

imc C-SERIES: CS-7008-N, CL-7016-N

All-Purpose and powerful measurement devices



Device type: CL, 16 analog channels



Device type: CS, 8 analog channels

Data Sheet Version 1.6

The devices of the imc C-SERIES CS-7008-N and CL-7016-N are suitable for direct connection of: voltage and current signals, current-fed sensors, such as ICP™ (optional), thermocouples, PT100, strain gauge measurement bridges, counters for measurement of RPMs, velocity or displacement, or for direct counting of impulses, CAN participants such as control devices, sensors etc.

imc C-SERIES - complete, compact and portable measurement devices

The devices of the imc C-SERIES are equipped with a defined standard configuration and available in two different housing types: "CS" in a Alu-Profile housing and "CL" in a dark flat plastic housing with carrying leafs. CL devices are ex-factory equipped with an internal graphic display.

Highlights

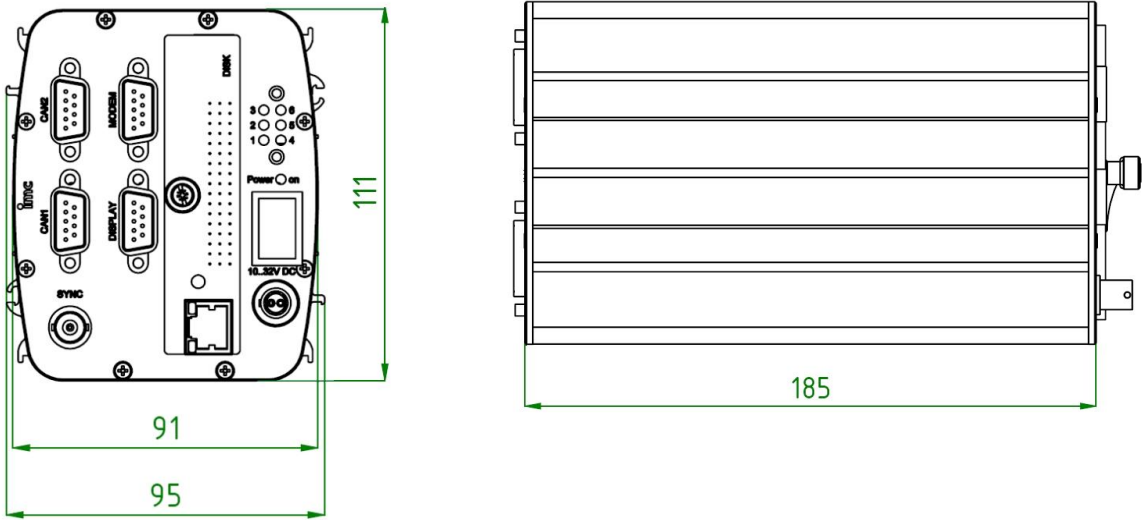
- Stand-alone startup and power-failure control logic
- Internal 3" graphic display for control and visualization (only with CL devices)
Dimension of the Display L x W: 6.7 x 3.5 cm
- Real-time signal processing and test control with imc Online FAMOS (as standard equipment)
- Intelligent power supply with UPS function and saving of data when power-failure
- Integrated CAN-Interface
- Counter inputs (measurement of angle, events, velocity etc.)
- Digital inputs and outputs
- Analog outputs (DAC)
- Onboard flash storage (CF card) or network-harddrive (NAS etc.)
- Complex triggering system PC independent
- Possible equipment with internal WiFi (WLAN) adaptor
- Supports platform independent remote access via standard internet browser (optionally integrated imc REMOTE Webserver)
- Adapted to synchronization with other imc measurement devices via:
 - isolated Sync-Signal (DCF-77, IRIG-B)
 - network based via NTP
 - GPS
- Measurement channel extension via direct connection of measurement modules belonging to imc's CANSAS series
- In conjunction with the operating software imc STUDIO and imc DEVICES the devices are immediately ready to take measurements, and all of their functions are operable.

