AD4 ECAT MM Series

User Guide

Innovative Mess- und Datentechnik

Copyright

Trademarks

Product disposal/recycling

If this symbol (crossed-out wheeled bin) appears on the device, this means that the European Directive 2012/19/EU applies to this device.

The correct disposal of old equipment will protect the environment and people from possible negative consequences.

Become familiar with local regulations for separate collection of electrical and electronic equipment.

Follow local regulations and do not dispose of old equipment with household waste.

Contact information

CSM offers support for its products over the entire product life cycle. Updates for the individual components (e.g. documentation, configuration software and firmware) are made available on the CSM website. To keep up to date, it is therefore recommended that you check the download area of the CSM website for updates at least once a month.

Contents

1 Introduction

1.1 About this user guide

This user manual contains important information on how to handle and configure the following CSM AD ECAT measurement modules:

- AD4 pro ECAT MM Series Typ IG100 | IG1000
- AD4 ECAT MM Series Typ OG100 | OG1000
- AD4 ECAT MM Series Typ IE100 | IE1000
- AD4 ECAT MM Series Typ OE100

The entire user guide should be read carefully before installation and initial operation.

1.2 Symbols and writing convention

Symbol/note	Meaning	Example of application
☞	User instruction	☞ Click on **OK** to confirm the entry.
⇨	Result of an action	⇨ The following dialog opens:
→	Cross reference to external information source(s)	→ *CSMconfig Online Help, section "Menu commands"*
→	Text highlighted in blue (with or without arrow) refers to a link link/cross reference within the document.	→ Chapter 4.3.2.4 "Ground connection" ☞ Continue with chapter 5.4.3.4 "Creating a new configuration file"
i	This pictogram refers to important notes or additional information on a specific topic.	**i** CSM offers a mounting kit for devices in standard housings. For further information please contact our sales department.
**Options	Interface**	**Menu selection** Menu items, options and buttons are highlighted in bold. The vertical bar "|" separates the menu from the menu command. The example on the right means: Click on the **Options** menu and select **Interface.**	☞ Select **Options	Interface**.
(→ **Options | Interface**)	A menu option integrated into the text.	The CAN interface is selected via the **Interface** dialog (→ **Options | Interface**).

Tab. 1-1: Symbols and writing conventions

1.3 List of abbreviations

Abbreviation	Meaning
ASAM	**A**ssociation for **S**tandardization of **A**utomation and **M**easuring Systems: registered association coordinating the development of technical standards → *asam.net*
CAN	**C**ontroller **A**rea **N**etwork: serial bus system developed by Bosch for networking ECUs in vehicles
CoE	**C**ANopen **o**ver EtherCAT®: protocol for use of the CANopen family of profiles over EtherCAT®
DAQ	**D**ata **A**c**Q**uisition), e.g. DAQ software
ECAT	**E**ther**CAT**®: an Ethernet-based field bus system developed by Beckhoff company and the EtherCAT® Technology Group → *ethercat.org*
EMC	**E**lectro**M**agnetic **C**ompatibility
ESD	**E**lectro**S**tatic **D**ischarge
HV	In terms of automotive engineering, **H**igh **V**oltage is used to specify the following voltage ranges: ▸ Alternating voltage (AC) greater than 30 V and up to 1000 V ▸ Direct voltage (DC) greater than 60 V and up to 1500 V
HV BM	HV Breakout Module
HV BM-Split evo	High-voltage measurement system with separate components for recording measured values (HV SAM1 evo), breakout boxes with shunt modules for current and voltage measurement (HV SBM(L)_I), and breakout boxes for voltage tapping (HV SBM(L)_U)
MC Tool	**M**easurement & **C**alibration Tool
STG	**ST**rain **G**auge
TEDS	**T**ransducer **E**lectronic **D**ata**S**heet: sensor with integrated memory for electronic data sheet
XCP	Universal Measurement and Calibration Protocol → *asam.net*

Tab. 1-2: List of abbreviations

1.4 Warning

A warning indicates specifically or potentially dangerous situations. Failure to follow a warning could result in injury or death to persons and/or damage to property.

This guide contains warnings that the user must observe to ensure safe operation and to prevent injury to persons and damage to property.

Warning design

A warning sign consists of the following components:

- Warning symbol
- Signal word
- Source/type of hazard
- Possible consequences of non-compliance
- Measures to avert the hazard

Warning symbols

Symbol	Meaning
	General risk This symbol indicates a general hazard.
	High voltage! This symbol indicates a risk due to hazardous electrical voltage.
	Hot surface! This symbol indicates a possible risk of burns from hot surfaces.

Tab. 1-3: Warning signs

Signal words

Signal word	Meaning
WARNING	... indicates a potential hazard. Failure to follow this warning may result in serious injury, or possibly death.
CAUTION	... indicates a potential hazard. Failure to follow this warning may result in minor injuries.

Tab. 1-4: Signal words

If several potential hazards originate from one source of danger, then the warning (signal word/symbol) that indicates the greatest potential hazard is used. For example, a warning indicating danger to life or serious injury may also indicate the potential risk of property damage.

1.5 Directive

A directive contains important information about the product described in the guide. Failure to observe a directive may result in malfunction and/or damage to property and material. A directive is indicated by the blue symbol and the signal word **NOTE**.

Example

NOTE!	
	This symbol indicates important information. Failure to observe this information can impair the function or result in damage to the measurement module. ☞ Read the information carefully.

Symbols

Symbol	Meaning
	This symbol indicates important information. Failure to observe this information can impair the function or result in damage to the measurement module.
	Wear suitable safety gloves.
	Disconnect the device before starting to work.

Tab. 1-5: Symbols used in mandatory signs

1.6 Legal disclaimer

This guide and other documents are part of the product and contain important information for its safe and efficient use. To maintain the high quality level the product is continuously being developed, which may result in the product‘s technical details changing at short notice. As a result, the contents of this documentation may differ from the technical specifications of the product. No claims against the manufacturer can therefore be derived from the contents of the product documentation.

Computer-Systeme-Messtechnik GmbH (hereafter referred to as "CSM") is not liable for technical or editorial errors or missing information.

CSM assumes no liability for damage resulting from improper use of the product and/or non-observance of the product documentation, in particular the safety instructions.

→ Chapter 2 "Safety Instructions"

1.7 Warranty and exclusion of warranty

The warranty covers the safety and functionality of the product within the warranty period. Excluded from the warranty are claims based on possible consequential damages caused by malfunction or non-function of the product.

The warranty shall become invalid if

- the product is handled improperly
- prescribed maintenance intervals are not observed
- the product is modified
- the user does not observe the product documentation
- the product is operated with accessories or parts which are not explicitly approved for operation by CSM.

→ Chapter 2 "Safety Instructions"

1.8 ESD information

The manufacturer of the product declares that the following measurement modules comply with the requirements of EU Directive 2014/30/EU:

- AD4 pro ECAT MM Series Typ IG100 | IG1000
- AD4 ECAT MM Series Typ OG100 | OG1000
- AD4 ECAT MM Series Typ IE100 | IE1000
- AD4 ECAT MM Series Typ OE100

NOTE!	
	Electronic components can be damaged or destroyed by electrostatic discharge (ESD). ☞ Make sure that no electrostatic discharge occurs via the internal contacts of the inputs. ☞ Avoid electrostatic discharge when handling or installing sensors.

2 Safety Instructions

2.1 General safety instructions

The measurement modules comply with the latest technical developments and the recognized safety standards. The measurement modules may only be used in a technically faultless condition and in accordance with their intended use. To avoid health hazards or damage to the measurement module, please observe the safety instructions in the following chapter and the document “Safety Instructions MiniModules”.

CAUTION!		
	The surface of the measurement module can become very hot if it is operated in specific environments (e.g. engine compartment). **Touching the surface may cause serious burns**. ☞ Let the device cool down before handling. ☞ Wear appropriate safety gloves, if required.	

NOTE!	
	The interface cables and connection cables of the measurement modules have shields, which are connected to ground. The housings of the measurement modules are also connected to ground (PA/PE). Therefore it is important that the shields of the cables and the enclosures are at the same voltage potential to avoid erroneous measurement results or destroyed measurement modules. ☞ Make sure that no differences in potential occur when mounting the device. ☞ Isolate the measurement module from the mounting location, if required.

NOTE!	
	Trouble-free operation and electrical safety can only be ensured if the module is correctly installed. ☞ Make sure that the module is correctly installed. ☞ Operate the module only within the specified operation environment. → Chapter 4 „Mounting and installation“ → *AD4 ECAT MM series datasheets*

2.2 Obligations of the operator

- The operator has to make sure that only qualified and authorized personnel are responsible for handling the product. This applies to installation and operation.
- In addition to the product's technical documentation, the operator may have to provide further operating instructions in accordance with the Occupational Safety and Health Act[1] and the Ordinance on the Use of Working Materials[1].

2.3 Intended use

- AD4 ECAT MM series measurement modules are designed for the acquisition of fast analog signals.
- These measurement modules may only be used under the operating conditions which are defined in the technical specifications.
- Read the technical documentation accompanying the measurement module(s) and follow the instructions contained therein.
- The calibration of measurement modules may only be performed by authorized calibration laboratories (e.g. CSM calibration laboratory).
- Repair work must only be carried out by CSM.
- The operator bears full responsibility if this device is used in any way which does not comply with the intended use.

