Operating instructions
AS-i SmartLine module

AC3222
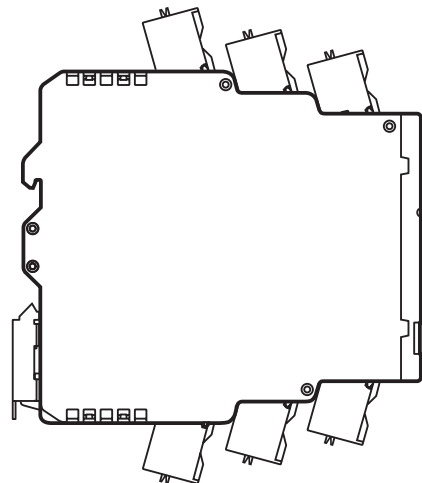
Contents

1 Preliminary note

Technical data, approvals, accessories and further information at www.ifm.com.

1.1 Explanation of symbols

▶   Instructions

>   Reaction, result

→   Cross-reference

[!]   Important note
Non-compliance may result in malfunction or interference.

[ⓘ]   Information
Supplementary note.

2 Safety instructions

- 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 (→ Functions and features).

- 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 unit must be carried out by qualified personnel authorised by the machine operator.

- Protect units and cables against damage.

3 Functions and features

The slave converts analogue signals (temperature values) into digital values and transfers them to the host.

The data transfer is asynchronous according to the AS-i profile S-7.3 and the AS-i specification V2.11.

- The slave can be operated in conjunction with a version 2.11 master or higher (master profile M3 or M4).

- Sensor supply via AS-i

- Conversion of measured values for 4 channels: 480 ms

- Resolution 16 bits / 0.1°C

- Measuring range -200…+850 °C

- AS-i profile S-7.3.E

- Connection of 2-wire and 4-wire sensors possible

- Maximum number of modules per AS-i system: 31

- The Pt100 sensors are connected via COMBICON terminals

4 Addressing

▶ Assign a free address between 1 and 31.

The address is set to 0 at the factory.

4.1 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.
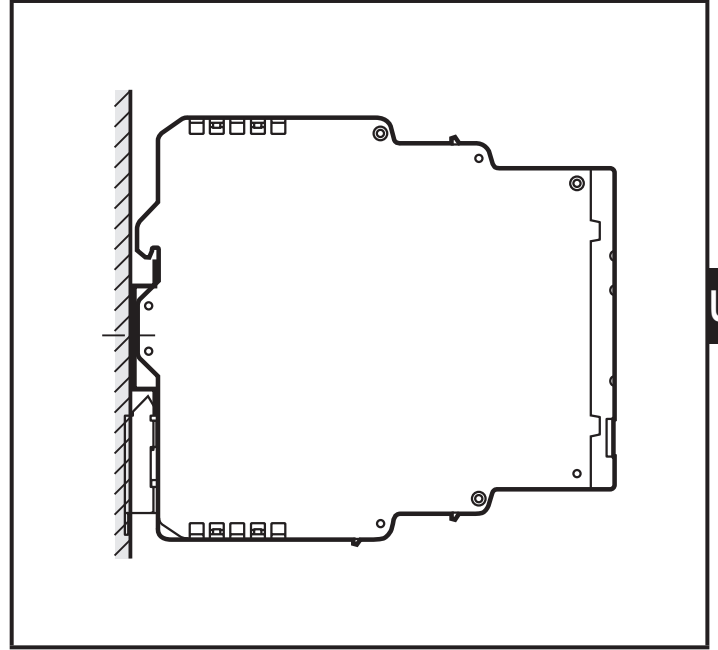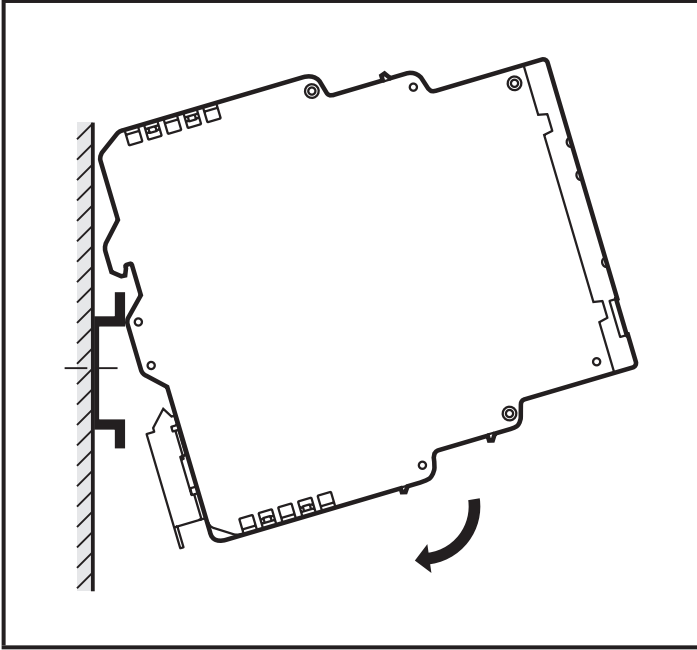
[!] No addressing via the addressing socket while live.

