



Operating instructions
AS-i ProcessLine module

GB

AC2952
AC2953
AC2954

Contents

1	Preliminary note	3
1.1	Symbols used	3
1.2	Safety symbol on the device	3
1.3	Warnings.	3
2	Safety instructions.	4
3	Intended use	5
4	Installation.	6
4.1	Install device	6
4.2	Operation in wet environments	6
4.3	Temperature derating AC2953	6
4.4	M12 connection.	7
5	Electrical connection	8
5.1	UL applications	8
5.2	Power supply (Power IN).	8
5.3	Wiring	9
5.3.1	Voltage supply (Power IN).	9
5.3.2	Sensor / actuator connection AC2952.	9
5.3.3	Sensor connection AC2953 and AC2954	10
5.3.4	Actuator connection AC2953.	10
6	Set-up.	11
6.1	Addressing	11
6.1.1	Addressing with the AC1154 addressing unit	11
6.2	Data bits	11
7	Operating and display elements	12
8	Scale drawing	15
9	Maintenance, repair and disposal	17

1 Preliminary note

You will find instructions, technical data, approvals, accessories and further information using the QR code on the device / packaging or at documentation.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

Warnings indicate the possibility of personal injury and damage to property. This enables safe product handling. Warnings are graded as follows:

	WARNING Warning of serious personal injury ▷ If the warning is not observed, fatal and serious injuries are possible.
	CAUTION Warning of minor to moderate personal injury ▷ If the warning is not observed, minor to moderate injuries are possible.
	ATTENTION Warning of damage to property ▷ If the warning is not observed, damage to property is possible.

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, programming, configuration, operation and maintenance of the product must be carried out by personnel qualified and authorised for the respective activity.
- Protect units and cables against damage.
- Replace damaged units, otherwise the technical data and safety will be impaired.
- Observe applicable documents.
- Store the product in its original packaging.

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.

- AC2952
4 digital inputs / 2 digital outputs (transistor), sensor/actuator supply from AS-i
- AC2953
4 digital inputs (Y-circuit) / 4 digital outputs (transistor), sensor supply from AS-i, actuator supply from AUX
- AC2954
4 digital inputs (Y-circuit), sensor supply from AS-i



The device is designed for use without a control cabinet in the food industry (indoor use).

- Use the device only within the limits of the technical data (→ Technical data).

4 Installation

4.1 Install device



- ▶ Disconnect the power to the machine during installation.
- ▶ Use a flat mounting surface for installation.
- ▶ Fix the unit to the mounting surface using 2 M5 mounting screws and washers, max. tightening torque 1.8 Nm.

