

This is how you find a suitable exhaust system

Fire prevention protection has an important place in planning building technology. In order to make it easier for you to select the necessary system, the planning documents have been structured according to fire protection.

MAICO offers 5 exhaust air systems:

- aeroduct Fire protection system
- PAM-GLOBAL L cast ventilation system
- Ceiling barrier system
- System with fire-proof shaft
- Air extraction system without fire protection
- First answer the question as to whether fire protection is necessary or has been stipulated.

In order to clarify this question you need:

- Copy of the building regulations
- Local building regulations from the respective authority with implementing ordinances.
- Special building regulations for special types and utilisation of buildings.
- Technical specifications, e.g. DIN, VDI, VDE, VDS .
- Fire protection specification requirements regarding ventilation systems.

If the answer is no, then you have already found a suitable system: the system without fire protection.

If fire protection is necessary, please answer this question: Does the installation shaft have any fire resistance e.g. unfinished wall installation with plaster boards?

If your answer to this question is no, the shaft is fire-proof.

The system with fire-proof shaft is the right one.

If the shaft is not fire-proof, please answer the next question:

Do you require a space-saving, easy-to-install system with a good price - performance ratio?

If your answer to this question is no, the ceiling barrier system is the right system for you.

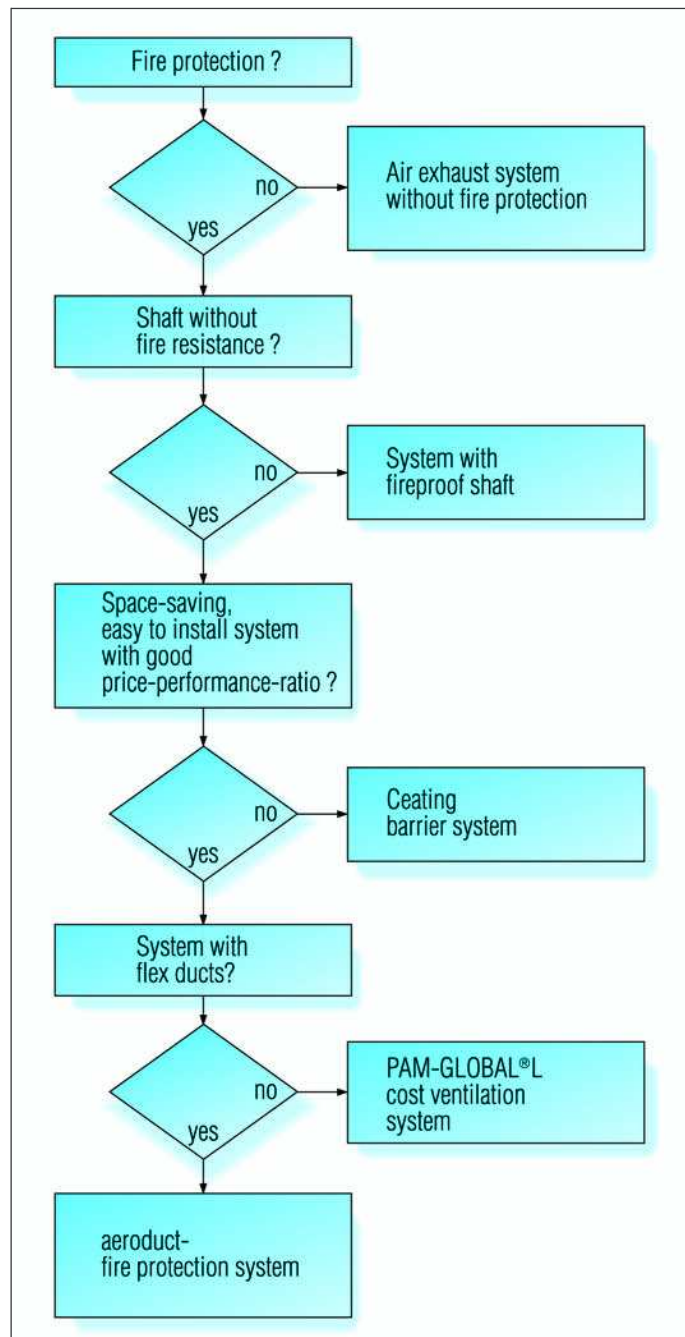
If your answer is yes, the next question will be:

Do you require a system with folded spiral seams ducts?