5 Installation

## 5.1 Installation of the device

▶ Install the device on a 35 mm DIN rail.

▶ Leave enough space between the unit and the top and bottom of the control cabinet to enable air circulation and to avoid excessive heating.

▶ Take into account the internal heating of all devices when mounting several devices side by side and observe the environmental conditions for every device.

5.2 Removal of the device

5
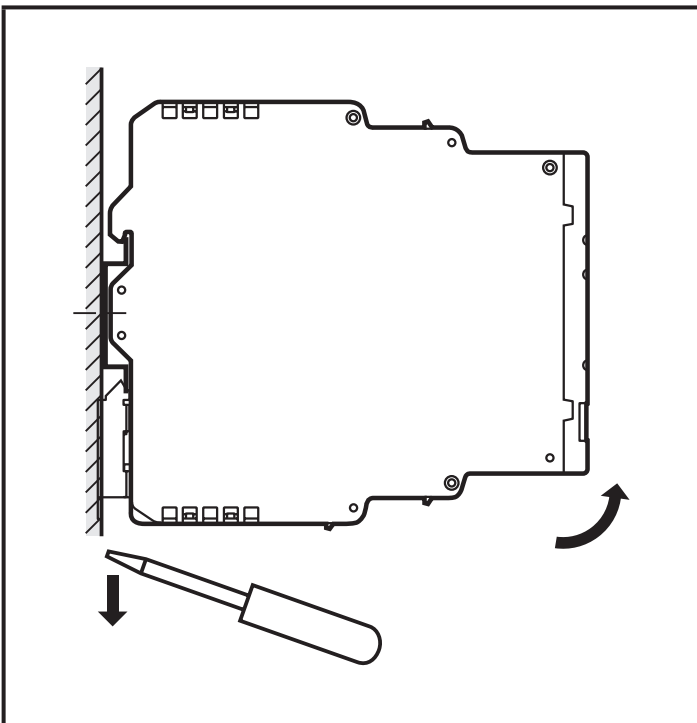
6 Electrical connection

! The unit must be connected by a qualified electrician.

The national and international regulations for the installation of electrical equipment must be adhered to.

▶ Disconnect power.

▶ Connect the unit.

6.1 Wiring

S+	sensor inputs + *)
S-	sensor inputs - *)
1+...4+	drive outputs +
1-...4-	drive outputs -
FE	functional earth
A+	AS-i +
A-	AS-i -
NC	not connected
*) only for 4-wire Pt100	

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FE	FE	FE	FE
S1	1+	1-	S-
S+	2+	2-	S-

S-	3-	3+	S+
S-	4-	4+	S+
A+	A-	nc	nc
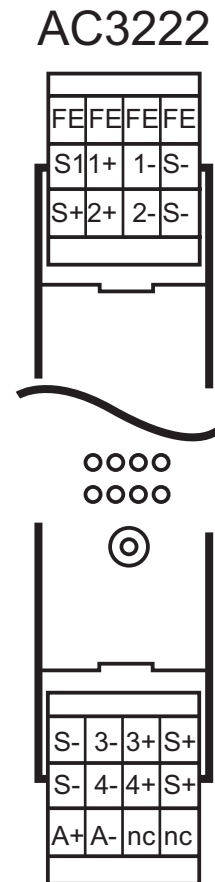
6.1.1 Connection of a 2-wire Pt100 element

