

C8 for imc CANSASflex

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

The CAN-Bus measurement module imc CANSASflex-C8 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 CANSASflex-C8
(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)

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 CANSASflex functions and specifications

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

The modules of the imc CANSASflex series (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: 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)

flex-Series: 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 BUSDAQflex

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 CANSASflex modules connected (Click-mechanism)
in a block with imc BUSDAQflex Logger (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 BUSDAQflex, imc C-SERIES, imc SPARTAN and imc CRONOS device family (CRFX, CRXT, CRC, CRSL)
- With any desired CAN-interfaces and CAN-loggers from 3rd-party manufacturers

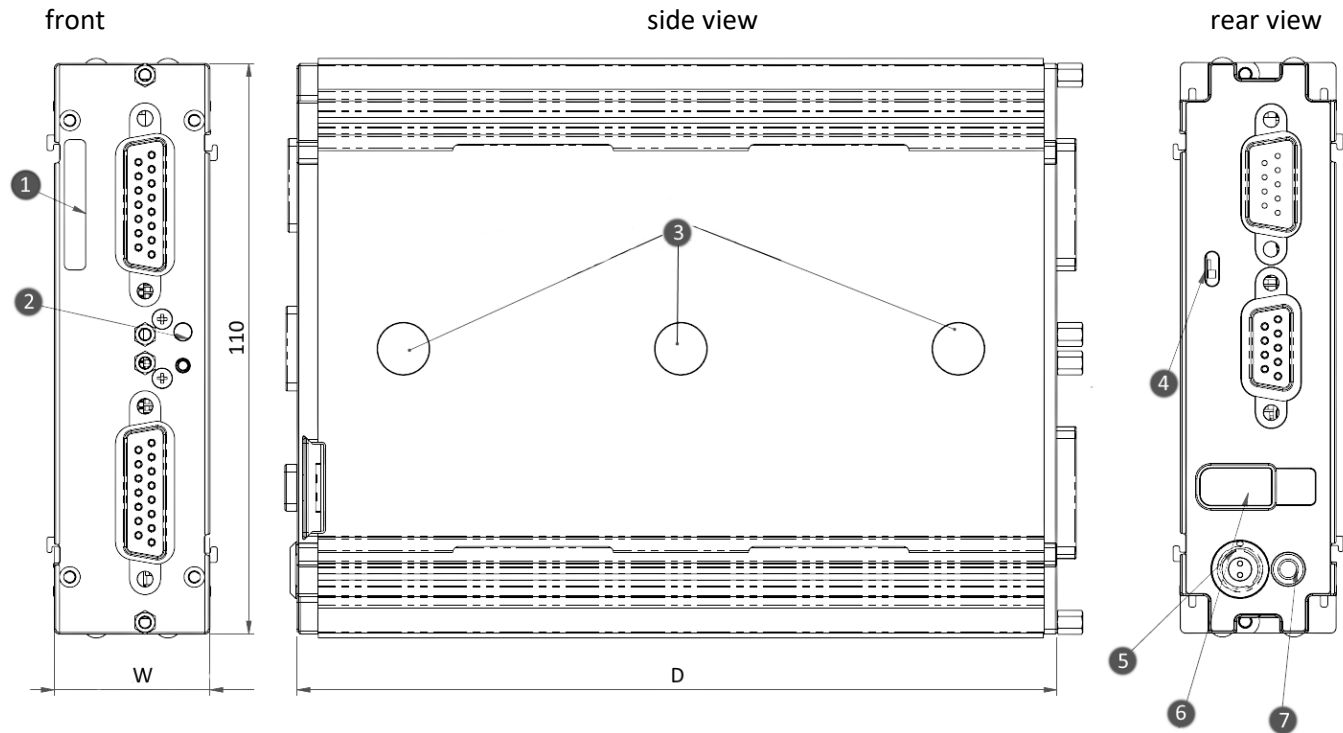
Overview of the available variants for imc CANSASflex-C8

Order Code	signal connection	option/extra	housing	article no.
CANFX/C8	DSUB-15		S0	12500037
CANFX/L-C8	DSUB-15		L0	12500038
CANFX/L-C8-SUPPLY	DSUB-15	Sensor supply	L1	12500077
CANFX/L-C8-2T	thermocouple terminal connector	type K	L1	12500104
CANFX/L-C8-2T-Y	thermocouple terminal connector	type K ANSI coding (yellow)	L1	12500070
CANFX/L-C8-BNC	BNC		L1	12500071

Additional-Option (Order option ex-factory): Sensor supply

- Variants with integrated sensor supply, requires no extra module expansion, configurable voltage settings

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 M3 |

Included accessories

Documents
Getting started with imc CANSAS (one copy per delivery)
Device certificate
Miscellaneous
Grounding set consisting of: a spring washer S3 (stainless steel), a flat washer (A3.2 DIN 433 A2) and a pan-head screw M3x8 (mounted on the rear panel).

