ISOF-8 for imc CRONOS-XT (CRXT/ISOF-8)

8-channel, fast and isolated differential amplifier

CRXT/ISOF-8
(Fig. similar)

The ISOF-8 is an isolated differential measurement amplifier with 8 galvanically-isolated channels for highly accurate measurements of:

- Voltage and current (20 mA)
- Temperature (Thermocoupe and PT100)
- IEPE/ICP sensors (with optional DSUB terminal plug)

Highlights

- Channel-wise isolated, galvanically-separated inputs
- Finely adjustable input voltage range (from ±25 mV to ±60 V)
- High signal bandwidth up to 48 kHz
- Each channel with its own adjustable filter (e.g., anti-aliasing filter) and simultaneous A/D converter

Typical applications

- Ideally suited for measurements with unclear potential conditions such as in-vehicle or in the railway sector with higher bandwidths.

imc CRONOS-XT - Maximizes flexible modularity

An imc CRONOS-XT system is composed of a base unit and one or more imc CRONOS-XT modules. The imc click mechanism offers a mechanically strong connection between several imc CRONOS-XT modules. At the same time, the "click" establishes an electrical connection to the system bus and the power supply.

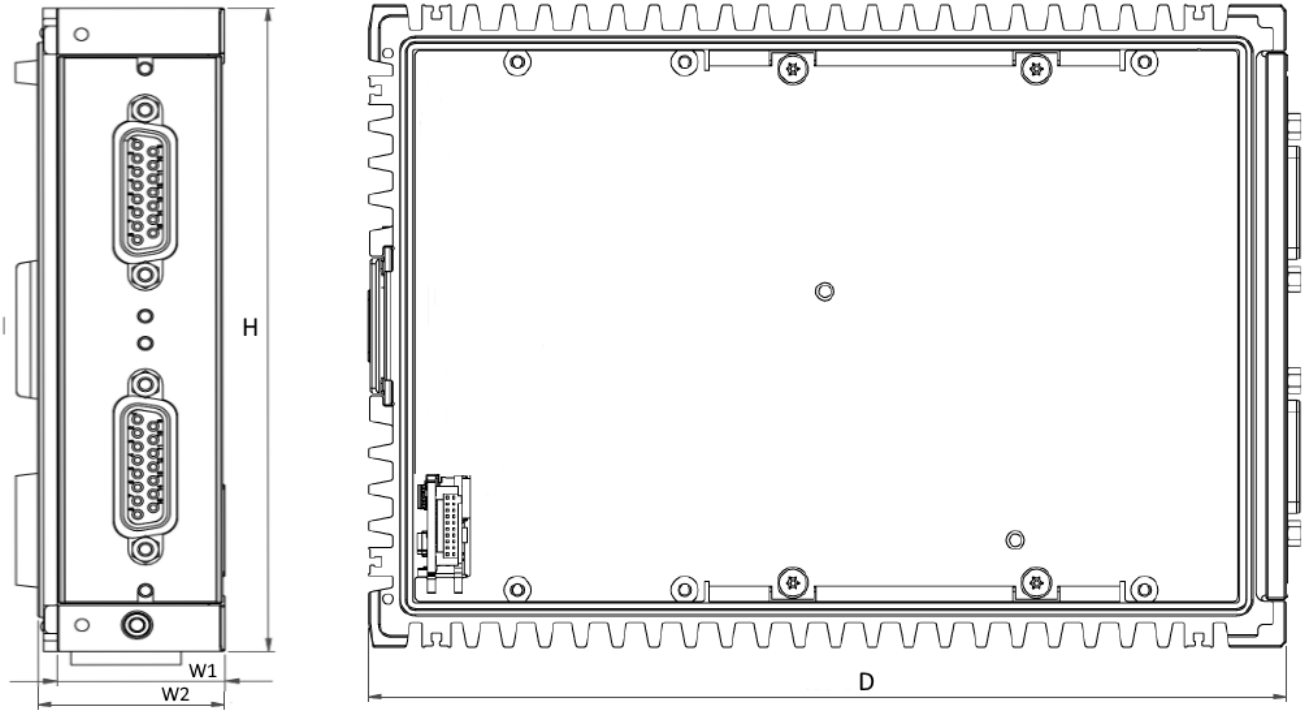
Overview of available variants

Order Code	Signal connections	power consumption	weight	housing	article no.
CRXT/ISOF-8	DSUB-15	10 W	0.7 kg	XT1	11100019
CRXT/ISOF-8-SUPPLY	DSUB-15	13 W	0.8 kg	XT1	11100057
CRXT/ISOF-8-L	LEMO	10 W		XT2	11100023

Integrated sensor supply

- The CRXT/ISOF-8-**SUPPLY** variant with an integrated sensor supply, requires no extra module expansion. This variant is equipped with adjustable supply voltages (globally selectable for 8 channels), output on reserved DSUB pins.

