imc BUSDAQflex

flexible and intelligent multi-bus data logger

imc BUSDAQflex-2-S

imc BUSDAQflex-4

imc BUSDAQ*flex* device series

imc BUSDAQ*flex* is a series of data loggers for CAN, CAN FD, LIN, ARINC, FlexRay, XCPoE and MVB. The basic standard configuration of 2 CAN nodes can be expanded to up to 12 nodes in the larger device models for various fieldbuses and vehicle buses. Along with recording of raw data streams and log channels, live decoding of individual channels is provided and complex protocols are supported, such as CCP, KWP2000, XCP, OBD2, UDS, DiagOnCan, TP2.0, GMLAN.

The BUSDAQ*flex* devices work autarkic and autonomously (without PC) and are rated for operation in extended temperature range (-40 to +85°C), making them ideal for mobile applications. The BUSDAQ*flex* series has very low power consumption and thanks to built-in UPS (uninterruptible power supply) ensures complete data integrity even in case of power failure outages. As a CAN or LIN-bus logger, imc BUSDAQ*flex* supports a signal or bus traffic controlled Sleep-mode (Wake-on-CAN) with a start-up time of only 200 ms and is thus perfectly suited for vehicle fleet testing.

Recorded data are stored in the device on a removable storage media (in particular Flash) and can already be live pre-processed, analyzed and evaluated by means of an onboard processing platform (imc Online FAMOS) - which even holds for autonomous stand alone operation. This allows e.g. threshold monitoring, min./max. values, digital filters, spectral analysis, order tracking, classification, and more. imc BUSDAQ records measurement data and status information of any type of bus subscribers, such as ECUs, sensors and CAN-based measurement amplifiers (e.g. imc CANSAS). In particular, modules of the imc CANSAS*flex* series (CANFX) can be directly docked, creating a very compact measurement system. The tool-free click mechanism connects a data logger and digitizing measurement modules both mechanically and electrically and requires no additional connecting cables.

imc BUSDAQ, like all imc measurement systems, is operated with the imc STUDIO software. The software provides provides complete manual as well as automatic configuration of setup parameters, real-time functions, triggering machines and storage modes. The measurement data display in curve windows and comprehensive documentation via report generator are integral parts of the package.

Characteristics and abilities

Logger operation:

- Autonomous operation without PC supported, self-start (timer, absolute time)
- Integrated real-time signal analysis, open and closed loop control with imc Online FAMOS
- Selection of either time stamp based recording (on receipt, 100 µs resolution) or fixed sampling rates (equidistant sampling)
- Also supports sending messages onto CAN bus (via imc Online FAMOS)

Storage and trigger:

- Data storage both onboard removable media (CF card) and/or on PC as well as on network storage (NAS)
- Circular buffer storage mode
- Complex trigger functionality, PC-independent, including multi-trigger machines and multiple sampling rates

Power supply:

- Intelligent power supply (10 to 50 V DC) with UPS-function and data saving upon power failure
- CAN/LIN-Logger: Sleep-Mode with Wake-on-CAN (200 ms) or wake up via control signal
- Remote controlled main power switch and Suspend/Resume function

Connectivity and additional functions:

- Networked via Ethernet TCP/IP and synchronizable to other imc measurement systems
- Optional internal WiFi (WLAN) adaptor available
- GPS connection for Geo-Positioning and time synchronization, not available with all variants
- Optional handheld display (color graphics), not available with all variants
- Digital Inputs and Outputs (BUSDAQ*flex*-4/6/8/12)

Extension options and mechanic:

- Standard equipment: 2 CAN nodes (isolated, High/Low-Speed, max. 1 MBit/s, internal configurable terminator)
- System configuration with up to 5 of the following additional module types available (ordering option):

CAN, CAN FD, LIN	(2 nodes each)
ARINC, FlexRay, XCPoE, MVB, Profibus	(1 node each)
Kistler RoaDyn, Application module (Ethernet / RS232/485), Modbus	

- Direct coupling of imc CANSAS*flex* measurement modules with latching ("click") mechanism: without the use of any tools nor the need for any extra cables

