Operating Instructions
MEAC300

Data Acquisition Unit DAU

Endress+Hauser
People for Process Automation

Described product
MEAC300 Data Acquisition Unit DAU

Manufacturer
Endress+Hauser SICK GmbH+Co. KG
Bergener Ring 27
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Deutschland

Legal information

Original document
This document is an original document of Endress+Hauser SICK GmbH+Co. KG.

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1 About this document

1.1 Function of this document

This document is an addendum to the Operating Instructions, e. g. Gas Analyzer, and to the Technical Information, e. g., Gas Analyzer.

It supplements these documents with information on the data acquisition unit DAU.

Observe all documents supplied with the MEAC300 system.

1.2 Scope of validity

These Operating Instructions are only applicable for the device described in the product identification.

They are not applicable for other Endress+Hauser devices.

The standards referred to in these Operating Instructions are to be observed in the respective valid version.

1.3 Target groups

This Manual is intended for persons installing, operating and maintaining the device.

1.4 Further information

- Operating Instructions MEAC300
- Technical Information MEAC300
- Technical Information MEAC300 Add-ons
- System documentation for the delivered MEAC system

1.5 Symbols and document conventions

1.5.1 Warning symbols

Symbol	Significance
	Danger (general)
	Danger - hazardous voltage
	Hazard for environment and organisms

1.5.2 Warning levels and signal words

DANGER:
Risk or hazardous situation which *will* result in severe personal injury or death.

WARNING:
Risk or hazardous situation which *could* result in severe personal injury or death.

CAUTION:
Risk or hazardous situation which *could* result in less severe or minor injuries.

NOTICE:
Hazard which *could* result in property damage.

Note:
Tips

1.5.3 Information symbols

Symbol	Significance
	Important technical information for this product
	Important information concerning electrical or electronic functions

1.6 Data integrity

Endress+Hauser uses standardized data interfaces, such as standard IP technology, in its products. The focus here is on the availability of the products and their properties.

Endress+Hauser always assumes the integrity and confidentiality of data and rights affected in connection with the use of the products are ensured by the customer.

In all cases, the customer is responsible for the implementation of safety measures suitable for the respective situation, e.g., network separation, firewalls, virus protection and patch management.

2 For your safety

2.1 Basic safety information

- ▶ Read and observe these Operating Instructions.
- ▶ Observe all safety information.
- ▶ If anything is not clear: Please contact Endress+Hauser Customer Service.

Retention of documents

These Operating Instructions

- Must be available for reference.
- Must be passed on to new owners.

Correct use

- Use the device only as described in “Intended use”. The manufacturer bears no responsibility for any other use.
- Do not carry out any work or repairs on the device that are not described in this Manual. Do not remove, add or modify any components to or on the device unless described and specified in the official manufacturer information.
- Use only original spare parts and wear and tear parts from Endress+Hauser.

In case of non-compliance:

- Any warranty by the manufacturer becomes void.
- The device could become dangerous.

Special local requirements

In addition to the information in this Manual, follow all local laws, technical rules and company-internal operating and installation directives applicable wherever the device is installed.

2.1.1 Responsibility for system safety

NOTICE: Responsibility for system safety
The safety of the system in which the equipment is integrated is the responsibility of the system operator.

2.2 Intended use

The device is the analog standard data acquisition unit of the evaluation computer. It is used for continuous acquisition of signals which are transmitted to the evaluation computer.

Installation location

The device is intended for indoor use only.

2.3 Requirements for the qualification of the personnel

Installation, commissioning and maintaining the device should only be carried out by skilled persons who, based on their technical training and knowledge as well as knowledge of the relevant regulations, can assess the tasks given and recognize the dangers involved.

3 Product description

3.1 Product identification

Product name	e. g. Gas Analyzer Data Acquisition Unit DAU
Manufacturer	Endress+Hauser SICK GmbH+Co. KG Bergener Ring 27 · 01458 Ottendorf-Okrilla · Germany
Type plate	Right front corner of the top of the housing at the height of the LEDs

3.2 Layout and function

The device is the analog standard data acquisition unit of the evaluation computer. It is used for continuous acquisition of mA and binary signals from the field. The signals are read in as device inputs and then transmitted serially via a proprietary protocol to the evaluation computer.

