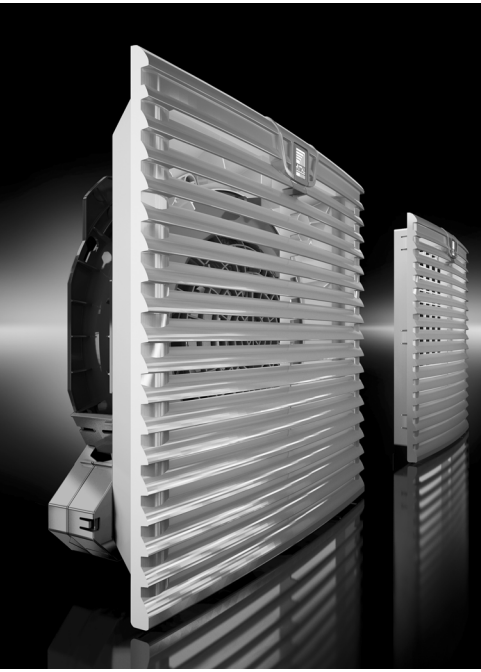
Rittal – The System.

Faster – better – worldwide.



EC-Filterlüfter
EC fan-and-filter unit
Ventilateur à filtre EC
EC ventilator
EC filterfläkt
Ventilatore-filtro EC
Ventilador con filtro EC

SK 3238.500
SK 3239.500
SK 3240.500
SK 3241.500
SK 3243.500
SK 3244.500
SK 3245.500
SK 3245.510
SK 3245.600

Montage-, Installations- und Bedienungsanleitung
Assembly and operating instructions
Notice d'emploi, d'installation et de montage
Montage- en bedieningshandleiding
Montage- och hanteringsanvisning
Istruzioni di montaggio e funzionamento
Instrucciones de montaje y funcionamiento

EN

Contents

1 Notes on documentation 3
1.1 Other applicable documents . . 3
1.2 Retention of documents 3
1.3 Symbols used 3

2 Safety notes 4

3 Device description 4
3.1 Functional description 4
3.1.1 How it works 4
3.1.2 Control 5
3.1.3 Safety equipment 5
3.1.4 Filter mats 5
3.2 Proper use 5
3.3 Scope of supply 5

4 Assembly and connection 6
4.1 Choosing the installation site 6
4.2 Assembly instructions 6
4.2.1 General 6
4.2.2 Layout of the components in the enclosure 6
4.3 Fitting the EC fan-and-filter unit or outlet filter 6
4.3.1 Cutting out the enclosure 6
4.3.2 Fitting the EC fan-and-filter unit 6
4.4 Notes on electrical installation 7
4.4.1 Connection data 7
4.4.2 Overvoltage protection and supply line load 7
4.4.3 PE conductor connection 7

5 Carrying out the electrical installation 8
5.1 Installing the power supply . . 8
5.2 Rotating the voltage connection 8
5.2.1 Installing the control line 9
5.3 Changing the direction of airflow 9

6 Commissioning 9

7 Changing the filter 9
7.1 Installing the filter media 9

8 Inspection and maintenance . . 10
8.1 General 10

9 Storage and disposal 10

10 Technical specifications 11

11 Cut-out/drilling dimensions . . 13

12 EMC fan/outlet filter 14

13 Connection diagrams 14

14 EC Declaration of Conformity 16

EN

1 Notes on documentation

These assembly instructions are aimed at tradespersons who are familiar with assembly and installation of the EC fan-and-filter unit, and at trained specialists who are familiar with operation of the EC fan-and-filter unit.

1.1 Other applicable documents

There is one set of instructions for the unit types described here:

– Assembly, installation and operating instructions enclosed with the unit as a printed document and/or on CD-ROM.

We cannot accept any liability for damage associated with failure to observe these instructions. Where applicable, the instructions for any accessories used also apply.

1.2 Retention of documents

These instructions and all associated documents constitute an integral part of the product. They must be given to the plant operator. The operator is responsible for storage of the documents so they are readily available when needed.

1.3 Symbols used

Please observe the following safety instructions and other notes in this guide:

Symbol identifying required actions:

■ The bullet point indicates an action to be performed.

Safety and other notes:

Danger!
Immediate danger to life and limb!

Caution!
Potential threat to the product and its environment.

Note:
Useful information and special features.