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	13500246
Power plug		
ACC/POWER-PLUG3	Power connector for DC supply LEMO FGG.0B.302, solder contact, max. 0.34 mm ²	13500033
ACC/CABLE-LEMO-0B-BAN-2 M5	Power supply cable LEMO/banana 2.5 m	13500276

DSUB-9 plug (CAN)		
CAN/RESET	Reset-plug (DSUB-9 female)	10500025
CAN/TERMI	2 CAN bus terminator: 1x DSUB-9 (male), 1x DSUB-9 (female)	10500028
ACC/CABLE-DSUB-DSUB-2M5	cable for CAN and power supply, DSUB-9 (female) to DSUB-9 (male); 2,5 m Länge; wire cross section: 0.25 mm ² signals; 1.0 mm ² supply	13500414

DSUB-15 plug		
ACC/DSUBM-U4	DSUB-15 plug with screw terminals for 4-channel voltage measurement.	13500166
ACC/DSUBM-I4	DSUB-15 plug with screw terminals for 4-channel current measurement of up to 50 mA (shunt 50 Ω, scaling factor 0.02 A/V)	13500168
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).	13500167

Handle		
CANFX/HANDLE-S	CANFX handle kit (left and right) - short (S)	12500027
CANFX/HANDLE-L	CANFX handle kit (left and right) - long (L)	12500028

Mounting brackets for fixed installations		
CANFX/BRACKET-CON-S	CANFX connection bracket short	12500019
CANFX/BRACKET-CON-L	CANFX connection bracket long	12500020
CANFX/RACK	19" Rack	12500094
CANFX/RACK-BLOCK	19" Rack frame for entire block CANFX/BUSFX	12500103

Mounting brackets for DIN Rail		
CANFX/BRACKET-DIN-S0	CANFX DIN Rail mounting bracket - Type S0	12500021
CANFX/BRACKET-DIN-L0	CANFX DIN Rail mounting bracket - Type L0	12500024
CANFX/BRACKET-DIN-L1	CANFX DIN Rail mounting bracket - Type L1	12500025

Miscellaneous		
CANFX/RUBBER-1M	silicone strip blue 1 m	12500029
CANFX/COVER-IP40	protective cover on top of the locking slider in compliance with IP40 ingress protection class	12500069
CANFX/USB-P	USB-CAN interface (CAN: DSUB-9, USB 2.0); AC/DC power adaptor, 24 V DC, 60 W, with LEMO.0B plug; CAN cable, DSUB-9 (F, terminated) - DSUB-9 (M, terminated); CAN reset plug; imc CANSAS configuration software (download)	12500043

Documents		
SERV/CAL-PROT	Calibration protocol per amplifier imc manufacturer calibration certificate with measurement values and list of calibration equipment used (pdf).	150000566
SERV/CAL-PROT-PAPER	Calibration protocol per amplifier (paper print) imc manufacturer calibration certificate with measurement values and list of calibration equipment used with signature and seal.	150000578

Device certificates and calibration protocols: Detailed information on certificates supplied, the specific contents, underlying standards (e.g. ISO 9001 / ISO 17025) and available media (pdf etc.) can be found on our website, or you can contact us directly.

Technical Specs - CANFX/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
Measurement mode BNC (-BNC)	voltage measurement	

Sampling rate, bandwidth		
Parameter	Value	Remarks
Sampling rate	≤100 Hz	per channel
Bandwidth	20 Hz	-3 dB (voltage measurement)
	10 Hz	-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
Overvoltage 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 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 error	0.01%	≤0.05% ≤0.02% ≤0.05%	of reading ±60 V to ±200 mV ±100 mV to ±20 mV ±10 mV to ±5 mV
Gain drift	5 ppm/K·ΔT _a	±20 ppm/K·ΔT _a	ΔT _a = T _a -25°C ; ambient temperature T _a
Offset error	0.005% 0.005% 0.02%	≤0.05% ≤0.01% ≤0.06%	of input range ±60 V to ±200 mV ±100 mV to ±20 mV ±10 mV to ±5 mV