Operating conditions:

- Operating temperature: -40°C to +85°C, condensation allowed
- Shock resistance: 50 g (pk over 5 ms)
- Ingress Protection rating: max. IP40

Software:

- Direct parametrization of imc CANSAS modules (without PC-CAN Interface)
- Vector CAN data base import (*.dbc Import)

Software minimum requirements:

Operation of imc BUSDAQ*flex* requires operating software of the following group:
imc STUDIO 5.0 R9 associated with firmware and driver package imc DEVICES 2.9 R6.

imc BUSDAQ*flex* / imc CANSAS*flex*-Series: flexible granulation, topology and mounting

imc BUSDAQ*flex* (BUSFX) is compatible with the imc CANSAS*flex* series (CANFX of CAN bus based measurement equipment). This series offers a wide selection of modules, which incorporate sensor and signal conditioning, digitizing and output of measurement data as CAN messages.

The modules of the imc CANSAS*flex* series (CANFX) can be joined together mechanically and electrically by means of a latching ("click") mechanism, without the use of any tools nor the need for any extra cables, and also allow the CAN-logger imc BUSDAQ*flex* (BUSFX) to dock on directly. Depending on the module type, they are available in either long (L-), short, or both housing versions.

Besides fixed installations or operation on a laboratory bench, the modules are also designed to fit in a special 19” subrack to provide a convenient solution in test station settings.

Click connection:

- Modules joinable to module-blocks: mechanically and electrically connected (CAN and power supply)
- No tools or additional cabling required
- With guide grooves, magnetic catches and locking slider
- Both short and long housing versions combinable:
  with electrical connection: align on rear side; mechanically only: align on front side

19" Rack solution:

- Modules designed for insertion into special 19" frames ("boom-box") for installation in test stations
- Rack backplane accommodates the power supply, CAN and slot information (automatically read out configuration information for use in automation software)

Mounting:

- Mountable by means of recessed threaded holes (M3), either individually or jointly as a block
- Rubber bumper rails providing secure placement in laboratory settings
- Various brackets, handles and DIN top-hat rail mounting kit available as accessories

imc CANSAS*flex* modules connected (click-mechanism) in a block with imc BUSDAQ*flex* logger (left)

rear view of this block:
CAN, power supply, terminator, locking slider

Key: ● standard, o optional, (●) restricted

imc BUSDAQ*flex* device models and functions

	BUSLOGflex	BUSDAQflex-2S	BUSDAQflex-2	BUSDAQflex-4 / 6 / 8 / 12	BUSDAQflex-4 / 6 / 8 / 12
General				**CAN only**	**+ others**
CAN nodes	2	2	2	4 / 6 / 8 / 12	>= 2
Extension modules					1 / 2 / 3 / 5
CAN, CAN FD, Lin, FlexRay, J1587, ARINC					o
XCPoE, MVB, RoaDyn, APPMOD					o
Housing type (size)	L0	L0	L1	L2/L3/L4/L6	L2/L3/L4/L6
Autonomous device capabilities					
Sleep/Standby, Wake-on-CAN	●	●	●	●	
Real-time data analysis (imc Online FAMOS)		o	o	o	o
Network storage (NAS)	●	●	●	●	●
Synchronization and clock					
DCF 77, NTP, IRIG-B	●	●	●	●	●
GPS (via ext. GPS Mouse)			●	●	●
Connectivity					
WLAN (WiFi) internal				o	o
Wireless UMTS, 3G/4G (external)	o	o	o	o	o
GPS, Display connection ports (2 x DSUB-9)			●	●	●
Prozess control (digital I/O): 4+4 Bit (2 x DSUB-15)				●	●
Remote controlled main switch	LEMO.0B	LEMO.0B	LEMO.0B	LEMO.0B	LEMO.0B
Synchronization signal	SMB	SMB	BNC	BNC	BNC
Programmable status feedback (LEDs)			●	●	●
Software					
Vector data base (*.dbc import)	●	o	o	o	o
ECU protocols		o	o	o	o
Web-Server (imc REMOTE)	o	o	o	o	o

