Digital-Analog-Converter
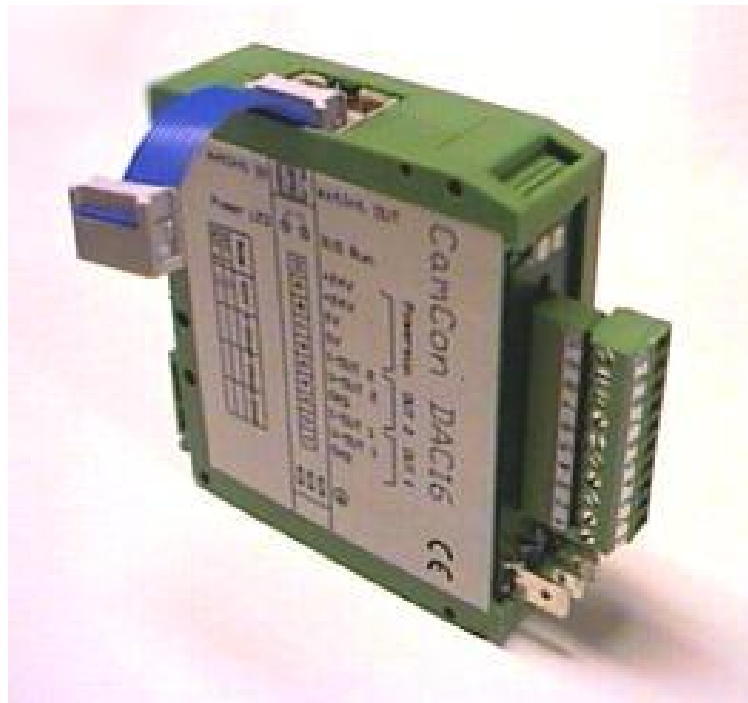
CamCon DAC16

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For your attention

This instruction manual relates to the CamCon DAC16 from 28.11.1997. The company Digitronic Automationsanlagen GmbH reserves the right to make changes which present an improvement of the quality or functionality of the device without prior notice. The instruction manual was created with great care, although it may not be error-proof. We would be grateful for any communication relating to any errors you may have found.

UP-date
You can also obtain this instruction manual on the Internet at **http://www.digitronic.com** in the latest version as PDF file.

Qualified personnel
This device may only be started and operated by qualified staff. By qualified we mean personnel who are entitled to handle, to earth and to lable devices, systems and power circuits in accordance with the technology safety standards.

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Note:	We have examined the devices of the CamCon series for year 2000 compatibility and have not found any adverse effects on any functions.
Note:	CamCon is a registered trademark of the company Firma Digitronic Automationsanlagen GmbH.
Note:	The devices of the CamCon series comply with the standards for electromagnetic compatibility: EN 55011, EN 55022, EN 55024 Part 2, EN 50082 Part 2, ENV 50140, VDE 0843 Part 2, VDE 0843 Part 4, VDE 0871, VDE 0875 Part 3 ("N"), VDE 0875 Part 11, VDE 0877 Part 2, IEC 801 Part 3, IEC 801 Part 2, IEC 801 Part 4, IEC 801 Part 5.

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PRECONISATEUR DE SOLUTIONS DEPUIS 1985

Table of contents

1. Introduction

The digital - analog - converter CamCon DAC16 is used as an anlog output expansion for electronic camswitches of the CamCon series. They are able to put out e.g. the speed, positiopn or values for Cams via their external interface. If using a a CamCon DAC16 converter instead of an ordinary output module (e.g. DC91I/O or DC16I/O), the parallel binary signal get converted into analog signals. Every CamCon DAC16 module has two 16Bit analog outputs that can provide current- as well as voltage signals. Inputs are not avaiable. By serial switching of several CamCon DAC16 modules, it is possible to expand the number of modules to a maximum of 13. This provides e.g. for a CamCon DC16 up to 26 analog Cam-outputs.

