imc CANSAS-IHR-R (I - High Resolution)

Current measurements with extremely high resolution

imc CANSAS-IHR-R provides two independent channels for measurement of currents, with automatic and dynamic range switching during a running measurement. This achieves an extremely high resolution of approx. 30 bits/180 dB.

The plug-in modules are equipped with backplane slot connectors according to DIN 41612 with very low impedance high current contacts. They achieve an active load patch resistance of less than 5 mΩ (for currents over 100 mA). A matching 19" rack solution is available that has a backplane with high-current capable contacts and push-in IDC type connectors.

Highlights

- Measurement of full load operating currents and low standby or leakage currents within one single uninterrupted measurement
- Automatic range switching (dynamic Auto-Ranging) with a minimum resolution of 36 nA
- Available in two different variants for the relevant electrical systems onboard vehicles:

	nominal current	limit
12 V systems	30 A	60 A
48 V systems	10 A	20 A

- 19" rack solution with slot detection
  Software-free configuration of the modules via additional DIP switches on the backplane

Applications

- Testing current consumption of automotive components
- Test of Sleep-mode and energy saving functions
- DC currents (uni-directional) at low voltage and breadboard testing

Fig. 1: imc CANSAS-IHR-R (front)

imc CANSAS general specifications and functions

- Plug-in modules for 19" rack and special backplane (max. 7 slots) with high-current connectors
- Each module: physically 2 isolated channels, logically 2 CANSAS modules

Power supply and operation:

- Galvanically-isolated power input
- DC input 9 V to 32 V (uniform for 12 V and 48 V load circuit versions)
- Autostart with saved configuration

Software
Configuration

- with imc CANSAS Software as of version 2.1R7
- Data logger operation
  Software: imc STUDIO
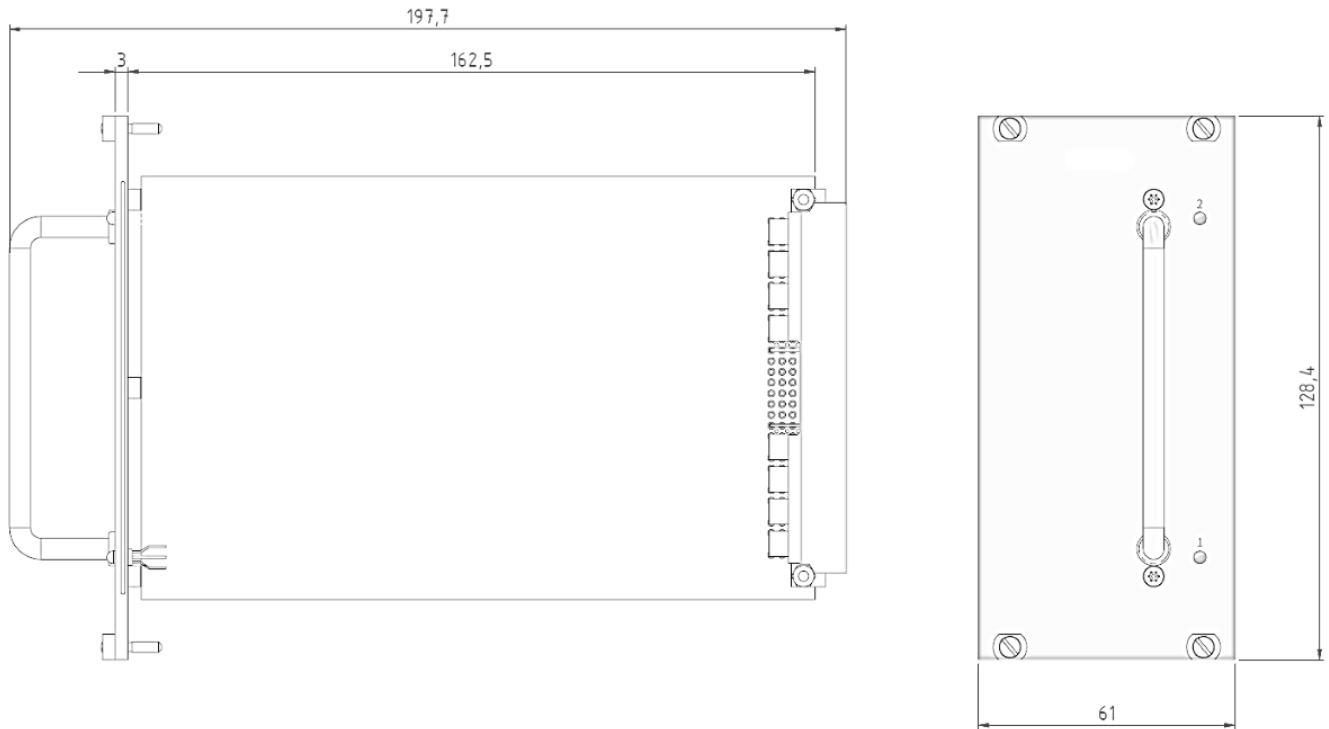 Hardware: imc measurement systems with CAN, e.g. imc BUSDAQ, imc CRONOS-family
- Any third-party CAN data logger systems

