

ISO2-8 for imc CRONOS-SL/compact

8-channel Isolated Differential Amplifier

ISO2-8 is an isolated measurement amplifier available for eight channels as a modular plug-in for imc CRONOS *compact* or configuration module for CRONOS-SL. It enables measurement of voltage, current, temperature and ICP-sensors on eight isolated channels.

Highlight

- Isolated channels enable measurements in settings where the voltage conditions are not clearly defined.



CRC/ISO2-8

imc CRONOS *compact*- modular measurement system

imc CRONOS *compact* is a modular and reconfigurable hardware a "rack"-based series of devices available in a variety of housing sizes and device frames. imc CRONOS *compact* (CRC) plug-in-modules can be inserted into the system (CRC-400 / CRC-2000G).

Once the modules are plugged into a portable or rack-based housing, they are electrically connected to the CRC-system and are supplied by the system with power. The data storage will be managed by the CRC-system.

Rack-based modules ("-R") differ from the standard modules only in terms of the front panel's attachment mechanism.



imc CRONOS compact plug-in-modules



imc CRONOS compact portable housing

Overview of available variants

Standard version		ET Version *	
Order Code:	article no.	article no.	Remarks
CRC/ISO2-8	11700019	11710018	for imc CRONOS <i>compact</i>
CRC/ISO2-8-R	11700109	11710068	for imc CRONOS <i>compact</i> RACK
CRC/ISO2-8-SUPPLY	11700141	11710095	for imc CRONOS <i>compact</i>
CRC/ISO2-8-SUPPLY-R	11700142	11710096	for imc CRONOS <i>compact</i> RACK
CRSL/ISO2-8-D		11800021	CRONOS-SL variant with DSUB-15
CRSL/ISO2-8-L		11800022	CRONOS-SL variant with LEMO sockets

Included accessories for imc CRONOS *compact*.

- ACC/DSUBM-T4 DSUB-15 plug with screw terminals for 4-channel measurement of voltages as well as temperatures with PT100 and thermocouples with integrated cold junction compensation (CJC). 13500167

Integrated sensor supply

- Version with an integrated sensor supply (option upon request: ISO2-8-SUPPLY), requires no extra module expansion. With adjustable supply voltages (globally selectable for 8 channels), output on reserved pins of DSUB terminal.

Optional accessories

DSUB-15 plugs

• ACC/DSUBM-TEDS-T4	version with TEDS support, according to IEEE 1451.4 for use with imc Plug & Measure	13500190
• ACC/DSUB-T4-IP65	sealed version, suitable for ET series	13500057
• ACC/DSUBM-U4	DSUB-15 plug with screw terminals for 4-channel voltage measurement	13500166
• ACC/DSUB-U4-IP65	sealed version, suitable for ET series	13500056
• ACC/DSUBM-TEDS-U4	DSUB-15 plug with screw terminals for 4-channel voltage measurement	13500189
• ACC/DSUB-TEDS-U4-IP65	sealed TEDS version	13500066
• ACC/DSUBM-I4	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)	13500168
• ACC/DSUB-I4-IP65	sealed version, suitable for ET series	13500058
• ACC/DSUBM-TEDS-I4	version with TEDS support, according to IEEE 1451.4 for use with imc Plug & Measure	13500192
• ACC/DSUB-TEDS-I4-IP65	sealed TEDS version	13500068
• ACC/DSUB-ICP4	DSUB-15 plug with screw terminals for conditioning of 4 IEPE/ICP inputs	13500032

Technical Specs - CRC/CRSL/ISO2-8

Inputs, measurement modes, terminal connection		
Parameter	Value	Remarks
Inputs	8	
Measurement modes DSUB-15	voltage measurement current measurement thermocouple, RTD (PT100) current fed sensors	shunt plug (ACC/DSUBM-I4) thermo plug (ACC/DSUBM-T4) with IEPE DSUB-15 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	2x DSUB-15 or	4 channels per plug
LEMO	8x LEMO.1B.307	1 channel per plug

