



Operating instructions

GB

AC3220

AC3221

AC3255

AC3256

AC3258

AC3259



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1 Preliminary note

You will find instructions, technical data, approvals, accessories and further information using the QR code on the unit / packaging or at www.ifm.com.

1.1 Symbols used

- ✓ Requirement
- ▶ Instructions
- ▷ Reaction, result
- [...] Designation of keys, buttons or indications
- Cross-reference
-  Important note
Non-compliance may result in malfunction or interference.
-  Information
Supplementary note




1.2 Safety symbol on the device



Safety symbol on the device:

- ▶ Adhere to the operating instructions for the safe operation of the unit.

1.3 Warnings used

	<p>ATTENTION</p> <p>Warning of damage to property</p>
	<p>CAUTION</p> <p>Warning of personal injury</p> <p>▷ Slight reversible injuries may result.</p>
	<p>WARNING</p> <p>Warning of serious personal injury</p> <p>▷ Death or serious irreversible injuries may result.</p>

2 Safety instructions

- The unit described is a subcomponent for integration into a system.
 - The system architect is responsible for the safety of the system.
 - The system architect undertakes to perform a risk assessment and to create documentation in accordance with legal and normative requirements to be provided to the operator and user of the system. This documentation must contain all necessary information and safety instructions for the operator, the user and, if applicable, for any service personnel authorised by the architect of the system.
- Read this document before setting up the product and keep it during the entire service life.
- The product must be suitable for the corresponding applications and environmental conditions without any restrictions.
- Only use the product for its intended purpose (→ Intended use).
- If the operating instructions or the technical data are not adhered to, personal injury and/or damage to property may occur.
- The manufacturer assumes no liability or warranty for any consequences caused by tampering with the product or incorrect use by the operator.
- Installation, electrical connection, set-up, operation and maintenance of the product must be carried out by qualified personnel authorised by the machine operator.
- Protect units and cables against damage.
- Replace damaged units, otherwise the technical data and safety will be impaired.

3 Intended use

- The devices act as digital input and output modules in the AS-i network. They connect max. 4 sensors (2-wire or 3-wire sensors) and max. 4 actuators each with the AS-i master.
- Outputs (relays) for direct control of contactors, smaller drives, valves, etc.
- In the control cabinet in an industrial environment (indoors) as a permanently installed unit with supply from SELV/PELV according to the technical data.

Operation by trained, authorised specialist personnel due to protection class IP20.

AC3220: 4 digital inputs / 4 digital outputs (relay), sensor supply from AS-i

AC3221: 4 digital inputs / 4 digital outputs (relay), sensor supply from AUX

AC3255: 4 digital inputs / 2 digital outputs (relay), sensor supply from AUX

AC3256: 4 digital inputs / 2 digital outputs (relay), sensor supply from AS-i

AC3258: 4 digital inputs / 4 digital outputs (relay), sensor supply from AS-i

AC3259: 4 digital inputs / 4 digital outputs (relay), sensor supply from AUX

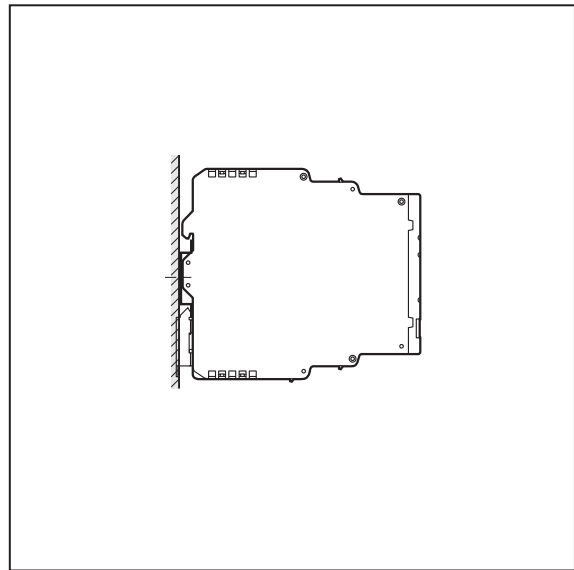
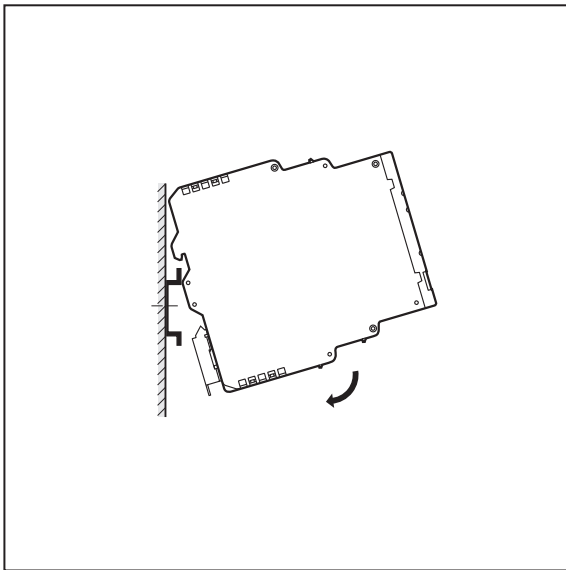
4 Installation

