Oppermann Regelgeräte

Duct Smoke Sensor KRM®

- VdS certification (G210059)
- Patented single tube air sampling system
- Contamination display in % and signalling at 100 %
- Electronic air flow control
- Externally operable reset button in the housing
- Remote reset option via terminals
- Long service life, low contamination

Technical Data

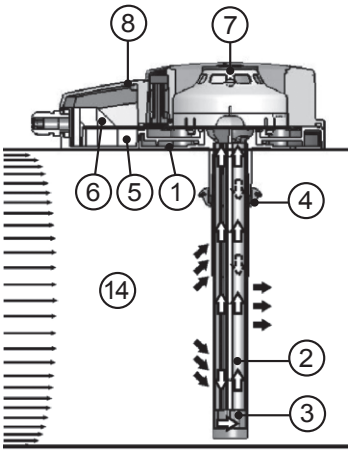
Sensor:	Scattering RM 3.3 (ALK-E)
Supply voltage KRM-1:	230 V AC ± 10 %, 50/60 Hz
Supply voltage KRM-2/KRM-2-MOD:	24 V AC/DC +15 % / -10 %
Rated current:	KRM-1: 30 mA KRM-2/KRM-2-MOD: 120 mA
Relay outputs:	floating
Alarm relay locked:	1 changeover contact, 8 A, 250 V AC or 24 V DC 1 NC, 8 A, 250 V AC or 24 V DC
Contamination relay:	1 NC contact, 6 A, 250 V AC or 24 V DC
Operating temperature:	-10 °C - +50 °C
Permissible humidity:	10 - 95 % non-condensing
Protection class:	IP 54, IP 65 with WDG (water resistant housing)
Approvals:	
Sensing chamber and air duct frames:	VdS approval G210059
Tested:	according to FprEN54-27
LED display:	% contamination level flashes at > 70 %
LED in housing:	green operating blue lack of air flow yellow failure, electronics, smoke detector defective, low voltage red smoke alarm, including contamination > 99 %, flashes at attempts to release when the sensing chamber is not empty
Adaptergehäuse:	ABS
Air measuring tube:	Aluminium / plastic shortest length 160 mm standard length 600 mm
Dimensions:	257 x 166 x 77 mm (L x W x H)
Screw connection:	3 x M16

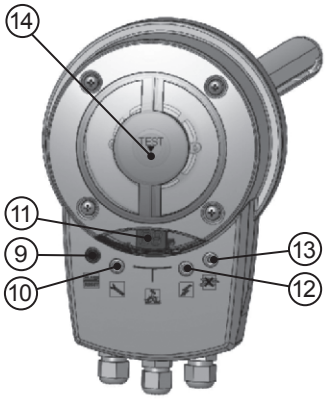
Accessories

Mounting bracket:	KS (for insulated / circular ducts)
Housing:	waterresistant housing for outdoor installation and increasing protection class to IP 65

