HISO-T-8-2L for imc CANSASflex

High voltage isolated 8-channel CAN-based measurement module for thermocouples

Within the imc CANSAS*flex* (CANFX) module series, the HISO series offers particularly highly isolated types that are specially designed for use in high voltage environments.

The model HISO-T-8-2L supports temperature measurement on 8 channels with thermocouples (type K) that are exposed to high voltage potentials of up to 1400 V:

- Temperature with thermocouples type K

Highlights

- Isolation: 1400 V (according to safety standard DIN EN 61010)
- High-voltage-proof special connectors
  "2L": 2 x LEMO.2P as common socket (4 channels at each 8-pin socket)
- Per-channel isolated measurement inputs, individual filtering and ADCs
- Channel individual internal cold junction compensation

- 24-bit digitization and internal processing
  CAN-output format selectable: 16-bit or FLOAT (24-bit mantissa)
- Clickable with all imc CANSAS*flex,* BUSDAQ*flex* and CANSAS*fdx* modules
  (providing both mechanical and electrical coupling)

Typical applications

- Testing in e-mobility environments (e.g., electric and hybrid vehicles)
- Temperature measurement on high-voltage components of hybrid and electric vehicles, such as batteries, fuel cells, supply systems, and stationary applications/energy storage systems (ESS).
- Environments where full personnel safety must be guaranteed even in the event of fault

General Functions and Specifications

As a CAN-bus-based measurement engineering tool, the imc CANSAS*flex* 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 CANSAS*flex* 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 BUSDAQ*flex* (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

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
- Reset function only available with ACC/CANFT-RESET at the SERVICE socket

Sampling rates:

- Configurable CAN data rate

Power supply:

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

On-board signal processing:

- Averaging filter
- Multi-functional status LED, global and, depending on module type, also channel-specific

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)

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 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

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 CANSAS*flex* modules connected (Click-mechanism) in a block with imc BUSDAQ*flex* 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

Measurement operation:

- imc Data logger operation:

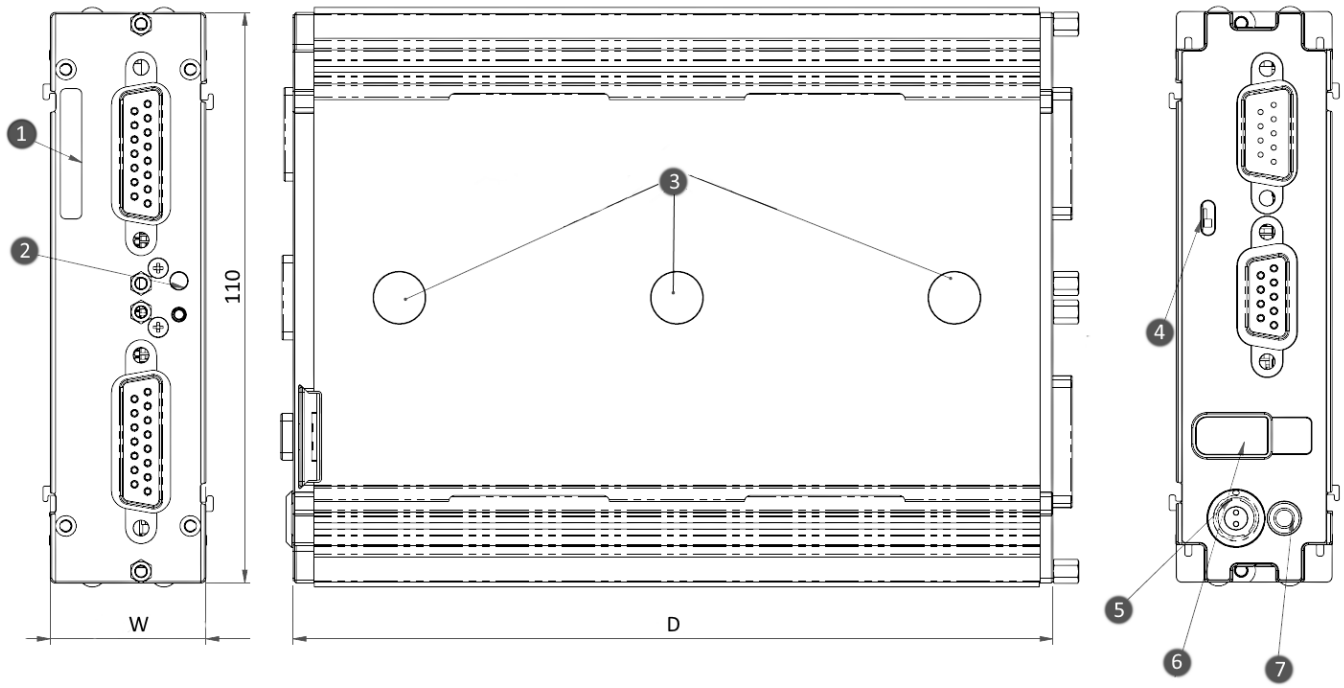
  Software: imc STUDIO

  Hardware: imc measurement system with CAN interface, e.g. imc BUSDAQ*flex*, imc C-SERIES, imc ARGUS*fit*, imc SPARTAN and imc CRONOS device family (CRFX, CRXT, CRC, CRSL)