4.1 Installation location

To ensure correct operation, install the device in a housing that can only be opened using a tool or in a locked control cabinet (both protection rating IP 54 or higher) as an enclosure in accordance with EN61010-1.

4.2 Installation of the device

- ▶ Mount the device on a 35 mm DIN rail.



- ▶ Leave enough space (≥ 50 mm) between the unit and the top and bottom of the control cabinet to enable air circulation and to avoid excessive heating.

4.3 Identical units mounted side by side

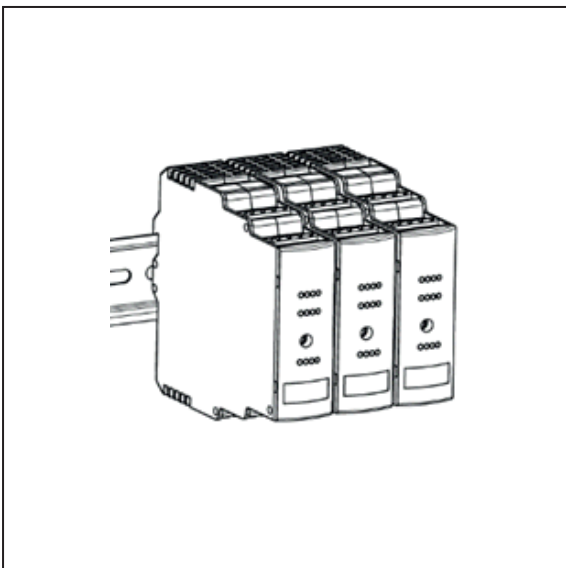


Fig. 1: Identical units mounted side by side

4.4 Deratings for side by side mounting of identical units

When identical units are mounted next to each other, derating according to the following table applies:

Article number	Derating
AC3220 AC3221 AC3258 AC3259	<p>Overall current rating for outputs when mounted side by side</p> <p>Ambient temperature -25...50°C / linear derating 40...50°C Overall current rating for outputs 50% each at 50°C corresponds to 2 x 6 A or 4 x 3 A (example)</p>

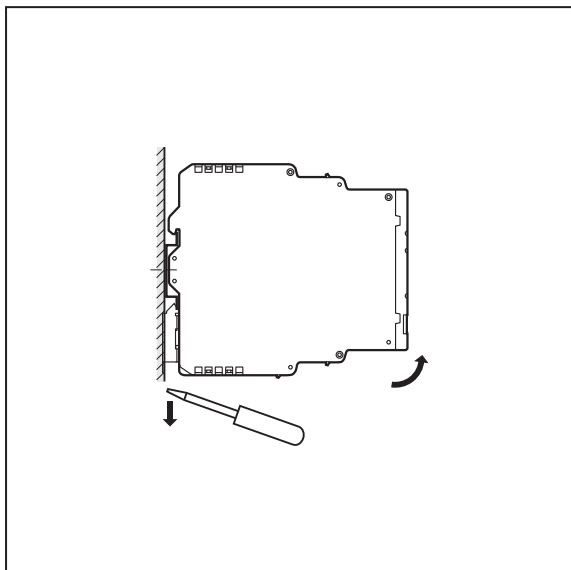
4.5 Side by side mounting of different units

ATTENTION

If units are mounted side by side, inadmissible heating may occur between the units.

- ▷ Malfunction / damage is possible.
- ▶ Take into account the internal heating of all devices when mounting different devices side by side and observe the environmental conditions for each device.

