

## imc CANSASfit HISO-T-8-2L

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

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

The model T-8 supports temperature measurement on 8 channels with thermocouples (type K), which are on a high common mode level or in environments with up to 1000 V voltage:

- Temperature with thermocouples type K



CANFT/HISO-T-8-2L

### Highlights

- Isolation: 1000 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)
- Click mechanism 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 and supply systems
- Environments where personnel safety has to be ensured

### imc CANSASfit general functionalities and specifications

As a CAN-Bus-based test and measurement tool, the imc CANSASfit series offers a selection of measurement modules which precondition and digitize sensor signals and output these as CAN-messages. Their design and the supported sensors and signals make them particularly suited for applications in the fields of automotive engineering, vehicle testing, road trials and measurements on mobile machines.

In deviation from the generally valid specification, no degree of protection (IP code) is defined for the CANFT/HISO products.

imc CANSASfit modules can be mechanically and electrically attached to each other by means of a click mechanism. When the module connectors are open, this is accomplished without the need for tools and without additional connecting cables.

### Application fields

- Ideal for vehicle testing and road trials (above the maximum water depth/restricted degree of protection)
- Deployable in both distributed installations and centralized measurement setups
- Operable with CAN interfaces and CAN data loggers from either imc or third-party suppliers

### Properties and capabilities

CAN-Bus:

- Configurable Baud-rate (max. 1 Mbit/s)
- Default configuration ex-factory: Baud rate=500 kbit/s and IDs: Master=2, Slave=3
- Galvanically isolated

Sampling rates:

- Configurable CAN data rate

Power supply:

- Wide range supply voltage, see technical specs
- LEMO.0B.305 sockets (IN / OUT) in conjunction with CAN-Bus signals

Onboard signal processing (depending on module type):

- Low pass filter
- Anti-Aliasing Filter (AAF) automatically adapted to the output rate
- Averaging filter
- Multi functional status LED, global or channel-wise (depending on module type)

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)

### **fit-series: versatile, click-together module block assemblies**

Click mechanism:

- Multiple modules connected in a central block: mechanically and electrically (CAN and power supply)
- No need for tools or additional connection cables
- To maintain the degree of protection, the assembly of a complete system consisting of several modules must be carried out in a controlled environment (e.g. also sealing cap for click connectors).

Mounting options:

- Fastening eyelets provided for installation with cable ties, screws or bolts



imc CANSASfit HISO connected with further imc CANSASfit Modules



Latching mechanism and protective cover for click mechanism

- The HISO module series differs from the other imc CANSASfit modules by its size (slightly raised and double width) and the degree of protection.

### **Software**

Configuration:

- Using imc CANSAS software (free of charge), including dbc-export
- Autostart with saved configuration; also pre-configurable at factory

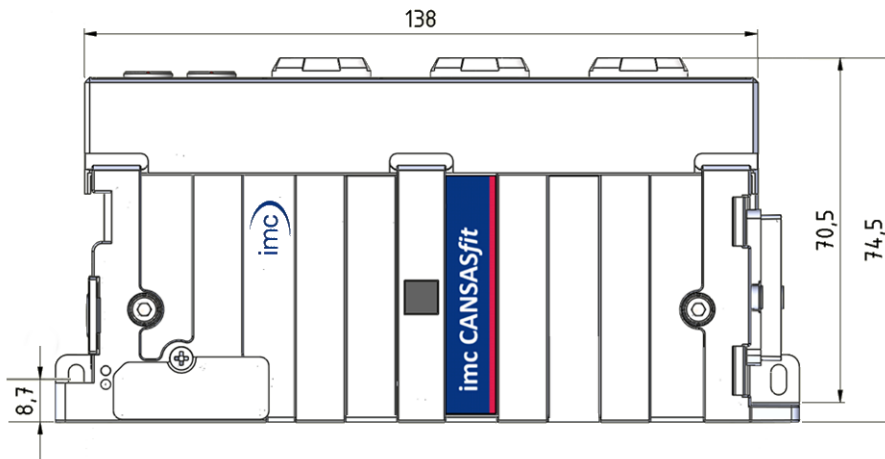
Measurement operation:

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

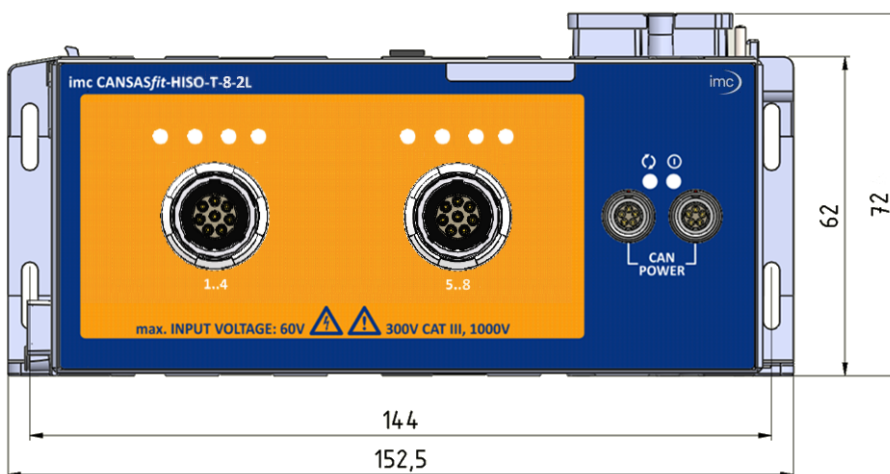
### Available variants of imc CANSASfit HISO-T-8

Order Code	Signal connection	CAN connection	extra	article no.
CANFT/HISO-T-8-2L	2x LEMO Redel 2P sockets	LEMO.OB.305		12100037

### Mechanical drawings



This representation of the module (with the connections facing upwards) is the preferred position for use.



### Attention



- CANFT/HISO may only be operated in closed condition (click connector closed).
- The two protective covers must be mounted on the module connection ports when the modules are not coupled together.
- Please note the [shock resistance rating](#) <sup>10</sup>, which varies depending on the date of manufacture.

### Included accessories

Documents		
Getting started with imc CANSASfit (one copy per delivery)		
Device certificate <sup>1</sup>		

### Optional accessories

Power supply: AC/DC power adaptor (imc CANSASfit power set)		
CANFT/POWER-P	AC/DC power adaptor, 24 V DC, 60 W, PHOENIX, cable for CAN and power supply, LEMO.0B to DSUB-9, power supply via PHOENIX	12100023

LEMO.2P (Redel) 8 pin, 4 channel sensor cable thermocouple type K for HV modules HISO-T-8-2L		
ACC/SENSORCABLE-4HV-T-L-3M	cable length 3 m	13500284
ACC/SENSORCABLE-4HV-T-L-XS-3M	cable length 3 m, extra slim, the stripped part of the cable (upper 40 cm) is not protected against contact	13500323
ACC/SENSORCABLE-4x1HV-T-L-3M	cable length 3 m, special socket with 4 individual, outgoing cable	13500322
Only safe measuring cables suitable for HV applications may be used. Please always observe the specifications of the cables!		

LEMO.2P (Redel) 8 pin, connection box for High voltage modules (HV)		
ACC/HVBOX-8-T-10M	4 channel HV connection box for 4 thermocouples type K with 10 m HV capable cable	13500353