The terminals 1+...4+ are interconnected in the module.
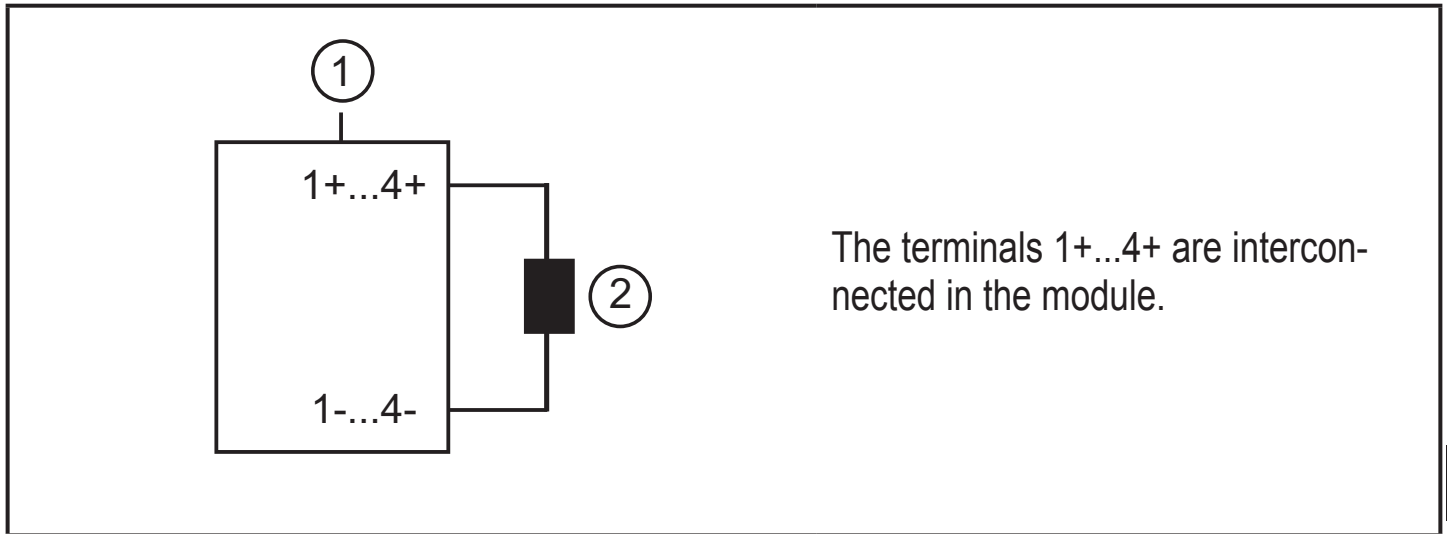
1: Analogue module
2: Pt100 element

6.1.2 Connection of a 4-wire Pt100 element

> ℹ 4-wire Pt100 sensors supply more exact results than 2-wire sensors provided that the wire resistance is the same.
>
> The changeover between 2 and 4-wire sensors is made via the parameter bit P3.

> ⚠ Connect at least one Pt100 sensor prior to switching on the AS-i slave, to start the A/D converter. Otherwise the LEDs I1 to I4 flash at a frequency of approx. 5 Hz.

The terminals 1+...4+ are interconnected in the module.
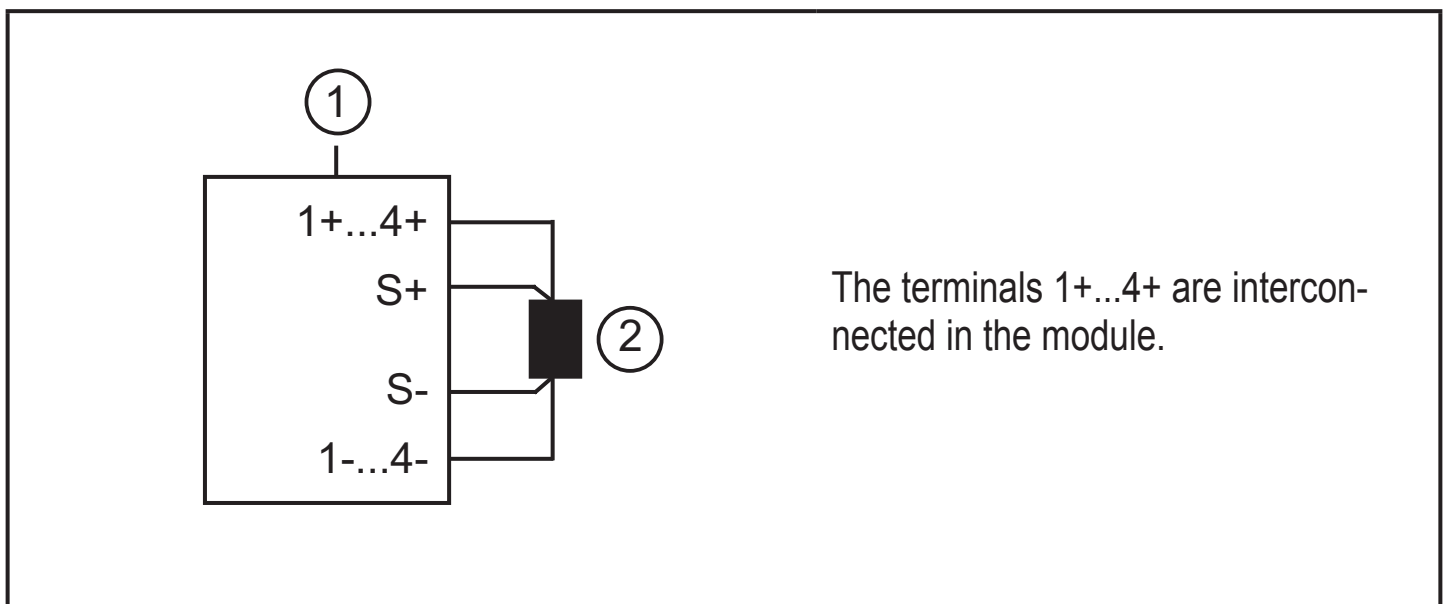
1: Analogue module
2: Pt100 element