Voltage measurement			
Parameter	Value typ.	min. / max.	Remarks
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) $\pm 60 \text{ V to } \pm 2 \text{ V}$ $\pm 1 \text{ V to } \pm 5 \text{ mV}$ $\pm 1 \text{ V to } \pm 5 \text{ mV}$	70 dB 120 dB 100 dB	$> 54 \text{ dB}$ $> 100 \text{ dB}$	common mode test voltage $\pm 50 \text{ V}$ $\pm 1 \text{ V}$ with C8-BNC variant
Noise	$51 \text{ nV}_{\text{rms}}$ $305 \text{ nV}_{\text{pkpk}}$		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	$-50^\circ\text{C to } 400^\circ\text{C}$ $-50^\circ\text{C to } 150^\circ\text{C}$ $-270^\circ\text{C to } 1370^\circ\text{C}$		type K
Resolution	0.025 K 0.0031 K		type K $-270^\circ\text{C to } 1370^\circ\text{C}$ $-50^\circ\text{C to } 150^\circ\text{C}$
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} $; cold junction T_j
Input impedance	100 k Ω		differential
Signal-noise ratio		$> 85 \text{ dB}$	bandwidth 10 Hz

Temperature measurement - RTD (PT100)			
Parameter	Value typ.	min. / max.	Remarks
Measurement range	$-200^\circ\text{C to } 850^\circ\text{C}$, $-50^\circ\text{C to } 150^\circ\text{C}$		resolution: $\approx 0.016 \text{ K}$, $\approx 0.003 \text{ K}$
Error		$< \pm 0.2 \text{ K}$ $< \pm 0.1 \text{ K}$ $< \pm 0.05\%$	$-200^\circ\text{C to } 850^\circ\text{C}$, four-wire connection $-50^\circ\text{C to } 150^\circ\text{C}$, four-wire connection corresponding resistance
Drift		$\pm 0.01 \text{ K/K} \cdot \Delta T_a$	$\Delta T_a = T_a - 25^\circ\text{C} $ ambient temperature T_a
PT100 sensor feed	625 μA		
Input impedance	20 M Ω	$\pm 1\%$	differential

Optional sensor supply (CANFX/xx-SUPPLY)				
Parameter	Value			Remarks
Configuration options	7 selectable settings			
Output voltage	voltage	current	net power	set globally for all channels of a module
	+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	
Isolation	non isolated			output to case (CHASSIS)
standard	isolated			nominal rating: 50 V, test voltage (10 sec): 300 V
optional, upon request				
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			
Parameter	Value typ.	min. / max.	Remarks
Supply voltage	10 V to 50 V DC		
Power consumption		<2.5 W	

Terminal connections		
Parameter	Value	Remarks
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) pin configuration: (1)+SUPPLY, (2)-SUPPLY
Module connector	via locking slider	for power supply and networking (CAN) of directly connected modules (Click-mechanism) without further cables
CAN bus	2x DSUB-9	CAN and power supply CAN_IN (male) bzw. CAN_OUT (female) all signals on both DSUB-9 directly 1:1 connected

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

Power supply			
Parameter	Value typ.	min. / max.	Remarks
Input 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

Pass through power limits for directly connected modules (Click-mechanism)		
Parameter	Value	Remarks
Max. current	8 A	at 25°C current rating of the click connector
	$-50 \text{ mA/K} \cdot \Delta T_a$	Derating with higher operating temperatures T_a , $\Delta T_a = T_a - 25^\circ\text{C}$
Max. power	96 W at 12 V DC	Equivalent pass through power at 25°C typ. DC vehicle voltage
	192 W at 24V DC	AC/DC power adaptor or cabinets
	60 W at 12 V DC 120 W at 24V DC	at +85°C

Available power for supply of additional modules via CAN-cable (DSUB-9, "down stream")		
Parameter	Value	Remarks
Max. current	6 A	at 25°C current rating of DSUB-9 connection (CAN-IN, CAN-OUT); assuming adequate wire cross section!
	$-30 \text{ mA/K} \cdot \Delta T_a$	Derating with higher operating temperatures T_a , $\Delta T_a = T_a - 25^\circ\text{C}$
Max. power	72 W at 12 V DC	Equivalent pass through power at 25°C typ. DC vehicle voltage
	144 W at 24 V DC	AC/DC power adaptor or cabinets
	50 W at 12 V DC 100 W at 24 V DC	at +85°C



An Axiometrix Solutions Brand

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imc ACADEMY - Training center

The safe handling of measurement devices requires a good knowledge of the system. At our training center, experienced specialists are here to share their knowledge.

E-Mail: schulung@imc-tm.de

Internet: <https://www.imc-tm.com/service-training/imc-academy>

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