In the event of a connection interruption, the signals can be temporarily stored in a ring buffer and subsequently transmitted to the evaluation computer when the connection is restored.

Furthermore, data calculated in the evaluation computer can be transmitted as mA or binary signals to downstream systems using the device outputs.

4 Transport

Before transport:

- ▶ Ensure obstacles that could cause falls or collisions are cleared away.
- ▶ Prepare the target location for the installation of the device (for example, cable connections).

Transport

- ▶ Secure the device during transport.
- ▶ Take complex enclosure parts into account (for example, when rotating the device).

5 Mounting

5.1 Safety

CAUTION: Risk of crushing
Risk of injury due to insufficient fastening
- ▶ Observe the weight specifications of the device when selecting the brackets.
- ▶ Before mounting the device, check the condition and load-bearing capacity of the rack.
- ▶ Consider the vibration load.
- ▶ Consider the device weight before lifting.

5.2 Preparing the installation location

Ambient conditions

- Installation on level surface.
- Vibration free place.
- Observe allowable ambient temperature.
- No direct sunlight.
- Ensure adequate air circulation.
- Avoid external heat sources or cooling.
- Choose a dry installation location free from frost.
- Maintain the permitted air humidity.

Preparation work

- Provide sufficient clearances for cable connections.
- Observe the maximum lengths of the connecting cables to the emission PC, see Fig. 2: “RS232 connection variants”, page 13.

5.3 Scope of delivery

Basic unit with power supply, CPU board (incl. EPROM) and memory board including serial connection cable, power cable with IEC plug.

Depending on the customer's requirements, a maximum of 15 plug-in boards for data acquisition or output of calculated data with corresponding D-SUB connection cables and transfer modules can be included in the scope of delivery.

Check the scope of delivery according to the order confirmation.

Fitting

- Max. 5x AI boards
- Max. 8x DI boards
- Max. 4x AO boards
- Max. 8x DO boards

5.4 Mounting sequence

NOTICE: Malfunction through incorrect mounting
If the device is mounted incorrectly, the intended use will not be achieved.
- ▶ Adhere to the ambient conditions
- ▶ Observe the mounting steps.

Note:
The data acquisition unit is a 19" device that should usually be installed in a suitable rack.

Procedure

- ▶ If additional plug-in boards are required, retrofit the data acquisition unit DAU, see Section “5.4.1 Installing additional plug-in boards”, page 10.
- ▶ Mount the data acquisition unit so that the base of the enclosure is approximately horizontal.
- ▶ Protect the data acquisition unit from hard shocks.
- ▶ Make sure that moisture condensation does not occur – both outside and inside the enclosure.

5.4.1 Installing additional plug-in boards

Note:
Observe the maximum configuration of the different plug-in boards, see Section “5.3 Scope of delivery”, page 9.

Procedure

1 On the back of the DAU, unscrew the screws ①.
2 Remove blind cover ②.
3 Insert additional plug-in board between the insertion rails.
4 If there is still a gap on the back of the DAU after inserting the board: Attach blind cover and fasten with screws.

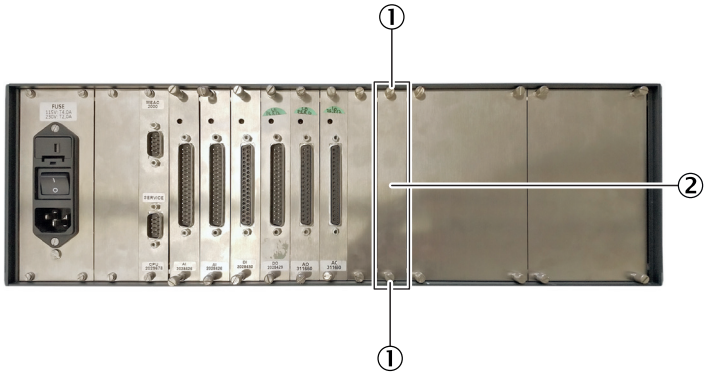


Fig. 1: Slots for additional plug-in boards

6 Electrical installation

Qualification

The electronic installation may only be carried out by a trained electrician.

6.1 Safety

WARNING: Hazard through electrical shock

There is a risk of electric shock when working on the device with the voltage supply switched on.

