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Speed control EC

3235.460

Assembly and operating instructions

EN

Contents

1 Application

The SK 3235.460 is a microprocessor-controlled thermostat. This control unit was developed especially for controlling and monitoring the enclosure internal temperature via fans. Up to four fans may be controlled and monitored to generate the airflow required in order to maintain a prescribed enclosure internal temperature. Furthermore, energy consumption and noise levels can be reduced by controlling the fan speed.
The unit is compatible with Rittal EC fan-and-filter units with the model numbers: 3240.500, 3240.9xx, 3241.500, 3241.9xx, 3243.500, 3243.9xx, 3244.500, 3244.9xx, 3245.500, 3245.510, 3245.600, 3245.8xx and 3245.9xx.

2 Safety instructions

– Only use in a closed enclosure configuration.
– When installing the unit, observe the safety measures to EN 60 335.
– The general safety precautions and provisions must be observed.
– The operating instructions must be observed.
– The safety instructions for enclosure installation must be observed.
– The work must only be carried out by suitably trained, qualified personnel.
– Before making any modifications inside or to the enclosure (such as relocating or installing new components), it is vital to read and observe the assembly instructions (plant documentation).
– Any changes to the settings of the unit must only be made by trained, qualified personnel.
– Please do not lay the sensor and control cables parallel to other cables. Interference may lead to malfunctions in the controller.
– The operating temperature range must be observed (see section 7 "Technical Data", page 5).
– The product must not come into contact with water, aggressive or flammable gases and vapours!

3 Intended use

The unit is intended exclusively for controlling the EC fan-and-filter units.

4 Assembly

The unit is simply snap-mounted on to the 35 mm support rail (EN 50 022).

5 Functional description

5.1 Temperature control

If the ambient temperature of the enclosure is below the setpoint, the control unit will regulate the enclosure internal temperature evenly to the prescribed setpoint. The current enclosure internal temperature is detected via a sensor. The actual value is compared with the setpoint (potentiometer 1). The fan speed is then controlled according to the temperature difference ascertained.
Within the temperature range "setpoint -6 K" to "setpoint +5 K", the fan speed is infinitely variable via a PI control section. At higher temperatures, the fans will always operate at full speed. At lower temperatures, the fans are deactivated. At the lower end of the monitored temperature range, control is based on a hysteresis of 3 K.