1 Outside the jurisdiction of this Act or this Ordinance, the relevant country-specific directives and ordinances applicable at the product's operating site have to be observed

3 Product Description

3.1 Connections and components

The following images show the connectors of an AD4 ECAT MM series measurement module.[2]

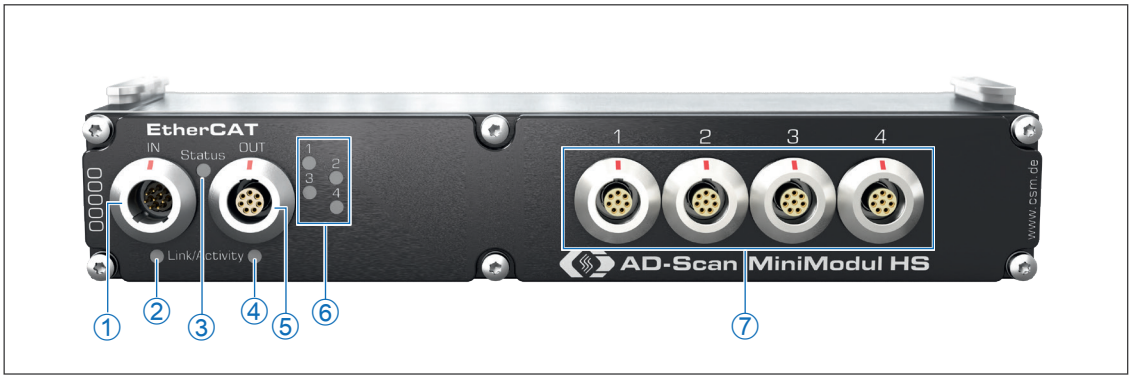


Fig. 3-1: AD4 pro IG1000, front view

1. **IN** socket (chapter 4.3.2.1 "EtherCAT® IN socket")
2. **Link/Activity** LED indicator to 1. (chapter 3.2.1 "EtherCAT® bus Link/Activity LED indicators IN and OUT")
3. EtherCAT® bus status LED indicator (chapter 3.2.2 "EtherCAT® bus Status LED indicator")
4. **Link/Activity** LED indicator to 5. (chapter 3.2.1 "EtherCAT® bus Link/Activity LED indicators IN and OUT")
5. **OUT** socket (chapter "EtherCAT® OUT socket")
6. Measurement channel LED indicators 1 - 4 (chapter 3.2.3 "Channel LED indicators")
7. Measurement inputs 1 - 4 (chapter 4.3.2.2 "Measurement input sockets")

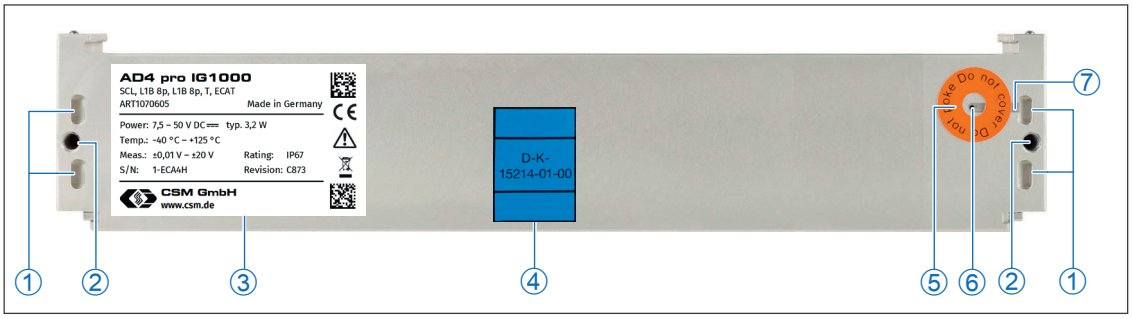


Fig. 3-2: AD4 pro IG1000, rear side of the housing

1. Cable tie eyelets (for cable ties with a width of max. 4 mm)
2. Threaded holes for mounting screws
3. Type label (chapter 6.1 "Type label")
4. DIN EN ISO/IEC 17025 calibration label (chapter 6.2 "Maintenance services")
5. Sticker "Do not poke – Do not cover"
6. GORE™ membrane ventilation opening
7. Venting groove

2 The measurement inputs of the device in Fig. 3-1 are equipped with LEMO 1B 8-pole sockets. Customer-specific solutions on request. All further technical specification of the measurement module, however, remain unaffected.

3.2 Functional description of LED indicators

3.2.1 EtherCAT® bus Link/Activity LED indicators IN and OUT

The LED indicators for the **IN** and **OUT** sockets (Fig. 3-1, ② and ④) are lit or are flashing when the AD4 pro ECAT measurement module is connected to an XCP-Gateway or another ECAT measurement module and data is being transferred.

LED		Meaning
Color	Status	
green	permanently lit	LED **IN**: Ethernet connection to an upstream module or gateway in the ECAT chain has been established. LED **OUT**: Ethernet connection to a downstream module or gateway in the ECAT chain has been established. No data is transferred.
green	flashing	Ethernet connection is active, i.e. data transfer is running
-	off	No measurement module or XCP-Gateway connected.

Fig. 3-3: EtherCAT® bus Link/Activity LED indicators **IN** and **OUT**

3.2.2 EtherCAT® bus Status LED indicator

The two-colour status LED (Fig. 3-1, ③) is lit red for a few seconds after the module is switched on and then turns off.[3]

LED		Meaning
Color	Status	
–	off	Measurement module not connected or power supply switched off
green	flashing	50 % on, 50 % off: Device is in status PRE-OPERATIONAL.[4]
green	flashing	20 % on, 80 % off: Device is in status SAFE-OPERATIONAL.[5]
green	permanently lit	Device is in status OPERATIONAL.[6]
red	flashing	Configuration error
red	permanently lit	Measurement module is switched on or connection to power supply has been established, but there is no Ethernet communication.
green/red	flashing	New firmware is downloaded and activated.

Tab. 3-1: EtherCAT® bus Status LED indicator

3 Status designations according to Beckhoff and EtherCAT® Technology Group EtherCAT® standard.
4 Status PRE-OPERATIONAL: Configuration/setting of the values for the measurement range
5 Status PRE-OPERATIONAL: Check the measurement range configuration and confirm if the set values are correct. If the measurement range is invalid, the measurement module remains in PRE-OPERATIONAL status.
6 Status OPERATIONAL: The module is in measurement operation.

3.2.3 Channel LED indicators

The channel LEDs provide information on the status of the corresponding channel.

LED	Meaning	Error code in measurement software
off	Normal operation, sensor excitation deactivated	
100% green	Sensor excitation activated	
50% green 50% off	Channel has been selected via configuration software	
50 % red 50 % off	deactivated channel has been selected via configuration software	
80 % red 20 % off	measured value is out of the measurement range	INPUT_RANGE_UNDERFLOW or INPUT_RANGE_OVERFLOW
100 % red	invalid measurement range	MEASUREMENT_RANGE_UNDERFLOW or MEASUREMENT_RANGE_OVERFLOW

Tab. 3-2: Channel LED indicators

→ *Further information can be found on the CSM website in section Products | ECAT MiniModules and in the following documents:*

- → *Datasheet "AD4 pro ECAT MM Series Type IG100 | IG1000"*
- → *Datasheet "AD4 ECAT MM Series Type OG100 | OG1000"*
- → *Datasheet "AD4 ECAT MM Series Type IE100 | IE1000"*
- → *Datasheet "AD4 ECAT MM Series Type OE100"*
- → *Data sheet "XCP-Gateway Series"*

4 Mounting and installation

For trouble-free operation and a long product service life, the requirements for mounting and installation specified in this chapter must be observed.

4.1 Before mounting

AD4 ECAT MM series measurement modules are equipped with a GORE™ membrane and a venting groove which are needed for pressure compensation. To ensure the breathing function of the membrane, the ventilation opening in the rear side of the housing must never be blocked/covered or permanently covered with water or other liquids. There is then a risk of condensation collecting inside the housing and damaging the measurement module.

	NOTE!
	The GORE™ membrane is required for pressure compensation. ☞ When mounting the module, make sure that the ventilation opening for the GORE™ membrane is not obstructed or permanently covered by water or other liquids.

	NOTE!
	Trouble-free operation and electrical safety can only be ensured if the measurement module is correctly installed. ☞ Ensure correct installation. ☞ Operate the measurement module only within the specified operation environment. → *AD4 ECAT MM series datasheets*

4.2 Mounting AD4 ECAT measurement modules

	NOTE!
	Strong magnetic fields, such as those induced by permanent magnets, may impair the trouble-free operation of the measurement module. ☞ Make sure that the mounting position of the measurement module is free from strong magnetic fields.

Requirements

- When choosing the mounting position, make sure that the ventilation opening of the GORE™ membrane is not obstructed or covered by liquids.
- The mounting site allows for sufficient space to connect and disconnect the cables without clamping or pinching them.
- Avoid mounting positions where the modules are permanently exposed to strong vibrations and shocks.

Required parts/material

- Two M4 screws[7] and suitable tools
- further mounting material such as mounting angles, if required

Mounting the measurement module

☞ Fasten the measurement module at the mounting position.

NOTE!	
	Making mechanical modifications to the housing, e.g. by drilling holes in the housing, can impair the function of the measurement module or destroy it. Doing so would also invalidate the warranty. ☞ Never drill any holes in the housing. ☞ Observe the mounting instructions.

Mounting of measurement modules using the Slide Case mechanism

If multiple modules are used in an application, Slide Case housings offer the advantage that not every device has to be mounted individually. After mounting the first module, further modules can be connected to each other via the guide rails on the upper side of the housing and the mounts on the underside of the housing. This forms compact module packages without the need for tools or mounting materials. Adapter plates are available for connecting Slide Case housings of different sizes. The first and the last module of a module package are fixed with one mounting angle each.

→ *"XCP/ECAT Accessories for CSM measurement modules"*

7 The thread depth in the module is 8 mm. The screw length must be chosen according to the thickness of the mounting material. Either two (slide case housing) or four screws (standard housing) are required depending on the module version.

4.3 Installing AD4 ECAT measurement modules

4.3.1 Before installation

i	CSM offers various cables for the connection of ECAT modules. → *"XCP/ECAT Accessories for CSM measurement modules"* For further details please contact the CSM sales department.

i	CSM offers maintenance and repair packages for ECAT measurement modules. → Chapter 6.2 "Maintenance services"

4.3.2 Connectors

The measurement module is connected to an XCP-Gateway (alternatively to an EtherCAT® master) or to an upstream EtherCAT® measurement module using the **IN** socket. The **OUT** socket is designed for connecting the device with further measurement modules. EtherCAT® measurement modules receive their power supply from the XCP-Gateway, i.e. via the same cable connection (chapter 4.3.2.1 and chapter 4.3.2.2). The sensors are connected to the measurement inputs 1 - 4 (chapter 4.3.2.3).

4.3.2.1 EtherCAT® IN socket

The measurement module is connected to the XCP-Gateway (alternatively to an EtherCAT® master) or to an upstream EtherCAT® measurement module via the EtherCAT® **IN** socket. EtherCAT® measurement modules receive their power supply from the XCP-Gateway, i.e. via the same cable connection. CSM uses LEMO 1B sockets as standard for the ECAT connection. For connecting a cable to this socket the following plug is needed:

- **FGL.1B.308.CLL xxxxx**[8]

Pin	Signal	Description
1	Power +	Power supply, plus
2	Power GND	Power supply, ground
3	RX -	Ethernet: Receive data, minus
4	TX -	Ethernet: Transmit data, minus
5	RX +	Ethernet: Receive data, plus
6	Power GND	Power supply, ground
7	Power +	Power supply, plus
8	TX +	Ethernet: Transmit data, plus
Housing	Shield	Cable shield

Tab. 4-1: Plug (front view) for EtherCAT® **IN** socket: pin assignment

NOTE!	
	The power supply is looped through from the **IN** socket to the **OUT** socket. The voltage applied to a pin on the **IN** socket is therefore always also applied to the corresponding pin on the **OUT** socket. ☞ Make sure that this work is only carried out by qualified and trained personnel.

8 "xxxxx" is a placeholder here. The actual designation depends on the diameter of the applied cable.