4.6 Removing the unit



4.7 Installation of the sensors

- ▶ Follow the manufacturer's installation instructions.

5 Electrical connection

5.1 General wiring information



▶ Disconnect the device from the mains supply before installation; if necessary, also disconnect any independently supplied input / output load circuits.

▶ Observe the national and international regulations for the installation of electrical equipment.



AS-i / AUX only permissible as SELV / PELV.



AC3220, AC3256 and AC3258

▶ Do not connect the terminals I1...I4 und I+, I- to external potential.



WARNING

Use of unconnected terminals

▷ Electric shock possible.

▶ Do not use unconnected terminals (n.c) which are not shown in the drawing as support point terminals.

▷ Protection guaranteed.

Touchable surfaces of the unit are insulated to the AS-i / AUX circuits and to the relay circuits O1+O3 and O2+O4 (AC3220, AC3221, AC3258, AC3259) or to the relay circuits O1 and O2 (AC3255, AC3256) with basic insulation according to IEC 61010-1 (mains circuit of overvoltage category II up to 300 V nominal mains voltage).

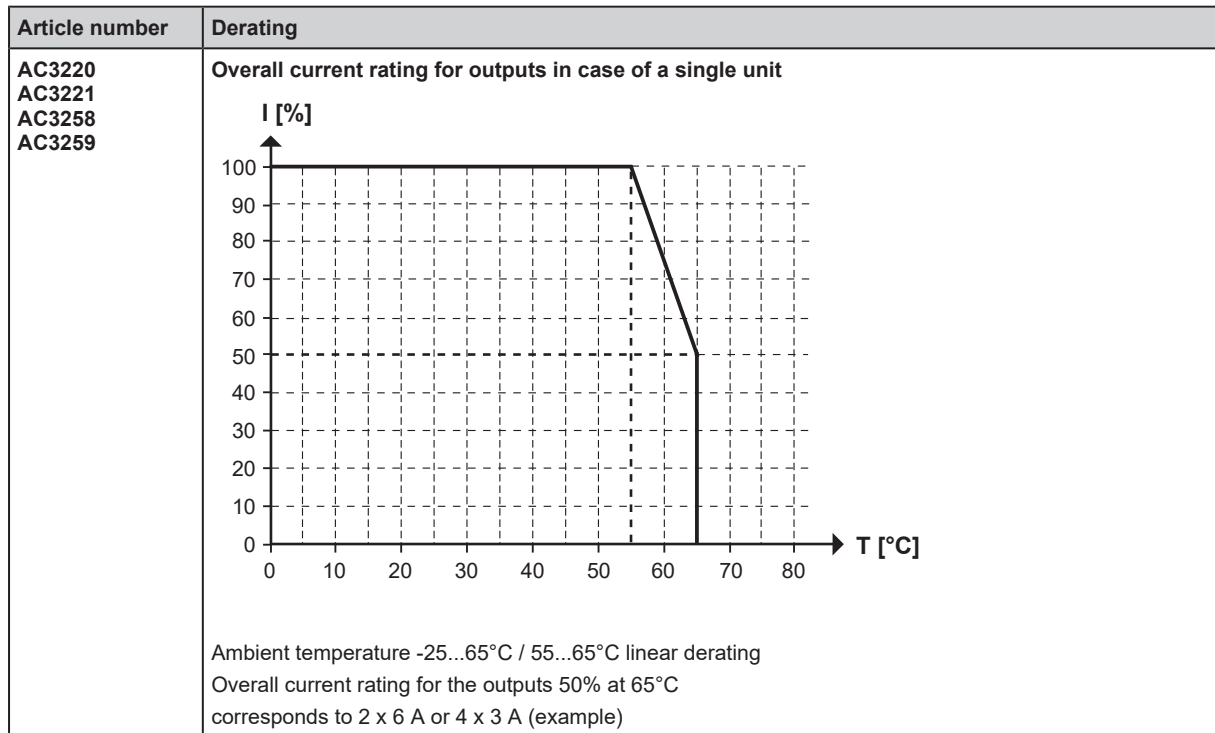
This does not apply to connection areas and cooling openings (IP20).

The AS-i / AUX circuits are insulated from each other with basic insulation according to IEC 61010-1 (secondary circuit with max. 32 V DC, supplied from the mains circuit up to 300 V of overvoltage category II).