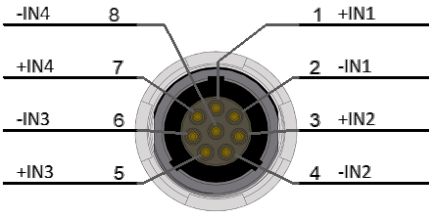
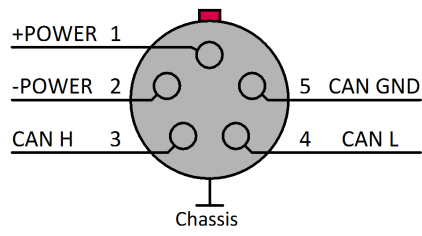
CAN: cable <sup>2</sup> and plugs		
ACC/FGG.0B.305.CLAD56ZN	plug for the CAN connection (FGG series <sup>3</sup> )	13500245
ACC/GMF.0B.035.060.EN	protective cover for the LEMO 0B plug (FGG series <sup>3</sup> ), IP65	13500272
ACC/CABLE-LEMO-LEMO-2M5	CAN + Power cable 2x LEMO.0B 2.5 m	13500229
ACC/CABLE-LEMO-DSUB-2M5	CAN + Power cable LEMO.0B/DSUB 2.5 m	13500230
ACC/CABLE-LEMO-DSUB-BAN-2M5	CAN + Power cable LEMO.0B/DSUB/PWR power via banana	13500231
ACC/CABLE-LEMO-DSUB-PHOE-2M5	CAN + Power cable LEMO.0B/DSUB/PWR power via PHOENIX	13500261
ACC/CABLE-LEMO-DSUB-LEMO-1B	CAN + Power cable LEMO.0B/DSUB power supply via LEMO.1B.302 for 15V/24V power adaptor	13500368
ACC/CABLE-LEMO-DSUB-LEMO-1BE	CAN + Power cable LEMO.0B/DSUB power supply via LEMO.1B.302 E-coded for 48 V power adaptor	13500296
ACC/CABLE-LEMO-LEMO-PWR-0M5	CAN + Power cable 2xLEMO.0B 0.5 m, with power supply for separate segments via banana	13500324
ACC/CAP-LEMO.0B	protective cover for the LEMO 0B socket	13500232
ACC/CAP-LEMO.1B	protective cover for the LEMO 1B socket	13500233
ACC/CANFT-TERMI	CAN Terminator 120 Ω, LEMO.0B plug	13500242

- 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.
- other cable lengths available
- The LEMO plug series FGG and the FEG series are both compatible with the module's terminals.  
The FEG plug model has an additional sealing lip which ensures an IP54 grade seal when connected. The protection rating provided by the FGG model when connected is IP50. The FGG plug could additionally be equipped with a protection grommet (e.g. 13500098).

<b>Mounting accessories</b>		
CANFT/BRACKET-DIN-XW	DIN Rail Mounting kit - extra-wide: for HISO types	12100039
CANFT/BRACKET-MAG-XW	Magnetic mounting kit - extra-wide: for HISO types	12100040
<b>imc CANSASfit configuration package (USB)</b>		
CANFT/USB-P		12100018
USB-CAN interface (CAN: DSUB-9, USB 2.0); AC/DC power adaptor, 24 V DC, 60 W, connection via PHOENIX; CAN and power cable LEMO.0B/DSUB Power supply via PHOENIX, 2.5 m; CAN Terminator 120 $\Omega$ , LEMO.0B; gender changer (DSUB-9) with integrated CAN terminator; imc CANSAS configuration software (download), including COM library and LabVIEW (TM) VI		
<b>Miscellaneous</b>		
Protocol Verification of the device safety test		



## Technical Specs - CANFT/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
CAN / power supply	LEMO.0B 5-pin	FEG.0B.305
Grounding / potential compensation	M4	
Measuring input	LEMO Redel 2P, 8-pin, Code B	
LEMO pin configuration	measurement input: 	CAN and power supply: 
Module connector	Click-connection (protected)	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
Filter			digital Filter
Type	low pass		
Characteristic	Butterworth, Bessel, Moving averaging (sinc), anti-aliasing filter		individual selectable; averaging and AAF: adapted automatically, according to selected output rate
Cut-off frequency	1 Hz to 200 Hz		
Order	2 <sup>nd</sup> and 8 <sup>th</sup>		selectable low pass filter
Anti-aliasing filter	Cauer 8 <sup>th</sup> order with $f_{\text{cut-off}} = 0.4 \cdot f_s$		$f_s$ : CAN output data rate and $f_s \geq 1$ Hz
Resolution	24 Bit		data output: 32 Bit FLOAT or 16 Bit INT