2. Assembling

The D/A converter DAC16 is snapped onto an "EN-carrier-rail" in the switch chest. To protect the module from overheating, it is necessary to leave a gap of at least 10mm between the devices. The grounding clamps are to be connected on the shortest possible way with the central grounding point of the assembling plate. The CamCon DC16's external interface is connected with the ten pole male plug **"ext.Int.IN"** of the CamCon DAC16 I/O module using the enclosed 10 pole flatwire cable. Every further CamCon DAC16 module is connected using the enclosed 10 pole flatwire cable to the ten pole male plug **"ext.Int.IN"** of the CamCon DAC16 I/O module. If in addition to the CamCon DAC16 module a CamCon DC16/IO module is used, the DAC16 module has to be switched to the end of this row.
The voltage supply has to be connected to every DAC16 module. It has a voltage of 24VDC +/- 20%. The data-lines of the CamCon DAC16 modules are connected to each other via optical couplers and therefore potentially free. The wiring of the analog outputs has to be done using shielded cables, the shield has to be laid to the grounding plug on one side. All wiring has to be done in cold state.
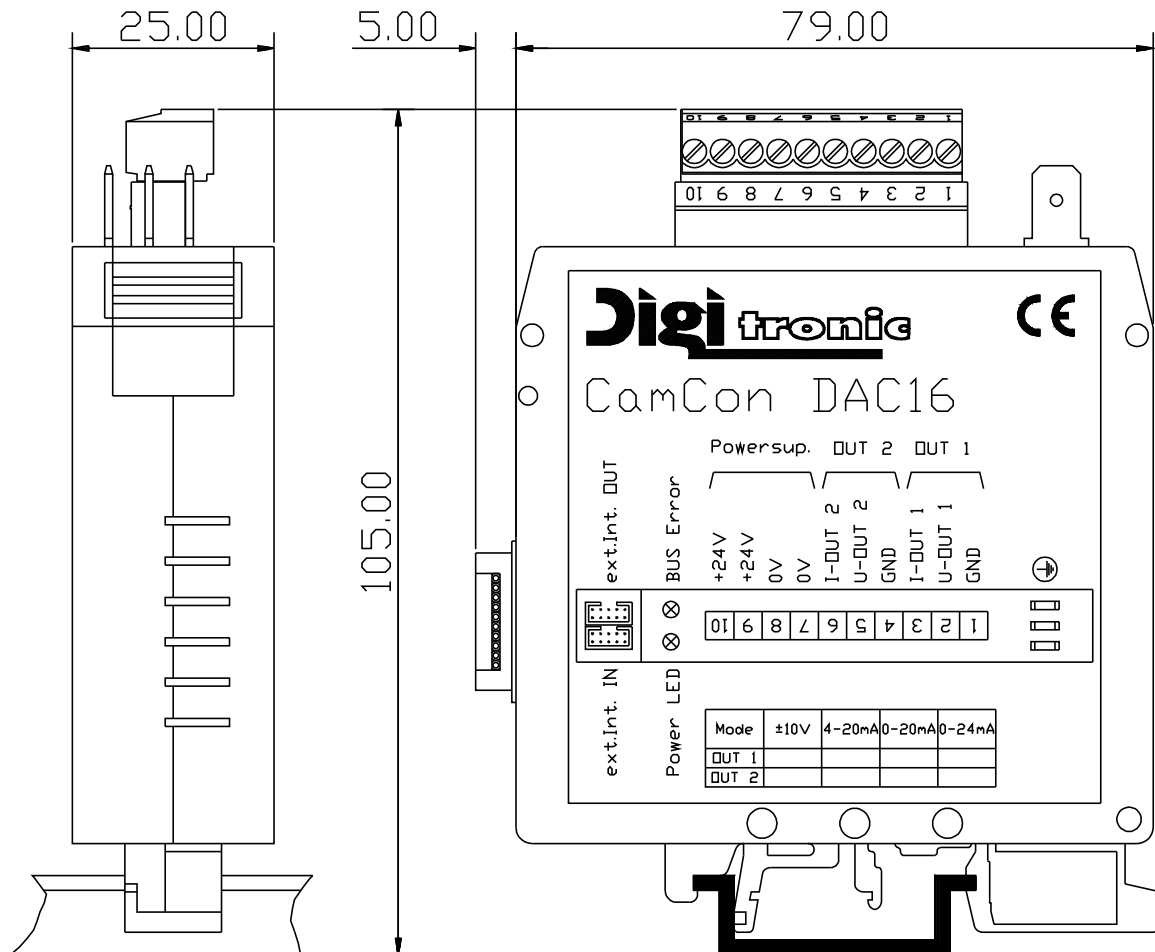
3. Status LED´s
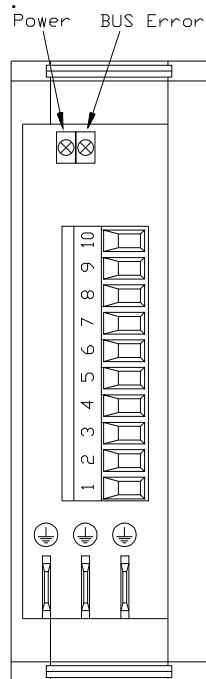
The D/A converter DAC16 has two status LEDs:

LED yellow: supply voltage is present.
LED Red: indicates, that no data exchange via a CamCon DC16 takes place at the moment. Possibles causes are: The cable length adjusted at the CamCon outruns the maximum length of 300 meters, the CamCon DC50, 90 or DC115 is switched off, i.e. the data exchange is interrupted (broken wire).

4. Dimensions

5. Electrical connections

Power BUS Error

5.1. Terminal allocation

5.1.1. Terminal allocation of the supply voltage

Terminal 7: 0V supply voltage
Terminal 8: 0V supply voltage
Terminal 9: +24VDC supply voltage
Terminal 10: +24VDC supply voltage

5.1.2. Terminal allocation of the analog input 1

Terminal 1: GND reference potential (0V)
Terminal 2: voltage output +/- 10Volt maximum 10mA.
Terminal 3: current output 0-20mA, 4-20mA or 0-24mA.
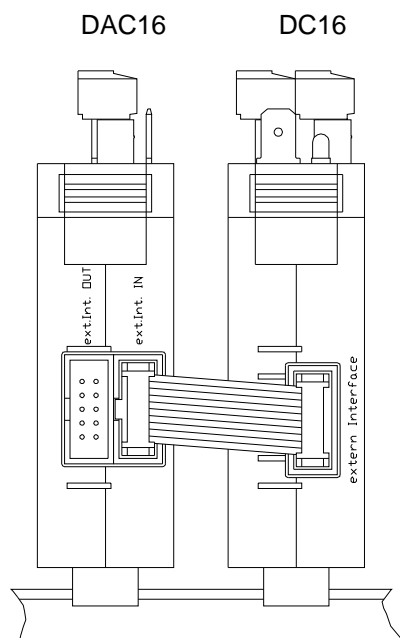   bei RL maximum 550Ω

5.1.3. Terminal allocation of the analog input 2

Terminal 4: GND reference potential (0V).
Terminal 5: voltage output+/- 10Volt maximum 10mA.
Terminal 6: current output 0-20mA, 4-20mA or 0-24mA.
               at RL maximum 550Ω

Note: Terminal 1, 4, 7 and 8 are connected to each other.

5.2. External interface

Via the external interface the data exchange with the CamCon camswitch takes place. The CamCon DAC16 Module has two 10 pole male plugs, called **"ext.Int.IN"** and **"ext.Int.OUT"** connection. Via the ext.Int.OUT the data exchange with a further CamCon module (e.g. CamCon DAC16, CamCon DC16I/O or CamCon DC91I/O i.e. DC92/I). The data exchange is realised via optical couplers and therefore the connection remains free of potentials. By this way of switching a BUS system for different applications can be established. For the connection of the DAC16 module with the CamCon DC16 a 10 pole flatwire cable is enclosed.

DAC16   DC16

5.2.1. Pin allocation of the external interface IN

Pin 1,10: not used
Pin 4,7:   ground (0V)
Pin 2:   RxD -
Pin 3:   RxD +
Pin 5:   CLK -
Pin 6:   CLK +
Pin 8:   TxD -
Pin 9:   TxD +

5.2.2. Pin allocation of the external interface OUT

Pin 1,4,7,10: not used
Pin 2:   TxD -
Pin 3:   TxD +
Pin 5:   CLK -
Pin 6:   CLK +
Pin 8:   RxD -
Pin 9:   RxD +

