

BR2-4 for imc CRONOS-XT

4-channel high performance bridge measurement amplifier

The BR2-4 is a universal DC and CF bridge measurement amplifier for 4 channels and can also be used as a DC differential amplifier. It is capable of measuring:

- 4 strain gauges, with selectable DC or CF (AC) excitation
- LVDT
- Voltage and current (20 mA)
- IEPE/ICP sensors (with optional DSUB-15 plug)

Highlights

- Carrier frequency excitation (5 kHz) for bridges and LVDT
- Single and dual sense line configurations are supported (e.g., 5/6-wire connection with full bridge)
- Symmetric bridge supply of 1 V, 2.5 V, 5 V with DC as well as with CF (AC) mode
- broken wire detection
- Integrated calibration resistor for shunt calibration
- Software selectable quarter-bridge completion 120 and 350 Ω
- Graphical configuration wizard to set strain gauge bridges



CRXT/BR2-4
(Fig. similar)

Typical applications

- Ideal for bridge measurements in CF mode with elevated requirements for noise suppression and stability, as well as LVDT and inductive displacement sensors.

imc CRONOS-XT - Maximizes flexible modularity

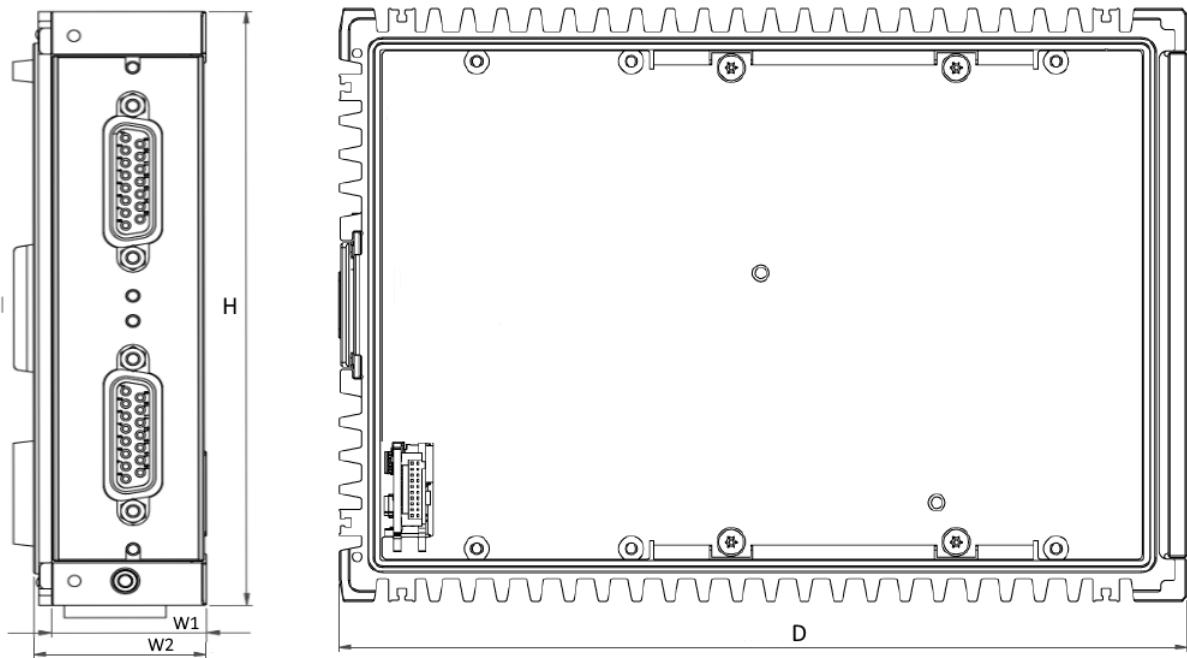
An imc CRONOS-XT system is composed of a base unit and one or more imc CRONOS-XT modules. The imc click mechanism offers a mechanically strong connection between several imc CRONOS-XT modules. At the same time, the "click" establishes an electrical connection to the system bus and the power supply.



