LV-16 for imc CRONOS-SL/compact

16-channel Differential Amplifier

LV-16 is a measurement amplifier for 16 channels available as a plug-in module for **imc CRONOS*compact*** or as a configuration module for **CRONOS-SL**. It enables measurement of 16 differential analog channels which can measure voltage and current.

By means of an optional connector, the measurement of ICP sensors[1] is also possible.

Highlights

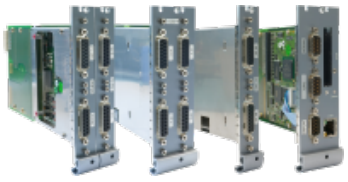
- Cost-effective acquisition of voltage and current
- Supports *imc Plug & Measure* (Transducer Electronic Data Sheets (IEEE 1451)

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/LV-16	11700051	11710026	for installation in an imc CRONOS*compact* housing
CRC/LV-16-R	11700115	11710074	for installation in an imc CRONOS*compact* RACK
CRSL/LV-16-D		11800015	for installation in an imc CRONOS-SL housing with DSUB sockets
CRSL/LV-16-L		11800016	for installation in an imc CRONOS-SL housing 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)
- 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

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

Technical Specs - LV-16

Parameter	Value	Remarks
Inputs	16	differential, analog, non isolated
Measurement modes (DSUB)	voltage measurement current measurement current fed sensors (IEPE/ICP)	 with 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	 4x DSUB-15 socket 4 channels per plug 16x LEMO / 1 channel per socket	

Sampling rate, Bandwidth, Filter, TEDS		
Parameter	**Value**	**Remarks**
Sampling rate	≤20 kHz	per channel
Bandwidth	0 Hz to 6.6 kHz 0 Hz to 5 kHz	-3 dB (analog AAF 5th order) -0.2 dB
Filter (digital) cut-off frequency characteristic order	2 Hz to 5 kHz	 Butterworth, Bessel (digital) low pass filter 8. 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)

General			
Parameter	**Value typ.**	**min. / max.**	**Remarks**
Overvoltage protection		±40 V	permanent channel to chassis
Input coupling	DC		
Input configuration	differential		
Input impedance	20 MΩ		differential, >10 kΩ off-state
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-extension plug independent of integrated sensor supply, short-circuit protected power per DSUB-plug

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.

Voltage measurement			
Parameter	**Value typ.**	**min. / max.**	**Remarks**
Input ranges	±10 V, ±5 V, ±2.5 V, ±1 V, ±500 mV, ±250 mV		
Gain: error drift	0.02 % ±8 ppm/K·ΔT_a	≤0.05 % ±30 ppm/K·ΔT_a	of reading ΔT_a=|T_a -25°C|; ambient temperature T_a
Offset: error drift	0.02 % ±18 µV/K·ΔT_a ±2 µV/K·ΔT_a	≤0.05 % ±45 µV/K·ΔT_a ±5 µV/K·ΔT_a	of range ±10 V to ±2.5 V ±1 V to ±250 mV ΔT_a=|T_a -25°C|; ambient temperature T_a
Max. common mode voltage		±12 V	
Common mode rejection Ranges ±10 V to ±2.5 V ±1 V to ±250 mV	 -90 dB -108 dB	 -80 dB -97 dB	common mode test voltage: ±10 $V_=$ and 7 V_{rms}, 50 Hz
Channel to channel crosstalk Ranges 10 V to ±2.5 V ±1 V to ±250 mV	 -90 dB -116 dB		test voltage: ±10 $V_=$ and 7 V_{rms}, 0 Hz to 50 Hz; range: ±10 V
Noise	12 μV_{rms}		bandwidth: 0.1 Hz to 1 kHz

Current measurement			
Parameter	**Value typ.**	**min. / max.**	**Remarks**
Input ranges	±50 mA, ±20 mA, ±10 mA, ±5 mA		50 Ω shunt in terminal plug
Max. over load	±60 mA		permanent
Input configuration	differential		50 Ω shunt plug (ACC/DSUBM-I4)
Gain: error drift	 0.02 % ±20 ppm/K·ΔT_a	 ≤0.06 % ≤0.1 % ±55 ppm/K·ΔT_a	of reading plus error of 50 Ω shunt ΔT_a=|T_a -25 °C|; ambient temp: T_a
Offset: error drift	 0.02 % ±30 nA/K·ΔT_a	 ≤0.05 % ±60 nA/K·ΔT_a	 of range ΔT_a=|T_a -25 °C|; ambient temp: T_a

Technical specs - sensor supply module

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 / Current / Netpower (+2.5 V) / 580 mA / 1.5 W +5.0 V / 580 mA / 2.9 W +10 V / 300 mA / 3.0 W +12 V / 250 mA / 3.0 W +15 V / 200 mA / 3.0 W +24 V / 120 mA / 2.9 W (±15 V) / 190 mA / 3.0 W		set globally for all channels of an amplifier special order: +12 V can be replaced by +2,5 V. +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 % 	0.5 % 0.9 % 1.5 %	at terminals, no load at 25°C over entire temperature range plus with optional bipolar output voltage
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