C-DIAS Analog Input Module **CAI 0811**
8 x resistance and temperature inputs
PT100, PT1000 or KTY can be set per channel

This analog input module is used to measure temperature ranges of

- -50 °C to +497 °C using a PT100 temperature sensor

- -125 °C to +850 °C using a PT1000 temperature sensor

- -50 °C to +150 °C using a KTY10 temperature sensor

The temperature sensor type can be set for each channel.

Resistance values from 80 - 280 Ω of 500 - 4700 Ω can also be measured optionally.

Technical Data

Temperature measurement with thermo resistors

Number of channels	8		
Resistance range	80 - 280 Ω	500 - 4700 Ω	
Applicable sensor type	PT 100	PT1000	KTY 10
Measurement range	-50 .... +497 °C	-125 ... +850 °C	-50 .... +150 °C
Resolution	0.1 K		
Conversion time for all channels	1 ms		
Input resistance	>10 MΩ		
Input filter	100 ms		
Measurement precision (4-wire measurement)	±0,8 % of maximum Measurement value		
Output reference	398 µA		
Max. Voltage drop over the sensor circuit	0.2 V		

Electrical requirements

Voltage supply from C-DIAS bus	+24 V	
Supply voltage (UL)	18 – 30 V DC	
Current consumption of C-DIAS bus (+5 V supply)	Typically 185 mA	Maximum 200 mA
Current consumption of C-DIAS bus (+24 V supply)	Typically 50 mA	Maximum 70 mA
Supply voltage current consumption (UL)	Maximum 175 mA	

IMPORTANT:
This module exceeds the standard current consumption for C-DIAS modules!
(+5 V: 150 mA and +24 V: 150 mA)

If this C-DIAS module is mounted on an 8-module carrier (CMB 08x), the total current of the C-DIAS modules used must be determined and checked.
The specification for the current can be found in the module-specific documentation under "Electrical Requirements".

The total current of the +5 V supply cannot exceed 1.2 A (150 mA / slot).
This is also true for the total current of the +24 V supply, which also cannot exceed 1.2 A (150 mA / slot).

IMPORTANT:
La consommation de courant de ce module dépasse les valeurs typiques pour les modules C-DIAS! (+5 V: 150 mA et +24 V: 150mA)

Si ce module C-DIAS est monté sur un fond de panier de taille 8 (CMB 08x), le courant total des modules utilisés doit être déterminé et vérifié.
Les données de la consommation de courant sont mentionnées dans la documentation technique du module respectif dans le paragraphe "Spécifications électriques"

Le courant total de l'alimentation +5 V ne peut pas dépasser 1,2A (150mA/module).
Cela vaut également pour le courant total de l'alimentation +24 V, lequel ne peut également pas dépasser 1,2A (150mA/module).

Only US and Canada:
This device was evaluated for UL508 as a limited voltage/current unit (LVLC). To meet the standard requirements, the device must be powered from an isolated transformer (24 V DC) with a UL-certified fuse (UL248) in the secondary circuit. The maximum rated current is 4 A. Alternatively, a class 2 power supply can be used.

Uniquement Etats-Unis et Canada:
Ce dispositif a été évalué pour UL508 comme une unité à tension / courant limité. Pour répondre aux exigences de la norme, l'appareil doit être alimenté par l'intermédiaire d'un transformateur d'isolement
(24 V DC) avec un fusible certifié UL (UL248) dans le circuit secondaire. Le courant maximum est de 4 A. Sinon, une alimentation de classe 2 peut être utilisée.
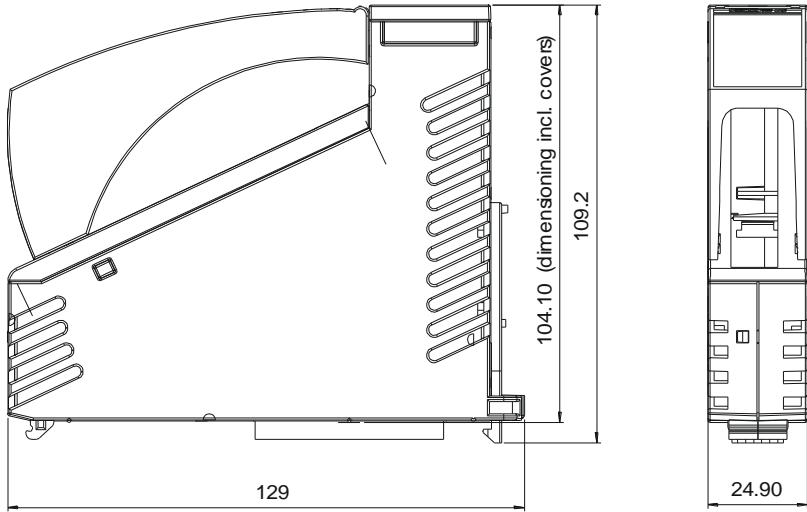
Miscellaneous