Overview of available variants

Order Code	Signal connections	power consumption	weight	housing	article no.
CRXT/BR2-4	DSUB-15	9.3 W	0.7 kg	XT1	11100075

Dimensions



Shown in standard operating orientation: housing type XT1

Housing type:	XT1	XT2	XT3	XT4	Remarks
W: Width in mm	30.5 34	61 64.5	91.5 95	116.9 120.4	W1: modular spacing (effective stacking width) W2: complete width
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 closed (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).

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.

Included accessories

Sealing Caps and mounting accessories		article no.
2x ACC/CAP-DSUB-15-IP67	sealing Cap IP67 for DSUB-15 sockets	13500342
CRXT/BRACKET-CON	interconnect brackets, intended for increased stability; set of 2 units for top and bottom side	11100040

Included accessories

Documents		
Device certificate		
Getting started with imc CRONOS-XT (one copy per delivery)		

Optional accessories

DSUB-15 plug (solder) IP67		article no.
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 ²	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

Dust protection caps		
ACC/CAP-DSUB-15	dust protection cap for DSUB-15	13500339

Miscellaneous		
CRXT/BRACKET-CON-BOT	interconnect bracket with mounting option (180°) for the bottom side of the CRXT module	11100084
ACC/DSUBM-LOCKING-BOLT-L	extended length locking bolts (2 pcs)	13500327
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-SERIES etc.		

Documents		
SERV/CAL-PROT	Calibration protocol per amplifier imc manufacturer calibration certificate with measurement values and list of calibration equipment used (pdf).	150000566
SERV/CAL-PROT-PAPER	Calibration protocol per amplifier (paper print) imc manufacturer calibration certificate with measurement values and list of calibration equipment used with signature and seal.	150000578
Device certificates and calibration protocols: Detailed information on certificates supplied, the specific contents, underlying standards (e.g. ISO 9001 / ISO 17025) and available media (pdf etc.) can be found on our website, or you can contact us directly.		

Technical Specs - BR2-4

Inputs, measurement modes, terminal connection		
Parameter	Value	Remarks
Inputs	4	
Measurement modes	bridge sensor strain gauge LVDT voltage measurement current measurement current-fed sensors IEPE/ICP	ACC/DSUBM-B2 full-, half- and quarter bridge inductive transducers (CF) voltage or bridge mode globally selected for all four channels with current plug: ACC/DSUBM-I2 with IEPE/ICP expansion plug (DSUB-15): CRXT/DSUB-ICP2-IP65, not isolated or ACC/DSUBM-ICP2I-BNC-S/-F ¹ , isolated
Terminal connection	2x DSUB-15	2 channels per plug

Sampling rate, Bandwidth, Filter, TEDS		
Parameter	Value	Remarks
Sampling rate	≤ 100 kHz	per channel
Bandwidth	8.6 kHz (DC) 3.9 kHz (CF)	-3 dB -3 dB
Filter	cut-off frequency characteristic order	2 Hz to 5 kHz Butterworth, Bessel low pass filter 8. 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 - Transducer Electronic DataSheets	conforming to IEEE 1451.4 Class II MMI	esp. with ACC/DSUBM-TEDS-xx (DS2433) not supported: DS2431 (typ. IEPE/ICP sensor)
Characteristic curve linearization	user defined (max. 1023 supporting points)	

General	Value typ.	min. / max	Remarks
Overvoltage protection		± 50 V ± 80 V	long term(differential- and SENSE-inputs) short-term
Input impedance	10 M Ω 1 M Ω		range ± 5 mV to ± 2 V range ± 5 V to ± 50 V and for deactivated device
Input current		40 nA	
Input capacitance	300 pF		
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 integrated sensor supply, short circuit proof power per DSUB-plug

