

imc CANSASflex-C8

8-channel CAN measurement module for voltage, current (20 mA) and temperature

The CAN-Bus measurement module imc CANSASflexC8 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 60 V)
- Current (20 mA sensors)
- Temperature (Thermocouples, PT100)



imc CANSASflexC8
(Fig. similar)

The module is available in both short and long housing.

Highlights

- 20 Hz bandwidth with max. 100 Hz/channel sampling rate
- Measurement range and sampling rates can be set per channel in steps of 1, 2, 5
- 24 Bit digitization and internal processing
CAN-output format: 16 Bit
- Optional: adjustable sensor supply (e.g. for active voltage fed sensors)
- Support of imc Plug & Measure:
TEDS (Transducer Electronic Data Sheets, IEEE 1451.4)

Typical applications

- General voltage signals, including vehicle battery voltages (up to 60 V) and current measurements at external shunts (down to 5 mV)
- Temperature measurement in test station applications as well as in drive testing
- Industrial sensors (standard 20 mA interface) for arbitrary physical variables

General imc CANSASflexfunctions and specifications

As a CAN-bus-based measurement engineering tool, the imc CANSASflexseries offers a wide selection of measurement modules which process and digitize sensor signals and output these as CAN-messages.

The modules of the imc CANSASflexseries (CANFX) can be joined together mechanically and electrically by means of a latching ("click") mechanism, without the use of any tools nor the need for any extra cables, and also allows the CAN-logger imc BUSDAQflex(BUSFX) to dock on directly. Depending on the module type, they are available in either long (L-), short, or both housing versions.

Besides fixed installations or operation on a laboratory bench, the modules are also designed to fit in a special 19" subrack to provide a convenient solution in test station settings.

Fields of application

- For test rigs, vehicle testing, road trials and all-purpose measurement applications
- Deployable both in decentralized, distributed and in centralized measurement setups
- Operable with CAN-interfaces and CAN-data loggers from either imc or 3rd-party manufacturers

Properties and capabilities

Operating conditions:

- Operating temperature: -40°C to +85°C, condensation allowed
- Shock resistance: 50 g (pk over 5 ms)
- Ingress Protection rating: IP40 (only with optional protective cover on top of the locking slider, otherwise IP20)

CAN-Bus:

- Configurable Baud rate (max. 1 Mbit/s)
- Default configuration ex-factory: Baud rate=125 kbit/s and IDs: Master=2, Slave=3
- Galvanically isolated
- Built-in terminator resistance, manually switchable

Sampling rates and synchronization:

- Configurable CAN data rate
- Simultaneous sampling of all module's channels, as well as across multiple modules
- Synchronization of multiple modules as well as to a global CAN-logger: based on CAN messages (no Sync-signal required)

Power supply:

- Galvanically isolated power supply input
- DC 10 V to 50 V
- LEMO.0B connector (2-pin); alternative power supply via CAN connector (DSUB-9)

On-board signal processing:

- "Virtual channels": integrated signal processor (DSP) for online processing. Data reduction, filtering, scaling, calculations, threshold monitoring, etc.
- Programmable multi-functional status-LED, supporting linkage to virtual channels

Heartbeat-message:

- Configurable with cyclical "life-sign", e.g. for integrity check purposes in test rigs
- Contains checksum for configuration and serial number, e.g. for consistency monitoring (checking of whether the correct module is still being used, for instance in installations undergoing maintenance)

FindMe:

- Identification of a module by means of selective LED flashing (via configuration software; does not occupy any additional CAN messages)

flexSeries: flexible granulation, topology and block assemblies

Click-mechanism:

- Modules joinable to module-blocks: mechanically and electrically connected (CAN and power supply)
- No tools or additional cabling required
- With guide grooves, magnetic catches and locking slider
- Both short and long housing versions joinable:
with electrical connection: align on rear side; mechanically only: align on front side
- Direct connection of compatible CAN-logger: imc BUSDAQ flex

19" rack solution (subrack):