- Before starting work on the device, ensure the power supply can be switched off using a disconnector switch or circuit breaker in accordance with the valid standard.
- Make sure the disconnector switch is easily accessible.
- An additional disconnecting device is mandatory when the disconnector switch is difficult to access or cannot be accessed when connecting the equipment after installation.
- Take suitable protective measures against local and plant-related hazards (for example, free movement areas, cable ducts, automatic restart).
- Switch off the voltage supply before starting any work on the device.
- The main power supply must have a protective conductor (protective ground, PE).
- Activation of the power supply only by the executing personnel in compliance with the valid safety regulations.

WARNING: Endangerment of electrical safety through power line with incorrect rating

Electrical accidents can occur when the specifications for installation of a power cable have not been adequately observed.

- Always observe the exact specification in the Operating Instructions when installing a power line (see “Technical data”).
- The user must ensure that the power cable is designed in accordance with the applicable standards.

6.2 Electrical connection of control unit

NOTICE: Device damage through incorrect or missing grounding

- During installation and maintenance work, it must be ensured that the protective grounding to the devices and/or lines involved is effective in accordance with EN 61010-1.

Installing a power fuse

- In addition to the main power switch, install a separate external power fuse for the data acquisition unit. Fuse rating T 10 A.

Installing a disconnector switch

- Install a separate disconnector switch. Observe the safety instructions.

Connecting the power line

Note:
- To ensure that the device is not unintentionally starting up: Ensure that the main power switch is turned off (“0” visible).

1 Check that the device is set to the correct power voltage (115/230 V). If required, adapt the setting to your power voltage; see Section “6.2.1 Electric fuses - adaption to the power voltage”, page 12.
2 Connect the power cable to the built-in plug on the rear panel (standard CEE-22 plug).
3 Connect the power cable to a suitable main power supply.

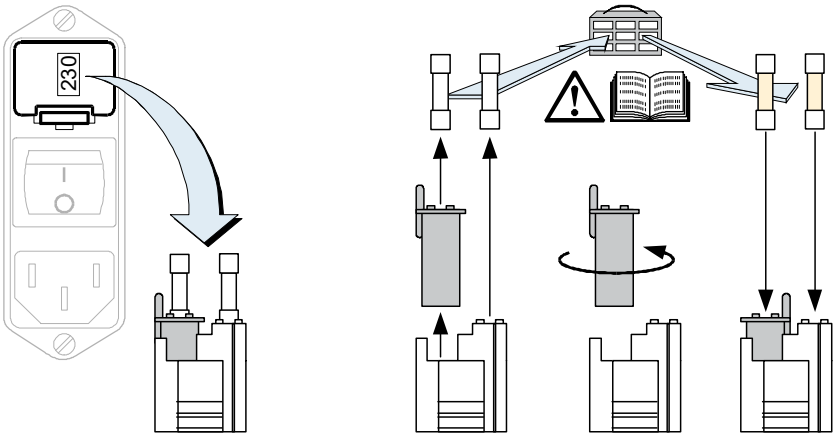
6.2.1 Electric fuses - adaption to the power voltage

NOTICE: Device damaged caused by incorrect fuses.
- Only use fuses as replacement which exactly meet the specified values (type of design, switch-off current, switch-off features).

The DAU can be set up for 230 V or for 115 V power voltage - see inspection window on the rear panel.

Changing the existing setting:

1 Disconnect the DAU from the power voltage.
2 Pull out the fuse box.



3 Remove the existing fuses.
4 One of the fuse holders can be removed from the fuse box. Pull out this fuse holder, turn it 180° and put it back into the fuse box. The desired power voltage should now be indicated on the front of the fuse box.
5 Insert power fuses with matching specification into the fuse holders.

Power voltage	Power fuses
230 V	T 2.0 C 5x20
115 V	T 4.0 C 5x20

6 Refit the fuse box.

7 Commissioning

7.1 Connect data acquisition unit with signal sources and emission PC

NOTICE: Device damage due to incorrect connection

Existing voltage or interchanging of the connection cables can lead to damage to the internal electronics and destruction of the plug-in boards.

- ▶ Before connecting signal terminals (also by plug-in connections), the data acquisition unit and connected devices must be de-energized.
- ▶ Before switching on, check that the appropriate connection cables for signal pickup are installed on the plug-in boards.