Function

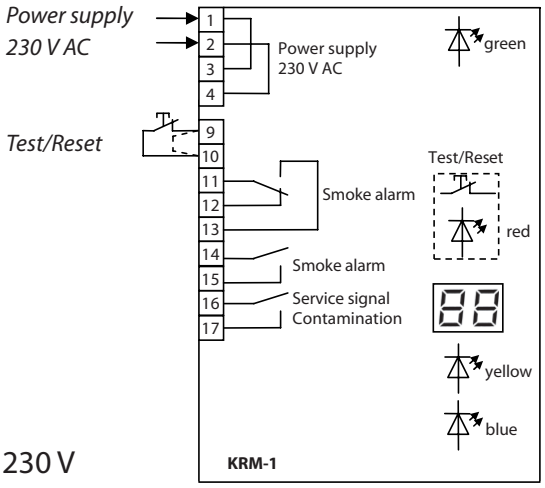
The KRM duct smoke detector is designed for smoke detection in ventilation ducts. It constitutes a combination of a smoke detector with an adapter system, whose measuring tube and housing have been specially adapted for optimal air flow through the smoke detector.
The multi-chamber measuring tube in the air duct transports the air within the air duct along the entire length of the tube, through the sensing chamber and back into the air duct. Upon detection of smoke, the sensor reacts immediately and triggers an alarm.
Over time, the sensor becomes contaminated. Because of alarm threshold tracking, the sensitivity up to total pollution remains the same. From 70 % contamination upwards, the sensor is triggered and indicates this by flashing. If the sensor is not replaced the smoke alarm is triggered at 99 % contamination.
The contamination level is indicated in a two-line LED display; at > 70 % it flashes.
To verify operability, the device is equipped with electronic air flow monitoring, which lights a blue LED at < 1 m/s. The failure LED illuminates when the smoke sensor or the electronics are defective, in the absence of a smoke sensor, and with short-circuits or cable breakage.
The smoke alarm must be released with the reset button.
A functionality test is also possible with the same button.
The operation functions like a smoke alarm.
Furthermore, the same function takes place on restart or when the bridge circuit between terminals 9 and 10 is opened (remote release).



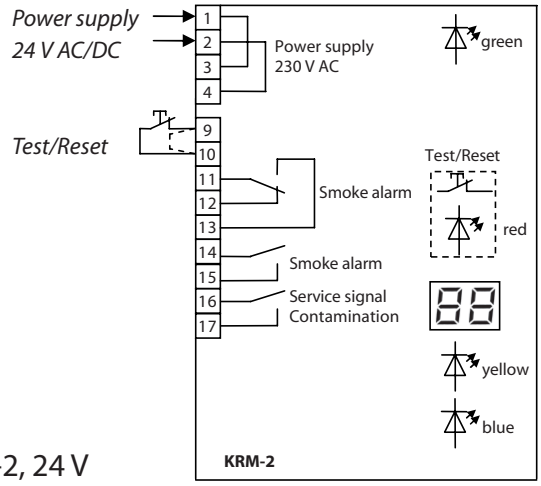


1 Adapter plate with gasket
2 Patented measuring tube (max. length 3 m)
3 End cap
4 Rubber bushing
(only for insulated or circular ducts)
5 Lower housing with seal
6 Electronics
7 Optical smoke sensor
8 Upper casing with seal
9 Red LED: alarm / reset button
10 Yellow LED: interference
11 LED display: % of sensor contamination
12 LED green: in operation
13 LED blue: air flow under 1 m / s
14 Opening for test gas
15 Air duct

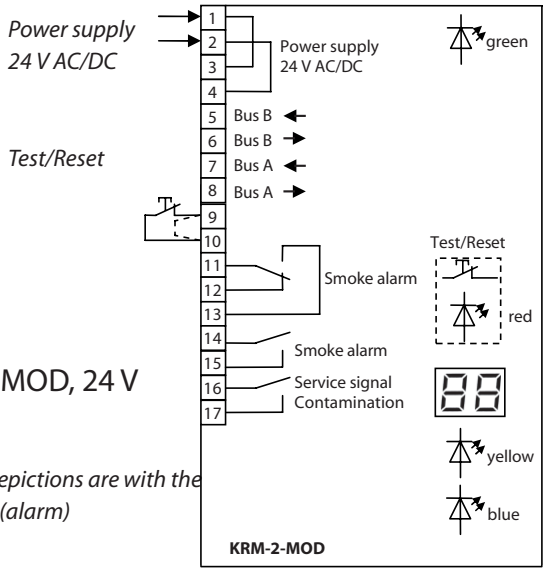
Electrical connection



KRM-1, 230 V



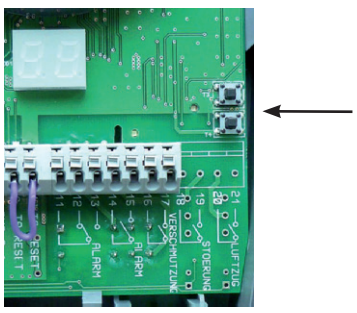
KRM-2, 24 V



KRM-2-MOD, 24 V

Contact depictions are with the power off (alarm)

