

imc CANSASfit HISO-UT-6-3L

High voltage isolated 6-channel CAN-based measurement module for voltage, temperature (RTD) and resistance (NTC)

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 UT-6 allows the measurement of low voltages as well as temperature sensors on 6 channels, which are on a high common mode level or in environments with up to 1000 V voltage:

- Voltage (25 mV to 100 V)
- Temperature (PT100, PT1000)
- Resistance (e.g. NTC)
- MEMS accelerometers (5 V sensor supply)



CANFT/HISO-UT-6-3L

Highlights

- Isolation: 1000 V (according to safety standard DIN EN 61010)
- High-voltage-proof special connectors
"3L": 3 x LEMO.2P as common socket (2 channels at each 8-pin socket)
- 5 V sensor supply per-channel (8 mA), suited for MEMS accelerometers (imc AC series)
- Per-channel isolated measurement inputs, individual filtering and ADCs
- 400 Hz bandwidth at max. 1 kSps/channel sampling rate (CAN output rate)

- 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 (esp. PT100/PT1000) on high voltage components in electrical and hybrid vehicles, such as fuel cells and supply circuits
- Measurement of low voltages such as single battery cells and battery modules
- Current measurement shunts on HV level
- Detection of mechanical loads and vibrations on high-voltage batteries
- Environments in which full personal safety must be guaranteed even in the event of faults.

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

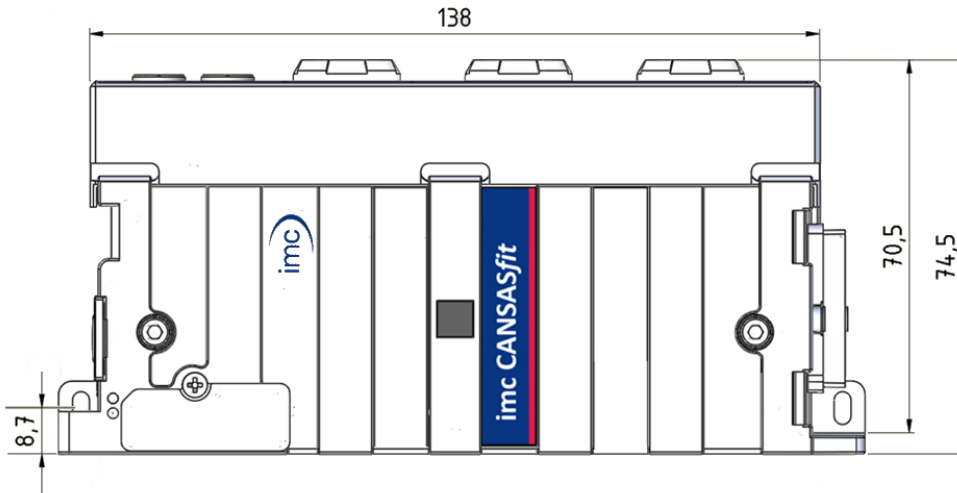
Measurement operation:

- 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

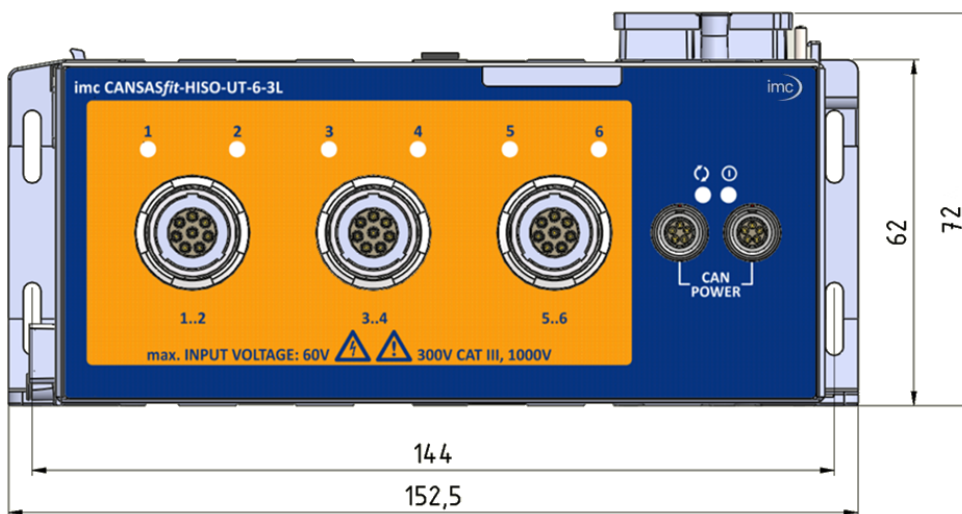
Available variants of imc CANSASfit HISO-UT-6

| Order Code | Signal connection | CAN connection | Extra | article no. |
|--------------------|-------------------|----------------|-------|-------------|
| CANFT/HISO-UT-6-3L | 3x LEMO.2P | LEMO.OB.305 | | 12100036 |

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.
- The resistance to mechanical stress is specified according to IK07 (robust against 2 J impact energy).

