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CMC III Analoger Luftstrom-
sensor
CMC III Analogue Airflow
Sensor

7030.140

Montage-, Installations- und Bedienungsanleitung
Assembly and operating instructions

ENCLOSURES

POWER DISTRIBUTION

CLIMATE CONTROL

IT INFRASTRUCTURE

SOFTWARE & SERVICES

FRIEDHELM LOH GROUP



Foreword

EN

Foreword

Dear Customer,

Thank you for choosing our CMC III analogue airflow sensor (referred to hereafter as "airflow sensor")!

We wish you every success.

Yours

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We are always happy to answer any technical questions regarding our entire range of products.

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1 Notes on documentation

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1 Notes on documentation

1.1 CE labelling

Rittal GmbH & Co. KG hereby confirms that the CMC III analogue airflow sensor is compliant with the EC EMC Directive 2004/108/EC. An appropriate declaration of conformity has been prepared. It can be provided on request.



1.2 Storing the documents

The operating, installation and maintenance instructions as well as all applicable documents are an integral part of the product. They must be passed to those persons who are engaged with the unit and must always be available and on hand for the operating and maintenance personnel.

1.3 Symbols used in these operating instructions

The following symbols are used in this documentation:



Danger!

A dangerous situation in which failure to comply with the instructions causes death or severe injury.



Warning!

A hazardous situation which may lead to death or serious injury if the instructions are not followed.



Caution!

A hazardous situation which may lead to (minor) injuries if the instructions are not followed.



Note:

Identification of situations that can lead to material damage.

- This symbol indicates an "action point" and shows that you should perform an operation or procedure.

1.4 Associated documents

- Installation and Short User's Guide
- CMC III Processing Unit/CMC III Processing Unit Compact assembly, installation and operating instructions

2 Safety instructions

2.1 General safety instructions

Please observe the subsequent general safety instructions for the installation and operation of the system:

- Use only original Rittal products or products recommended by Rittal in conjunction with the airflow sensor.
- Please do not make any changes to the airflow sensor that are not described in this manual or in the associated manuals.
- The operational safety of the airflow sensor is guaranteed only for its approved use. The technical specifications and limit values stated may not be exceeded under any circumstances. In particular, this applies to the specified ambient temperature range and IP degree of protection.
- The airflow sensor may not be opened. The unit does not contain any parts that need servicing.
- Operating the system in direct contact with water, aggressive materials or inflammable gases and vapours is prohibited.
- Other than these general safety instructions, ensure you also observe the specific safety instructions when the tasks described in the following chapters are performed.

2.2 Service and technical staff

- The mounting, installation, commissioning, maintenance and repair of this unit may only be performed by qualified mechanical and electro-technical trained personnel.
- Only properly instructed personnel may work on a unit while in operation.

3 Product description

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3 Product description

3.1 Function description and components

3.1.1 Function

The airflow sensor measures and monitors the analogue air speed within a server enclosure, e.g. to record the contamination level of a filter mat. It reports the measured airspeed to the connected CMC III PU. The airflow sensor has an identification that allows it to be detected automatically by the CMC III Processing Unit.



Note:

In the following text the designation "CMC III Processing Unit" refers to both the "CMC III Processing Unit" and also the "CMC III Processing Unit Compact". All of the text passages which only apply for one of the two variants are labelled accordingly.

3.1.2 Components

The device consists of a compact plastic housing in RAL 7035 with a ventilated front in RAL 9005.

3.2 Proper use, foreseeable misuse

The airflow sensors serves exclusively to measure and monitor the analogue airspeed inside a server enclosure. It may only be used together with the CMC III Processing Unit. Any other use is not permitted.