- With any desired CAN-interfaces and CAN-loggers from 3rd-party manufacturers

Dimensions

front side view rear view



CANFX-module 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
2: Status LED (blue / red)
3: magnet (depending on model)
4: adjustable CAN terminator
5: supply socket (LEMO)
6: locking slider CAN/supply
7: ground connection M3

Order details

Order code		housing type	article no.
CANFX/L-HISO-T-8-2L	high voltage isolated 8-channel CAN-based module	L2	12500156

Included accessories

Reset plug		
ACC/CANFT-RESET	To reset the module to the factory settings, use the CANFT reset plug. Before inserting the reset plug, remove the protective cap from the service socket (see manual, chapter "Reset plug"). Then replace the cover on the service socket.	13500421

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).

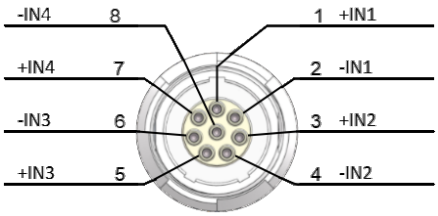
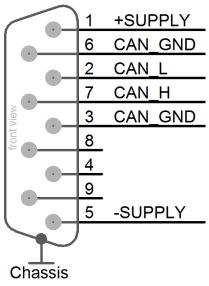
Optional accessories

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		article no.
ACC/POWER-PLUG3	Power connector for DC supply LEMO FGG.0B.302, solder contact, max. 0.34 mm²	13500033
ACC/CABLE-LEMO-0B-BAN-2 M5	Power supply cable LEMO/banana 2.5 m	13500276
DSUB-9 plug (CAN)		
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 mm² signals; 1.0 mm² supply	13500414
LEMO.2P (Redel, 8-pin) connection box		
ACC/HVBOX-8-T-10M	4-channel HV connection box for 4 type K thermocouples with 10 m HV-compatible connection cable	13500353
LEMO.2P (Redel, 8-pin) 4-channel sensor cable		
ACC/SENSORCABLE-4HV-T-L-2M	HV-capable LEMO.2P (Redel) plug, cable length 2 m	13500283
ACC/SENSORCABLE-4HV-T-L-3M	HV-capable LEMO.2P (Redel) plug, cable length 3 m	13500284
ACC/SENSORCABLE-4x1HV-T-L-3M	common plug with 4 individual outgoing cables	13500322
ACC/SENSORCABLE-4HV-T-L-XS-3M	extra slim, diameter 4.5 mm, the stripped part of the cable (upper 40 cm) is not protected against contact, limited channel separation, HV-capable (Redel) plug, Kabellänge 3 m	13500323
ACC/SENSORCABLE-4HV-T-L-XS-5M	extra slim, diameter 4.5 mm, the stripped part of the cable (upper 80 cm) is not protected against contact, limited channel separation, HV-capable (Redel) plug, cable length 5 m	13500392
ACC/EXTCABLE-4HV-T-L-3M	4 channel TC HV extension cable type K, 3 m	13500375
Only safe measuring cables and accessories suitable for HV applications may be used. Please always observe the specification of the equipment used!		
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
Miscelleaneous		
CANFX/RUBBER-1M	Rubber bumper, 1 m strip (blue silicone profile)	12500029

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 - HISO-T-8-2L

General

Inputs, measurement modes		
Parameter	**Value**	**Remarks**
Inputs	8	
Measurement mode	temperature measurement by thermocouple	
Supported sensors	Thermocouple type K	
Connector / socket	compatible socket type	recommended plug
power supply	type LEMO.0B (2-pin)	compatible with LEMO.EGE.0B.302, multicoded 2 notches for optional individually power supply
Grounding / potential compensation	M4	
Measuring input	 LEMO Redel 2P, 8-polig, Code B	4-channel sensor cables are available separately as accessories 5
CAN	 DSUB-9	CAN IN (male) / CAN OUT (female) Pinbelegung identisch
Module connector	via locking slider	for the supply and system bus (CAN) of directly connected modules without further cables

Sampling rate, Bandwidth, Filter			
Parameter	**Value typ.**	**min. / max.**	**Remarks**
Sampling rate		≤100 Hz	output rate of CAN bus data, configurable, individually per channel
Bandwidth	15 Hz 2.5 Hz		-3 dB; CAN output data rate = 100 Hz; anti-aliasing filter (AAF) 0.1 dB
Resolution	24 Bit		data output: 32 Bit FLOAT or 16 Bit INT