The relay circuits O1+O3 and O2+O4 (AC3220, AC3221, AC3258, AC3259) or O1 and O2 (AC3255, AC3256) are insulated from AS-i / AUX and from each other with reinforced insulation according to IEC 61010-1 (mains circuit of overvoltage category II up to 300 V nominal mains voltage).

The external wiring has to be carried out in a way that ensures the required separation from other circuits.

5.2 Deratings for separately mounted units



5.3 Wiring

5.3.1 Digital input and output modules AC3220 and AC3258

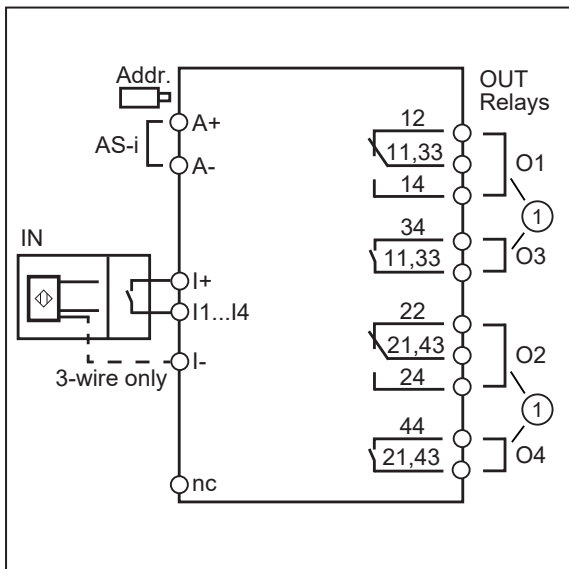
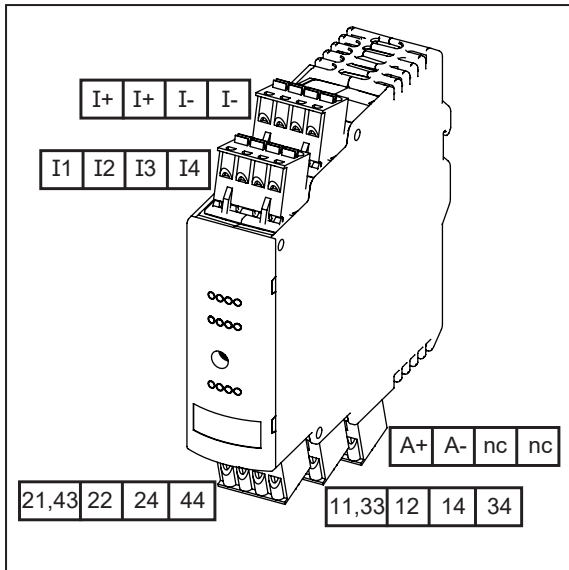


Fig. 2: Wiring

1: The outputs (relays) O1 + O3 and O2 + O4 must be supplied in pairs with the same voltage.



- I-: sensor supply 0 V
- I+: sensor supply +24 V
- I1...I4: switching input sensor 1...4, sensor supply from AS-i
- A+: AS-i +
- A-: AS-i -
- O1...O4: switching output relay 1...4
- 11: relay O1 changeover contact, common
- 12: relay O1 changeover contact, normally closed
- 14: relay O1 changeover contact, normally open
- 21: relay O2 changeover contact, common
- 22: relay O2 changeover contact, normally closed
- 24: relay O2 changeover contact, normally open
- 33, 34: relay O3 normally open
- 43, 44: relay O4 normally open
- nc: not connected

