UTI-6 for imc ARGUSfit

6-channel measurement module for voltage, current, temperature (RTD) and resistance (NTC)

The UTI-6 module belonging to the imc ARGUS*fit* series is a 6-channel measurement amplifier that can be used in conjunction with an imc ARGUS system (or base unit) to which it is directly docked with its housing.

Individually isolated, configurable differential channels capturing:

- Voltage (25 mV to 60 V)
- Current (20 mA sensors)
- Temperature (PT100, PT1000)
- Resistance (e.g. NTC)

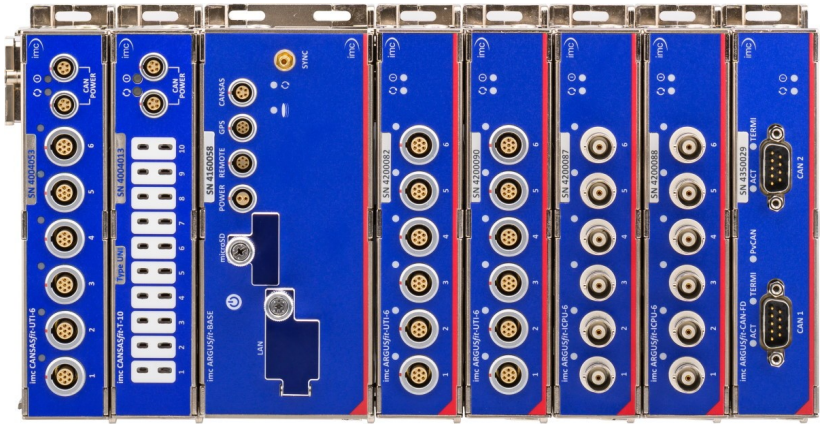
Highlights

- Per-channel isolated measurement inputs, individual filtering and ADCs
- Sensor supply (for active voltage-fed sensors), individually isolated and adjustable
- 40 kHz bandwidth at max. 100 kSps/channel sampling rate
- Measurement ranges and sampling rates individually selectable (in steps of 1, 2, 5)
- 24-bit digitization, internal processing and data resolution
- Robust, compact and miniaturized: click mechanism for imc ARGUS*fit* systems

Typical applications

- Robust data acquisition for mobile or stationary applications and for test benches
- General voltage signals, including vehicle battery voltage (up to 60 V) and current measurements with external shunts (down to 25 mV)
- Active voltage-fed sensors
- Industrial sensors (20 mA) for arbitrary physical variables
- Temperature measurement with resistance-based sensors (PT100, PT1000, NTC)

imc ARGUS*fit*: Flexible modular system for fast measurement systems

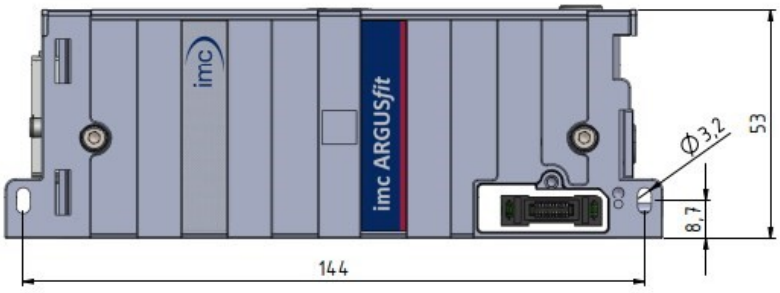


Based on an imc ARGUS*fit* base unit, imc ARGUS*fit* measurement amplifier and interface modules can be combined to form complete systems by means of a robust click mechanism, which can even integrate imc CANSAS*fit* modules. The click connectors provide the electrical connection to the power supply and system bus.

For expansion to decentralized distributed topologies, the fast internal ARGFT system bus can be converted to fiber optic cables by means of a clickable fiber converter module.

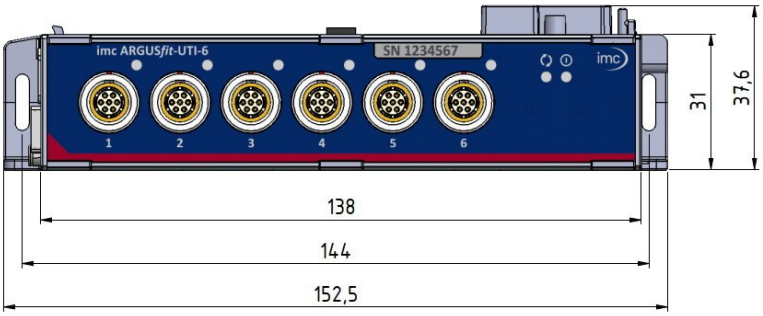
The entire system can be controlled via a common Ethernet connection (LAN/WLAN) with a PC (imc STUDIO software) and can be networked and operated synchronously and uniformly with all other imc measuring instrument series. Furthermore, it can also be operated autonomously and stand-alone capable without PC with data storage on microSD during the measurement.

