LV3-8 for imc CRONOS-SL/compact

8-channel Differential Amplifier

CRC/LV3-8

The LV3-8 is a differential measurement amplifier with 8 channels for measuring:

- Voltage and current (20 mA)
- IEPE/ICP sensors (with optional DSUB-15 plug)

Highlights

- Economical, high-resolution measuring of current and voltage
- Finely adjustable input voltage range (±5 mV to ±50 V)
- High signal bandwidth up to 48 kHz
- Each channel with its own adjustable filter (e.g., anti-aliasing filter) and simultaneous A/D converter
- Supports imc Plug & Measure (Transducer Electronic Data Sheets)

Typical applications

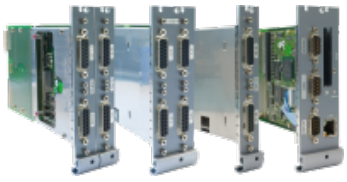
- Ideally suited for measurements of signals, voltage-based sensors as well as 20 mA process variables with higher bandwidths.

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 CRONOScompact plug-in-modules

imc CRONOScompact portable housing

Overview of available variants

Standard version		ET Version *	
Order Code:	article no.	article no.	Remarks
CRC/LV3-8	11700015	11710014	for imc CRONOS*compact*
CRC/LV3-8-R	11700105	11710064	for imc CRONOS*compact* RACK
CRC/LV3-8-L	11700223	117100xx	variant with LEMO sockets
CRC/LV3-8-L-R	11700224		variant with LEMO sockets for the 19"RACK

* ET: Version in extended temperature range

Standard version		ET-Version	
Order Code:	article no.	article no.	Remarks
CRC/LV3-8-SUPPLY-L	11700225		with integrated sensor supply
CRC/LV3-8-SUPPLY-L-R	11700226		with integrated sensor supply for 19"RACK
CRSL/LV3-8-D		11800086	**CRONOS-SL** variant with DSUB-15
CRSL/LV3-8-L		11800087	**CRONOS-SL** variant with LEMO sockets

Included accessories

- Calibration certificate with test equipment verification as per ISO 9001 (manufacturer's calibration certificate, PDF)
- Getting started with imc CRONOS*compact* (CRC) respectively CRONOS-SL (one copy per delivery)
- ACC/DSUBM-U4 — DSUB-15 plug with screw terminals for 4-channel voltage measurement — 13500166

Optional accessories

DSUB-15 plugs

- 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 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 imc CRONOS*compact* devices (CRC)

- CRC/BRACKET-CON — mounting bracket 90° — 11700153
- CRC/BRACKET-90 — mounting bracket for DIN-Rail — 11700152
- CRC/BRACKET-BACK — mounting bracket for DIN-Rail — 11700154

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

- CRSL/BRACKET-90 — mounting bracket 90°, mounting on a flat surface — 11800080

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

Technical Specs - CRC/CRSL/LV3-8

Inputs, measurement modes, terminal connection		
Parameter	**Value**	**Remarks**
Inputs	8	
Measurement modes DSUB	voltage measurement current measurement current feed sensors	 shunt plug (ACC/DSUBM-I4) with DSUB-15 expansion plug: ACC/DSUB-ICP4, not isolated ACC/DSUBM-ICP2I-BNC-S/-F [1], isolated
Measurement modes LEMO	voltage measurement current measurement	 with external shunt
Terminal connection Standard LEMO	 2x DSUB-15 8x LEMO.1B.307	 4 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	-3 dB -0.1 dB
Filter (digital) cut-off frequency characteristic 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 8.order with $f_{cutoff} = 0.4\ f_s$
Resolution	16 Bit	internal processing 24 Bit
TEDS	conforming to IEEE 1451.4 Class II MMI	esp. with ACC/DSUBM-TEDS-xx (DS2433) not supported: DS2431 (typ. IEPE/ICP sensor)

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.

General			
Parameter	**Value typ.**	**min. / max.**	**Remarks**
Overvoltage protection		±80 V ±50 V	permanent, differential input range >±10 V or device switched off input range ≤±10 V
Input coupling	DC		
Input configuration	differential		
Input impedance	1 MΩ 20 MΩ		range >±10 V range ≤±10 V
Auxiliary supply voltage available current internal resistance	 +5 V >0.26 A 1.0 Ω	 ±5% >0.2 A <1.2 Ω	for IEPE/ICP expansion plug independent of optional sensor supply, short circuit proof power per DSUB-plug

Voltage measurement			
Parameter	**Value typ.**	**min. / max.**	**Remarks**
Input ranges	±50 V, ±25 V, ±10 V, ±5V, ±2.5 V, ±1 V... ±5 mV		
Maximum input voltage		-11 V to +15 V	between ±IN and CHASSIS; input range ≤±10 V
Gain error	0.02 %	0.05 %	of the reading
Gain drift	10 ppm/K·ΔT_a	30 ppm/K·ΔT_a	$\Delta T_a = \lvert T_a - 25\ °C \rvert$; ambient temperature T_a
Offset error	0.02 %	 ≤0.05 % ≤0.06 % ≤0.15 %	of the range, at 25 °C >±50 mV ≤±50 mV ≤±10 mV
Offset drift	±40 µV/K·ΔT_a ±0.7 µV/K·ΔT_a ±0.1 µV/K·ΔT_a	±200 µV/K·ΔT_a ±6 µV/K·ΔT_a ±1.1 µV/K·ΔT_a	range >±10 V range ±10 V to ±0.25 V range ≤±0.1 V $\Delta T_a = \lvert T_a - 25°C \rvert$ ambient temperature T_a
Nonlinearity	30 ppm	≤90 ppm	
Common mode rejection ranges ±50 V to ±25 V ±10 V to ±50 mV ±20 mV to ±5 mV	 80 dB 110 dB 138 dB	 >70 dB >90 dB >132 dB	Common mode voltage (DC..60 Hz): ±50 V ±10 V ±10 V
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}	bandwidth 0.1 Hz to 50 kHz 0.1 Hz to 1 kHz 0.1 Hz to 10 Hz

Current measurement with shunt plug			
Parameter	**Value typ.**	**min. / max.**	**Remarks**
Input ranges	±50 mA, ±20 mA, ±10 mA, ±5 mA, ±2 mA, ±1 mA		50 Ω shunt in terminal plug
Shunt impedance	50 Ω		external plug ACC/DSUBM-I4
Over load protection		±60 mA	permanent
Maximum input voltage		-11 V to +15 V	between ±IN and CHASSIS
Input configuration	differential		50 Ω shunt in terminal plug
Gain error	0.02 %	≤0.06 % ≤0.1 %	of reading plus error of 50 Ω shunt
Gain drift	+15 ppm/K·ΔT_a	+55 ppm/K·ΔT_a	ΔT_a=|T_a -25 °C|; ambient temperature T_a
Offset error	0.02 %	≤0.05 %	of the range
Current 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

Sensor supply module (LV3-8-SUPPLY, LV3-8-L-SUPPLY)				
Parameter	**Value typ.**		**max.**	**Remarks**
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 optional, special order: +15 V can be replaced by ±15 V
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