

B-8 for imc CRONOS-XT (CRXT/B-8)

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

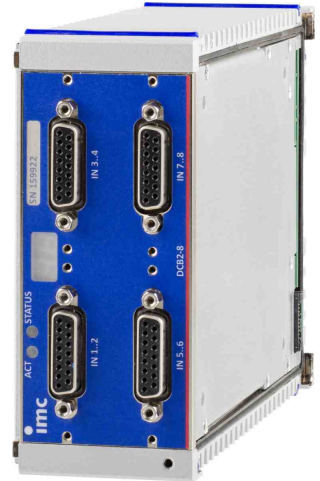
The B-8 is an DC bridge amplifier. With 8 differential analog inputs, it allows the measurement of:

- 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

- Very high signal bandwidths of up to 48 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)



CRXT/B-8
(Fig. similar)

Typical applications

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

imc CRONOS-XT - Maximizes flexible modularity

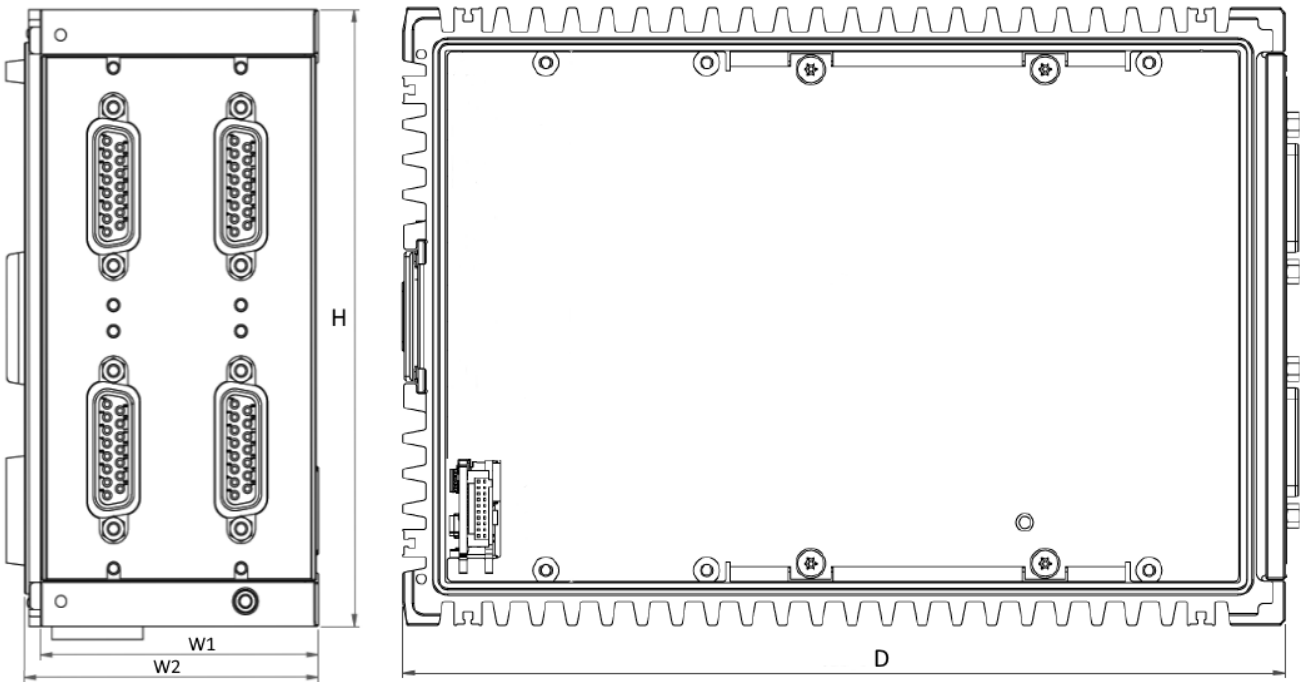
An imc CRONOS-XT system is composed of a base unit and one or more imc CRONOS-XT modules. The imc click mechanism offers a mechanically strong connection between several imc CRONOS-XT modules. At the same time, the "click" establishes an electrical connection to the system bus and the power supply.



Overview of available variants

| Order Code | Signal connections | power consumption | weight | housing | article no. |
|------------|--------------------|-------------------|--------|---------|-------------|
| CRXT/B-8 | DSUB-15 | 10 W | 1.1 kg | XT2 | 11100027 |

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).

