

# A-CAN-DG-v2.1

## Analog to CAN Converter

8 Analog + 2 Digital inputs

Texense sensors are designed for data logging. Should the users want to include this sensor in a closed loop system, they must undertake total responsibility from doing so.

Analog inputs features			
Analog Inputs	Range	0...+5 0...+10	V
	Pull down	internal	
	Input impedance	40	kΩ
	Accuracy from -40°C to +125°C	0.25	% FS
	Sampling (per channel)	4	kHz
Anti-Aliasing Filter	Type	Low pass, SRRRC or Butterworth	
	Cut-off frequency at -3dB	Programmable from 15 to 500Hz <sup>(1)</sup>	
Digital inputs features			
Digital Inputs	Square wave level	0 to 5	V
		or NPN open collector	
	Pull up	Internal: 10kΩ to 5V	
	Freq. max	200	kHz
Wheel Speed	Range	0 to 500	kph
		0 to 500	mph
	Circumference	300 to 5000	mm
Resolution	0.01	kph/bit	
	0.01	mph/bit	
Engine speed	Resolution	1	rpm/bit
Frequency meter	Resolution	1	Hz/bit

(1) It is highly recommended to choose **Cut-off frequency < 2 x Output Frequency** to avoid aliasing measurement

CAN bus features		
CAN bus type	Programmable 2.0A (11 bits ID) or 2.0B (29 bits ID)	
Baud rate	125k to 1Mbps	
Parameters	identifiers, baudrate, frequency, digital and analog inputs parameters.	
Output Frequency	1Hz to 1kHz, request mode.	
Output format	16bits or mV	
Electrical features		
Supply Voltage	6 to 16	V
Typical Supply Current	35	mA
Sensor supply Output	Protected supply 6 to 16V (0.5A max)	
Mechanical features		
Dimensions	See Mechanical drawing	
Material	Aluminum	
Weight	45	g
Protection	IP67	
Vibration test	20Gpp 5'	
Operating Temp	-40 to +125	°C
Storage Temp	-40 to +125	°C

Due to CAN bus bandwidth limitation, the output frequency is limited as follow:

Output frequency	CAN bus Baudrate			
	125 kbps	250 kbps	500 kbps	1 Mbps
1 to 200Hz	OK	OK	OK	OK
500 Hz		OK	OK	OK
1kHz				OK

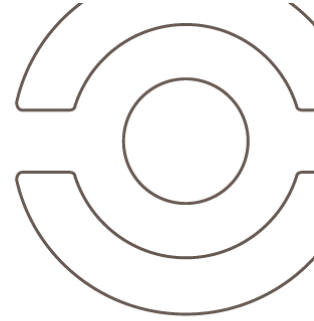
### Ordering ref:

A-CAN-DG-v2.1 - Input range - Option

2: 0V...5V input range  
4: 0V...10V input range

C: Cable

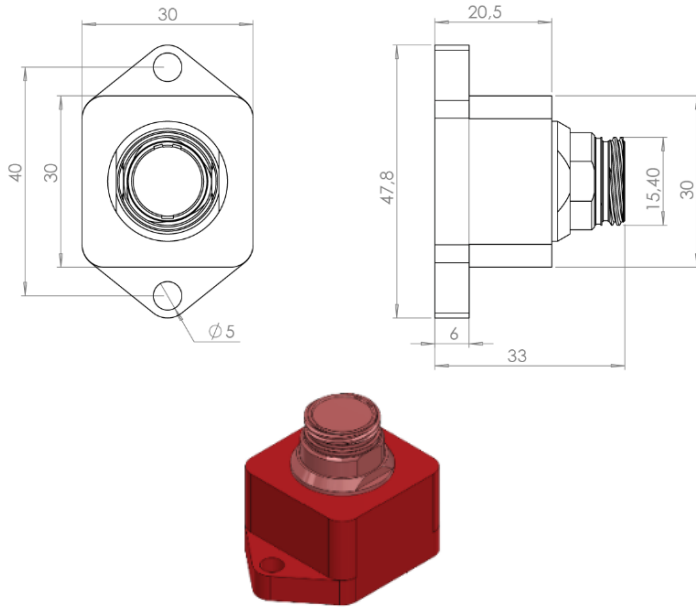
ex: A-CAN-DG-v2.1-2-C



## Mechanical drawing and pinout

### Standard version:

Connector: LEMO HES.2M.319.XLDP  
Mating connector: LEMO FGS.2M.319.XLM

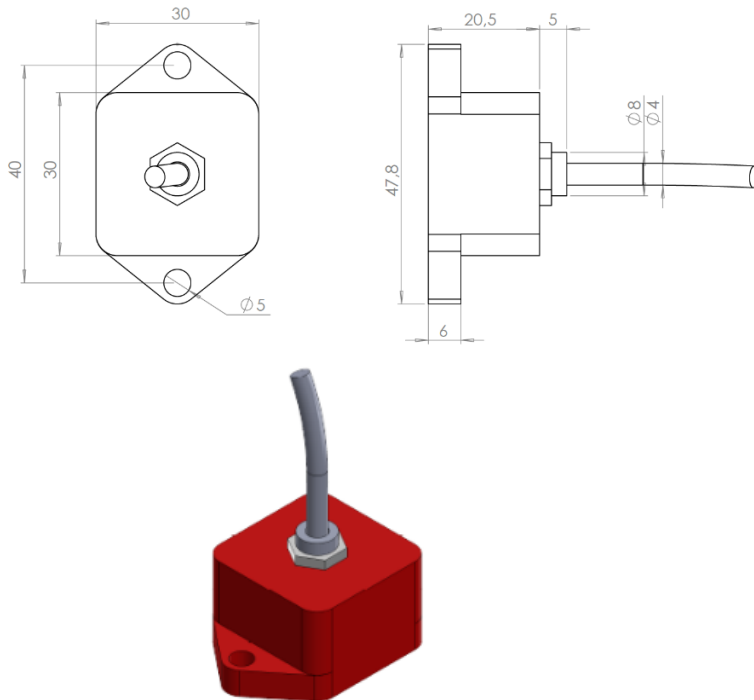


Function	Description	Pin
Supply	Supply (6 to 16 V)	1
	GND <sup>(2)</sup>	2
Analog Inputs	Channel 1	3
	Channel 2	4
	Channel 3	5
	Channel 4	6
	Channel 5	7
	Channel 6	8
	Channel 7	9
	Channel 8	10
Digital Inputs	Input 1	11
	Input 2	12
CAN	CAN High	13
	CAN Low	14
manufacturer reserved	do not connect	15
Sensor supply	Protected supply 6 to 16V (0.5A max)	16
	5V	17
	GND <sup>(2)</sup>	18
	GND <sup>(2)</sup>	19

(2) Ground pins are internally connected

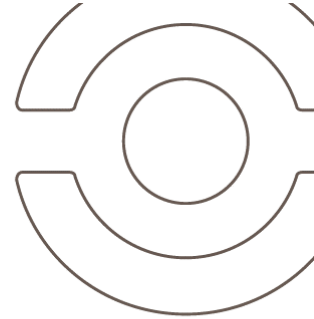
### Cable version:

Cable: 19 AWG 28 RW-200-E-3/16  
Cable length: 500mm



Function	Description	Wire color	Ring
Supply	Supply (6 to 16 V)	Red	Brown
	GND <sup>(2)</sup>	Black	Red
Analog Inputs	Channel 1	White	Orange
	Channel 2		Yellow
	Channel 3		Green
	Channel 4		Blue
	Channel 5		Purple
	Channel 6		Grey
	Channel 7		White
	Channel 8		Brown Black
Digital Inputs	Input 1	Orange	Brown Brown
	Input 2		Brown Red
CAN	CAN High	Yellow	Brown Orange
	CAN Low	Blue	Brown Yellow
manufacturer reserved	do not connect	Green	Brown green
Sensor supply	Protected supply 6 to 16V (0.5A max)	Red	Brown Blue
	5V	Red	Brown Purple
	GND <sup>(2)</sup>	Black	Brown Grey
	GND <sup>(2)</sup>	Black	Brown White

(2) Ground pins are internally connected



## CAN data output

Measure	Unit configuration	Range	Resolution	Data type	Comment
ANA voltage signal	mV	0...5V	1 mV/bit	Unsigned int 16 bits	
		0...10V	1 mV/bit	Unsigned int 16 bits	
	16 bits	0...5V	0,0763 mV/bit	Unsigned int 16 bits	
		0...10V	0,1526 mV/bit	Unsigned int 16 bits	
Wheel speed	kph	0...500 kph	0,01 kph/bit	Unsigned int 16 bits	Check max frequency (200kHz) for digital inputs. Ex: 360km/h with 2m wheel circumference and 100 tops/rev → $360/3.6/2 \times 100 = 5\text{kHz}$ .
	mph	0...500 mph	0,01 mph/bit	Unsigned int 16 bits	
Engine revs		see comment	1 rpm/bit	Unsigned int 16 bits	Check max frequency (200kHz) for digital inputs. Ex: 8000rpm with 48 tops/rev → $8000/60 \times 48 = 6.4\text{kHz}$ .
Frequency meter			1 Hz/bit	Unsigned int 16 bits	