Order Code	article-number	CAN-nodes	extension	housing	properties
BUSFX-LOG	12400002	2	--	L0	no imc Online FAMOS option
BUSFX-2-S	12400001	2	--	L0	no GPS-, Display-option, without DIO
BUSFX-2	12400003	2	--	L1	2 x CAN
BUSFX-4	12400006	2	1	L2	2 x CAN + 1 extension
BUSFX-6	12400004	2	2	L3	2 x CAN + 2 extensions
BUSFX-8	12400007	2	3	L4	2 x CAN + 3 extensions
BUSFX-12	12400005	2	5	L6	2 x CAN + 5 extensions

Fieldbus interface extensions for imc BUSDAQ*flex*-4..12 (order option ex-factory)

CAN/LIN extensions (preserving the Sleep-Mode capabilities of the entire device)			
Order Code	article no.	nodes	properties
BUSFX/CAN	12400008	2	2 CAN nodes
BUSFX/LIN	12400010	2	2 LIN nodes
Vehicle and field bus extension (no Sleep-Mode supported for the entire device)			
BUSFX/CAN-FD	12400009	2	2 CAN FD nodes
BUSFX/FLEXRAY2	12400012	1	1 FlexRay nodes
BUSFX/J1587-2	12400011	1	1 J1587 node
BUSFX/ARINC-8RX-4TX	12400013	1	ARINC Bus (8x Receive, 4x Transmit)
BUSFX/XCPoE2-MASTER	12400014	1	XCPoE Master
BUSFX/XCPoE2-SLAVE	12400028	1	XCPoE Slave, OFA Professional recommended
BUSFX/PROFIBUS	12400039	1	Profibus Interface, passive sniffer mode
BUSFX/PROFINET-IRT	12400000	1	Profinet-IRT Interface, OFA Pro required
BUSFX/MVB-EMD	12400015	1	MVB-Bus (type EMD)
BUSFX/MVB-ESD	124000xx	1	MVB-Bus (type ESD+)
BUSFX/MODBUS	12400043	1	Modbus Interface
Special purpose extensions (no Sleep-Mode supported for the entire device)			
BUSFX/APPMOD-NET-COM	12400017	1	Application module: Ethernet/RS232/485

Detailed technical data of the Fieldbus expansions: see separate data sheet "*imc fieldbus interfaces*".

Additional options (order option ex factory)

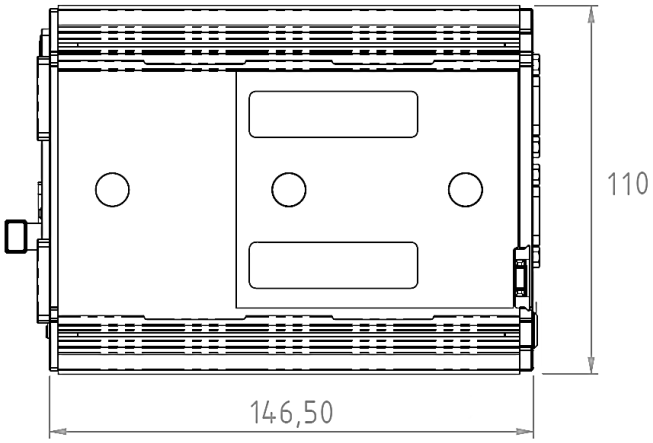
WiFi (WLAN) and CAN-POWER		
Order Code	article no.	properties
BUSFX/WLAN-I	12400019	Internal WiFi (WLAN) adaptor
BUSFX/CAN-POWER-1	12400018	power supply to CAN-connection

Additional device software (upgrade options)		
Order Code	article no.	properties
BUSFX/OFA	12400020	imc Online FAMOS (OFA)
BUSFX/OFA-UP	12400023	update from imc Online FAMOS to OFA-Professional
BUSFX/VEC-DATB	12400021	vector data base interface
BUSFX/ECU-P	12400022	ECU protocols for CAN Interface
BUSFX/imc-REMOTE	12400024	imc REMOTE
BUSFX/SW-P	12400025	Software package for imc BUSDAQ*flex*

