	350 Ω internal *
CANSAS-SL-DCB8-D	1150004	sealed IP65 (SL)	DSUB-15	DSUB-9	
CANSAS-SL-DCB8-D-350	1150043	sealed IP65 (SL)	DSUB-15	DSUB-9	350 Ω internal *
CANSAS-SL-DCB8-D-PROTECT-350	1150044	sealed IP65 (SL)	DSUB-15	DSUB-9	350 Ω internal *

* internal quarter bridge completion 350 Ω instead of 120 Ω

The 350 Ω variant (1/4 bridge completion) does not support current measurement with internal shunt. Alternatively an external shunt can be used. For the DSUB-15 variant an appropriate shunt plug is available (ACC/DSUB(M)-I2).

With the "protected" variant (imc CANSAS-SL-DCB8-D-PROTECT) an increased robustness versus ESD and transient overvoltage is ensured. In this variant the shunt calibration is disabled.

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

Accessories and Plugs

Included accessories

- Calibration certificate with test equipment verification as per ISO 9001 (manufacturer's calibration certificate)
- 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-B2	DSUB-15 plug with screw terminals for 2-channel measurement of strain gauges, bridges and voltage	1350170
• ACC/DSUBM-B2-IP65	sealed version, suitable for SL series	1350218
• ACC/DSUBM-TEDS-B2	version with TEDS support, according to IEEE 1451 for use with imc Plug & Measure	1350191
• ACC/DSUBM-TEDS-B2-IP65	sealed TEDS version	1350xxx
• ACC/DSUB-U2-BNC	DSUB-15 plug with signal connection via BNC for 2-channel voltage measurement	

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 - DCB8

Inputs, Measurement modes		
Parameter	Value	Remarks
Inputs	8	
Measurement modes DSUB	voltage measurement current measurement bridge measurement strain gauge	 ACC/DSUBM-I2 half-, quarter- and full bridge
LEMO	voltage measurement current measurement bridge measurement strain gauge	 half-, quarter- and full bridge
Terminal connection	4x DSUB-15 or 8x LEMO	2 channels per plug 1 channel per plug

Sampling rate, Bandwidth, Filter		
Parameter	Value	Remarks
Sampling rate	≤1 kHz	per channel, output rate on the CAN-Bus
Bandwidth	200 Hz	-3 dB; Filter OFF
	190 Hz	-3 dB; with AAF-filter
Resolution	16 Bit	internal 24 bit processing output rate: 16 bit Integer
CANopen® mode	"CiA® DS 301 V4.0.2" and "CiA® DS 404V1.2" supports 4 PDOs in INT16, INT32, and FLOAT	
TEDS - Transducer Electronic Data Sheets	conformant to IEEE 1451	ACC/DSUBM-TEDS-xxx

General			
Parameter	Value typ.	min. / max.	Remarks
Isolation: CAN-Bus power supply input analog inputs	 ±60 V ±60 V no isolation		to case (CHASSIS) nominal; testing: 300 V (10 s) nominal; testing: 300 V (10 s) analog reference ground: CHASSIS
Overvoltage protection	±40 V		long term
Input coupling	DC		
Input configuration	differential		
Input impedance	20 MΩ 9.5 MΩ	±1%	differential when Power OFF

Parameter	Value	Remarks
Supply voltage	10 V to 50 V DC	
Power consumption	4 W to 18 W	
Operating temperature	-40°C to 85°C	

Voltage measurement			
Parameter	Value typ.	min. / max.	Remarks
Input range	±10 V, ±5 V, ±2 V, ±1 V... ±5 mV		
Gain error	0.02%	≤0.05%	of reading
Gain drift	+20 ppm/K·ΔT_a	+80 ppm/K·ΔT_a	ΔT_a=|T_a-25°C| ambient temperature T_a
Offset error	0.02%	≤0.05% ≤0.1% ≥0.15%	of range, in ranges: >±50 mV ≤±50 mV ±5 mV
Offset drift	±0.06 µV/K·ΔT_a	±0.3 µV/K·ΔT_a	ΔT_a=|T_a-25°C| ambient temperature T_a
Common mode rejection ranges ±10 V to ±50mV ±20 mV to ±5mV	 92 dB 120 dB	 >84 dB >100 dB	common mode test voltage: ±10 $V_=$
Noise (RTI)	0.4 μV_{rms} 14 nV/√Hz		bandwidth 0.1Hz to 200 Hz (RTI)