Fig. 3: Terminal connection

5.3.2 Digital input and output modules AC3221 and AC3259

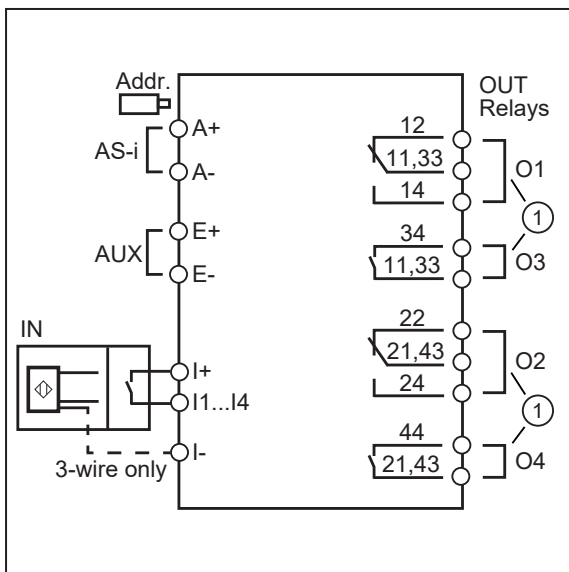
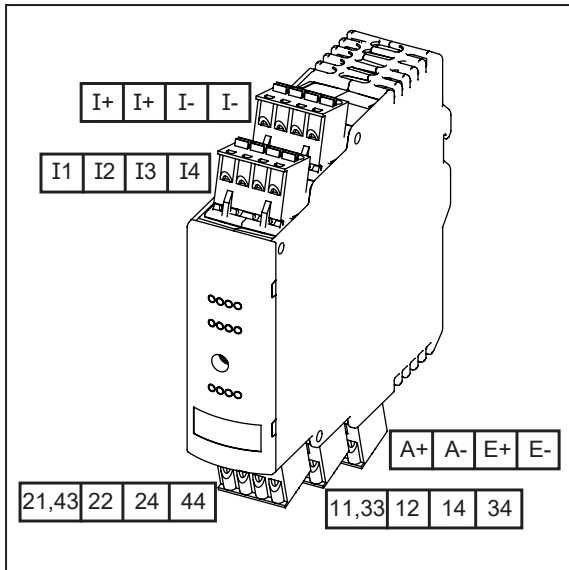


Fig. 4: Wiring

1: The outputs (relays) O1 + O3 and O2 + O4 must be supplied in pairs with the same voltage.





- I-: sensor supply 0 V
- I+: sensor supply +24 V
- E+: external voltage supply +24 V
- E-: external voltage supply +0 V
- I1...I4: switching input sensor 1...4, sensor supply from AUX
- A+: AS-i +
- A-: AS-i -
- O1...O4: switching output relay 1...4
- 11: relay O1 changeover contact, common
- 12: relay O1 changeover contact, normally closed
- 14: relay O1 changeover contact, normally open
- 21: relay O2 changeover contact, common
- 22: relay O2 changeover contact, normally closed
- 24: relay O2 changeover contact, normally open
- 33, 34: relay O3 normally open
- 43, 44: relay O4 normally open

Fig. 5: Terminal connection

5.3.3 Digital input and output module AC3255

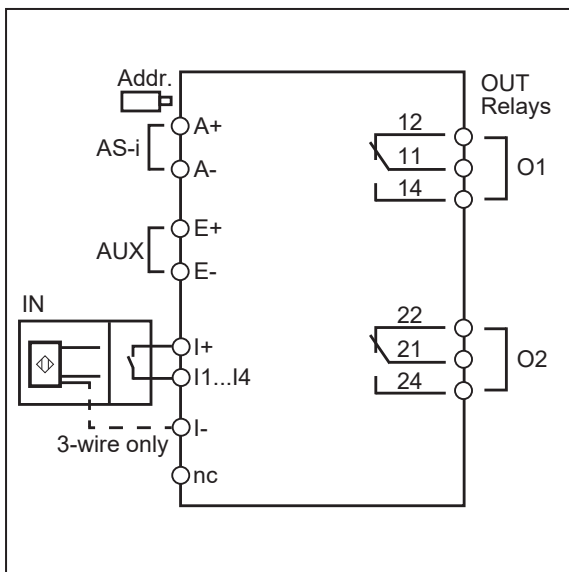
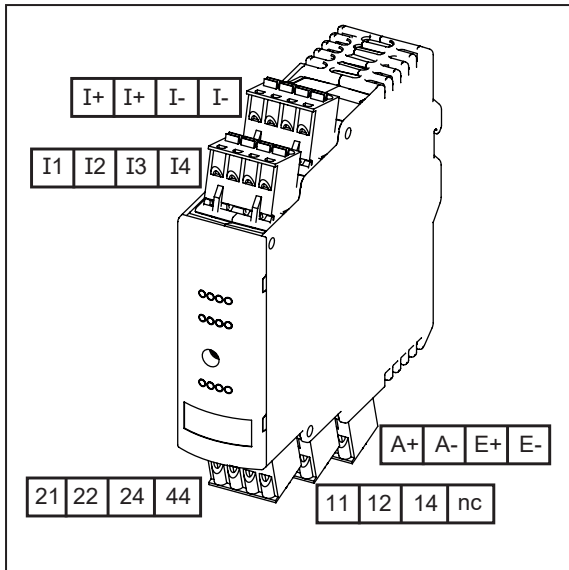