EN

2 Safety notes

Please observe the following general safety notes when assembling and operating the unit:

- Assembly, installation and servicing may only be performed by properly trained specialists.
- Do not obstruct the air inlet and outlet of the EC fan-and-filter unit inside and outside the enclosure (see also section “4.2.2 Layout of the components in the enclosure”, page 6).
- The heat loss of the components installed in the enclosure must not exceed the level of cooling provided by the EC fan-and-filter unit at the specific air throughput, maximum permissible enclosure internal temperature and maximum ambient temperature.
- EC fan-and-filter units must always be installed on vertical panels (door or walls).
- The louvres must always have their opening pointing downwards.
- Use only original spare parts and accessories.
- Do not make any changes to the EC fan-and-filter unit other than those described in these and other applicable instructions.
- The EC fan-and-filter unit must only be connected to the mains with the system de-energised. Connect the pre-fuse specified on the rating plate.
- Changes to the direction of airflow must only be carried out with the system de-energised.
- Changes to the positioning of the mains connection must only be carried out with the system de-energised.
- Never insert your fingers into the rotating fan blade.
- Electrical connection and any repairs may only be carried out by authorised specialist personnel.

3 Device description

Depending on the model chosen, your EC fan-and-filter unit may vary in appearance from the illustrations contained in these instructions. However, the functions are identical in principle.

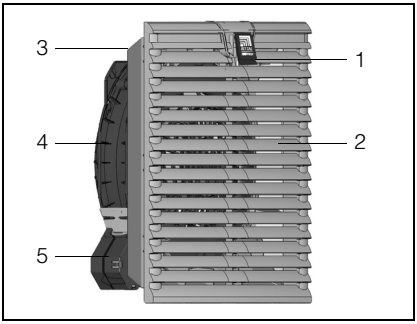


Fig. 1: Device description

Key

1 Function logo
(to release the louvred grille)
2 Louvred grille
3 Filter box with filter mat
4 Fan housing
5 Variable electrical connection

3.1 Functional description

The EC fan-and-filter unit in conjunction with the corresponding outlet filter(s) is used to dissipate heat loss from enclosures and ventilate the enclosure, thereby protecting temperature-sensitive components. This is achieved via the direct infeed of ambient air, the temperature of which must be less than the admissible enclosure interior temperature.
The system is fitted into prepared cut-outs in the door or walls of the enclosure.

3.1.1 How it works

The EC fan-and-filter unit is comprised of the following four main components: Fan motor, filter box, louvred grille with function logo and filter medium.

3.1.2 Control

Rittal EC fan-and-filter units may be controlled more efficiently using an enclosure internal thermostat (Model No. SK 3110.000), digital temperature display (Model No. SK 3114.200), temperature-dependent control unit (Model No. SK 3235.440) and/or hygrostat (Model No. SK 3118.000).
The Rittal EC fan-and-filter units SK 3240.500 to SK 3245.510 possess an integrated control interface (0 – 10 V/PWM input and tacho signal output). These units can be connected either via a Rittal control unit (e.g. SK 3235.440) or else directly to a control system (e.g. PLC) provided by the customer, enabling the speed of the fan to be both controlled and monitored.
The corresponding connection diagram is to be found on page 14 (fig. 11).

3.1.3 Safety equipment

The fan is equipped with thermal winding protection devices for protection against excess current.

3.1.4 Filter mats

The EC fan-and-filter unit/outlet filter is supplied with a standard filter mat already installed. Depending on the incidence of dust, you will need to replace the filter mat from time to time.
In order to increase the protection category, and in the case of dust with a grain size of < 10 µm, we recommend the use of fine filter mats.

Note:
The air throughput volume will be reduced.
Special filter mats are required for EMC EC fan-and-filter units (see accessories).

3.2 Proper use

Rittal EC fan-and-filter units were developed and designed in accordance with the state-of-the-art and the recognised rules governing technical safety. Nevertheless, if used improperly, they may pose a threat to life and limb or cause damage to property. The unit is only intended for ventilating enclosures and electronic cases. Any other use is deemed improper. The manufacturer will not be liable for any damages caused as a result of improper use, or for incorrect assembly, installation or use.
All risk is borne solely by the user.
Proper usage also includes the observation of all valid documents and compliance with the inspection and servicing conditions.