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 | | |
|--|---|----------|
| 4x ACC/CAP-DSUB-15-IP67 | Sealing Cap IP67 for DSUB-15 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 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/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 - B-8

| Channels, measurement modes, terminal connection | | |
|--|--|---|
| Parameter | Value | Remarks |
| Inputs | 8 | |
| Measurement modes | 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 |
| Terminal connection | 4x DSUB-15 | 2 channels 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 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 24 Bit | output format is selectable for each channel individually: a) 16 Bit Integer b) 32 Bit Float (24 Bit Mantissa) |
| TEDS | 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 | +5 V | ±5% | for IEPE/ICP extension plug |
| voltage | 0.26 A | 0.2 A | independent of integrated |
| available current | 1.0 Ω | <1.2 Ω | sensor supply, short-circuit protected |
| internal resistance | | | power per DSUB-plug |

| Voltage measurement | | | |
|------------------------------------|--|--|--|
| Parameter | Value typ. | min. / max. | Remarks |
| Input range | $\pm 10\text{ V}, \pm 5\text{ V}, \pm 2.5\text{ V}, \pm 1\text{ V} \dots \pm 5\text{ mV}$ | | |
| Gain error | 0.02% | 0.05% | of the measured value, at 25°C |
| Gain drift | $10\text{ ppm/K} \cdot \Delta T_a$ | $30\text{ ppm/K} \cdot \Delta T_a$ | $\Delta T_a = T_a - 25^\circ\text{C} $; ambient temperature T_a |
| Offset error | 0.02% | $\leq 0.05\%$ $\leq 0.06\%$ $\leq 0.15\%$ | of the measurement range at 25°C range $> \pm 50\text{ mV}$ range $\leq \pm 50\text{ mV}$ range $\leq \pm 10\text{ mV}$ |
| Offset drift | $\pm 0.7\text{ }\mu\text{V/K} \cdot \Delta T_a$ $\pm 0.1\text{ }\mu\text{V/K} \cdot \Delta T_a$ | $\pm 6\text{ }\mu\text{V/K} \cdot \Delta T_a$ $\pm 1.1\text{ }\mu\text{V/K} \cdot \Delta T_a$ | range $\pm 10\text{ V}$ to $\pm 0.25\text{ V}$ range $\leq \pm 0.1\text{ V}$ $\Delta T_a = T_a - 25^\circ\text{C} $; ambient temperature T_a |
| Nonlinearity | 10 ppm | 50 ppm | |
| CMRR (common mode rejection ratio) | 110 dB 138 dB | $> 90\text{ dB}$ $> 132\text{ dB}$ | DC and $f \leq 60\text{ Hz}$ range $\pm 10\text{ V}$ to $\pm 50\text{ mV}$ range $\pm 25\text{ mV}$ to $\pm 5\text{ mV}$ |
| Noise (RTI) | $0.6\text{ }\mu\text{V}_{\text{RMS}}$ $0.14\text{ }\mu\text{V}_{\text{RMS}}$ | $1.0\text{ }\mu\text{V}_{\text{RMS}}$ $0.26\text{ }\mu\text{V}_{\text{RMS}}$ | 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 | $\pm 50\text{ mA}, \pm 20\text{ mA}, \pm 10\text{ mA}, \pm 5\text{ mA},$ $\pm 2\text{ mA}, \pm 1\text{ mA}$ | | |
| Shunt impedance | 50 Ω | | external plug ACC/DSUBM-I2 |
| Over load protection | | $\pm 60\text{ mA}$ | 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 | $15\text{ ppm/K} \cdot \Delta T_a$ | $55\text{ ppm/K} \cdot \Delta T_a$ | $\Delta T_a = T_a - 25^\circ\text{C} $ ambient temperature T_a |
| Offset error | 0.02% | 0.05% | of range, at 25°C |
| Noise (current) | $0.6\text{ nA}_{\text{RMS}}$ $0.15\text{ nA}_{\text{RMS}}$ | $10\text{ nA}_{\text{RMS}}$ $0.25\text{ nA}_{\text{RMS}}$ | 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 | $\pm 50\text{ mA}, \pm 20\text{ mA}, \pm 10\text{ mA}, \pm 5\text{ mA},$ $\pm 2\text{ mA}, \pm 1\text{ mA}$ | | |
| Over load protection | | $\pm 60\text{ mA}$ | permanent |
| Input configuration | Single-ended | | internal current backflow to -VB |
| Gain error | 0.02% | 0.06% | of reading, at 25°C |
| Gain drift | $15\text{ ppm/K} \cdot \Delta T_a$ | $55\text{ ppm/K} \cdot \Delta T_a$ | $\Delta T_a = T_a - 25^\circ\text{C} $ ambient temperature T_a |
| Offset error | 0.02% | 0.05% | of range, at 25°C |
| Noise (current) | $0.6\text{ nA}_{\text{RMS}}$ $0.15\text{ nA}_{\text{RMS}}$ | $10\text{ nA}_{\text{RMS}}$ $0.25\text{ nA}_{\text{RMS}}$ | 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 ± 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) | $\pm 0.5\%$ $\pm 0.5\%$ | 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 k Ω | | |
| Internal quarter bridge completion | 120 Ω , 350 Ω | | internal |
| Input impedance | 20 M Ω | $\pm 1\%$ | 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 | $\pm 0.2\%$ | 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 | | | 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% (typ.) / <0.5% (max.) <0.9% (max.) | | | at terminals, no load at 25°C over entire temperature range |
| 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 |