Article number	12-009-0811
Hardware version	1.x
Standard	UL508 (E247993)

Environmental conditions

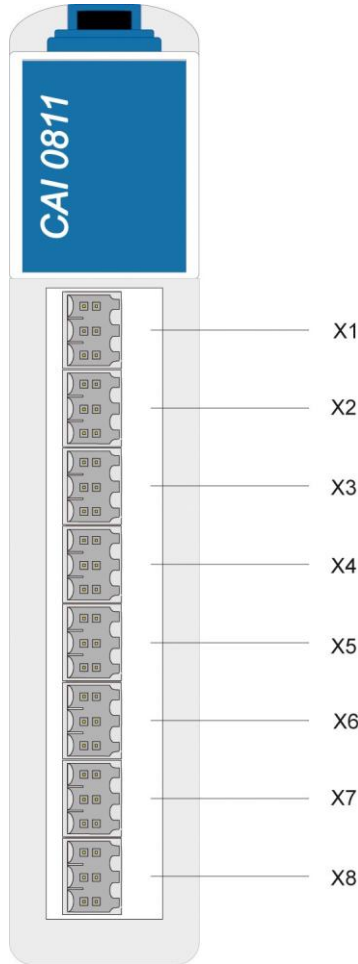| Storage temperature	-20 – +85 °C	
Operating temperature	0 – +60 °C	
Humidity	0 - 95 %, uncondensed	
EMV stability	According to EN 61000-6-2:2001 (industrial area)	
Shock resistance	EN 60068-2-27	150 m/s²
Protection Type	EN 60529	IP 20
Protection Type (UL)	open type device	
Pollution degree	2	

Mechanical Dimensions

Mounting position

To ensure optimal cooling of the module, the CAI 0811 must be mounted as shown (standing). For an angled mounting position, forced convection (cooling fan) must be used.
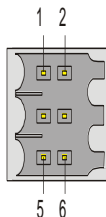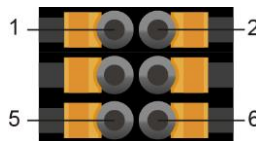
Top

Bottom

Connector Layout

X1 – X8: Analog inputs temperature sensor (PT100, PT1000 or KTY)

Pin	Function
1	Analog IN -
2	Analog IN +
3	Analog IN -
4	Analog IN +
5	AGND
6	Reference OUT

Connector	Type	Wire Size	Max. drive torque
X1-8	B2L 3.5/6	0.13 - 1.0 mm^2 28 - 18 AWG (UL/CSA)	Cage clamp

Applicable connectors
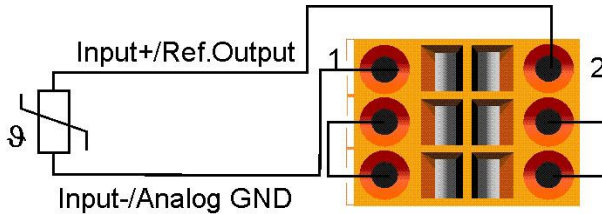
X1 - X8: 6-pin Weidmüller plug B2L/B2CF 3,5/6 / AU

The complete C-DIAS CKL 111 connector set with spring terminals is available from SIGMATEK under the article number 12-600-111.

Temperature Measurement with Thermo Resistors

2-wire measurement

The 2-wire measurement is only recommended for short sensor wires, as the resistance of the wire affects the measurement.
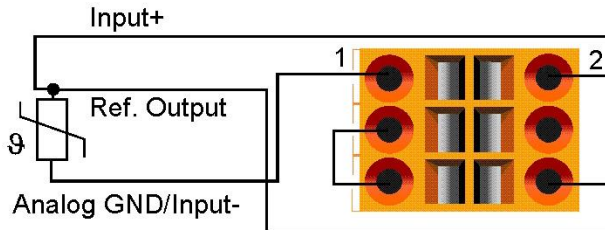The positive input must be connected with the reference output and the negative input with analog GND.