- Modules designed for insertion into special 19" frames ("boom-box") for installation in test stations
- Rack backplane accommodates the power supply, CAN and slot information (automatically read out configuration information for use in automation software)

Mounting:

- Mountable by means of recessed threaded holes (M3), either individually or jointly as a block
- Rubber bumper rails providing secure placement in laboratory settings
- Various brackets and handles, and DIN top-hat rail mounting kit available as accessories



imc CANSASflexmodules connected (Click-mechanism)
in a block with imc BUSDAQ flexLogger (left)

rear view of this block:
CAN, Power supply, Terminator, Locking slider

Software

Configuration:

- Using imc CANSAS software (free of charge), including dbc-export
- Autostart with saved configuration; also pre-configurable at factory
- The module's current configuration can be read out and exported by the software; For transfer of configuration via physical transport of the module; for back tracing and recovery.
- Supports the CANopen® protocol according "CiA® DS 301 V4.0.2" and "CiA® DS 404V1.2"; 4 TPDOs (Transmit Process Data Objects) in INT16, INT32 and FLOAT.
See "CANSAS CANopen®" for a detailed description of the supported features and settings.

Measurement operation:

- Data logger operation:

Software:	imc STUDIO
Hardware:	imc measurement system with CAN-Interface, e.g. imc BUSDAQ, imc C-SERIE, imc SPARTAN imc CRONOS device family (CRFX, CRC, CRS, CRPL)
- Basic measurement operation with imc CANSASpro
- With any desired CAN-interfaces and CAN-loggers from 3rd-party manufacturers

Models and Options

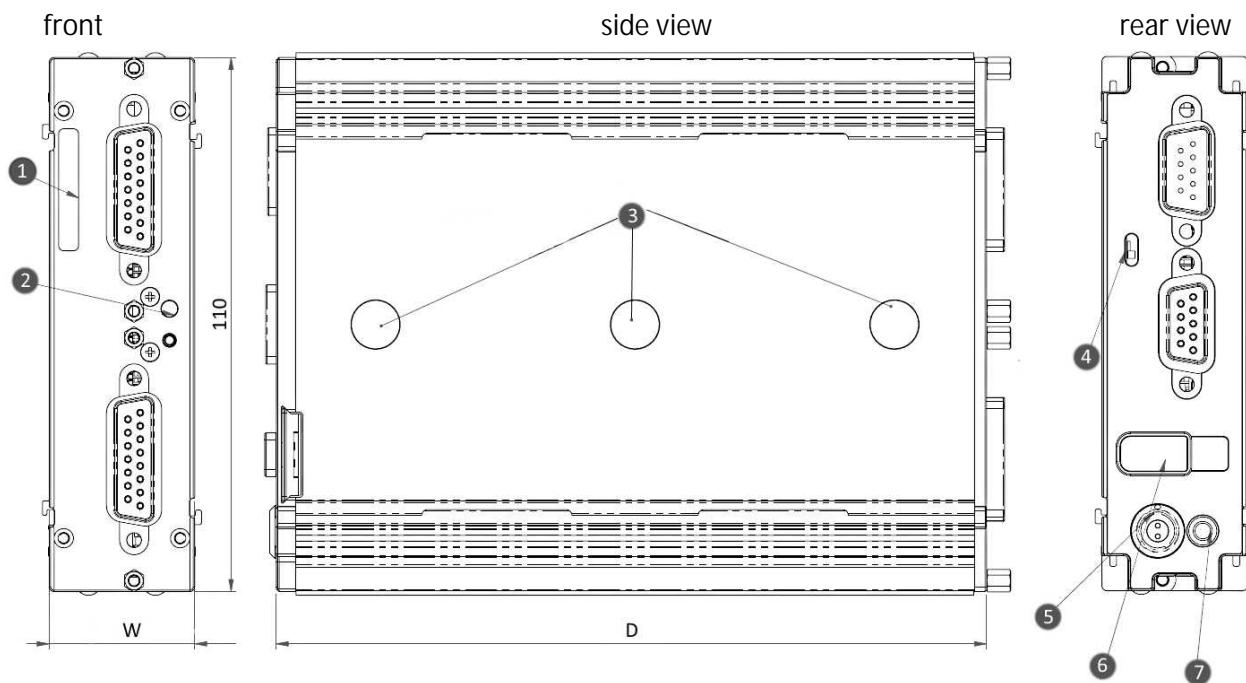
Overview of the available variants for imc CANSASflex-C8