Sampling rate, Bandwidth, Filter, TEDS		
Parameter	Value	Remarks
Sampling rate	≤100 kHz ≤10 kHz	per channel at temperature measurement
Bandwidth	0 Hz to 11 kHz 0 Hz to 8 kHz 0 Hz to 1 kHz	-3 dB -0.2 dB -0,1 dB at temperature measurement
Filter (digital) cut-off frequency characteristic type and order	2 Hz to 5 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 $f_{\text{cut-off}} = 0.4 f_a$
Resolution	16 Bit	internal processing 24 Bit
TEDS - Transducer Electronic DataSheets	conforming to IEEE 1451.4 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, PE), as well as against common reference of all PT100 current sources and TEDS. not isolated when using ICP plug and PT100 mode
nominal rating	$\pm 60 \text{ V}$		
test voltage	$\pm 300 \text{ V (10 s)}$		
Overvoltage protection	$\pm 60 \text{ V}$ ESD 2 kV transient protection: automotive load dump ISO 7637		differential input voltage, continuous human body model $R_i=30 \text{ } , t_d=300 \text{ } \mu\text{s}, t_r<60 \text{ } \mu\text{s}$
Input coupling	DC		
Input configuration	differential, isolated		
Input impedance	6.7 M 1 M 50		range $\leq \pm 2 \text{ V}$ and temperature mode range $\geq \pm 5 \text{ V}$ or device powered down with shunt plug ACC/DSUBM-I4
Input current		1 nA 1 mA	for operation $ V_{in} > 5 \text{ V}$ on ranges $< \pm 5 \text{ V}$ or device powered-down
Auxiliary supply			for IEPE/ICP plug independent of optional sensor supply, short circuit proof power per DSUB-plug
voltage	+5 V	$\pm 5 \text{ } \%$	
available current	$> 0.26 \text{ A}$	$> 0.2 \text{ A}$	
internal resistance	1.0	< 1.2	

Voltage measurement			
Parameter	Value typ.	min. / max.	Remarks
Voltage input ranges	$\pm 60 \text{ V} / \pm 50 \text{ V} / \pm 25 \text{ V} / \pm 10 \text{ V}$ $\pm 5 \text{ V} / \pm 2 \text{ V} / \pm 1 \text{ V} / \pm 500 \text{ mV}$ $\pm 250 \text{ mV} / \pm 100 \text{ mV} / \pm 50 \text{ mV}$		
Gain error	$< 0.02 \text{ } \%$	$< 0.05 \text{ } \%$	of the measured value, at 25°C
Gain drift		6 ppm/K $\cdot \Delta T_a$ 50 ppm/K $\cdot \Delta T_a$	ranges $\leq \pm 2 \text{ V}$ ranges $\geq \pm 5 \text{ V}$ over full temp. range
Offset error	0.02 %	$< 0.05 \text{ } \%$	of the measurement range, at 25°C
Offset drift		2.5 ppm/K $\cdot \Delta T_a$	over entire temperature range $\Delta T_a = T_a - 25^\circ \text{C} $ ambient temperature T_a
Non-linearity	$< 120 \text{ ppm}$		range $\pm 10 \text{ V}$
Signal noise	$2.5 \text{ } \mu\text{V}_{\text{rms}}$ $20 \text{ } \mu\text{V}_{\text{pkpk}}$		bandwidth 0.1 Hz to 1 kHz; in the range: $\pm 50 \text{ mV}$
IMR (isolation mode rejection)	140 dB 64 dB	$> 130 \text{ dB}$ $> 60 \text{ dB}$	range $\leq \pm 2 \text{ V}$ range $\geq \pm 5 \text{ V}$ $R_{\text{source}} = 0 \text{ } , f = 50 \text{ Hz}$
Channel isolation	$> 1 \text{ G } , < 40 \text{ pF}$ $> 1 \text{ G } , < 10 \text{ pF}$		channel-to-ground / CHASSIS (case) channel-to-channel
Channel isolation (crosstalk)	$> 165 \text{ dB (50 Hz)}$ $> 92 \text{ dB (50 Hz)}$		range $\leq \pm 2 \text{ V}$ range $\geq \pm 5 \text{ V}$ $R_{\text{source}} \leq 100$