Overview of the available devices

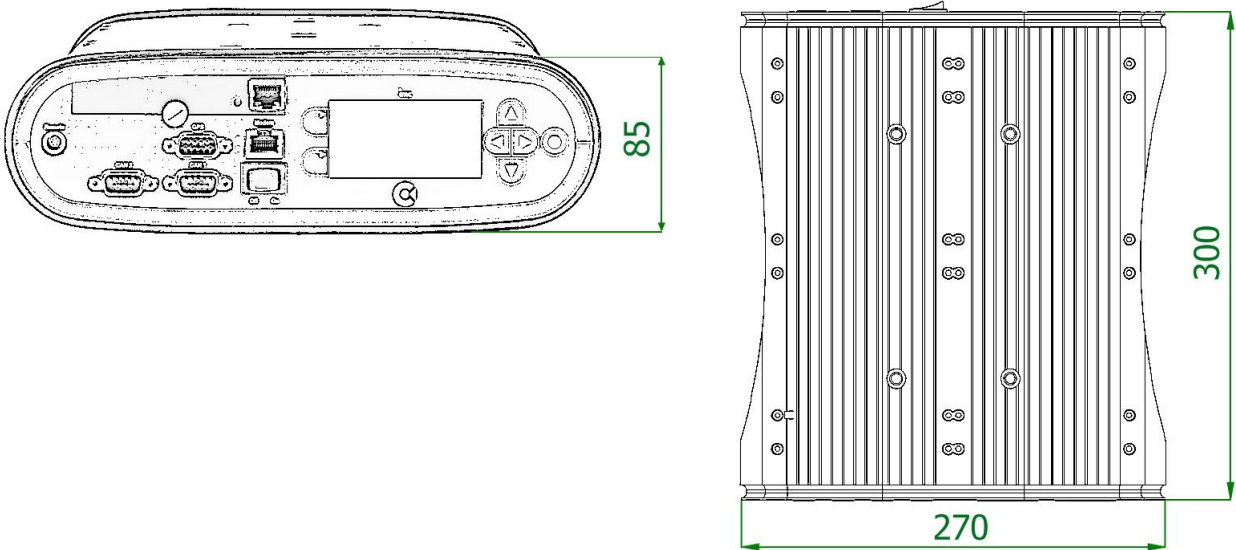
Order Code	Article number	Housing	Analog channels	Remarks
CS-7008-N	1400069	CS alu profile	8	DSUB-15
CS-7008-N-L	1400xxx			LEMO sockets
CS-7008-N-ET	1410034			extended temperature range
CL-7016-N	1400070	CL portable housing	16	DSUB-15
CL-7016-N-L	1400xxx			LEMO sockets
CL-7016-N-ET	1410035			extended temperature range

Mechanical drawings with dimensions

Housing type: CS (95x111x185 mm)



Housing type: CL (270x85x300 mm)



Required software version

- Supported by imc STUDIO 4.0R1 and imc DEVICES 2.8R3, or higher, included with all functions

- imc Plug & Measure (TEDS)

This device supports TEDS and can be used together with imc SENSORS.

Included accessories

- 230/110 V power adapter (optionally with country-specific power cable)
- "Getting Started with imc C-SERIES" (printed)
- Manufacturer's Calibration Certificate
- 1x Ethernet patch cable with latch protection (uncrossed, 2 m)
- 1x LEMO.1B plug with CS devices and with CL devices 1x LEMO.0B

Terminal connections

- 4x or 8x ACC/DSUBM-UNI2 DSUB-15 plug with screw terminals for 2-channel voltage, current¹ and bridge measurement as well as temperatures with PT100 and thermocouples with integrated cold junction compensation (CJC) 1350169

¹ single-end current measurement, for differential measurement an external shunt or the appropriate connector (ACC/DSUB(M)-I2) is necessary

- 1x ACC/DSUBM-DI4-8 DSUB-15 plug for digital inputs 1350174
- 1x ACC/DSUBM-DO8 DSUB-15 plug for digital outputs 1350173
- 1x ACC/DSUBM-ENC4 DSUB-15 plug for incremental inputs 1350171
- 1x ACC/DSUBM-DAC4 DSUB-15 plug for analog outputs 1350177

Optional accessories

Terminal connections

- 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) 1350180
- ACC/DSUB-ICP2 DSUB-15 plug with screw terminals for conditioning of 2 IEPE/ICP inputs 1350036

