



Operating instructions
AS-i AirBox
AC2042
AC2055

GB

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	M12 connection.	7
4.2	Identical devices mounted side by side	8
4.3	Derating for side by side mounting of identical devices	9
4.4	Side by side mounting of different devices	10
4.5	Removing the device.	10
4.6	Installation of the sensors	10
5	Electrical connection	11
5.1	Derating for separately mounted devices	11
5.2	Sensor connection	12
6	Set-up	13
6.1	Addressing	13
6.2	Data bits	13
7	Operation	14
7.1	Pneumatic circuit diagram	14
7.2	Compressed air.	14
7.2.1	Compressed air quality	14
7.2.2	Specification of the compressed air purity	15
7.3	Electromagnetic compatibility (EMC).	15
8	Operating and display elements	16
8.1	LEDs	16
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 device 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 devices and cables against damage.

The operating pressure range is 2...8 bar.

Operation outside the indicated operating pressure range or use of incorrectly processed compressed air can cause permanent leaks and irreparable damage to the pneumatic components and may lead to malfunctioning.

- Replace damaged units, otherwise the technical data and safety will be impaired.
- Observe applicable documents.



WARNING

When the valve is switched off, the air in the connected components through which air flows is vented through the device.

Sound pressure during venting:

72dBA max (device without the connected components through which air flows).

- ▷ The sound pressure level in the system may exceed the set range.
- ▶ The system architect must take design measures to ensure that the nationally or locally applicable maximum sound pressure level is adhered to.
- ▶ Otherwise, the system architect must inform the operator of the latter's obligation to ensure occupational health and safety (sound pressure) and, if necessary, provide appropriate information.

3 Intended use

The device, which is designed for indoor use, is destined for the decentralised control of cylinders and valve actuators in industrial plant engineering.

The device functions as a digital input and output module in the AS-i network. It connects two sensors and two pneumatic outputs to the AS-i master.

- Integrated sensor supply
- Sensor connection via connectors
- Maximum number of modules per master: 31
- AS-Interface version 3.0, backwards compatible
- AC2055: metal parts, 1.4305 (stainless steel / 303)
- 4 (2 x 2) digital inputs
- 2 pneumatic outputs
- AS-i profile S-7.F.F
- Extended addressing mode: no
- Connection to the AS-i network via the lower part of the module
- Exhaust air routing
 - AC2042: exhaust air with integrated filter
 - AC2055: exhaust air can be discharged through tube connection
- Connection to the pneumatic system via Legris 3000 / 8mm tube fitting, outside calibration according to CETOP standard RP 54 P
- Operation with compressed air of 2...8 bar incl. possible pressure peaks