Included accessories

| Documents | | |
|--|--|--|
| Getting started with imc CANSASfit (one copy per delivery) | | |
| Device certificate | | |

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, 2 channel sensor cable | | |
|---|---|----------|
| ACC/SENSORCABLE-2HV-L2P-PT-3M | 8 wire cable with 2 connected PT100 (class A) cable length 3 m ¹ | 13500355 |
| ACC/SENSORCABLE-2HV-LP2-3M | 8 wire cable with open ends, cable length 3 m ¹ | 13500356 |
| 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-8-10M | 2 channel HV connection box for e.g. two PT100 sensors with 10 m HV capable cable | 13500354 |

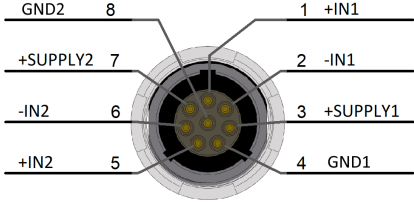
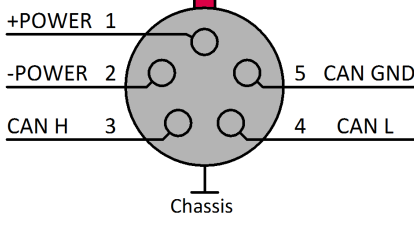
| CAN: cable ¹ and plugs | | |
|-----------------------------------|--|----------|
| ACC/FGG.0B.305.CLAD56ZN | plug for the CAN connection (FGG series ²) | 13500245 |
| ACC/GMF.0B.035.060.EN | protective cover for the LEMO 0B plug (FGG series ²), IP65 | 13500272 |
| ACC/CABLE-LEMO-LEMO-2M5 | CAN + Power 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 supply via banana, 2.5 m | 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 |

- 1 other cable lengths available
- 2 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).

| CAN: cable and plugs | | |
|---|--|-----------|
| 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/CANFT-TERMI | CAN Terminator 120 Ω, LEMO.0B plug | 13500242 |
| Mounting accessories | | |
| 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 |
| imc CANSASfit configuration package (USB) | | |
| 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 Ω, LEMO.0B; gender changer (DSUB-9) with integrated CAN terminator; imc CANSAS configuration software (download), including COM library and LabVIEW (TM) VI | |
| Miscellaneous | | |
| Protocol Verification of the device safety test | | |
| Appropriate MEMS accelerometers (5 V supply) are available as accessories (imc AC series) | | |
| MEMS accelerometers | | |
| SEN/ACC-AC1A010 | accelerometers MEMS 10 g uniaxial | 13900026 |
| SEN/ACC-AC1A050 | accelerometers MEMS 50 g uniaxial | 13900027 |
| 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 - CANFT/HISO-UT-6-3L



General

| Inputs, measurement mode | | |
|---|--|--|
| Parameter | Value | Remarks |
| Inputs | 6 | differential, analog |
| Measurement mode | voltage measurement voltage measurement active sensors (5 V) resistance measurement temperature sensor PT100/PT1000 | e.g. MEMS acceleration sensors series imc AC 4-wire |
| Connector / socket CAN / power supply Grounding / potential compensation Measuring input | compatible socket type LEMO.0B 5-pin M4 LEMO Redel 2P, 8-pin, Code C | recommended plug FEG.0B.305 |
| 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 | Remarks |
| Sampling rate | ≤ 1 kHz | CAN output data rate; configurable, individually per channel |
| Bandwidth | 0 Hz to 400 Hz | -3 dB; CAN output data rate = 1 kHz; anti-aliasing filter (AAF) |
| Filter | Moving average, Butterworth, Bessel, anti-aliasing filter | digital filter |
| Characteristic | | individual selectable; averaging and AAF: adapted automatically, according to selected output rate |
| Cut-off frequency | 1 Hz to 200 Hz | -3 dB, in 1 - 2 - 5 steps |
| Order | 2 nd and 8 th | selectable low pass filter |
| Anti-aliasing filter | Cauer 8 th order with $f_{\text{cut-off}} = 0.4 \cdot f_s$ | f_s : CAN output data rate $f_s \geq 1$ Hz |
| Resolution | 24 Bit | data output: 32 Bit Float or 16 Bit Integer |

| 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 | | working voltage according EN 61010-1, EN 61010-2-030, EN 60664-1 |
| test voltage | 1000 V CAT I 600 V CAT II 300 V CAT III | |
| | 4.4 kV RMS, 60 s | according EN 61010-1, EN 60664-1 AC voltage test |
| | 8 kV 1.2/50 µs | surge voltage test each measuring connector against chassis and all other inputs |
| pollution degree | 2 | according EN 61010-1, EN 60664-1 |