EtherCAT® OUT socket

The **OUT** socket is used for daisy-chaining the EtherCAT® measurement modules. CSM uses LEMO 1B sockets as standard for the **OUT** socket. For connecting a cable to this socket the following plug with plug insert (male) is needed:

- **FGA.1B.308.CLA xxxxx**[9]

	Pin	Signal	Description
	1	Power +	Power supply, plus
	2	Power +	Power supply, plus
	3	Power GND	Power supply, ground
	4	RX +	Ethernet: Receive data, plus
	5	TX -	Ethernet: Transmit data, minus
	6	RX -	Ethernet: Receive data, minus
	7	Power GND	Power supply, ground
	8	TX +	Ethernet: Transmit data, plus
	Housing	Shield	Cable shield

Tab. 4-2: Plug (front view) for EtherCAT® **OUT** socket: pin assignment

4.3.2.2 Measurement input sockets

By default, LEMO 1B sockets are used for the measurement inputs. To have the device equipped with different sockets, please contact CSM. For connecting a cable to this socket the following plug with plug insert (male) is needed:

- **FGG.1B.308.CLADxxxxx**[9]

	Pin	Signal	Description
 Code G	1	V_{IN} -	Measured voltage, minus
	2	V_{IN} +	Measured voltage, plus
	3	V_{GND}	Sensor excitation voltage, ground
	4	V_{OUT} +	Sensor excitation, plus
	5	V_{OUT} -	Sensor excitation, minus
	6	–	–
	7	Shield channel	Shield for measurement signal
	8	Data	Data line (TEDS)
	Housing	Cable shield	Outer shield (housing)

Tab. 4-3: Plug (front view) for measurement input socket: pin assignment

9 "xxxxx" is a placeholder here. The actual designation depends on the diameter of the applied cable.

4.3.2.3 Connecting the cables

A variety of cables in different lengths is available for connecting the device to the data acquisition system and the power supply on the one hand and for daisy-chaining the measurement modules on the other hand.

- Cable for connecting an EtherCAT® measurement module to the PC and the power supply: K420e.2-xxxx[10]
- Cable for connecting/linking EtherCAT® measurement modules: K400.1-xxxx

i	In order to prevent short circuits caused by small metallic items (e.g. short pieces of wire), the plug connecting the interface cable to the **IN** socket has been designed as a plug with socket insert (female). Accordingly, the plug connecting a connection cable to the **OUT** socket is designed as a plug with plug insert (male). → Chapter 4.3.2.1 and chapter 4.3.2.2

Connecting the power supply

AD4 ECAT measurement modules receive their power supply from the XCP-Gateway. The XCP-Gateway is connected to the power supply and the data acquisition system (PC) via the interface cable. These cables are available in different lengths.

CSM measurement modules are designed for low power consumption. In combination with the connection cables from CSM and due to their compact design, MiniModules can in most cases be easily installed. To ensure error-free functioning, the following aspects should be considered when choosing the appropriate power supply.

Minimum power supply voltage

The minimum power supply voltage is the minimum voltage delivered by a power supply. In an automotive application, this is usually the vehicle's on-board supply system (e.g. "12 V" for passenger cars). Note that this minimum value is required for proper operation of the module. In a 12 V vehicle electrical system, for example, this value can drop for a short time (from a few milliseconds to a few seconds) during engine start-up to a value below the minimum value specified for a measurement module. During operation, it has to be ensured that the supply voltage applied to the modules of a measurement chain does not drop below the specified minimum value.[11]

Cable lengths

The resistance of the connection cables causes a voltage drop along the cable. The extent of the voltage drop depends on the length of the cable and the current flowing through it. In a supply chain, the required minimum voltage has to be applied to each module.[11]

NOTE!
Depending on the number of measurement modules and the cable lengths it may be necessary to apply one or multiple intermediate power supplies. An intermediate power supply is also required if the measurement modules connected to the XCP-Gateway require more power than the existing power supply can provide due to higher power consumption.

10 This cable can also be used to connect an AD4 ECAT MM series device directly to a data acquisition system (PC). This requires that the PC is equipped with data acquisition software that supports EtherCAT® master operation.
11 The minimum value specified on the type label of a measurement module is the relevant indicator (chapter 6.1 "Type label").

i	The following special cables are available for intermediate supply: ▸ Cable for intermediate power supply K72 (CAN) ▸ Cable for intermediate power supply K410.1 (ECAT)

Further information on the cables available can be found in the corresponding data sheets.

→ *"XCP/ECAT Accessories for CSM measurement modules"*

5 How to use AD4 ECAT measurement modules

5.1 CSMconfig user interface

The CSMconfig user interface consists of the following sections:

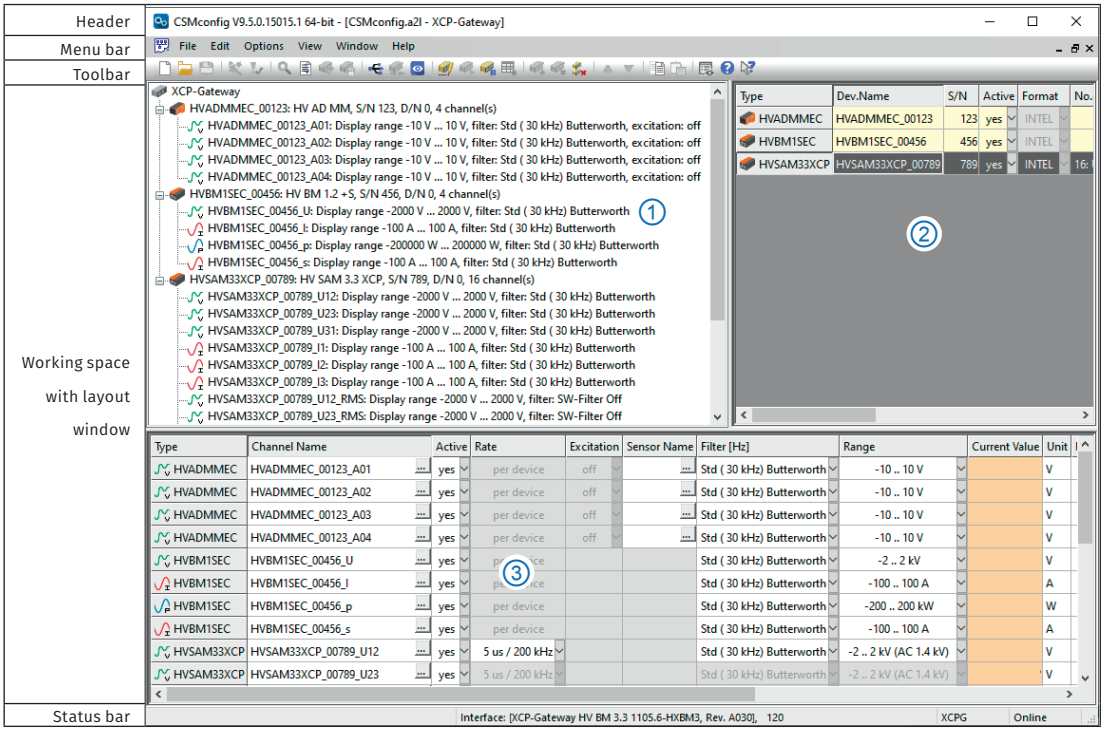


Fig. 5-1: CSMconfig user interface

5.1.1 Header

Clicking the program icon on the left opens the program menu.

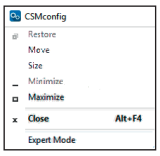


Fig. 5-2: Program menu

In addition to the standard Windows functions, it also contains the **Expert Mode** option.

→ *CSMconfig Online Help, section "Expert mode"*

5.1.2 Menu bar

The commands are arranged in the following menus:

Fig. 5-3: Menu bar

→ *CSMconfig Online Help, section "Menu commands"*

5.1.3 Toolbar

The toolbar contains the most frequently used menu commands. A command is executed by clicking on the corresponding icon.

Fig. 5-4: Toolbar

→ *CSMconfig Online Help, section "Toolbar"*

5.1.4 Working space

The configuration data is stored in a configuration document. Depending on the bus system, the configuration document is either saved as a DBC file (CAN) or an A2L file (XCP-on-Ethernet).

→ *CSMconfig Online Help, section "Configuration document (DBC-/A2L-File)"*

CSMconfig provides various configuration views to create or process a configuration document:

- **Tree view** (Fig. 5-1, ①)
- **Device list** (Fig. 5-1, ②)
- **Channel list** (Fig. 5-1, ③)

These views are integrated in a higher-level window, the layout window. The **Select view layout** dialog offers a number of layouts with different combinations of configuration views.

☞ Select **Window | Select View Layout**.

⇨ The **Select view layout** dialog opens.

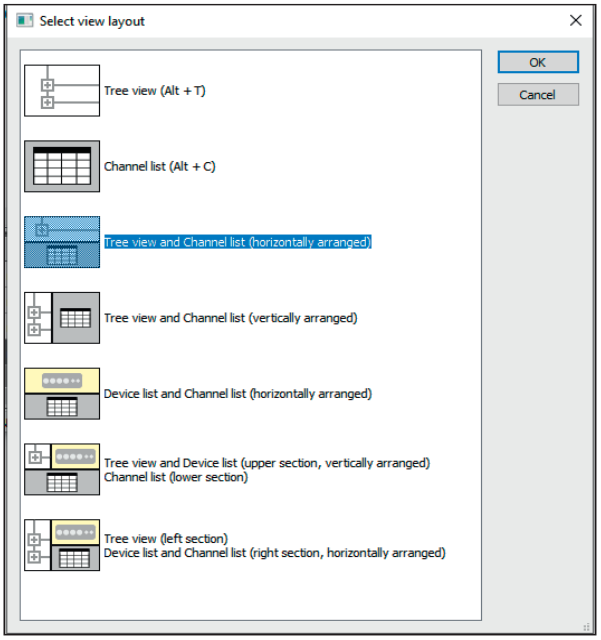


Fig. 5-5: **Select view layout** dialog

☞ Select the matching layout and confirm your choice by clicking on **OK**.

→ *CSMconfig Online Help, section "Configuration views and layout window"*

5.1.5 Status bar

Fig. 5-6: Status bar

The status bar provides the following information:

- The interface currently connected to the PC or the message "No valid interface selected"
- The bus system of the active configuration.
- The configuration status: "Online" or "Offline"

5.2 Preparing the module configuration

The configuration software CSMconfig is used to configure an AD4 ECAT device in conjunction with an XCP-Gateway [12]. The configuration of measurement modules can be performed via an EtherCAT® master as well. CANopen over EtherCAT® (CoE) is used as application protocol.

	NOTE!
	It is recommended always to use the latest version of CSMconfig. Older versions may not support all module variants and functions. The latest version of CSMconfig is available in the download section of the CSM website. CSMconfig can check for new versions every time the program is started. If a newer version is available, the corresponding download link will be displayed in the dialog box.