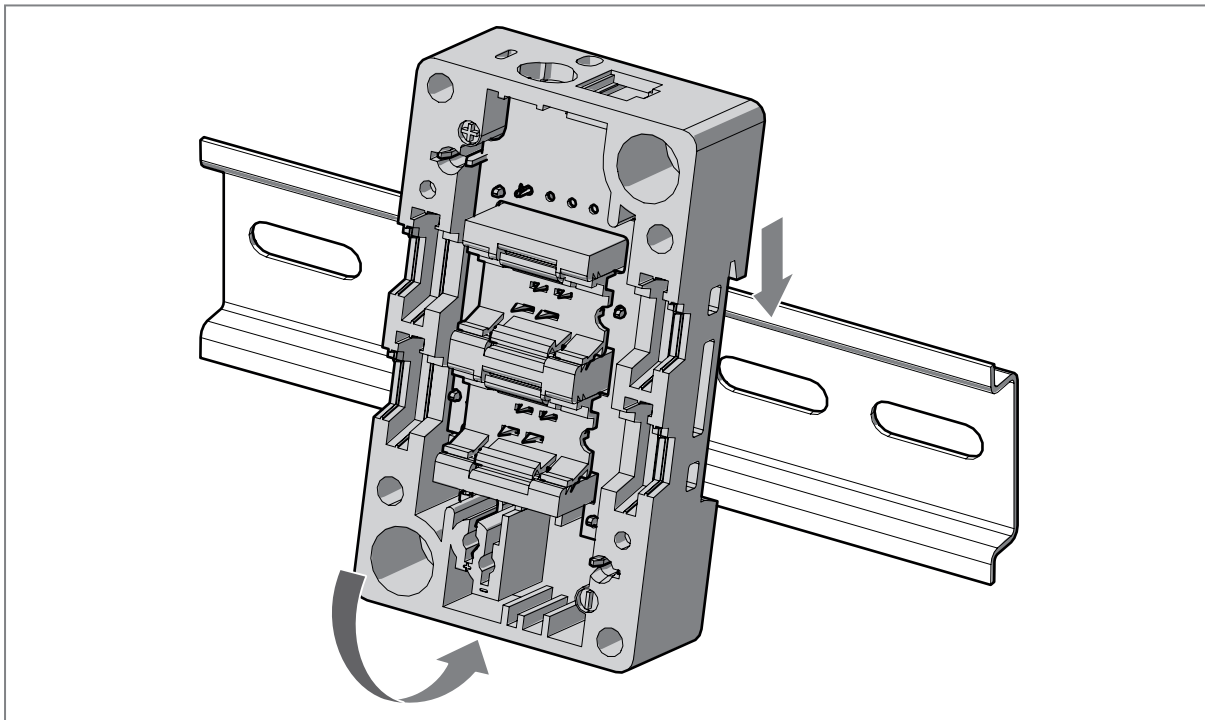


Avoid pressure peaks > 8 bar

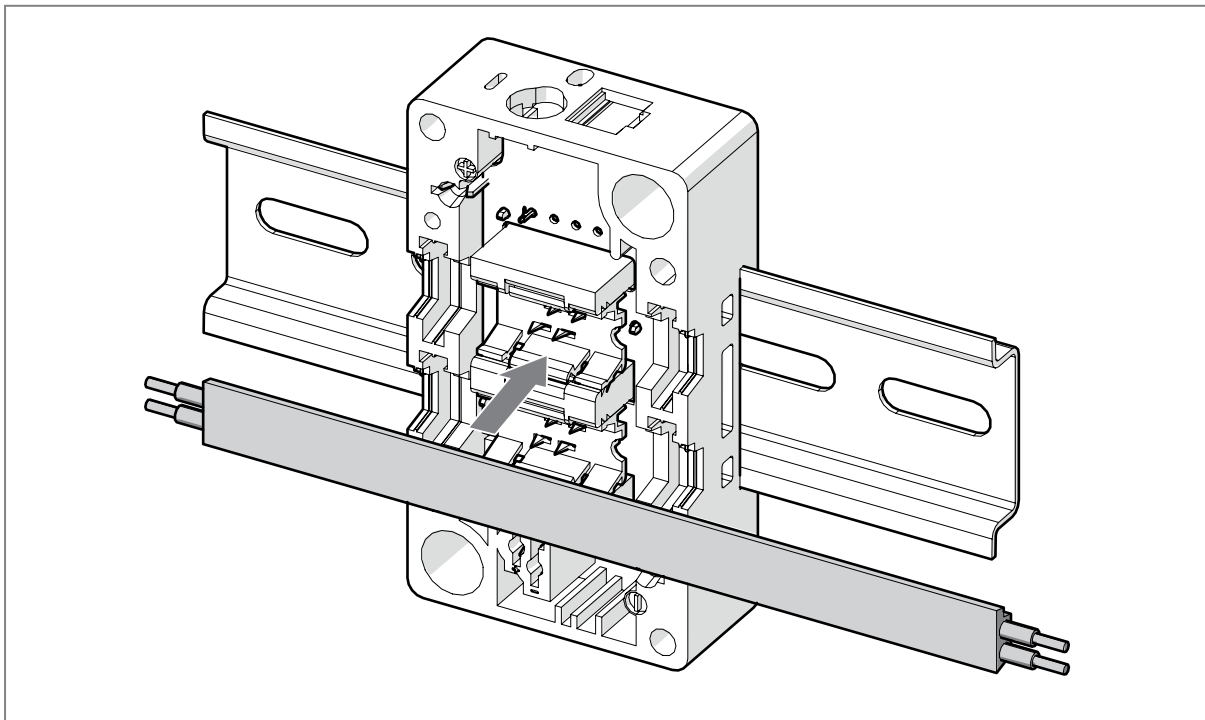
▷ Pressure peaks > 8 bar can cause permanent leaks and irreparable damage to the AirBox.