Dimensions



Shown in standard operating orientation: housing type XT1

Housing type:	XT1	XT2	XT3	XT4	Remarks
W: Width in mm	30.5 34	61 64.5	91.5 95	116.9 120.4	W1: modular spacing (effective stacking width) W2: complete width
H: Height in mm	130				
D: Depth in mm	186.5				

Sealing, IP rating and environmental specs

A single CRXT slice cannot achieve an IP protection level at first because it is functionally open at the side. The specified specifications are always only valid for a complete in a controlled environment clicked (closed) CRXT system. Only after it has been combined with a CRXT base unit (plus power module), CRXT slices if applicable, and the final handles to form a CRXT system can an evaluation be made. The specification for shock, vibration and IP degree of protection applicable to the entire device is then derived from the weakest specification of the CRXT slices used in this combination. They assume that the individual CRXT slices are each mounted in conjunction with the additional stabilizing interconnect brackets (included in the standard accessories supplied).

The module variants with LEMO sockets are equipped with LEMO.1B connection sockets, which meet the IP65 degree of protection. This determines the upper limits for the sealing of the complete system equipped with it.

According to IEC 60529 the Ingress Protection (IP) rating refer to protection classes provided by a housing, the protection of the electrical parts within the housing shell. If all functionally accessible contacts of the sockets are also to be protected, the corresponding plugs must be connected to all sockets. In many cases, a protective

cover can also be used alternatively on unused sockets.

Included accessories

Sealing Caps and mounting accessories		
2x ACC/CAP-DSUB-15-IP67	Sealing Cap IP67 for DSUB-15 sockets	13500342
2x CRXT/BRACKET-CON	interconnect brackets, intended for increased stability	11100040

Miscellaneous
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 CRONOS-XT (one copy per delivery)

Optional accessories

DSUB-15 plug (solder) IP67		
CRXT/DSUB15M-IP67	IP67 DSUB-15 plug male	11100073

DSUB-15 plugs (IP65)		
ACC/DSUBM-I4-IP65	IP65 DSUB-15 plug with screw terminals for 4-channel current measurement of up to 50 mA (50 Ω shunt, scaling factor: 0.02 A/V)	13500328
ACC/DSUBM-TEDS-I4-IP65	sealed IP65 TEDS version	13500333
ACC/DSUBM-U4-IP65	IP65 DSUB-15 plug with screw terminals for 4-channel voltage measurement	13500216
ACC/DSUBM-TEDS-U4-IP65	sealed IP65 TEDS version	13500330

DSUB-15 extension plugs for two IEPE transducers (no IP65 rating)		
ACC/DSUBM-ICP2I-BNC-S	ICP2I (isolated, 2x BNC), slow (1)	13500293
ACC/DSUBM-ICP2I-BNC-F	ICP2I (isolated, 2x BNC), fast (1)	13500294

Dust protection caps		
ACC/CAP-DSUB-15	dust protection cap for DSUB-15	13500339
ACC/CAP-LEMO.1B	dust protection cap for LEMO.1B sockets (and XT-Con)	13500233

Miscellaneous		
ACC/DSUBM-LOCKING-BOLT-L	extended length locking bolts (2 pcs) For the slices with DSUB-15 sockets, the sealed terminal plugs ACC/DSUBM-xxx-IP65 must be used - regardless of the sealing properties: The simple standard plug (ACC/DSUBM-xxx without suffix [-IP65]) have shorter locking screws and therefore cannot be fixed to CRXT slices. However, they can be retrofitted with the long bolts. With long bolts: only for CRXT, with short standard bolts: only for CRFX, CRC, C-SERIE etc.	13500327