Order Code		article no.
CAN/IHR-R	plug-in module for 19" IHR-RACK with two current channels (12 V system)	1050450
CAN/IHR-48V-R	plug-in module for 19" IHR-RACK with two current channels (48 V system)	1050451

Mechanical dimensions


Fig. 2: imc CANSAS-IHR-R (dimensions)

CAN-Bus

Termination of the CAN-Bus:

The CAN-Bus must be terminated at both ends with 120 Ω (for detailed information see CANSAS manual). On each IHR plug-in module there is a terminating resistor available which can be switched on.

At the time of delivery this terminating resistor is not set.

When operating several modules on a backplane only one terminating resistor must be switched on.
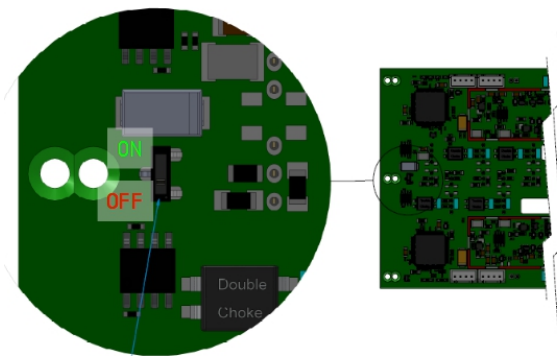
CAN terminator switch

Fig. 3: Position of the terminating resistor on the module

Included accessories

- Calibration certificate with test equipment verification as per DIN EN ISO 9001 (manufacturer's calibration certificate)
- Getting started with imc CANSAS (one copy per delivery)

Optional accessories

Order Code		article no.
CAN/IHR-RACK	19" Rack and backplane with plug-in terminals at the back side	1050452

Miscellaneous	
Calibration report set for each device: Report set with manufacturer's calibration certificate and individual readings, as well as list of test equipment used (PDF). Meets requirements of DIN EN ISO 17025	

Technical Specs - imc CANSAS-IHR-R

Parameter	Value	Remarks
Inputs	2	
Terminals DIN41612	Harting male & female multi-point connectors	for the plug-in backplane CAN/IHR-RACK
Terminals		at the rear panel of the CAN/IHR-RACK
measurement connections	4x spring-loaded terminal: 0.75 mm^2 ... 16 mm^2	
Supply, CAN-Bus	spring-loaded terminal: 0.14 mm^2 ... 0.5 mm^2	
Output values	current (mean value) current (peak values)	Default name: Channel01 MaxValue / MinValue
Output type	CAN	

Sampling rate, bandwidth		
Parameter	**Value**	**Remarks**
Sampling rate	30 kHz 1 Hz, 10 Hz, 100 Hz, 1 kHz	per channel / internal primary output rate (CAN) for all output values of each channel
Bandwidth	output rate · 0.4	-3 dB
Filter characteristic	Sinc	Sinc-Filter (Block averaging)
Resolution	30 Bit	nominal measurement range / minimum measured value resolution (ADC)

