

## DCB2-8 for imc CRONOS-XT (CRXT/DCB2-8)

### 8-channel bridge measurement amplifier for multi-channel strain gauge applications

The DCB2-8 is an 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-15 plug)

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

#### Highlights

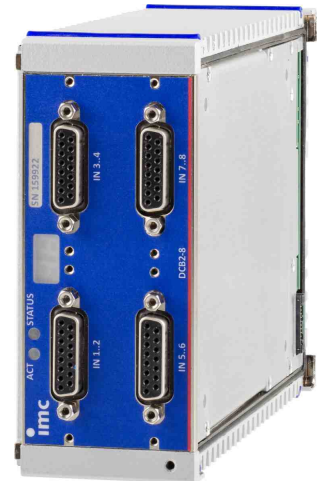
- Medium signal bandwidths of up to 5 kHz
- Sensor supply with adjustable voltage supply
- Software selectable quarter-bridge completion between 120 and 350  $\Omega$
- Graphical configuration wizard to set strain gauge bridges
- Supports imc Plug & Measure (Transducer Electronic Data Sheets)

#### Typical applications

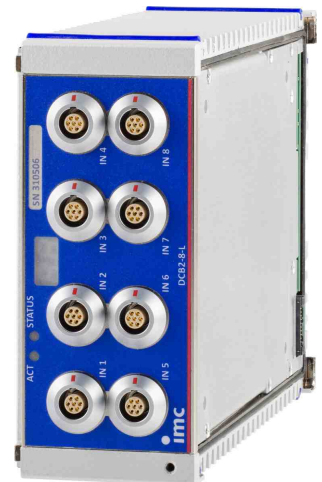
- Strain gauge measurements, load cells, pressure sensors and
- universal voltage measurements

#### imc CRONOS-XT - Maximizes flexible modularity

An imc CRONOS-XT system is composed of a base unit and one or more imc CRONOS-XT modules. The imc click mechanism offers a mechanically strong connection between several imc CRONOS-XT modules. At the same time, the "click" establishes an electrical connection to the system bus and the power supply.