4 Installation

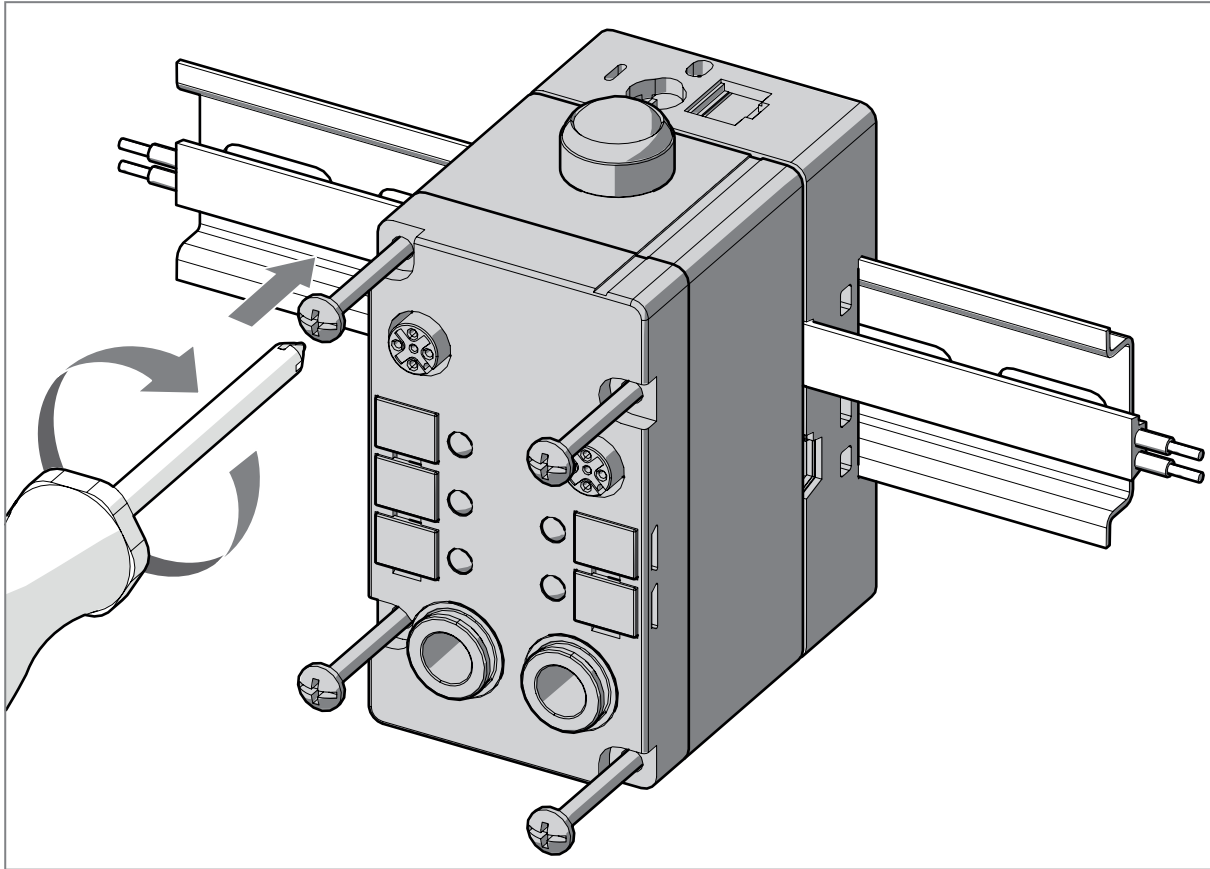
- Mount the lower part of the module on a 35 mm DIN rail.