Order Code	signal connection	option/extra	housing	article number
CANFX/C8	DSUB-15		S0	1250037
CANFX/L-C8	DSUB-15		L0	1250038
CANFX/L-C8-SUPPLY	DSUB-15	Sensor supply	L1	12500xx

Additional-Option (Order option ex-factory)

- Variants with integrated Sensor supply, configurable voltage settings

Mechanical drawings with dimensions



Shown in standard operating orientation: housing type L0; width (W) = 30 mm.

Housing type	S0	S1	S2	L0	L1	L2	
W: Width	30 mm	50.3 mm	70.6 mm	30 mm	50.3 mm	70.6 mm	
D: Depth	93 mm, with two magnets			146.5 mm, with three magnets			

Legend:

1: Serial number label	3: magnet (depending on model)	5: supply socket (LEMO)
2: Status LED (blue / red)	4: adjustable CAN terminator	6: locking slider CAN/supply
		7: ground connection M4

Accessories and Connectors

Included accessories

- Calibration certificate with test equipment verification as per ISO 9001 (manufacturer's calibration certificate)

Optional accessories

AC/DC power adaptor 110-230V AC (with appropriate LEMO plug)		
ACC/AC-ADAP-24-60-0B	24 V DC, 60 W, LEMO.0B.302	1350246

Power connector

ACC/POWER-PLUG3	Power connector for DC supply LEMO FGG.0B.302, solder contact, max. 0.34 mm ²	1350033
ACC/CABLE-LEMO-BAN-2M5	Power supply cable LEMO/banana 2.5 m	13500xx

DSUB-9 connector (CAN)

CAN/RESET	Reset-plug	1050025
CAN/KABEL-TYP2	CAN-Bus connection cable 2x DSUB-9 1:1, 2 m length	1050027

DSUB-15 connector (measurement inputs)

ACC/DSUBM-U4	DSUB-15 plug with screw terminals for 4-channel voltage measurement.	1350166
ACC/DSUBM-TEDS-U4	U4 plug variant with TEDS support, according IEEE 1451.4 for use with imc Plug & Measure	1350189
ACC/DSUBM-I4	DSUB-15 plug with screw terminals for 4-channel current measurement of up to 50 mA (shunt 50 μ A, scaling factor 0.02 A/V)	1350168
ACC/DSUBM-TEDS-I4	I4 plug variant with TEDS support, according IEEE 1451.4 for use with imc Plug & Measure	1350192
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/DSUBM-TEDS-T4	T4 plug variant with TEDS support, according IEEE 1451.4 for use with imc Plug & Measure	1350190

Handle

CANFX/HANDLE-S	CANFX handle kit (left and right) - short (S)	1250027
CANFX/HANDLE-L	CANFX handle kit (left and right) - long (L)	1250028

Mounting brackets for fixed installations

CANFX/BRACKET-CON-S	CANFX connection bracket short	1250019
CANFX/BRACKET-CON-L	CANFX connection bracket long	1250020

Mounting brackets for DIN Rail

CANFX/BRACKET-DIN-S0	CANFX DIN Rail mounting bracket - Type S0	1250021
CANFX/BRACKET-DIN-L0	CANFX DIN Rail mounting bracket - Type L0	1250024
CANFX/BRACKET-DIN-L1	CANFX DIN Rail mounting bracket - Type L1	1250025