	NOTE!
	Since CSMconfig requires ports 5555 and 5556 for communication, the firewall settings may need to be adjusted. ☞ Make sure that the firewall is configured in such a way that it allows incoming and outgoing traffic on the ports 5555 and 5556.

	NOTE!
	The XCP-Gateway uses a fixed IP address (factory setting: 192.168.100.3). To be able to communicate with the XCP-Gateway from the data acquisition software, the IP addresses of the network adapter connecting the XCP-Gateway with the data acquisition system (PC) and the XCP-Gateway need to be within the same address range. A typical IP address (IPv4) for the network adapter of the PC which is suitable for the factory setting is IP address 192.168.100.1. ☞ Make sure that all IP addresses are unique and within the same IP address range.

→ Chapter 5.3.3.5 "Communication parameter settings"

12 Instead of an XCP Gateway module, it is also possible to use an XCP measurement module with an integrated and enabled XCP-Gateway.

5.2.1 Changing the IP address of the network card

	NOTE!
	To change the IP address, extended user rights or administrator rights may be required.[13]

Windows 10

☞ Select **Start | Control Panel | Network and Sharing Center.**
⇨ The **Network and Sharing Center** dialog is displayed.
☞ Select **View your active networks**, then click on the **Wireless Network Connection** entry
⇨ The **Local Area Connection Status** dialog is displayed.
☞ Click on **Properties**.
⇨ The **Local Area Connection Properties** dialog is displayed.
☞ Select the option **Internet Protocol Version 4 (TCP/IPv4)** and click on **Properties**.
⇨ The dialog **Internet Protocol Version 4 (TCP/IPv4) Properties** is displayed.

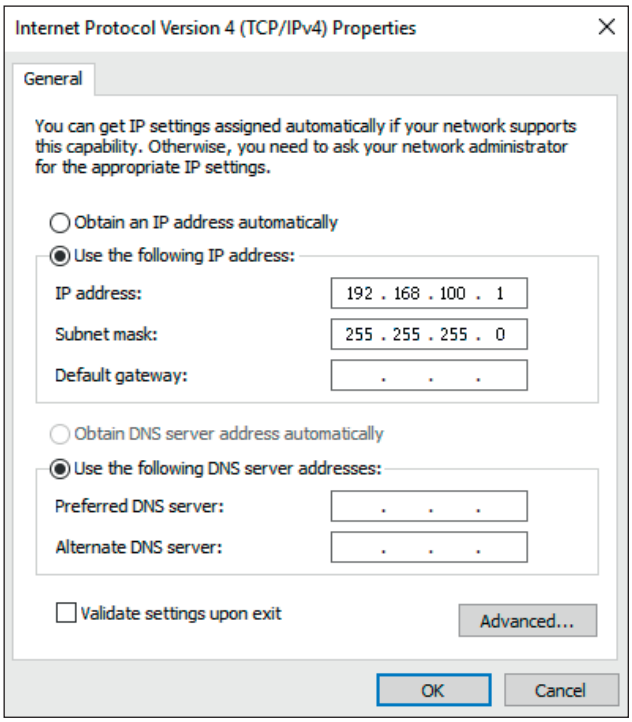


Fig. 5-7: Windows 10, **Internet Protocol Version 4 (TCP/IPv4) Properties** dialog

☞ Enter the required address into the **IP address** field (here: 192.168.100.1).
⇨ The **Subnet mask** entry is added automatically.
☞ Click **OK** to finish the process.

13 Information on setting the IP addresses for Vector interfaces is provided in the CSMconfig online help, section "Connecting and configuring Vector Interfaces in CSMconfig".

Windows 11

☞ Select **Start | Settings**.

☞ Select **Network & internet** from the left sidebar.

⇨ The options for **Network & internet** are displayed.

☞ Select **Advanced network settings**.

⇨ The options for **Advanced network settings** are displayed.

☞ Select the required Ethernet network from the Network adapters list.

☞ Go to the **View additional properties** section and click on the arrow on the right.

⇨ The options for **View additional properties** are displayed.

☞ Go to **IP assignment** and click on **Edit**.

⇨ The **Edit IP settings** dialog opens. If the option "Automatic (DHCP)" is set, the remaining setting options of the dialog box will be hidden.

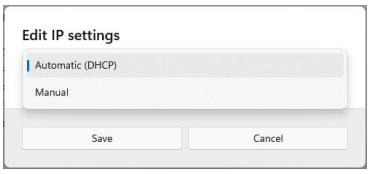


Fig. 5-8: Windows 11, **Edit IP Settings** dialog, settings hidden

☞ In this case, change the setting from "Automatic (DHCP)" to "Manual" (Fig. 5-8).

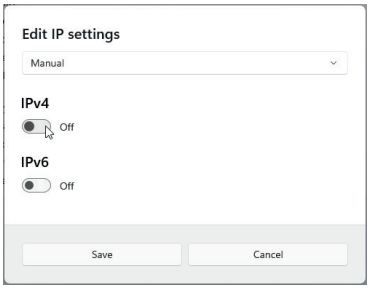


Fig. 5-9: Windows 11, **Edit IP Settings** dialog, IP options

☞ Next, enable the required internet protocol (IPv4 or IPv6) (Fig. 5-9).

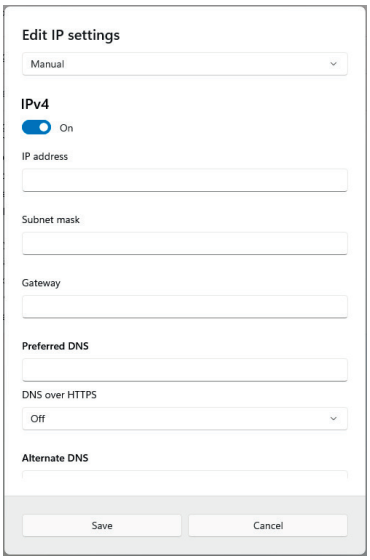


Fig. 5-10: Windows 11, **Edit IP Settings** dialog, full setting options

☞ Make the required settings (IP address, etc.) and then click **Save** (Fig. 5-10).

5.3 Configuring AD4 ECAT measurement modules

The following paragraphs contain information on the following topics:

- Settings of AD4 ECAT MM devices
- Creating a standard configuration (offline and online) with an AD4 ECAT measurement module in CSMconfig

Online configuration

- The measurement modules are linked to the configuration software.
- A configuration can be transferred to a single or to all measurement modules of a measurement chain in CSMconfig immediately after completion.

Offline configuration

- There is no connection between configuration software and measurement module(s). The configuration document is created "offline", which means without connection to the measurement chain.
- If an online connection to the measurement chain is established at a later time, the configuration can then be transferred using CSMconfig.

Configuration views

The user can choose from three different view modes for configuration: **Tree view**, **Device list** or **Channel list**. As of program version 8.12 these configuration views are integrated in a higher-level window to form configuration layouts.

→ Chapter 5.1.4 "Working space"

The following paragraphs contain the basic steps for a configuration using the **Tree view**.

5.3.1 Dialogs and windows

i	Which views are displayed during configuration depends on the configuration layout defined in the **Select view layout dialog**.

Example

If a new configuration file is created, the Select document type dialog is displayed by default. Select the file type required for the configuration here. Use document type **XCP-on-Ethernet (A2L)** for measurement applications with ECAT measurement modules.

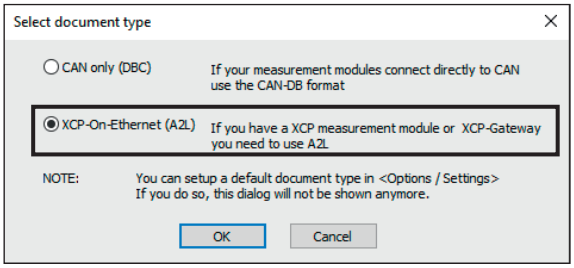


Fig. 5-11: **Select document type** dialog, **XCP-on-Ethernet (A2L)** selected

The settings used to create a new configuration file can be specified in the **Program Settings** dialog. The **Default document type** option offers the following options for creating configuration files:

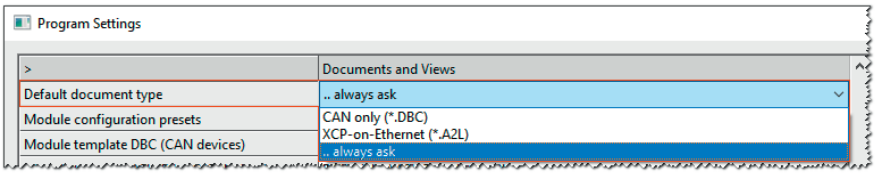


Fig. 5-12: **Program Settings** dialog, **Default document type** options

- **... always ask** (default): The **Select document type** dialog is used.
- **CAN only (*.DBC)**: When a new configuration file is created, the *.DBC file type is automatically used.
- **XCP-on-Ethernet (*.A2L)**: When a new configuration file is created, the *.A2L file type is automatically used.

→ *CSMconfig Online Help, section "Program settings"*

5.3.2 Offline configuration

The following sections describe the steps for configuration in **offline mode**. This file can be transferred to a measurement module at a later time or made available for further use in other tools such as vMeasure CSM, CANape® or INCA.

☞ Start CSMconfig.
⇨ The CSMconfig program window opens.

☞ Select **File | New**.
⇨ The **Select document type** dialog (Fig. 5-11) opens.

☞ For configurations with ECAT measurement modules (XCP-Gateway), select **XCP-on-Ethernet (A2L)** and confirm with **OK**.
⇨ The **Tree view** window opens (here **CSMconfig.a2l**).

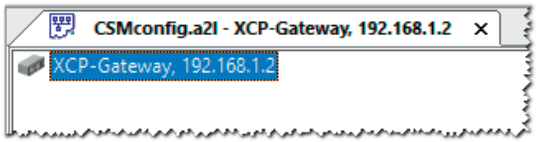


Fig. 5-13: Layout window **CSMconfig.a2l**, **Tree view**

→ *User guide "XCP-Gateway Series", chapter "Communication parameter settings"*

☞ Move the mouse pointer to the window and right-click.
⇨ The context menu opens.

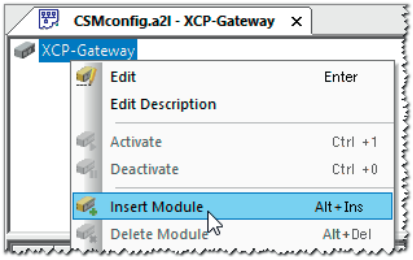


Fig. 5-14: **CSMconfig.a2l** window, **Tree view**, context menu

☞ Select **Insert Module**.

⇨ The **Select device type** dialog opens.