- Insert the AS-i flat cable.



- ▶ Carefully insert the enclosed seal between the lower part of the module and the AirBox.
- ▶ Make sure the seal is seated correctly.
- ▶ Mount the AirBox on the wired lower part of the module, tightening torque 0.8 Nm.



-  In a dusty environment the AirBox can be mounted with the filter facing downwards.
-  The AirBox can be operated in wet environments.

4.1 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 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.
- ▶ Before installation / when replacing the device, observe pollution degree 2.

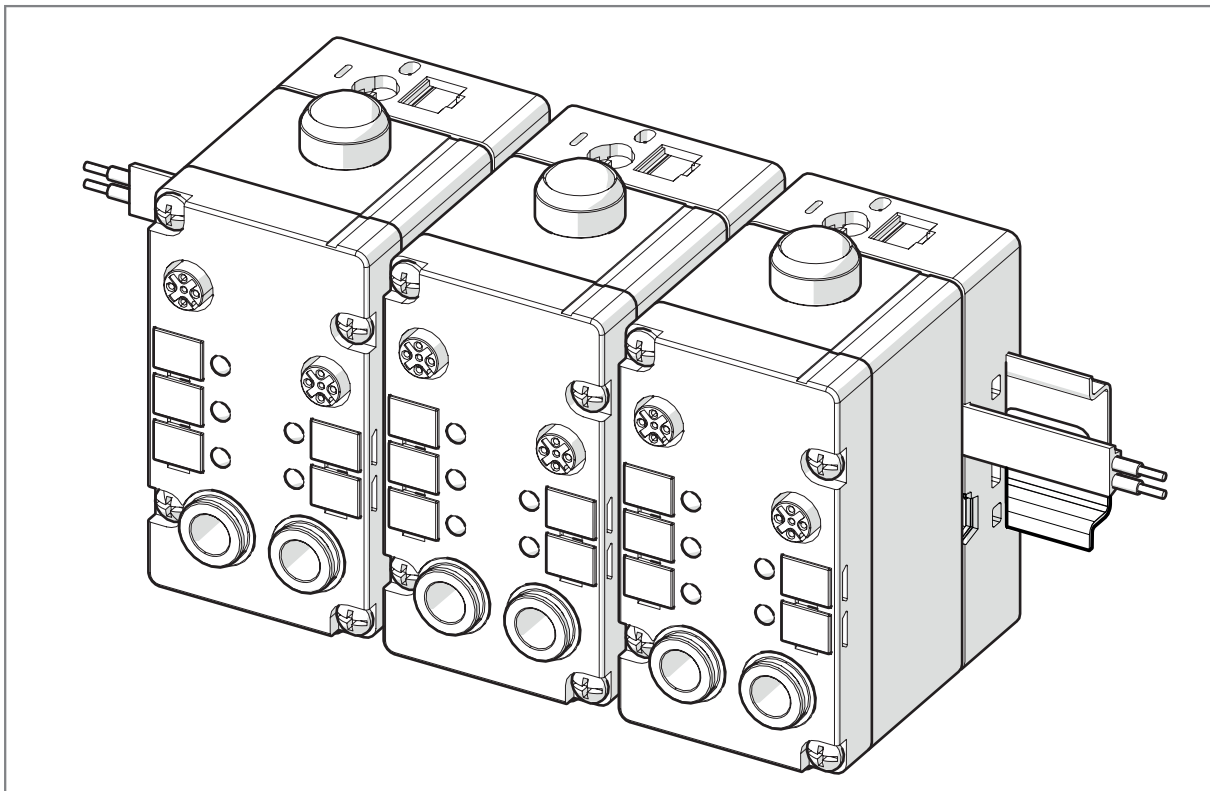
- ▶ Connect the M12 connectors of the device (→ Electrical connection).
- ▶ Install the unit so that the M12 connection parts and the unit are protected from mechanical stress such as shock and vibration.