3.3 Scope of supply

The fan is supplied in a packaging unit in a fully assembled state and ready to connect.
Please check the delivery for completeness:

Qty.	Description
1	EC fan-and-filter unit
4	– Mounting screws (not for SK 3238.5XX to SK 3239.5XX)
1	– Assembly, installation and operating instructions
1	Drilling template, self-adhesive

Tab. 1: Scope of supply

EN

4 Assembly and connection

4.1 Choosing the installation site

When choosing the installation site for the enclosure, please observe the following:

– The site for the enclosure, and hence the arrangement of the EC fan-and-filter unit, must be carefully selected so as to ensure good ventilation.
– The site must be free from excessive dirt and moisture.
– The ambient temperature must be lower than the permissible enclosure interior temperature.
– The mains connection data as stated on the rating plate of the unit must be guaranteed.

4.2 Assembly instructions

4.2.1 General

– Check the packaging carefully for signs of damage. Packaging damage may be the cause of a subsequent functional failure.
– The EC fan-and-filter unit and outlet filter must always be mounted on an enclosure in order to ensure air exchange.

Note:
The outlet filter should be at least the same size as the EC fan-and-filter unit.

– The enclosure must be sealed on all sides (IP 54). If the enclosure has a leak, unfiltered, contaminated air may enter the enclosure, depending on the direction of airflow of the fan.

4.2.2 Layout of the components in the enclosure

Exercise particular caution with the airflow from the blowers of built-in electronic components. For installation, it is important to ensure that the airflows of fans and built-in electronic components do not have a negative influence on one another (air short-circuit).

The corresponding minimum distances between the fan and component must be observed in order to ensure unhindered air circulation.

4.3 Fitting the EC fan-and-filter unit or outlet filter

The EC fan-and-filter unit or outlet filter is mounted on a vertical panel of the enclosure:

■ For this purpose, the appropriate door, side or rear panel must be cut out using the supplied drilling template.

The EC fan-and-filter unit is generally fitted in the lower part of the enclosure, and the outlet filter in the upper part.

4.3.1 Cutting out the enclosure

■ Stick the self-adhesive drilling template supplied to the envisaged position on the door, side or rear panel of the enclosure.

There are dimensioning lines on the drilling plate for the cut-out and for the holes required for mounting and securing the fan, depending on the metal thickness (see also fig. 8 and fig. 9, page 13).

Risk of injury!
Carefully deburr all cut-outs to prevent injuries caused by sharp edges.

■ Make the cut-outs including the line width as per the drilling template. Deburr the cut-outs.

4.3.2 Fitting the EC fan-and-filter unit

■ The fan may be fitted without tools, by simply snapping into the pre-configured mounting cut-out.
■ However, if the metal thickness is greater than 3 mm, the fan will need to be screw-fastened. To this end, remove the louvred grille in order to gain access to the lower mounting holes.

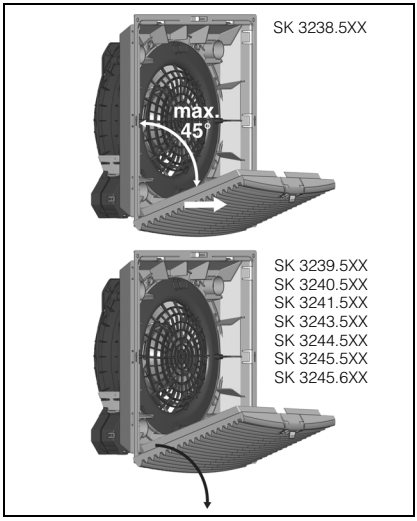


Fig. 2: Remove the louvred grille

- If transporting over long distances or to a different installation site, we strongly recommend that you screw-fasten the fan to prevent it from falling out of the mounting cut-out.
- The fan-and-filter unit is a rotating component that may transfer vibrations and oscillations. Suitable design measures to dampen vibrations should be implemented in advance before constructing the system.
- The protection category can be increased by means of the following accessories:
  – IP 55 by using an additional fine filter mat or hose-proof hood.
  – IP 56 by using a hose-proof hood.

Note:
To increase the protection category, an additional fine filter mat or hose-proof hood must be used in both the EC fan-and-filter unit and the outlet filter.

4.4 Notes on electrical installation

When performing the electrical installation, it is important to observe all valid national and regional regulations as well as the provisions of the responsible power supply company. Electrical installation must only be carried out by a qualified electrician who is responsible for compliance with the existing standards and regulations.