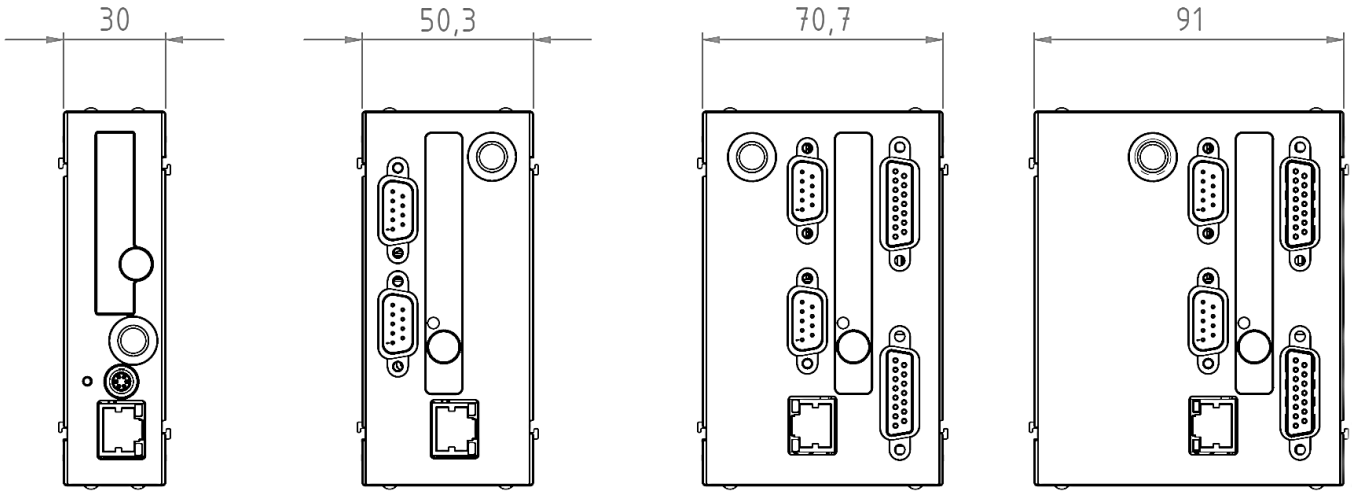
- Forwarding of the power supply (direct feed through) to the CAN-connection of the first two CAN-nodes (2x DSUB-9): Additional-order option "BUSFX/CAN-Power-1".
  Bidirectional and with max. 1 A current limit: For the supply of external imc CANSAS modules or supply of the BUSDAQ via CAN-cables (e.g. OBD). In this configuration there will be no current reserves for the supply of directly connected (clicked) CANSAS-modules!