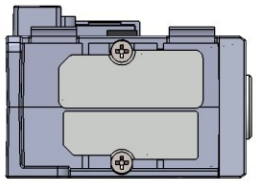
Dimensions



imc ARGUSfit UTI-6

Module shown in standard operating position (terminal connections upwards)





left module panel with parking position for the covers of the module connectors

Overview of the available variants

Order Code	Properties	article no.
ARGFT/UTI-6-SUP	voltage amplifier with sensor supply	11400206

Included accessories

Documents
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.
Getting started with imc ARGUS*fit* (one copy per delivery)

Miscellaneous
6x ACC/CAP-LEMO.1B, 13500233 (protective cover for LEMO.1B sockets)

Optional accessories

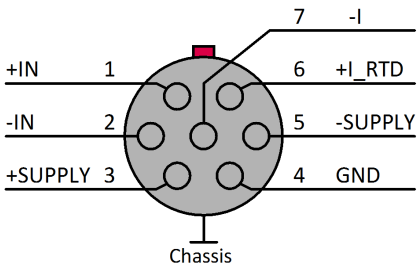
Connector: signals		
ACC/FGG.1B.307.CLAD62ZN	plug for the signal connection (FGG series[1])	13500096

Fiber-Converter Set		
ARGFT/FIBER-CONVERTER-SET	Media converter for the ARGUS system bus Includes: 2 converter modules, 2x SFP+ transceiver, 5 m fiber optic cable, AC/DC power adaptor and a power plug	11400225

Mounting accessories		
CANFT/BRACKET-DIN	Mounting on DIN-Rail (top hat rail) for imc ARGUS*fit* and imc CANSAS*fit*	12100029
CANFT/BRACKET-MAG	Mounting with magnet system for imc ARGUS*fit* and imc CANSAS*fit*	12100030

Technical Specs - ARGFT/UTI-6

General

Inputs, measurement mode			
Parameter	**Value typ.**	**min. / max.**	**Remarks**
Inputs	6		
Measurement mode	voltage measurement current measurement resistance measurement temperature measurement PT100/PT1000		 4-wire
Connector / socket	compatible socket type		recommended plug
Measuring input	LEMO.1B 7-pin		FEG.1B.307
LEMO pin configuration	measuring input  *UTI-6-SUP*		
Module connector	Click-connection (covering caps)		for the supply and system bus of directly connected modules without further cables, see data sheet of ARGFT base unit

Sampling rate, Bandwidth, Filter			
Parameter	**Value typ.**	**min. / max.**	**Remarks**
Sampling rate		≤100 kHz	configurable, individually per channel
Bandwidth	0 Hz to 40 kHz 0 Hz to 30 kHz		sampling rate 100 kHz, AAF filter -3 dB 0.1 dB
Filter			
Type	low pass		
Characteristic	Mean, Butterworth, Bessel, AAF		individual selectable; mean and AAF: adapted automatically, according to selected output rate
Cut-off frequency	1 Hz to 20 kHz		-3 dB, 1 - 2 - 5 steps digital filter in addition to hardware filter
Order	8^{th}		
Anti-aliasing filter	Cauer 8^{th} order		with $f_{cut\text{-}off} = 0.4 \cdot f_s$; f_s: output rate
Resolution	24 Bit		output: 32 Bit Float (24 Bit mantissa)

Isolation		
Parameter	**Value**	**Remarks**
Isolation		to case (CHASSIS) and between functional units
Analog input channels	±60 V	analog input and sensor supply
Channel-to-channel	±60 V	

Coupling		
Parameter	**Value**	**Remarks**
Input coupling	DC	
Input configuration	isolated	

Status-LED		
Parameter	**Value**	**Remarks**
Power-LED		
green	power active	
Status-LED	multicolor	global status of module
green	operating, run	
blue	init, firmware update etc.	
yellow	prepare configuration	
red	error	
Channel-Status-LED	bicolor	status for each channel
off	channel passive	
green	channel active	
red	over-range error	>5 % over nominal range
red	error	see manual for detailed information

Sensor supply			
Parameter	**Value typ.**	**min. / max.**	**Remarks**
Output voltage	±15 V, ±12 V, ±10 V, ±7.5 V, ±5 V, ±4 V, ±3.5 V, ±3.3 V, ±3 V, ±2.5 V		referenced to GND; arbitrary for each channel
Short-Circuit-Proof	unlimited duration		protection for module and each channel
Overvoltage protection	±50 V		voltages are referenced to GND
Error of output voltage		±2% $0.01\%/K \cdot \Delta T_a$	$\Delta T_a = \lvert T_a - 25°C \rvert$; with T_a = ambient temperature
Output power			
per channel		0.5 W 0.4 W	bipolar supply with symmetric load unipolar supply or asymmetric load
per module		2 W	
Output impedance	0.6 Ω		