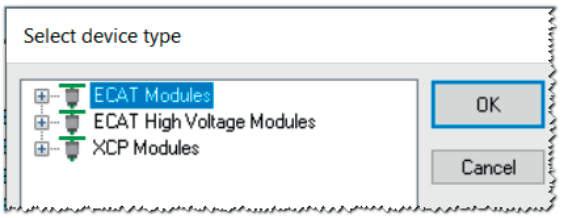


Fig. 5-15: **Select device type** dialog

	NOTE!
	This dialog is designed to select a module series (e.g. **AD MM series**, **Type IG**) but not specific module variants (e.g. AD4 pro IG100). The options displayed in the dialogs for device and channel configuration comply with the highest configuration level of the corresponding module series. When transferring the configuration file to the measurement module, if some of the settings are not compatible, an error message appears indicating the incorrect setting (e.g. measurement data rate too high).

☞ If the required measurement module is not displayed in the selection window, click on the corresponding **+** symbol on the left.

⇨ The submenu opens.

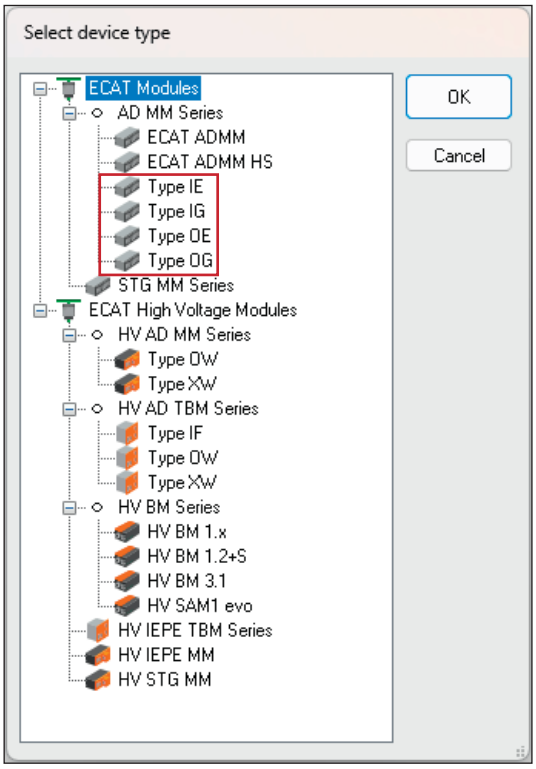


Fig. 5-16: **Select device type** dialog, subentries faded in

☞ Select the module series (e.g. **ECAT modules | AD MM Series | Type IG**) and confirm selection with **OK**.

⇨ The **Device configuration dialog** is displayed.

⇨ The layout window **CSMconfig.a2l** appears in the background.

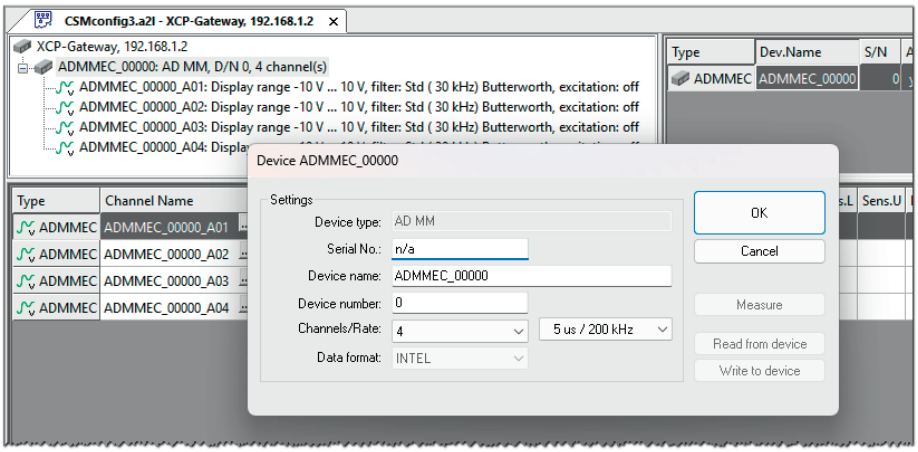


Fig. 5-17: **Device configuration dialog**, **CSMconfig.a2l** window in the background

Notes on the configuration of measurement channels and the measurement modules can be found in the "Online configuration" section.

→ Chapter 5.3.3.7 "Measurement channel settings" or chapter 5.3.3.8 "Measurement module settings"

When a connection to the measurement setup has been established, the configuration must still be transferred to the corresponding measurement module.

→ Section "Transferring configuration data to the measurement module"

5.3.3 Online configuration

5.3.3.1 Preparing the configuration

☞ Before starting an online configuration, make sure that

- Measurement module(s) are correctly connected to the XCP-Gateway
- XCP-Gateway and computer are properly connected via a suitable interface
- the power supplies are connected
- the latest version of CSMconfig has been installed on the PC

5.3.3.2 Starting the program

☞ Start CSMconfig.

⇨ The program window opens (the last loaded configuration may be displayed).

☞ If an interface is displayed in the status bar of the program window (Fig. 5-18), proceed with chapter 5.3.3.4 "Creating a new configuration file".

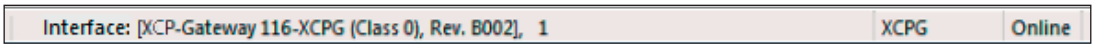


Fig. 5-18: Status bar: "XCP Gateway" interface

☞ If no interface is displayed in the status bar (Fig. 5-19), continue with chapter 5.3.3.3 "Selecting a communication interface".

Fig. 5-19: Status bar: "No valid interface selected"

5.3.3.3 Selecting a communication interface

The XCP-Gateway was designed as a bus interface, which is why it is listed in the **Interface** dialog. If no XCP-Gateway is displayed in the status bar after program start-up, the message **No valid interface selected** will be shown instead (Fig. 5-19). This means that a suitable communication interface still has to be selected.

After the program has been started CSMconfig checks the communication interfaces for available connections. These are listed in the **Interface** dialog.

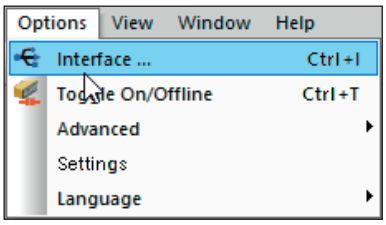


Fig. 5-20: **Options | Interface**

☞ Select **Options | Interface**.

⇨ The **Interface** dialog opens.

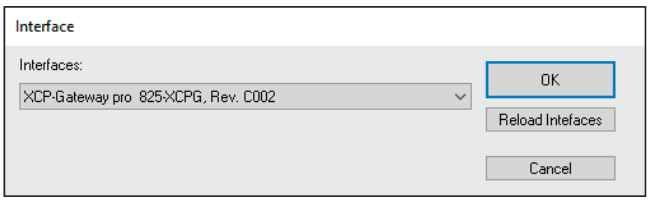


Fig. 5-21: **Interface** dialog

☞ If the required interface is not displayed, click on the arrow ▼ to the right.

⇨ The drop-down menu opens.

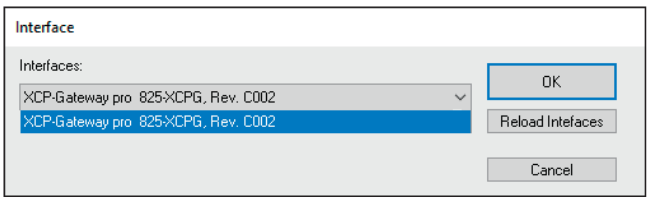


Fig. 5-22: **Interface** dialog, drop-down menu open

☞ Select the required interface (XCP-Gateway).

☞ Click **OK** to confirm the selection.

5.3.3.4 Creating a new configuration file

i	The procedure described in the following section is not required if the configuration is performed using the option **Auto-Configuration**.

→ Chapter 5.3.3.6 "Scan Bus and Auto-Configuration"

☞ Select **File | New**.

⇨ The **Select document type** dialog (Fig. 5-11) opens.

⇨ For configurations via an XCP-Gateway, choose **XCP-on-Ethernet (A2L)** and confirm with **OK**.

⇨ The configuration window **CSMconfig.a2l** opens.

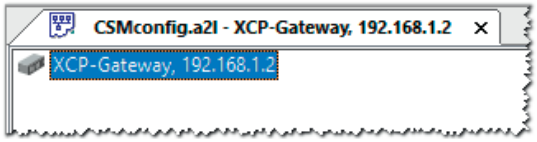


Fig. 5-23: **CSMconfig.a2l** window, **Tree view**

5.3.3.5 Communication parameter settings

The communication parameters used by the data acquisition software to establish the connection to one or more measurement modules via the XCP-Gateway are specified in the **XCP-Gateway Configuration** dialog. Modifications are only necessary if the default settings do not match the settings of the PC which is used for data acquisition.

The communication between CSMconfig and XCP Gateway - and thus also the configuration of the measurement modules connected to the XCP Gateway - can be carried out without any adjustment of these parameters.

☞ Go to the **Tree view** window and double-click on the **XCP-Gateway** entry.

⇨ The **XCP-Gateway Configuration** dialog then opens.

In the following example, the XCP-Gateway is connected with a network interface with the following IP settings:

- Class C network, subnet mask 255.255.255.0
- Fixed host IP address: 192.168.100.1

→ Chapter 5.2.1 "Changing the IP address of the network card"

This corresponds to the Windows default settings for network configurations.

- By default CSMconfig assigns the IP address 192.168.100.3 (host + 2).
- The port for XCP communication is 5555 (+ 5556 for broadcast commands).

This IP configuration is used by the XCP-Gateway for measurements.

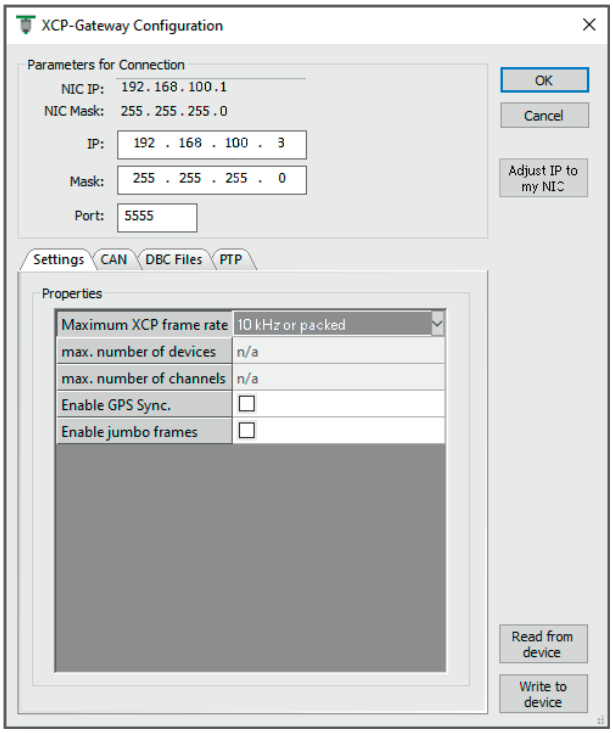


Fig. 5-24: **XCP Gateway Configuration** dialog, **Settings** tab

Section Parameters for Connection

- **NIC IP**: IP address of the network card to which the XCP-Gateway is connected.
- **NIC mask**: By default, the NIC mask is set to 255.255.255.0 (class C).
- **IP address**: Input field for the IP address of the XCP-Gateway. Input field for the IP address of the XCP-Gateway. The address 192.168.100.3 (host + 2) is assigned by default. If more than one XCP module or gateway is connected to a port via a switch, it has to be made sure that the default address is only used once, i.e. only by one XCP-Gateway.
- **Subnet mask**: By default, the subnet mask is set to 255.255.255.0 (class C).
- **Port**: The default setting for communication via XCP is port 5555.