Fig. 6: Wiring



- I-: sensor supply 0 V
- I+: sensor supply +24 V
- E+: external voltage supply +24 V
- E-: external voltage supply +0 V
- I1...I4: switching input sensor 1...4, sensor supply from AUX
- A+: AS-i +
- A-: AS-i -
- O1...O2: switching output relay 1...2
- 11: relay O1 changeover contact, common
- 12: relay O1 changeover contact, normally closed
- 14: relay O1 changeover contact, normally open
- 21: relay O2 changeover contact, common
- 22: relay O2 changeover contact, normally closed
- 24: relay O2 changeover contact, normally open
- nc: not connected

Fig. 7: Terminal connection

5.3.4 Digital input and output module AC3256

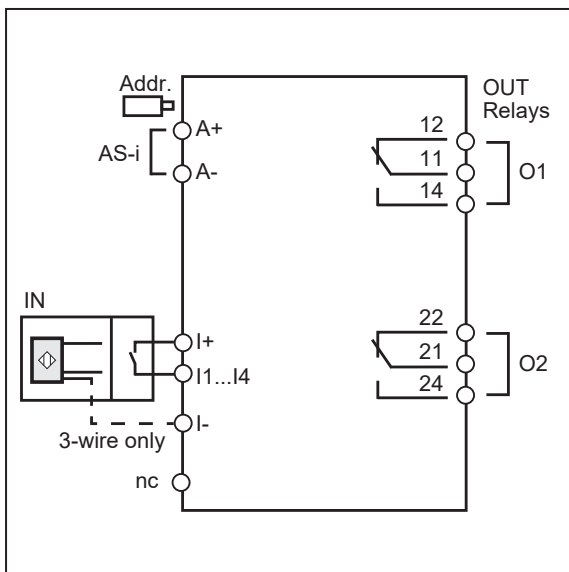
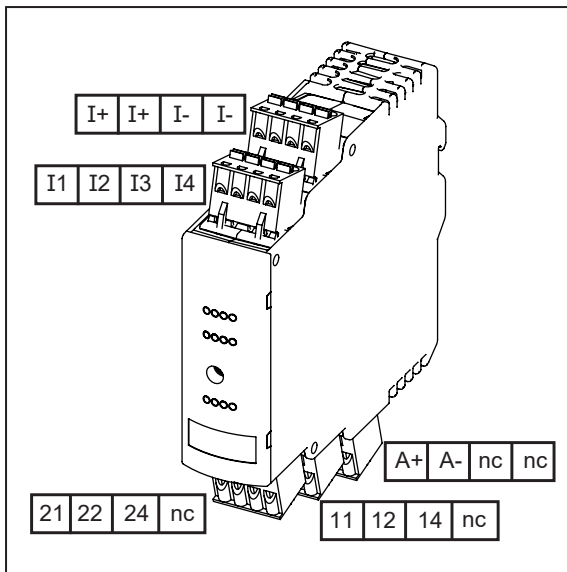


Fig. 8: Wiring








- I-: sensor supply 0 V
- I+: sensor supply +24 V
- I1...I4: switching input sensor 1...4, sensor supply from AS-i
- A+: AS-i +
- A-: AS-i -
- O1...O2: switching output relay 1...2
- 11: relay O1 changeover contact, common
- 12: relay O1 changeover contact, normally closed
- 14: relay O1 changeover contact, normally open
- 21: relay O2 changeover contact, common
- 22: relay O2 changeover contact, normally closed
- 24: relay O2 changeover contact, normally open
- nc: not connected

Fig. 9: Terminal connection

5.4 Safety instructions relay contacts

-  The external protection of the relay currents according to the valid regulations to the values of the technical data is the responsibility of the system manufacturer.
-  The relays are not designed for small switching currents. If the relay outputs are used for switching very small currents (e.g. PLC inputs), considerable contact resistance can arise.
-  External interference suppression of inductive loads is required.