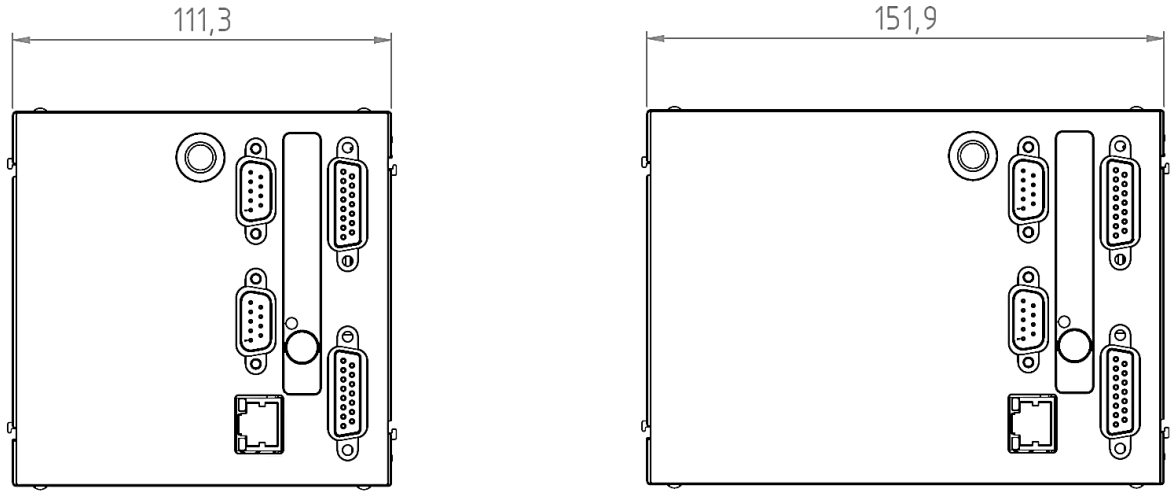
Mechanical drawings with dimensions

Side view



Front





Included accessories

AC/DC power adaptor 110-230V AC (with appropriate LEMO plug)		
ACC/AC-ADAP-24-60-0B	24 V DC, 60 W, LEMO.0B.302	13500246

Documents
Getting started with imc BUSDAQ*flex* (one copy per delivery)
Device certificate

Miscellaneous
Grounding set consisting of: a spring washer S3 (stainless steel), a flat washer (A3.2 DIN 433 A2) and a pan-head screw M3x8 (mounted on the rear panel). 1x Ethernet network cable with latch protection (uncrossed, 2 m) 1x protective cover for the remote control socket type 0B

Optional accessories

Power plug		
ACC/POWER-PLUG3	DC supply plug LEMO FGG.0B.302, with solder contact, AWG18 (0.82 mm^2)	13500033
ACC/CABLE-LEMO-0B-BAN-2M5	Power supply with LEMO.0B via banana plug, cable length 2.5 m	13500276
DSUB-15 plug for DIO (only with imc BUSDAQ*flex*-4..12)		
ACC/DSUBM-DI2-4	DSUB-15 plug for digital inputs	13500185
ACC/DSUBM-DO4	DSUB-15 plug for digital outputs	13500186
ACC/REMOTE-0B	6-pin remote control plug LEMO type 0B	13500050
Handle (BUSFX respectively CANFX)		
CANFX/HANDLE-L	CANFX handle kit (left and right) - long (L)	12500028
Mounting brackets for fixed installations (BUSFX respectively CANFX)		
CANFX/BRACKET-CON-L	CANFX connection bracket long	12500020
Mounting brackets for DIN Rail (BUSFX respectively CANFX)		
CANFX/BRACKET-DIN-L0	DIN Rail mounting bracket type L0	12500024
CANFX/BRACKET-DIN-L1	DIN Rail mounting bracket type L1	12500025
CANFX/BRACKET-DIN-L2	DIN Rail mounting bracket type L2	12500026
CANFX/BRACKET-DIN-L3	DIN Rail mounting bracket type L3	12500090
CANFX/BRACKET-DIN-L4	DIN Rail mounting bracket type L4	12500079
CANFX/BRACKET-DIN-L6	DIN Rail mounting bracket type L6	12500080
CANFX/BRACKET-DIN-Lxx	for all L-variants available	125000xx
Miscellaneous		
CANFX/RUBBER-1M	silicone bumper strip blue 1 m	12500029
BUSFX/COVER-IP40	protective cover on top of the locking slider in compliance with IP40	12400031
H/ISOSYNC	external isolation adaptor for synchronization signal (BNC)	12700020
ACC/SYNC-FIBRE	optical synchronization adaptor, for extended temperature range	13500156
CRFX/GPS-MOUSE-5Hz	external GPS receiver (5 Hz, high-sensitivity, RS232, DSUB-9, including 5 m connection cable)	11900036