1 Only the IEPE base functionality is supported by this module, see also TD ACC/DSUBM-ICP2I-BNC.

Voltage measurement			
Parameter	Value typ.	min. / max.	Remarks
Input ranges		$\pm 50 \text{ V} / \pm 25 \text{ V} / \pm 10 \text{ V}$ $\pm 5 \text{ V} / \pm 2 \text{ V} / \pm 1 \text{ V}$ $\pm 500 \text{ mV} / \pm 250 \text{ mV} / \pm 100 \text{ mV}$ $\pm 50 \text{ mV} / \pm 25 \text{ mV} / \pm 10 \text{ mV} / \pm 5 \text{ mV}$	
Gain error	0.02 %	$\leq 0.05 \text{ %}$	of reading (measurement value)
Gain drift	60 ppm / K	$< 100 \text{ ppm} / \text{K}$	
Offset drift	0.02 %	$\leq 0.05 \text{ %}$ $\leq 0.1 \text{ %}$ $\leq 0.2 \text{ %}$	of measurement range range $\geq \pm 25 \text{ mV}$ range = $\pm 10 \text{ mV}$ range = $\pm 5 \text{ mV}$
Input offset-drift	0.05 $\mu\text{V} / \text{K}$	0.3 $\mu\text{V} / \text{K}$	DC voltage measurement
Non-linearity	<200 ppm		
Common mode voltage (max.)	$\pm 50 \text{ V}$ $\pm 2.8 \text{ V}$		ranges $\pm 50 \text{ V}$ to $\pm 5 \text{ V}$ ranges $\pm 2 \text{ V}$ to $\pm 5 \text{ mV}$
Common mode rejection ratio (CMRR) range:			DC
$\pm 5 \text{ mV}$ to $\pm 25 \text{ mV}$		>120 dB	
$\pm 50 \text{ mV}$ to $\pm 100 \text{ mV}$		>110 dB	
$\pm 250 \text{ mV}$ to $\pm 2 \text{ V}$		95 dB	
$\pm 5 \text{ V}$ to $\pm 50 \text{ V}$		>54 dB	
$\pm 5 \text{ mV}$ to $\pm 2 \text{ V}$	>100 dB	>90 dB	$f \leq 50 \text{ Hz}$
$\pm 5 \text{ V}$ to $\pm 50 \text{ V}$	>68 dB	>54 dB	
all ranges		>50 dB	$f = 5 \text{ kHz}$
SNR (signal to noise ratio)			full-scale / rms-noise full bandwidth ranges $\pm 100 \text{ mV}$ to $\pm 50 \text{ V}$ range $\pm 50 \text{ mV}$ range $\pm 25 \text{ mV}$ range $\pm 10 \text{ mV}$ range $\pm 5 \text{ mV}$
Input noise, voltage (RTI)			DC-Mode (range $\pm 5 \text{ mV}$) spectral noise density 1 kHz 0 Hz to 10 kHz 0 Hz to 10 kHz 0.1 Hz to 10 Hz
	$16 \text{ nV}/\sqrt{\text{Hz}_{\text{rms}}}$ $16 \mu\text{V}_{\text{pk-pk}}$ $2 \mu\text{V}_{\text{rms}}$ $0.6 \mu\text{V}_{\text{pk-pk}}$		

Current measurement with shunt plug		
Parameter	Value	Remarks
Input ranges	$\pm 40 \text{ mA}$ / $\pm 20 \text{ mA}$ / $\pm 10 \text{ mA}$ $\pm 5 \text{ mA}$ / $\pm 2 \text{ mA}$ / $\pm 1 \text{ mA}$ $\pm 400 \text{ mA}$ / $\pm 200 \mu\text{A}$ / $\pm 100 \text{ mA}$	
Shunt impedance	50 Ω	ACC/DSUBM-I2 (shunt plug)

