

# ISO2-8 for imc CRONOS-PL/-SL/compact

Datasheet Version 3.5

## 8-channel Isolated Differential Amplifier



CRPL/ISO2-8



CRC/ISO2-8

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

### This amplifier's strengths are:

- Isolated channels enable measurements in settings where the voltage conditions are not clearly defined.
- Supported *imc Plug & Measure* (Transducer Electronic Data Sheets (IEEE 1451))

Order code:	Article number	Remarks
<b>CRPL/ISO2-8</b>	1080135	for installation in an imc CRONOS-PL housing
<b>CRPL/ISO2-8-ET</b>	1081090	Version in extended temperature range
<b>CRSL/ISO2-8-D</b>	1180021	for installation in an imc CRONOS-SL housing with DSUB interconnections
<b>CRSL/ISO2-8-L</b>	1180022	for installation in an imc CRONOS-SL housing with LEMO interconnections
<b>CRC/ISO2-8</b>	1170019	for installation in an imc CRONOS <i>compact</i>
<b>CRC/ISO2-8-ET</b>	1171018	Version in extended temperature range
<b>CRC/ISO2-8-R</b>	1170109	for installation in an imc CRONOS <i>compact</i> <b>RACK</b>
<b>CRC/ISO2-8-R-ET</b>	1171068	Version in extended temperature range

## Physical structure

Plug-in module for imc CRONOS-PL/*compact* systems, occupying one slot.

## Interconnections

- 2x DSUB-15 terminals for each 4-channel group
- 8x 7-pin LEMO terminals for 1 channel (only with CRSL/ISO2-8-L) see table for other measurement modes

## Included accessories for imc CRONOS-PL/*compact*:

### Connection terminal:

- The **ACC/DSUB-T4** is a 15-pin DSUB clamp terminal for 4-channel blocks. It is for measurement of voltages and temperatures with Pt100 and thermocouples (with integrated cold-junction compensation)

At this terminal, there is no contact for +SUPPLY and -SUPPLY. When using a module having the optional sensor supply, use the ACC/DSUB-U4 for the respective 4-channel group.

## Included accessories for imc CRONOS-SL:

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## Power supply:

- provided by imc CRONOS-PL/-SL/compact:
- Additional power consumption due to installed module: 2.4 W (+1.4 W when using ICP sensors)

## Operating conditions

- The module varieties' respective operating conditions (with or without an extended temperature range) depend on the corresponding housing type.

## Measurement properties:

- Sampling rates adjustable in steps of 1, 2, 5 (channel individual)
- 11 kHz bandwidth (-3 dB)
- 16-bit resolution (with internal 24-bit processing)

## Installed software

- The module is fully supported by the imc CRONOS-PL/-SL/compact operating software. The entire functionality, particularly the parameterization, storage and online computations is provided.

## Data storage

- handled via imc CRONOS-PL/-SL/compact

### Optional built-in sensor supply module

- A built-in sensor supply module can be ordered along with the amplifier. See below for technical specs.