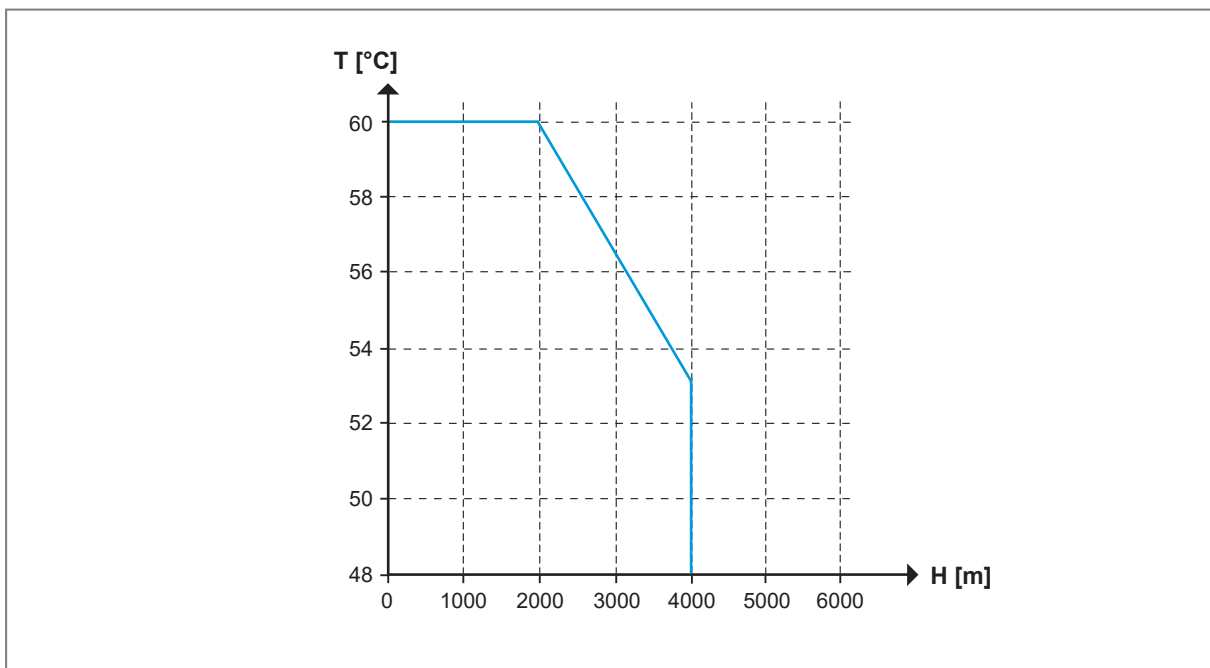
4.2 Operation in wet environments



The device can be operated in wet environments.

4.3 Temperature derating AC2953

Temperature derating according to operating altitude above sea level (ASL)



Maximum height above sea level [m]	Maximum ambient temperature [°C]
2000	60
3000	56
4000	53

4.4 M12 connection

The threaded connections in the device correspond to the M12 standard. To ensure compliance with the specified protection rating, only cables that comply with this standard may be used. In the case of self-assembled cables, the system manufacturer is responsible for the protection rating.

- ▶ Use connectors with gold-plated contacts.
- ▶ During installation, place the connectors vertically so that the coupling nut will not damage the thread.
- ▶ Observe the coding of the connectors during installation.

If connector in the device:

- ▶ Tighten the cable sockets according to the torque specifications indicated by the cable vendor. Maximum permissible tightening torque: 1.8 Nm

If sockets in the device:

- ▶ Tighten the cable plug using 1.3 ± 0.1 Nm.
- ▶ Cover unused connections with protective covers. Tightening torque: 1.3 ± 0.1 Nm
- ▶ Provide all outgoing cables with suitable strain relief after a maximum of 400 mm. Observe the minimum bending radius of the cables (→ information from the cable manufacturer).

The IP rating of the overall system depends on the protection ratings of the individual devices, the applied connection elements and the corresponding protective caps.

- ▶ Ensure correct fit and proper assembly of the M12 connection parts.
 - ▷ If these instructions are not complied with, the specified protection rating cannot be guaranteed.

ATTENTION

No protection rating / no protection of the contacts without mounted connectors / protective caps.

- ▷ Inadmissible soiling / moisture possible.
- ▷ Separation of circuits / safety might be impaired.
- ▶ Before installation / when replacing the device, observe pollution degree 2.
- ▶ Ensure separation / safety.

- ▶ Connect the M12 connectors of the device (→ Electrical connection).
- ▶ Install the device so that the M12 connection parts and the device are protected from mechanical stress such as shock and vibration.



The following applies to all types of mounting:

- ▷ The responsibility for the compliance with the requirements concerning mounting of the device in the application with regard to shock, vibration, acceleration and weight lies with the system architect.

5 Electrical connection

- ▶ Disconnect power.



The unit must be connected by a qualified electrician.

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

The circuit is insulated from device surfaces that could be touched 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 external wiring has to be carried out in a way that ensures the required separation from other circuits.



- ▶ Do not connect the terminals IN1...IN4 and L+, L- to external potential.

5.1 UL applications

To connect devices, only use UL-certified cables belonging to category CYJV or PVVA with a minimum temperature of 80 °C (75 °C in case of a maximum ambient temperature of 40 °C).

5.2 Power supply (Power IN)

- Operating voltage (SELV/PELV)
- ▶ Observe the maximum current rating of the M12 connections (→ technical data).