General technical specs for all devices of imc C-SERIES

Parameter	Value	Remarks
Housing type	Alu profile plastic portable housing	CS CL
Ingress Protection	IP20	
Terminal connection		
Terminal connection (DSUB-15) analog inputs	ACC/DSUB(M)-UNI2 ACC/DSUB(M)-I2 ACC/DSUB-ICP2	
Terminal connection (DSUB-15) DI, DO, INC, DAC	ACC/DSUB(M)-DI4-8 ACC/DSUB(M)-DO8 ACC/DSUB(M)-ENC4 ACC/DSUB(M)-DAC4	8 digital inputs 8 digital outputs 4 counter inputs 4 analog outputs
Further terminal connections	RJ45 CF-Card slot 2x DSUB-9 DSUB-9 DSUB-9 BNC LEMO FGG.1B.302.CLAD52ZN LEMO FGG.0B.302.CLAD52ZN	Ethernet (10/100 MBit), PC/network removable storage two CAN-nodes external Display (CS) external GPS module synchronization supply (CS) supply (CL)
Weight without table-top power adapter	approx. 2 kg approx. 3.5 kg	CS CL
Dimensions (WxHxD) in mm	95 x 111 x 185 270 x 85 x 300	CS CL

Power supply		
Parameter	Value	Remarks
DC input supply voltage	10 V to 32 V DC	
Isolation of supply input	not-isolated isolated	CS CL
Power adapter	110 V / 230 V AC	external adapter, included in delivery
Auto start upon power up	configurable	automatic start of measurement
Automatic shutdown with data saving upon power fail	yes	
UPS	battery: lead-gel	uninterruptable power supply
UPS buffer time constant	1 sec (with CS) 30 sec. (with CL)	maximum duration of a continuous outage before triggering device shutdown
Internal battery voltage	4 V 24 V	CS CL
Effective buffer capacity	≥3,5 Wh ≥5,1 Wh	typ. 23°C, battery fully charged CS CL

Power supply		
Parameter	Value	Remarks
Minimum charging time for 1 min. buffer duration	≤19 min ≤21 min.	for empty battery, 23°C CS CL
Charging time for empty battery	6 h	device activated
Charging capacity	1.1 W 1.5 W	automatic charge control CS CL

Operating conditions	
Operating environment (standard)	dry, non corrosive environment within specified temperature range
Operating temperature (standard)	-10°C to +55°C no condensation
Operating temperature(extended)	-40°C to +85°C with condensation
Operating altitude	up to 2000 m
Relative humidity	80% for less than 31°C, for more than 31°C linear declining to 50%, according DIN EN61010-1
Shock resistance	60 g mechanical MIL-STD-810 40 g, 6 ms half sine IEC 60068-2-27, IEC 61373
Vibration resistance	MIL-STD-810 Rail Cargo Vibration Exposure U.S. Highway Truck Vibration Exposure IEC 60068-2-64, IEC 61373

Data acquisition and hardware options	
Max. aggregate sampling rate	400 kS/s
Sampling rate channel wise configurable in steps of 1-, 2-, 5	✓
Number of simultaneously applicable sampling rates (in one configuration)	2
Monitor channels (doubled channels with independent sampling and trigger configurations)	✓
Multi-triggered data acquisition: multitriggers and multi-shot	✓
Independent trigger machines (start/stop, arbitrary channel assignments)	48
Extensive intelligent trigger functions	✓
Direct onboard data reduction: arithmetic mean, min, max	✓
Extensive real-time calculation and control functions	✓ included in standard deliveries (via imc Online FAMOS)
Synchronization	DCF 77, IRIG-B (auto detect) NTP GPS
External GPS signal receiver	O
Internal WiFi (WLAN) adaptor	O IEEE 802.11g (1 Antenna) max. 54 MBit/s

Data storage	
internal removable storage	CF-Card (covered CF slot)
internal hard drive	O (with CL)
Any memory depth with pre- and post triggering	✓
Circular buffering	✓

Synchronization and time base

Time base per device without external synchronization			
Parameter	Value typ.	min. / max.	Remarks
Accuracy		±50 ppm 1 µs (1 ppm)	internal time base RTC not balanced devices (default), at 25°C balanced devices, with GPS (upon request) @ 25°C
Drift	±20 ppm	±50 ppm	-40°C to +85°C operating temperature
Ageing		±10 ppm	@ 25°C; 10 years