### TX Frame #01

ID	Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7
0x03F0 (default)	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB
	Channel 1 voltage		Channel 2 voltage		Channel 3 voltage		Channel 4 voltage	

### TX Frame #02

ID	Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7
0x03F4 (default)	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB
	Channel 5 voltage		Channel 6 voltage		Channel 7 voltage		Channel 8 voltage	

### TX Frame #03

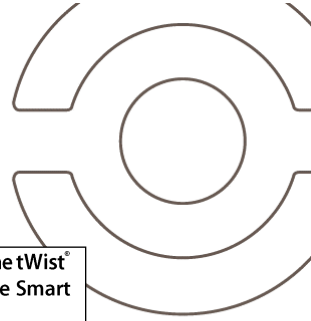
ID	Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7
0x03F8 (default)	MSB	LSB	MSB	LSB	Not used	Not used	Not used	Not used
	Digital Input 1		Digital Input 2					
	Unsigned int 16 bits		Unsigned int 16 bits					

## CAN data input

### Rx Trig frame, for CAN request mode only

#### RX Frame

ID	Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7
0x07F0 (default)	-	0x00, 0x07 or 0xFF (all Msg) 0x01: Enable frame 1 0x02: Enable frame 2 0x04: Enable frame 3	-	-	-	-	-	-



## Parameters

Must be setup according to Texense CAN protocol, or by using the tWist\* software (texense Windows software tool) with the tSIB (texense Smart Interface Box).

### CAN bus parameters:

Address	Parameter	Raw values	Values	Comments	
0x00	Baudrate & CAN Type	0x00	CAN2.0A 1Mbps	default	
		0x01	CAN2.0A 500 Kbps		
		0x02	CAN2.0A 250 Kbps		
		0x03	CAN2.0A 125 Kbps		
		0x10	CAN2.0B 1Mbps		
		0x11	CAN2.0B 500 Kbps		
		0x12	CAN2.0B 250 Kbps		
		0x13	CAN2.0B 125 Kbps		
0x01	Emission frequency	0x00	Rx frame trig	Request mode - 500Hz max.	
		0x01	1 Hz		
		0x02	5 Hz		
		0x03	10 Hz		
		0x04	50 Hz		
		0x05	100 Hz		
		0x06	200 Hz		
		0x07	500 Hz		
		0x08	1kHz		Default
0x02	Rx frame ID	if CAN2.0A: 0 to 0x7F0		MSB	Default 0x07F0
0x03		if CAN2.0B: 0 to 0xFFFF		LSB	
0x04	Tx1 frame ID	if CAN2.0A: 0 to 0x7F0		MSB	Default 0x03F0
0x05		if CAN2.0B: 0 to 0xFFFF		LSB	
0x06	Tx2 frame ID	if CAN2.0A: 0 to 0x7F0		MSB	Default 0x03F4
0x07		if CAN2.0B: 0 to 0xFFFF		LSB	
0x08	Tx3 frame ID	if CAN2.0A: 0 to 0x7F0		MSB	Default 0x03F8
0x09		if CAN2.0B: 0 to 0xFFFF		LSB	

### Digital Input parameters:

0x0A	Speed Unit (only in wheel speed mode)	0	0.01 mph/bit	Default	
		1	0.01 kph/bit		
0x0B	Wheel circumference (input 1)	300 to 5000	mm	MSB	Default 2000
0x0C				LSB	
0x0D	Wheel circumference (input 2)	300 to 5000	mm	MSB	Default 2000
0x0E				LSB	
0x0F	Tops / rev (input 1)	1 to 100		Default 10	
0x10	Tops / rev (input 2)	1 to 100		Default 10	
0x11	Digital input 1 mode	0x00	Frequency meter mode	Default	
		0x01	Wheel speed mode		
		0x02	Engine speed mode		
0x12	Digital input 2 mode	0x00	Frequency meter mode	Default	
		0x01	Wheel speed mode		
		0x02	Engine speed mode		

### Analog Input parameters:

0x13	Output format	0	16bits	Default 1 (mV)
		1	mV	

### Filter parameters:

0x14	Analog input numeric filter type	0x00	No digital filter on analog inputs	Default 1 (Butterworth)	
		0x01	N <sup>th</sup> Butterworth on analog inputs		
		0x02	SRRC (Linear Phase) with N coefficients on analog inputs		
0x15	Digital filter parameter N	1 to 9 for Butterworth filters		MSB	Default 2
0x16		1 to 200 for SRRC filters			
0x17	Cut-off frequency of digital filter (if any)	15 to 500Hz		MSB	Default 250 (1Hz/bit)
0x18				LSB	