5.3 Wiring

5.3.1 Voltage supply (Power IN)

M12 connector (4 poles, A-coded)	Assignment	Description
	1: AS-i +	AS-Interface +
	2: AUX -	External voltage supply (AUX) for actuators 0 V (only AC2953)
	3: AS-i -	AS-Interface -
	4: AUX +	External voltage supply (AUX) for actuators +24 V (only AC2953)

5.3.2 Sensor / actuator connection AC2952

M12 socket (5 poles, A-coded)	Assignment	Description
	I-1/2 and O-1-Port	
	1: L+	Sensor supply +24 V
	2: IN2	Switching input sensor IN2
	3: L-	Sensor supply 0 V
	4: MP1 (IN1/OUT1)	Switching input sensor IN1 / switching output actuator OUT1
	5: n.c.	not connected
	I-3/4 and O-2-Port	
	1: L+	Sensor supply +24 V
	2: IN4	Switching input sensor IN4
	3: L-	Sensor supply 0 V
	4: MP2 (IN3/OUT2)	Switching input sensor IN3 / switching output actuator OUT2
	5: n.c.	not connected

MPx=Multi-function port (digital input/digital output)

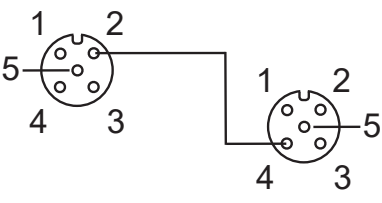
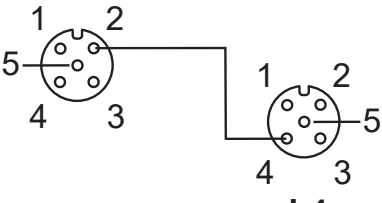


Maximum cable length per port: 30 m.

▷ The cables must not leave the building.

5.3.3 Sensor connection AC2953 and AC2954

The digital inputs IN1...IN4 are Y-connected.

M12 socket (5 poles, A-coded)	Assignment	Description
I-1/2 	I-1/2 port	
	1: L+	Sensor supply +24 V
	2: IN2	Switching input sensor IN2
	3: L-	Sensor supply 0 V
	4: IN1	Switching input sensor IN1
	5: n.c.	not connected
	I-2 port	
	1: L+	Sensor supply +24 V
	2: n.c.	not connected
	3: L-	Sensor supply 0 V
	4: IN2	Switching input sensor IN2
	5: n.c.	not connected
I-3/4 	I-3/4 port	
	1: L+	Sensor supply +24 V
	2: IN4	Switching input sensor IN4
	3: L-	Sensor supply 0 V
	4: IN3	Switching input sensor IN3
	5: n.c.	not connected
	I-4 port	
	1: L+	Sensor supply +24 V
	2: n.c.	not connected
	3: L-	Sensor supply 0 V
	4: IN4	Switching input sensor IN4
	5: n.c.	not connected



Maximum cable length per port: 30 m.

▷ The cables must not leave the building.

5.3.4 Actuator connection AC2953

M12 socket (5 poles, A-coded)	Assignment	Description
	O-1...O-4 port	
	1: n.c.	not connected
	2: n.c.	not connected
	3: OUT-	Switching output actuator 0 V
	4: OUT1...OUT4	Switching output actuator 1...4
	5: n.c.	not connected



Maximum cable length per port: 30 m.

▷ The cables must not leave the building.

6 Set-up

6.1 Addressing

The address is set to 0 at the factory.

- Assign a free address between 1A and 31B.

6.1.1 Addressing with the AC1154 addressing unit

- Connect the module to the addressing unit using a connection cable with M12 connector (4 or 5-pole).

6.2 Data bits

AC2952

AS-i profile S-7.A.E / extended addressing mode: yes

Data bit	D0	D1	D2	D3
Input	1	2	3	4
Socket	I-1/2	I-1/2	I-3/4	I-3/4
Pin	4	2	4	2
Output	1	2	-	-
Socket	O-1	O-2	-	-
Pin	4	4		



Input 1 (IN1) and output 1 (OUT1) as well as input 3 (IN3) and output 2 (OUT2) are each connected to pin 4.