Time base per device with external synchronization signal				
Parameter	GPS	DCF77	IRIG-B	NTP
Supported formats	NMEA / PPS*		B002 B000, B001, B003**	Version 4 (downwards compatible)
Precision	±1 µs			<5 ms after ca. 12 h
Jitter (max.)	±8 µs			
Voltage level	TTL (PPS*) RS232 (NMEA)	5 V TTL level		---
Input resistance	1 kΩ (pull up)	20 kΩ (pull up)		---
Input connector	DSUB-9 "GPS" non-isolated	BNC connector "SYNC" (isolated) Isolation strength: 300 V (1 minute test voltage)		Ethernet
Shield potential input		BNC connector: isolated Signal-GND (marked by a yellow ring around the BNC plug)		---

* PPS (Pulse per second): signal with an impulse >5 ms is necessary

** using BCD information only

Synchronization with DCF77 for several devices (Master/Slave)			
Parameter	Value typ.	min. / max.	Remarks
max. cable length		200 m	BNC cable RG58
max. number of devices		20	Slaves, plus 1 Master
Common mode		max. 50 V	SYNC-signal is already internally isolated, for reliable operation even with different ground voltage level (ground loops)
Voltage level	5 V		
DCF input/output	"SYNC" connection		BNC

Cx-70xx analog inputs

Inputs, measurement modes, terminal connection		
Parameter	Value	Remarks
Inputs	8 16	CS CL
Measurement modes DSUB-15	voltage measurement current measurement thermocouple measurement bridge sensor strain gauge PT100 (3- and 4-wire configuration) current-fed sensors (IEPE/ICP) charge measurement	ACC/DSUB(M)-UNI2 single end (internal shunt) or shunt plug ACC/DSUB(M)-I2 full, half, quarter bridge ACC/DSUB-ICP2 ICP™-, Deltatron®-, Piezotron®-Sensors ACC/DSUB-Q2
Measurement modes LEMO	voltage measurement current measurement thermocouple measurement bridge sensor strain gauge PT100 (3- and 4-wire configuration)	LEMO connector with built-in cold- junction compensation (CJC) ACC/TH-LEM-150 full, half, quarter bridge
Terminal connection DSUB-15 LEMO	DSUB-15 LEMO.1B.307	2 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 48 kHz 0 Hz to 30 kHz 0 Hz to 10 Hz	-3 dB -0.1 dB -3 dB for temperature measurement
Filter (digital) cut-off frequency characteristic order	10 Hz to 20 kHz	Butterworth, Bessel low pass or high pass filter: 8th order band pass: LP 4th and HP 4th order Anti-aliasing filter: Cauer 8th order with $f_{\text{cutoff}} = 0.4 f_s$
Resolution	16 Bit	internal processing 24 Bit
TEDS Transducer Electronic Data Sheets	conforming to IEEE 1451.4 Class II MMI	ACC/DSUB(M)-TEDS-xxx

General			
Parameter	Value typ.	min. / max	Remarks
Overvoltage protection		$\pm 80\text{ V}$ $\pm 50\text{ V}$	permanent, differential range $>\pm 10\text{ V}$ and device off range $\leq \pm 10\text{ V}$
Input coupling	DC		
Input configuration	differential		
Input impedance	1 M Ω 20 M Ω		range $>\pm 10\text{ V}$ range $\leq \pm 10\text{ V}$
Auxiliary supply			for IEPE/ICP-extension plug
voltage	+5 V	$\pm 5\%$	independent of integrated
available current	0.26 A	0.2 A	sensor supply, short-circuit protected
internal resistance	1.0 Ω	$<1.2\text{ }\Omega$	power per DSUB-plug

