DCB(C)2-8 for imc CRONOS-PL/-SL/compact

Datasheet Version 3.4

8-channel bridge amplifier

CRPL/DCB2-8

CRC/DCB2-8

DCB2(C)-8 is an affordable dynamic analog bridge amplifier (DC) for 8 channels which comes as a module for **imc CRONOS-PL/*compact*** and as a configuration module for **imc CRONOS-SL**. By means of eight differential, analog inputs, it enables the measurement of:

- Voltage, current, bridges, strain gauges
- ICP-sensors (using an optional available DSUB-15 connector plug for 2 channels)

For the supply of external sensors or for the bridge measurement, a sensor supply module with adjustable supply voltages is built in.

This amplifier's special strength is:

- DCB2-8 supports *imc Plug & Measure* (Transducer Electronic Data Sheets (IEEE 1451)

Order code:	Article #	Remarks
CRPL/DCB2-8	1080202	for installation in an imc CRONOS-PL housing
CRPL/DCB2-8-ET	1081133	Version in extended temperature range
CRSL/DCB2-8-D	1180077	for installation in an imc CRONOS-SL housing with DSUB interconnections
CRSL/DCB2-8-L	1180078	for installation in an imc CRONOS-SL housing with LEMO interconnections
CRC/DCB2-8	1170018	for installation in an imc CRONOS*compact* housing
CRC/DCB2-8-ET	1171017	Version in extended temperature range
CRC/DCB2-8-L	1170083	for installation in an imc CRONOS*compact* housing with LEMO interconnections
CRC/DCBC2-8	1170076	for installation in an imc CRONOS*compact* housing with DSUB-26-**HD** (high density) interconnections
CRC/DCBC2-8-ET	-	Version in extended temperature range with

CRC/DCB2-8-R	11710108	for installation in an imc CRONOS*compact* **RACK**
CRC/DCB2-8-R-ET	1171067	Version in extended temperature range
CRC/DCBC2-8-R	-	for installation in an imc CRONOS*compact* **RACK** with DSUB-26-**HD** (high density) interconnections
CRC/DCBC2-8-R-ET	-	Version in extended temperature range

Physical structure:

- Plug-in module for imc CRONOS-PL/*compact* systems, occupying two slots (DCB2-8) or one slot (DCBC2-8)

Terminal connections:

- 4x DSUB-15 terminals for channel pairs (DCB2-8)
- 2x DSUB-26 terminals for 4 channels (DCBC2-8)
- 8x 7-pin LEMO connectors for 1 channel (only with CRSL/DCB2-8-L or CRC/DCB2-8-L) see table for other measurement modes

Included accessories for imc CRONOS-PL/*compact*:

Terminal connections:

- for DSUB-15 variants: 4x **ACC/DSUB-B2**, 15-pin DSUB-connection terminals for channel pairs, voltage and bridge measurement

Included accessories for imc CRONOS-SL:

Measurement properties:

- Sampling rates adjustable in series of 1-, 2-, 5 up to 100 kHz per channel
- 5 kHz bandwidth
- 16-bit resolution (with internal 24-bit processing)

Power supply:

- provided by the imc CRONOS-PL/-SL/compact unit
- Additional power consumption due to installed module: 4.2 W

Operating conditions:

- The module varieties' respective operating conditions (with or without an extended temperature range) depend on the corresponding housing type. The indicated technical data are valid within the operating temperature range on use of the indicated imc connection technology.

Installed software:

The module is fully supported by the imc CRONOS-PL/-SL/compact operating software. The entire functionality, particularly the parameterization, storage and online computations is provided.

Data storage:

- handled via **imc CRONOS-PL/-SL/compact**

Optional accessories:

Connection terminals:

- **ACC/DSUB-ICP2**, 15-pin DSUB connection terminal with conditioning for 2 ICP inputs. For this, the internal 5 V supply voltage is used. Thus, no other voltages can be set for this module.
- **ACC/DSUB-I2**, 15-pin DSUB connection terminal for channel pairs (50 Ω shunt). For measurement of currents up to 50 mA (scaling factor 0.02 A/V)
- **ACC/DSUB-TEDS-B2**, 15-pin DSUB-connection terminals for channel pairs, voltage and bridge measurement, according to IEEE 1451.4 for use with *imc Plug & Measure*
- **ACC/DSUB-TEDS-I2**, 15-pin DSUB connection terminal for channel pairs (50 Ω shunt). For measurement of currents up to 50 mA (scaling factor 0.02 A/V), according to IEEE 1451.4 for use with *imc Plug & Measure*
- **ACC/DSUB-B2-IP65**, 15-pin DSUB clamp terminal adapted to CRONOS-SL for measurement of strain gauges, bridges and voltage on 2 channels per terminal
- **ACC/DSUB-ICP2-IP65**, 15-pin DSUB clamp terminal adapted to CRONOS-SL with conditioning for 2 ICP2 inputs

