P8 for imc CANSASflex (CANFX/L-P8-GX)

8-channel CAN measurement module for the capture of pressure

imc CANSASflex-P8

The CAN-Bus measurement module imc CANSAS*flex*-P8, with 8 channels via integrated sensors respectively fittings, is designed to take measurements of pressure. A tube can be connected to these fittings via a coupling, and either the absolute or relative pressure of the gas or liquid in the tube can be measured, depending on the sensor in the fitting. A barometer inside the module makes it possible to derive the relative pressure even when using sensors for measurement of absolute pressure.

Highlights

- 8 channels with built-in pressure sensors (either relative or absolute pressure as desired)
- The input range for each of the 8 pressure measurement channels can be set separately, in accordance with the particular sensor selected upon module order. Thanks to a built-in barometer, measurements of relative pressure are possible by means of the absolute pressure sensors.
- 440 Hz bandwidth with max. 1 kSps/channel sampling rate
- Measurement range and sampling rates can be set per channel in steps of 1, 2, 5
- 24 Bit digitization and internal processing CAN-output format: 16 Bit

imc CANSAS*flex* functions and specifications

As a CAN-bus-based measurement engineering tool, the imc CANSAS*flex* series offers a wide selection of measurement modules which process and digitize sensor signals and output these 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 allows 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.

Fields of application

- For test rigs, vehicle testing, road trials and all-purpose measurement applications
- Deployable both in decentralized, distributed and in centralized measurement setups
- Operable with CAN-interfaces and CAN-data loggers from either imc or 3rd-party manufacturers

Properties and capabilities

CAN-Bus:

- Configurable Baud rate (max. 1 Mbit/s)
- Default configuration ex-factory: Baud rate=125 kbit/s and IDs: Master=2, Slave=3
- Galvanically isolated
- Built-in terminator resistance, manually switchable

Sampling rates and synchronization:

- Configurable CAN data rate
- Simultaneous sampling of all module’s channels, as well as across multiple modules
- Synchronization of multiple modules as well as to a global CAN-logger: based on CAN messages (no Sync-signal required)

Power supply:

- Galvanically isolated power supply input
- DC 10 V to 50 V
- LEMO.0B connector (2-pin); alternative power supply via CAN connector (DSUB-9)

On-board signal processing:

- "Virtual channels": integrated signal processor (DSP) for online processing. Data reduction, filtering, scaling, calculations, threshold monitoring, etc.
- Programmable multi-functional status-LED, supporting linkage to virtual channels

Heartbeat-message:

- Configurable with cyclical "life-sign", e.g. for integrity check purposes in test rigs
- Contains checksum for configuration and serial number, e.g. for consistency monitoring (checking of whether the correct module is still being used, for instance in installations undergoing maintenance)

FindMe:

- Identification of a module by means of selective LED flashing (via configuration software; does not occupy any additional CAN messages)

flex-Series: flexible granulation, topology and block assemblies

Click-mechanism:

- 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 joinable: with electrical connection: align on rear side; mechanically only: align on front side
- Direct connection of compatible CAN-logger: imc BUSDAQ*flex*

19" rack solution (subrack):

- 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 and 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

Software

Configuration:

- Using imc CANSAS software (free of charge), including dbc-export
- Autostart with saved configuration; also pre-configurable at factory
- The module's current configuration can be read out and exported by the software; For transfer of configuration via physical transport of the module; for back tracing and recovery.
- Supports the CANopen® protocol according "CiA® DS 301 V4.0.2" and "CiA® DS 404V1.2"; 4 TPDOs (Transmit Process Data Objects) in INT16, INT32 and FLOAT. See "CANSAS CANopen®" for a detailed description of the supported features and settings.

