

CANSAS-INC4

Module for acquisition of frequency, rotation, position and angle counter signals

Version 1.4



CANSAS-INC4 offers 4 differential channels which can each be used for event counting, time measurement or a combination of event counting and time measurement. These operating modes enable capture of incremental counter sensors such as those used for measuring frequencies, RPM-values and velocities. The switching threshold and hysteresis are software configurable for the purpose of detecting events or impulses for incremental measurements.

Order code:	Article #
CANSAS-INC4	1050008
CANSAS-L-INC4	1050056
CANSAS-L-INC4-V	1050143
CANSAS-L-INC4-V-SUPPLY	1050151
CANSAS-K-INC4	1050092
CANSAS-SL-INC4-L	1150015
CANSAS-SL-INC4-D	1150016

7 different models available:

CANSAS-INC4

Fan-less extruded aluminum housing (Short model, 2 x DSUB signal terminals)
35 x 111 x 90 (W x H x D in mm)
Weight typ. 300 g

CANSAS-L-INC4

Fan-less extruded aluminum housing (Long model, 2 x DSUB signal terminals)
35 x 111 x 145 (W x H x D in mm)
Weight typ. 425 g

CANSAS-L-INC4-V

Like CANSAS-L-INC4 (Long mod)
Signal terminals: 4 x ITT Veam

CANSAS-L-INC4-V

Like CANSAS-L-INC4 (Long mod)
Signal terminals: 4 x ITT Veam
with build-in sensor supply

CANSAS-K-INC4

Fan-less cassette, 3U/8HP (Cassette model, 2 x DSUB signal terminals)
For installation in the imc 19" subrack
CAN-Bus and supply are connected to the module via the 19" subrack
Weight typ. 900 g

CANSAS-SL-INC4-L

Fan-less IP65 extruded aluminum housing (SL model, LEMO signal terminals)
38 x 112.5 x 152 (W x H x D in mm)

CANSAS-SL-INC4-D

Fan-less IP65 extruded aluminum housing (SL model, DSUB signal terminals)
38 x 112.5 x 152 (W x H x D in mm)

Refer also "*CANSAS Installation and Assembly*" for information on the models and module racks.

Interconnections at standard extruded aluminum housings and cassette models

- CAN-Bus connected via 2 DSUB-9 terminals; CAN IN (male), CAN OUT (female)¹
CAN-Bus Interface for sending measurements on the CAN-Bus at rates of up to 1Mbit/s, (equipped in accordance with the CiA® Draft Standard 102 Version 2.0, CAN Physical Layer for Industrial Applications)
- Signal terminals on the module: 2 x 15-pin DSUB-screw terminal blocks
With **CANSAS-L-INC4-V(-SUPPLY)**: signal connection via ITT VEAM plug (1 input per plug)
With **CANSAS-C-INC4**: signal connection via 2 x 9-pin DSUB screw terminals
- Power supply via PHOENIX (MC1, 5/4STF-3,81) socket (CAN/Power-Plug)¹

Interconnections at SL extruded aluminum housings**CANSAS-SL-INC4-D**

- CAN-Bus connected via 2 x DSUB-9 terminals; CAN IN (male), CAN OUT (female)
CAN-Bus Interface for sending measurement channel signals on the CAN-Bus at up to 1Mbit/s, (equipped in accordance with the CiA® Draft Standard 102 Version 2.0, CAN Physical Layer for Industrial Applications)
- Voltage supply via 6 pin LEMO terminal (type HGA.1B.306) connector, alternatively via CAN connection
- Signal connection at the module:
 - 2 x 15 pin DSUB terminals with 4 channels per plug at CANSAS-SL-INC4-D

CANSAS-SL-INC4-L

- CAN-Bus connected via 2 x 10 pin LEMO terminals (type HGA.1B.310); CAN IN (male), CAN OUT (female)
CAN-Bus Interface for sending measurement channel signals on the CAN-Bus at up to 1Mbit/s, (equipped in accordance with the CiA® Draft Standard 102 Version 2.0, CAN Physical Layer for Industrial Applications)
- Voltage supply via 6 pin LEMO terminal (type HGA.1B.306) connector, alternatively via CAN connection
- Signal connection at the module:
 - 4 x 7 pin LEMO terminals with one channel per plug at CANSAS-SL-INC4-L

Power supply for standard extruded aluminum housings and cassette models

- Supply voltage: 10 V to 50 V DC² via (4-pin) PHOENIX plug or via CAN-Bus plug¹
- Automatic independent start upon application of supply voltage
- Power consumption <4.0 W (typ.)