LED		
Parameter	**Value**	**Remarks**
Power-LED (PWR)		
green	power active	
Status-LED	multicolor	overall status of module
green	normal operating, run	
blue	init, etc.	
blue/orange	firmware update	
yellow	prepare configuration	
red	error	
Channel-Status-LED	bicolor	status for each channel
off	channel passive	
green	channel active	
red	over-range error	signal exceeding nominal range by 5 %

Isolation

Parameter	Value	Remarks
Isolation	galvanically isolated	
CAN	±60 V	to system ground
power supply input	±60 V	to system ground
channels of one connection socket		according EN 61010-1, EN 61010-2-030, EN 60664-1
working voltage	1000 V_{AC}, 1400 V_{DC}	to CAN, power supply, channels of the other connection socket
	1000 $V_{AC/DC}$	to channels of the same connection socket
measurement category	300 V CAT III, 600 V CAT II	to CAN, power supply and channels of the other connection socket
test voltage	8 kV 1.2/50 µs 4.4 kV RMS, 60 s	to CAN, power supply and channels of the other connection socket
	3 kV RMS, 60 s	between channels of the same connection socket
Pollution degree	2	

Note: Always observe the specifications of the cables used in the application.

Measurement Mode

Thermocouple measurement			
Parameter	**Value typ.**	**min. / max.**	**Remarks**
Sensor	Thermocouple type K		DIN EN 60854 [1]
Input range	-270 °C to +1370 °C -100 °C to 250 °C		output format: 16 Bit INT or FLOAT [2] output format: 16 Bit INT
Overvoltage protection	±200 V		protection of electronics against differential signal voltage
Input coupling	DC		
Input configuration	isolated		differential
Measurement error -200 °C to -150 °C -150 °C to -50 °C **-50 °C to 500 °C** 500 °C to 1300 °C Impact of the sensor impedance	 0,4 K 0,2 K **0,1 K** 0,3 K 0.0002 % / Ω · R_{TC}	 ±1,3 K ±0,7 K **±0,7 K** ±0,9 K	 of reading; resistance of sensor R_{TC} [3]
Drift	+ 0.0009 %/K · ΔT_a 0.02 K/K · ΔT_a		T = -150 °C to 1300 °C T_a = -20 °C to 90 °C of reading $\Delta T_a = \lvert T_a - 25\ °C \rvert$
IMRR (Isolation mode rejection ratio)	0.003 K/V		50 V; 50 Hz; R_{TC} = 100 Ω thermocouple
Noise	0.01 K_{rms}		average filter 100 ms output format: FLOAT; -100 °C to 250 °C

1 Based on "International Temperature Scale of 1990" (ITS-90)

2 The listed measuring ranges can only be selected via CANSAS (via devices in group A or via PC dongle). In imc STUDIO (via devices in group B), only the large measuring range and only float are available.

3 The specific cable resistance of NiCr/Ni (IEC-Standard) is approx. 0.5 Ω · mm^2/m.
(e.g. diameter = 0.8 mm; length = 3 m; resistance = 6 Ω)

Operating and environmental conditions

Parameter	Value	Remarks
Ingress protection class	IP40	With optional protective cap (CANFX/COVER-IP40) on the locking slide of the click mechanism, otherwise IP20 The service protective cap must always remain in place and may only be removed temporarily to perform a reset.
Operating temperature range	-40°C to +105°C	internal condensation temporarily allowed (pollution degree 2)
Pollution degree	2	according DIN EN 61010-1, DIN EN 60664-1
External mechanical stress	IK07	
Shock- and vibration resistance	IEC 61373, IEC 60068-2-27 IEC 60062-2-64 category 1, class A and B	

Power supply of the module			
Parameter	**Value typ.**	**min. / max.**	**Remarks**
Input supply voltage		7 V to 50 V DC 9.5 V to 50 V DC	after power up upon power up
Power consumption	1.6 W	<2.2 W	
Power supply options	CAN, power cable or via adjacent module		DSUB-9 (rear) LEMO.0B, 2-pin (rear) module connector (click mechanism)

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 mA/K·ΔT_a	Derating with higher operating temperatures T_a, $\Delta T_a = T_a - 25°C$
Max. power		Equivalent pass through power at 25°C
	96 W at 12 V DC 192 W at 24V DC	typ. DC vehicle voltage 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 mA/K·ΔT_a	Derating with higher operating temperatures T_a, $\Delta T_a = T_a - 25°C$
Max. power	72 W at 12 V DC 144 W at 24 V DC	Equivalent pass through power at 25°C typ. DC vehicle voltage AC/DC power adaptor or cabinets
	50 W at 12 V DC 100 W at 24 V DC	at +85°C

Contact imc

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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.

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