### Optional accessories:

#### Connection terminals:

- **ACC/DSUB-U4**, 15-pin DSUB terminal plug for 4-channel groups. Voltage measurement
- **ACC/DSUB-I4**, 15-pin DSUB connection terminals for each 4-channel group (50  $\Omega$  shunt). For measurement of currents of up to 50 mA (scaling factor 0.02 A/V)
- **ACC/DSUB-ICP4**, 15-pin DSUB terminal plug with conditioning for 4 ICP inputs
- **ACC/DSUB-TEDS-U4**, 15-pin DSUB connection terminal for each 4-channel group, according to IEEE 1451.4 for use with *imc Plug & Measure*
- **ACC/DSUB-TEDS-T4**, 15-pin DSUB connection terminal for each 4-channel group for measurement of voltages as well as temperatures with Pt100 and thermocouples (with integrated cold-junction compensation), according to IEEE 1451.4 for use with *imc Plug & Measure*
- **ACC/DSUB-TEDS-I4**, 15-pin DSUB connection terminals for each 4-channel group (50  $\Omega$  shunt). For measurement of currents of up to 50 mA (scaling factor 0.02 A/V), according to IEEE 1451.4 for use with *imc Plug & Measure*
- **ACC/DSUB-U4-IP65**, 15-pin DSUB clamp terminal adapted to CRONOS-SL, for each group of 4 voltage measurement channels (up to  $\pm 50$  V)
- **ACC/DSUB-T4-IP65**, 15-pin DSUB terminal adapted to CRONOS-SL, for each 4-channel group. for measurement of voltages as well as temperatures with Pt100 and thermocouples (with integrated cold-junction compensation)
- **ACC/DSUB-ICP4-IP65**, 15-pin DSUB terminal adapted to CRONOS-SL with signal conditioning for 4 ICP2 inputs
- **ACC/DSUB-I4-IP65**, 15-pin DSUB clamp terminal adapted to CRONOS-SL for each 4-channel group (50  $\Omega$  shunt). For measurement of currents of up to 50 mA (scaling factor: 0.02 A/V)
- **ACC/DSUB-TEDS-U4-IP65**, 15-pin DSUB clamp terminal adapted to CRONOS-SL, for each group of 4 voltage measurement channels, conformant to IEEE1451.4 for use with *imc Plug & Measure*
- **ACC/DSUB-TEDS-I4-IP65**, 15-pin DSUB clamp terminal adapted to CRONOS-SL for each 4-channel group (50  $\Omega$  shunt). For measurements of currents of up to 50 mA (scaling factor: 0.02 A/V), conformant to IEEE1451.4 for use with *imc Plug & Measure*
- **ACC/DSUB-TEDS-T4-IP65**, 15-pin DSUB clamp terminal adapted to CRONOS-SL for each 4-channel group. For measurement of voltages as well as temperatures with Pt100 and thermocouples (with integrated cold-junction compensation), conformant to IEEE1451.4 for use with *imc Plug & Measure*

## ISO2-8 Voltage, Current, Temperature (isolated)

### Technical Specs: Datasheet Version 3.5

Parameter	typ.	min. / max.	Remarks
Channels		8	differential, isolated
Measurement modes (DSUB)	voltage thermocouple, RTD (Pt100) current current feed sensors		with thermo plug (ACC/DSUB-T4) with shunt plug (ACC/DSUB-I4) with plug (ACC/DSUB-ICP4(-IP65))
Measurement modes (LEMO)	voltage current RTD (Pt100)		directly or with 50 $\Omega$ shunt
Connector plug Standard	2x DSUB-15. 4 channels per plug		ACC/DSUB-U4(-IP65) ACC/DSUB-I4(-IP65) ACC/DSUB-T4(-IP65) ACC/DSUB-ICP4(-IP65)
LEMO	or 8x LEMO.1B.307 / 1 channel		

Bandwidth, Filter, TEDS			
Parameter	typ.	min. / max.	Remarks
Filter (digital) cut-off frequency, characteristic, order	2 Hz to 5 kHz		Butterworth, Bessel low pass filter: 8th order high pass filter: 4th order band pass: LP 8th and HP 4th order Anti-aliasing filter: Cauer 8.order with $f_{\text{cutoff}} = 0.4 f_a$
Bandwidth	0 Hz to 11 kHz 0 Hz to 8 kHz		-3 dB -0.2 dB
Sampling frequency	$\leq 100$ kHz		per channel
Resolution	16 bit		
TEDS	conform IEEE 1451.4 Class II MMI		ACC/DSUB-TEDS-U4(-IP65) ACC/DSUB-TEDS-I4(-IP65) ACC/DSUB-TEDS-T4(-IP65) ACC/DSUB-ICP-Microdot
Isolation nominal rating test voltage	60 V 300 V (10 sec.)		channel to case (chassis) and channel-to-channel not with ICP plug
Overvoltage protection	$\pm 60$ V ESD 2 kV transient protection: automotive load dump ISO 7637, Test impulse 6		differential input voltage (continuous) human body model test pulse 6 with max. -250 V $R_i=30 \Omega$ , $t_d=300 \mu\text{s}$ , $t_r<60 \mu\text{s}$
Input coupling configuration	DC, isolated (differential)		galvanically isolated to System-GND (case, CHASSIS)
Input impedance	10 M $\Omega$ 1 M $\Omega$ 50 $\Omega$		range $\leq \pm 2$ V and temperature mode range $\geq \pm 5$ V and switched off current mode (shunt-plug) (ACC/DSUB-I4(-IP65))
Input current operating conditions on overvoltage condition		1 nA 1 mA	for operation $ V_{\text{in}}  > 5$ V on ranges $< \pm 5$ V or device powered-down

Parameter	typ.	min. / max	Remarks
Auxiliary supply			with ICP-extension plug
voltage	+5 V	±5%	independent of optional
current	>0.26 A	>0.2 A	sensor supply, short circuit proof
internal resistance	1.0 Ω	<1.2 Ω	power per DSUB-plug