Adapting the IP address to a network card (Network Interface Card, NIC)

- If measurement will be done with a different PC/NIC, the XCP-Gateway connection parameters must match the network settings on the other machine.
- If you use PC and network adapter card for both configuration and measurements, the IP addresses of the network adapter and the XCP-Gateway must be in the same address range (Fig. 5-25, green markers), but they must not be identical (Fig. 5-25, blue markers). If necessary, the IP address can be adjusted by clicking the button **Adjust IP to my NIC**. The IP address is automatically adjusted to the IP address of the network adapter. A manual modification of the **IP address** entry is not required.

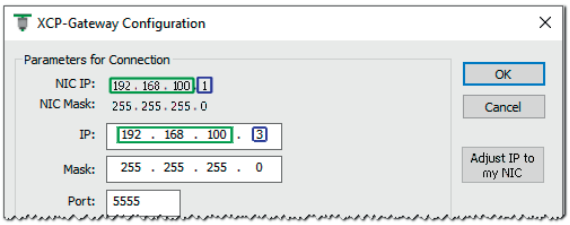


Fig. 5-25: **Adjust IP to my NIC** command

☞ Click **Adjust IP to my NIC** to adjust the IP address to the network adapter.
⇨ The IP address is adjusted and displayed in the **IP** field.

☞ Click on **Write to device** to transfer the settings to the XCP-Gateway.

CSMconfig reads out the parameters of the network card to which the XCP-Gateway is connected. This is the data displayed in the **Settings** tab. If no XCP-Gateway is connected, the settings of the previous configuration or the default settings are used.

Tabs

The **XCP-Gateway Configuration** dialog contains additional setting options spread out over up to five tabs.

The following sections describe the functions and setting options of the **Settings** tab (Fig. 5-24).

- **max. XCP frame rate:** This selection menu includes two options for data acquisition via XCP:
  - **2 kHz**: for low sampling rates (≥ 500 µs) and a larger number of measurement channels. The lower frame rate of 2 kHz allows a larger number of measurement channels (up to 600 channels and 100 measurement modules per XCP-Gateway). If this option is selected, the sampling rate of the connected measurement module may not exceed 2 kHz.
    → Rate ≥ 500 µs, max. 100 devices, 600 channels
  - **10 kHz or packed**: for high sampling rates (< 500 µs to 1 µs) and a low(er) number of measurement channels. The higher frame rate of 10 kHz allows up to 150 channels and 25 measurement modules per XCP-Gateway. With sampling rates over 10 kHz (i.e. when the sampling rate is higher than the frame rate), the XCP-Gateway automatically switches to "packed" mode. The higher the sampling rate – up to 4 MHz is possible, depending on the measurement module – the lower the number of channels and measurement modules which can be operated on the gateway.
    → Max. 25 devices, 150 channels, "packed" mode for rates under 100 µs
- **max. number of devices**: maximum number of measurement modules that can be connected to this XCP-Gateway
- **max. number of channels**: maximum number of measurement channels which can be assigned to this XCP-Gateway

→ *User guide "XCP-Gateway Series", chapter "Communication parameter settings"*

5.3.3.6 Scan Bus and Auto-Configuration

The next step is to check which measurement modules are connected to the bus. You can do this by using the commands **Scan Bus** and **Auto-Configuration**.

Measurement modules connected to the bus can be identified and the stored configurations can be read out using both functions. In addition to detecting modules, **Auto-Configuration** also provides the option to resolve potential conflicts (e.g. CAN ID conflicts or name assignment conflicts). An automatic channel configuration in its very sense (e.g. setting the measurement range), however, is not performed.

Running Scan Bus

Scan Bus searches the bus for connected measurement modules. The configuration data is summarized in order to be finally saved in a configuration document.

	NOTE!
	A configuration document has to be opened in order to perform **Scan Bus**. ☞ Select **File | New**.

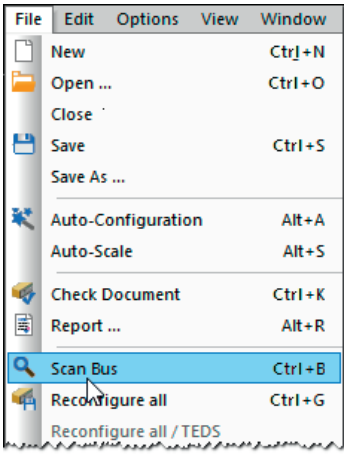


Fig. 5-26: **File | Scan Bus**

☞ Select **File | Scan Bus**.

⇨ The bus is checked for available measurement modules.

⇨ Detected measurement modules are listed below the bus level.

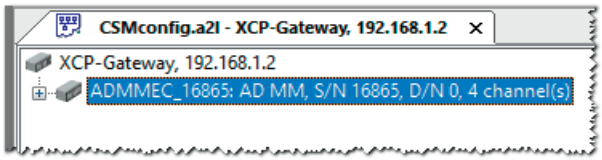


Fig. 5-27: **CSMconfig.a2l** window, **Tree view**, detected measurement modules

Running Auto-Configuration

If the command **Auto-Configuration** is used instead of **Scan bus**, there is no need to create a new configuration file beforehand. A new configuration file is automatically created when executing the command. Upon process completion, the new configuration file needs to be named accordingly and stored in the required folder.

→ Chapter 5.3.3.9 "Saving the measurement configuration"

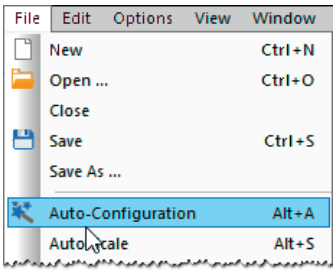


Fig. 5-28: **File | Auto-Configuration**

☞ Select **File | Auto-Configuration**.

⇨ The bus will be scanned for measurement modules and possibly existing conflicts.

⇨ The configuration window **AutoConfig** opens.

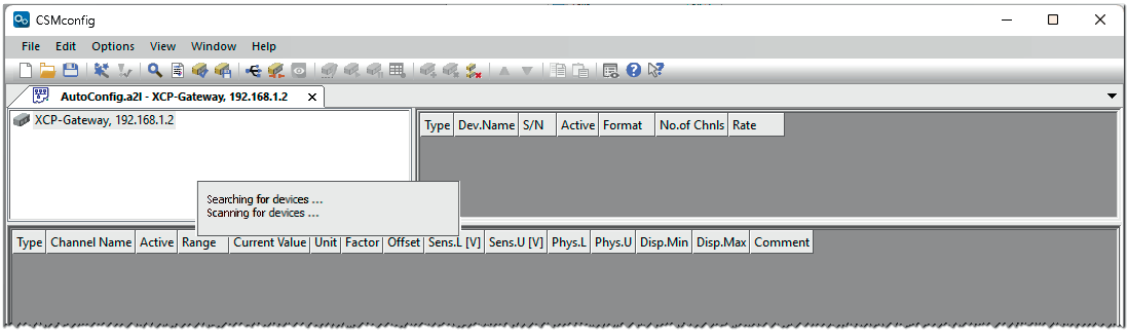


Fig. 5-29: **AutoConfig** window: "Searching for devices.../Scanning for devices"

⇨ Auto-Configuration is performed, the message "Searching for devices.../Scanning for devices..." is displayed.

⇨ When the process is completed, the following windows are displayed:

- **AutoConfig** shows the connected measurement modules.

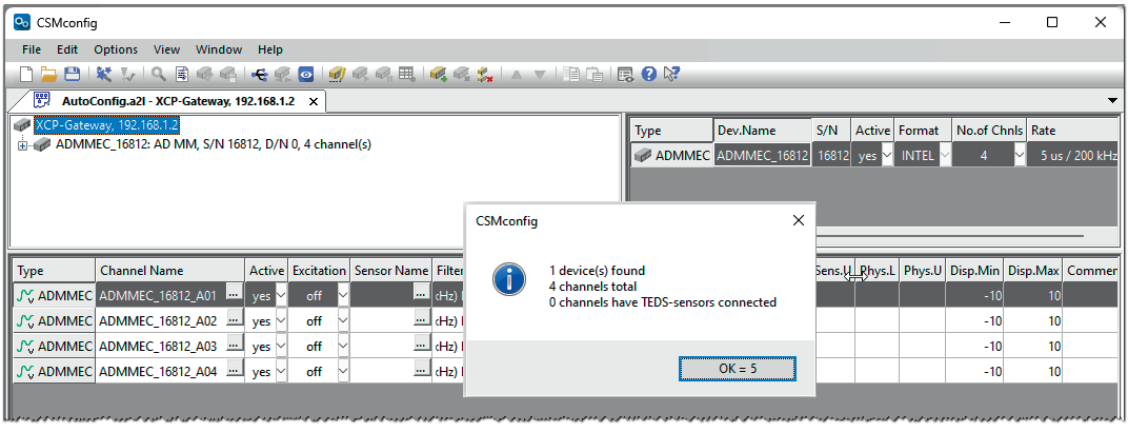


Fig. 5-30: Auto-Configuration is performed.

- In another window, a message appears, indicating how many measurement modules and channels have been detected.

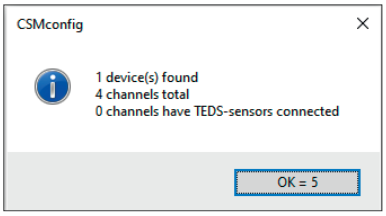


Fig. 5-31: Message window after **Auto-Configuration** has been completed

The **OK** button in this window contains an automatic counter that counts down from "5" to "0". The window closes automatically as soon as the counter has reached "0". The window can be closed immediately by clicking on **OK**.

→ Chapter 5.3.3.9 "Saving the measurement configuration"

5.3.3.7 Measurement channel settings

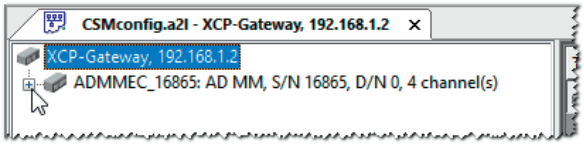


Fig. 5-32: **CSMconfig.a2l** window, **Tree view**, channel list faded out

☞ If the measurement channel list is not visible, click on the **+** symbol on the left to open the directory tree.