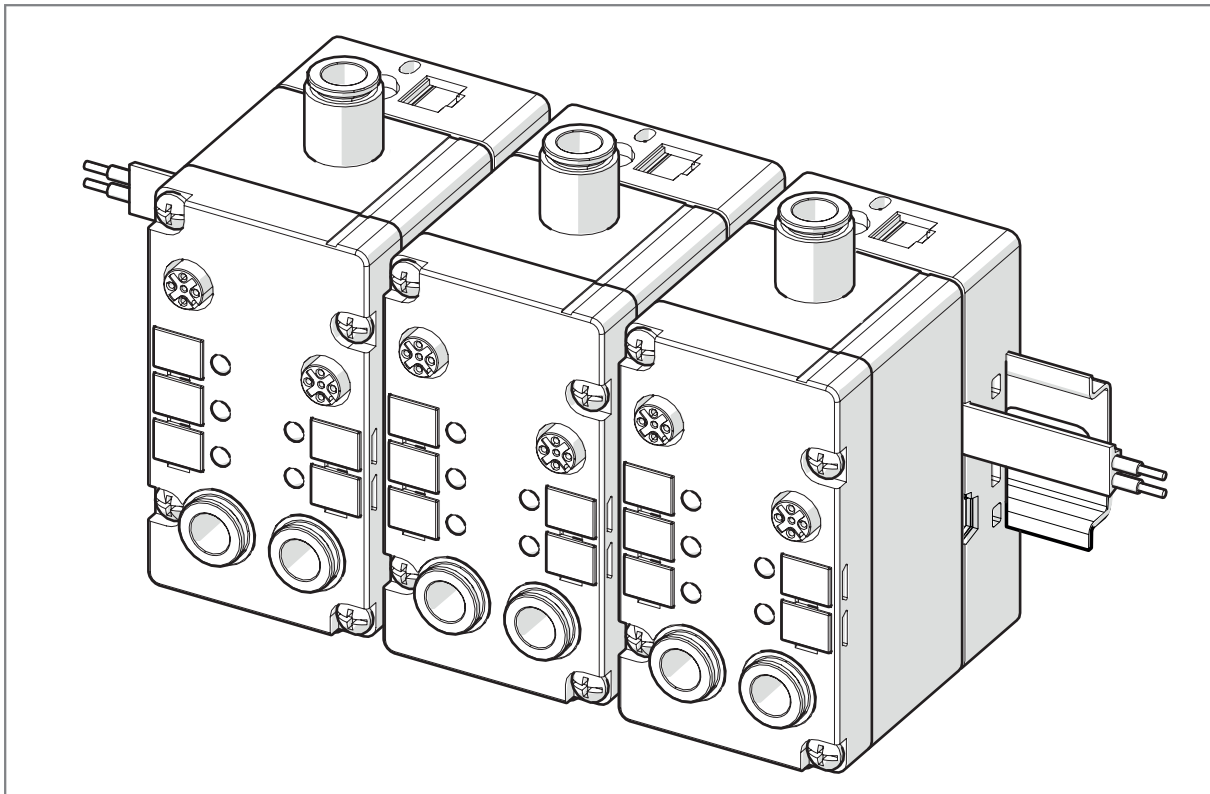
The following applies to all types of mounting:

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.