4.4.1 Connection data

– The voltage and frequency of the connection must correspond to the values stated on the rating plate.
– Electrical connection and any repairs may only be carried out by authorised specialist personnel.
  Use only original spare parts!
– Install the pre-fuse cited on the rating plate (circuit-breaker or slow fuse) to protect the cable and fan from short-circuits. If several fans are operated on a single fuse, observe the total connected load.
– The direction of airflow and the direction of rotation are each marked on the motor housing with an arrow.

4.4.2 Overvoltage protection and supply line load

The unit does not have its own overvoltage protection. Measures must be taken by the operator at the supply end to ensure effective lightning and overvoltage protection. The mains voltage must not exceed a tolerance of ±10%.

4.4.3 PE conductor connection

The PE conductor connection must be connected to the PE conductor system of the overall system.

EN

5 Carrying out the electrical installation

5.1 Installing the power supply

- Complete the electrical installation by following the wiring plans.

Note:
For technical data, refer to the rating plate.

- Remove the red cover from the electrical connection.

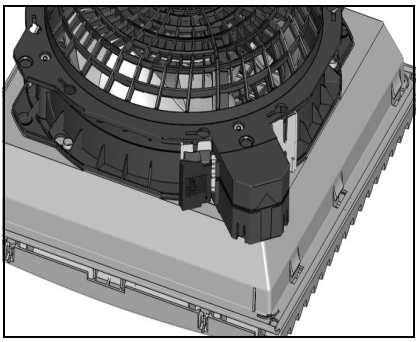


Fig. 3: Access the electrical connection

- Insert the connection cable with wire end ferrules into the screwless spring terminals. Choose an appropriate pre-fuse according to the line cross-section (2 x 0.75 – 2.5 mm^2 multi-wire, 2 x 1.5 – 2.5 mm^2 fine-wire soldered).

Caution!
If no wire end ferrules are used, the insulation of the individual wires should be stripped to a max. of 9 mm (to comply with clearance and creepage distances).

- Re-attach the electrical connection cover.

5.2 Rotating the voltage connection

If the position of the voltage connection is not ideally accessible, it may be rotated through 90° and snapped into position. To this end, press down on the release button of the bayonet connection at the rear of the fan. Units SK 3238.XXX to SK 3239.XXX are released by pulling out the clip (see fig. 4) of the bayonet connection.

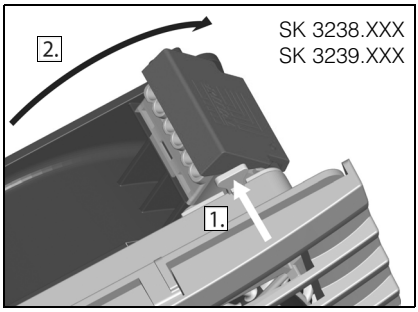


Fig. 4: Release the bayonet connection

Units SK 3240.XXX, SK 3241.XXX, SK 3243.XXX to SK 3245.XXX are released by pressing the release button of the bayonet connection (see fig. 5), located on the opposite corner from the connection terminal.

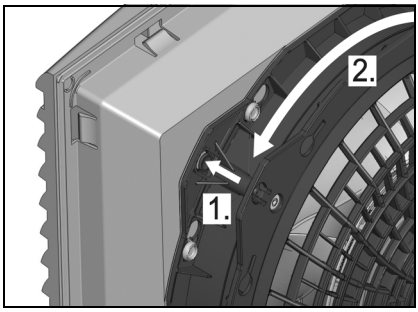


Fig. 5: Release the bayonet connection

EN

5.2.1 Installing the control line

To permit control of the EC fan-and-filter units via an external control unit (e.g. SK 3235.440), the units SK 3240.5XX to SK 3245.5XX possess a separate terminal for connection of a control line.

- To this end, release and remove the jumper between the "+10 V" and "0 – 10 V/PWM" connections.
  For this purpose, use a screwdriver with a 3.5 x 0.5 mm blade.
- Use the screwdriver to open the terminal and insert the connection cable of the control line in accordance with the connection diagram on page 14 (line cross-section 0.8 – 1.5 mm^2, fine wire).
- Remove the screwdriver.

5.3 Changing the direction of airflow

The direction of airflow blows into the enclosure from the outside as standard. Should it become necessary to change the direction of airflow for technical reasons (space, specific component air routing etc.), this is easily achieved. Simply remove the fan housing and rotate it through 180°.
To remove, please follow the same procedure as described under "5.2 Rotating the voltage connection", page 8.
Please also observe the instructions outlined under "4.2.1 General", page 6.