Technical Specs imc BUSDAQflex

Terminal connections		
Parameter	**Value**	**Remarks**
CAN	2 x DSUB-9	2 nodes, standard equipment for all device variants 1 node / DSUB-9 (male at device side) in/out
PC / network	RJ45	Ethernet 100 MBit
Power supply	type LEMO.0B (2-pin)	compatible with LEMO.EGE.0B.302 multi coded 2 notches compatible with plugs: FGG.0B.302 (standard) or FGE.0B.302 (E-coded, 48 V)
Remote	type LEMO.0B (6-pin)	LEMO FGG.0B.306 plug
Sync	 SMB BNC	synchronization BUSFX-2-S and BUSFX-LOG all others
Flash removable storage	CF-Card slot	can also be read out via network
External Display	DSUB-9	except BUSFX-2-S, BUSFX-LOG
External GPS module	DSUB-9	except BUSFX-2-S, BUSFX-LOG
Internal WLAN-adaptor	optional IEEE 802.11g (1 antenna) max. 54 MBit/s	only with BUSFX-4/6/8/12
Digital Input/Output	2 x DSUB-15	only with BUSFX-4/6/8/12
	4 x DI (TTL / 24 V, isolated) 4 x DO (0.7 A high-side switch)	ACC/DSUBM-DI2-4, ACC/DSUBM-DO4
Module connector	via locking slider	for power supply and networking (CAN) of directly connected modules (Click- mechanism) without further cables

Power supply		
Parameter	**Value**	**Remarks**
Input supply voltage	10 V to 50 V DC	not galvanically isolated of housing (CHASSIS)
Power consumption	 5 W 8 W 10 W 12 W 15 W	depending on model, typ. value: at 12 V Super-Caps charged imc BUSDAQ*flex*-2(-S) imc BUSDAQ*flex*-4 imc BUSDAQ*flex*-6 imc BUSDAQ*flex*-8 imc BUSDAQ*flex*-12 when the Super-Caps are discharged, then the power consumption will increase by a max. of 6 W for a short period of time, depending on the model
Forwarded (passing through) power supply	onto module connector on CAN connections	standard; for CANFX optional (upon request)
Pass through power limits for supply of directly connected modules (click-connection)		
Max. current	8 A	current rating of the module connector
Max. power	 96 W at 12 V DC 192 W at 24 V DC 384 W at 48 V DC	equivalent pass through power typ. DC vehicle voltage AC/DC line adaptor or facilities optional AC/DC adaptor
Available power with optional supply via CAN (DSUB-9)		
Max. current	1 A	passed through on 2 x DSUB-9; secured with PTC; bidirectional: in/ out

UPS and data integrity		
Parameter	**Value**	**Remarks**
Self start (Automatic data acquisition operation)	configurable	automatic start when power supply is available
Auto data-saving upon power outage	✔	buffering (UPS) with auto-stop, data storage and shutdown
UPS	integrated	Super-Caps
Charging time of the UPS Super-Caps	 3 min. 4 min. 8 min.	minimum active operation for full UPS functionality BUSFX-LOG, BUSFX-2(S) BUSFX-4/-6 BUSFX-8/-12
Shutdown delay with power outage	1 s	"buffer-time constant": required duration of a continuous outage that will trigger auto shutdown procedure

Sleep-Mode		
Parameter	**Value**	**Remarks**
Sleep mode	available with devices equipped exclusively with CAN/LIN	
Sleep / Wakeup Trigger	CAN-activity or control signal	mode "Wake-on-CAN" enter sleep mode upon inactivity (after configurable time)
Power consumption in sleep mode	200 mW	average power consumption, including occasional refresh-cycles of the UPS Super-Caps
Boot delay	200 ms 30 s	wake up from sleep mode upon Power-On
Sleep / Wake up via control signal	external signal (5..55 V) or switch contact	at REMOTE terminal ("Suspend/Resume")

Data acquisition, storage, signal processing		
Parameter	**Value**	**Remarks**
Channels	max. 512	each device
Channel individual sampling rates	selectable in 1–2–5 steps	
Number of sampling rates	arbitrary	to be used in one system configuration
Monitor channel	✔	to be enabled for each individual node: doubled channels with independent sampling and trigger settings
Intelligent trigger functions	✔	e.g. logical combination of multiple channel events (threshold, edge) to create triggers that start and stop acquisition of assigned channels
Multi-triggered data acquisition	✔	Multitrigger and multi-shot
Independent trigger machines	48	start/stop, arbitrary channel assignment
Extensive real-time analysis and control functions	optional (imc Online FAMOS)	device-option, licensed via activation code
CAN message send	via imc Online FAMOS	
Synchronization	DCF 77, GPS, NTP	Master / Slave
Removable flash storage	Compact Flash (CF)	recommended media available at imc; the specified operating temperature range of the media is relevant
Storage on NAS (network storage)	✔	alternatively to flash storage
Arbitrary memory depth with pre- and post trigger	✔	maximum pretrigger limited by size of Circular Buffer RAM; posttrigger only limited by available mass storage (Flash)
Circular buffer mode	✔	cyclic overwrite of circular buffer memory on mass storage media