Programming the Bus address for the KRM-2-Mod:
Press buttons T3+T4 on the circuit board (to the right, next to the display) at the same time, so that the display changes from contamination level to show the bus address (the display will flash). Press button T3 or T4 to adjust the desired address (1-99). The last set bus address is automatically saved. The display resets automatically after 3 seconds or by simultaneously pressing T3+T4.



Notes: The floating switching contacts (terminals 11-17) are uniformly assigned to an installation category according to EN 60730-1. These switching contacts are only to be used for 230 V AC or 24 V AC/DC, a combination is not permitted.
A mixed connection of safety extra-low voltage (SELV) and low voltage must not occur. The assembly may only be operated on one mains phase.

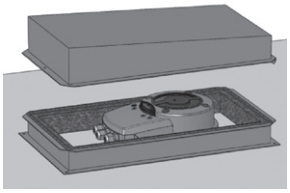
Installation Instructions

Install the detector where flow meters, etc. are normally fixed, so that the air flow can run in a laminar manner with the measuring tube. Follow the installation instructions. All work must be carried out by sufficiently qualified craftsman.

Current local rules and regulations (e.g. building regulations, elecrical/VDE guidelines, etc.) are to be observed. Installers and operators are required to be adequately informed before operation. We assume no liability for misprints and changes after printing. Compliance with operating and installation instructions is also included within the regulations of intended use. We assume no liability for damages caused by improper use. Operating licenses and guarantees and all warranty claims will be voided in the event of unauthorized modifications or any tampering with the device.

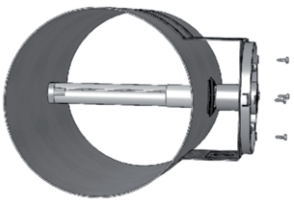
Accessories

Splash-proof housing (type WDG) for outdoor installation to prevent condensation. The housing is lined with insulating foam.



Mounting bracket

Type KS is required if the duct smoke sensor must be mounted on round air ducts. The bracket can also be used with insulated rectangular ducts. For this the adapter is mounted with the air measuring tube before insulation.



Maintenance

Targeted maintenance can be carried out since the smoke detector is equipped with a contamination indicator. From a 70 % contamination level or higher the smoke sensor must be changed. There is a contact available for this signal, and it should be connected to the automation station.

Installation and positioning

1.

We recommend that the duct smoke detector be installed at the same distance to heating, cooling and humidity equipment and be mounted similarly to flow sensors. The distance of the smoke sensor to fittings, valves, filters, etc., should be 3 times the diagonal length of the cross-section of the duct when going against the air flow, and 5 times the diagonal length with the flow.

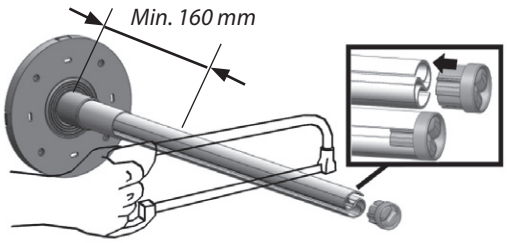
2.

Drill a hole of 43-44 mm in diameter at the intended mounting location.

Note: Installation of the TurboTube measuring tube is possible either from the top, bottom or side of the channel for all duct cross-sections (for round ducts as well).

3.