Check and connect inputs and outputs:

- ▶ Supply measured values via analog inputs.
- ▶ Supply status signals via digital inputs.
- ▶ Output calculated numerical values via analog outputs.
- ▶ Output stored and calculated signals via digital outputs.

Connection options to the emission PC:

- RS232 (see Fig. 2: “RS232 connection variants”), max. 15 m
- RS485 (external converter)
- Fiber optic cable (external converter)
- Ethernet/LAN (external converter)

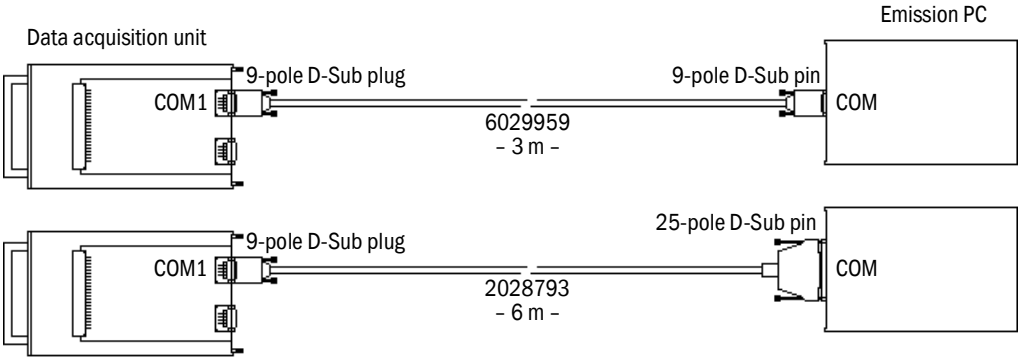


Fig. 2: RS232 connection variants

8 Shutdown

8.1 Shutdown procedure

Secure connected stations

The shutdown of the data acquisition unit could affect external systems. In this case:

- ▶ Take into account the switching logic with which the switching outputs of the data acquisition unit function.
- ▶ If necessary, an intentional shutdown of the DAU must be marked manually in connected data processing systems so that this is not interpreted as a malfunction of the data acquisition unit.
- ▶ If necessary, notify connected external agencies.
- ▶ Check if any automatic emergency measures could be triggered when you shutdown the device.

Switching off

- ▶ Switch off the main power switch on the rear of the enclosure or disconnect the main power supply at an external location (external switch, fuse).

8.2 Disposal

The following assemblies contain substances that may have to be disposed of separately:
- *Electronics*: Capacitors

The device can easily be disassembled into its components which can then be sent to the respective raw material recycling facilities.

- ▶ Dispose of electronic components as electronic waste.

8.2.1 Disposal of batteries

NOTE:
Batteries must not be disposed of with household waste.
Observe the respective valid local regulations for disposal.

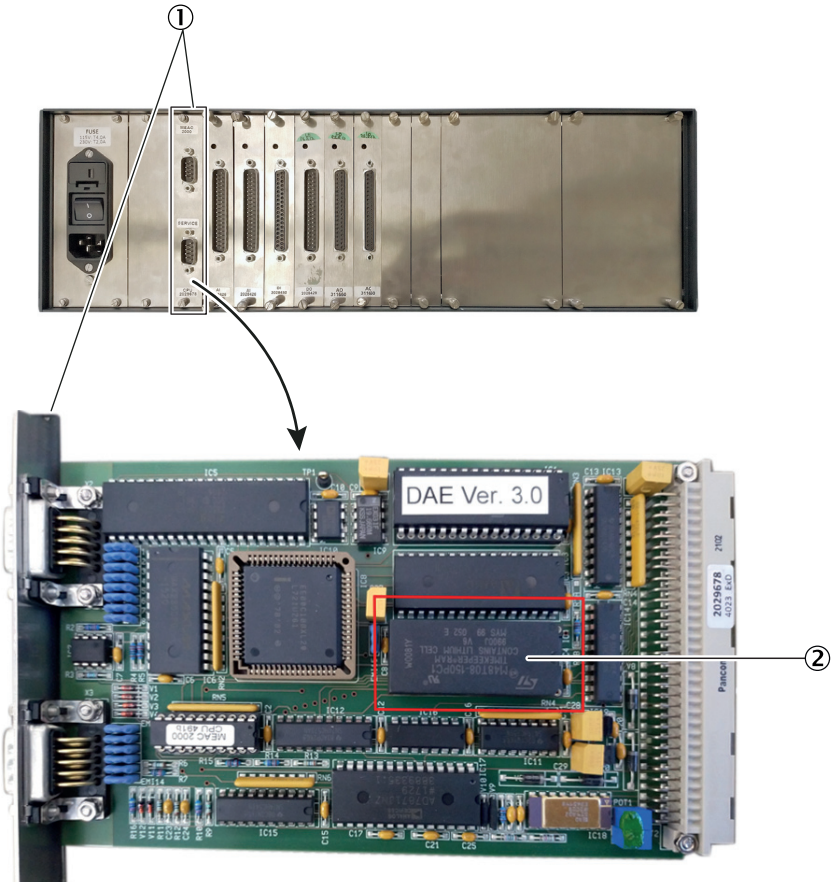
The data acquisition unit contains a battery which is permanently installed in an IC. To dispose of the battery the IC must be removed from the electronic board CPU.