! Important notes for Pt100 measurements

With the Pt100 measuring method, very low currents flow into the measuring electronics. Make sure to avoid additional resistance (conductors, contact and transfer resistance, loose contacts, etc.) in the measuring circuit.

4-wire measurement is always to be preferred over 2-wire measurement. For 2-wire measurement, all contact resistances and connection resistances add up by measurement and can falsify the measurement result.

7 Parameter setting

Parameter bit / Designation	Description		Comments			
P0 Filter	1 50 Hz filter active in the A/D converter		The 50 Hz filter applies to the whole of Europe			
	0 60 Hz filter active in the A/D converter					
P1, P2 Peripheral fault	parameter bit		peripheral fault can be triggered by			
	P1	P2	1	2	3	4
	0	0	on	off	off	off
	0	1	on	on	off	off
	1	0	on	on	on	off
	1	1	on	on	on	on
P3 Type of the Pt100 element	1 2-wire mode					
	0 4-wire mode					

7.1 Activation of the periphery fault message of the channels 1 to 4

By means of the parameter bits P1 and P2 you can define which measuring channels can trigger a peripheral fault message (see table).

But irrespective of the defined parameters all 4 channels are always transferred via the AS-Interface.

8 Measuring range

▶ For the measuring ranges please refer to the following tables.

Range -200...850 °C	Units dec.	Units hex.	LED analogue	Meaning
< -219.4 °C	32767	7FFF	flashing	short circuit
-219.4 °C...-200.1 °C	-2194 ... -2001	F76E ... F82F	on	below nominal range
-200 °C...850 °C	-2000 ... 8500	F830...2134	on	nominal range
850.1 °C...883.6 °C	8501 ... 8836	2135 ... 2090	on	above nominal range
> 883.6 °C	32767	7FFF	off	wire break

8.1 Transmission time of the analogue values

The transmission time of the analogue values depends on the conversion time of the analogue signals into digital signals in the AS-i module and on the transmission time via the AS-Interface.

The conversion time for 4 Pt100 signals is 480 ms.

The transmission time of the 4 16-bit values via the AS-interface ideally is 7 AS-i cycles per value. For a cycle time of 5 ms per AS-i cycle this results in a transmission time of 4 x 7 x 5 ms = 140 ms via the AS-Interface.

Thus the total transmission time for 4 temperature values ideally is 480 ms (conversion time) + 140 ms (transmission time) = 620 ms.

9 Operation

▶ Check the safe functioning of the unit.

9.1 LED display

LED AS-i green lights	AS-i voltage supply OK
LEDs I1...I4 yellow light	analogue signal in the measuring range
LEDs I1...I4 yellow flash	analogue signal outside the measuring range
LEDs I1...I4 yellow off	not connected
LED FAULT red lights	AS-i communication error, e. g. slave address 0
LED FAULT red flashes	Peripheral fault A peripheral fault is indicated if at least one of the signals I1, I2, I3 or I4 is outside the measuring range or if nothing is connected to at least one analogue channel.