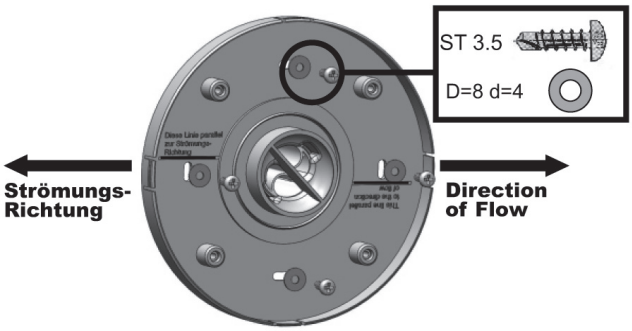
- Determine how long the measuring tube must be. The TurboTube measuring tube must be inserted into the duct at least to the middle of the duct's cross-section.
- If necessary, shorten the tube. Minimum length 160 mm.
- Deburr the cutting face and put the end plug back on up **to the stop collar**.



Attention: Operation without end plug not permitted.

4.

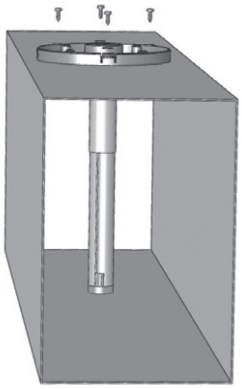
- Determine the direction of flow and fit the adapter plate so that the line on the adapter plate under the text „Strömungsrichtung“ is parallel to the flow direction.
- Four self-tapping screws serve for attaching it to the sheet metal duct (not included in delivery).



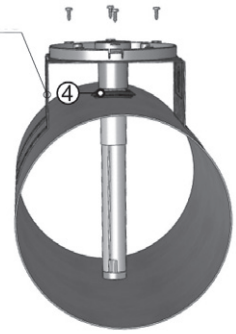
5. Installation on a rectangular air duct

6. Installation on a circular air duct

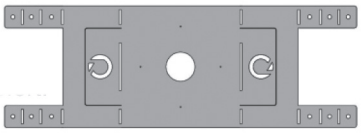
- For mounting on a circular air duct use mounting bracket type KS and the rubber bushing④. Thanks to the bend perforations they can be adapted to a round duct.

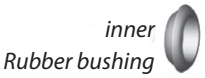


Mounting bracket



The type KS mounting bracket is supplied flat.



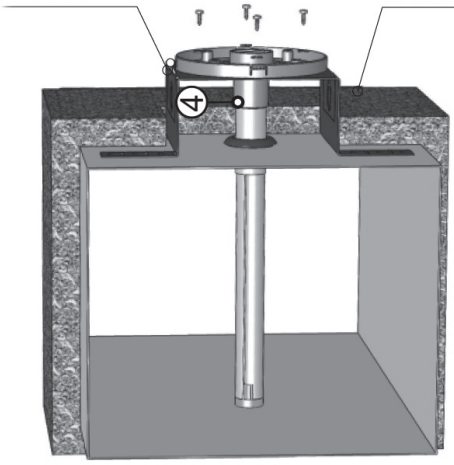


inner
Rubber bushing *outer*

7. Installation on air ducts with insulation

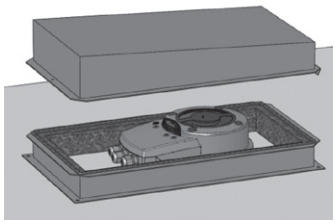
- Use the rubber bushing and insert it into the Ø 43-44mm opening in the air duct.
- Install the mounting bracket.
- Insert the assembled adapter plate into the measuring tube by sliding the measuring tube through the grommet, and screw the adapter plate onto the mounting bracket using the 4 self-tapping screws. Then the insulation can be installed.

Mounting bracket *Insulation*



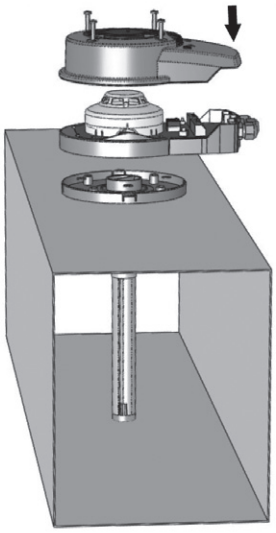
8. Installation outdoors or in a cold environment

- As protection for smoke detectors, which are exposed to the open air or in a cold environment, there is a special WDG type housing. This enclosure prevents the warm air in the smoke detector duct from condensing.