Removal of battery

1 Dismantle device:
   - ▶ Put device out of operation.
   - ▶ Disconnect power plug.
   - ▶ Disconnect the signal connection cables from the plug-in boards.
   - ▶ Remove connection cable of data acquisition unit (DAU) to emission PC.

2 Remove electronic board CPU from the DAU:
   - ▶ On the back of the DAU, unscrew the knurled screws of printed-circuit board CPU ①.
   - ▶ Pull out the printed-circuit board and place it on a potential-free surface.

3 Pull the IC with battery ② out of the socket.



9 Technical data

9.1 Rated data for ambient conditions

Use inside or outside buildings	Indoor
Altitude	Max. 2000 m (above sea level)
Ambient air pressure	700 ... 1200 hPa
Ambient temperature	+5 ... +45 °C
Storage temperature	–20 ... +70 °C
Max. relative humidity	≤ 95% , non condensing
Line voltage fluctuations	115 or 230 V AC (–15% / +10%), 48 ... 62 Hz
Overvoltage category	Overvoltage category II
Enclosure rating	IP20
Wet environment	Not relevant
Degree of contamination	Degree of contamination 1

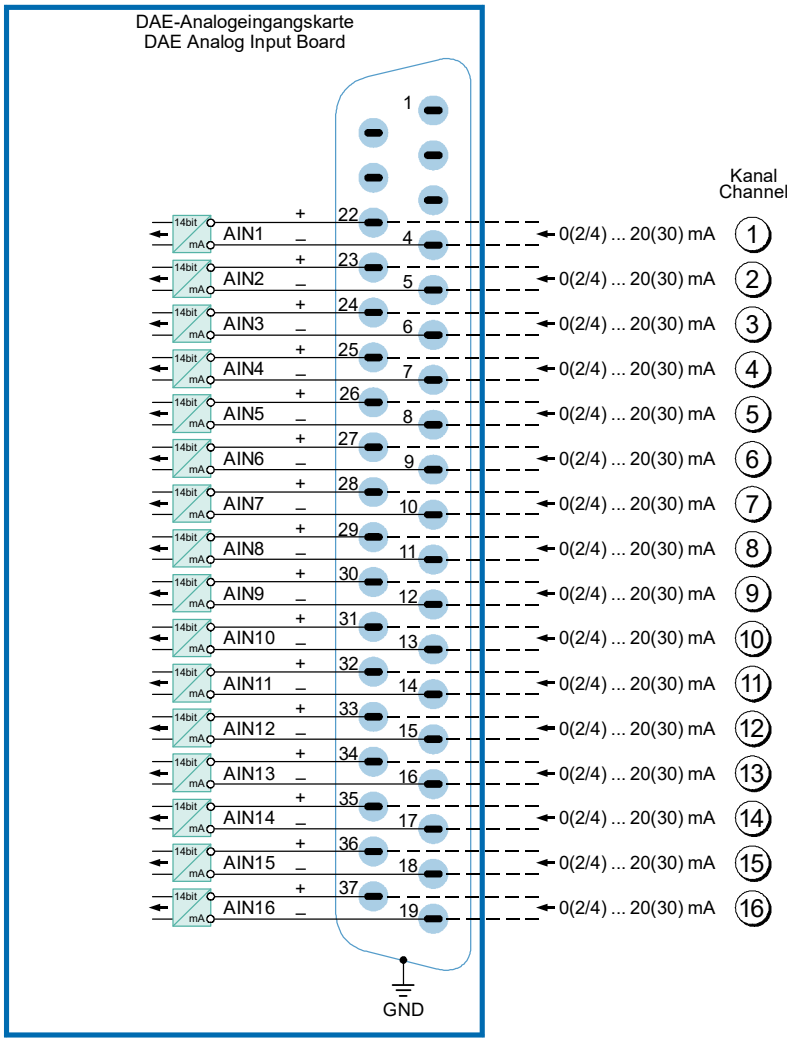
9.2 DAU basic unit (chassis)