Measurement operation:

- Data logger operation:

  Software: imc STUDIO

  Hardware: imc measurement system with CAN-Interface, e.g. imc BUSDAQ, imc C-SERIES, imc SPARTAN and imc CRONOS device family (CRFX, CRXT, CRC, CRSL)

- With any desired CAN-interfaces and CAN-loggers from 3rd-party manufacturers

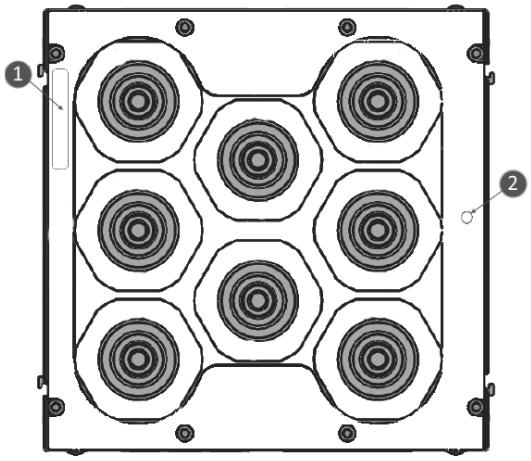
Models and Options

Overview of the available variant for imc CANSAS*flex*-P8

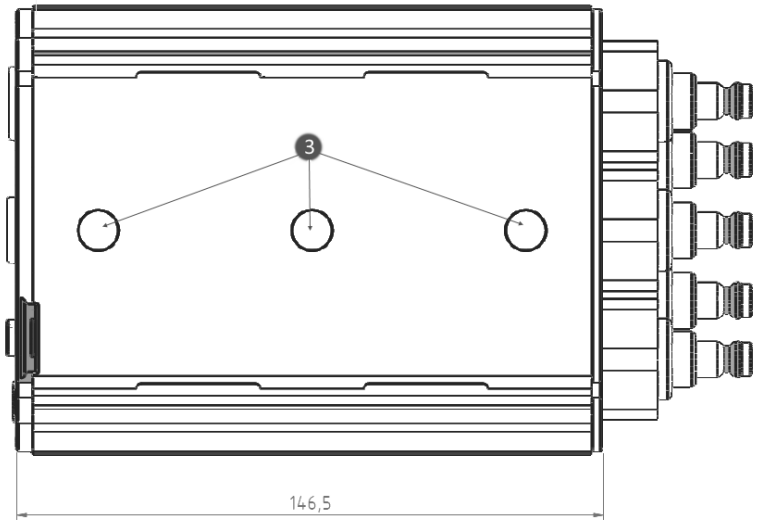
Order Code	Signal connection	Option/Extra	Housing	Article no.
CANFX/L-P8-GX	8 pressure inputs		L4	12500109

Mechanical drawings with dimensions

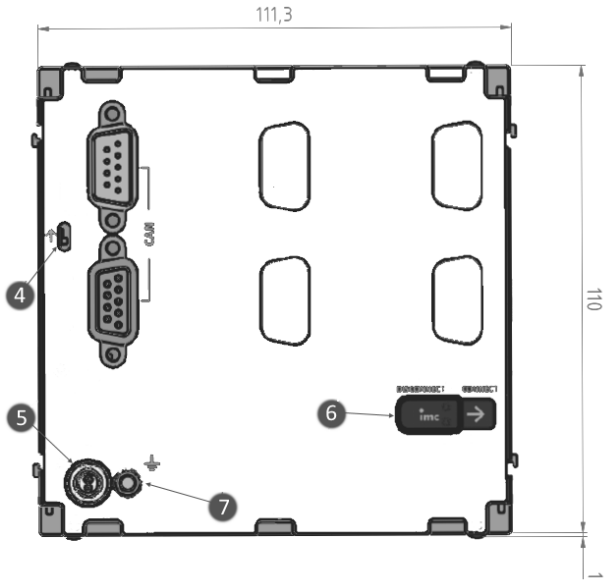
front



side view



rear view



Legend:

1: Serial number label
2: Status LED (blue / red)
3: magnet
(depending on model)
4: adjustable CAN terminator
5: supply socket (LEMO)
6: locking slider CAN/supply
7: ground connection M3

Shown in standard operating orientation: housing type L4; width (W) = 111.3 mm.