4.2 Identical devices mounted side by side



AirBox AC2042 – mounted side-by-side



AirBox AC2055 – mounted side-by-side

4.3 Derating for side by side mounting of identical devices

When identical devices are mounted side-by-side (distance between the devices: at least 1 cm), derating according to the following table applies:

Article number	Derating
AC2042 AC2055	Overall current rating of inputs when mounted side by side Ambient temperature 0...55°C / linear derating 50...55°C Overall current rating for inputs 50% at 55°C corresponds to a sensor current of 50 mA

4.4 Side by side mounting of different devices

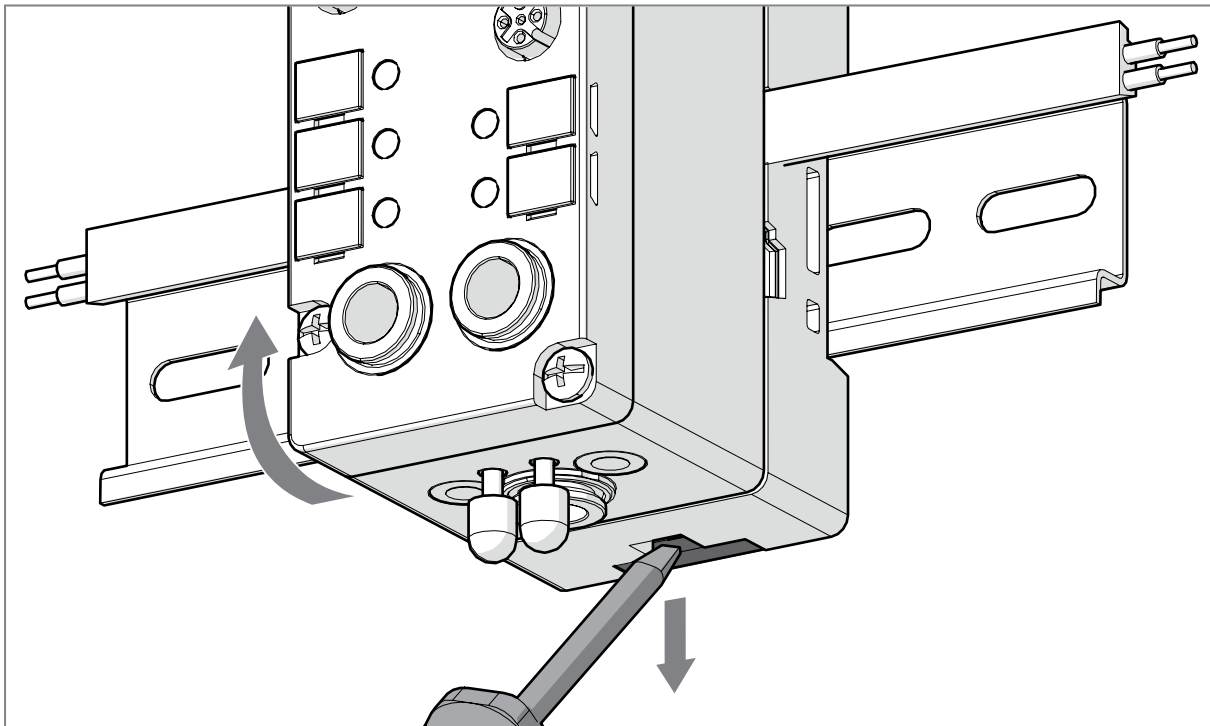
ATTENTION

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.

4.5 Removing the device



4.6 Installation of the sensors

► Follow the manufacturer's installation instructions.

5 Electrical connection



The unit must be connected by a qualified electrician.

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

The voltage is supplied via the yellow AS-i flat cable.

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.

5.1 Derating for separately mounted devices

Observe the derating of the current rating depending on the ambient temperature according to the following tables:

Article number	Derating
AC2042 AC2055	Overall current rating of inputs in case of a single device Ambient temperature 0...55°C / linear derating 50...55°C Overall current rating for inputs 50% at 55°C corresponds to a sensor current of 50 mA

5.2 Sensor connection

- Connect the sensors with the inputs I-1/2 and I-3/4.