Measurement modes

Voltage measurement			
Parameter	**Value typ.**	**min. / max.**	**Remarks**
Input range	±60 V, ±50 V, ±25 V, ±10 V, ±5 V, ±2.5 V, ±1 V to ±25 mV		for measuring range ±60 V applies: nominal working voltage 60 V (acc. to Low Voltage Directive); adjustable for valid measured values: up to 100 V
Max. Over Voltage	±200 V		differential input voltage
Input impedance	1 MΩ 20 MΩ	±1% ±1%	measurement ranges ≥±5 V or device off measurement ranges ≤±2.5 V
Gain error	0.008% + 0.0004%/K·ΔT_a	0.02% + 0.001%/K·ΔT_a	of reading ΔT_a=|T_a -25°C|; with T_a = ambient temperature
Offset error	0.003% + 0.00006%/K·ΔT_a	0.02% or 10 µV + 0.001%/K·ΔT_a	of range whichever is greater ΔT_a=|T_a -25°C|; with T_a = ambient temperature
Bandwidth ranges ±60 V to ±100 mV ranges ±50 mV to ±25 mV	 0 Hz to 40 kHz 0 Hz to 30 kHz 0 Hz to 30 kHz 0 Hz to 8 kHz		 -3 dB 0.1 dB -3 dB 0.1 dB
IMRR (Isolation mode rejection ratio)	90 dB 130 dB		50 Hz measurement ranges ≥±5 V measurement ranges ≤±2.5 V
Noise	1 mV_{rms} 16 μV_{rms} 14 μV_{rms}		sampling rate = 100 kHz; filter = AAF; resolution = 32 bit float; ranges: 60 V, ..., 5 V 2.5 V 1 V, ..., 25 mV

Current measurement			
Parameter	**Value typ.**	**min. / max.**	**Remarks**
Input range	±20 mA		
Overload	±100 mA		
Input impedance	25 Ω	±1%	
Gain error		0.02% + 0.002%/K·ΔT_a	of the measured value ΔT_a=|T_a -25°C|; with T_a = ambient temperature
Offset error		0.01% + 4 nA/K·ΔT_a	of range ΔT_a=|T_a -25°C|; with T_a = ambient temperature
Bandwidth	0 Hz to 48 kHz 0 Hz to 30 kHz		-3 dB 0.1 dB

Resistance measurement			
Parameter	**Value typ.**	**min. / max.**	**Remarks**
Input range	100 kΩ, 50 kΩ, 25 kΩ, 10 kΩ, ..., 100 Ω		
Overvoltage protection	±30 V		
Gain error		0.02% + 0.002%/K·ΔT_a	of the measured value $\Delta T_a = \lvert T_a - 25°C \rvert$; with T_a = ambient temperature
Offset error		0.01% + 0.003%/K·ΔT_a	of range $\Delta T_a = \lvert T_a - 25°C \rvert$; with T_a = ambient temperature
Bandwidth	0 Hz to 28 kHz 0 Hz to 10 kHz		-3 dB 0.1 dB

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 -200°C to 250°C		
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 PT100, PT1000			
-200°C to 0°C	0.001 K	0.05 K	
0°C to 100°C	0.001 K	0.1 K	
100°C to 300°C	0.002 K	0.18 K	
300°C to 500°C	0.003 K	0.25 K	
500°C to 850°C	0.006 K	0.4 K	

Operating conditions

Operating conditions		
Parameter	**Value**	**Remarks**
Operating environment	dry, non corrosive environment within specified operating temperature range	
Ingress protection class	IP50	with correctly mounted covers 2 over both module connectors
Pollution degree	2	
Operating temperature range	-15 °C to +55 °C	without condensation
Shock- and vibration resistance	IEC 60068-2, IEC 61373 IEC 60062-2-64 category 1, class A and B MIL-STD-810 Rail Cargo Vibration Exposure U.S. Highway Truck Vibration Exposure	
Extended shock- and vibration resistance	upon request	specific tests or certification upon request
Dimensions (L x W x H)	153 x 40 x 53 mm	including mounting flanges and click mechanism, see mechanical drawings 2
Weight	0.33 kg	

Power supply of the module			
Parameter	**Value typ.**	**min. / max.**	**Remarks**
Input supply voltage		10 V to 35 V DC	via base unit, fiber converter or UPS module; in dry environment up to 50 V allowed
Power consumption	3 W 1.5 @ 12 V 5.7 @ 12 V	3 W 7 W	sensor supply not loaded sensor supply loaded
Power supply options	via adjacent module		module connector (click mechanism)

Pass through power limits for directly connected modules (click-mechanism)		
Parameter	**Value**	**Remarks**
Max. current	5 A	at 55 °C current rating of click connector to ARGFT modules (right side, viewed from the base unit 2)
	60 W at 12 V DC 120 W at 24 V DC	typ. DC vehicle voltage AC/DC power adaptor and installations