CPU	80C188 (10 MHz)
Data buffer capacity	4 MB, example: When buffering the minute values of 16 analog inputs 30 days
Interfaces	RS232 for emission PC
Free slots for DAA boards	15
Power voltage	115 or 230 V AC (–15% / +10%), switchable
Power frequency	48 ... 62 Hz
Power input	Max. 100 VA Standard: 40 VA [1]
Power connection	Standard plug CEE-22
Power cable cross-section	Min. 0.75 mm^2
Battery	Type: Button cell BR12 Chemical system: LI(CF)/polycarbon-monofluoride lithium battery
Ambient temperature during operation	+5 ... +45 °C
Transport and storage temperature	–20 ... +70 °C
Relative humidity	No condensation
Enclosure	19" rack, 3 RU
Dimensions (HxWxD)	135 x 450 x 240 mm
Weight	12 kg (fully equipped)
Enclosure rating	IP20 (DIN 40050)

[1] With standard equipment (2 analog input boards, 2 status input boards, 1 analog output board, 1 status output board)

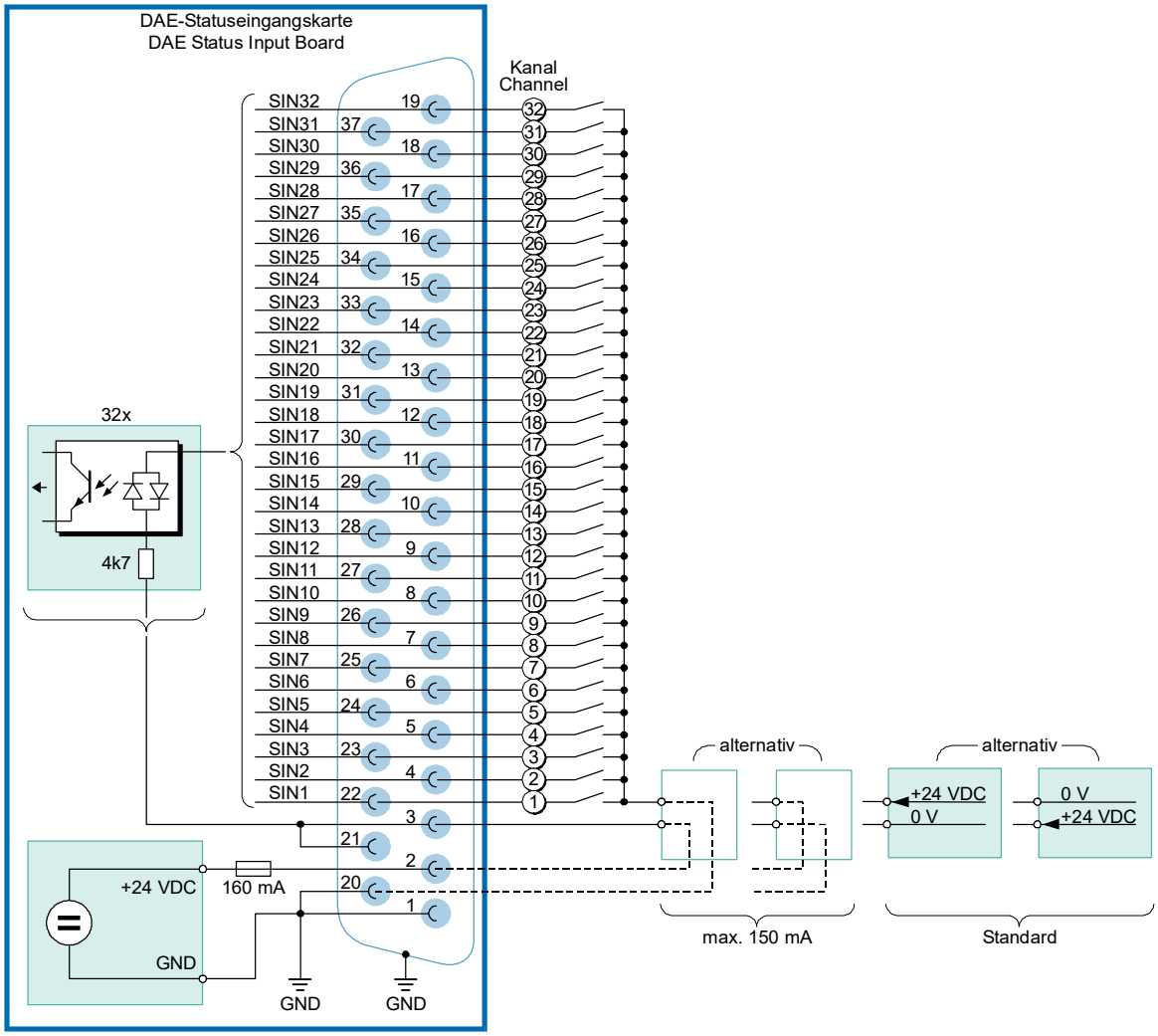
9.3 DAU analog input board

Number of signal inputs	16