If your answer to this question is no, you can use the PAM-GLOBAL L cast ventilation system.

If your answer is yes, the aeroduct fire protection system is the right one for you.

The following flow chart will quickly guide you to a suitable system that meets your requirements.



Once you have decided on a system, select the required fan.

To do this, proceed as follows:

- Determine the required volumetric flow of the exhaust air. Guide values and layout examples can be found in the "Planning instructions".
- Select the fan size that matches this volumetric flow. MAICO offers fans with a volumetric flow of 60 m³/h or 100 m/h.
- Select the type of fan installation according to the building requirements: Surface-mounted or recessed.
- Select one of the possible models for the fan.

aeroduct fire protection system

Application areas

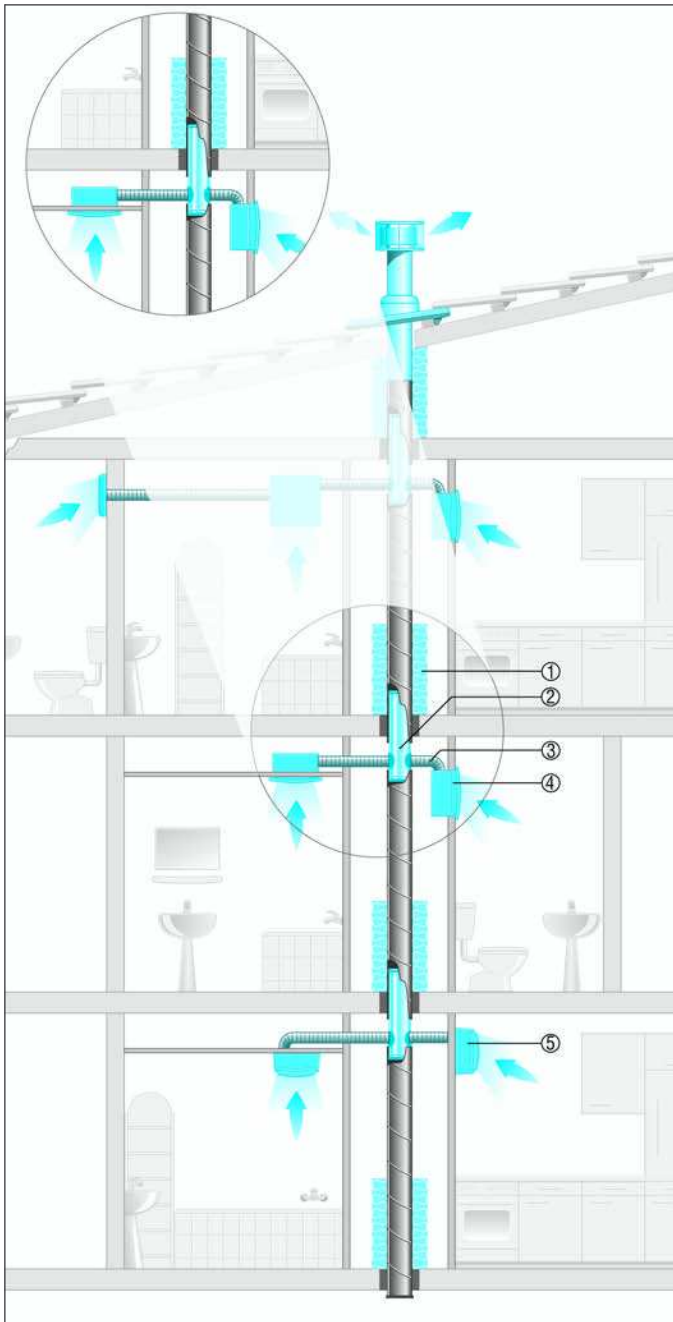
- Domestic kitchens, bathrooms and WCs

Constructional requirements:

- Non-fire-proof installation shaft
- Shaft wall made of plaster board, 12.5 mm thick
- Ceiling compound 100 mm
- Maximum floor height 3.5 m

Approval:

- General official approval
- Approval number Z-41.6-573 (approval only in conjunction with MAICO fans)
- Fire resistance class K90-18017 S



- BI fire protection insulation
- BA fire protection compensation element
- SFR flexible steel duct
- Recessed-mounted housing ER-UPD with ER fan insert
- ER-APB surface-mounted fan

Functional description

The aeroduct fire protection system in case of fire

- The shut-off devices for MAICO fans close automatically in the event of a fire.
- The heat expands the main duct towards the ceiling and this moves the fire protection compensation element upwards.
- Consequently the roof does not come under stress, and cracks are avoided in the ceiling.
- The fire-proof insulation screens the combustible material in the installation shaft from the heat. A separating bridge is unnecessary here.

