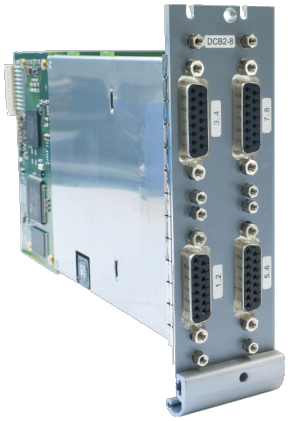
B(C)-8 for imc CRONOScompact (CRC/B(C)-8)

8-channel bridge measurement amplifier for multi-channel, dynamic strain gauge applications

The **B(C)-8** is a DC bridge amplifier with 8 differential analog inputs of higher bandwidths allowing the measurement of:

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

For powering external sensors or bridge measurements, a software selectable sensor supply is integrated



CRC/B-8

Highlights

- Very high signal bandwidth of up to 48 kHz
- Software selectable quarter-bridge completion between 120 and 350 Ω
- Graphical configuration wizard to set strain gauge bridges
- Supports imc Plug & Measure
- Also available with compact, high-density DSUB terminal connections (variant "C")

Typical applications

- Strain gauge measurements, load cells, pressure sensors, universal voltage measurements 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		ET-Version *	
Order Code	article no.	article no.	remarks
CRC/B-8	11700017	11710016	with DSUB-15 input connectors
CRC/B-8-R	11700107	11710066	DSUB-15, for CRC RACK
CRC/BC-8	11700087	--	with DSUB-26 input connectors
CRC/BC-8-R	--	--	DSUB-26, for CRC RACK

* ET: Version in extended temperature range

Included accessories

DSUB-15 plug for the module variant with DSUB-15 input connectors		
4x ACC/DSUBM-B2	DSUB-15 plug with screw terminals for 2-channel measurement of strain gauges, bridges and voltage	13500170

DSUB-26-HD plug for the module variant with DSUB-26-HD input connectors		
2x ACC/DSUBM-HD-B4	DSUB-26 plug with screw terminals for 4-channel measurement of strain gauges, bridges and voltage	13500197

Documents
Getting started with imc CRONOS*compact* (one copy per delivery / system)
Device certificate

Optional accessories

DSUB-15 plugs

• ACC/DSUBM-TEDS-B2	version with TEDS support, according to IEEE 1451 for use with imc Plug & Measure	13500191
• 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)	13500180
• ACC/DSUBM-TEDS-I2	version with TEDS support, according to IEEE 1451 for use with imc Plug & Measure	13500193
• ACC/DSUBM-ICP2I-BNC-S	DSUB-15 plug for 2 IEPE/ICP sensors, BNC connection, isolated, slow	13500293
• ACC/DSUBM-ICP2I-BNC-F	DSUB-15 plug for 2 IEPE/ICP sensors, BNC connection, isolated, fast	13500294

LEMO plug

• ACC/TH-LEM-150	LEMO.1B plug for thermocouple measurement with built-in cold-junction compensation (CJC) via PT100	13500086

High-Density (HD) plug

• ACC/DSUBM-HD-I4	DSUB-26 plug with screw terminals for 4-channel current measurement of up to 50 mA (50 Ω shunt, scaling factor: 0.02 A/V)	13500195
• ACC/DSUBM-HD-B4	DSUB-26 plug with screw terminals for 4-channel bridge measurement	13500197

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

Technical Specs - CRC/B(C)-8

Channels, measurement modes, terminal connection		
Parameter	**Value**	**Remarks**
Inputs	8	
Measurement modes DSUB-15	voltage measurement current measurement bridge sensor strain gauges current-fed sensors (IEPE/ICP)	 shunt-plug ACC/DSUBM-I2(-IP65) or single end (internal shunt) full, half, quarter bridge with DSUB-15 extension plug: e.g. ACC/DSUBM-ICP2I-BNC-S/-F, isolated
Measurement modes DSUB-26-HD	voltage measurement current measurement bridge sensor strain gauges	 ACC/DSUBM-HD-I4 shunt-plug or Single-ended (internal shunt) full, half, quarter bridge
Measurement modes LEMO	voltage measurement bridge sensor strain gauges current measurement	 full, half, quarter bridge Single-ended (internal shunt)
Terminal connection DSUB-15 DSUB-26-HD LEMO	 4x DSUB-15 2x DSUB-26-HD 8x LEMO.1B.307	 2 channels per plug 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	-3 dB
Filter (digital) cut-off frequency characteristic order	10 Hz to 20 kHz	 Butterworth, Bessel (digital) 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 only with B-8 (DSUB-15)	conforming IEEE 1451.4 Class II MMI	esp. with ACC/DSUBM-TEDS-xx (DS2433) not supported: DS2431 (typ. IEPE/ICP sensor)