Version of the signal inputs	Differential input; Positive and negative pole are potential-free (galvanically isolated) up to ±10 V
Signal current	–5 ... +30 mA
Peak filter	Electrical attenuation (RC = 100 µs) + software filter
Sampling rate (digitization)	10 Hz
Resolution (digitization)	3.66 µA (full scale = 14 bit; 1 bit = 3.66 µA)
Maximum error	±0.1%
Load	100 Ω
Connection	D-Sub plug connector, 37-pole, plug (male)
Power consumption	–
Maximum number per DAU	5 boards (= 80 analog inputs)
Part number	2028426



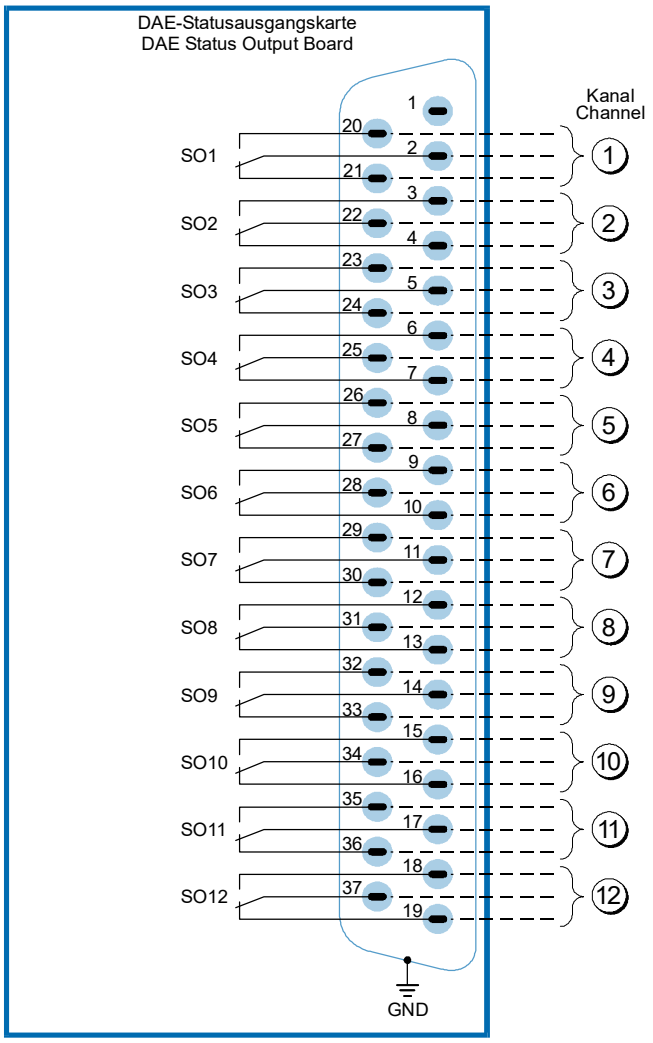
9.4 DAU status entry board

Number of signal inputs	32
Version of the signal inputs	Bipolar optocouplers, one common pole, floating (galvanically isolated)
Signal voltage	±5 ... 48 V DC
Signal voltage source	5 ... 48 V DC external (recommended), any polarity, or 24 V DC internal (potential separation removed, max. 150 mA)
Response / bounce time	< 10 ms
Connection	D-Sub plug connector, 37-pole, socket (female)
Power consumption	3.8 W
Maximum number per DAU	8 boards (= 256 status inputs)
Part number	2028430