¹ not with Cassette model

² modules build before April 2011: 9 V to 32 V, see specification label

Power supply for SL extruded aluminum housings

- Supply voltage: 10 V to 50 V DC via 6 pin LEMO or via CAN-bus plug
- Automatic independent power-up upon application of supply voltage
- Power consumption <4.0 W (typ.)

Operating conditions for standard extruded aluminum housings and cassette models

- Operating temperature: -30°C to 85°C condensation allowed
- Shock resistance 50 g pk over 5ms (without plug)
- With extruded aluminum housing: Connection terminal for power supply via PHOENIX socket

Operating conditions for SL extruded aluminum housings

- Operating temperature: -30°C to 85°C condensation allowed
- Shock resistance: MIL STD810F (without plug)
- Protection class IP65
- With extruded aluminum housing: Connection terminal for power supply via LEMO socket

Included accessories

- Calibration certificate as per DIN EN ISO 9001
- Instruction manual
- With extruded aluminum housing: Connection terminal for power supply via PHOENIX socket or via LEMO socket with gum sealing ring at SL models

Measurement characteristics

- Sampling rates can be set to up to 1 kHz per channel in steps of 1, 2, 5
- 500 kHz bandwidth (-3 dB)
- 16-bit resolution (with internal 24-bit processing)
- Integrated DSP for online signal processing: data reduction, filtering, scaling, statistics etc..
- 33 ns time resolution corresponds to 32 MHz counter frequency

Measurement channels

- for capturing signals of displacement, angle, events, time, frequency, velocity, RPMs
- 4 channels of 2 tracks (X,Y) each
- 1 index channel
- all channels fully conditioned; the slopes of the edges, as well as the hysteresis for the module are adjustable
- synchronized sampling of all measurement channels
- Synchronized sampling with measurement systems or other appropriate modules is possible both with extra synchronization line and also simply via the CAN-Bus.³
- CAN-Bus Interface for sending measurements on the CAN-Bus at rates of up to 1Mbit/s, (equipped in accordance with the CiA[®] Draft Standard 102 Version 2.0, CAN Physical Layer for Industrial Applications)

Special characteristics

- The module can send a CAN-Bus message at intervals ("heartbeat"). This periodic message can serve the purpose of monitoring whether the correct module is being used with the correct configuration.
- The module's configuration can be exported by the software; this makes it possible to transfer configurations made by others by means of just the module.²
- With the Long and Cassette models, the module can import slot data from the rack and pass it to automation software.
- It supports the **CANopen[®]** protocol according "CiA[®] DS 301 V4.0.2" and "CiA[®] DS 404V1.2"; 4 PDO (Process Data Objects) in INT16, INT32, and FLOAT⁴. The supported capabilities, more standards and the settings which can be edited via CANopen[®] are described in "CANSAS CANopen[®]".

³ upon request

⁴ CANopen[®] mode does not support virtual channels and controlling the LEDs

Optional accessories**Connection terminals:**

- **ACC/DSUB-ENC**; connector for acquiring two incremental signals
- **ACC/DSUB-ENC4-IU**, 15 pin DSUB terminal for conversion of current signals into voltage signals
- **ACC/DSUB-ENC4-IP65**; connector for acquiring two incremental signals adapted for CANSAS-SL
- **M.1050059**; ITT Veam connection terminal for 1 channel; cable diameter: 3 mm
- **M.1050060**, ITT Veam connection terminal for 1 channel; cable diameter: 6 mm

Additional options and accessories

- Depending on the model, the modules can be either attached together to form stacks or installed in racks; see the document "*CANSAS Installation and Assembly*" for more on these options.
- The connectors necessary for the signals are described in "*Signal Connection Terminals*".
- The modules can be configured for CAN-network applications either -by order- at factory, or by the customer using appropriate configuration software. The necessary software as well as cables and additional accessories are presented in the documentation "*Integrating CANSAS in CAN Networks*".

INC4

Datasheet Version 1.4 (4 incremental counter inputs)