WARNING

AC3220, AC3221, AC3258, and AC3259:
The relays are connected in pairs: O1+O3 and O2+O4 (see wiring)

Connection of different voltage sources within one relay pair

- ▷ Electric shock / dangerous voltage possible in the plant.
- ▶ Only connect the same voltage sources to the relay output pairs O1+O3 and O2+O4.
- ▷ Safety guaranteed.



Only the supplied coded or technically identical connectors may be used on the terminals blocks for the relay outputs O1...O4 (AC3220, AC3221, AC3258 and AC3259) or O1...O2 (AC3255, AC3256).

- ▷ These must be coded at poles 1 and 4, e.g. by using coding pins.

**WARNING**

Use of non-coded connectors relay outputs O1...O4 (AC3220, AC3221, AC3258 and AC3259) / O1...O2 (AC3255, AC3256).

- ▷ Electric shock / dangerous voltage in the plant possible if the connectors on the unit are reversed.
- ▶ Use the supplied coded connectors for the relay outputs.
- ▷ Confusion of the relay circuits with the SELV/PELV circuits is impossible.

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5.5 Connection technology

ATTENTION

No IP20 protection without connector.

- ▷ Cover unused connectors with terminals.
- ▶ Observe IP 20.

- ▶ Strip the insulation from the connection cables to 10 mm.

5.6 Connection accessories

The unit is supplied including connectors.

5.7 AUX supply / fuse



Only for connection with an isolating transformer with a UL approved max. 10 A upstream fuse at AUX (E+).

Alternatively, a class 2 power supply can be used to supply AUX.

Alternatively, an energy-limited circuit according to UL61010 can be used to supply AUX.

- ▷ Please note the technical data concerning the AUX supply.



The maximum cable length is 30 m.

6 Set-up / addressing

The address is set to 0 at the factory.

6.1 Addressing with the AC1154 addressing unit

When mounted and wired, the module can be addressed with the addressing cable (E70213) via the integrated addressing interface.

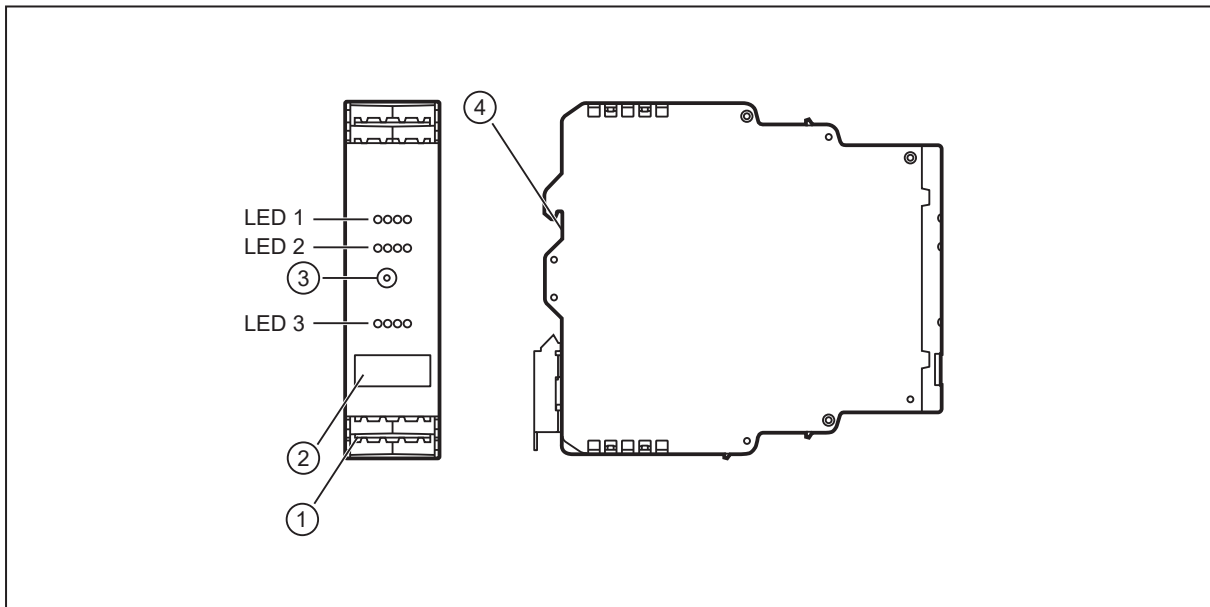
If a slave is used in combination with a master of the new generation (version 2.1), it is possible to select an address between 1A and 31B with the AC1154 addressing unit.