3.3 Scope of supply

- CMC III analogue airflow sensor
- Accessories provided (fig. 1)
- Installation and Short User's Guide

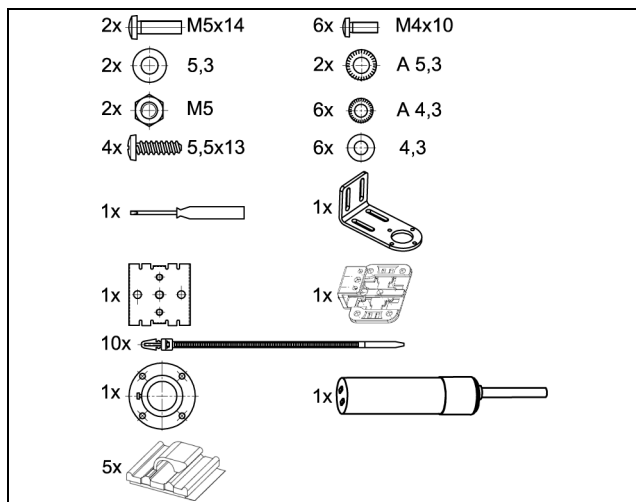


Fig. 1: Accessories provided

4 Transport and handling

4.1 Transport

The unit is delivered in a carton.

4.2 Unpacking

- Remove the unit's packaging materials.



Note:

After unpacking, the packaging materials must be disposed of in an environmentally friendly way. It consists of the following materials:

Polyethylene film (PE film), cardboard.

- Check the unit for any damage that occurred during transport.



Note:

Damage and other faults, e.g. incomplete delivery, should immediately be reported to the shipping company and to Rittal GmbH & Co. KG in writing.

- Remove the unit from the PE film.
- Remove the protective film from the front cover of the device.

5 Installation

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5 Installation

5.1 Safety instructions

- Please observe the valid regulations for installation in the country in which the airflow sensor is installed and operated, and the national regulations for accident prevention. Please also observe any company-internal regulations, such as work, operating and safety regulations.
- The technical specifications and limit values stated must not be exceeded under any circumstances. In particular, this applies to the specified ambient temperature range and IP degree of protection.
- If a higher IP protection class is required for a special application, the airflow sensor must be installed in an appropriate housing or in an appropriate enclosure with the required IP degree of protection.
- The tip of the sensor probe may become very hot during operation. There is a risk of burns. Please note the assembly instructions in order to prevent damage to cables and other components as a result of the high temperature.

5.2 Siting location requirements

To ensure the correct function of the unit, the conditions for the installation site of the unit specified in section 8 "Technical specifications" must be observed.

Electromagnetic interference

- Interfering electrical installations (high frequency) should be avoided.

5.3 Installation procedure

There are two general options for installing the airflow sensor:

1. Installation on the frame of the enclosure or IT enclosure using the bracket included.
2. Installation on a top-hat rail using the bracket included along with a spring clip.

5.3.1 Installation notes

- First install the sensor probe in the location at which you wish to be making a measurement.
- When installing the sensor probe, ensure that no cables or other components can touch the tip of the sensor probe. Otherwise there is a risk of damage due to the high temperature at the tip of the sensor probe.
- The airflow sensor must be positioned so that it is ventilated with an adequate amount of air and the ventilation slots are not covered.
- Install the airflow sensor in such a way that the length of the connecting cable is sufficient to reach the sensor probe.

5.3.2 Installing the sensor probe

The sensor probe is installed using the bracket included in the scope of delivery and the sensor probe holder.

- First attach the bracket included in the scope of delivery to the sensor probe holder (fig. 2).
- Then install the bracket in the location at which the airflow is to be measured.
- Then use the plastic screw to attach the sensor probe to the outside of the holder.