5.2.3. External interface with a wiring distance of 0.5 up to 300m

The maximum wiring distance of the external interface is 300 meters. For this purpose a 6 pole data cable with conductors wired as pairs is required as well as an adapter cable from 10 pole flatwire to 9 pole D-Sub-plug. This cable's shielding has to be laid to the grounding plugs on both sides.
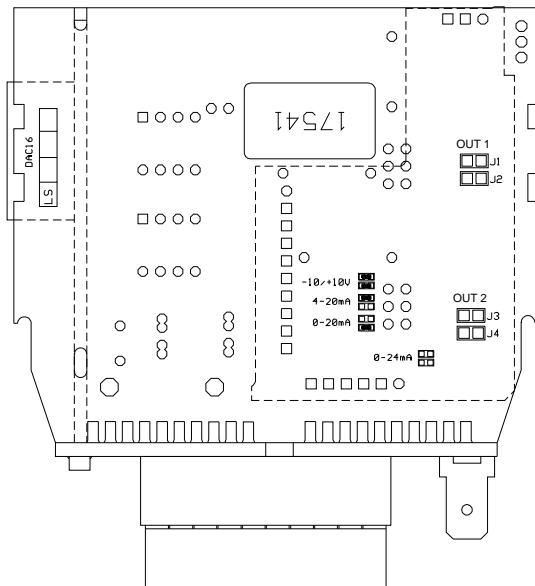
6. The analog outputs

The CamCon DAC16 has two 16 Bit analog outputs. They provide either 0 - 20mA, 4 - 20mA, 0 - 24mA or, as an option, +/-10Volt signals. The maximum output current at +/-10 Volt is 10mA (not short circuit proof). The load-resistance under current-output must not outrun 550 Ω. The outputs are not potentially free towards the voltage supply. the wiring of the analog outputs has to be done using shielded cables and the cable's shielding has to be laid to the grounding plugs on one side.

6.1. Signal level of the analog outputs

The CamCon DAC16 module offers 4 possibilities of signal output for both analog outputs. These are: 0 - 20mA, 4 - 20mA, 0 - 24mA or optionaly +/- 10Volt.
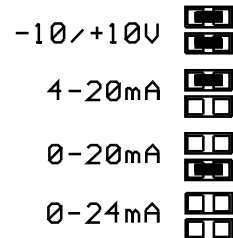
The adjusted signal levels are factory-provided marked by a cross at the sticker label on the left side of the case.

Mode	±10V	4-20mA	0-20mA	0-24mA
OUT 1		✖		
OUT 2	✖			

If you want to change the signal level, the device has to be opened. The case can be opened in the middle using a screwdriver. On the solding side of the largest printed circuit board two solding bridges for every analog output, i.e. the analog output 1(OUT1) and 2 (OUT2), are located, which are named J1 to J4 in the drawing to the right. J1 and J2 are used to adjust the signal level for output 1 and J3 and J4 to adjust the output level for output 2.

The drawing to the right shows which solding bridges have to be opened or closed, to get the desired signal level.

-10/+10V

4-20mA

0-20mA

0-24mA

Note:
For the +/-10Volt voltage output an daditional small wrapped printed circuit board is required.

7. Commisioning

Before the first commisioning, check the device's wiring carefully. See also chapter 5. Electrical connections on page 5. For configuration and calibration of the analog outputs please regard in the camswitches manual the chapter "unit configuration", sub-chapter "anolog outputs" and in the chapter "system configuration" sub-chapter "special outputs".

8. Technical data

Display .... 2 Status LED´s for supply voltage and error messages
Number of outputs .... two 16 Bit analog outputs.

Type of output .... Power or optionally voltage.
Current output .... optionally 0 - 20mA, 4 - 20mA or 0 - 24mA
at RL maximum 550Ω.
Voltage output .... +/- 10Volt up to 10mA (not short circuit proof)
Resolution .... 16Bit.

Maximum response time with full levellift............ approximately 3ms.

Length of the connection cable
between CamConDC16 and CamCon DAC16 ... maximum 300m.

Supply voltage.. 24VDC ±20 %
Power consumption .... approximately 60mA without load.

Connections for:
Voltage supply and outputs .... via plug-in screw clamps IP20

Assembling .... comfortable snap-on assembling, carrier rail according to EN 50 022, may be set in rows with 10mm gap for air circulation

Disassembling... by pulling back the snap-bars.

Dimensions .... See chapter 4. Dimensions on page 4.

Protection.. Case corresponds to IP20.

Working temperature .... 0°C ... + 50° C

Weight... approximately 150g