6 Commissioning

- Once all the assembly and installation work is complete, switch on the power supply to the EC fan-and-filter unit.

The EC fan-and-filter unit operates automatically, in other words, the fan will start up once the power has been switched on.

Note:
EC fan-and-filter units start running with a delay of approx. 15 sec.

7 Changing the filter

7.1 Installing the filter media

The EC fan-and-filter unit and outlet filter are supplied as standard with a standard filter mat for the pre-filtering of dry, coarse dust and lint. In order to increase the protection category, and in the case of dust with a grain size of < 10 µm, we recommend the use of fine filter mats (optionally available).
Depending on the incidence of dust, you will need to replace the filter mat from time to time.

Caution!
Only change the filter mat while the fan wheel is stationary.
Never insert your fingers into the fan wheel.

- Use your finger to pull the function logo in the louvred grille upwards slightly to unlock it. The grille will now flip open by about 70° to allow the filter mat to be replaced easily.

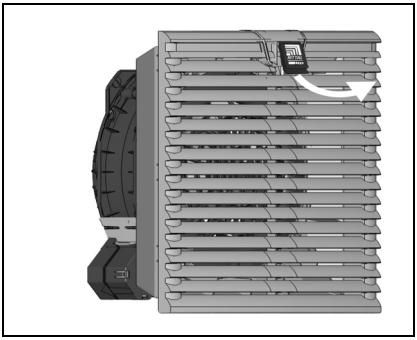


Fig. 6: Release the louvred grille

EN

- Insert the filter mat into the louvred grille as shown in fig. 7 and push the louvred grille back onto the enclosure until it snaps audibly into position.

Note:
The progressive side of the filter mat is pointing towards the fan wheel.

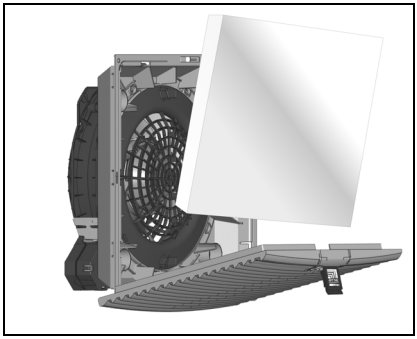


Fig. 7: Install the filter mat

8 Inspection and maintenance

Risk of electric shock!
The unit is live.
Switch off the power supply before opening, and take suitable precautions against it being accidentally switched back on.

8.1 General

The installed maintenance-free fan is mounted on ball bearings, protected against moisture and dust, and fitted with a temperature monitor.
The life expectancy is at least 60.000 operating hours (L10, 40 °C).
The EC fan-and-filter unit is thus largely maintenance free.

From time to time, the components may need to be cleaned using a vacuum cleaner or compressed air if they become visibly dirty.
Any stubborn, oily stains may be removed using a non-flammable detergent, such as degreaser.
Maintenance interval: 2,000 operating hours. Depending on the level of contamination in the ambient air, the maintenance interval may be reduced to suit the air pollution intensity.

Caution!
Risk of fire!
Never use flammable liquids for cleaning.

Sequence of maintenance measures:
- Check the level of dirt.
- Filter soiling?
  Replace the filter if necessary.
- Fan membranes soiled?
  Clean if necessary.
- Check the noise generation of the fan.
- Compressed air cleaning.

9 Storage and disposal

Caution!
Risk of damage!
The EC fan-and-filter unit must not be stored at temperatures above +70 °C or below –25 °C.

Disposal can be performed at the Rittal plant.
Please contact us for advice.

EN

10 Technical specifications

– Observe the mains connection data (voltage and frequency) as per the rating plate.

– Observe the pre-fuse as per the specifications on the rating plate.

