

C-8 for imc CRONOS-PL/-SL/compact

Datasheet Version 3.3

8-channel Differential Amplifier



CRPL/C-8

The **C-8** is a high-precision measurement amplifier for eight channels available as a modular plug-in for imc CRONOS-PL/*compact* and as a configuration module for CRONOS-SL. It enables the measurement of voltages, currents and **temperatures** by means of 8 differential analog channels.

This amplifiers strengths are:

- Backplane for Type K thermo-socket available (extra charge)
- Supports *imc Plug & Measure* (Transducer Electronic Data Sheets (IEEE 1451))

Order code:	Article number	Remarks
CRPL/C-8	1080092	for installation in an imc CRONOS-PL housing
CRPL/C-8-ET	1081056	version in extended temperature range
CRPL/C-8-T	1080084	for installation in an imc CRONOS-PL housing (connection via 3-pin thermoslot type K, green)
CRSL/C-8-D	1180019	for installation in an imc CRONOS-SL housing with DSUB interconnections
CRSL/C-8-L	1180020	for installation in an imc CRONOS-SL housing with LEMO interconnections
CRC/C-8	1170053	for installation in an imc CRONOS <i>compact</i> housing
CRC/C-8-ET	1171028	version in extended temperature range
CRC/C-8-R	1170117	for installation in an imc CRONOS <i>compact</i> RACK
CRC/C-8-R-ET	1171076	version in extended temperature range

Physical structure:

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

Terminal connections:

- 2x DSUB-15 terminals for each group of four channels
- 8x 7-pin LEMO connectors for 1 channel (only with CRSL/C-8-L)
For this module, the use of DSUB-connectors is recommended, since LEMO connectors do not support temperature measurement with thermocouples

Included accessories for imc CRONOS-PL/compact:**Terminal connection (for standard interconnections):**

- 2x **ACC/DSUB-T4**, 15-pin DSUB clamp terminal for 4-channel groups, for measurement with Pt100 and thermocouples (with built-in cold junction compensation) and for the measurement of voltages

Included accessories for imc CRONOS-SL:

Power supply:

- provided by imc CRONOS-PL/-SL/compact unit
- Additional power consumption by module: 1.3 W

Operating conditions:

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

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 accessories:**Connection terminals:**

- **ACC/DSUB-U4**, 15-pin DSUB terminal plug for 4-channel groups. Voltage measurement
- **ACC/DSUB-I4**, 15-pin DSUB terminal plug for 4-channel groups (50 Ω shunt). For measurement of currents up to 50 mA (scaling factor: 0.02 A/V)
- **ACC/DSUB-TEDS-T4**, 15-pin DSUB clamp terminal for 4-channel groups, for measurement with Pt100 and thermocouples (with built-in cold junction compensation) and for the measurement of voltages, according to IEEE 1451.4 for use with *imc Plug & Measure*
- **ACC/DSUB-TEDS-U4**, 15-pin DSUB terminal plug for 4-channel groups. Voltage measurement, according to IEEE 1451.4 for use with *imc Plug & Measure*
- **ACC/DSUB-TEDS-I4**, 15-pin DSUB terminal plug for 4-channel groups (50 Ω shunt). For measurement of currents up to 50mA (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 ± 50 V)
- **ACC/DSUB-I4-IP65**, 15-pin DSUB clamp terminal adapted to CRONOS-SL for each 4-channel group (50 Ω shunt). For measurement of currents of up to 50 mA (scaling factor: 0.02 A/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-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 Ω 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*

Integratable sensor supply module:

- A built-in sensor supply module can be ordered with the system. See below for technical data.

Plug & Measure (TEDS):

- Supports *imc Plug & Measure* (Transducer Electronic Data Sheets (IEEE 1451))

Further options for imc CRONOS-PL:**Three models available:**

- Standard: as per description above
- BNC: voltage measurement only within the ranges from ± 5 mV to ± 50 V (extra charge)
- Type K thermo-socket: only for measurements with Type K thermocouples (extra charge)