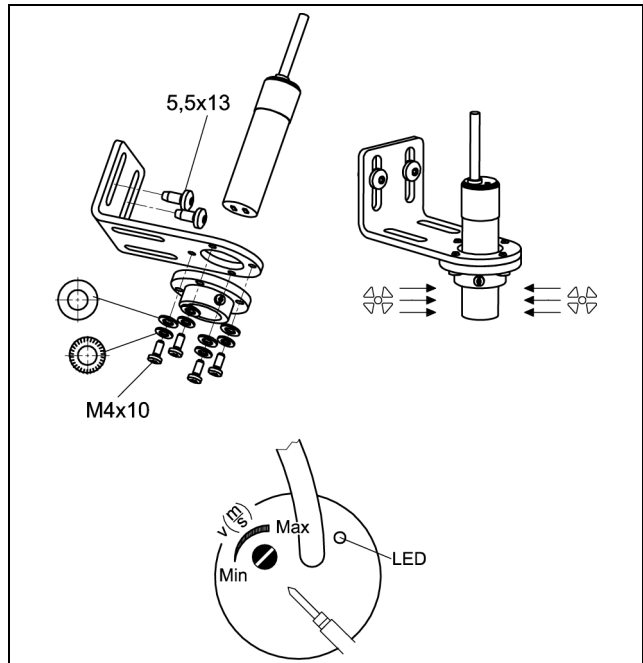


Fig. 2: Installing the sensor probe



Note:

Ensure that you do not overtighten the screw.

5.3.3 Installation with the mounting bracket provided

It can be mounted on the frame of the IT enclosure using the bracket included in the scope of delivery.

- Place the airflow sensor on the bracket from above.

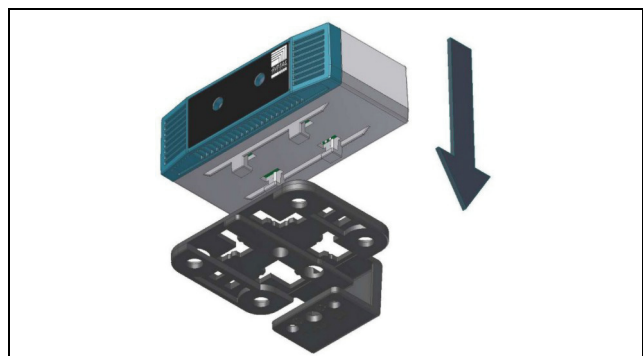


Fig. 3: Attaching the sensor to the bracket

- Move the sensor sideways slightly on the bracket, so that it latches into place.

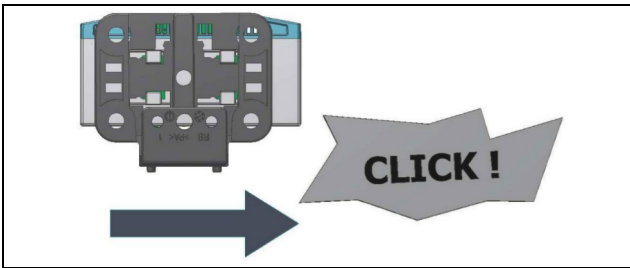


Fig. 4: Latching the sensor into place on the bracket

- Mount the bracket and the airflow sensor in the desired position in the enclosure or the IT enclosure using the screw included in the scope of delivery.

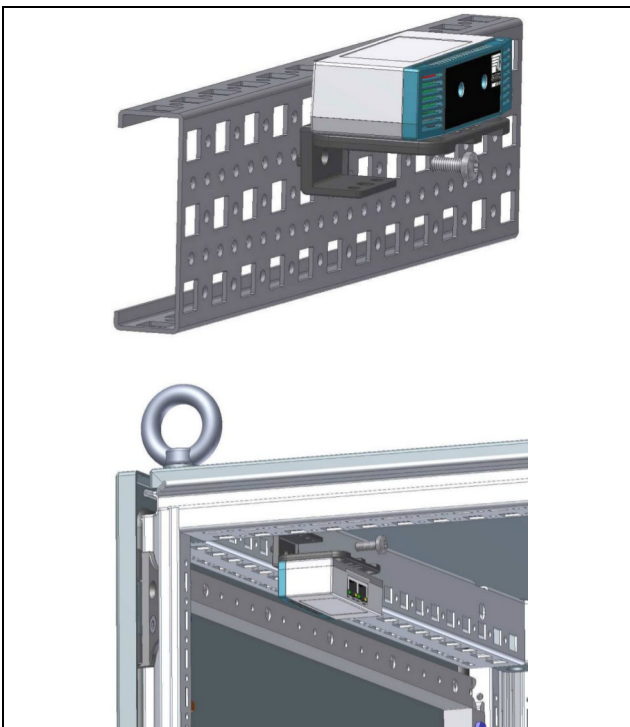


Fig. 5: Mounting the sensor in the enclosure or IT enclosure

5.3.4 Installation on a top-hat rail

The sensor can also be mounted on a top-hat rail using the bracket along with the spring clip included in the scope of delivery.