Model No. SK fan-and-filter unit		**3238.500**	**3239.500**	**3240.500**	**3241.500**	**3243.500**
Rated operating voltage Volt, Hz		200 – 240, 50/60				
Dimensions mm	B1/H1	148.5	204	255		323
	B2/H2	124	177	224		
	T1	16	24	25		
Max. installation depth mm	T2	58.5	86	107		118.5
Air throughput, unimpeded airflow		**55 m³/h**	**105 m³/h**	**180 m³/h**	**230 m³/h**	**550 m³/h**
Air throughput with outlet filter incl. standard filter mat	1 x SK 32XX.200	43	87	138	183	440
	2 x SK 32XX.200	46	93	165	203	510
Control interface[1]		–	–	■	■	■

Fan	Diagonal/EC motor				
Rated current	45 mA		0.15 A	0.2 A	0.48 A
Power consumption	5.8 W		12.8 W	18.4 W	50.4 W
Pre-fuse	6 A				
Noise pressure level	49 dB (A)	53 dB (A)	47 dB (A)	52 dB (A)	63 dB (A)
Operating temperature range	–20 °C to +55 °C		–25 °C to +55 °C		
Storage temperature range	–30 °C to +70 °C		–25 °C to +70 °C		
Protection category					
Standard	IP 54	IP 54	IP 54	IP 54	IP 54
With fine filter mat	IP 54	IP 55	IP 55	IP 55	IP 55
With hose-proof hood	IP 56	IP 56	IP 56	IP 56	IP 56

Accessories	Packs of					
SK outlet filter	1	3238.200	3239.200	3240.200	3240.200	3243.200
Spare filter mats	5	3322.700	3171.100	3172.100	3172.100	3173.100
Fine filter mats	5	3238.055	3181.100	3182.100	3182.100	3183.100
Hose-proof hood	1	3238.080	3239.080	3240.080	3240.080	3243.080
Cover panel	1	3238.020	3239.020	3240.020	3240.020	3243.020
Enclosure internal thermostat	1	3110.000	3110.000	3110.000	3110.000	3110.000
Digital temperature display/thermostat	1	3114.200	3114.200	3114.200	3114.200	3114.200
Hygrostat	1	3118.000	3118.000	3118.000	3118.000	3118.000
EC control unit	1	–	–	3235.440	3235.440	3235.440

[1] 0 – 10 V/PWM input and tacho signal output

Special voltages available on request.
We reserve the right to make technical modifications.

B = Width
T = Depth

10 Technical specifications

EN

Model No. SK fan-and-filter unit		**3244.500**	**3245.500**	**3245.510**	**3245.600[1)]**
Rated operating voltage Volt, Hz		200 – 240, 50/60		115, 50/60	200 – 240, 50/60
Dimensions in mm	B1/H1	323			
	B2/H2	292			
	T1	25			
Max. installation depth mm	T2	130.5			
Air throughput, unimpeded airflow		**700 m³/h**	**900 m³/h**		
Air throughput with outlet filter incl. standard filter mat	1 x SK 32XX.200	544	680		
	2 x SK 32XX.200	630	820		
Control interface[2)]		■	■		

Fan		Diagonal/EC motor			
Rated current		0.66 A	1.33 A	2.5 A	1.33 A
Power consumption		79 W	1685 W		
Pre-fuse		6 A			
Noise pressure level		64 dB (A)	72 dB (A)		
Operating temperature range		–25 °C to +55 °C			
Storage temperature range		–25 °C to +70 °C			
Protection category					
Standard		IP 54	IP 51	IP 51	IP 51
With fine filter mat		IP 55	IP 52	IP 52	IP 52
With hose-proof hood		IP 56	IP 56	IP 56	IP 56
Accessories	Packs of				
SK outlet filter	1	3243.200	3243.200	3243.200	3243.060
Spare filter mats	5	3173.100	3173.100	3173.100	3243.066
Fine filter mats	5	3183.100	3183.100	3183.100	3183.100
Hose-proof hood	1	3243.080	3245.080	3245.080	3245.080
Cover panel	1	3243.020	3245.020	3245.020	3245.020
Enclosure internal thermostat	1	3110.000	3110.000	3110.000	3110.000
Digital temperature display/thermostat	1	3114.200	3114.200	3114.200	3114.200
Hygrostat	1	3118.000	3118.000	3118.000	3118.000
EC control unit	1	3235.440	3235.440	3235.440	3235.440

[1)] EMC version
[2)] 0 – 10 V/PWM input and tacho signal output

Special voltages available on request.
We reserve the right to make technical modifications.

