

UNI2-8 for imc CRONOS-PL/-SL/compact

8-channel All-purpose Amplifier

UNI2-8 is an all-purpose amplifier with eight channels for the measurement of:

- voltage, current, temperature (thermocouple and PT100)
- bridges and strain gauges (quarter-, half- and full bridge)
- IEPE/ICP-sensors (using a optional available DSUB plug for 2 channels)

A sensor supply with selectable ranges is included in order to supply external sensors or bridge measurements.



CRC/UNI2-8

Highlights

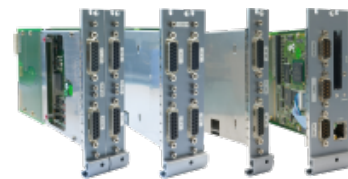
- Flexible application for acquisition of up to eight channels
- Signal bandwidth up to 48 kHz
- Software selectable quarter bridge completion 120 Ω and 350 Ω
- Supports imc's *Plug & Measure* (TEDS)

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 the available variants

Standard version		ET Version *	
Order Code:	article no.	article no.	Remarks
CRC/UNI2-8	1170016	1171015	for imc CRONOScompact
CRC/UNI2-8-R	1170106	1171065	for imc CRONOScompact RACK
CRC/UNI2-8-L	1170198	11710xx	variant with LEMO sockets
CRC/UNI2-8-L-R	1170199	11710xx	with LEMO sockets for CRC RACK
CRSL/UNI2-8-D		1180075	CRONOS-SL variant with DSUB-15
CRSL/UNI2-8-L		1180076	CRONOS-SL variant with LEMO sockets

* ET: Version in extended temperature range

Included accessories

- Calibration certificate with test equipment verification as per ISO 9001 (manufacturer's calibration certificate, PDF)
- ACC/DSUBM-UNI2 DSUB-15 plug with screw terminals for 2-channel voltage, current¹ and bridge measurement, as well as temperatures with PT100 and thermocouples with integrated cold junction compensation (CJC) 1350169

Optional accessories

DSUB-15 plugs

- ACC/DSUB-UNI2-IP65 sealed version, suitable for ET series 1350049
- ACC/DSUBM-TEDS-UNI2 version with TEDS support, according to IEEE 1451 for use with imc Plug & Measure 1350188
- ACC/DSUB-TEDS-UNI2-IP65 sealed TEDS version 1350069
- ACC/DSUBM-I2 DSUB-15 plug with screw terminals for 2-channel current measurement of up to 50 mA (50 Ω shunt, scaling factor: 0.02A/V) 1350180
- ACC/DSUBM-I2-IP65 sealed version, suitable for SL series 1350xxx
- ACC/DSUBM-TEDS-I2 version with TEDS support, according to IEEE 1451 for use with imc Plug & Measure 1350193
- ACC/DSUBM-TEDS-I2-IP65 sealed TEDS version 1350xxx
- ACC/DSUB-ICP2 DSUB-15 plug with screw terminals for conditioning of 2 IEPE/ICP inputs 1350036

LEMO Connector

- ACC/TH-LEM-150 LEMO.1B plug for thermocouple measurement with built-in cold-junction compensation (CJC) via PT100 1350086

Mounting brackets for fixed installations of imc CRONOScompact devices (CRC)

- CRC/BRACKET-CON mounting bracket 90° 1170153
- CRC/BRACKET-90 mounting bracket for DIN-Rail 1170152
- CRC/BRACKET-BACK mounting bracket for DIN-Rail 1170154

Mounting brackets for fixed installations of imc CRONOS-SL devices (CRSL)

- CRSL/BRACKET-90 mounting bracket 90°, mounting on a flat surface 1180080

Miscellaneous

- Report set with manufacturer's calibration certificate and individual readings, as well as list of test equipment used (PDF). Meets requirements of DIN EN ISO 17025

¹ single end current measurement, for differential measurement an external shunt or the appropriate connector (ACC/DSUBM-I2) is necessary

Technical Specs - CRC/CRSL/CRPL/UNI2-8

Inputs, measurement modes, terminal connection		
Parameter	Value	Remarks
Inputs	8	
Measurement modes DSUB-15	voltage measurement current measurement bridge sensor strain gauge thermocouple measurement PT100 (3- and 4-wire configuration) current-fed sensors (IEPE/ICP)	ACC/DSUBM-UNI2 Single-ended (internal shunt) or shunt plug ACC/DSUBM-I2 full, half, quarter bridge with DSUB-15 extension plug: ACC/DSUBM-ICP2I-BNC-S/-F, isolated
Measurement modes LEMO	voltage measurement current measurement thermocouple measurement bridge sensor strain gauge PT100 (3- and 4-wire configuration)	LEMO connector with built-in cold-junction compensation (CJC) ACC/TH-LEM-150 full, half, quarter bridge
Terminal connection DSUB-15 LEMO	4x DSUB-15 8x LEMO.1B.307	2 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 30 kHz 0 Hz to 10 Hz	-3 dB -0.1 dB -3 dB for temperature measurement
Filter (digital) cut-off frequency characteristic type and order	10 Hz to 20 kHz	Butterworth, Bessel low pass or high pass filter: 8th order band pass: LP 4th and HP 4th order Anti-aliasing filter: Cauer 8th order with $f_{\text{cutoff}} = 0.4 f_s$
Resolution	16 Bit	internal processing 24 Bit
TEDS Transducer Electronic Data Sheets	conforming to IEEE 1451.4 Class II MMI	ACC/DSUBM-TEDS-xxx