C-8 Voltage, Temperature

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Parameter	typ.	min. / max.	Remarks
Inputs		8	differential, analog
Measurement modes (DSUB)		voltage current thermocouples, Pt100	ACC/DSUB-I4(-IP65)
Measurement modes (LEMO)		voltage current Pt100	
Filter (digital) cut-off frequency characteristic, order		1 Hz to 50 Hz	Butterworth low pass: 6th order Anit-aliasing filter: Butterworth 6th order $f_{\text{cutoff}} = 0.5 f_s$
Terminal connections standard		2x DSUB-15. 4 channels per plug or 8x LEMO.1B.307 / 1 channel	ACC/DSUB-U4 (-IP65), ACC/DSUB-T4 (-IP65), ACC/DSUB-I4 (-IP65)
TEDS - Transducer Electronic Data Sheets		conform IEEE 1451.4 Class II MMI	ACC/DSUB-TEDS-T4(-IP65) ACC/DSUB-TEDS-U4(-IP65) ACC/DSUB-TEDS-I4(-IP65)
Voltage measurement			
Sample rate / channel		≤100 Hz	
Voltage input range		±50 V, ±25 V, ±10 V, ±5 V, ±2.5 V, ±1 V, ±500 mV, ±250 mV, ..., ±2.5 mV	
Surge protection	±250 V	±80 V	long term to chassis <1 ms
Input impedance	1 MΩ 492 kΩ 79 kΩ	±1% >135 kΩ >75 kΩ	differential ±50 V to ±2.5 V ±1 V to ±50 mV ±25 mV to ±2.5 mV
Gain uncertainty	0.01% 5 ppm/K·ΔT _a	≤0.05% ≤0.02% ≤0.05% ±20ppm/K·ΔT _a	of reading ±50 V to ±250 mV ±100 mV to ±25 mV ±10 mV to ±2.5 mV ΔT _a = T _a -25°C ambient temperature T _a
Offset uncertainty	0.01% 0.005% 0.01% 0.02% ±4 μV/K ±0.07μV/K	≤0.05% ≤0.01% ≤0.05% ≤0.1% <±12 μV/K <±0.16 μV/K	of measurement range ±50 V to ±250 mV ±100 mV to ±25 mV ±10 mV to ±5 mV ±2.5 mV ±50 V to ±2.5 V ±1V to ±2.5 mV
Common mode voltage ±50 V to ±2 V ±1 V to ±2.5 mV	50 V 2 V	<30 V <1 V	with differential input voltage: ±50 V ±1 V
Common mode rejection CMRR ±50 V to ±2 V ±1 V to ±2.5 mV	70 dB 120 dB	>54 dB >100 dB	common mode test voltage: ±50 V ±1 V
Signal-to noise ratio	95 dB 90 dB 86 dB	>90 dB >86 dB >82 dB	bandwidth 0.1 Hz to 10 Hz ±50 V to ±10 mV ±5 mV ±2.5 mV

Parameter	typ.	min. / max.	Remarks
Bandwidth	0 Hz to 20 Hz		-3 dB
Temperature measurement - thermocouples			
Parameter	typ.	min. / max.	Remarks
Sample rate / channel		≤100 Hz	
Measurement range	J, T, K, E, N, S, R, B		according IEC 584
Resolution	0.063 K		J, T, K, E, N, S, R, B
Measurement uncertainty	±0.2 K	<±0.5 K	type J, T, K, E, L (for all other types see specifications of voltage measurement)
Temperature drift	±0.02 K/K·ΔT _a		ΔT _a = T _a - 25°C ambient temperature T _a
Cold junction compensation uncertainty drift of cold junction comp.	±0.001 K/K·ΔT _j	<±0.15 K	DSUB (standard) ΔT _j = T _j - 25°C cold junction temperature T _j
Input impedance	100 kΩ		differential
Temperature measurement – RTD (Pt100)			
Input range		-200°C to 850°C, -50°C to 150°C	
Resolution	0.063 K		-200°C to 850°C -50°C to 150°C
Uncertainty		<±0.1 K <±0.05%	-200°C to 850°C, four-wire connection plus of reading
Drift		±0.01 K/K·ΔT _a	ΔT _a = T _a - 25°C ; ambient temp: T _a
Sensor supply	625 μA		
Input impedance	20.0 MΩ	±1 %	differential
Signal-noise ratio		>85 dB	bandwidth 0.1 Hz to 10 Hz
Bandwidth		0 Hz to 10 Hz	-3 dB

Technical Specs sensor SUPPLY module

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

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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