AC2953

AS-i profile S-7.A.7 / extended addressing mode: yes

Data bit	D0	D1	D2	D3
Input	1	2	3	4
Socket	I-1/2	I-1/2 / I-2	I-3/4	I-3/4 / I-4
Pin	4	2 / 4	4	2 / 4
Output	1	2	3	4
Socket	O-1	O-2	O-3	O-4
Pin	4	4	4	4

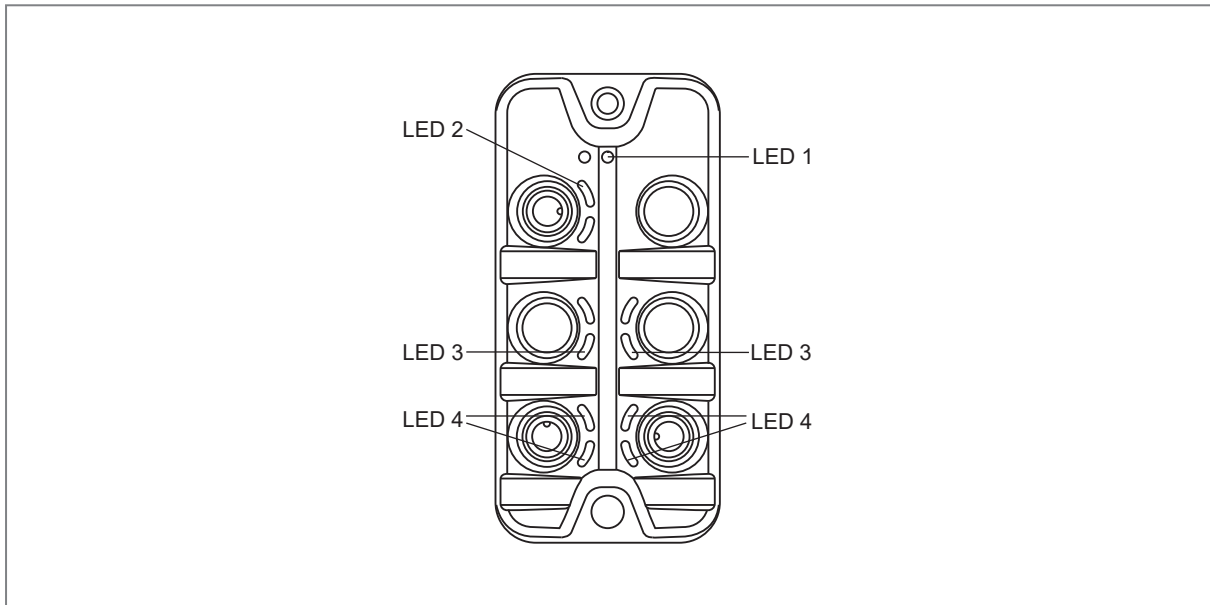
AC2954

AS-i profile S-0.A.E / extended addressing mode: yes

Data bit	D0	D1	D2	D3
Input	1	2	3	4
Socket	I-1/2	I-1/2 / I-2	I-3/4	I-3/4 / I-4
Pin	4	2 / 4	4	2 / 4

7 Operating and display elements

LED assignment AC2952



Red LED 1 FLT is on:

Red LED 1 FLT flashes:

Green LED 2 AS-i is on:

Yellow LED 3 is on:

Yellow LED 4 is on:

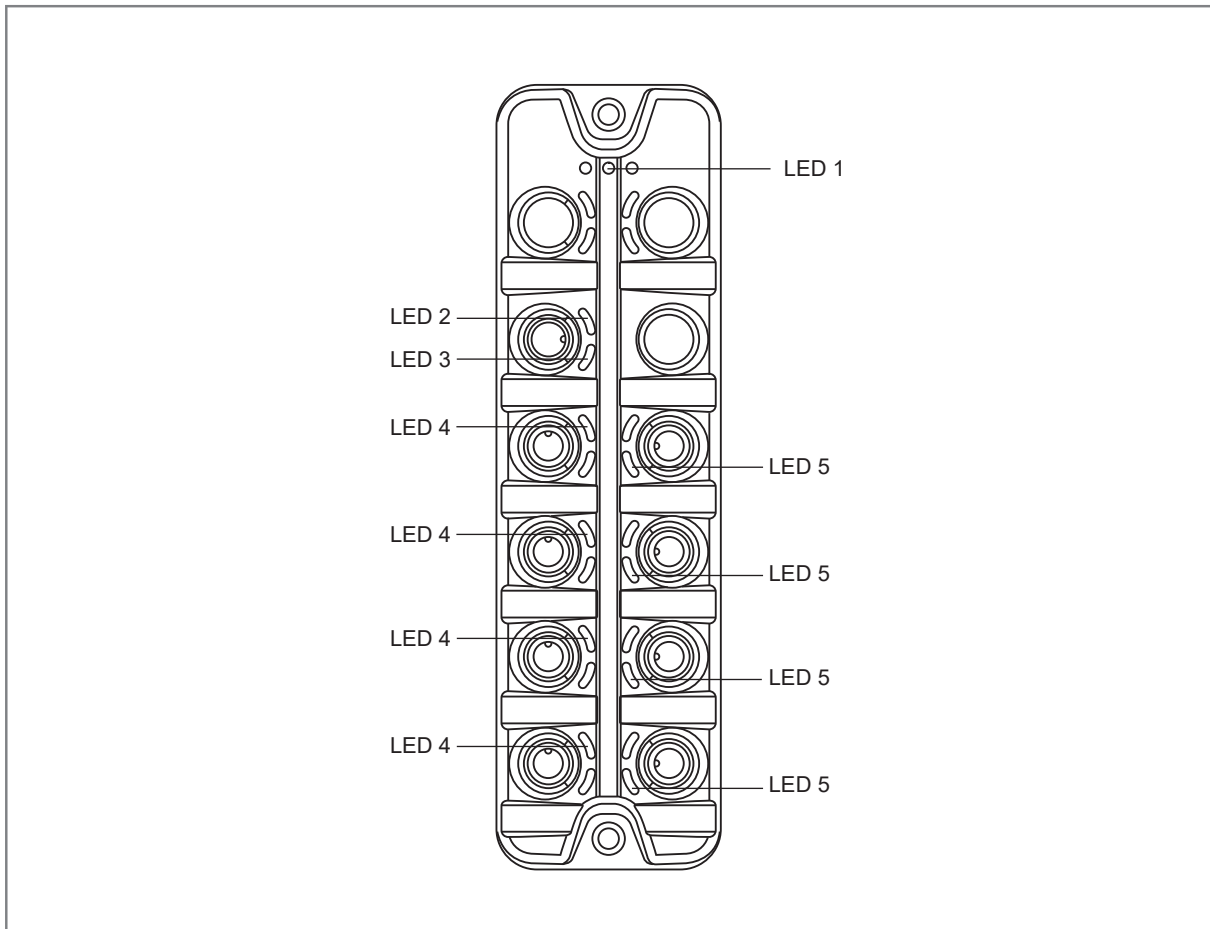
AS-i communication error, slave does not participate in the "normal" exchange of data, e.g. slave address 0

Peripheral fault, e.g. sensor supply / output overloaded or shorted

AS-i voltage supply OK

Output (OUT1...OUT2) switched

Input (IN1...IN4) switched

LED assignment AC2953

Red LED 1 FLT is on:

Red LED 1 FLT flashes:

Green LED 2 AS-i is on:

Green LED 3 AUX is on:

Yellow LED 4 is on:

Yellow LED 5 is on:

AS-i communication error, slave does not participate in the "normal" exchange of data, e.g. slave address 0