- **ACC/DSUB-I2-IP65**, 15-pin DSUB clamp terminal adapted to CRONOS-SL for each channel pair (50 Ω shunt). For measurement of currents of up to 50 mA (scaling factor: 0.02 A/V)
- **ACC/DSUB-TEDS-B2-IP65**, 15-pin DSUB clamp terminal adapted to CRONOS-SL for each channel pair, voltage and bridge measurement, conformant to IEEE1451.4 for use with *imc Plug & Measure*
- **ACC/DSUB-TEDS-I2-IP65**, 15-pin DSUB clamp terminal adapted to CRONOS-SL for each channel pair (50 Ω shunt). For measurement of currents of up to 50 mA (scaling factor: 0.02 A/V), conformant to IEEE1451.4 for use with *imc Plug & Measure*
- **ACC/DSUB-ESD**, 15-pin pass-through DSUB connector adapted to CRONOS-SL. In case of high-frequency disturbance voltage levels, this connector can be connected between the signal connector and the measurement system.

imc Plug & Measure (TEDS):

- The DCB2-8 module supports *imc Plug & Measure* (Transducer Electronic Data Sheets (IEEE 1451)

DCB(C)2-8 Bridge, Voltage, Current

Technical Specs: Datasheet Version 3.4

Parameter	typ.	min. / max.	Remarks
Inputs	8		differential, analog
Measurement modes DSUB-15	• Bridge sensors • Bridge: strain gauges • Voltage measurement • Current measurement • Current-fed sensors, ICP		ACC/DSUB-B2 ACC/DSUB-I2 Shunt-plug ACC/DSUB-ICP2 (*ICP™-, Deltatron®-, Piezotron®-Sensors)
Measurement modes DSUB-26 CRC/DCBC2-8 and BC-8	• Bridge sensors • Bridge: strain gauges • Voltage measurement		HD-DSUB-26
Measurement modes LEMO	• Bridge sensors • Bridge: strain gauges • Voltage measurement • Current measurement		single ended or with ext. shunt
Connector plug DSUB-15 DSUB-26 LEMO	 4x DSUB-15 / 2 channels 2x DSUB-26 / 4 channels 8x LEMO.1B.307 / 1 channel		DSUB-15: ACC/DSUB-B2(-IP65) ACC/DSUB-I2(-IP65) ACC/DSUB-ICP2(-IP65)

Bandwidth, Filter, TEDS			
Parameter	**typ.**	**min. / max.**	**Remarks**
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_{cutoff} = 0.4 f_s
Bandwidth	0 Hz to 5 kHz		-3 dB
Sampling frequency	≤100 kHz		per channel
Resolution	16 bit		
TEDS only with DCB2-8	conform IEEE 1451.4 Class II MMI		ACC/DSUB-TEDS-B2(-IP65) ACC/DSUB-TEDS-I4(-IP65)

Sensor supply 5 V only DCB2-8, B-8 (DSUB-15)			
Parameter	**typ.**	**min. / max**	**Remarks**
Auxiliary supply voltage current internal resistance	 +5 V >0.26 A 1.0 Ω	 ±5% >0.2 A <1.2 Ω	with ICP-extension plug independant of integrated sensor supply, short circuit proof power per DSUB-plug

Voltage measurement			
Parameter	**typ.**	**min./ max**	**Remarks**
Input ranges	±10 V, ±5 V, ±2.5 V, ±1 V... ±5 mV		
Surge protection		±40 V	permanent
Input coupling	DC		
Input configuration	differential		
Input impedance	20 MΩ	±1 %	differential
Gain uncertainty drift	0.02 % +10 ppm/K·ΔT_a	≤0.05 % +30 ppm/K·ΔT_a	of reading (25°C) ΔT_a=|T_a -25°C|; ambient temp: T_a
Offset uncertainty drift	 0.02 % ±0.7 µV/K·ΔT_a ±0.1 µV/K·ΔT_a	 ≤0.05 % ≤0.06 % ±6 µV/K·ΔT_a ±1.1 µV/K·ΔT_a	of range, in ranges (25°C) >±50 mV ≤±50 mV ±10 V to ±0.25 V ≤±0.1 V ΔT_a=|T_a -25 °C| ambient temp T_a
Non-linearity	10 ppm	≤50 ppm	
Common mode rejection ranges: ±10 V to ±50 mV ±25 mV to ±5 mV	>110 dB >138 dB	>90 dB >132 dB	Common mode voltage (DC..60 Hz): test voltage: ±10 $V_=$
Noise (RTI)	 0.6 µVeff 0.14 µVeff	 1.0 µVeff 0.26 µVeff	bandwidth 0,1 Hz to 1 kHz 0.1 Hz to 10 Hz