Bridge measurement			
Parameter	Value typ.	min. / max.	Remarks
Mode	DC, CF		
Sensors	LVDT, strain gauge: full-, half-, quarter bridge piezo-resistive bridge transducer potentiometer		directly connectable
Measurement mode	full-, half-, quarter bridge		
Input ranges	$\pm 1 \text{ mV/V}$ to $\pm 400 \text{ mV/V}$ $\pm 2 \text{ mV/V}$ to $\pm 800 \text{ mV/V}$ $\pm 5 \text{ mV/V}$ to $\pm 2000 \text{ mV/V}$		for bridge voltage: 5 V 2.5 V 1 V
Bridge supply	1 V; 2.5 V; 5 V (symmetric) 1 V; 2.5 V; 5 V (peak)		set globally for 4-channel groups corresponding to $\pm 0.5 \text{ V}$, $\pm 1.25 \text{ V}$, $\pm 2.5 \text{ V}$ corresponding to RMS: 0.7 V; 1.8 V; 3.5 V
Internal quarter-bridge completion	120 Ω , 350 Ω		selectable
Min. bridge impedance	120 Ω , 10 mH full bridge 60 Ω , 5 mH half bridge		bridge supply = 1 V to 5 V, $I_{\text{load}} \leq 42 \text{ mA}$
Bridge impedance (max.)	5 k Ω		
Gain error	<0.05 %		of measurement value at 25°C
Offset after bridge balance	<0.02 %		of the range at 25°C
Input offset-drift	0.01 $\mu\text{V/V} / \text{K}$	0.06 $\mu\text{V/V} / \text{K}$	DC full bridge (Bridge supply=5 V, 1 mV/V range) without ext. bridge offset
Drift of bridge balance	50 ppm/K	<90 ppm/K	of compensated offset value
Equivalent offset drift corresponding to balanced ext. bridge offset	0.05 $\mu\text{V/V/K}$	0.09 $\mu\text{V/V/K}$	full bridge (DC or CF), ext. bridge offset = 1 mV/V 1 mV/V input range
Half-bridge drift (int. half-bridge)	0.05 $\mu\text{V/V/K}$	1 $\mu\text{V/V/K}$	DC or CF
Bridge balancing range	\geq measurement range not less than: $\geq \pm 5 \text{ mV/V}$ $\geq \pm 10 \text{ mV/V}$ $\geq \pm 25 \text{ mV/V}$		for bridge supply = 5 V for bridge supply = 2.5 V for bridge supply = 1 V
Cable length (max.)	500 m (one-way length)		$A = 0.14 \text{ mm}^2$, $R = 130 \text{ m}\Omega/\text{m}$, 65 Ω

Bridge measurement			
Parameter	Value typ.	min. / max.	Remarks
Cable-Compensation full bridge / half bridge quarter bridge	4-wire-technique 3-wire-technique with shunt-calibration full compensation in 3-wire-technique		any cable for symmetric (similar) cables one-time non-adaptive compensation including Gain-Correction!
Automatic shunt-calibration	0.5 mV/V		for 120 Ω and 350 Ω bridges
Input noise (bridge)			range: 1 μ V/V (bridge voltage = 5 V)
DC full bridge	3 μ V/V _{pkpk} , 0.39 μ V/V _{rms} 0.9 μ V/V _{pkpk} , 0.12 μ V/V _{rms} 0.3 μ V/V _{pkpk} , 0.04 μ V/V _{rms} 0.1 μ V/V _{pkpk}		0 Hz to 10 kHz 1 kHz, lowpass filter 100 Hz, lowpass filter 10 Hz, lowpass filter
DC half-/quarter bridge	3.3 μ V/V _{pkpk} , 0.45 μ V/V _{rms} 1.1 μ V/V _{pkpk} , 0.15 μ V/V _{rms} 0.35 μ V/V _{pkpk} , 0.05 μ V/V _{rms} 0.3 μ V/V _{pkpk}		0 Hz to 10 kHz 1 kHz, lowpass filter 100 Hz, lowpass filter 10 Hz, lowpass filter
CF full bridge, half bridge	3.5 μ V/V _{pkpk} , 0.47 μ V/V _{rms} 1.7 μ V/V _{pkpk} , 0.22 μ V/V _{rms} 0.6 μ V/V _{pkpk} , 0.07 μ V/V _{rms} 0.3 μ V/V _{pkpk}		0 Hz to 10 kHz 1 kHz, lowpass filter 100 Hz, lowpass filter 10 Hz, lowpass filter

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imc ACADEMY - Training center

The safe handling of measurement devices requires a good knowledge of the system. At our training center, experienced specialists are here to share their knowledge.

E-Mail: schulung@imc-tm.de

Internet: <https://www.imc-tm.com/service-training/imc-academy>

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