Current measurement with shunt plug			
Parameter	Value typ.	min. / max.	Remarks
Input ranges	$\pm 40 \text{ mA} / \pm 20 \text{ mA} / \pm 10 \text{ mA}$ $\pm 5 \text{ mA} / \pm 2 \text{ mA} / \pm 1 \text{ mA}$		
Shunt impedance	50		external plug ACC/DSUBM-I4
Input configuration	differential		
Gain error	<0.02 %	<0.05 % <0.1%	of the measured value, with 25 °C additional error of 50 in plug
Gain drift		6 ppm/K · ΔT_a 50 ppm/K · ΔT_a	ranges $\leq \pm 2 \text{ V}$ over entire temp. range ranges $\geq \pm 5 \text{ V}$
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 = T_a - 25^\circ\text{C} $ ambient temperature T_a

Current measurement with internal shunt (variant with round connector etc.)			
Parameter	Value typ.	min. / max.	Remarks
Input ranges	$\pm 40 \text{ mA} / \pm 20 \text{ mA} / \pm 10 \text{ mA}$		
Shunt impedance	50		internal
Input configuration	differential		
Gain error	<0.02 %	<0.05 %	of the measured value, with 25 °C
Gain drift		30 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 = T_a - 25^\circ\text{C} $ ambient temperature T_a

Temperature measurement - thermocouples			
Parameter	Value typ.	min. / max.	Remarks
Measurement mode	R, S, B, J, T, E, K, L, N		
Measurement range	-270°C to 1370°C -270°C to 1100°C -270°C to 500°C		type K
Resolution	0.063 K (1/16 K)		16-Bit integer
Measurement error		< $\pm 0,6 \text{ K}$ < $\pm 1.0 \text{ K}$ < $\pm 1.5 \text{ K}$	type K, range -150°C to 1200°C type T, range -150°C to 400°C type N, range 380°C to 1200°C type K, range -200°C to -150°C type T, range -200°C to -150°C type N, range -200°C to 380°C
Temperature drift	$\pm 0.02 \text{ K/K} \cdot \Delta T_a$		$\Delta T_a = T_a - 25^\circ\text{C} $ ambient temperature T_a
Error of cold junction compensation		< $\pm 0.15 \text{ K}$	with ACC/DSUBM-T4
Temperature drift	$\pm 0.001 \text{ K/K} \cdot \Delta T_a$		$\Delta T_a = T_a - 25^\circ\text{C} $ ambient temperature T_a

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)	
Gain error	<±0.05%	of measured value (corresponding resistance)
Offset error	<±0.2 K	with 4-wire configuration
Offset drift	±0.01 K/K ΔT_a	$\Delta T_a = T_a - 25^\circ\text{C} $ ambient temperature T_a
Sensor feed	250 μA	non-isolated

Sensor supply (ISO2-8(-L)-SUPPLY)			
Parameter	Value typ.		max.
Configuration options	5 selectable settings		
			The sensor supply module always has 5 selectable voltage settings. default selection: +5 V to +24 V
Output voltage	Voltage (+2.5 V) +5.0 V +10 V +12 V +15 V +24 V (±15 V)	Current 580 mA 580 mA 300 mA 250 mA 200 mA 120 mA 190 mA	Netpower 1.5 W 2.9 W 3.0 W 3.0 W 3.0 W 2.9 W 3.0 W
			set jointly for all eight channels optional, special order: +12 V or 15 V can be replaced by +2.5 V preferred selection with 2.5 V: +2.5 V, +5.0 V, +10 V, +12 V, +24 V Special order: +15 V can be replaced by ±15 V. With the LEMO variant, TEDS support is omitted with this choice, see manual.
Isolation Standard: option, upon request:	non isolated isolated		output to case (CHASSIS) nominal rating: 50V, test voltage (10sec.): 300 V, not available with option ±15 V
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