The main system components

Fire protection compensation element
BA



Fire protection insulation
BI



Recessed housing
ER-UPD



Fan insert
ER



Surface-mounted fan
ER-APB



Steel flex duct
SFR



PAM-GLOBAL L cast ventilation system

Application areas

- Domestic kitchens, bathrooms and WCs

Constructional requirements:

- Non-fire-proof installation shaft
- Shaft wall made of plaster board, 12.5 mm thick
- Ceiling compound 150 mm

Approval:

- General official approval
- Approval number Z-41.6-603 (approval only in conjunction with MAICO fans)
- Fire resistance class K90-18017 S

Functional description

The PAM-GLOBAL cast ventilation system in case of fire




- The shut-off devices for MAICO fans close automatically in the event of a fire.
- The cast ventilation system is able to withstand fire.
- The Rockwool Conlit 150 P insulation shields the combustible materials in the installation shaft. A separating bridge is therefore not needed.
- The BI fire protection insulation from MAICO cannot be used.

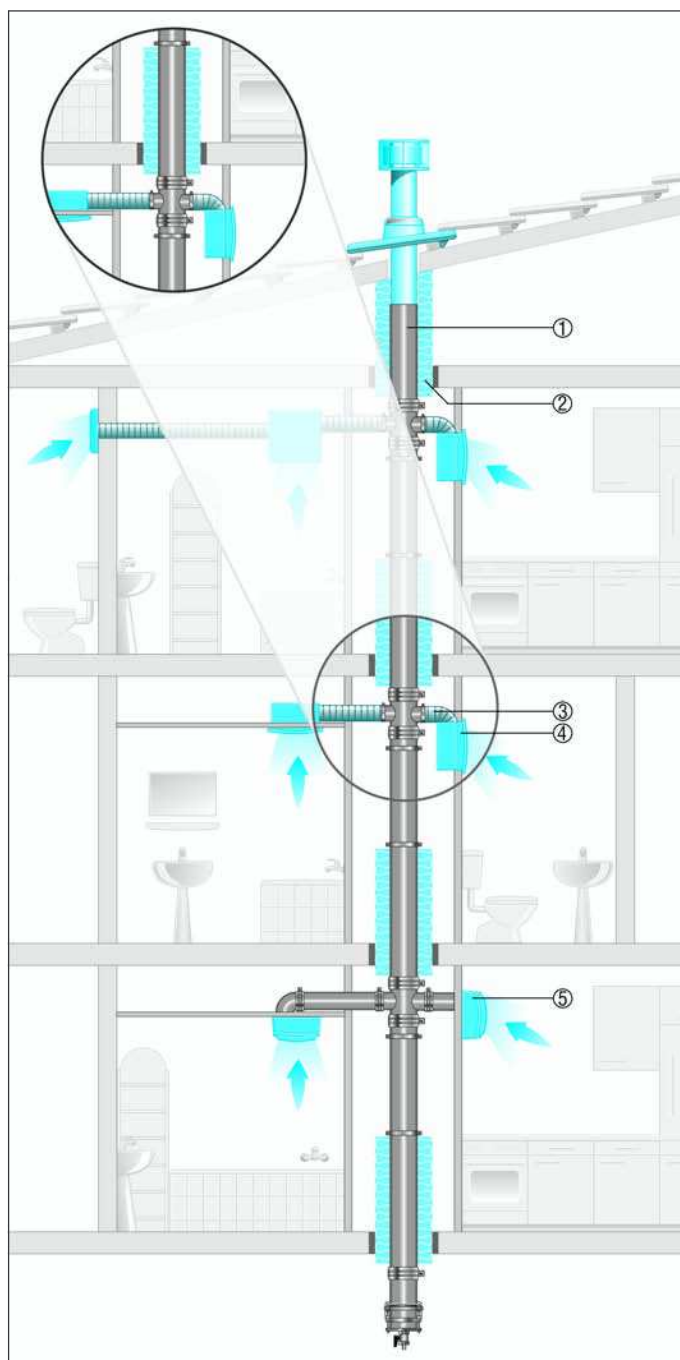
Contact address

For further information on PAM-GLOBAL L pipes and shaped elements, please visit www.saint-gobain-hes.de or contact:

Saint-Gobain HES GmbH - Ettore-Bugatti-Strasse 35 -
51149 Köln/Porz-Gremberghoven - Germany -
Phone: +49 2203 / 97 84-0 - Fax: 02203 / 97 84-200

The main system components

<p>Duct PAM-GLOBAL L</p> 	<p>Rockwool Conlit</p> 
<p>Recessed housing ER-UPD</p> 	<p>Fan insert ER</p> 
<p>Surface-mounted fan ER-APB</p> 	<p>Steel flex duct SFR</p> 



- PAM-GLOBAL L cast duct
- Rockwool Conlit
- SFR flexible steel duct
- Recessed-mounted housing ER-UPD with ER fan insert
- ER-APB surface-mounted fan

Ceiling barrier system

Application areas

- Domestic kitchens, bathrooms and WCs

Constructional requirements:

- Non-fire-proof installation shaft
- Ceiling compound 100 mm

Approval:

- General official approval
- Approval number Z-41.6-556
- Fire resistance class K90-18017

Functional description

The ceiling barrier system in the case of fire

- The TS 18 fire protection ceiling barrier consists of a housing in which several lamella with pressure springs can close off the cross section. A synthetic insert alongside the housing wall prevents the lamella from closing. The housing wall is covered with temperature dependent expanding foam material.
- The synthetic insert becomes soft in the case of fire.
- The springs press the lamella together and this mechanically closes the main duct.
- The temperature dependent expanding foam material expands and closes the main duct.
- Fire protection devices on the fans are unnecessary here.