Housing type	S0	S1	S2	L0	L1	L2	L4
W: Width	30 mm	50.3 mm	70.6 mm	30 mm	50.3 mm	70.6 mm	111.3 mm
D: Depth	93 mm, with two magnets			146.5 mm, with three magnets			

Guidelines for device equipment (configuration and order):

- The desired selection of sensors (and resulting ranges) must be explicitly specified when ordering. The order must include 8x specific additional options (CANFX/-SEN-xxx with respective article numbers).
- A mixed configuration with different sensor types is possible.
- The total price of the module, as listed in the current price list already includes the sensors (unless special surcharges are explicitly stated). Other sensors not listed here or in the price list must be requested individually.
- As connection fitting, universal types suitable for gas and liquids are equipped as standard, with free passage.
- As an additional option, leakage-free types can be equipped. Those types must be ordered channel by channel (e.g. 8 x) as additional options subject to a surcharge.
- The sealing materials used in the standard meet a wide range of applications in the operating temperature range of the module.
  There are applications (temperature curves) and media (for example: chemicals, brake fluids) where the use of other sealing materials may need to be considered.
- In addition to the fittings, suitable for quick-connect couplings, Swagelok couplings and fittings for a direct hose connection can also be fitted, subject to technical clarification.

Integrated transducers (permanently installed, order option)

Order Code	Sensor type / range	Fitting: passage/NW*	Article no.	Type
CANFX/P-SEN-A25	Absolute pressure transducer 0.1 bar to 25 bar	free passage, NW5	12500110	A25
CANFX/P-SEN-A10	Absolute pressure transducer 0.1 bar to 10 bar		12500111	A10
CANFX/P-SEN-A6	Absolute pressure transducer 0.1 bar to 6 bar		12500112	A6
CANFX/P-SEN-A3.5	Absolute pressure transducer 0.1 bar to 3.5 bar		12500113	A3.5
CANFX/P-SEN-A1.2	Absolute pressure transducer 0.1 bar to 1.2 bar		12500114	A1.2
CANFX/P-SEN-R0.3	Relative pressure transducer ±0.3 bar		12500115	R0.3
CANFX/P-SEN-R5	Relative pressure transducer -0.9 bar to 5 bar		12500117	R5
CANFX/P-SEN-FUEL-A15	Absolute pressure transducer 0.1 bar to 25 bar	leakage free, NW5	12500128	A25-F
CANFX/P-SEN-FUEL-A10	Absolute pressure transducer 0.1 bar to 10 bar		12500129	A10-F
CANFX/P-SEN-FUEL-A6	Absolute pressure transducer 0.1 bar to 6 bar		12500130	A6-F
CANFX/P-SEN-FUEL-A3.5	Absolute pressure transducer 0.1 bar to 3.5 bar		12500131	A3.5-F
CANFX/P-SEN-FUEL-A1.2	Absolute pressure transducer 0.1 bar to 1.2 bar		12500132	A1.2-F
CANFX/P-SEN-FUEL-R0.3	Relative pressure transducer ±0.3 bar		12500133	R0.3-F
CANFX/P-SEN-FUEL-R5	Relative pressure transducer -0.9 bar to 5 bar		12500134	R5-F

* NW - Nominal width

Available connection fittings (permanently installed, Standard respectively order option)

Order Code	Media	Passage	Material, Size	Sealing fitting / front panel	Sealing fitting / sensor	Article no.
CANFX/P-SEN-	universal (for gas and liquids)	free passage	Stainless steel, 1.4305 (AISI 303), NW 5	FKM/FPM	FVMQ	standard
CANFX/P-SEN-FUEL-		leakage free	Stainless steel, 1.4305 (AISI 303), NW 5	FFKM	FVMQ	optional, on request

Optional accessories: Coupler

Order Code	Passage	applicable for fuels	Material, Size, Sealing	Article no.
CAN/21KFAD14RVX	free passage	---	stainless steel, NW5 Sealing Viton ™ (FPM, FKM) [1] 60° cone, metric outer thread (DIN 2353)	10500064
CAN/21KLAD14RKXS	leakage free	yes	stainless steel, NW5 Sealing Kalrez ™ (FFKM) [2] 60° cone, metric outer thread (DIN 2353)	10500066
CAN/25KAAD14RVX	single side sealed	yes	stainless steel, **NW7.8** Sealing Viton ™ (FPM, FKM) 60° cone, metric outer thread (DIN 2353)	10500063
CAN/21KFKO06MPN	free passage	---	brass chrome plated, NW5 Sealing Perbunan ™ (NBR) [3] tubing connection 4x6mm	10500000

1 Brand names: Viton®, Technoflon®, Fluorel®

2 Brand name: Kalrez®

3 **Brand names**: Perbunan® , Chemigum®, Hycar®, Krynac®, Elaprim®, JSR-N®

Accessories and Plugs

Included accessories

Documents
Getting started with imc CANSAS (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).