1 When using the 2-channel plug only two channels (first and third channel) out of four are usable.

Technical Specs - CRXT/ISOF-8

Inputs, measurement modes, terminal connection		
Parameter	**Value**	**Remarks**
Inputs	8	
Measurement modes DSUB-15	voltage measurement current measurement thermocouple, RTD (PT100) current fed sensors IEPE/ICP	 shunt plug (ACC/DSUBM-I4) thermo plug (ACC/DSUBM-T4) IEPE/ICP expansion plug (ACC/DSUB-ICP4, not isolated ACC/DSUBM-ICP2I-BNC-S/-F [1], isolated)
Measurement modes LEMO	voltage measurement current measurement RTD (PT100)	 differential (internal shunt)
Terminal connection Standard LEMO	 2x DSUB-15 or 8x LEMO.1B.307	 4 channels per plug 1 channel per plug

Sampling rate, bandwidth, filter, TEDS		
Parameter	**Value**	**Remarks**
Sampling rate	≤100 kHz	per channel
Bandwidth	0 Hz to 48 kHz 0 Hz to 46 kHz	-3 dB -0.2 dB
Filter (digital) cut-off frequency characteristic order	 10 Hz to 20 kHz	 Butterworth, Bessel low pass filter: 8th order high pass filter: 4th order band pass: LP 4th and HP 4th order Anti-aliasing filter: Cauer 8.order with f_{cutoff} = 0.4 f_a
Resolution	 16 Bit 24 Bit	output format is selectable for each channel individually: a) 16 Bit Integer b) 32 Bit Float (24 Bit Mantissa)
TEDS - Transducer Electronic Data Sheets	conforming to IEEE 1451 Class II MMI	esp. with ACC/DSUBM-TEDS-xx (DS2433) not supported DS2431 (typ. IEPE/ICP sensor)
Characteristic curve linearization	user defined (max. 1023 supporting points)	

1 When using the two-channel IEPE plug in combination with the analog inputs, which provide four channels per socket, only channels 1 and 3 can be used. Only the IEPE base functionality is supported by this module, see also TD ACC/DSUBM-ICP2I-BNC.

General			
Parameter	**Value typ.**	**min. / max.**	**Remarks**
Isolation	galvanically isolated		channel-to-channel and against system ground (housing, CHASSIS), as well as against common reference of all PT100 current sources and TEDS.
nominal rating	±60 V		Isolation with IEPE/ICP connector: depends on plug type
test voltage	±300 V (10 sec.)		
Overvoltage protection	±100 V		differential input voltage (continuous)
	ESD 2 kV		human body model
	transient protection: automotive load dump ISO 7637		R_i=30 Ω, t_d=300 µs, t_r<60 µs
Input coupling	DC		
Input configuration	differential, isolated		
Input impedance	6,7 MΩ		range ≤±2 V or temperature mode
	1 MΩ		range ≥±5 V or device powered down
	50 Ω		current mode (shunt-plug) (ACC/DSUBM-I4)
Input current			
operating conditions		2.4 nA	for operation
on overvoltage condition	1 mA		$\|V_{in}\|$ >5 V on ranges <±5 V or device powered-down
Auxiliary supply			for IEPE/ICP plug
voltage	5 V	±5%	independent of optional
available current	>0.26 A	>0.2 A	sensor supply, short circuit proof
internal impedance	1.0 Ω	<1.2 Ω	power per DSUB-plug

Voltage measurement				
Parameter	**Value typ.**	**min. / max.**	**Remarks**	
Input ranges	±60 V / ±50 V / ±25 V / ±10 V ±5 V / ±2 V / ±1 V / ±500 mV ±250 mV / ±100 mV / ±50 mV / ±25 mV			
Gain error	<0.025%	<0.05%	of the measured value, at 25°C	
Gain drift		30 ppm/K·ΔT_a 60 ppm/K·ΔT_a	ranges ≤±2 V ranges ≥±5 V	over full temperature range
Offset error	0.02 %	<0.05 %	of the range	
Offset drift		2.5 ppm/K·ΔT_a	over entire temperature range ΔT_a=|T_a -25°C|; with T_a = ambient temperature	
Nonlinearity	<120 ppm			
Input voltage noise	2.6 μV_{rms} / 22 μV_{pkpk} 0.5 μV_{rms} / 3.5 μV_{pkpk} 0.1 μV_{pkpk} 14 nV / √Hz		range ±25 mV bandwidth 0.1 Hz to 48 kHz bandwidth 0.1 Hz to 1 kHz bandwidth 0.1 Hz to 10 Hz spectral noise density	
CMRR (common mode rejection ratio) / IMR	>145 dB (50 Hz) >80 dB (50 Hz)		ranges ≤±2 V ranges ≥±5 V	R_{source} = 0 Ω
Channel isolation	>1 GΩ, < 40 pF		channel-to-ground / CHASSIS (case)	
	>1 GΩ, < 10 pF		channel-to-channel	
Channel isolation (crosstalk)	>155 dB (50 Hz) >92 dB (50 Hz)		ranges ≤±2 V ranges ≥±5 V	R_{source} ≤100 Ω