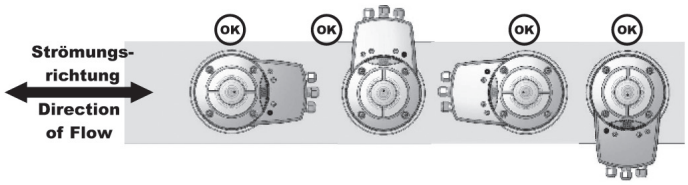
9. Installing the housing with the sensor

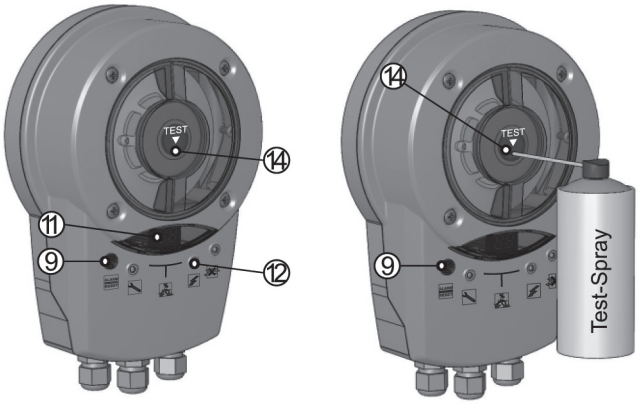
- Attach the housing bottom part with the electronics and sensor to the adapter plate. The housing can be attached at increments of 90 °. The direction of the housing has no effect on the measurement result. You can align the housing with the sensor optimally.
- Check that the seals in the housing upper part are correctly positioned.
- By snapping on and tightening the upper housing and then firmly pressing down on the arrow marked on the central cable area (to ensure that the catch at the lower end of the housing snaps in correctly) the mounting is complete.



10. Testing the duct smoke sensor

- After completing the installation work, doing proper wiring and applying power, the duct smoke sensor is operational.
- The green LED (12) illuminates.
- By pressing the alarm/reset button (9), an initial simple functional test can be made. All LEDs must light up and all the relays drop out. The units connected to the relays are activated! The display (11) indicates the current degree of sensor contamination. If the button is released, all LEDs will go out except for LED (12) which shows the supply voltage, and the relays activate.
- For testing the smoke sensor the housing must not be opened. It has a self-closing test opening (14) in the center of the transparent cover. Use Oppermann test gas spray. Insert the test spray's tube fully into the test opening (appx.1.5mm deep) and release as much test gas as needed until the smoke sensor activates. The alarm/reset button lights up, the relays drop out. The electronics are on alert and locked. To release, the alarm/reset button must be pressed. At the time of the reset, the sensor must be free of smoke and test gas. Should there still be test gas in the chamber a higher degree of contamination will appear. In this case, after some time perform a reset by disconnecting from the power or by an external reset.

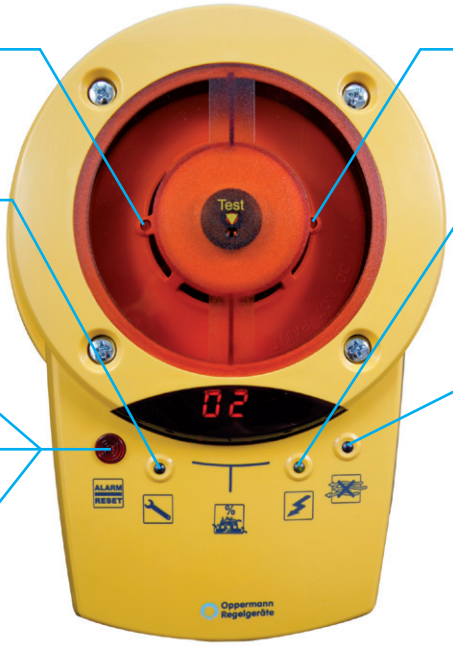


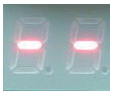


11. Final review

- Are all screws tight?
- Is the adapter plate properly mounted for the flow direction?
- Are all seals in the correct position?
- In operation, when air flow > 1 m/s the blue LED may not light up.