Voltage measurement			
Parameter	Value typ.	min. / max.	Remarks
Input range	$\pm 50\text{ V}$, $\pm 25\text{ V}$, $\pm 10\text{ V}$, $\pm 5\text{ V}$, $\pm 2.5\text{ V}$, $\pm 1\text{ V}$ to $\pm 5\text{ mV}$		
Gain uncertainty	0.02%	0.05%	of the measured value, at 25°C
Gain drift	10 ppm/K $\cdot\Delta T_a$	30 ppm/K $\cdot\Delta T_a$	$\Delta T_a = T_a - 25^\circ\text{C} $ ambient temperature T_a
Offset uncertainty	0.02%	0.05% 0.06%	of the range, at 25°C range $>\pm 50\text{ mV}$ range $\leq \pm 50\text{ mV}$
Offset drift	$\pm 40\text{ }\mu\text{V/K}\cdot\Delta T_a$ $\pm 0.7\text{ }\mu\text{V/K}\cdot\Delta T_a$ $\pm 0.1\text{ }\mu\text{V/K}\cdot\Delta T_a$	$\pm 200\text{ }\mu\text{V/K}\cdot\Delta T_a$ $\pm 6\text{ }\mu\text{V/K}\cdot\Delta T_a$ $\pm 1.1\text{ }\mu\text{V/K}\cdot\Delta T_a$	range $>\pm 10\text{ V}$ 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	30 ppm	90 ppm	
CMRR (common mode rejection ratio)	80 dB 110 dB 138 dB	$>70\text{ dB}$ $>90\text{ dB}$ $>132\text{ dB}$	DC and $f \leq 60\text{ Hz}$ range $\pm 50\text{ V}$ to $\pm 25\text{ V}$ range $\pm 10\text{ V}$ to $\pm 50\text{ mV}$ range $\pm 25\text{ mV}$ to $\pm 5\text{ mV}$
Noise	3.6 μV_{rms} 0.6 μV_{rms} 0.14 μV_{rms}	5.5 μV_{rms} 1.0 μV_{rms} 0.26 μV_{rms}	range 0.1 Hz to 50 kHz range 0.1 Hz to 1 kHz range 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/DSUB(M)-I2
Over load protection		± 60 mA	permanent
Input configuration	differential		
Gain uncertainty	0.02%	0.06% 0.1%	of the reading, at 25°C additional uncertainty of 50 Ω in plug
Gain drift	15 ppm/K· ΔT_a	55 ppm/K· ΔT_a	$\Delta T_a = T_a - 25^\circ\text{C} $ ambient temperature T_a
Offset uncertainty	0.02%	0.05%	of the range, at 25°C
Noise current	40 nA _{rms} 0.7 nA _{rms} 0.17 nA _{rms}	70 nA _{rms} 12 nA _{rms} 0.3 nA _{rms}	Bandwidth: 0.1 Hz to 50 kHz 0.1 Hz to 1 kHz 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 end		internal current backflow to -VB
Gain uncertainty	0.02%	0.06%	of the reading, at 25°C
Gain drift	15 ppm/K· ΔT_a	55 ppm/K· ΔT_a	$\Delta T_a = T_a - 25^\circ\text{C} $ ambient temperature T_a
Offset uncertainty	0.02%	0.05%	of the range, at 25°C
Noise current	40 nA _{rms} 0.7 nA _{rms} 0.17 nA _{rms}	70 nA _{rms} 12 nA _{rms} 0.3 nA _{rms}	Bandwidth: 0.1 Hz to 50 kHz 0.1 Hz to 1 kHz 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 range	± 1000 mV/V, ± 500 mV/V, ± 200 mV/V, ± 100 mV/V ... $\pm 0,5$ mV/V ... ± 1 mV/V ... ± 2 mV/V ... ± 2 mV/V		(as an option) (as an option)
Bridge supply	10 V 5 V	$\pm 0.5\%$ $\pm 0.5\%$	The actual value will be dynamically captured and compensated for in bridge mode.
(as an option)	2.5 V and 1 V		
Minimum bridge impedance	120 Ω full bridge 60 Ω half bridge		
Maximum bridge impedance	5 k Ω		
Quarter bridge completion	120 Ω , 350 Ω		internal, switchable per software
Input impedance	20 M Ω	$\pm 1\%$	differential, full bridge
Gain uncertainty	0.02%	0.05%	of the reading, at 25°C
Gain drift	20 ppm/K $\cdot\Delta T_a$	50 ppm/K $\cdot\Delta T_a$	$\Delta T_a = T_a - 25^\circ\text{C} $ ambient temperature T_a
Offset uncertainty	0.01%	0.02%	of input range, at 25°C, after automatic bridge balancing
Automatic shunt-calibration (calibration jump)	0.5 mV/V	$\pm 0.2\%$	for 120 Ω and 350 Ω