If a slave with the ID code "A" (extended address mode possible) is used in combination with a master of the 1st generation (version 2.0), the parameter P3 must be 1 and the output bit D3 must be 0.* The output bit D3 must not be used.

An address between 1A and 31A must be assigned to this slave.

* Default setting

7 Operating and display elements

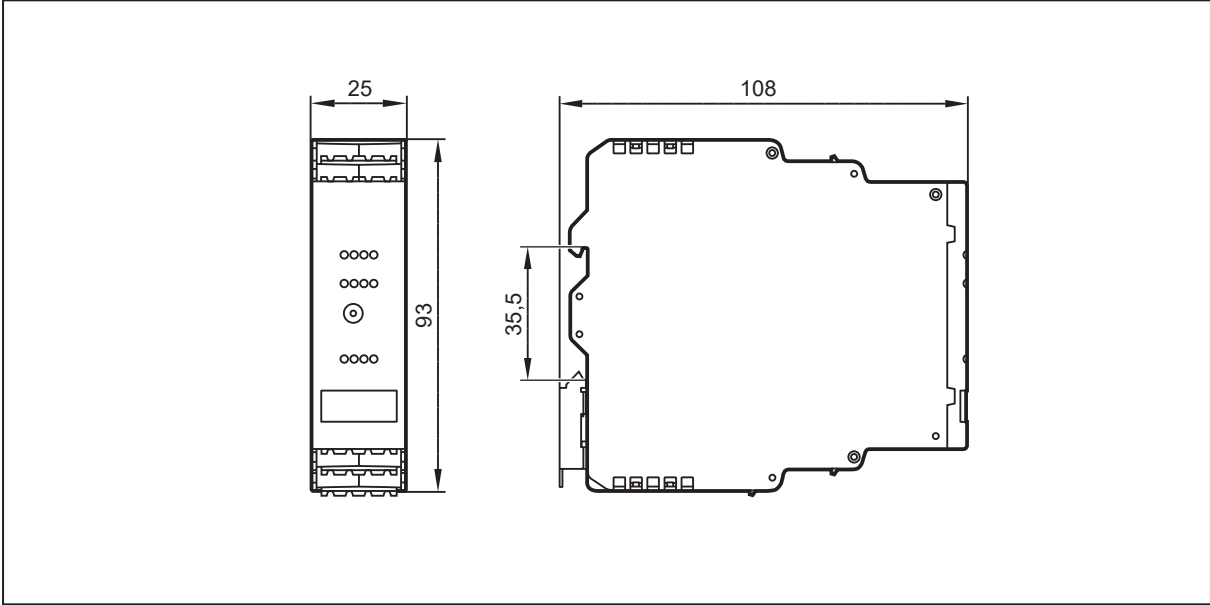


1: Connector with cage clamps	LED 1: switching status indication sensor inputs I1...I4
2: Panel for labelling	LED 2: AS-i, FAULT, AUX (except AC3220, AC3256, AC3258)
3: Addressing socket	LED 3: switching status indication relay outputs O1...O4 (AC3220, AC3221, AC3258, AC3259) / O1...O2 (AC3255, AC3256)
4: DIN rail mounting	

7.1 Operation / LEDs

LED 1 yellow LED on:	inputs (I1...I4) switched
LED 2 AS-i green lights:	AS-i voltage supply OK
LED 2 FAULT red lights:	AS-i communication error, slave does not participate in the "normal" exchange of data, e.g. slave address 0
LED 2 FAULT red flashes:	peripheral fault, e.g. sensor supply / output overloaded or shorted
LED 2 AUX green lights:	external voltage supply ok
LED 3 yellow LED on:	relay output (O1...O4) / (O1...O2) switched

7.2 Scale drawing



8 Maintenance, repair and disposal

8.1 Maintenance

The unit is maintenance-free.

8.2 Cleaning the housing surface

- ▶ Disconnect the device.
- ▶ Clean the device from dirt using a soft, chemically untreated and dry cloth.



Micro-fibre cloths without chemical additives are recommended.

8.3 Repair

- ▶ The device must only be repaired by the manufacturer. Observe the safety instructions (→ 2 Safety instructions) .

8.4 Disposal

- ▶ Dispose of the unit in accordance with the national environmental regulations.