

DCB(C)2-8 for imc CRONOScompact (CRC)

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

The **DCB(C)2-8** is a DC bridge amplifier. With 8 differential analog inputs, it allows the measurement of:

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

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

Highlights

- Medium signal bandwidth of up to 5 kHz
- Sensor supply with adjustable voltage supply
- Software selectable quarter-bridge completion between 120 and 350 Ω
- Graphical configuration wizard to set strain gauge bridges
- Supports imc Plug & Measure (Transducer Electronic Data Sheets (IEEE 1451))
- 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



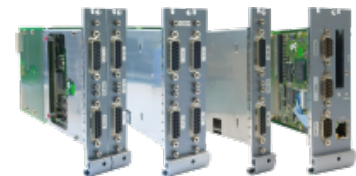
CRC/DCB2-8

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-400GP).

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/DCB2-8	11700018	11710017	for imc CRONOScompact
CRC/DCB2-8-R	11700108	11710067	for imc CRONOScompact RACK
CRC/DCBC2-8	11700076		variant with DSUB-26 sockets
CRC/DCBC2-8-R	11700144		for imc CRONOScompact 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-15 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 CRONOScompact (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 CRONOScompact 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/DCB(C)2-8

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-ICP21-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 5 kHz	-3 dB
Filter (digital) cut-off frequency characteristic order	1 Hz to 2 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 $f_{\text{cutoff}} = 0.4 f_s$
Resolution	16 Bit	internal processing 24 Bit
TEDS only with 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	+5 V	±5%	independent of integrated sensor supply, short-circuit protected
available current	0.26 A	0.2 A	power per DSUB-plug
internal resistance	1.0 Ω	<1.2 Ω	

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	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

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	±1000 mV/V, ±500 mV/V, ±200 mV/V, ±100 mV/V ...		(as an option) (as an option)
bridge supply: 10 V	... ±0.5 mV/V		
bridge supply: 5 V	... ±1 mV/V		
bridge supply: 2.5 V	... ±2 mV/V		
bridge supply: 1 V	... ±5 mV/V		
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	120 Ω, 10 mH full bridge 60 Ω, 10 mH half bridge		
Max. bridge impedance	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