B = Width
T = Depth

11 Cut-out/drilling dimensions

EN

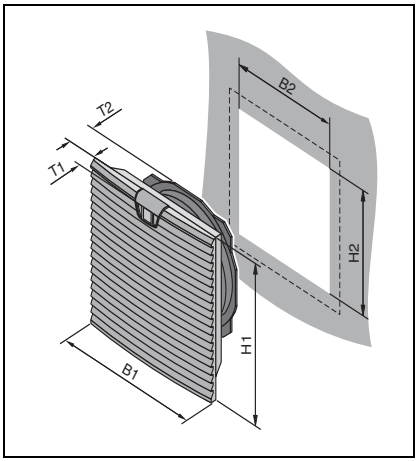


Fig. 8: Cut-out dimensions

B = Width
T = Depth

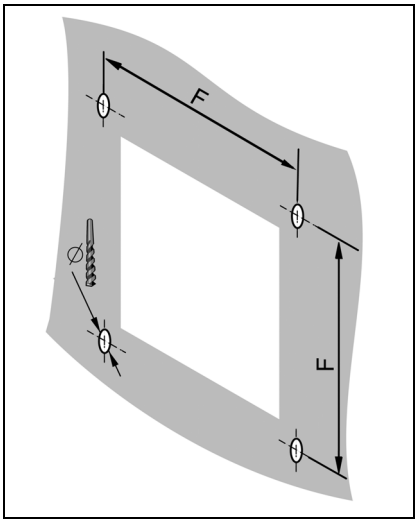


Fig. 9: Drilling pattern

Model No. SK	Ø mm	F mm
3238.XXX	3.5	132.5
3239.XXX	4.5	185
3240.XXX	4.5	234
3241.XXX	4.5	234
3243.XXX	4.5	302
3244.XXX	4.5	302
3245.XXX	4.5	302

Tab. 2: Hole size

EN

12 EMC fan/outlet filter

To achieve EMC protection, the EMC fans and EMC outlet filters should be snapped into the mounting cut-out and screw-fastened using the screws supplied. Next, the four contact foils should be stuck on all-round between the fan-and-filter unit and the inside of the enclosure as shown in the following illustration.

Note:
Only use original EMC filter mats (see Accessories in the Rittal Catalogue).