General			
Parameter	Value typ.	min. / max.	Remarks
Overvoltage protection		$\pm 80 \text{ V}$ $\pm 50 \text{ V}$	permanent, differential range $> \pm 10 \text{ V}$ and device off range $\leq \pm 10 \text{ V}$
Input coupling	DC		
Input configuration	differential		
Input impedance	1 M Ω 20 M Ω		range $> \pm 10 \text{ V}$ range $\leq \pm 10 \text{ V}$
Auxiliary supply			for IEPE/ICP-extension plug
voltage	+5 V	$\pm 5\%$	independent of integrated
available current	0.26 A	0.2 A	sensor supply, short-circuit protected
internal resistance	1.0 Ω	$< 1.2 \text{ } \Omega$	power per DSUB-plug

Voltage measurement			
Parameter	Value typ.	min. / max.	Remarks
Input range	$\pm 50 \text{ V}$, $\pm 25 \text{ V}$, $\pm 10 \text{ V}$, $\pm 5 \text{ V}$, $\pm 2.5 \text{ V}$, $\pm 1 \text{ V}$ to $\pm 5 \text{ mV}$		
Gain error	0.02%	0.05%	of the measured value, at 25°C
Gain drift	10 ppm/K· ΔT_a	30 ppm/K· ΔT_a	$\Delta T_a = T_a - 25^\circ\text{C} $ ambient temperature T_a
Offset error	0.02%	0.05% 0.06%	of the range, at 25°C range $> \pm 50 \text{ mV}$ range $\leq \pm 50 \text{ mV}$
Offset drift	$\pm 40 \text{ } \mu\text{V/K} \cdot \Delta T_a$ $\pm 0.7 \text{ } \mu\text{V/K} \cdot \Delta T_a$ $\pm 0.1 \text{ } \mu\text{V/K} \cdot \Delta T_a$	$\pm 200 \text{ } \mu\text{V/K} \cdot \Delta T_a$ $\pm 6 \text{ } \mu\text{V/K} \cdot \Delta T_a$ $\pm 1.1 \text{ } \mu\text{V/K} \cdot \Delta T_a$	range $> \pm 10 \text{ V}$ range $\pm 10 \text{ V}$ to $\pm 0.25 \text{ V}$ range $\leq \pm 0.1 \text{ V}$ $\Delta T_a = T_a - 25^\circ\text{C} $ ambient temperature T_a
Non-linearity	30 ppm	90 ppm	
CMRR (common mode rejection ratio)	80 dB 110 dB 138 dB	$> 70 \text{ dB}$ $> 90 \text{ dB}$ $> 132 \text{ dB}$	DC and $f \leq 60 \text{ Hz}$ range $\pm 50 \text{ V}$ to $\pm 25 \text{ V}$ range $\pm 10 \text{ V}$ to $\pm 50 \text{ mV}$ range $\pm 25 \text{ mV}$ to $\pm 5 \text{ mV}$
Noise	3.6 μV_{rms} 0.6 μV_{rms} 0.14 μV_{rms}	5.5 μV_{rms} 1.0 μV_{rms} 0.26 μV_{rms}	range 0.1 Hz to 50 kHz range 0.1 Hz to 1 kHz range 0.1 Hz to 10 Hz

Current measurement with shunt plug			
Parameter	Value typ.	min. / max.	Remarks
Input range	$\pm 50 \text{ mA}$, $\pm 20 \text{ mA}$, $\pm 10 \text{ mA}$, $\pm 5 \text{ mA}$, $\pm 2 \text{ mA}$, $\pm 1 \text{ mA}$		
Shunt impedance	50 Ω		external plug ACC/DSUBM-I2
Over load protection		$\pm 60 \text{ mA}$	permanent
Input configuration	differential		
Gain error	0.02%	0.06% 0.1%	of the reading, at 25°C additional error of 50 Ω in plug
Gain drift	15 ppm/K· ΔT_a	55 ppm/K· ΔT_a	$\Delta T_a = T_a - 25^\circ\text{C} $ ambient temperature T_a
Offset error	0.02%	0.05%	of the range, at 25°C
Noise	40 nA _{rms} 0.7 nA _{rms} 0.17 nA _{rms}	70 nA _{rms} 12 nA _{rms} 0.3 nA _{rms}	Bandwidth: 0.1 Hz to 50 kHz 0.1 Hz to 1 kHz 0.1 Hz to 10 Hz

