

# C-DIAS Analogue Output Module

for eight  $\pm 10\text{V}$  DC respectively eight  $0 - 20\text{mA}$  DC outputs

## CAO 082

This analogue output module is used for driving components capable of being analogue driven (e.g. proportional pressure valves, frequency converters, etc.).



## Technical Data

### Analogue channel specifications

Number of channels	8 voltage outputs respectively 8 current outputs
Output voltage respectively output current	-10 to +10V DC 0 – 20mA
Output value	-2000 to +2000 or 0 to 4000
Voltage resolution	12 bit (5mV / bit)
Current resolution	12 bit (5 $\mu\text{A}$ / bit)
Voltage output protected against short circuiting	Yes
Current output protected against short circuiting	Yes
Loading capacity of the voltage output	>5K $\Omega$
Apparent ohmic resistance of current output	Maximum apparent ohmic resistance: 500 $\Omega$
Transient time -10V to +10V	<500 $\mu\text{s}$
Transient time 0 to 20mA	<5ms
Precision of analogue channel -10V to +10V	$\pm 0.3\%$ of the output size
Precision of analogue channel 0 to 20mA	$\pm 1\%$ of the output size

## Electrical requirements

Supply of the C-DIAS bus	+5V	
Current drawn at the C-DIAS bus (+5V supply)	Typically 12mA	Maximum 20mA
Current drawn at the C-DIAS bus (+24V supply)	Typically 180mA	Maximum 200mA

### IMPORTANT:

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

In case this C-DIAS module is mounted on an 8x module carrier (CMB 08x), the total current of the modules used must be determined and tested.

The specification for the current consumption is found in the module specific technical document under "Electrical Requirements"

The total current of the +5V supply cannot exceed 1.2A (150mA/slot).

This also applies to the total current of the +24V supply, which cannot exceed 1.2A (150mA/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).

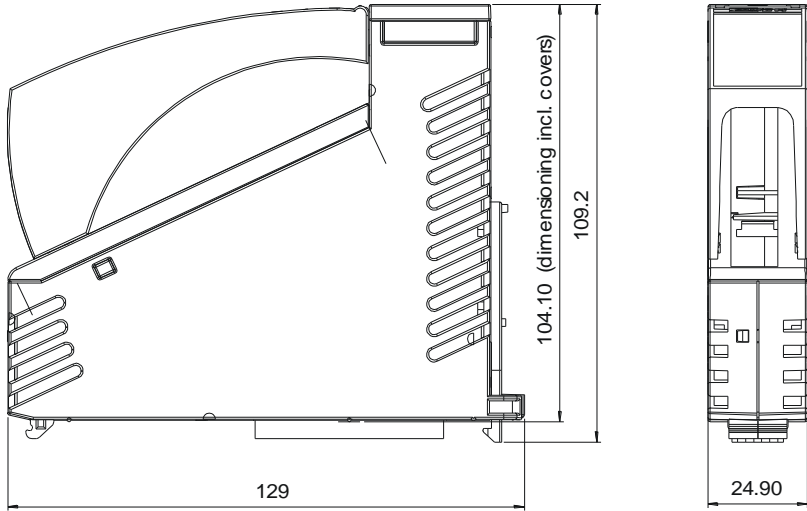
## Miscellaneous

Article number	12-010-082
Hardware version	1.x
Standardization	UL (E247993)

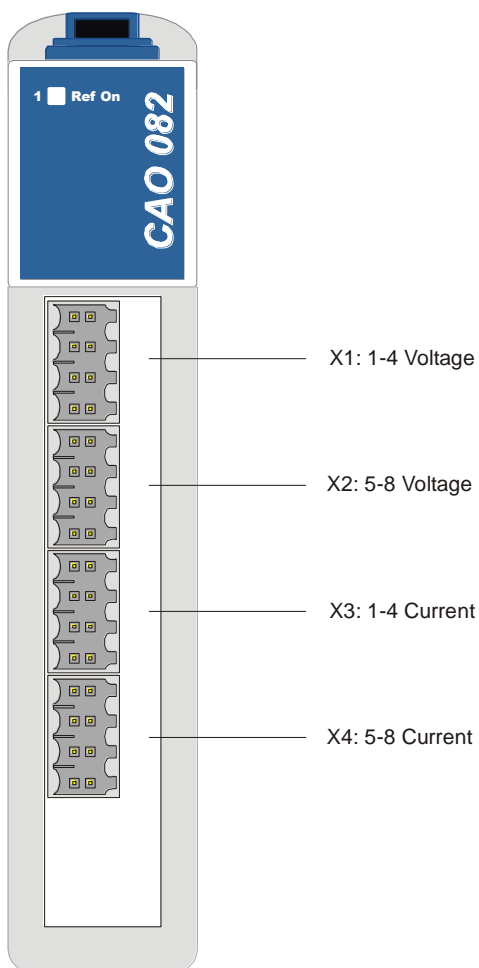
**Environmental conditions**

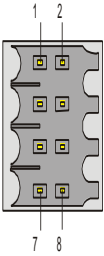
Storage temperature	-20 – +85°C	
Operating temperature	0 – +60°C	
Humidity	0 – 95%, without condensation	
EMV stability	In accordance with EN 61000-6-2:2001 (industrial)	
Resistance to shocks	EN 60068-2-27	150m/s <sup>2</sup>
Protective system	EN 60529	IP 20