The main system components

Surface-mounted fan
ER-AP



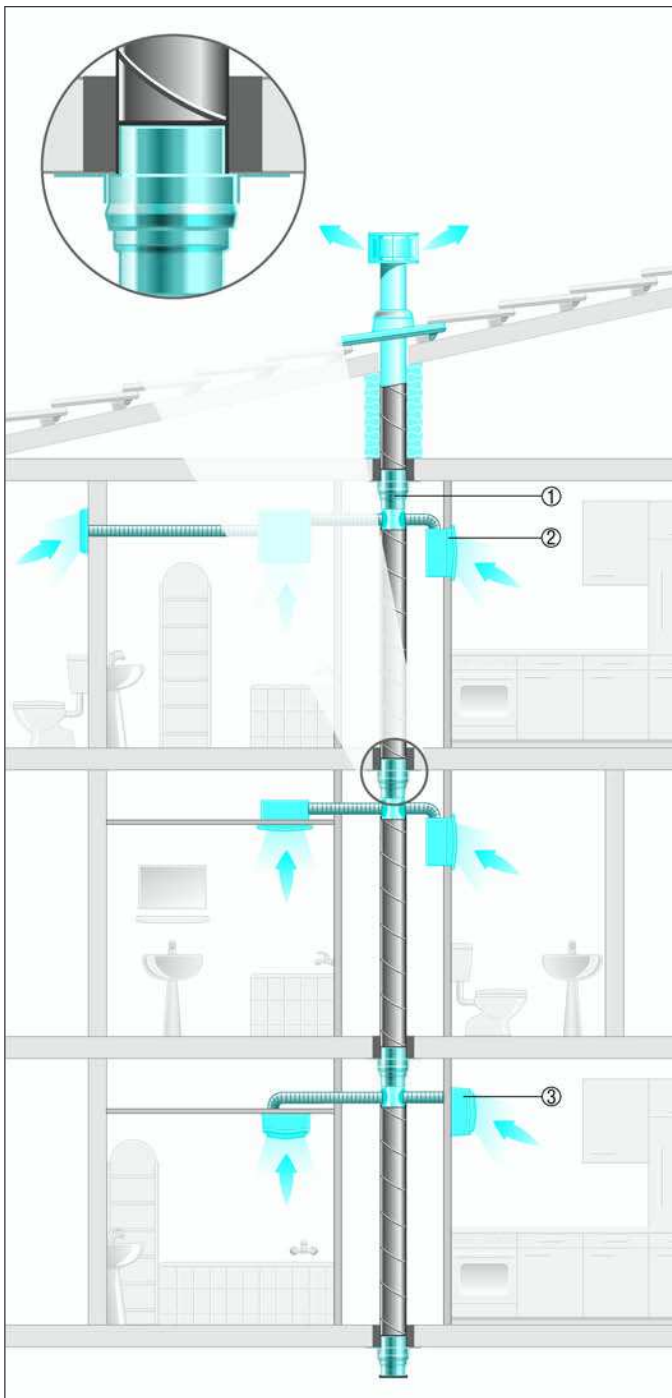
Fire protection ceiling barrier
TS 18



Recessed housing
ER-UP/G



Fan insert
ER



- TS 18 fire protection ceiling barrier
- Recessed-mounted housing ER-UP/G with ER fan insert
- ER-AP surface-mounted fan

Multiple family unit air extraction

System selection



System with fire-proof shaft

Application areas

- Domestic kitchens, bathrooms and WCs

Constructional requirements:

- Fire-proof installation shaft
- Ceiling compound 100 mm

Functional description

System with fire-proof shaft in the case of fire

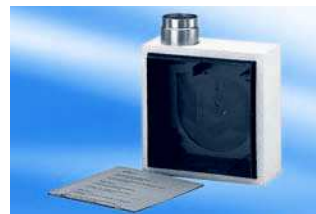
- The shut-off devices for MAICO fans close automatically in the event of a fire.
- The fire-proof housings are mounted in the wall of the fire-proof installation shaft. This prevents fire and smoke from spreading.