Current measurement with internal shunt			
Parameter	Value typ.	min. / max.	Remarks
Input range	$\pm 50 \text{ mA}$, $\pm 20 \text{ mA}$, $\pm 10 \text{ mA}$, $\pm 5 \text{ mA}$, $\pm 2 \text{ mA}$, $\pm 1 \text{ mA}$		
Shunt impedance	120 Ω		internal
Over load protection		$\pm 60 \text{ mA}$	permanent
Input configuration	Single-ended		internal current sink to -VB
Gain error	0.02%	0.06%	of the reading, at 25°C
Gain drift	15 ppm/K· ΔT_a	55 ppm/K· ΔT_a	$\Delta T_a = T_a - 25^\circ\text{C} $ ambient temperature T_a
Offset error	0.02%	0.05%	of the range, at 25°C
Noise	40 nA _{rms} 0.7 nA _{rms} 0.17 nA _{rms}	70 nA _{rms} 12 nA _{rms} 0.3 nA _{rms}	Bandwidth: 0.1 Hz to 50 kHz 0.1 Hz to 1 kHz 0.1 Hz to 10 Hz

Bridge measurement			
Parameter	Value typ.	min. / max.	Remarks
Mode	DC		
Measurement modes	full, half, quarter bridge		bridge supply ≤ 5 V with quarter bridge
Input range	± 1000 mV/V, ± 500 mV/V, ± 200 mV/V, ± 100 mV/V $\pm 0,5$ mV/V ... ± 1 mV/V ... ± 2 mV/V ... ± 5 mV/V		(as an option) (as an option)
Bridge supply	10 V 5 V	$\pm 0.5\%$ $\pm 0.5\%$	The actual value will be dynamically captured and compensated for in bridge mode.
(as an option)	2.5 V and 1 V		
Minimum bridge impedance	120 Ω full bridge 60 Ω half bridge		
Maximum bridge impedance	5 k Ω		
Quarter bridge completion	120 Ω , 350 Ω		internal, switchable per software
Input impedance	20 M Ω	$\pm 1\%$	differential, full bridge
Gain error	0.02%	0.05%	of the reading, at 25°C
Gain drift	20 ppm/K· ΔT_a	50 ppm/K· ΔT_a	$\Delta T_a = T_a - 25^\circ\text{C} $ ambient temperature T_a
Offset error	0.01%	0.02%	of input range, at 25°C, after automatic bridge balancing
Automatic shunt-calibration (calibration jump)	0.5 mV/V	$\pm 0.2\%$	for 120 Ω and 350 Ω

Temperature measurement - Thermocouples			
Parameter	Value typ.	min. / max.	Remarks
Measurement mode	J, T, K, E, N, S, R, B		
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		0.06% 0.05%	type K of measurement range, at 25°C of reading (total uncertainty min. 0.85 K)
Drift	0.02 K/K· ΔT_a	0.05 K/K· ΔT_a	$\Delta T_a = T_a - 25^\circ\text{C} $ ambient temperature T_a
Error of cold junction compensation		± 0.15 K	with ACC/DSUBM-UNI2, at 25°C
Cold junction drift	± 0.001 K/K· ΔT_a		$\Delta T_a = T_a - 25^\circ\text{C} $ ambient temperature T_a

RTD (PT100)			
Parameter	Value typ.	min. / max.	Remarks
Input range	-200°C to 850°C -200°C to 250°C		
Resolution	0.063 K		
Measurement error			
4-wire measurement		0.25 K +0.02%	-200°C to 850°C of measured value of resistance
3-wire measurement		0.1 K +0.02%	-200°C to 250°C of measured value of resistance
		0.42 K +0.03%	-200°C to 850°C of measured value of resistance
		0.38 K +0.02%	-200°C to 250°C of measured value of resistance
			Precision for 3-wire mode: with individual adjustment, only (special version upon request)
Drift		0.01 K/K·ΔT _a	ΔT _a = T _a - 25°C ambient temperature T _a
Sensor feed (PT100)	1.25 mA		

Sensor supply				
Parameter	Value			Remarks
Configuration options	5 selectable settings			always 5 selectable voltage settings default selection: +5 V to +24 V
Output voltage	Voltage (+1 V) (+2.5 V) +5.0 V +10 V +12 V +15 V +24 V (±15 V)	Current 580 mA 580 mA 580 mA 300 mA 250 mA 200 mA 120 mA 190 mA	Power 0.6 W 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 upon request, also 2.5 V and 1 V settings are available, for example by replacing the +12 V or +15 V setting. An arbitrary set of 5 setting can be chosen preferred selections: +24 V, +12 V, +10 V, +5.0 V, +2.5 V +15 V, +10 V, +5.0 V, +2.5 V, +1 V upon request, special order: +15 V can be replaced by ±15 V. This eliminates the internal current- and quarter bridge measurement.
Isolation	non isolated			output to case (CHASSIS)
Short-circuit protection	unlimited duration			to output voltage reference ground: "-VB"
Accuracy of output voltage	<0.25% (typ.)		<0.5% (max.) <0.9% (max.)	at terminals, no load at 25°C over entire temperature range
Compensation of cable resistances	3-line control: SENSE line as refeed (-VB: supply ground)			calculated compensation with bridges
Max. capacitive load	>4000 μF >1000 μF >300 μF			2.5 V to 10 V 12 V, 15 V 24 V