- First screw the bracket onto the spring clip provided for installation on a top-hat rail.

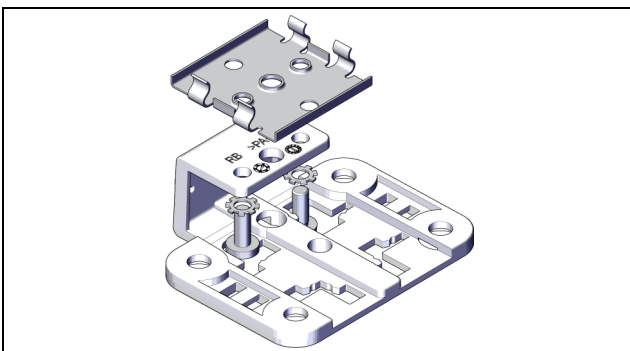


Fig. 6: Fastening the bracket to the spring clip

- Then place the airflow sensor on the bracket (fig. 3) and latch it in place (fig. 4).

- Latch the spring clip into place at the desired position on the top-hat rail.

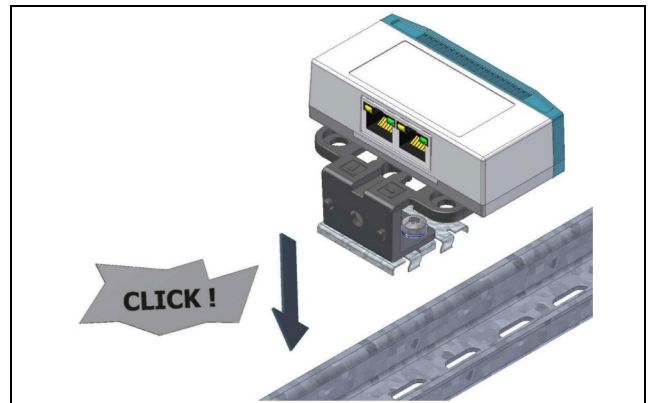


Fig. 7: Fastening the spring clip to the top-hat rail

5.4 Connecting the sensor probe

- Connect the three colour-coded wires from the sensor-probe cable to the pins on the universal interface as follows (fig. 8, item 4).

Pin	Wire colour	Signal
Pin 1	Brown	+24 V
Pin 2	Blue	GND
Pin 3	Black	4 mA...20 mA input
Pin 4	(Bridge to Pin 2)	4 mA...20 mA GND

Tab. 1: Pin allocation of the sensor probe

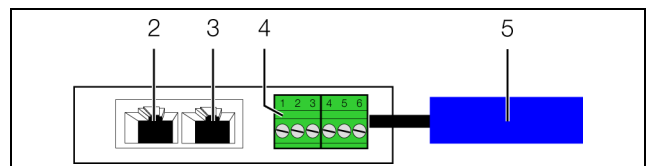


Fig. 8: Rear of the airflow sensor

Key

- 1 CAN bus connection, 24 V \equiv
- 2 CAN bus connection, 24 V \equiv
- 3 Universal interface
- 4 Sensor probe with cables

- Also install a wire bridge from Pin 2 to Pin 4 (4 mA...20 mA GND).

5.5 Connecting the sensor

The CAN bus connection supplies the airflow sensor with the necessary operating voltage. A separate power supply unit does not need to be connected.

- Use a CAN bus connection cable to connect the airflow sensor to a CAN bus interface on the CMC III Processing Unit or the neighbouring component on the CAN bus (fig. 8, item 2).

The following CAN bus connection cables from the CMC III accessories can be used:

- 7030.090 (length 0.5 m)

5 Installation

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- 7030.091 (length 1 m)
- 7030.092 (length 1.5 m)
- 7030.093 (length 2 m)
- 7030.480 (length 3 m)
- 7030.490 (length 4 m)
- 7030.094 (length 5 m)
- 7030.095 (length 10 m)

The software is updated, if necessary, after being connected. The status LED of the airflow sensor glows blue throughout the entire update process and also flashes purple while the sensor itself receives an update.