M12 socket (5 poles, A-coded)	
	Sensor connection 1: I-1/2 1: Sensor supply L+ 2: Data input I-2 3: Sensor supply L- 4: Data input I-1 5: Not used

M12 socket (5 poles, A-coded)	
	Sensor connection 2: I-3/4 1: Sensor supply L+ 2: Data input I-4 3: Sensor supply L- 4: Data input I-3 5: Not used



Maximum cable length per port: 30 m

▷ The cables must not leave the building.



The electrical triggering has priority over the mechanical triggering.

6 Set-up

6.1 Addressing

The address is set to 0 at the factory.

- Addressing the device via the AS-i master.
- Assign a free address between 1 and 31.

6.2 Data bits

Data bit	D0	D1	D2	D3
Input	I-1	I-2	I-3	I-4
Pneumatic output	-	-	O-3	O-4

7 Operation

7.1 Pneumatic circuit diagram

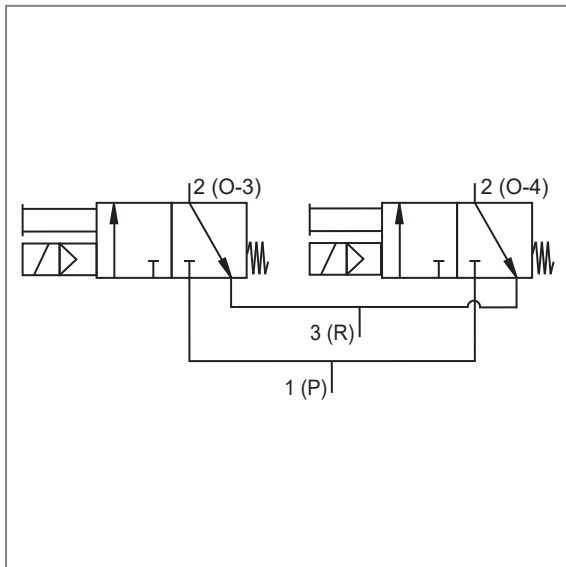


Fig. 1: 2 x 3/2-way valve

7.2 Compressed air



Observe the safety regulations and provisions for setting up pneumatic systems.

- ▶ Switch off pressure.
- ▶ Establish the connections of the compressed air supply 1 (P), of the pneumatic outputs 2 (O-3, O-4) and of the exhaust air 3 (R) to the pneumatic system.
- ▶ Cut the connection tube straight and push it into the tube fitting until you hear it click into place.

Removal of the tubes

- ▶ To remove the tubes press on the black ring and pull out the tube at the same time.
- ▶ Use the manual pushbuttons to activate the pneumatic outputs.
- ▶ Allow compressed air to flow into the AirBox.
- ▶ Press manual pushbutton 1: pneumatic output O-3 is controlled.
- ▶ Press manual pushbutton 2: pneumatic output O-4 is controlled.

7.2.1 Compressed air quality

For trouble-free operation sufficiently treated air must be used (filtered air 5µm, lubricated (ISO-VG10) or not lubricated).



Operation with lubricated air

- ▷ If lubricated air is used, the initial lubrication is removed. If the AirBox has been used with lubricated air once, it must always be used with lubricated air.

7.2.2 Specification of the compressed air purity

According to ISO 8573-1:2001 the air purity is divided into three classes:

1. The purity class of the solid particle content
2. The purity class for the humidity content
3. The purity class for the total oil content

The AirBoxes are suitable for compressed air of the purity classes 6- 3- 4

Meaning:

1. Solid particle contamination acc. to class 6:
Max. particle size 5 μm , max. particle density 5 mg / m^3
2. Maximum water content acc. to class 3:
Pressure dew point -20°C
3. Maximum total oil content acc. to class 4:
5 mg / m^3

7.3 Electromagnetic compatibility (EMC)

Special applications such as the conveying and distribution of bulk material can generate higher electrostatic charges.