⇨ A list of the available measurement channels is displayed.

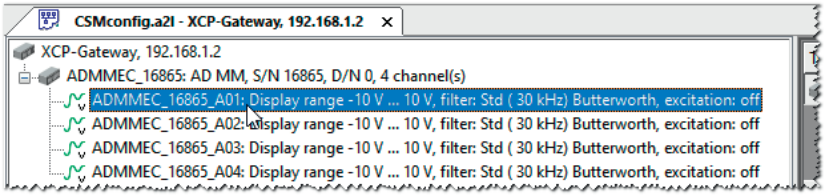


Fig. 5-33: **CSMconfig.a2l** window, **Tree view**, channel list faded in

☞ Double-click on the selected channel entry.

⇨ The **Channel configuration dialog** opens.

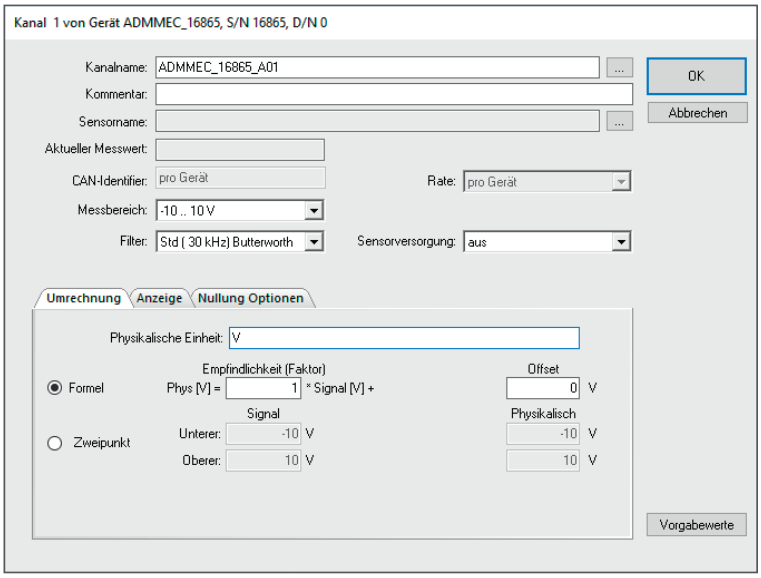


Fig. 5-34: **Channel configuration dialog** (AD4 ECAT measurement module)

☞ Make the required settings ("Channel configuration options AD4 ECAT MM")

☞ Click on **OK** to close the dialog.

☞ For configuring the remaining device channels, proceed as described above.

→ *CSMconfig Online Help, section "Channel configuration dialog"*

Channel configuration options AD4 ECAT MM

Field	Function
General Settings	
Channel Name	Input field for channel name. This name is stored in the DBC file and will be used by the DAQ software as identifier. Allowed characters: [a...z], [A...Z], [0...9] and [_] (max. 32 characters) It is possible to integrate a signal database in CSMconfig. The signal database is called up by clicking the … button. This database allows signal names (channel names) to be selected and assigned to the measurement channel. A comment may have been assigned to the signal name. If so, it will be displayed in the **Comment** field after the signal name has been selected. A greyed-out button indicates that no signal database is available. → *CSMconfig Online Help, section "Channel configuration dialog"*
Comment	Input field for additional text, e.g. channel-specific notes / comments; Any character may be used (max. 100 characters)
Sensor Name	The … button opens a dialog for selecting sensor definitions. By selecting a sensor definition, the corresponding parameters (calibration, sensor excitation, measurement range) will be applied to the configuration document. → *CSMconfig Online Help, sections "Channel configuration dialog" and "Sensor Data Base"*
Current value	Indicates the current measured value of the channel.
CAN identifier	The channel-specific CAN identifier is defined with this option. This option is only available on the CAN side. To be able to use this function, the **Per channel configuration** option in the **Device configuration dialog** has to be enabled (non-functional and greyed out for ECAT measurement modules).
Rate	The channel-specific send rate is defined with this option. This option is only available on the CAN side. To be able to use this function, the **Per channel configuration** option in the **Device configuration dialog** has to be enabled (non-functional and greyed out for ECAT measurement modules).
Measurement range	Drop-down menu for setting the measurement range: **AD4 pro IG100/IG1000**: ±10, ±20, ±50, ±100, ±200, ±500 mV and ±1, ±2, ±5, ±10, ±20 V **AD4 OG100/1000**: ±5, ±10, ±20, ±45, ±90 V **AD4 IE100**: ±1, ±2, ±5, ±10, ±20 V **AD4 OE100**: ±5, ±10, ±20, ±45, ±90 V
Filter	AD4 ECAT MM series modules feature a selectable software filter (6th order Butterworth low-pass filter). The options available in the drop-down menu depend on the sampling rate or measurement data rate. The recommended value for the filter frequency is displayed under Std. (e.g. **Std. (1500 Hz)**). The filter is deactivated with the option **SW-Filter off**. The value for the standard filter is adjusted accordingly when the measurement data rate is changed.

Field	Function	
General Settings (cont.)		
Sensor excitation	**AD4 pro IG100/1000** and **AD4 OG100/1000** bipolar, switchable, adjustable per channel ±5, ±8, ±10, ±12, ±15 V DC	**AD4 IE100** and **AD4 OE100** unipolar, per channel adjustable per channel adjustable 5, 8, 10, 12, 15, 24 V DC
Buttons		
Defaults	Resets the settings in the dialog to the factory defaults. The content of some specific fields, however (e.g. **Channel Name**), remains unchanged.	
Auto-Offset	calls up the **Auto-Offset** function of the **Auto-Scale** wizard.	
Auto-Scale	calls up the **Two Points** function of the **Auto-Scale** wizard.	
Conversion tab		
Using physical scaling, the measured values supplied by a sensor can be scaled into any measured variable using downstream DAQ software (e.g. vMeasure CSM, INCA or CANape®). CSMconfig provides the options **Formula** (scaling as a linear function) and **Two Points** (scaling over two points) here.		
Conversion tab (cont.)		
Physical Unit	Input field for the channel measurement unit. Allowed characters: [a...z], [A...Z], [0...9], [_], [°], [µ], [²] and [³] (max. 32 characters) The unit entered here is automatically displayed as measurement unit in the **Conversion** and **Display Range** tabs.	
Formula	**Formula** provides the option to create a conversion formula by using the parameters **Factor** and **Offset**.	
Sensitivity (factor)	Input field for the scaling parameter	
Offset	Input field for offset value	
Two Points	The **Two Points** function converts sensor readings into another measured variable by defining two points on one axis.	
Signal	measurement values provided by the sensor	
Lower	Lower sensor measurement value	
Upper	Upper sensor reading	
Physical	Scaled measured values in the measured variable specified under **Physical Unit**.	
Lower	Lower measured value, to be defined by the user	
Upper	Upper value to be defined by the user	

Field	Function
Display Range tab	
The default values for the measured value display can be defined in a downstream MC or DAQ tool here.	
Device	The limits for the lower and upper value of the scaled measurement range are displayed in the greyed-out fields.
Minimum	Display of the lower limit value of the scaled measurement range
Maximum	Display of the upper limit value of the scaled measurement range
User	These parameters define the lower and upper limit for the measurement range displayed in the downstream MC or DAQ software. By default, it shows the minimum or maximum value of the measurement range that is displayed in the **Device** field.
Minimum	Minimum value that is used by the MC or DAQ software (to be defined by the user)
Maximum	Maximum value that is used by the MC or DAQ software (to be defined by the user)

Tab. 5-1: Channel configuration options (AD4 ECAT MM)

5.3.3.8 Measurement module settings

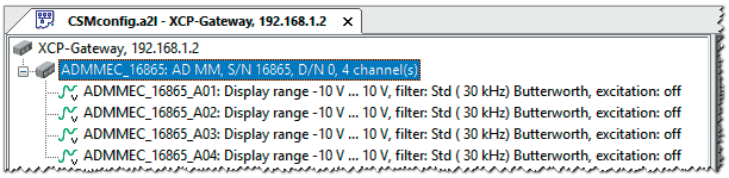


Fig. 5-35: **AutoConfig - XCP-Gateway** window

☞ Double-click on the device entry with the left mouse button.

⇨ The **Device configuration dialog** opens.

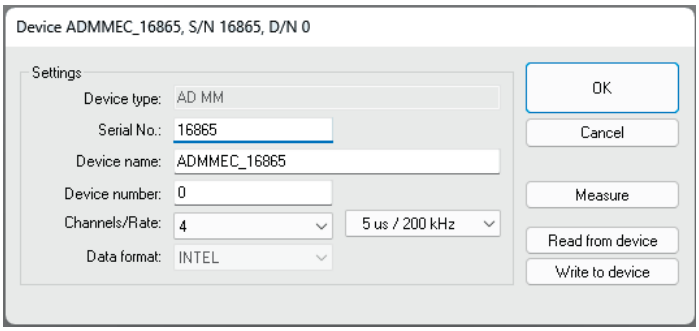


Fig. 5-36: Device configuration dialog (AD4 ECAT MM)

Settings section

With an online configuration, after executing **Scan Bus** or **Auto-Configuration** the device type is displayed in the **Device type** field and the serial number is displayed in the **Serial No.** field.

In an offline configuration, the field **Device type** displays the device type that has been selected in the dialog **Select device type** (Fig. 5-16). The serial number of the measurement device for which the configuration is created must be entered manually into the **Serial No.** field.

A default name is displayed under **Device name** consisting of the name of the device type and the serial number. Alternatively, an individual, user-defined name can be entered.

The following conditions/limitations must be observed when assigning names:

- The length must not exceed 24 characters.
- Allowed characters: [a...z], [A...Z], [0...9] and [_].
- The name must start with a letter or [_].
- The name needs to be unique. It may only be used once per configuration file.

If the default name remains unchanged, it will be automatically modified as soon as the serial number is changed. The name entered in this field is also used as a component for the channel designation (Fig. 5-36).

The **Device number** field is provided for entering a device number. However, it is not mandatory to use this number (non-functional and greyed out for XCP and ECAT measurement modules).

The number of available measurement channels is specified in the **Channels** selection menu.

The measurement data rate valid for all channels is set via the selection menu **Rate**.

The selection menu **Data format** (right) provides two formats for the transmission of CAN messages (non-functional and greyed out for ECAT measurement modules):

- INTEL (LSB first, Little Endian)
- MOTOROLA (MSB first, Big Endian)

Buttons

- **Read from device** is reading a configuration from a measurement module The firmware version and the hardware revision number are also read out.
- **Write to device** writes a configuration to a measurement module.