Display and operation for Duct Smoke Sensor KRM



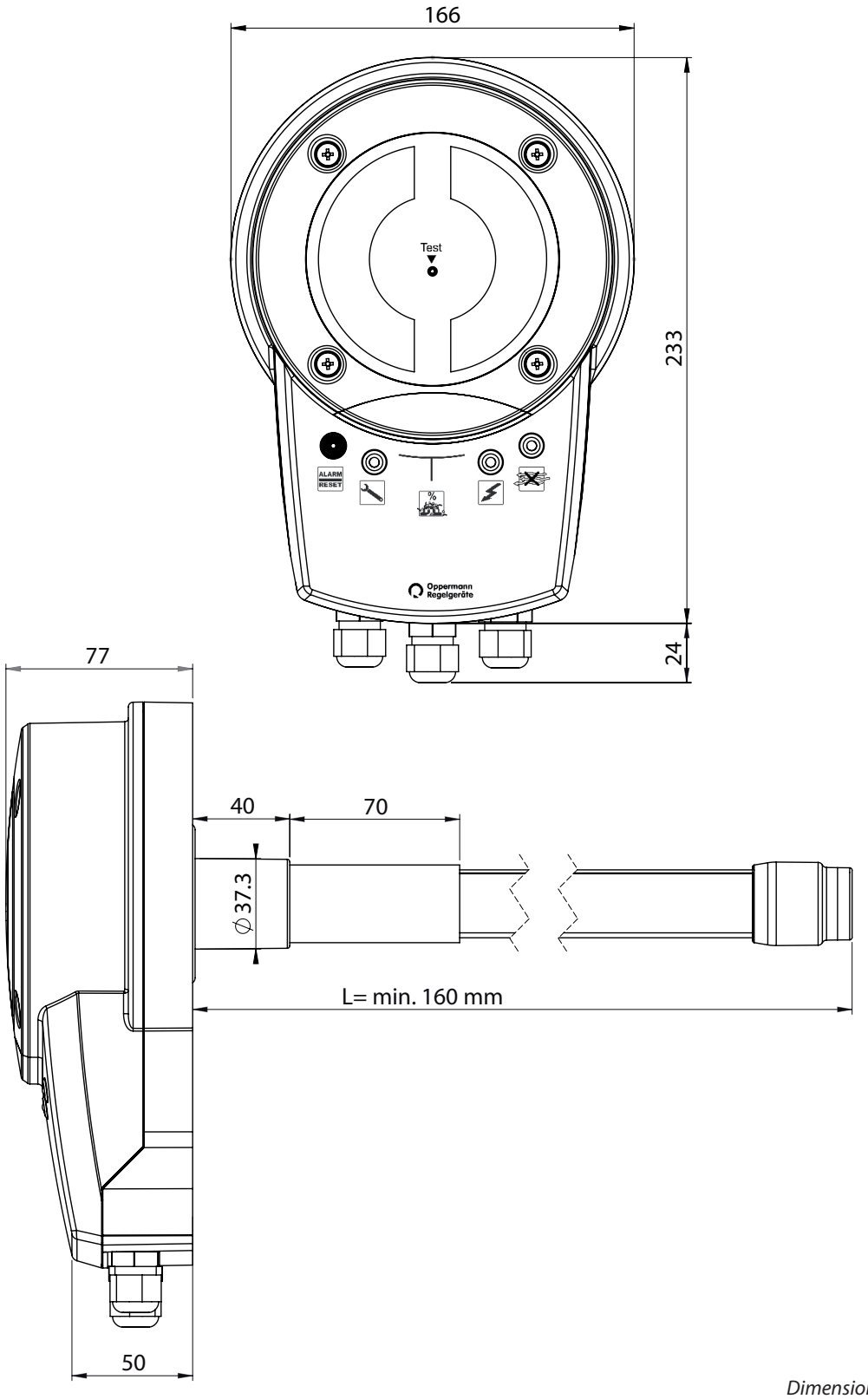
Display	Meaning	Comments
	Start / calibration	Shortly after starting the software version is displayed (4 digits), e.g. 00 then 17 = Software 0017. Thereafter, the rotating segment display follows at startup or after a power failure.
 **00 – 99**	Contamination in %	Flashes starting at 70 %; at 99 % with display LED alarm.
	Failure	e.g. Missing smoke detector, disrupted communication with the smoke detector, processor failure. Failure LED & alarm LED light up at the same time (not on the DIBT version). Troubleshooting: Change the detector and confirm by pressing the alarm / reset button.
88	Confirmation reset / new start	If alarm / reset button is pressed for more than 8 seconds, or if terminal 9 / 10 is open (missing bridge circuit or remote reset). Display goes out after releasing the alarm / reset button
00 – 99 flashing	BUS adresse	Display only with MOD versions after pressing the address buttons T3 / T4 directly on the circuit board.