The main system components

Surface-mounted fan
ER-APB



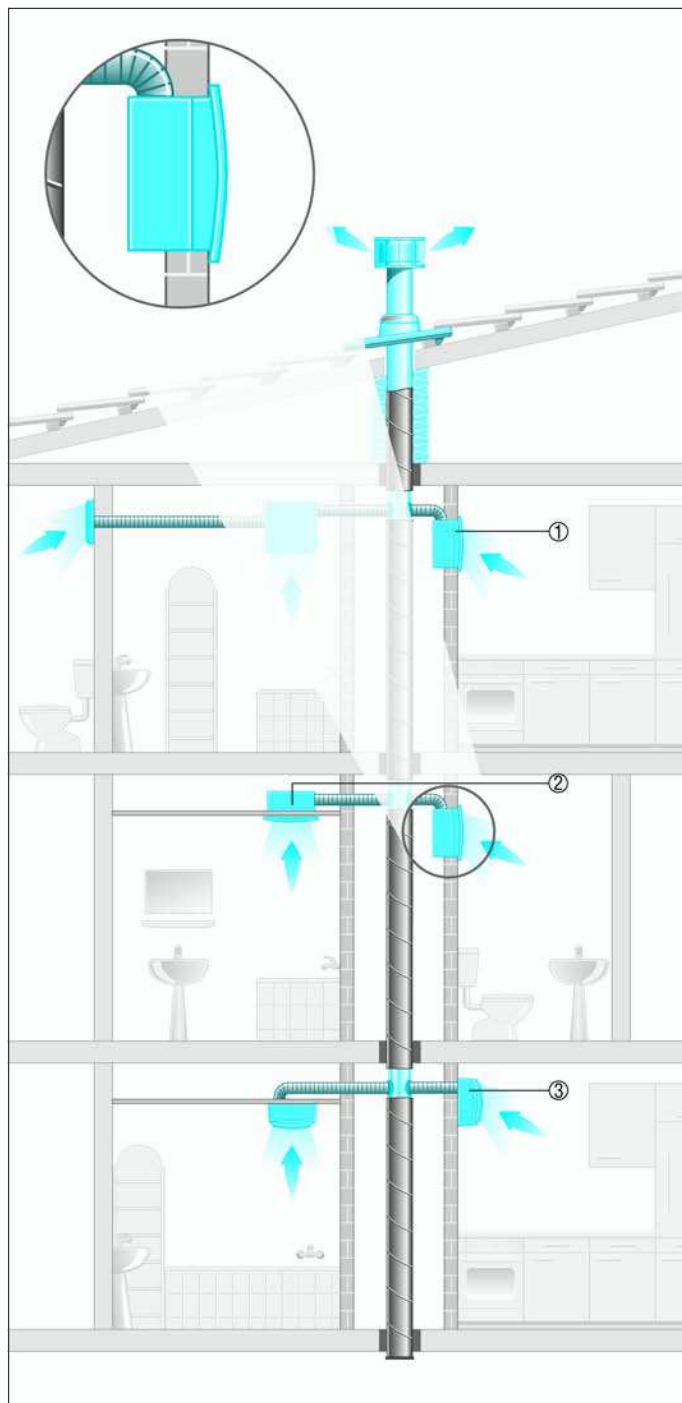
Recessed housing
ER-UPB



Recessed housing
ER-UPD



Fan insert
ER



- Recessed-mounted housing ER-UPB with ER fan insert
- Recessed-mounted housing ER-UPD with ER fan insert
- ER-APB surface-mounted fan

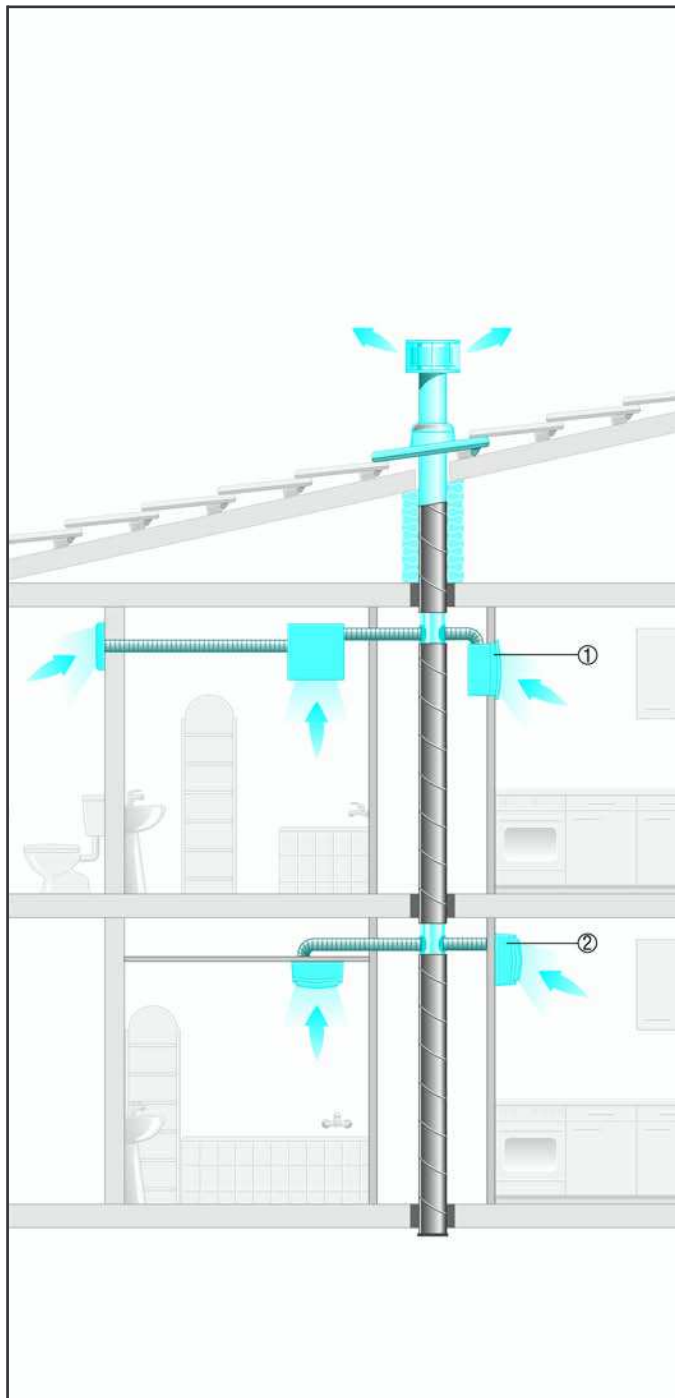
Air extraction system without fire protection