## Mechanical dimensions

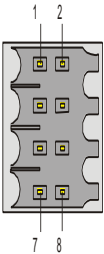


## Connections

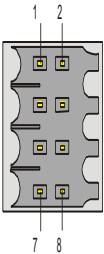


**X1: 1-4 Voltage**

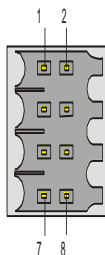
Pin	Assignment
1	AGND
2	Analogue output 1 ( $\pm 10V$ )
3	AGND
4	Analogue output 2 ( $\pm 10V$ )
5	AGND
6	Analogue output 3 ( $\pm 10V$ )
7	AGND
8	Analogue output 4 ( $\pm 10V$ )

**X2: 5-8 Voltage**

Pin	Assignment
1	AGND
2	Analogue output 5 ( $\pm 10V$ )
3	AGND
4	Analogue output 6 ( $\pm 10V$ )
5	AGND
6	Analogue output 7 ( $\pm 10V$ )
7	AGND
8	Analogue output 8 ( $\pm 10V$ )

**X3: 1-4 Current**

Pin	Assignment
1	AGND
2	Analogue output 1 (0-20mA)
3	AGND
4	Analogue output 2 (0-20mA)
5	AGND
6	Analogue output 3 (0-20mA)
7	AGND
8	Analogue output 4 (0-20mA)

**X4: 5-8 Current**


Pin	Assignment
1	AGND
2	Analogue output 5 (0-20mA)
3	AGND
4	Analogue output 6 (0-20mA)
5	AGND
6	Analogue output 7 (0-20mA)
7	AGND
8	Analogue output 8 (0-20mA)

**Usable connectors**

**X1-X4:** 8-pol. Weidmüller plug B2L/B2CF 3,5/8

The complete C-DIAS plug set CKL 047 with spring clamp is available from Sigmatek with the article number 12-600-047.

## Status display



LED No.	LED color	Meaning
1	green	Reference voltage on/off



## Wiring instructions

In order to guarantee trouble free functioning it is essential to stick to a meticulous wiring arrangement:

- The 0V supply voltage connection must follow the shortest path to the common 0V terminal.
- The CMB – housing must be properly connected to earth.
- The connecting wires to the analogue components must be as short as possible and avoid lying in parallel to wires carrying digital signals.
- The signal carrying wires must be screened.
- The screening must be connected to a common screening rail.

### Connection of the analogue outputs

Example of application: axis control for direct current servos, frequency converter



## Addressing

The analogue module is not automatically read into the process map by the operating system.

Address	Access		Function
16#00,16#01	WRITE	WORD	Analogue output value channel 1 (low byte, high byte)
16#02,16#03	WRITE	WORD	Analogue output value channel 2 (low byte, high byte)
16#04,16#05	WRITE	WORD	Analogue output value channel 3 (low byte, high byte)
16#06,16#07	WRITE	WORD	Analogue output value channel 4 (low byte, high byte)
16#08,16#09	WRITE	WORD	Analogue output value channel 5 (low byte, high byte)
16#0A,16#0B	WRITE	WORD	Analogue output value channel 6 (low byte, high byte)
16#0C,16#0D	WRITE	WORD	Analogue output value channel 7 (low byte, high byte)
16#0E,16#0F	WRITE	WORD	Analogue output value channel 8 (low byte, high byte)
16#11	WRITE	BYTE	Bit 7: Switch on/off reference

## Matching data

(24C02 is organized byte-wise)

Address	Data	Description
\$00	\$xx	Check sum
\$01	123	Identification
\$02	6	Module group 6 = CAO
\$03	2	Module version = CAO082
\$04	8	Number of channels
\$05	\$10	Hardware version \$10 = HW 1.0
\$06-\$3F	\$00	FILL
\$10		Serial number
		<b>Matching data in serial EEPROM</b>
\$40	\$xxxx	Check sum
\$42	12345	Identification
\$44	10	Length of the following data block in WORD
\$46	\$0808	Number of channels (MSB = 8 AO-I, LSB = 8 AO-U)
		<b>AO matching data for voltage output: (-2000 / 0 / 2000 = -10V / 0V / +10V)</b>
\$48	2061	AO1 Offset
\$4A	3800	AO1 Multiplier
\$4C	3892	AO1 Divisor
\$4E-\$52		Matching data AO2
\$54-\$58		Matching data AO3
\$5A-\$5E		Matching data AO4
\$60-\$64		Matching data AO5
\$66-\$6A		Matching data AO6
\$6C-\$70		Matching data AO7
\$72-\$76		Matching data AO8

<b>Matching data for current output: (0 / 4000 = 0mA / 20mA)</b>		
\$78	0020	AO1 Offset
\$7A	3800	AO1 Multiplier
\$7C	3827	AO1 Divisor
\$7E-\$82		Matching data AO2
\$84-\$88		Matching data AO3
\$8A-\$8E		Matching data AO4
\$90-\$94		Matching data AO5
\$96-\$9A		Matching data AO6
\$9C-\$A0		Matching data AO7
\$A2-\$A6		Matching data AO8
\$A8-\$FF	\$00	FILL