In addition, the status LED of the CMC III Processing Unit flashes white and a corresponding message appears on the website.



Note:

No settings can be modified as long as the update process is running.

The update of the sensor is complete when the following conditions have been fulfilled:

1. The LEDs on the CAN bus connection of the sensor light green.
2. The multi-LED of the sensor behind the front panel flashes blue and green, yellow or red, depending on the condition of the sensor.

Further components are connected as a daisy chain.

- If necessary, connect another component (e.g. another sensor type) to the second, free CAN bus interface of the airflow sensor (fig. 8, item 3).

Status change display:

- The two green and the two red CAN bus LEDs on the CAN bus connection flash.
 - The multi-LED of the Processing Unit flashes continually in the sequence green – orange – red.
 - The multi-LED of the airflow sensor flashes blue continuously.
- Press the "C" key on the CMC III Processing Unit (an initial audio signal will sound) and keep it pressed for approx. 3 seconds until a second audio signal is heard.



Note:

See section 6.5.1 "Multi-LED displays" for a list of all of the multi-LED displays.

6 Operation

6.1 Safety instructions



Caution!

The tip of the sensor probe becomes very hot during operation (depending on the ambient temperature up to 90°C). To avoid burns, do not touch the tip of the sensor probe until it has had sufficient time to cool down.

6.2 Activating the airflow sensor

After connecting the airflow sensor to a neighbouring component using a CAN bus connecting cable, the airflow sensor starts automatically (see section 5.5 "Connecting the sensor"). Separate activation is not required.

6.3 Operating and display elements



Fig. 9: Front of the airflow sensor

Key

1 Multi-LED for status display

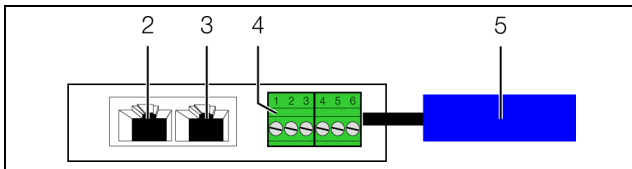


Fig. 10: Rear of the airflow sensor

Key

1 CAN bus connection, 24 V $\overline{\text{---}}$
 2 CAN bus connection, 24 V $\overline{\text{---}}$
 3 Universal interface
 4 Sensor probe with cables

6.4 Setting the sensitivity

The sensitivity of the sensor can be set on the rear of the sensor probe using a setting screw (20 step potentiometer). The correct adjustment is carried out during operation.

- After correctly positioning the sensor in the airflow, adjust the setting of the potentiometer in such a way that a value of approximately 70% to 80% is displayed.
- If necessary, turn the setting screw clockwise to increase the sensitivity.
A higher percentage value is then displayed for the same airflow.
- If necessary, turn the setting screw anticlockwise to reduce the sensitivity.
A lower percentage value is then displayed for the same airflow.

6.5 LED displays

A multi-LED for the status display is integrated into the front of the airflow sensor (fig. 9, item 1). Further LEDs are located at the rear on the CAN bus connection (fig. 10, item 2 and item 3).

6.5.1 Multi-LED displays

The status of the airflow sensor can be read on the multi-LED.

Continuously lit

Colour	Status
Red	Invalid measured value

Tab. 2: Multi-LED continuously lit

Flashing codes

Colour	Status
Green	When the measured value changes or, at the latest, every 5 seconds.
Orange	The airflow sensor has the "warning" status. Fast flashing: upper limit value overshoot. Slow flashing: lower limit value undershoot.
Red	The airflow sensor has the "alarm" status. Fast flashing: upper limit value overshoot. Slow flashing: lower limit value undershoot.
Blue	Communication via the CAN bus.

Tab. 3: Multi-LED flashing codes

6.5.2 LED displays on the CAN bus connection

A red and a green LED are located on the CAN bus connection. They display the status of the CAN bus.

Colour	Status
Green (continuously lit)	Communication via the CAN bus possible.
Red (flashing)	Transmission fault.