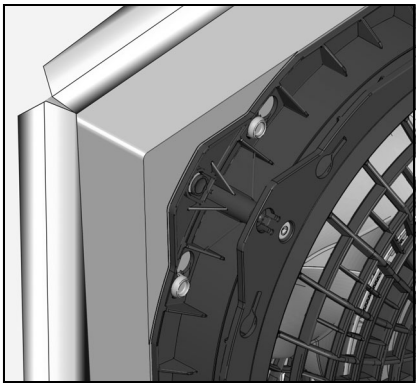


Fig. 10: EMC contact foils

13 Connection diagrams

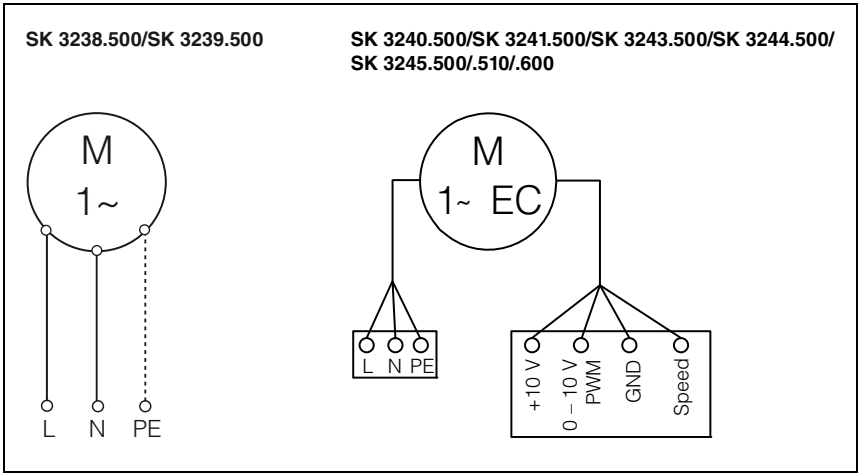


Fig. 11: Connection diagrams

EN

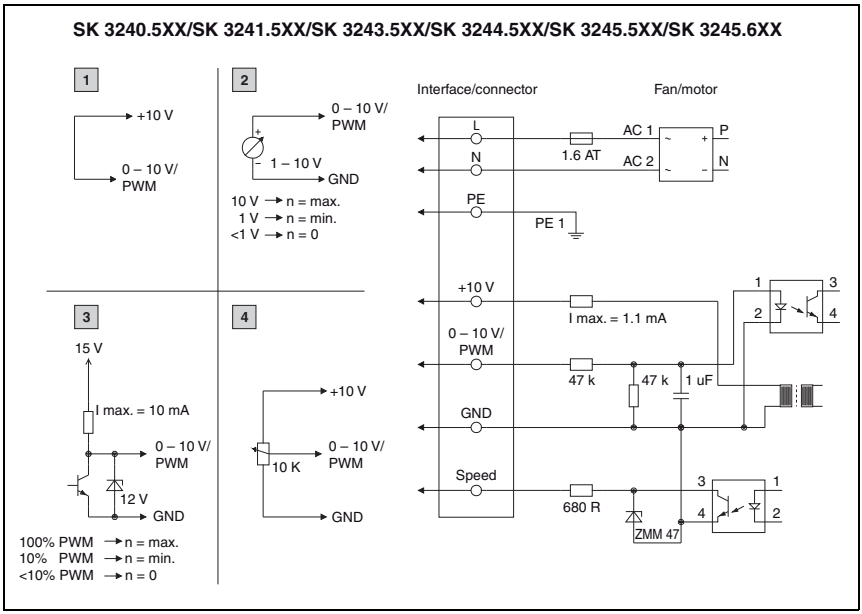


Fig. 12: Connection diagram SK 3240.5XX/SK 3241.5XX/SK 3243.5XX/SK 3244.5XX/SK 3245.5XX/ SK 3245.6XX

1 Max. speed (as delivered)
2 Adjustable speed
3 Adjustable speed via PWM 1 – 10 kHz
4 Adjustable speed via potentiometer

Connection	Function/Assignment
L	Power supply
N	Neutral conductor
PE	PE conductor
GND	GND connection of the control interface
0 – 10 V/PWM	Control input 0 – 10 V or PWM, galvanically isolated, impedance 100 kΩ
+10 V	Voltage output 10 V max. 1.1 mA, galvanically isolated, not short circuit-protected
Speed	Speed output Open Collector, 1 pulse per revolution, galvanically isolated

Tab. 3: Explanations to fig. 12

EN

14 EC Declaration of Conformity

EG-Konformitätserklärung
Maschinenrichtlinie 2006/42/EG Anhang II A
EC Declaration of Conformity
Machinery Directive 2006/42/EC Annex II A

Hiermit erklären wir, *(We hereby declare)*

Rittal GmbH & Co. KG, Auf dem Stützelberg, D-35745 Herborn

dass die Filterlüfter: *(that the fan-and-filter units:)*
SK 3237.XXX SK 3238.XXX SK 3239.XXX SK 3240.XXX SK 3241.XXX SK 3243.XXX SK 3244.XXX SK 3245.XXX

„XXX" steht für *("XXX" applies to):*
100, 109, 110, 124*), 140, 500, 509, 510, 600, 609, 610
*) 24 VDC Version, nicht nach NSpRI 2006/95/EG *(24 VDC version; does not comply with LVD 2006/95/EC)*

folgenden Richtlinien entsprechen: *(conform to the following directives:)*

Maschinenrichtlinie 2006/42/EG *(Machinery Directive 2006/42/EC)*
Elektromagnetische Verträglichkeit 2004/108/EG *(Electromagnetic Compatibility 2004/108/EC)*

Bei einer nicht mit uns abgestimmten Änderung der Maschine verliert diese EG-Konformitätserklärung ihre Gültigkeit.
This EC Declaration of Conformity shall become null and void when the assembly is subjected to any modification that has not met with our approval.

Herborn, 31.07.2012

Verantwortlich für Dokumentation
(Responsible für documentation)

Rittal GmbH & Co. KG
Auf dem Stützelberg
D-35745 Herborn

Frank Himmelhuber
Bereichsleiter FuE
(Senior Vice President R&D)

Mehr Informationen finden Sie auf www.rittal.de
Please find further information on www.rittal.com

Rittal – The System.

Faster – better – worldwide.

- Enclosures
- Power Distribution
- Climate Control
- IT Infrastructure
- Software & Services

6. edition 09.2012 / ID no. 328 628 / Drawing no. A 4474200SK23

RITTAL GmbH & Co. KG
Postfach 1662 • D-35726 Herborn
Phone +49(0)2772 505-0 • Fax +49(0)2772 505-2319
E-mail: info@rittal.de • www.rittal.com