Isolation		
Parameter	Value	Remarks
Isolation	galvanically isolated	to system ground
CAN bus	±60 V	
power supply input	±60 V	
channel	1000 V	channel to channel, channel to CAN, channel to module power supply
measurement category	1000 V CAT I 600 V CAT II 300 V CAT III	working voltage according EN 61010-1, EN 61010-2-030, EN 60664-1
test voltage	4.4 kV RMS, 60 s 8 kV 1.2/50 µs	according EN 61010-1, EN 60664-1 AC voltage test surge voltage test each measuring connector against chassis and all other inputs
pollution degree	2	according EN 61010-1, EN 60664-1

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

### Measurement Mode

Thermocouple measurement			
Parameter	Value typ.	min. / max.	Remarks
Sensor	Thermocouple type K		DIN EN 60854 <sup>1</sup>
Input range	-200 °C to +1300 °C -100 °C to 250 °C		output format: 16 Bit INT or FLOAT <sup>2</sup> 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	0,4 K	±1,3 K	
-150 °C to -50 °C	0,2 K	±0,7 K	
<b>-50 °C to 500 °C</b>	<b>0,1 K</b>	<b>±0,7 K</b>	
500 °C to 1300 °C	0,3 K	±0,9 K	
Impact of the sensor impedance	0.0002 % / Ω · R <sub>TC</sub>		of reading; resistance of sensor R <sub>TC</sub> <sup>3</sup>
Drift	+ 0.0009 %/K · ΔT <sub>a</sub> 0.02 K/K · ΔT <sub>a</sub>		T = -150 °C to 1300 °C T <sub>a</sub> = -20 °C to 90 °C of reading ΔT <sub>a</sub> =  T <sub>a</sub> - 25 °C
IMRR (Isolation mode rejection ratio)	0.003 K/V		50 V; 50 Hz; R <sub>TC</sub> = 100 Ω thermocouple
Noise	0.01 K <sub>rms</sub>		average filter 100 ms output format: FLOAT; -100 °C to 250 °C

- 1 Based on "International Temperature Scale of 1990" (ITS-90) For reasons of compatibility with older products, the range in the user interface is -270°C to 1370°C.
- 3 The specific cable resistance of NiCr/Ni (IEC-Standard) is approx. 0.5 Ω · mm<sup>2</sup>/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 IK08	for devices manufactured before 2021 for devices manufactured in 2022 or later
Shock- and vibration resistance	IEC 61373, IEC 60068-2-27 IEC 60068-2-64 category 1, class A and B	
Dimensions (L x W x H)	approx. 153 x 70 x 75 mm	including mounting flanges and click
Weight	approx. 0.7 kg	

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	<2.5 W	
Power supply options	CAN/Power cable or via adjacent module		LEMO.0B, 5-pin module connector (click mechanism)

Max. number of modules for direct coupling (block size with click mechanism)		
Parameter	Value	Remarks
Max. number of modules	8	limited by termination of internal CAN-Bus backbone (click junction)

Pass through power limits for directly connected modules (click-mechanism)		
Parameter	Value	Remarks
Max. current	4 A	at 25 °C current rating of click connector
	$-20 \text{ mA/K} \cdot \Delta T_a$	derating with higher operating temperatures $T_a$ $\Delta T_a = T_a - 25 \text{ °C}$
Max. power	48 W at 12 V DC 96 W at 24 V DC	equivalent pass through power at 25 °C typ. DC vehicle voltage AC/DC power adaptor and installations
	24 W at 12 V DC 48 W at 24 V DC	at +105 °C

Available power for supply of additional modules via CAN-cable (LEMO.0B, "down stream")		
Parameter	Value	Remarks
Max. current	6.5 A	at 25 °C current rating of LEMO.0B connection (CAN-IN, CAN-OUT); assuming adequate wire cross section!
	$-15 \text{ mA/K} \cdot \Delta T_a$	derating with higher operating temperatures $T_a$ $\Delta T_a = T_a - 25 \text{ °C}$
Max. power	78 W at 12 V DC 156 W at 24 V DC	equivalent pass through power at 25 °C typ. DC vehicle voltage AC/DC power adaptor and installations
	60 W at 12 V DC 120 W at 24 V DC	at +105 °C



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

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