General			
Parameter	**Value typ.**	**min. / max.**	**Remarks**
Overvoltage protection		±40 V	permanent
Input coupling	DC		
Input configuration	differential		
Input impedance	20 MΩ	±1%	
Auxiliary supply			only with DSUB-15 variant for IEPE/ICP expansion plug
voltage available current internal resistance	+5 V 0.26 A 1.0 Ω	±5% 0.2 A <1.2 Ω	independent of integrated sensor supply, short-circuit protected power per DSUB-plug

Voltage measurement			
Parameter	**Value typ.**	**min. / max.**	**Remarks**
Input range	±10 V, ±5 V, ±2.5 V, ±1 V... ±5 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	ΔT_a=|T_a-25°C|; with T_a = ambient temperature
Offset error	0.02%	≤0.05% ≤0.06% ≤0.15%	of the input range at 25°C range >±50 mV range ≤±50 mV range ≤±10 mV
Offset drift	(±0.7 µV/K)·ΔT_a (±0.1 µV/K)·ΔT_a	(±6 µV/K)·ΔT_a (±1.1 µV/K)·ΔT_a	range ±10 V to ±0.25 V range ≤±0.1 V ΔT_a=|T_a-25°C|; with T_a = ambient temperature
Nonlinearity	10 ppm	50 ppm	
CMRR (common mode rejection ratio)	110 dB 138 dB	>90 dB >132 dB	DC and f≤60 Hz range ±10 V to ±50 mV range ±25 mV to ±5 mV
Noise (RTI)	0.6 μV_{RMS} 0.14 μV_{RMS}	1.0 μV_{RMS} 0.26 μV_{RMS}	bandwidth 0.1 Hz to 1 kHz bandwidth 0.1 Hz to 10 Hz

Current measurement with shunt plug			
Parameter	**Value typ.**	**min. / max**	**Remarks**
Input range	±50 mA, ±20 mA, ±10 mA, ±5 mA, ±2 mA, ±1 mA		
Shunt impedance	50 Ω		external plug ACC/DSUBM-I2
Over load protection		±60 mA	permanent
Input configuration	differential		
Gain error	0.02%	0.06% 0.1%	of reading, at 25°C plus error of 50 Ω shunt
Gain drift	(15 ppm/K)·ΔT_a	(55 ppm/K)·ΔT_a	ΔT_a=|T_a-25°C|; with T_a = ambient temperature
Offset error	0.02%	0.05%	of range, at 25°C
Noise (current)	0.6 nA_{RMS} 0.15 nA_{RMS}	10 nA_{RMS} 0.25 nA_{RMS}	bandwidth 0.1 Hz to 1 kHz bandwidth 0.1 Hz to 10 Hz

Current measurement with internal shunt			
Parameter	**Value typ.**	**min. / max**	**Remarks**
Input range	±50 mA, ±20 mA, ±10 mA, ±5 mA, ±2 mA, ±1 mA		
Shunt impedance	120 Ω		internal
Over load protection		±60 mA	permanent
Input configuration	Single-ended		internal current backflow to -VB
Gain error	0.02%	0.06%	of reading, at 25°C
Gain drift	(15 ppm/K)·ΔT_a	(55 ppm/K)·ΔT_a	$\Delta T_a = \lvert T_a - 25°C \rvert$; with T_a = ambient temperature
Offset error	0.02%	0.05%	of range, at 25°C
Noise (current)	0.6 nA_{RMS} 0.15 nA_{RMS}	10 nA_{RMS} 0.25 nA_{RMS}	bandwidth 0.1 Hz to 1 kHz bandwidth 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 ranges bridge supply: 10 V bridge supply: 5 V bridge supply: 2.5 V bridge supply: 1 V	±1000 mV/V, ±500 mV/V, ±200 mV/V, ±100 mV/V ... ... ±0.5 mV/V ... ±1 mV/V ... ±2 mV/V ... ±5 mV/V		 (as an option) (as an option)
Bridge excitation voltage (as an option)	10 V 5 V (2.5 V and 1 V)	±0.5% ±0.5%	The actual value will be dynamically captured and compensated for in bridge mode.
Min. bridge impedance Max. bridge impedance	120 Ω, 10 mH full bridge 60 Ω, 10 mH half bridge 5 kΩ		
Internal quarter bridge completion	120 Ω, 350 Ω		internal, switchable per software
Input impedance	20 MΩ	±1%	differential, full bridge
Gain error	0.02%	0.05%	of reading
Offset error	0.01%	0.02%	of input range after automatic bridge balancing
automatic shunt calibration	0.5 mV/V	±0.2%	for 120 Ω and 350 Ω
Cable resistance for bridges (without return line)	<6 Ω <12 Ω		10 V excitation 120 Ω 5 V excitation 120 Ω

Sensor 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 (+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 %		0.5 % 0.9 % 1.5 %	at terminals, no load at 25 °C over entire temperature range plus with optional bipolar output voltage
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