LEDs	Meaning	Comments
Alarm / reset (red)	Smoke alarm or failure (not on the DIBT version)	**Reset after failure:** Briefly press alarm / reset button. KRM immediately restarts. **Reset after alarm:** Press and hold the alarm / reset button for at least 2 seconds until the red alarm LED in the button goes out. Do not release it until then. KRM will start again only after release. As long as the alarm / reset LED flashes when the button is pressed, the smoke sensor is still filled with test gas / test spray / smoke, and can not be reset. In that case blow the sensor out or wait.
Failure (yellow)	Defective circuit board or missing smoke alarm	Check / replace circuit board or smoke detector RM 3.3 (ALK-E)
Smoke alarm (2 x red)	Smoke alarm or contamination 99 %	Red LEDs directly on the smoke detector RM 3.3 (ALK-E). Red LEDs directly on the smoke detector RM 3.3 (ALK-E). LEDs permanently on until reset has taken place.
Power (green)	Supply voltage is on	Green LED lights up if supply voltage is on
Air flow (blue)	Air flow is too low	Blue LED lights up when air flow is too low. Check smoke detector position in the duct, check sampling tube (TurboTube) for contamination / clean if necessary.

Behavior of the alarm relay and fault relay and displays, plus reset options

	Smoke alarm		Device failure / missing detector…	
	DIBT versions KRM-1-DZ / KRM-2-DZ	KRM-1 / KRM-2 KRM-2-MOD	**DIBT versions** KRM-1-DZ / KRM-2-DZ	KRM-1 / KRM-2 KRM-2-MOD
Alarm relay 11 / 12 / 13	Drops out	Drops out	Does not drop out	Drops out
Relais **Alarm** 14 / 15	Drops out	Drops out	Does not drop out	Drops out
LED **Alarm / Reset**	Lights up	Lights up	Does not light up	Lights up
Relay **failure** 18 / 19	Does not drop out	--------- Not equipped	Drops out	--------- Not equipped
LED **failure**	Does not light up	Does not light up	Lights up	Lights up
Alarm reset or failure reset	**Not with power interruption!** It is **mandatory** to use the alarm button or terminal 9 / 10 provided that sensing chamber is free.	With power interruption, alarm button or with terminal 9 / 10 provided that sensing chamber is free.	**Not with power interruption!** It is **mandatory** to use the alarm button or terminal 9 / 10 provided that sensing chamber is free + disturbance has ceased.	With power interruption, alarm button or with terminal 9 / 10 provided that sensing chamber is free + disturbance has ceased.

Dimensions



Dimensions in mm