Current measurement with shunt plug				
Parameter	**Value typ.**	**min. / max.**	**Remarks**	
Input ranges	±40 mA / ±20 mA / ±10 mA			
Shunt impedance	50 Ω		external plug ACC/DSUBM-I4	
Gain error	<0.07 %	<0.15 %	of the measured value, at 25 °C	
Gain drift		30 ppm/K·ΔT_a 60 ppm/K·ΔT_a	ranges ≤±2 V ranges ≥±5 V	over full temperature range
Offset error	10 µV		range ±25 mV	
Offset drift	0.7 µV/K·ΔT_a		range ±25 mV ΔT_a=|T_a -25°C|; with T_a = ambient temperature	

Current measurement with internal shunt (variant with round connector etc.)			
Parameter	**Value typ.**	**min. / max.**	**Remarks**
Input ranges	±40 mA / ±20 mA / ±10 mA		
Shunt impedance	50 Ω		internal
Input configuration	differential		
Gain error	<0.02 %	<0.05 %	of the measured value, with 25°C
Gain drift		40 ppm/K·ΔT_a	over entire temperature range
Offset error	0.02 %	<0.05 %	of the measurement range
Offset drift		2.5 ppm/K ·ΔT_a	over entire temperature range $\Delta T_a = \lvert T_a - 25°C \rvert$; with T_a = ambient temperature

Temperature measurement - thermocouples			
Parameter	**Value typ.**	**min. / max.**	**Remarks**
Measurement mode	R, S, B, J, T, E, K, L, N		
Measurement range	-270°C bis 1370°C -270°C bis 1100°C -270°C bis 500°C		type K
Resolution	0.063 K (1/16 K)		16-Bit integer
Measurement error (gain + offset)		<±0.6 K <±1.0 K	type K, value -150°C to 1100°C else
Drift (gain + offset)		±0.02 K/K·ΔT_a ±0.05 K/K·ΔT_a	type K, range -270°C to 1100°C type K, range -270°C to 1370°C $\Delta T_a = \lvert T_a - 25°C \rvert$; with T_a = ambient temperature
Error of cold junction compensation		<±0.15 K	with ACC/DSUBM-T4
Cold junction drift	±0.001 K/K·ΔT_a		$\Delta T_a = \lvert T_a - 25°C \rvert$; with T_a = ambient temperature

Temperature measurement – PT100		
Parameter	**Value**	**Remarks**
Measurement range	-200°C to +850°C -200°C to +250°C	
Resolution	0.063 K (1/16 K)	16-Bit integer
Measurement error	<±0.05%	of the measured value
Offset error	<±0.2 K	4-wire connection
Offset drift	±0.01 K/K·ΔT_a ±0.02 K/K·ΔT_a	range -200°C to 250°C range -200°C to 850°C $\Delta T_a = \lvert T_a - 25°C \rvert$; with T_a = ambient temperature
Sensor feed (PT100)	250 µA	non-isolated

Sensor supply (ISOF-8-SUPPLY)				
Parameter	**Value typ.**		**max.**	**Remarks**
Configuration options	5 selectable settings			5 settings only Default ranges: +5 V to +24 V
Output voltage	Voltage	Current	Netpower	set globally for all channels of a module
	(+2.5 V)	580 mA	1.5 W	special order, +12 V or 15 V can be replaced by +2.5 V;
	+5.0 V	580 mA	2.9 W	default selection with 2.5 V:
	+10 V	300 mA	3.0 W	+2.5 V, +5.0 V, +10 V, +12 V, +24 V
	+12 V	250 mA	3.0 W	
	+15 V	200 mA	3.0 W	
	+24 V	120 mA	2.9 W	Special order: +15 V can be replaced by ±15 V.
	(±15 V)	190 mA	3.0 W	
Short-circuit protection	unlimited duration			to output voltage reference ground
Accuracy of output voltage	<0.25 %		0.5 % 0.9 % 1.5 %	at terminals, no load at 25 °C over entire temperature range plus with optional bipolar output voltage
Max. capacitive load	>4000 µF >1000 µF >300 µF			2.5 V to 10 V 12 V, 15 V 24 V