

HISO-HV4 for imc CANSASflex (CANFX/HISO-HV4)

High voltage isolated CAN module for the measurement
of differential voltages up to 800 V



imc CANSASflex-HISO-HV4

The CAN-Bus measurement module imc CANSASflex-HISO-HV4 allows a differential voltage measurement up to 800 V on four channels.

Highlights

- Channel-wise isolated, galvanically-separated inputs
- High-voltage isolation: channel/channel, channel/housing, channel/CAN and power supply
- Isolation: 800 V, 300 V CAT II
(according to safety standard IEC 61010)

Typical applications

- Voltage measurement and tests on high-voltage components of hybrid and electric vehicles.
- HV-batteries, on-board high-voltage electrical systems, DC bus, charging converters, accessory subsystems
- Evaluation of charge flows, energy balances and efficiencies
- Environments where personnel safety has to be ensured.
- For supplementary current measurement the modules of the HISO8-L/-4L series can be used (with measurement shunt at HV level) or precision current transformers in conjunction with non-isolated standard voltage modules.

imc CANSASflex - General 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:

- 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.

Measurement operation:

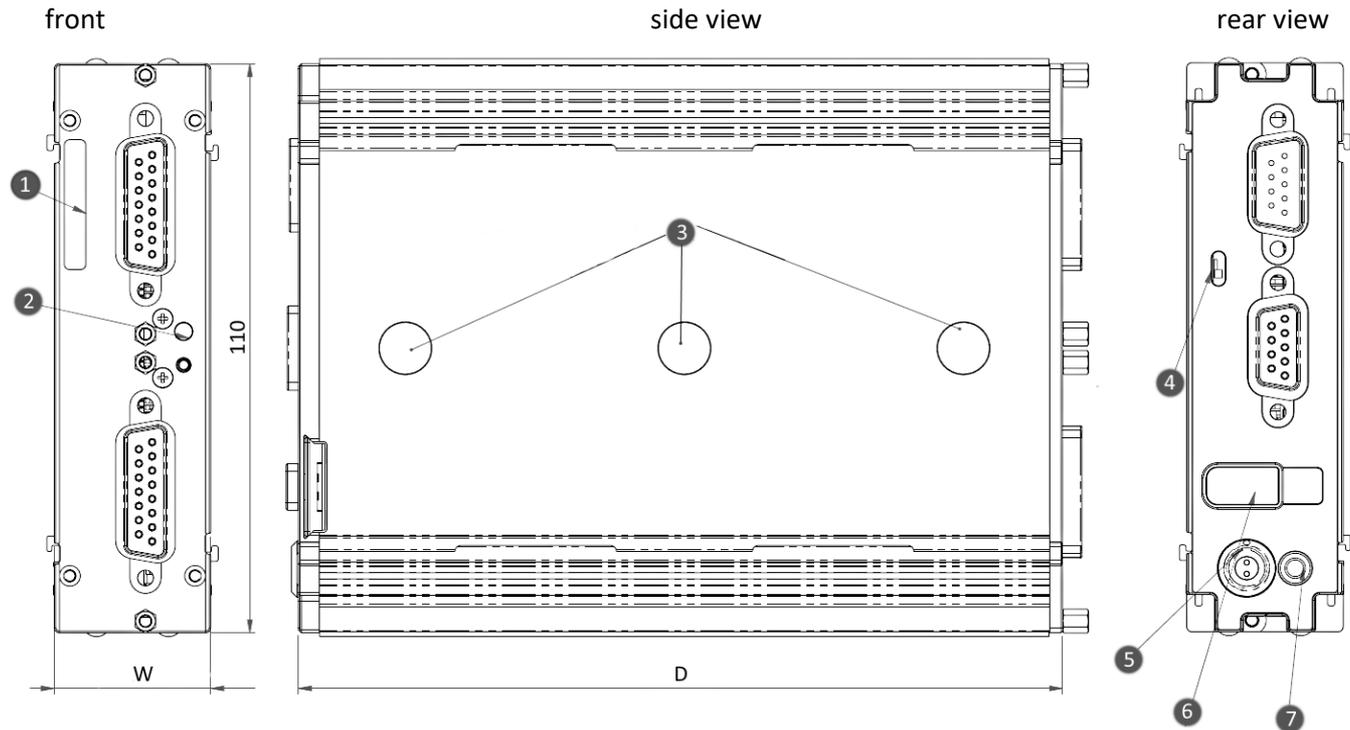
- Data logger operation:
Software: imc STUDIO
Hardware: imc measurement system with CAN-Interface, e.g. imc BUSDAQ, imc C-SERIES, imc SPARTAN and imc CRONOS device family (CRFX, CRXT, CRC, CRSL)
- With any desired CAN-interfaces and CAN-loggers from 3rd-party manufacturers