Temperature measurement - Thermocouples			
Parameter	Value typ.	min. / max.	Remarks
Measurement mode	J, T, K, E, N, S, R, B		according to IEC 584
Measurement range	-270°C to 1370°C -270°C to 1100°C -270°C to 500°C		type K
Resolution	0.063 K (1/16 K)		
Measurement uncertainty		0.06% 0.05%	type K of measurement range, at 25°C of reading (total uncertainty min. 0.85 K)
Drift	0.02 K/K $\cdot\Delta T_a$	0.05 K/K $\cdot\Delta T_a$	$\Delta T_a = T_a - 25^\circ\text{C} $ ambient temperature T_a
Uncertainty of cold junction compensation		± 0.15 K	with ACC/DSUB(M)-UNI2, at 25°C
Cold junction drift	± 0.001 K/K $\cdot\Delta T_a$		$\Delta T_a = T_a - 25^\circ\text{C} $ ambient temperature T_a

Temperature measurement - PT100				
Parameter	Value typ.		min. / max.	Remarks
Input range	-200°C to 850°C -200°C to 250°C			
Resolution	0.063 K (1/16 K)			
Measurement uncertainty			0.25 K 0.02% 0.1 K 0.02%	4-wire measurement: -200°C to 850°C of reading -200°C to 250°C of reading
Drift			0.01 K/K·ΔT _a	ΔT _a = T _a - 25°C ambient temperature T _a
Sensor feed (PT100)	1.25 mA			

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 optional, special order: +12 V or +15 V can be replaced by +2.5 V preferred selection with 2.5 V: +2.5 V, +5.0 V, +10 V, +12 V, +24 V optional, 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

Technical Specs: Features (for all devices of imc C-SERIES)

Digital Inputs

Parameter	Value	Remarks
Channels	8	common ground reference for each 4-channel group, isolated from the other input group
Configuration options	TTL or 24 V input voltage range	configurable at the DSUB globally for 8 Bits: • jumper from LCOM to LEVEL: activates TTL-mode • LEVEL unconnected: activates 24 V-mode
Sampling rate	10 kHz	per channel
Isolation strength	± 150 V	tested ± 200 V isolated to system ground, supply and channel-to-channel
Input configuration	differential	isolated mutually and from supply
Input current	max. 500 μ A	
Switching threshold	1.5 V (± 200 mV) 8 V (± 300 mV)	5 V level 24 V level
Switching time	<20 μ s	
Supply HCOM	5 V max. 100 mA	Reference at level otherwise electrically isolated from system
Terminal connection	DSUB-15	ACC/DSUB(M)-DI4-8

Digital outputs

Parameter	Value	Remarks
Channels / bits	8 bit	Group of 8 bits, galvanically isolated common reference potential ("LCOM") for each group
Isolation strength	± 50 V	to system ground (protection ground)
Output configuration	totem pole (push-pull) or open-drain	configurable at the DSUB globally for 8 Bits: • jumper from OPDRN to LCOM: totem pole • OPDRN unconnected: open-drain
Output level	TTL or max. U_{ext} -0.8 V	internal, galvanically isolated supply voltage by connecting an external supply voltage U_{ext} with "HCOM", $U_{\text{ext}} = 5$ V to 30 V
State following system start	High resistance (high-Z)	Independent of output configuration (OPDRN-pin)!
Activation of the output stage following system start	upon first preparation of measurement	with initial states which can be selected in the experiment (High / Low) in the selected output configuration (OPDRN-pin)
Max. output current (typ.) TTL 24 V-logic open-drain open-drain with intern. 5 V supply	HIGH 15 mA 22 mA --- LOW 0.7 A 0.7 A 0.7 A 160 mA	external clamp diode needed for inductive load for all outputs

Parameter	Value		Remarks
Output voltage	HIGH	LOW	for load current: $I_{high} = 15 \text{ mA}$, $I_{low} \leq 0.7 \text{ A}$ $I_{high} = 22 \text{ mA}$, $I_{low} \leq 0.7 \text{ A}$
TTL	$>3.5 \text{ V}$	$\leq 0.4 \text{ V}$	
24 V-logic ($U_{ext} = 24 \text{ V}$)	$>23 \text{ V}$	$\leq 0.4 \text{ V}$	
Internal supply voltage	5 V, 160 mA (isolated)		available at contacts
Switching time	$<100 \mu\text{s}$		
Terminal connection	1x DSUB-15 / 8 Bit		ACC/DSUB(M)-DO8