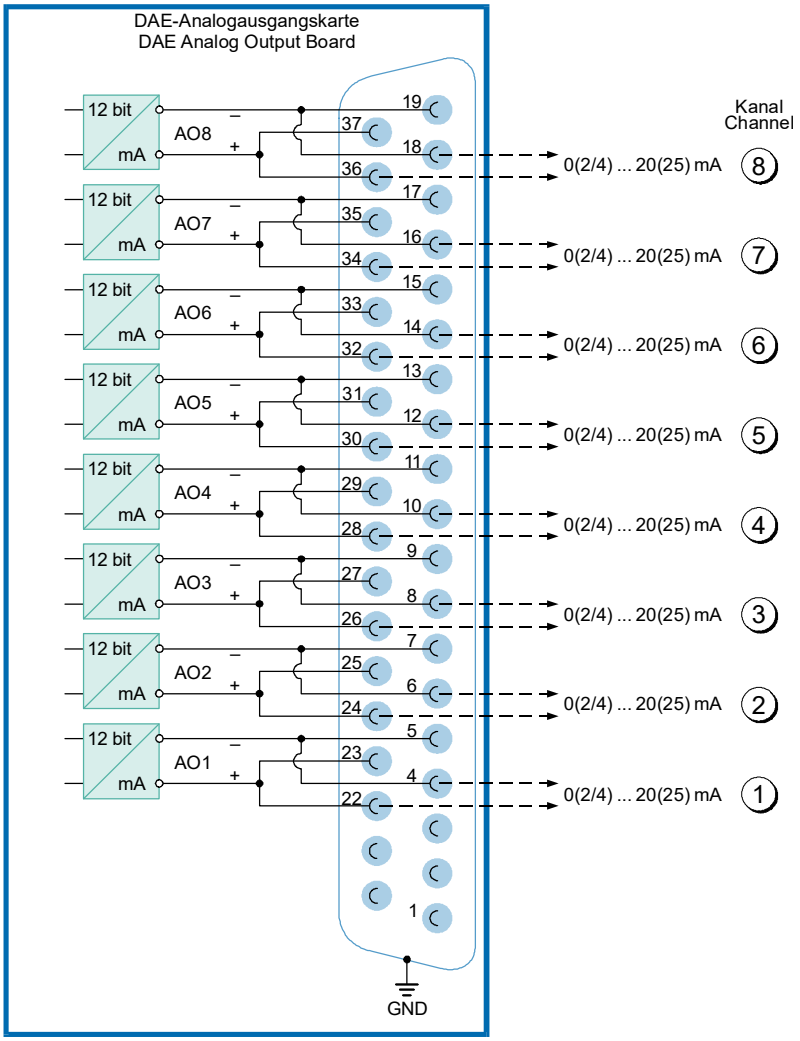
9.5 DAU status output board

Number of signal outputs	12
Version of the signal outputs	Potential-free relay switchover contacts
Response / bounce time	< 10 ms
Permissible contact load	Max. 48 V / 0.5 A
Connection	D-Sub plug connector, 37-pole, plug (male)
Power consumption	3.6 W
Maximum number per DAU	8 boards (= 96 relay status outputs)
Part number	2028429



9.6 DAU analog output board

Number of signal outputs	8
Version of the signal outputs	Controlled power sources; Negative pole at 0 V internal (not potential-free)
Output signal	0 ... 25 mA
Load	0 ... 500 Ω
Resolution (analogization)	5.0 µA (full scale = 12.3 bit eff.; 1 bit = 5.0 µA)
Maximum error	±0.1%
Connection	D-Sub plug connector, 37-pole, socket (female)
Power consumption	3.8 W
Maximum number per DAU	4 boards (= 32 status outputs)
Part number	2028425



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