

C-8 for imc CRONOS-SL/compact

8-channel differential amplifier

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

Highlights

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



CRC/C-8

imc CRONOScompact - modular measurement system

imc *CRONOScompact* is a modular and reconfigurable hardware a "rack"-based series of devices available in a variety of housing sizes and device frames. imc *CRONOScompact* (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 CRONOScompact plug-in-modules



imc CRONOScompact portable housing

Overview of available variants

Standard version		ET version *	
Order Code	article no.	article no.	remarks
CRC/C-8	11700053	11710028	for installation in an imc <i>CRONOScompact</i> housing
CRC/C-8-2T	11700101	11710xxx	for installation in an imc <i>CRONOScompact</i> housing
CRC/C-8-R	11700117	11710076	for installation in an imc <i>CRONOScompact</i> RACK
CRC/C-8-2T-R	11700xxx	11710xxx	for installation in an imc <i>CRONOScompact</i> RACK
CRSL/C-8-D		11800019	for installation in an imc CRONOS-SL housing with DSUB sockets
CRSL/C-8-L		11800020	for installation in an imc CRONOS-SL housing with LEMO sockets

* ET: Version in extended temperature range

Included accessories for imc CRONOScompact

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|----------------|--|----------|
| • 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 |
|----------------|--|----------|

Optional accessories

DSUB-15 plugs

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|-------------------------|--|----------|
| • 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 |

Mounting brackets for fixed installations of CANSAS modules with Alu profile housing

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|--------------------|-------------------------------|------------|
| • CAN/BACKET-90 | mounting bracket 90° | (10500319) |
| • CAN/BACKET-DIN-S | mounting bracket for DIN-Rail | (10500324) |
| • CAN/BACKET-DIN-M | mounting bracket for DIN-Rail | (10500325) |

Mounting brackets for fixed installations of CANSAS-SL modules

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|---------------------|-----------------------|------------|
| • CAN/SL-BACKET-CON | interconnect bracket | (11500048) |
| • CAN/SL-BACKET-90 | mounting bracket 90° | (11500047) |
| • CAN/SL-BACKET-180 | mounting bracket 180° | (11500049) |

Technical Specs - C-8

Inputs, measurement nodes, terminal connection		
Parameter	Value	Remarks
Inputs	8	
Measurement modes DSUB-15	voltage measurement current measurement thermocouple measurement PT100 temperature measurement	ACC/DSUBM-I4
Measurement modes LEMO	voltage measurement current measurement PT100 temperature measurement	with external shunt
Measurement mode Thermocouple terminal socket (-2T)	thermocouple type-K	miniature thermocouple terminal
Terminal connection DSUB-15	2x DSUB-15 or	4 channels per plug
LEMO	8x LEMO.1B.307 or	1 channel per plug
-2T	8x miniature thermocouple terminal	1 channel per plug

Sampling rate, bandwidth, filter, TEDS		
Parameter	Value	Remarks
Sampling rate per channel	≤ 20 kHz	update rate max. 100 Hz
Bandwidth	0 Hz to 20 Hz	-3 dB
Filter (digital) cut-off frequency characteristic order	1 Hz to 50 Hz	Butterworth low pass: 6th order Anti-aliasing filter: Butterworth 6th order $f_{\text{cutoff}} = 0.5 f_s$
TEDS - Transducer Electronic Data Sheets	conforming to IEEE 1451.4 Class II MMI	esp. with ACC/DSUBM-TEDS-xx (DS2433)

General			
Parameter	Value typ.	min. / max.	Remarks
Overvoltage protection	± 250 V	± 80 V	long term to chassis <1 ms
Input coupling	DC		
Input configuration	differential		
Input impedance	1 M Ω 492 k Ω 79 k Ω	$\pm 1\%$ >135 k Ω >75 k Ω	range ± 50 V to ± 2.5 V range ± 1 V to ± 50 mV range ± 25 mV to ± 2.5 mV