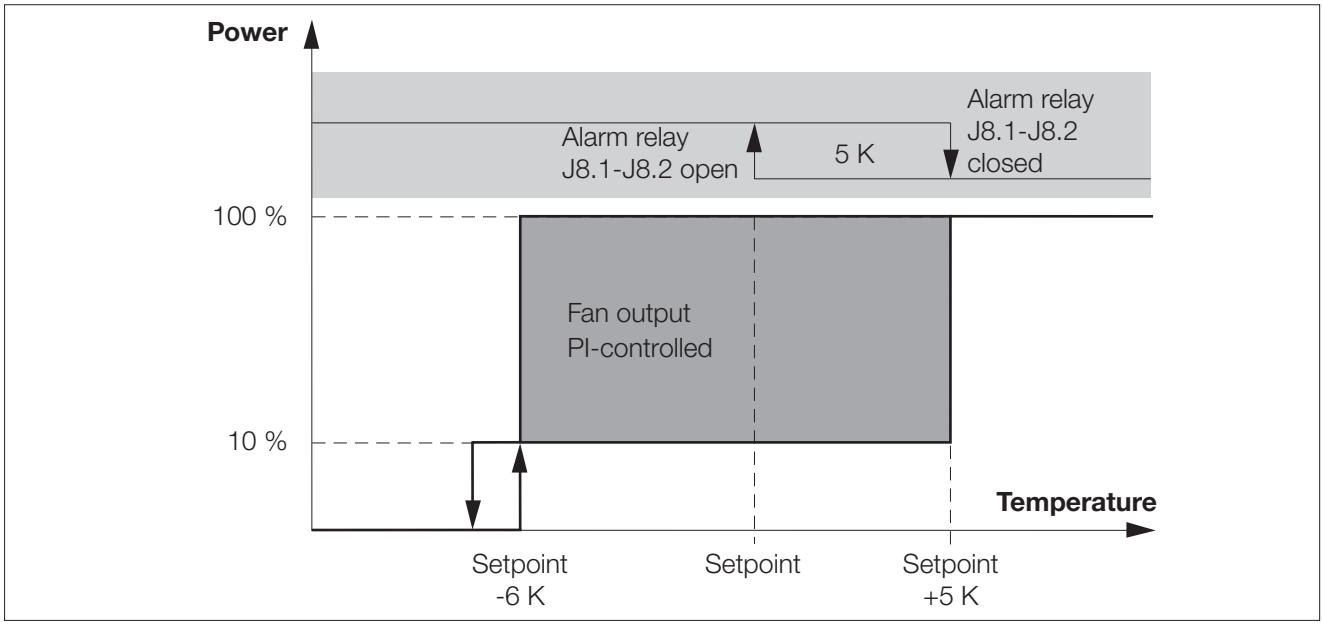

Fig. 1: Temperature control

EN

5.2 Fan detection

After switching on for the first time, the control unit will automatically ascertain which fan outputs have fans connected to them. There are applications in which only one, two, three or four fans are connected. With several fans connected simultaneously, the speed is controlled identically for all fans (0 – 100%). Should a previously detected fan suddenly stop responding during operation, a warning message will be issued. If no fans at all are initially detected following commissioning, a warning message will likewise be generated.

5.3 Monitoring/malfunctions

During normal operation, contact J8.1-J8.2 of the alarm relay is open.

Overtemperature

At a measured temperature of more than 5 K above the setpoint, temperature monitoring will cut in (see diagram). The red LED is illuminated. The fault alarm relay drops out (contact J8.1-J8.2 closed). The overtemperature warning is cancelled as soon as the measured temperature drops back below the setpoint.

Fan-and-filter unit failure/line break

If the speed of all fans drops to zero, the fault alarm relay will drop out (contact J8.1-J8.2 closed) and the red LED will flash continuously (ON/OFF for 0.5 sec. each). If there is not at least one tacho signal present and one set value is assigned to the fan(s), an alarm signal is triggered. Example: If 3 fans are connected and two of these fans fail, no alarm signal is triggered by the fan monitoring. However, if the temperature setpoint is exceeded (see "Overtemperature"), an alarm signal is triggered. Please note: In the event of a line break, the fan runs automatically at a fixed speed.

Sensor break/short-circuit

If a temperature sensor break is detected, the fans will run at full speed. Rapid intermittent triple flashing of the red LED. The fault alarm relay drops out (contact J8.1-J8.2 closed).

System error

In the event of a system error, the control unit resets itself automatically. If the control unit is unable to execute the program normally, all the connected fans are set to maximum speed. The red LED is continuously illuminated. The fault alarm relay drops out (contact J8.1-J8.2 closed).

5.4 LEDs

Green = Operating voltage applied
Red = Malfunction,
see section 5.3 "Monitoring/malfunctions", page 4

5.5 Temperature sensor

The sensor may be extended to a maximum of 50 m using a two-wire cable (suitable for 230 V); it can also be shortened. Cable routing parallel to live cables should be avoided, to prevent interference.