10 Maintenance, repair, disposal

10.1 Maintenance

The unit is maintenance-free.

10.2 Cleaning of the housing surface

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

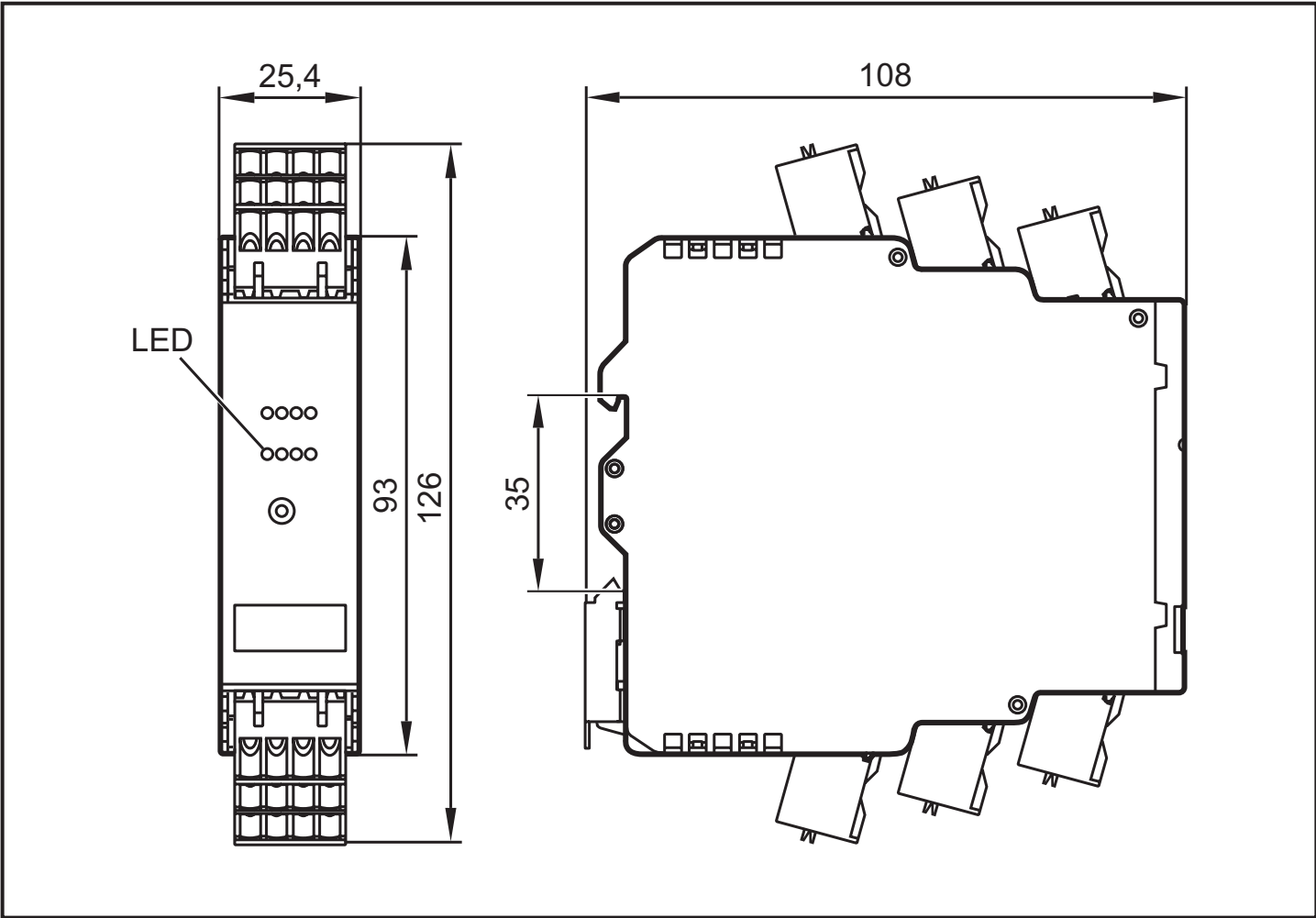ⓘ Micro-fibre cloths without chemical additives are recommended.

10.3 Repair

▶ The device must only be repaired by the manufacturer.

10.4 Disposal

▶ Dispose of the device in accordance with the national environmental regulations.

11 Scale drawing

25,4

LED

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