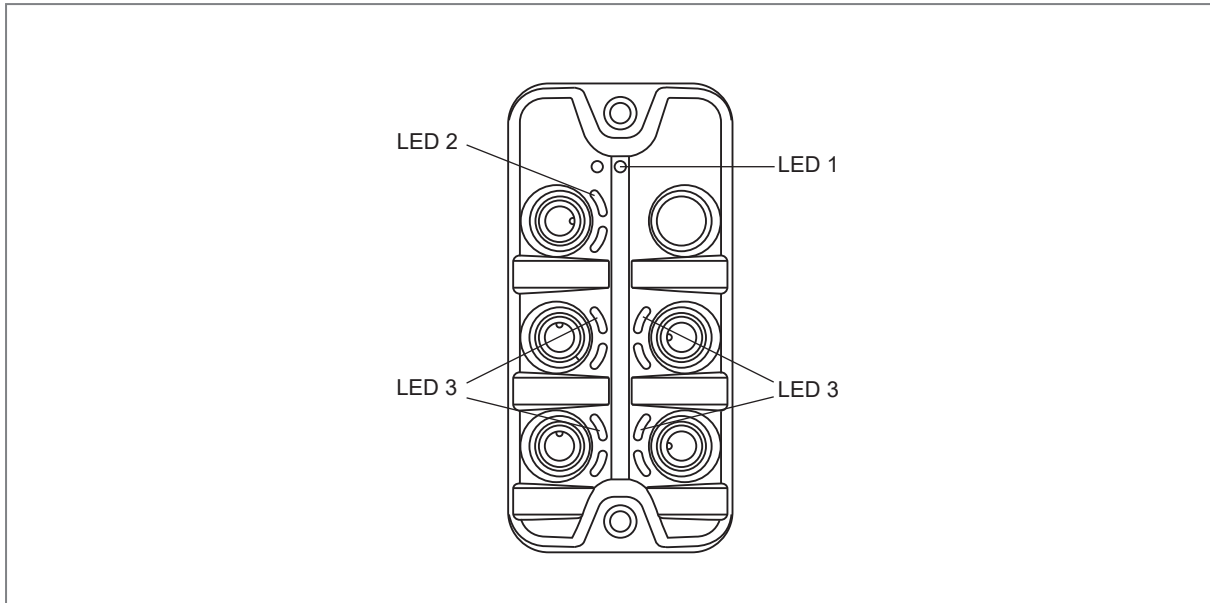
Peripheral fault, e.g. sensor supply / output overloaded or shorted

AS-i voltage supply OK

External voltage supply (AUX) OK

Input (IN1...IN4) switched

Output (OUT1...OUT4) switched

LED assignment AC2954

Red LED 1 FLT is on:

Red LED 1 FLT flashes:

Green LED 2 AS-i is on:

Yellow LED 3 is on:

AS-i communication error, slave does not participate in the "normal" exchange of data, e.g. slave address 0