Operating conditions		
Parameter	**Value**	**Remarks**
Ingress Protection	IP40	only with optional protective cover on top of the locking slider, otherwise IP20
Pollution degree	2	
Operating temperature	-40°C to 85°C	internal condensation temporarily allowed (pollution degree 2)
Weight	0.5 kg	BUSFX-2-S

Synchronization and time base

Time base of individual device without external synchronization			
Parameter	**Value typ.**	**min. / max.**	**Remarks**
Accuracy		 ±50 ppm 1 µs (1 ppm)	internal time base RTC (at 25°C) not calibrated (standard devices) calibrated devices (upon request)
Drift	±20 ppm	±50 ppm	-40°C to +85°C operating temperature
Ageing		±10 ppm	at 25°C; 10 years

Time base of individual device with external synchronization signal				
Parameter	**GPS** (4)	**DCF77**	**IRIG-B**	**NTP**
Supported formats	NMEA / PPS (1)		B000, B001, B002, B003 (2)	Version ≤4
Precision	±1 µs			<5 ms after ca. 12 h (3)
Jitter (max.)	<100 ns (5)			---
Voltage level	TTL (PPS (1)) RS232 (NMEA)	5 V TTL level		---
Input impedance	1 kΩ (pull up)	20 kΩ (pull up)		---
Input connection	DSUB-9 "GPS"	BNC respectively SMB "SYNC" (not isolated)		RJ45 "LAN"
Cable shield connection		signal-GND = CHASSIS single-ended signal (with possible ground loops: external option "ISOSYNC" recommended)		---

Synchronization of multiple devices via DCF77 (Master/Slave)			
Parameter	**Value typ.**	**min. / max.**	**Remarks**
max. cable length		200 m	BNC cable type RG58 (propagation delay of cable needs to be considered) with possible ground loops: external option "ISOSYNC" recommended
max. number of devices		20	Slaves, plus 1 Master

(1) PPS (Pulse per second): signal with an impulse >5 ms is required; max. current = 220 mA
(2) Using BCD information only
(3) Max. value concerning the following condition: first-synchronization
(4) not imc BUSDAQ*flex* 2-s
(5) Without the system-related jitter for fieldbus channels

Digital Inputs and Outputs (BUSFX-4/6/8/12)

Digitale Inputs		
Parameter	**Value**	**Remarks**
Channels / Bits	4	each 2 Bit with common ground reference are isolated against the other inputs, the supply, CAN-Bus and housing
Configuration options	TTL or 24 V input voltage level	configurable at DSUB globally for 2 Bit-groups: LEVEL = LCOM: TTL-mode LEVEL offen: 24 V-mode
Sampling rate	≤ 10 kHz	
Isolation strength	60 V	tested: 200 V against housing (CHASSIS)
Input current	< 500 µA	
Switching threshold	1.5 V (±200 mV) 8 V (±300 mV)	TTL / 5 V level 24 V level
Switching delay	200 µs	

Digital Outputs		
Parameter	**Value**	**Remarks**
Channels / Bits	4	group of 4 Bit with common ground reference LCOM. isolated against supply, CAN-Bus and housing
Configuration	electronic High-Side switch	connection of an external power supply required: 7 V .. 30 V at HCOM / LCOM
Max. load current	0.7 A	protected against short circuit and over load
Output impedance	≤ 0,4 Ω	
Isolation strength	60 V	against housing (CHASSIS)
Switching delay	100 µs	