Optional 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

Power plug		
ACC/POWER-PLUG3	Power connector for DC supply LEMO FGG.0B.302, solder contact, max. 0.34 mm^2	13500033
ACC/CABLE-LEMO-0B-BAN-2 M5	Power supply cable LEMO/banana 2.5 m	13500276

DSUB-9 plug (CAN)		
CAN/RESET	Reset-plug (DSUB-9 female)	10500025
CAN/KABEL-TYP2	CAN-Bus connection cable 2x DSUB-9 1:1, 2 m length	10500027

Handle		
CANFX/HANDLE-L	CANFX handle kit (left and right) - long (L)	12500028

Mounting brackets for fixed installations		
CANFX/BRACKET-CON-L	CANFX connection bracket long	12500020
CANFX/RACK	19" Rack	12500094
CANFX/RACK-BLOCK	19" Rack frame for entire block CANFX/BUSFX	12500103

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.		

Miscellaneous		
CANFX/RUBBER-1M	silicone strip blue 1 m	12500029
CANFX/COVER-IP40	protective cover on top of the locking slider in compliance with IP40 ingress protection class	12500069
CANFX/USB-P	USB-CAN interface (CAN: DSUB-9, USB 2.0); AC/DC power adaptor, 24 V DC, 60 W, with LEMO.0B plug; CAN cable, DSUB-9 (F, terminated) - DSUB-9 (M, terminated); CAN reset plug; imc CANSAS configuration software (download)	12500043

Technical Specs - P8

Parameter	Value	Remarks
Inputs	8	8 pressure fittings
Measurement modes	absolute pressure relative pressure	
Sampling rate	1 kHz (max.)	per channel
Resolution	16 Bit	

Pressure measurement			
Parameter	**Measurement error**		**Remarks**
Measurement ranges (working range, valid values)	ranges depending on selected sensor type CANFX/P-SEN-xx		-30 °C to +85 °C mounting position horizontal (schematic) [1]
Absolute pressure			Sensor type, calibrated range
0.1 bar to 25.0 bar	<0.2 %	<50 mbar	A25(-F), > 0.5 bar
0.1 bar to 10.0 bar	<0.2 %	<20 mbar	A10(-F), > 0.5 bar
0.1 bar to 6.0 bar	<0.2 %	<12 mbar	A6(-F), > 0.5 bar
0.1 bar to 3.5 bar	<0.2 %	<7 mbar	A3.5(-F), > 0.5 bar
0.1 bar to 1.2 bar	<0.1 % abs.	<1.2 mbar	A1.2(-F), > 0.5 bar
Internal barometer	<0.1 % abs.	<1.2 mbar	
Relative pressure	related to span (abs. ranges)		Sensor type, calibrated range
calculation with int. barometer			
-0.9 bar to +24.0 bar	< 0.2 %	< 51 mbar	A25(-F), > -0.5 bar
-0.9 bar to +9.0 bar	< 0.2 %	< 21 mbar	A10(-F), > -0.5 bar
-0.9 bar to +5.0 bar	< 0.25 %	< 13.2 mbar	A6(-F), > -0.5 bar
-0.9 bar to +2.5 bar	< 0.25 %	< 8.2 mbar	A3.5(-F), > -0.5 bar
-0.9 bar to +0.2 bar	< 0.6 %	< 2.4 mbar	A1.2(-F), > -0.2 bar
Relative pressure			Sensor type, calibrated range
Relative pressure sensor			R5(-F), > -0.3 bar
-0.9 bar to +5 bar	< 0.3 %	< 13.2 mbar	R0.3(-F), > -0.3 bar
-0.3 bar to +0.3 bar	< 0.3 %	< 1.8 mbar	temperature range on request

Medium hookup	Value	Remarks
Non-leak-free	NW5 or 7,2, stainless steel, fluorine rubber (FPM, FKM) designed for gases, oils, water NW5, brass, butadiene acrylonitrile rubber (NBR) designed for gases	
Leak-free [2]	quick-release fittings NW5, stainless steel, perfluorine rubber (FFKM) designed for gases, fuels, oils, water NW5, chrome-plated brass (FFKM) designed for fuels	
Mating cycles	1000	with regular lubrication

1 Due to the effect of gravity on the oil column in its internal barometer, the sensors' high sensitivity can lead to offset errors if its position is changed. (For measurements of relative pressure, this can be compensated using the Tare function)

2 Leak-free signifies that the fitting come with a valve which closes automatically when the tube is disconnected (useful for liquids).