Tab. 4: LEDs for the CAN bus connection

6.5.3 LED displays on the sensor probe

The LED on the sensor probe remains constantly green while the sensor probe is operational.

6.6 Operating the CMC III Processing Unit from the website

After logging on to the CMC III Processing Unit, the web interface for operating the device is displayed.

- First select the "CMCIII-UNI" entry in the navigation area.

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Similar to the CMC III Processing Unit, the **Configuration** tab can be used to individually configure the access rights for the airflow sensor (**Access Rights** button) and the alarm messages (**Alarm Configuration** button).

The **Observation** tab is used to configure all of the settings for the airflow sensor, such as the limit values for warning and alarm messages.

In the following sections 6.6.1 "Device" and 6.6.2 "Analogue", only those parameters which you can modify are described. There are also display values that provide information.

6.6.1 Device

General settings for the airflow sensor are configured at the "Device" level.

Parameter	Explanation
Description	Specific description of the airflow sensor.
Location	Installation location of the airflow sensor.

Tab. 5: Settings in the "Device" level

In addition, parameters that provide detailed information about the airflow sensor, such as the version of the deployed software and hardware, are also displayed. You should have such information available, in particular to permit fast troubleshooting of queries with Rittal.

6.6.2 Analogue

The airflow measurement settings are configured on the "Analogue" level.

Parameter	Explanation
DescName	Specific description of the airflow measurement.
SetPtHigh-Alarm	Upper limit of the airflow; an alarm message is output if this is exceeded.
SetPtHigh-Warning	Upper limit of the airflow; a warning message is output if this is exceeded.
SetPtLow-Warning	Lower limit of the airflow; a warning message is output if this is fallen below.
SetPtLow-Alarm	Lower limit of the airflow; an alarm message is output if this is fallen below.
Hysteresis	The necessary percentage deviation for falling below or exceeding the limit for the airflow to trigger a status change (see the assembly, installation and operating instructions for the CMC III Processing Unit).

Tab. 6: Settings in the "Analogue" level

The following parameters are also displayed for the airflow sensor:

Parameter	Explanation
Value	Currently measured airflow in %.
Status	Current status of the sensor, taking into account the hysteresis.

Tab. 7: Displays in the "Analogue" level



Note:

If the value "0" is entered for all limit values at the "Analogue" level, the status of the sensor is always "OK".

If "0" is not entered for all of the limit values, then the measurement value is evaluated as follows:

Current [mA]	Value	Status
$I < 3.00$	0%	24 (MSG_PROBE_OPEN)
$3.00 < I < 4.00$	0%	OK / warning / alarm
$4.00 \leq I \leq 20.00$	X%	OK / warning / alarm
$20.00 < I < 21.00$	100%	OK / warning / alarm
$21.00 < I$	0%	25 (MSG_PROBE_SHORT)

Tab. 8: Evaluation of the measurement value

The "Input 1" and "Input 2" levels along with the "EnergyMeter_1" and "EnergyMeter_2" levels are not important for the airflow measurement.

7 Storage and disposal

7.1 Storage

If the device is not used for a long period, Rittal recommends that it is disconnected from the mains power supply and protected from damp and dust.

7.2 Disposal

Since the airflow sensor consists mainly of the "housing" and "circuit board" parts, the device must be passed on to the electronic waste recycling system for disposal.

8 Technical specifications

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8 Technical specifications

Technical specifications		CMC III analogue airflow sensor
Model no.		7030.140
W x H x D (mm)		110 x 30 x 40
Operating temperature range		0°C...+55°C
Storage temperature		-45°C...+85°C
Operating humidity range		5%...95% relative humidity, non-condensing
Measurement range		0.5 m/s...15 m/s (display in %)
Sensor probe interface		4 mA...20 mA
Protection category		IP 30 to IEC 60 529
Inputs and outputs	CAN bus (RJ 45)	2 x
	Sensor probe interface	1 x
Operation/signals	LED display	OK / warning / alarm / network status

Tab. 9: Technical specifications

9 Customer service addresses

For technical queries, please contact:

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Homepage: www.rittal.com

For complaints or service requests, please contact:

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