To avoid electrostatic discharge the following remedial actions are possible, among others:

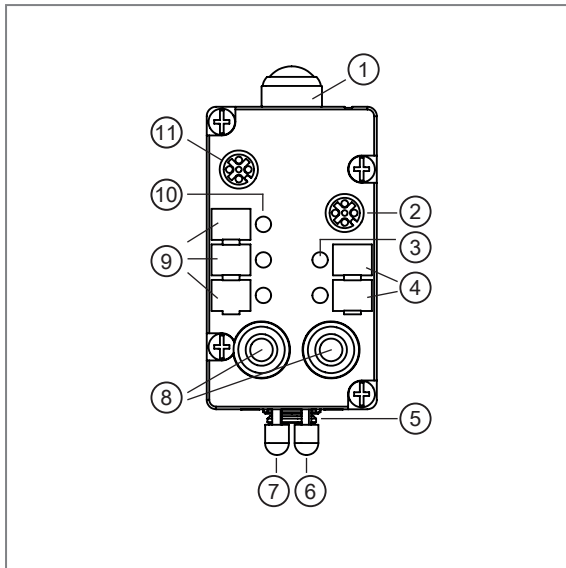
- Equalisation of potential according to the installation instructions
- Separate laying of
 - signal and bus cables
 - equipotential bonding conductors
 - power cables
- Physical separation of the AirBox and all cables from all parts carrying or discharging electrostatic charges

If these discharges are not avoided there is the danger of:

- Injury to/incapacitation of operators and maintenance staff
- Sparking
- Damage to the AirBox
- Damage to the electrical equipment

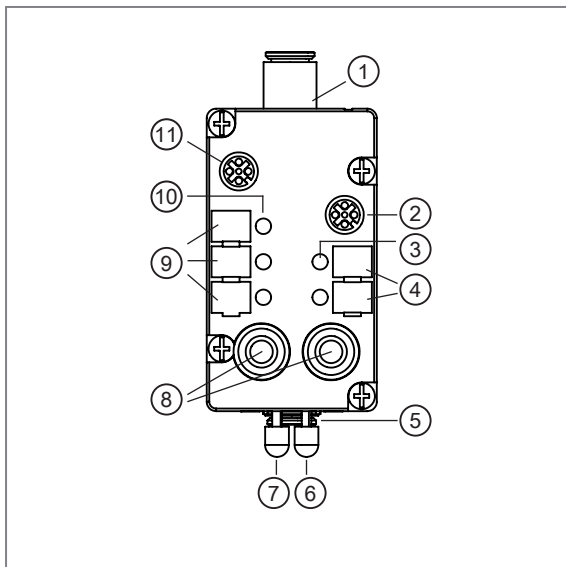
8 Operating and display elements

AC2042



- 1: Exhaust air 3 (R) - filter
- 2: Sensor connection 2: I-3/4
- 3: LEDs
- 4: Labels
- 5: Plug-in connection for compressed air supply 1 (P)
- 6: Manual pushbutton 2 for O-4
- 7: Manual pushbutton 1 for O-3
- 8: Pneumatic outputs O-3 / O-4
- 9: Labels
- 10: LEDs
- 11: Sensor connection 1: I-1/2

AC2055



- 1: Exhaust air 3 (R) - tube connection
- 2: Sensor connection 2: I-3/4
- 3: LEDs
- 4: Labels
- 5: Plug-in connection for compressed air supply 1 (P)
- 6: Manual pushbutton 2 for O-4
- 7: Manual pushbutton 1 for O-3
- 8: Pneumatic outputs O-3 / O-4
- 9: Labels
- 10: LEDs
- 11: Sensor connection 1: I-1/2

8.1 LEDs

Check the safe function of the device. Display by LEDs:

LED green	AS-i voltage supply OK
LED yellow	Function display: input / pneumatic output switched

9 Maintenance, repair and disposal

The unit is maintenance-free.

Only the manufacturer is allowed to repair the unit.

- ▶ Disconnect the device.
- ▶ Clean the device from dirt using a soft, chemically untreated and dry cloth.
- ▶ In case of severe soiling, use a damp cloth (water).
- ▶ After use, dispose of the unit in an environmentally friendly way in accordance with the applicable national regulations.