| Coupling | | |
|---------------------|----------|--------------|
| Parameter | Value | Remarks |
| Input coupling | DC | |
| Input configuration | isolated | differential |

| Status-LED | | |
|--|--|---|
| Parameter | Value | Remarks |
| Power-LED green  | bicolor power active | |
| Status-LED green  blue yellow red | multicolor operating, run init, firmware update etc. 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 |

| Sensor supply | | | |
|--------------------------|------------|---------------|----------------------------|
| Parameter | Value typ. | min. / max. | Remarks |
| Output voltage | +5 V | | arbitrary for each channel |
| Error of output voltage | | -2 % to +10 % | |
| Output current | 8 mA | >7 mA | |
| Output power per channel | | 34 mW | |
| Capacitive load | 0 to 1 mF | | |
| Output impedance | 30 Ω | | |

Measurement modes

| Voltage measurement | | | |
|---------------------------------------|---|--|---|
| Parameter | Value typ. | min. / max. | Remarks |
| Input range | ±100 V, ±50 V, ±25 V, ±10 V, ±5 V, ..., ±25 mV | | |
| Max. Over Voltage | ±200 V | | differential input voltage |
| Input impedance | 1 MΩ 20 MΩ | ±1% ±1% | measurement ranges ≥±5 V measurement ranges ≤±2.5 V |
| Gain error | | 0.02% + 0.002%/K·ΔT _a | of reading ΔT _a = T _a -25°C |
| Offset error | | 0.02% or 10 μV + 0.001%/K·ΔT _a | of range, sensor supply voltage = 0 V whichever is greater ΔT _a = T _a -25°C |
| IMRR (Isolation mode rejection ratio) | -125 dB -152 dB | | 50 Hz measurement ranges ≥±5 V measurement ranges ≤±2.5 V |
| Noise | 75 μV _{rms} 1.6 μV _{rms} 1 μV _{rms} 0.7 μV _{rms} | | sampling rate = 1 kHz; filter = AAF; resolution = 32 bit float; ranges: 100 V, ..., 5 V 2.5 V 1 V 500 mV, ..., 25 mV |

| Resistance measurement | | | |
|------------------------|---|---|---|
| Parameter | Value typ. | min. / max. | Remarks |
| Input range | 100 kΩ, 50 kΩ, 25 kΩ, 10 kΩ, ..., 100 Ω | | 50 Ω .. 10 Ω on request |
| Gain error | | 0.02% 0.002%/K·ΔT _a | of the measured value ΔT _a = T _a -25°C |
| Offset error | | 0.01% 0.003%/K·ΔT _a | of range range = 100 kΩ to 100 Ω ΔT _a = T _a -25°C |
| SNR | -82 dB -100 dB -104 dB | | bandwidth = 400 Hz; filter = AAF range = 100 kΩ; signal: 1%..100% of range range = 10 kΩ; signal: 1%..100% of range range = 1 kΩ |
| RTD measurement | | | |
| Parameter | Value typ. | min. / max. | Remarks |
| Temperature sensors | Resistance Temperature Detectors (RTDs) PT100, PT1000 | | 4-wire configuration |
| Input range | -200°C to 850°C -50°C to 150°C | | output format: 16 Bit INT or FLOAT output format: 16 Bit INT |
| Overvoltage protection | | ±60 V | |
| Supply Current | 0.88 mA 0.7 mA | | PT100; P _{dis} <0.3 mW PT1000; P _{dis} <1.9 mW |
| Measurement error | -200°C to 0°C 0°C to 100°C 100°C to 300°C 300°C to 500°C 500°C to 850°C | 0.001 K 0.001 K 0.002 K 0.003 K 0.006 K | 0.05 K 0.1 K 0.18 K 0.25 K 0.4 K |
| Noise, SNR | 0.005 K _{rms} <1 LSB | | average filter 100 ms output format: Float; 850°C output format: 16 Bit Integer; 850°C |

Operating conditions

| Parameter | Value | Remarks |
|---------------------------------|--|--|
| Operating temperature range | -40°C to +85°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 | |
| Dimensions (L x W x H) | approx. 153 x 70 x 75 mm | including mounting flanges and click mechanism |
| 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 | 1.9 W | <3.2 W | without sensor supply with sensor supply |
| 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 +85 °C |

| Available power for supply of additional modules via CAN-cable (LEMO.0B) | | |
|--|-------------------------------------|--|
| 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 | equivalent pass through power at 25 °C |
| | 156 W at 24 V DC | typ. DC vehicle voltage AC/DC power adaptor and installations |
| | 60 W at 12 V DC 120 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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You will find the contact person responsible for you in our overview list of imc partners:

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