CRXT/DCB2-8



CRXT/DCB2-8-L

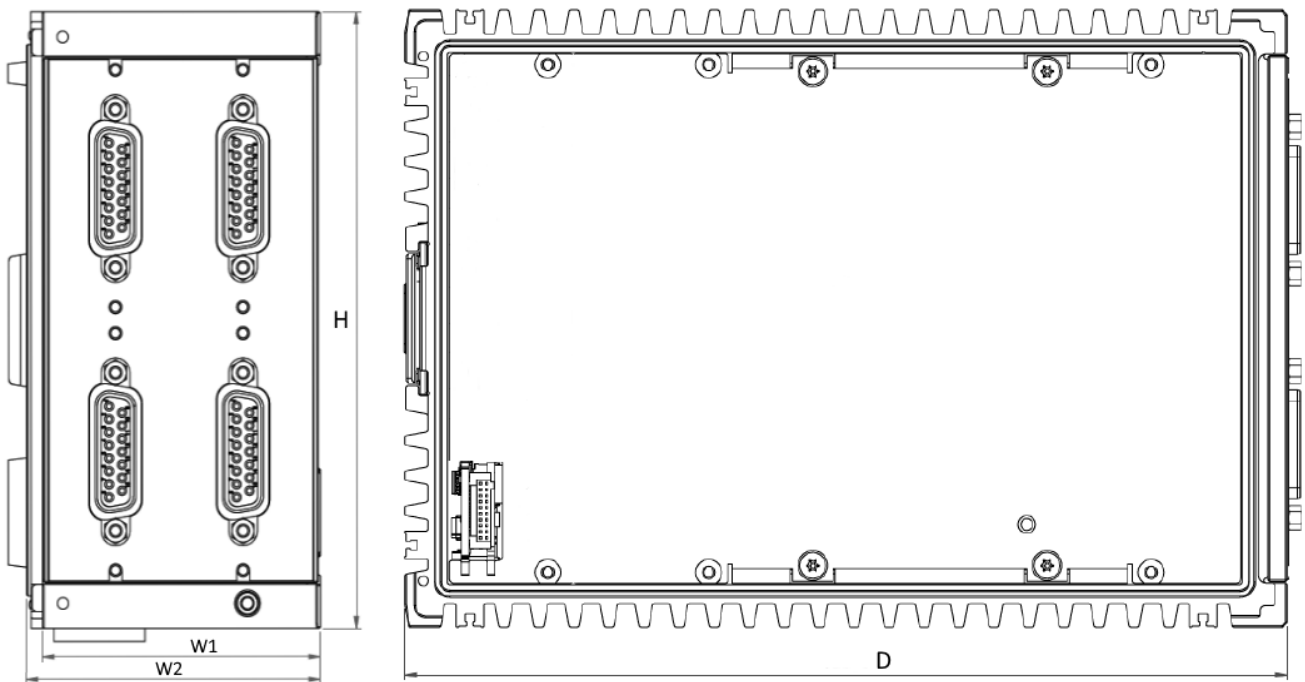


## Models and Options

### Overview of available variants

Order Code	Signal connections	power consumption	weight	housing	article no.
CRXT/DCB2-8	DSUB-15	10 W	1.1 kg	XT2	11100016
CRXT/DCBC2-8	DSUB-26-HD	10 W	0.8 kg	XT1	11100024
CRXT/DCB2-8-L	LEMO	10 W	1.1 kg	XT2	11100026

### Dimensions



Shown in standard operating orientation: housing type XT2

Housing type:	XT1	XT2	XT3	XT4	Remarks
W: Width in mm	30.5	61	91.5	116.9	W1: modular spacing (effective stacking width) W2: complete width
	34	64.5	95	120.4	
H: Height in mm	130				
D: Depth in mm	186.5				

### Sealing, IP rating and environmental specs

A single CRXT slice cannot achieve an IP protection level at first because it is functionally open at the side. The specified specifications are always only valid for a complete in a controlled environment clicked (closed) CRXT system. Only after it has been combined with a CRXT base unit (plus power module), CRXT slices if applicable, and the final handles to form a CRXT system can an evaluation be made. The specification for shock, vibration and IP degree of protection applicable to the entire device is then derived from the weakest specification of the CRXT slices used in this combination. They assume that the individual CRXT slices are each mounted in conjunction with the additional stabilizing interconnect brackets (included in the standard accessories supplied). The module variants with LEMO sockets are equipped with LEMO.1B connection sockets, which meet the IP65 degree of protection. This determines the upper limits for the sealing of the complete system equipped with it.

According to IEC 60529 the Ingress Protection (IP) rating refer to protection classes provided by a housing, the protection of the electrical parts within the housing shell. If all functionally accessible contacts of the sockets are also to be protected, the corresponding plugs must be connected to all sockets. In many cases, a protective cover can also be used alternatively on unused sockets.

## Accessories and Plugs

### Included accessories

Sealing Caps and mounting accessories		
4x ACC/CAP-DSUB-15-IP67	Sealing Cap IP67 for the variant with DSUB-15 and DSUB-26-HD sockets	13500342
2x CRXT/BRACKET-CON	interconnect brackets, intended for increased stability	11100040
Miscellaneous		
Calibration certificate with test equipment verification as per ISO 9001 (manufacturer's calibration certificate, PDF)		
Getting started with imc CRONOS-XT (one copy per delivery)		

### Optional accessories

DSUB-15 plug (solder) IP67		
CRXT/DSUB15M-IP67	IP67 DSUB-15 plug male	11100073
DSUB-15 plug (IP65)		
ACC/DSUBM-B2-IP65	IP65 DSUB-15 plug with screw terminals for 2-channel measurement of strain gauges, bridges and voltage	13500218
ACC/DSUBM-TEDS-B2-IP65	sealed IP65 TEDS version	13500331
ACC/DSUBM-I2-IP65	IP65 DSUB-15 plug with screw terminals for 2-channel current measurement of up to 50 mA (50 Ω shunt, scaling factor: 0.02A/V)	13500329
ACC/DSUBM-TEDS-I2-IP65	sealed IP65 TEDS version	13500334
DSUB-15 extension plug for two IEPE transducers (IP65)		
CRXT/DSUB-ICP2-IP65	IP65 DSUB-15 plug with 2 PG for cable with diameter 2.5 to 3 mm <sup>2</sup>	11100064
DSUB-15 extension plugs for two IEPE transducers (no IP65 rating)		
ACC/DSUBM-ICP2I-BNC-S	ICP2I (isolated, 2x BNC), slow	13500293
ACC/DSUBM-ICP2I-BNC-F	ICP2I (isolated, 2x BNC), fast	13500294
DSUB-26-HD plug (no IP65 rating)		
ACC/DSUBM-HD-B4	DSUB-26 plug with screw terminals for 4-channel measurement of strain gauges, bridges and voltage	13500197
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
Dust protection caps		
ACC/CAP-DSUB-15	dust protection cap for DSUB-15 and DSUB-26-HD	13500339
ACC/CAP-LEMO.1B	dust protection cap for LEMO.1B sockets (and XT-Con)	13500233