Voltage and current measurement			
Parameter	typ.	min. / max.	Remarks
Voltage input ranges	±50 mV / ±100 mV / ±250 mV / ±500 mV ±1 V / ±2 V / ±5 V / ±10 V / ±25 V / ±50 V / ±60 V		
Current input ranges	±1 mA / ±2 mA / ±5 mA ±10 mA / ±20 mA / ±40 mA		with shunt-plug (Shunt 50 Ω) (ACC/DSUB-I4)
Gain uncertainty	< 0.025 % < 0.07 %	< 0.05 % < 0.15 %	voltage, 25 °C current with shunt-plug of reading
Offset uncertainty	0.02 %	<0.05 %	of range
Non-linearity	<120 ppm		range ±10 V
Gain drift		6 ppm/K 50 ppm/K	ranges ≤± 2 V ranges ≥± 5 V over full temperature range
Offset drift		2.5 ppm/K	over full temperature range
Input voltage noise	2.5 μVrms 20 μVpp		bandwidth 0.1 Hz to 1 kHz; range:±50 mV
IMR (isolation mode rejection)	> 145 dB (50 Hz) > 70 dB (50 Hz)		range ≤± 2 V range ≥± 5 V R <sub>source</sub> = 0 Ω
Channel isolation	>1 GΩ, < 40 pF > 1 GΩ, < 10 pF		channel-to-ground (housing) channel-to-channel
Channel isolation (crosstalk)	> 165 dB (50 Hz) > 92 dB (50 Hz)		range ≤± 2 V range ≥± 5 V R <sub>source</sub> ≤ 100 Ω

Temperature measurement - thermocouples			
Parameter	typ.	min. / max.	Remarks
Measurement range	R, S, B, J, T, E, K, L, N		according IEC 584
Resolution	0.063 K (1/16 K)		
Measurement uncertainty		<±0.6 K <±1.0 K <±0,6 K <±1,5 K	type K, range -150 °C to 1200 °C range -200 °C to -150 °C Typ N, range 380 °C to 1200 °C range -200 °C to 380 °C
Temperature drift	±0.02 K/K·ΔT <sub>a</sub>		ΔT <sub>a</sub> =  T <sub>a</sub> - 25 °C  ambient temperature T <sub>a</sub>
Uncertainty of cold junction compensation		< ±0.15 K	ACC/DSUB-T4 ΔT <sub>j</sub> =  T <sub>j</sub> - 25 °C
Temperature drift	±0.001 K/K·ΔT <sub>j</sub>		cold junction temperature T <sub>j</sub>

Temperature measurement – Pt100			
Parameter	typ.	min. / max.	Remarks
Measurement range		-200 °C to +850 °C -200 °C to +250 °C	
Resolution		0.063 K (1/16 K)	
Measurement uncertainty		<±0.2 K <±0.05 %	-200 °C to +850 °C, 4-wire connection plus of reading
Temperature drift		±0.01 K/K $\Delta T_a$	$\Delta T_a =  T_a - 25 \text{ °C} $ ; ambient temp. $T_a$
Sensor feed (Pt100)		250 $\mu\text{A}$	

## Technical Specs sensor SUPPLY module

Optional sensor supply for SC2-32, LV-16, LV2-8, LV3-8, C-8, ISO2-8, OSC-16

Technical datasheet version 3.1

Parameter	Value (typ./ max.)			Remarks
Configuration options	5 adjustable ranges			The sensor supply module always got 5 selectable voltage ranges. Default ranges: +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	upon request, +12 V can be replaced by +2,5 V set globally for all channels of an amplifier.  upon request, +15 V can be replaced by ±15 V
Isolation Standard: option, upon request:	non isolated isolated			output to case (CHASSIS) nominal rating: 50 V, Test voltage (10 sec.): 300 V, not available with option ±15 V.
Short-circuit protection	unlimited duration			to output voltage reference ground
Accuracy of output voltage	<0.25% (typ.) <0.5% (max.) <0.9% (max ).			at terminals, no load 25°C 25°C over entire temperature range
Efficiency	typ. 72% typ. 66% typ. 55% typ. 50%			10 V to 24 V none isolated 5 V 10 V to 24 V isolated 5 V
Max. capacitive load	>4000 µF >1000 µF >300 µF			2.5 V to 10 V 12 V, 15 V 24 V