Peripheral fault, e.g. overload or short circuit of the sensor supply

AS-i voltage supply OK

Input (IN1...IN4) switched

8 Scale drawing

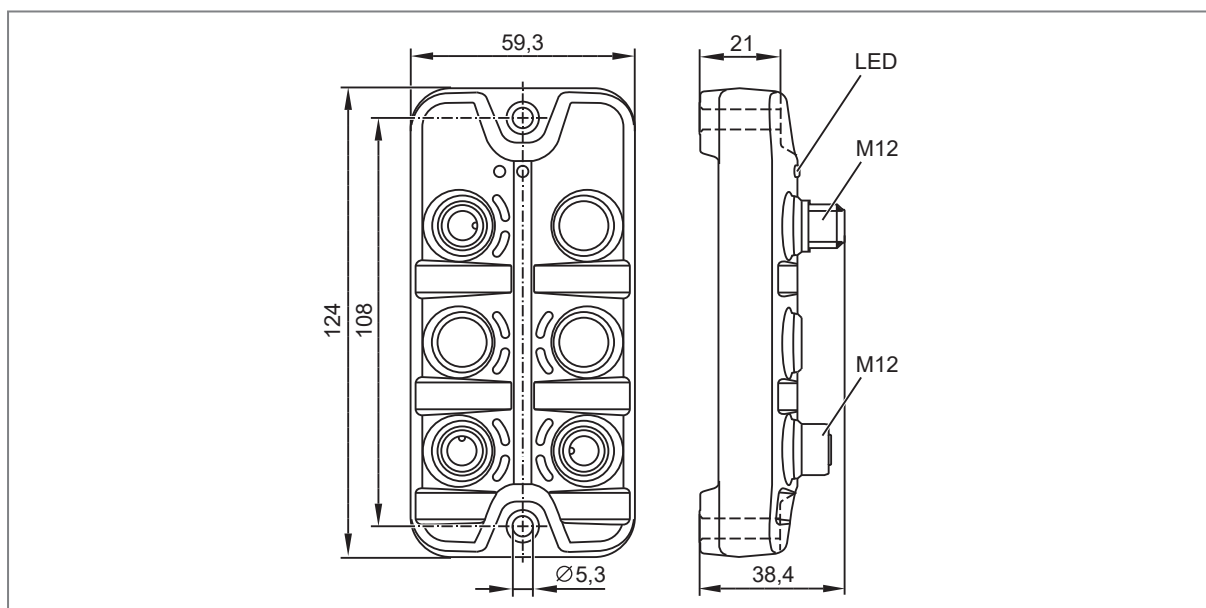


Fig. 1: AC2952 - 2x (2 DI / 1 DO)