Bridge measurement			
Parameter	Value typ.	min. / max.	Remarks
Bridge measurement modes	full-, half bridge quarter bridge		 5 V bridge excitation voltage only
Bridge input ranges	±1000 mV/V, ±500 mV/V, ±200 mV/V, ±100 mV/V ... ±0.5 mV/V ... ±1 mV/V ... ±2 mV/V		bridge excitation voltage: 10 V 5 V 2.5 V
Gain error	0.02%	≤0.05%	of reading
drift	+20 ppm/K·ΔT_a	+80 ppm/K·ΔT_a	ΔT_a=|T_a –25°C| ambient temperature T_a
Offset	0.01%	≤0.02%	of input range after automatic bridge balancing
drift	+16 nV/V/K·ΔT_a	+0.2 µV/V/K·ΔT_a	ΔT_a=|T_a –25°C| ambient temperature T_a
Bridge excitation voltage	10 V 5 V 2.5 V		not with quarter bridge measure
min. bridge impedance max. bridge impedance	120 Ω, 10 mH full bridge 60 Ω, 5 mH half bridge 5 kΩ		
Internal quarter-bridge completion	120 Ω		optional 350 Ω
Cable resistance for bridges (without return line)	<6 Ω <12 Ω <24 Ω		10 V excitation 120 Ω 5 V excitation 120 Ω 2.5 V excitation 120 Ω

Built-in DCB8 Sensor Supply				
Parameter	Value			Remarks
Configurations options	7 ranges			
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
Short circuit protection	unlimited duration			to reference ground of the output voltage
Output voltage accuracy [1]	<0.25% (typ.) <0.5% (max.) <0.9% (max.)			at terminal plugs, no load 25°C; 2.5 V to 24 V 25°C; 2.5 V to 24 V over entire temperature range
Compensation of cable resistances	measurement mode: bridge measurement, strain gauge 3-wire circuit: single sense wire: sensing of return line only (–VB: supply ground) voltage drops dynamically monitored and numerically compensated			provided for 2.5 V, 5 V and 10 V. prerequisites: 1) symmetrical feed and return lines differing cable length for individual channels allowed
Compensation of cable resistances	measurement mode: voltage measurement with adjusted supply 3-wire circuit: single sense wire: sensing of return line only (–VB: supply ground) physical adjustment of voltage (+VB)			provided for 5 V prerequisites: 1) symmetrical feed and return lines, 2) identical wires for all channels, 3) representative measurement at channel [1] special operation mode: only for an operation with special sensors with a sensitivity depends in a certain extent on the exact value of the supply (especially "Nippon DENSO")
Efficiency	min. 40% typ. 55% typ. 50%			2.5 V 5 V, ..15 V 24 V
Max. capacitive load	>4000 µF >1000 µF >300 µF			2.5 V to 10 V 12 V, 15 V 24 V

[1] The precision of the bridge measurement is not affected by actual precision of the bridge supply. The current value of the bridge supply is continuously monitored and compensated.

Parameter	Value	Remarks
Dimensions (W x H x D)	75 x 111 x 142 mm 81 x 128.4 x 145 mm 58 x 112.5 x 152mm	CANSAS-L-DCB8 CANSAS-K-DCB8 CANSAS-SL-DCB8-D, -Protect, -SL-DCB8-L
Terminal connection CANSAS-K, -L	8x 7-pin LEMO (HGG.1B.307) 4x DSUB-15	 2 channels per plug
	2x DSUB-9	CAN (in / out), supply (alternatively)
	PHOENIX (MC 1.5/4STF-3.81)	power supply
Terminal connection CANSAS-SL	8x 7-pin LEMO (HGG.1B.307) 4x DSUB-15	 2 channels per plug
	2x DSUB- 9 2x 10-pin LEMO (HGA.1B.310)	CAN (in / out), supply (alternatively) CAN (in / out), supply (alternatively)
	1x 6-pin LEMO (HGA.1B.306)	power supply