Miscellaneous		
CRXT/CAL-P Calibration report set for each device	Report set with manufacturer's calibration certificate and individual readings, as well as list of test equipment used (PDF). Meets requirements of ISO 17025	11100071
ACC/DSUBM-LOCKING-BOLT-L	extended length locking bolts (2 pcs) For the slices with DSUB-15 sockets, the sealed terminal plugs ACC/DSUBM-xxx-IP65 must be used - regardless of the sealing properties: The simple standard plug (ACC/DSUBM-xxx without suffix [-IP65]) have shorter locking screws and therefore cannot be fixed to CRXT slices. However, they can be retrofitted with the long bolts. With long bolts: only for CRXT, with short standard bolts: only for CRFX, CRC, C-SERIE etc.	13500327

### Technical Specs - DCB2-8

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 expansion 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, max system throughput of all module channels: 800 kHz including monitor channels
Bandwidth	0 Hz to 5 kHz	-3 dB
Filter (digital) cut-off frequency characteristic order	10 Hz to 5 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 24 Bit	output format is selectable for each channel individually: a) 16 Bit Integer b) 32 Bit Float (24 Bit Mantissa)
TEDS only with DSUB-15	conforming IEEE 1451.4 Class II MMI	esp. with ACC/DSUBM-TEDS-xx (DS2433) supports also: DS2431 (typ. IEPE/ICP sensor)
Characteristic curve linearization	user defined (max. 1023 supporting points)	

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			for IEPE/ICP expansion plug
voltage	+5 V	±5%	independent of integrated
available current	0.26 A	0.2 A	sensor supply, short-circuit protected
internal resistance	1.0 Ω	<1.2 Ω	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 <sub>a</sub>	30 ppm/K·ΔT <sub>a</sub>	ΔT <sub>a</sub> = T <sub>a</sub> -25°C ; ambient temperature T <sub>a</sub>
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 <sub>a</sub> ±0.1 μV/K·ΔT <sub>a</sub>	±6 μV/K·ΔT <sub>a</sub> ±1.1 μV/K·ΔT <sub>a</sub>	range ±10 V to ±0.25 V range ≤±0.1 V ΔT <sub>a</sub> = T <sub>a</sub> -25°C ; ambient temperature T <sub>a</sub>
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 <sub>RMS</sub> 0.14 μV <sub>RMS</sub>	1.0 μV <sub>RMS</sub> 0.26 μV <sub>RMS</sub>	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 <sub>a</sub>	55 ppm/K·ΔT <sub>a</sub>	ΔT <sub>a</sub> = T <sub>a</sub> -25°C  ambient temperature T <sub>a</sub>
Offset error	0.02%	0.05%	of range, at 25°C
Noise (current)	0.6 nA <sub>RMS</sub> 0.15 nA <sub>RMS</sub>	10 nA <sub>RMS</sub> 0.25 nA <sub>RMS</sub>	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 <sub>a</sub>	55 ppm/K·ΔT <sub>a</sub>	ΔT <sub>a</sub> = T <sub>a</sub> -25°C  ambient temperature T <sub>a</sub>
Offset error	0.02%	0.05%	of range, at 25°C
Noise (current)	0.6 nA <sub>RMS</sub> 0.15 nA <sub>RMS</sub>	10 nA <sub>RMS</sub> 0.25 nA <sub>RMS</sub>	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 ...  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		(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	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
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.
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