Voltage measurement			
Parameter	Value typ.	min. / max.	Remarks
Input range	$\pm 50\text{ V}$, $\pm 25\text{ V}$, $\pm 10\text{ V}$, $\pm 5\text{ V}$, $\pm 2.5\text{ V}$, $\pm 1\text{ V}$, $\pm 500\text{ mV}$, $\pm 250\text{ mV}$, ..., $\pm 2.5\text{ mV}$		
Gain error	0.01%	$\leq 0.05\%$ $\leq 0.02\%$ $\leq 0.05\%$	of reading $\pm 50\text{ V}$ to $\pm 250\text{ mV}$ $\pm 100\text{ mV}$ to $\pm 25\text{ mV}$ $\pm 10\text{ mV}$ to $\pm 2.5\text{ mV}$
Gain drift	$5\text{ ppm/K} \cdot \Delta T_a$	$20\text{ ppm/K} \cdot \Delta T_a$	$\Delta T_a = T_a - 25^\circ\text{C} $ ambient temperature T_a
Offset error	0.01% 0.005% 0.01% 0.02%	$\leq 0.05\%$ $\leq 0.01\%$ $\leq 0.05\%$ $\leq 0.1\%$	of measurement range $\pm 50\text{ V}$ to $\pm 250\text{ mV}$ $\pm 100\text{ mV}$ to $\pm 25\text{ mV}$ $\pm 10\text{ mV}$ to $\pm 5\text{ mV}$ $\pm 2.5\text{ mV}$
Offset drift	$\pm 4\text{ }\mu\text{V/K}$ $\pm 0.07\text{ }\mu\text{V/K}$	$< \pm 12\text{ }\mu\text{V/K}$ $< \pm 0.16\text{ }\mu\text{V/K}$	$\pm 50\text{ V}$ to $\pm 2.5\text{ V}$ $\pm 1\text{ V}$ to $\pm 2.5\text{ mV}$
Common mode voltage $\pm 50\text{ V}$ to $\pm 2.5\text{ V}$ $\pm 1\text{ V}$ to $\pm 2.5\text{ mV}$	50 V 2 V	$< 30\text{ V}$ $< 1\text{ V}$	with differential input voltage: $\pm 50\text{ V}$ $\pm 1\text{ V}$
Common mode rejection ratio (CMRR) $\pm 50\text{ V}$ to $\pm 2.5\text{ V}$ $\pm 1\text{ V}$ to $\pm 2.5\text{ mV}$	70 dB 120 dB	$> 54\text{ dB}$ $> 100\text{ dB}$	common mode test voltage: $\pm 50\text{ V}$ $\pm 1\text{ V}$
Signal-to noise ratio	95 dB 90 dB 86 dB	$> 90\text{ dB}$ $> 86\text{ dB}$ $> 82\text{ dB}$	bandwidth 0.1 Hz to 10 Hz $\pm 50\text{ V}$ to $\pm 10\text{ mV}$ $\pm 5\text{ mV}$ $\pm 2.5\text{ mV}$

Temperature measurement - Thermocouples			
Parameter	Value typ.	min. / max.	Remarks
Measurement mode	J, T, K, E, N, S, R, B		
Measurement range	-270°C bis 1370°C -270°C bis 1100°C -270°C bis 500°C		type K
Resolution	0.063 K		J, T, K, E, N, S, R, B
Measurement error	0.2 K	$< 0.6\text{ K}$ $< \pm 1\text{ K}$	type J, T, K, E, L (for all other types see specifications of voltage measurement) range -150°C to 1100°C otherwise
Drift	$0.02\text{ K/K} \cdot \Delta T_a$		$\Delta T_a = T_a - 25^\circ\text{C} $ ambient temperature T_a
Cold junction compensation error		$\pm 0.15\text{ K}$	DSUB (standard)
drift of cold junction comp.	$\pm 0.001\text{ K/K} \cdot \Delta T_a$		$\Delta T_a = T_a - 25^\circ\text{C} $ ambient temperature T_a
Input impedance	100 k Ω		differential

Temperature measurement - PT100			
Parameter	Value typ.	min. / max.	Remarks
Input range	-200°C to 850°C, -50°C to 150°C		
Resolution	0.063 K		
Error		<±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 temperature T _a
Sensor supply	625 μA		
Input impedance	20 MΩ	±1%	differential
Signal-noise ratio		>85 dB	bandwidth 0.1 Hz to 10 Hz
Bandwidth	0 Hz to 10 Hz		-3 dB