Models and Options

Overview of available variants for imc CANSASflex-HISO-HV4

Order Code	signal connection	measurement modes	housing	article no.
CANFX/L-HISO-HV4	4x2 banana jacks	voltage	L2	12500008

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 | 5: supply socket (LEMO) |
| 2: Status LED (blue / red) | (depending on model) | 6: locking slider CAN/supply |
| | 4: adjustable CAN terminator | 7: ground connection M4 |

Included accessories

Documents
Getting started with imc CANSAS (one copy per delivery)
Device certificate
Miscellaneous
Grounding set consisting of: a spring washer S4 (stainless steel), a flat washer (A4.2 DIN 433 A2) and a pan-head screw M4x8 (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-2M5	Power supply cable LEMO/banana 2.5 m	13500276

Sensor cables		
ACC/KABEL-CATIII-SW	safety measurement cable, black 2 m IEC 1010, 1000 V CAT III, 4 mm safety-banana plug	13500022
ACC/KABEL-CATIII-ROT	safety measurement cable, red 2 m IEC 1010, 1000 V CAT III, 4 mm safety-banana plug	13500021

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

Mounting brackets for fixed installations		
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-L2	CANFX DIN Rail mounting bracket - Type L2	12500026

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.



CANFX/COVER-IP40: set consisting of left and right protective cover

<%CANFX-HISO-HV4-DATA%>

Inputs, measurement modes		
Parameter	Value	Remarks
Channels	4	HV-isolated analog channels
Measurement mode	voltage measurement up to 800 V	rated voltage of isolation: max. 800 V AC _{RMS} max. 800 V DC permanent
Terminal connection	safety banana jacks 4 mm	

Sampling rate, bandwidth, filter		
Parameter	Value	Remarks
Sampling rate	≤1 kHz	per channel
Bandwidth	440 Hz	-3 dB
Filter type characteristics	low pass Butterworth and Bessel 2nd order, 1st to 4th order, averaging filter	digital filter individually selectable; cut-off frequency = 1/6 of sampling rate

Voltage measurement			
Parameter	Value typ.	min. / max.	Remarks
Measurement ranges	±800 V, ±500 V, ±200 V, ±100 V, ±50 V, ±20 V, ±10 V		rated voltage of isolation: max. 800 V AC _{RMS} max. 800 V DC permanent linear operation and valid measurement output (e.g. transients): up to 960 V
Gain error	<0.02 %	<0.05 %	of the measured value, at 25°C
Gain drift		50 ppm/K	over full temperature range
Offset error	0.02 %	≤0.05 %	of range, at 25°C
Offset drift		1.5 mV/K	
Non-linearity	<120 ppm		
Signal noise		1 mV _{rms} 6 mV _{pkpk}	bandwidth 0.1 Hz to 440 Hz R _{source} = 0 Ω

General			
Parameter	Value typ.	min. / max.	Remarks
Isolation			conforming to IEC 61010-1:2010-07 and IEC 61010-2-030:2011-07 channel / channel channel / CAN channel / supply channel / housing
General			
Pollution degree		2	
Test voltage to system ground		3000 V	1 min.
Automotive			
Working voltage		800 V 1131 V	AC/DC peak
Additional transient overvoltage		500 V	
Mains circuits (power supply)			
Measurement category		CAT II	
Rated voltage		300 V	
Overvoltage protection		±1500 V ESD 2 kV	differential input protection against damage of the electronics by overvoltage (e.g. transients) human body model
IMR (isolation mode rejection)		>70 dB (50 Hz)	
Channel isolation		>1 GΩ >1 GΩ	against system ground / housing channel-to-channel
Crosstalk		>72 dB (50 Hz)	
Input coupling		DC	
Input configuration		differential, isolated	isolated from system ground (housing, CHASSIS, functional earth)
Input impedance		10 MΩ	

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
Pollution degree	2	
Operating temperature range	-40°C to 85°C	internal condensation temporarily allowed (pollution degree 2)

Power supply			
Parameter	Value typ.	min. / max.	Remarks
Input supply voltage	10 V to 50 V DC		
Power consumption	4 W	5,5W	
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