5.6 Scope of supply

Qty.	Designation
1	Thermostat
1	Temperature sensor, L = 1.8 m
1	Assembly instructions

Tab. 1: Scope of supply

6 Electrical connection

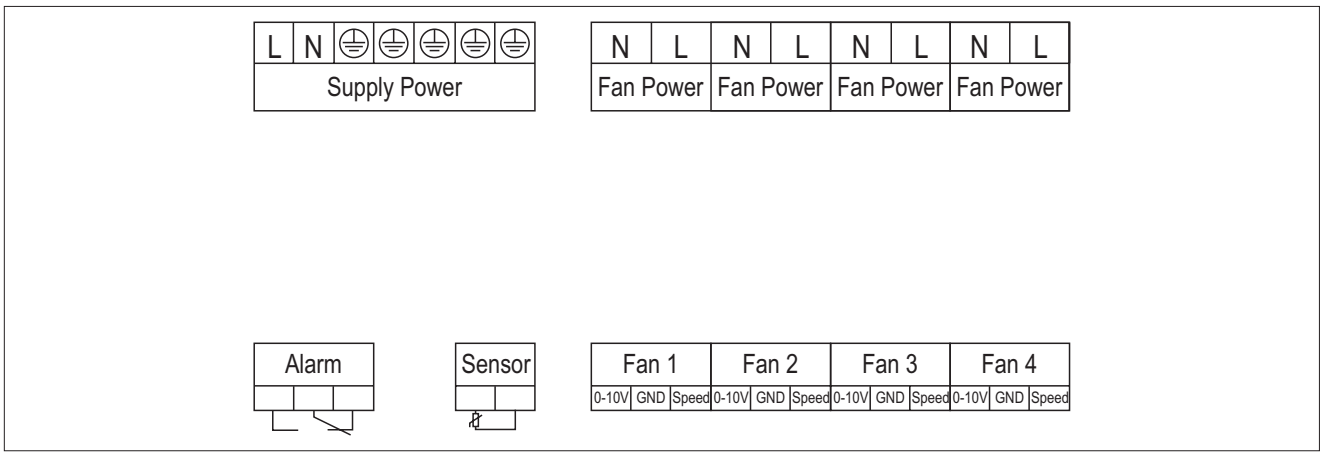

Fig. 2: Electrical connection

7 Technical Data

Model No.	3235.460
Operating voltage and operating current	100 V – 250 V/AC, < 8 mA without fan
Frequency	50/60 Hz
Rated impulse voltage	2500 V
Maximum phase to ground voltage of the supply source	250 V
Environment	Indoor, open type
Classification of installation and use	Incorporated control intended to be used in protection class I equipment
Control type	Incorporated control, panel mounting
Software class	A
Overvoltage category	II
Setting range, temperature (P1)	5…55 °C/41…131 °F
Fan speed	10 %…100 %
Temperature sensor	NTC, 10 kΩ at 25 °C, β 3977 K, cable 1.8…2 m
Control	PI
Alarm	Alarm Relay, changeover contact; Contact rating 24 V DC and 100…230 V AC, 2 A (cos ϕ = 1) load
Level of contamination	2
EMC immunity	IEC 61 000-6-2
EMC interference emission	IEC 61 000-6-4
Protection category	IP 20
Operating temperature	-25 °C…+55 °C
Storage temperature	-40 °C…+70 °C
Humidity	10…95 %
Operating air pressure	80 kPa…108 kPa (2000 m)
Connection	Spring clamp terminals 0,8...1,5 mm^2 (Cage Clamp terminal strip) Internal conductors – the methods of connection for main supply and I/O are shown by markings and the technical sheet delivered with operating control.
Solid/Stranded conductor	0.08…2.5 mm^2
Solid/Stranded conductor with ferrule	0.25…1.5 mm^2
Mounting	Onto 35 mm support rail (EN 50 022)
Enclosure	Polycarbonate, UL 94 V-0
Dimensions	W x H x D: 163 x 57.6 x 90 mm

Tab. 2: Technical Data

Caution!
If more than one EC fan-and-filter unit is used, this is a Class A device that causes radio interference in residential areas. In such cases, the operating company may be asked to implement appropriate measures. When using a single EC fan-and-filter unit, Class B is achieved.

8 Warranty

The conditions named in the sales and delivery conditions of the associated Rittal agents and subsidiaries apply.

Notes

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