Fieldbus: Technical Details

CAN FD Bus Interface

Parameter	Value	Remarks
Number of CAN-nodes	2	one galvanically isolated node per connector
Terminal connection	2x DSUB-9	
Topology	bus	
Transfer protocol	configurable per software: CAN FD (ISO Standard) (max. 8 MBaud) non-ISO CAN FD (Draft) (max. 8 MBaud) CAN High Speed (max. 1 MBaud) CAN Low Speed (max. 125 KBaud)	individually for each node current standard according ISO 11898-1:2015 former draft (Bosch) according ISO 11898 according ISO 11519
Operating principle	Multi Master principle	
Direction of data flow	sending and receiving	
Baud rate	5 kbit/s to 8 Mbit/s	configurable via software; maximum is depending on selected protocol (FD/High/Low Speed)
Termination	120 Ω	switchable by software for each node
Isolation strength	±60 V	to system ground and case
Direct access for configuration of imc CANSAS modules	yes	via the CAN node of the device with imc STUDIO (CAN High Speed Mode only)

Note Remote Frame

imc devices actually does not support Remote Frames (RTR) according to CAN specification.

LIN-Bus Interface

Parameter	Value	Remarks
Nodes	2	for each node LIN_IN / LIN_OUT
Terminal connection	2x DSUB-9	one DSUB for each node
Topology	Bus	
Transfer protocol	LIN 2.1, LIN 2.0, LIN 1.3	LIN 1.3 and LIN 2.x specifications can run on a bus simultaneously
Operating mode	Master and/or Slave	Master: with fixed schedule table in the LDF file
Direction of data flow sending receiving	 Display variables, virtual bits LIN data in measurement channels	
Baud rate	1 to 20 kbit	
Data rate	30 kS/s	
Termination	Pull up resistor	selectable via software Master/Slave
Isolation strength	60 V	to system ground (case, CHASSIS)

FlexRay Interface

Parameter	Value	Remarks
Number of FlexRay nodes	1 additional 1 cold start node	1x channel A+B
Terminal connection Standard	 1x DSUB-9 per module	 optionally 2x DSUB-9 (channel A+B separately)
Topology	Bus	
Transfer protocol	FlexRay protocol specification v3.0	
	XCP- specification Universal Measurement and Calibration Version 1.2.0; Date: 2013-06-20"	• ASAM_AE_MCD-1_XCP_BS_Protocol-Layer_V1-2-0.pdf "ASAM MCD-1 (XCP); Protocol; Protocol Layer Specification; • ASAM_AE_MCD-1_XCP_AS_Flexray-Transport-Layer_V1-2-0.pdf "ASAM MCD-1 (XCP on FlexRay); Protocol; FlexRay Transport Layer;
Operating mode	Sync nodes, cold start nodes or normal nodes	
Direction of data flow sending	 Display variables, Virtual bits, Process vector variables and Ethernet bits	 Cyclic and Single Shot Frames with imc Online FAMOS
Baud rate	2.5 / 5.0 or 10.0 Mbit/s	
Max. cable length at data transfer rate	see FlexRay protocol	
Data rate	max 60 kSample/s	per module
Isolation strength	60 V	to system ground (case, CHASSIS)

ARINC-Bus Interface

Parameter	Value typ.	min. / max.	Remarks
Number of Rx-channels	8		
Number of Tx-channels	4		
Terminal connection	2x DSUB-15		
Transfer protocol	ARINC 429		
Baud rate	Low (12.5 kbit/s) High (100 kbit/s)		
Max. voltage for each Rx connection		±29 V	to System ground (protection ground)
Max. voltage for each Tx connection	5 V	4.5 V / 5.5 V	to GND "ZERO": min -0.25 V .. max 0.25 V
	10 V	9 V / 11 V	differential "ZERO": min -0.5 V .. max 0.5 V
Isolation strength	no galvanically isolation		

Contact imc

An Axiometrix Solutions Brand

Presented by: Absolute Gauge Technologies
sales@absolutegauge.com;
www.absolutegauge.com,
Toronto: 416 754 3168,
Montreal: 514 695 5147,
Toll Free: 1 888 754 7008