→ *CSMconfig Online Help*

Transferring configuration data to the measurement module

After having completed the channel configuration, the configuration data has to be transferred to the measurement module to be saved permanently and used for other purposes.

	NOTE!
	This step is required for both offline and online configurations. With online configurations, the transfer can take place at any time; with offline configurations, it can take place once an online connection has been established.

☞ Click on **Write to device**.

⇨ The following message is displayed:

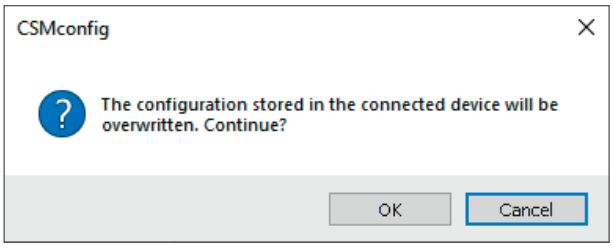


Fig. 5-37: Safety prompt before overwriting the old configuration

☞ Click on **OK** to save the configuration.

⇨ A message indicates the successful reconfiguration of the measurement module.

or

☞ Click on **Cancel** to keep the old configuration.

Verifying the measurement values

Finally, the **Measure** function in the **Device configuration dialog** provides the means to check the plausibility of measurements.

☞ Click on **Measure** (Fig. 5-31).

⇨ The **Measurement Values** window opens.

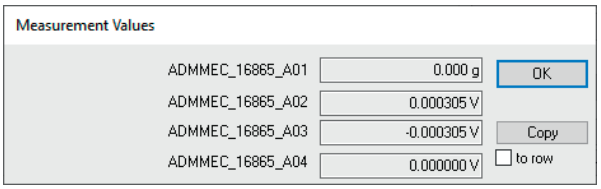


Fig. 5-38: **Measurement Values** window (AD4 ECAT MM)

☞ Click on **OK** to close the **Measurement Values** window.

☞ Click on **OK** to close the **Device configuration dialog**.

5.3.3.9 Saving the measurement configuration

The configuration can then be saved in an A2L file. The default path for the storage of configuration files refers to the CSMconfig installation directory. If user rights are restricted, the program prompts the user to store the file in the corresponding user directory.

Changing the path for file storage

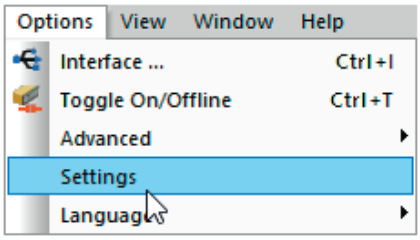


Fig. 5-39: **Options | Settings**

☞ Select **Options | Settings**.

⇨ The **Program Settings** dialog opens.

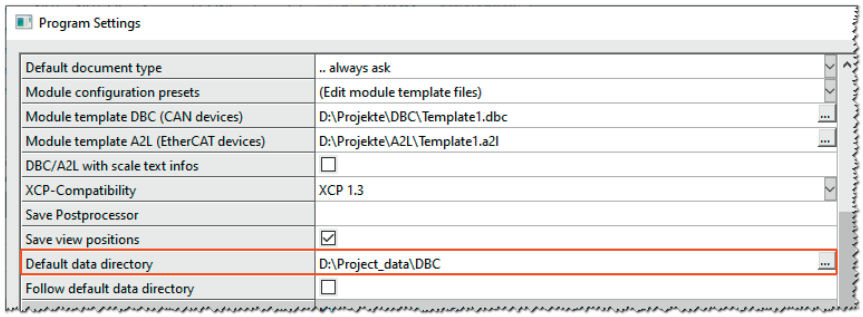


Fig. 5-40: **Program Settings** dialog, option **Default data directory**

☞ Enter the new path in the **Default data directory** field.

☞ Click on **OK** to close the **Program Settings** dialog.

i	If the option **Follow default data directory** is enabled, CSMconfig always sets the path that the user last used for storing a DBC or A2L file in the **Default data directory** path.

Saving an A2L file

☞ **Select** File | Save.

⇨ The **Save As** dialog opens.

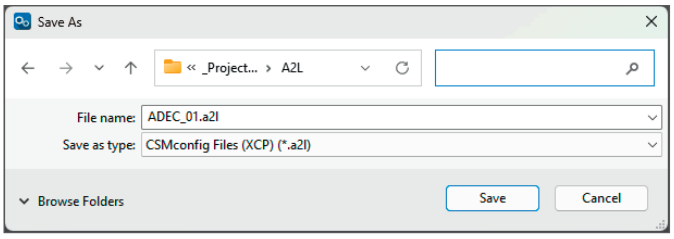


Fig. 5-41: **Save As** dialog

☞ Select directory, enter the required file name into the field **File name** and confirm by clicking on **Save**.

⇨ The configuration file with the extension *.a2l is stored in the current directory.

⇨ The name of the newly created configuration file appears in the header of the Tree View window (here: ADEC_01.a2l).

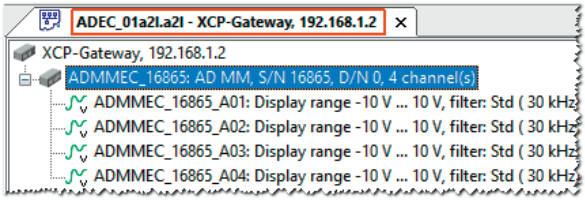
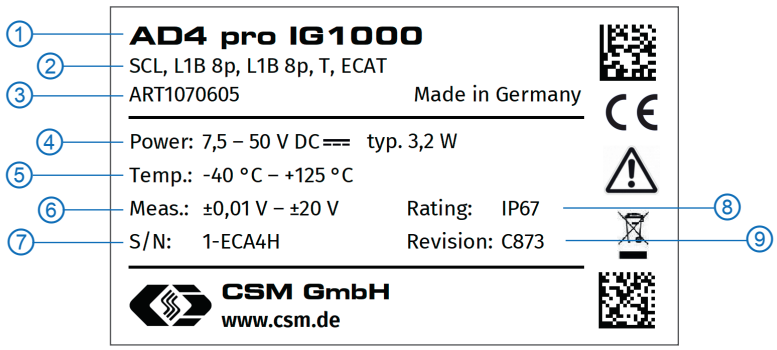


Fig. 5-42: New file name in the header: **ADEC_01.a2l**

6 Maintenance Services and Cleaning Instructions

6.1 Type label

The type label shows the technical data of the measurement module:



①	AD4 pro IG1000	Device type
②	SCL, L1B 8p, L1B 8p, T, ECAT	Device details: ▸ SCL - housing type "Slide Case Large" ▸ L1B 8p - measurement input sockets: LEMO 1B, 8-pole ▸ L1B 8p - **IN**/**OUT** sockets: LEMO 1B, 8-pole ▸ T - TEDS ▸ ECAT - Bus system
③	ART1070605	Part number of the measurement module
④	Power: 7.5 – 50 V DC, typ. 3.2 W	Power supply range, typical power consumption
⑤	Temp.: -40 °C – +125 °C	Operating temperature range
⑥	Meas.: ±0.01 V – ±20 kV	Measurement ranges
⑦	S/N: 1-ECA4H	Serial number of the measurement module
⑧	Rating: IP67	Protection class
⑨	Revision: C873	Hardware revision number

Tab. 6-1: Type label

6.2 Maintenance services

The following testing certificate is issued for AD4 ECAT MM series measurement modules:

- Calibration certificate in accordance with DIN EN ISO/IEC 17025

This is documented by a corresponding calibration label, which is applied to the back or top of the module housing, depending on the housing design.

Fig. 6-1: Calibration label

To ensure reliability and functionality, a measurement module should be checked at least every 12 months. CSM offers maintenance packages and a repair service for this purpose.

- Calibration in accordance with DIN EN ISO/IEC 17025, including functional test
- Repair service

Monitoring of calibration due date[14]

The feature for calibration due date monitoring in the **Program Settings** dialog provides the option to specify the period of time for which the calibration of a module is valid (**Calibration interval**). In addition, it is possible to define the period of time during which CSMconfig indicates the impending expiration of the validity of the calibration with recurring messages (**Lead warn time**).

☞ Select **Options | Settings** from the menu.
⇨ The **Program Settings** dialog opens.

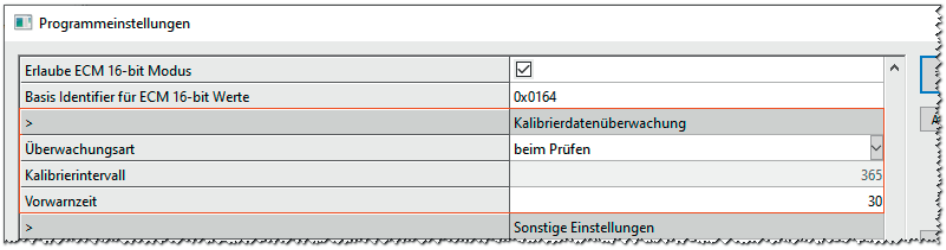


Fig. 6-2: **Program Settings** dialog, **Calibration date monitoring** section

☞ Make the required settings in section **Calibration date monitoring**.
→ *CSMconfig online help, section "Program Settings"*

14 When monitoring the calibration date, CSMconfig checks the date that has been written to the measurement module during calibration. The calibration date is only available if the measurement module has been calibrated at the CSM calibration laboratory

6.3 Cleaning instructions

NOTE!	
	☞ De-energize the measurement module before starting to work.

NOTE!	
	The surface of the housing is sensitive to aggressive cleaning agents, solvents and abrasive media. ☞ Do not use aggressive cleaning agents or solvents to clean the measurement module. ☞ Use only a moist cloth.

7 Appendix

7.1 Shortcuts used in CSMconfig

Shortcut	Menu command/meaning
Alt + A	Auto Configuration
Alt + INS	Insert Module
Alt + DEL	Delete Module
Alt + F4	Exit
Alt + M	CSMview
Alt + R	Report...
Alt + U	Firmware update
Entry field	Edit
F1	Help
F11	Resize grid columns
Ctrl + 0 (zero)	Deactivate
Ctrl + 1	Activate
Ctrl + B	Scan Bus
Ctrl + C	Copy
Ctrl + F4	Close
Ctrl + D	Move Down
Ctrl + F6	Next (configuration document)
Ctrl + G	Reconfigure All
Ctrl + I	Interface...
Ctrl + K	Check Document
Ctrl + N	New
Ctrl + O	Open
Ctrl + P	Print
Ctrl + R	Read from device
Ctrl + S	Save
Ctrl + T	Toggle On/Offline
Ctrl + U	Move up
Ctrl + V	Insert
Ctrl + W	Write settings to device
Shift + Ctrl + F6	Previous (configuration document)

Tab. 7-1: Shortcuts used in CSMconfig

7.2 List of figures

7.3 List of tables

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