Incremental encoder channels

Parameter	Value		Remarks
Channels	4 + 1 (5 tracks)		Four single-tracks or combining two single- into two-track encoders One index track
Measurement modes	Displacement, Angle, Events, Time, Frequency, Velocity, RPMs		
Sampling rate	50 kHz		per channel
Time resolution of measurement	31.25 ns		Counter frequency: 32 MHz
Data resolution	16 bits		
Input configuration	differential		
Input impedance	100 k Ω		
Input voltage range	$\pm 10 \text{ V}$		(differential)
Common mode input range	min. -11 V	max. +25 V	
Switching threshold	-10 V to +10 V		selectable per channel
Hysteresis	min. 100 mV		selectable per channel
Analog bandwidth	500 kHz		-3 dB (full power)
Analog filter	Bypass (no Filter), 20 kHz, 2 kHz, 200 Hz		selectable (per-channel) 2 nd order Butterworth
Switching delay	500 ns		Modulation: 100 mV squarewave
CMRR	70 dB 60 dB	50 dB 50 dB	DC, 50 Hz 10 kHz
Gain uncertainty	$<1 \%$		of input voltage range @ 25 °C
Offset uncertainty	$<1 \%$		of input voltage range @ 25 °C
Overvoltage strength	$\pm 50 \text{ V}$		to system ground
Sensor supply	+5 V, 300 mA		not isolated (reference: GND, CHASSIS)
Terminal connection	DSUB-15		ACC/DSUB(M)-ENC4

Analog outputs

Parameter	Value typ.	min. / max.	Remarks
Channels	4		
Output level	±10 V		
Load current	max. ±10 mA / channel		
Resolution	16 Bit		
Non-linearity	±2 LSB	±3 LSB	
Max. output frequency	50 kHz		
Analog bandwidth	50 kHz		-3 dB, low pass 2. order
Gain uncertainty	<±5 mV	<±10 mV	-40 °C to 85 °C
Offset uncertainty	<±2 mV	<±4 mV	-40 °C to 85 °C
Terminal connection	DSUB-15		ACC/DSUB(M)-DAC4

Fieldbus: Technical Details
CAN-Bus Interface

Parameter	Value	Remarks
Number of CAN-nodes	2	for each galvanically isolated node (for each CAN IN and CAN OUT) one connector
Terminal connection	2x DSUB-9	
Topology	bus	
Transfer protocol	CAN High Speed 1 MBaud (ISO 11898) CAN Low Speed 125 KBaud (ISO 11519)	default switchable per software
Operating mode	Multi Master principle	
Direction of the data flow	sending and receiving	
Baud rate	5 kBit/s to 1 MBit/s	configurable via software; maximum is depending on selected protocol (High/Low Speed)
Data rate	1 MBit/s	
Max. cable length at data transfer rate	25 m at 1000 kBit/s 90 m at 500 kBit/s	CAN High Speed cable delay 5,7 ns/m
Termination	124 Ω	switchable by software for each node
Isolation strength	60 V	to system ground (protection ground)
Parameterize of imc CANSAS modules	yes	current modules type "CAN2" and BUSDAQ/CAN(-ET)

UPS

Parameter	Value	Remarks
Input supply	10 V to 32 V _{DC}	
Internal battery voltage	4 V (CS) / 24 V (CL)	
UPS battery type	Lead-gel	
Buffer time constant	1 sec. (CS) / 30 sec. (CL and CX)	at 25°C ambient temp. 5 to 30 sec selectable the duration of a continuous outage which triggers device deactivation. Other configurations upon request
Effective buffer capacity	≥3.5 Wh (CS) / ≥5.1 Wh	typ. 23°C, battery fully charged
Minimum charging time for 1 min. buffer duration	≤19 min. (CS) / ≤21 min.	for empty battery @ 23°C
Charging time ratio CL	buffer time * (total power/ 4 W)	
Charging time for empty battery	6 h	device activated!
Charging capacity	1.1 W (CS) / 1.5 W (CL)	