General			
Parameter	**CAN/IHR-R**	**CAN/IHR-48V-R**	**Remarks**
Max. load voltage	15 V	60 V	working voltage of the load circuit; load circuit will be opened in case of overload via electronic fuse operating threshold overvoltage protection (TVS)
Isolation	galvanic isolation of all 3 circuits: supply, channel and CAN against each other		All 3 circuits are mutually isolated so that their potentials are safely separated at all common board voltages.
Isolation voltage			
Nominal			
All (supply, channel and CAN)	70 V DC		working voltage
Test voltage			1 min
Channel - housing	500 V$_{rms}$		
Channel - Channel	700 V$_{rms}$		
CAN - housing	450 V$_{rms}$		

CAN		
Parameter	**Value**	**Remarks**
Output format	32 Bit Integer	
Scaling factor	$36.379 \cdot 10^{-9}$	current

CAN in flexible mode (all DIP switches of the backplane ON)		
Parameter	**Value**	**Remarks**
Baud rate	125 kbit/s, 250 kbit/s, 500 kbit/s, 1000 kbit/s	via imc CANSAS configurable

CAN messages
   Number of base addresses
   Installation and config.
   Identifier no.
	2 or 4
	fix
	free configurable
		configurable via imc CANSAS
		max. 2 CAN messages per channel
		with/without additional channels
		including Master-ID/Slave-ID,
		e.g. 2/3 or 2032/2033

CAN in RACK-mode (DIP switches coding via backplane)		
Parameter	**Value**	**Remarks**
Baud rate	500 kbit/s	fix, not changeable

CAN messages
   Number of base addresses
   Installation and config.
   Identifier no.
	2
	fix
	fix
		2 CAN messages per channel
		fixed rules
		coded via DIP switches

Default settings Identifier	Master-ID=2, Slave-ID=3	not changeable
Address allocation	automatic 1 base address per module	base address for each slot can be configured via DIP switch

Current measurement	**Value**		
	12 V system	**48 V system**	
Parameter	**CAN/IHR-R**	**CAN/IHR-48V-R**	**Remarks**
Input variable	current		only one current direction
Measurement range Nominal	0 to +30 A	0 to +10 A	automatic range-switching permanent operation
Overload protection	reversible electronic fuse		Load circuit separated by electronic fuse, automatic Reset
Trigger-Characteristic of the electronic fuse	30 A to 60 A 60 A to 78 A as of 78 A	10 A to 20 A 20 A to 26 A as of 26 A	max. dwell time until triggering: 60 s 1 s immediately
Reset electronic fuse	automatically after 60 s		
Max. allowable current	limited by thermal load capacity		relevant parameters: mean continuous current, short-time peaks, operating temperature

Max. peak current
   at 5 A continuous current
   at 30 A continuous current
	78 A
	54 A
		26 A
		18 A
			short-time peaks
			at 25°C
			at 40°

Current measurement	Value		Remarks
	12 V system	**48 V system**	
Parameter	**CAN/IHR-R**	**CAN/IHR-48V-R**	**Remarks**
Shunt	2 Ω,		Kelvin sensing for both shunts
	2 mΩ		High-Current-Range
Switching times	<1 µs		2 Ω —> 2 mΩ
	<1 ms		2 mΩ —> 2 Ω
Switching threshold	100 mA (typ.)		2 Ω —> 2 mΩ
	80 mA (typ.)		2 mΩ —> 2 Ω
Hysteresis	20 mA (typ.)		
Resolution	36 nA		
Path resistance	<10 mΩ	<20 mΩ	at 20°C and min. 100 mA
Gain uncertainty	<1%		of respective value
Gain drift	<40 ppm/°K		
Offset uncertainty	±200 nA		
Offset drift	30 ppm/°K + 20 nA/°K		
Noise (current-mean value)	200 nA (pkpk)		output rate: 1 Hz
Status LED			
normal operation	LED on		
trigger electronic fuse	LED off		

Power supply of the module		
Supply voltage	9 V to 36 V DC	
Power consumption	3 W at 10 V supply	both channels
	5.4 W at 36 V supply	
Temperature range	5°C to 40°C	
Dimension (W x H x D)	60.62 x 129 x 162.5 mm (12 TE)	DIN 41612 with front panel
Weight	approx. 500 g	