Bridge measurement			
Parameter	**typ.**	**min. / max.**	**Remarks**
Measurement modes	full bridge half bridge quarter bridge		5 V bridge excitation voltage only
Input ranges bridge supply: 10 V bridge supply: 5 V bridge supply: 2.5 V	±2000000 µm/m ... ±1000 µm/m ±1000 mV/V, ±500 mV/V, ±200 mV/V, ±100 mV/V ... ±0.5 mV/V ±1000 mV/V, ±500 mV/V, ±200 mV/V, ±100 mV/V ... ±1 mV/V ±1000 mV/V, ±500 mV/V, ±200 mV/V, ±100 mV/V ... ±2 mV/V		with strain gauge with quarterbridge: ±10 mV/V to ±0.5 mV/V all modes as an option
Input impedance	20 MΩ	±1 %	differential, full bridge
Gain uncertainty	0.02 %	≤0.05 %	of reading
Offset uncertainty	0.01 %	≤0.02 %	of input range after automatic bridge balancing
Bridge excitation voltage	10 V 5 V 2.5 V	±0.5 %	 as an option
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, switched per software
automatic shunt calibration	0.5 mV/V	± 0.2 %	for 120 Ω and 350 Ω
Cable resistence for bridges (without return line)	< 6 Ω < 12 Ω		10 V excitation 120 Ω 5 V excitation 120 Ω

Current measurement			
Parameter	**typ.**	**min./ max**	**Remarks**
Input ranges	±50 mA, ±20 mA, ±10 mA, ±5 mA, ±2 mA, ±1 mA		with 50 Ω shunt in terminal plug ACC/ DSUB-I2 or with 120 Ω internally
Over load protection		±60 mA	permanent
Input configuration	single-end differentiell		with 120 Ω internally or 50 Ω shunt in terminal plug (ACC/DSUB-I2)
Gain: uncertainty drift	0.02 % +15 ppm/K·ΔT_a	≤ 0,06 % ≤ 0,1 % +55 ppm/K·ΔT_a	of reading plus uncertainty of 50 Ω shunt
Offset: uncertainty	0.02 %	≤ 0,05 %	of range

Noise (current)	0.6 nA_{eff} 0.15nA_{eff}	10nA_{eff} 0.25nA_{eff}	bandwidth: 0.1 Hz to 1 kHz 0.1 Hz to 10 Hz

Sensor supply ±VB				
Parameter	**typ. (min/max)**			**Remarks**
Configuration options	5 ranges			The sensor supply module always got 5 selectable voltage ranges. Default ranges: +5 V to +24 V
Output voltage	Voltage	Current	Power	set jointly for all eight channels
	+2.5 V	580 mA	1.5 W	optional upon request, +12 V or +15 V can be replaced by +2.5 V
	+5.0 V	580 mA	2.9 W	
	+10 V	300 mA	3.0 W	
	+12 V	250 mA	3.0 W	
	+15 V	200 mA	3.0 W	
	+24 V	120 mA	2.9 W	
	±15 V	190 mA	3.0 W	optional upon request, +15 V can be replaced by ±15 V
Isolation	non isolated			output to case (CHASSIS)
Short-circuit protection	unlimited duration			to reference ground of output voltage
Accuracy of output voltage	<0.25 % (typ.) <0.5 % (max.) <0.9 % (max).			at terminals, no load 25 °C 25 °C over entire temp. range
compensation of cable resistances	3-wire adjustment: SENSE line on return line (–VB: supply ground			Calculated compensation for bridges (no voltage adjustment) Prerequisites: symmetric feed and return lines
Efficiency	typ. 72 % typ. 66 %			10 V, to 15 V 5 V
Max. capacitive load	>4000 µF >1000 µF >300 µF			2.5 V to 10 V 12 V, 15 V 24 V