Miscellaneous

Calibration report set for each device	Report set with manufacturer's calibration certificate and individual readings, as well as list of test equipment used. Meets requirements of DIN EN ISO 17025	
Instruction manual	Getting started with imc CANSAS	
CANFX/RUBBER-1M	silicone strip blue 1 m	1250029

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 mode Thermocouple terminal socket (-2T)	thermocouple type-K	miniature thermocouple terminal

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
Ovvoltage protection	± 250 V	± 80 V	permanent channel to chassis <1 ms

Voltage measurement			
Parameter	Value typ.	min. / max.	Remarks
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 M 492 k 79 k	$\pm 1\%$ ± 135 k ± 75 k	differential ± 60 V to ± 2 V ± 1 V to ± 50 mV ± 20 mV to ± 5 mV
Gain error	0.01%	$\leq 0.05\%$ $\leq 0.02\%$ $\leq 0.05\%$	of reading ± 60 V to ± 200 mV ± 100 mV to ± 20 mV ± 10 mV to ± 5 mV
Gain drift	5 ppm/K $\cdot \Delta T_a$	± 20 ppm/K $\cdot \Delta T_a$	$\Delta T_a = T_a - 25^\circ 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 ± 60 V to ± 200 mV ± 100 mV to ± 20 mV ± 10 mV to ± 5 mV
Offset drift	± 4 μ V/K ± 0.07 μ V/K	≤ 12 μ V/K ≤ 0.16 μ V/K	± 60 V to ± 2 V ± 1 V to ± 5 mV

Voltage measurement			
Parameter	Value typ.	min. / max.	Remarks
Common mode voltage ±50 V to ±2 V ±1 V to ±5 mV	50 V 2 V	<30 V <1 V	with differential input voltage: ±50 V ±1 V
Common mode rejection ratio (CMRR) ±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
Noise	51 nV _{rms} 305 nV _{pkpk}	range ±5 mV	sampling rate 100 Hz $R_{source} = 50$

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	±0.2 K	<±0.5 K	types J, T, K, E, L (for all other types, the voltage measurement error applies)
drift	±0.02 K/K·ΔT _a		$\Delta T_a = T_a - 25^\circ C $ ambient temperature T _a
Error of cold junction compensation		<±0.15 K <±0.5 K	C8-2T
Drift of cold junction	±0.001 K/K·ΔT _j		$\Delta T_j = T_j - 25^\circ C $; cold junction T _j
Input impedance	100 k		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	$\Delta T_a = T_a - 25^\circ C $ ambient temperature T _a
PT100 sensor feed	625 µA		
Input impedance	20 M	±1%	differential

Optional sensor supply (CANFX/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 optional, upon request		non isolated isolated		output to case (CHASSIS) 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 typ.	min. / max.	Remarks
Supply voltage	10 V to 50 V DC		
Power consumption		<2.5 W	
Module power supply options	power socket (LEMO) CAN socket (DSUB-9) adjacent module		direct connection imc CANSASflex or imc BUSDAQflex

Operating conditions

Parameter	Value	Remarks
Ingress protection class	IP40	only with optional protective cover on top of the locking slider, otherwise IP20
Operating temperature	-40°C to 85°C	internal condensation temporarily allowed

Terminal connections		
Parameter	Value	Remarks
CAN Bus	2x DSUB-9	CAN and supply IN / OUT (male / female)
Supply input	type: LEMO.0B (2-pin)	compatible with LEMO.EGE.0B.302 multicoded 2 notches for optional individually power supply compatible with connectors FGG.0B.302 (Standard) or FGE.0B.302 (E-coded, 48 V)
Module connector	via locking slider	for power supply and networking (CAN) of directly connected modules (Click- mechanism) without further cables

Pass through power limits for directly connected modules (Click-mechanism)		
Parameter	Value	Remarks
Max. Current	8 A	current rating of the module connector
Max. Power	96 W at 12 V DC 192 W at 24 V DC 384 W at 48 V DC	equivalent pass through power typ. DC vehicle voltage AC/DC power adaptor optional AC/DC adaptor