Overload limits			
Parameter	**min.**	**max.**	**Remarks**
Input ranges 0.1 bar to 25.0 bar 0.1 bar to 10.0 bar 0.1 bar to 6.0 bar 0.1 bar to 3.5 bar 0.1 bar to 1.2 bar ±0.3 bar	 +0.5 bar -0.5 bar	 TBD +15 bar TBD +5 bar +1.5 bar +0.5 bar	sensor types CANFX/P-SEN-xx A25(-F) A10(-F) A6(-F) A3.5(-F) A1.2(-F) R0.3(-F) (Relative pressure transducer)
Temperature of medium	0°C to +100°C Perfluorine rubber (FFKM) -15°C to +100°C Fluorine rubber (FPM, FKM) 0°C to +100°C butadiene acrylonitrile rubber (NBR)		The upper limits are determined by the pressure sensors. Sealings not used in standard models

Terminal connections		
Parameter	**Value**	**Remarks**
Supply input	type: LEMO.0B (2-pin)	compatible with LEMO.EGE.0B.302 multicoded 2 notches for optional individually power supply compatible with connectors FGG.0B.302 (Standard) or FGE.0B.302 (E-coded, 48 V) pin configuration: (1)+SUPPLY, (2)-SUPPLY
Module connector	via locking slider	for power supply and networking (CAN) of directly connected modules (Click-mechanism) without further cables
CAN bus	2x DSUB-9	CAN and power supply CAN_IN (male) bzw. CAN_OUT (female) all signals on both DSUB-9 directly 1:1 connected

Operating conditions		
Parameter	**Value**	**Remarks**
Ingress protection class	IP40	only with optional protective cover (CANFX/COVER-IP40) on top of the locking slider, otherwise IP20
Operating temperature range	-30°C to 85°C	internal condensation temporarily allowed
Operating altitude	up to 3000 m up to 1500 m	when using direct sensor readings only when deriving rel. pressure using internal barometer
Dimensions	111.3 x 110 x 146.5 mm	W x H x D

Remarks:

- Accuracy ratings pertain to settled state of thermal equilibrium.
- If the module is subjected to accelerations, the inertia will cause measurement errors with the sensitive sensors.

Power supply			
Parameter	**Value typ.**	**min. / max.**	**Remarks**
Input supply voltage	10 V to 50 V DC		
Power consumption	5 W	8 W	
Module power supply options	power socket (LEMO) CAN socket (DSUB-9) adjacent module		direct connection imc CANSAS*flex* or imc BUSDAQ*flex*

Pass through power limits for directly connected modules (Click-mechanism)		
Parameter	**Value**	**Remarks**
Max. current	8 A	at 25°C current rating of the click connector
	-50 mA/K·ΔT_a	Derating with higher operating temperatures T_a, $\Delta T_a = T_a$ –25°C
Max. power	96 W at 12 V DC 192 W at 24V DC	Equivalent pass through power at 25°C typ. DC vehicle voltage AC/DC power adaptor or cabinets
	60 W at 12 V DC 120 W at 24V DC	at +85°C

Available power for supply of additional modules via CAN-cable (DSUB-9, "down stream")		
Parameter	**Value**	**Remarks**
Max. current	6 A	at 25°C current rating of DSUB-9 connection (CAN-IN, CAN-OUT); assuming adequate wire cross section!
	-30 mA/K·ΔT_a	Derating with higher operating temperatures T_a, $\Delta T_a = T_a$ –25°C
Max. power	72 W at 12 V DC 144 W at 24 V DC	Equivalent pass through power at 25°C typ. DC vehicle voltage AC/DC power adaptor or cabinets
	50 W at 12 V DC 100 W at 24 V DC	at +85°C