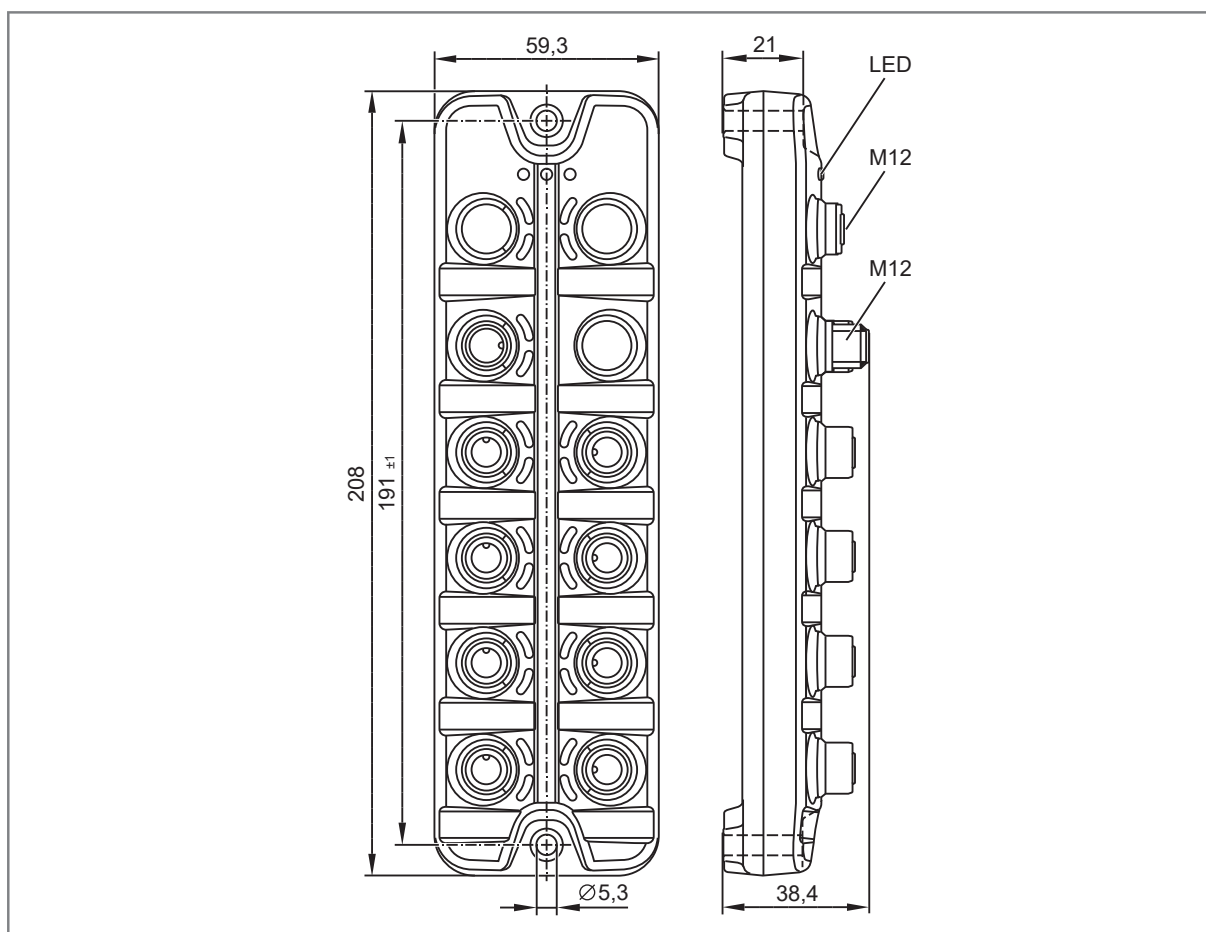


Fig. 2: AC2953 - 4 DI-Y / 4 DO

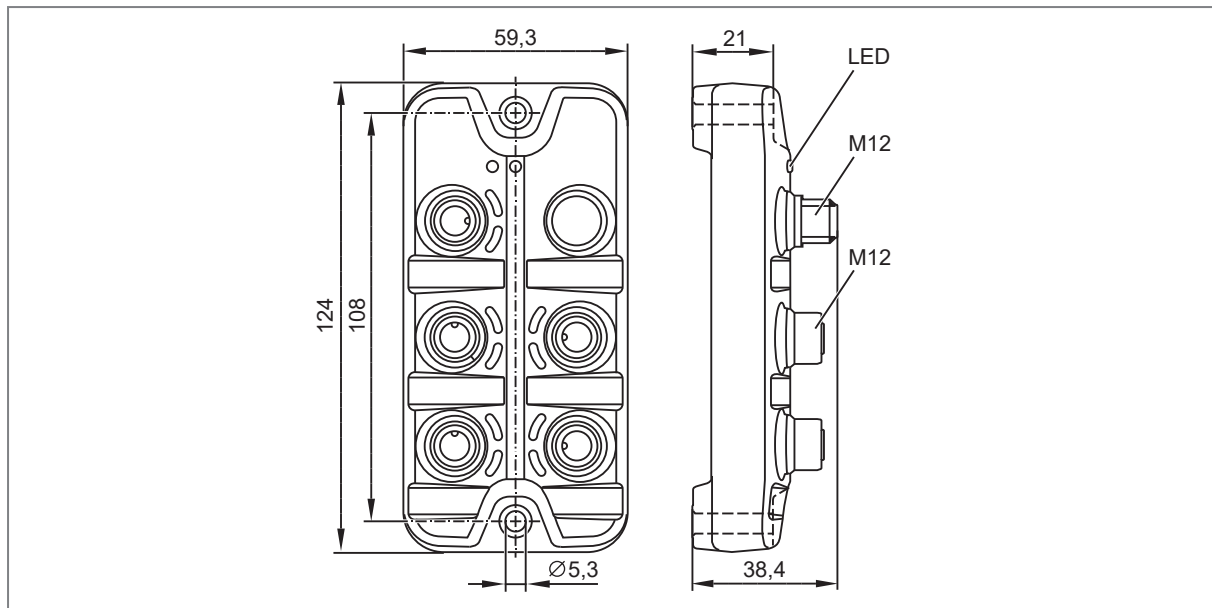


Fig. 3: AC2954 - 4 DI-Y

9 Maintenance, repair and disposal

The unit is maintenance-free.

- ▶ Carry out cleaning considering the technical data (protection rating) and the connection technology used.
- ▶ Cleaning agents must be checked by the system manufacturer / operator for their suitability for the device materials (→ Technical data) and the connection technology used.
- ▶ The cleaning agents must not damage the device materials.
- ▶ It is not possible to repair the unit.
- ▶ After use, dispose of the unit in an environmentally friendly way in accordance with the applicable national regulations.