3-wire measurement

The method can be implemented when the ground wire has a large cross section and therefore a lower resistance.
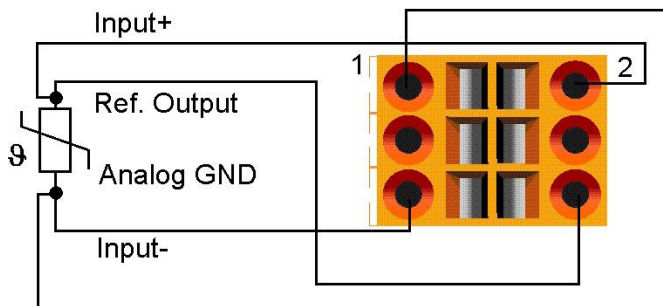The negative input must be connected to analog GND.

4-wire measurement

The type of connection gives the least measurement errors.

Addressing

Address	RD/WR	Description
$00	RD16	14-bit reference voltage for the analog measurement value
$02	RD16	Analog measurement value channel 1, 14-bit
$04	RD16	Analog measurement value channel 2, 14-bit
$06	RD16	Analog measurement value channel 3, 14-bit
$08	RD16	Analog measurement value channel 4, 14-bit
$0A	RD16	Analog measurement value channel 5, 14-bit
$0C	RD16	Analog measurement value channel 6, 14-bit
$0E	RD16	Analog measurement value channel 7, 14-bit
$10	RD16	Analog measurement value channel 8, 14-bit
$17	RD8/WR8	**Amplification setting for channel 1 to 8** Bit 0, 1 and 2 for channel selection: Bit 0 = „0", Bit 1 = „0" and Bit 2 = „0" … channel 1 Bit 0 = „1", Bit 1 = „0" and Bit 2 = „0" … channel 2 … Bit 0 = „1", Bit 1 = „1" and Bit 2 = „1" … channel 8 Bit 3 = „0" for setting the amplification Bit 4, 5 and 6 for setting the amplification of the selected channel Bit 0 = „1", Bit 1 = „0" and Bit 2 = „0" … PT1000, KTY10, potentiometer 500-4700 Ω Bit 0 = „1", Bit 1 = „0" and Bit 2 = „1" … PT100, potentiometer 80-280 Ω Bit 7 = not used
$18	RD8	PLL status register Bit 1 = PLL online Bit 0 = PLL lock (PLL latched)
$19	RD8/WR8	PLL configuration register Bit 0...3: Period of the PLL base time in ms
$1A	RD8	reserved
$1B	RD8	Xilinx Version

Data in EEPROM

Module data (organized byte-wise)

Address	Data	Description
$00	$xx	Check sum
$01	123	Indetification
$02	5	Module group 5 = CAI
$03	18	Variant 1 = CAI083
$04	8	Number of channels
$05	$1x	Hardware version $10 = HW-V1.0, $11 = HW-V1.1, …

AI matxhing data (organized word-wise)

Address	Data	Description
$40	$xxxx	Check sum
$42	12345	Indetification
$44	65	Length oft he following data in WORD
$46	$0008	Number of channels (8x AI)
$48	e.g. 12880	AI0 = Reference voltage at the time of calibration
$4A	80	Lower Ohm value channel 1 (high amplification)
$4C	e.g. 2050	Parts for Ohm value (80 Ohms) channel 1
$4E	300	Parts for Ohm value (300 Ohms) channel 1
$50	e.g. 9239	Parts for Ohm value (300 Ohms) channel 1
$52	500	Lower Ohm value channel 1 (low amplification)
$54	e.g. 299	Parts for Ohm value (500 Ohms) channel 1
$56	4700	Upper Ohm value channel 1 (low amplification
$58	e.g. 9529	Parts for Ohm value (4700 Ohms) channel 1
$5A - $68	-	Matching values channel-2
$6A - $78	-	Matching values channel-3
$7A - $88	-	Matching values channel-4
$8A – A8	-	Matching values channel-5
$AA - $B8	-	Matching values channel-6
$BA - $C8	-	Matching values channel-7
$CA - $D8	-	Matching values channel-8