Parameter	Value (typ. / max)	Remarks
Inputs	4 + 1 (9 tracks)	4 channels with 2 tracks (X, Y) each 1 index channel all fully conditioned inputs isolated from CAN-Bus and supply, but not mutually.
Measurement modes:	displacement, angle, events, time, frequency; velocity, RPMs	
Sampling rate (CAN output)	1 kHz / channel (max.)	
Time resolution of measurement	33 ns	counter frequency 32 MHz (primary sampling rate)
frequency stability	<100 ppm	
deterioration	<±5 ppm / year	
Resolution of data	16 bits	
Input configuration	differential	
Input impedance	100 kΩ	
Switching threshold	-8 V to +10 V	globally selectable in 0.1 V steps
Hysteresis	0,3 V to 4 V	globally selectable in 0.1 V steps
Input voltage range (differential)	±10 V ±30 V	linear range maximum, outside of linear range: max. non-linearity uncertainty: 300 ns
Common mode input voltage	max. ±30 V	
Analog bandwidth	500 kHz	-3 dB (full power)
Analog filter	bypass (without filter), 20 kHz, 2 kHz, 200 Hz	adjustable (globally for all channels) Butterworth, 2nd order
CMRR	70 dB (typ.), 50 dB (min.) 60 dB (typ.), 50 dB (min.)	DC, 50 Hz 10 kHz
Gain uncertainty	< 1 %	23°C
Offset	< 1 %	23°C
frequency stability	< 100 ppm	deterioration <±5 ppm / year
CAN-Bus	defined by ISO 11898	
CANopen® mode	"CiA® DS 301 V4.0.2" and "CiA® DS 404V1.2" supports 4 PDOs in INT16, INT32, and FLOAT	
isolation: CAN-Bus power supply input analog input	±60 V ±60 V no isolation	to CHASSIS nominal; testing: 300 V (10 s) nominal; testing: 300 V (10 s) analog reference ground: CHASSIS
Overvoltage protection	±60 V	long-term
Sensor supply	+5 V ±200 mA, 20 mA	Reference: GND
Supply voltages	10 V to 50 V DC	
Sensor supply voltage at CANSAS-L-INC4-V-SUPPLY	+2.5 V to +24 V	
Power consumption:	4 W (typ.)	12 V supply, 23°C
Operating temperature	-30°C to 85°C	
Dimensions (W x H x D)	35 x 111 x 90 mm 35 x 111 x 145 mm 41 x 128 x 145 mm 38 x 112.5 x 152 mm	CANSAS-INC4 CANSAS-L-INC4, -L-INC4-V CANSAS-C-INC4 (8TE) CANSAS-SL-INC4-L

Parameter	Value (typ. / max)	Remarks
	38 x 112.5 x 152 mm	CANSAS-SL-INC4-D
Weight	300 g	CANSAS-INC4
Connection terminals	2x DSUB-15 4x ITT VEAM 2x DSUB-9 2x DSUB-9 PHOENIX (MC 1,5/4STF-3,81)	Inputs: -INC4, -L-INC4 -L-INC4-V(-SUPPLY) -K-INC4 CAN (in / out), supply (alternatively) power supply
Connection terminals for SL inputs	2x DSUB-15	CANSAS-SL-INC4-D
CAN (in/out) inputs	2x DSUB-9	power supply (alternatively)
CAN (in/out) power supply	4x 7-pin LEMO (HGG.1B.307) 2x 10-pin LEMO (HGA.1B.310) 1x 6-pin LEMO (HGA.1B.306)	only CANSAS-SL-INC4-L power supply (alternatively) for all SL models

Sensor SUPPLY module

Version 1.1

For CANSAS C8, CI8, SCI8, SC16, SCI16 and INC4-V-SUPPLY optional

(Optional for model long and cassette CANSAS-SC16)

Order code: CAN/SEN-SUPPLY

The sensor supply module always makes only 7 of 8 selectable voltage ranges available:

- default case: all voltage ranges not isolated (standard ranges: +2.5 V to +24 V; ± 15 V optional)
- upon request: all voltage ranges isolated, but only if the range ± 15 V is not included (only for SL with LEMO connectors)
- upon request: with range ± 15 V instead of one other range, however all voltage ranges not isolated (only for C8, CI8, not for SL with LEMO-connectors)

Parameter	Value (typ. / max.)			Remarks
Configuration options	8 ranges			
Output voltage	voltage	current	net power	globally selected, isolated on request (not for LEMO)
	+2.5 V	580 mA	1.5 W	
	+5.0 V	580 mA	2.9 W	
	+7.5 V	400 mA	3.0 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	available on request for C8, CI8 (then only non isolated; not for LEMO)
Short-circuit protection	unlimited duration			to output voltage reference ground
Output voltage accuracy	<0.25 % (typical) <0.5 % (max.) < 0.9 % (max.) <1 % (max.)			at terminal plugs, no load 25°C; 2.5 V to 24 V 25°C; 2.5 V to 24 V full temperature range ± 15 V
Deviation control of lead impedance	3-wire control: SENSE lead as feedback (-VB is supply ground)			available for 5V and 10V requirements: 1) balanced cables 2) identical cables on all channels 3) representative measurement with channel 1
Efficiency	typ. 55 % typ. 50 % typ. 70 % min. 40 %			5V, to 15 V 24 V ± 15 V 2.5 V
Capacitive load (max.)	>4000 μ F >1000 μ F >400 μ F			2,5 V, 10 V, ± 15 V 12 V, 15 V 24 V
Operating temperature	-30°C to 85°C			