Application areas

- Domestic kitchens, bathrooms and WCs

Constructional requirements:

- No fire protection requirements
- Ceiling compound recommended



① Recessed-mounted housing ER-UP/G with ER fan insert
 ② ER-AP surface-mounted fan

The main system components

Surface-mounted fan
 ER-AP



Recessed housing
 ER-UP/G



Fan insert
 ER



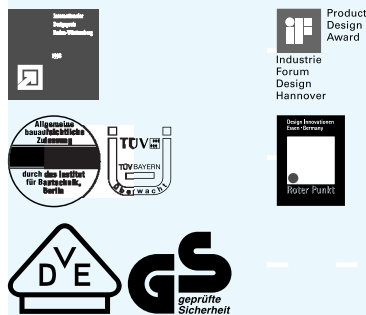


Short description

- Fan insert for recessed-mounted housing.
- Smooth-surfaced, white cover with exhaust air filter.
- The housing has easy to install snap-in fan fittings and electrical plug connections.
- High pressure characteristic curves.
- Very quiet.
- IP X5, approved for installation in area 1.
- Many controller models. Please refer to "Models".

Application examples

- Bathroom
- Kitchen
- Multiple family unit
- Day room
- Dining room
- Flat occupying the whole of one floor
- Low energy house
- Room without window



Standard Standard model

- Speed controllable.

VZ Model with time delay switch

- Start delay approx. 50 seconds.
- Overrun time approx. 6 minutes.
- Single speed only.

VZC Model with adjustable time delay switch

- Start delay can be set in steps from 0 to approx. 150 seconds.
- The overrun time can be adjusted from approx 1.5 min to 24 min.
- Single speed only.

F Model with light control

- The light control switches on the fan when the minimum light intensity in the room is exceeded, e.g. when a light is switched on.
- Switch-on intensity (at fan) min. 30 Lux.
- Switch-off intensity (at fan) min. 0.3 Lux.
- No additional installation between switch and unit is required.
- Start delay approx. 50 seconds.
- Overrun time approx. 6 minutes.
- Single speed only.
- Switching variation: The fan can be switched off independently of the room lighting by an additional switch (see the wiring diagrams).

G Model with base load circuit.

- The unit runs in continuous operation at 35 m³/h.
- Can be switched over to full load, e. g. when normally unused rooms are used for a long period.
- Single speed only.
- Switching variation: The base load can be switched on or off by an additional switch (see the wiring diagrams).

GVZ Model with base load circuit and time delay switch

- The unit runs in continuous operation at 35 m³/h.
- Switching to full load with start delay of approx. 50 seconds.
- Full load overrun time approx. 6 minutes.
- Single speed only.
- Switching variation: The base load can be switched on or off by an additional switch (see the wiring diagrams).

H Model with humidity control and base load circuit

- Switch-on point: 60 %, 70 %, 80 % or 90 % relative humidity can be set with jumper.
- Switch-off point: approx. 10 % below the switch-on point
- Full load ON: relative humidity above the switch-on point
- Base load ON: when the relative humidity lies below the switch-on point or falls below the switch-off point.
- Can be operated manually via a switch, e.g. switching full load on using a light switch.
- Additional circuits, e.g. for operation without basic ventilation, see the wiring diagrams.
- Single speed only.
- Not suitable for second room ventilation.
- Standard switching: fan runs in base load mode, humidity control is active, full load mode, when the switch-on point is exceeded
- base load mode when humidity falls below switch-off point

I Model with interval control.

- The interval control ventilates rooms that are not regularly used.
- Time interval adjustable from 0 to approx. 15 hours.
- Approx. 10 minutes operating time per interval.
- When operated manually (e.g. by light switch) there is a start delay of approx. 50 seconds and an overrun time of approx. 10 minutes.
- Interval control can be switched off.
- Single speed only.

D Model with three-speed switch

- The air volume can be set in combination with a three-step switch:
 - Step 1: 35 m³/h
 - Step 2: 60 m³/h
 - Step 3: 100 m³/h
- Can be used when combined with supply air elements for controlled domestic ventilation.
- Use is particularly recommended when reconstruction measures are taken.
- Single speed only.

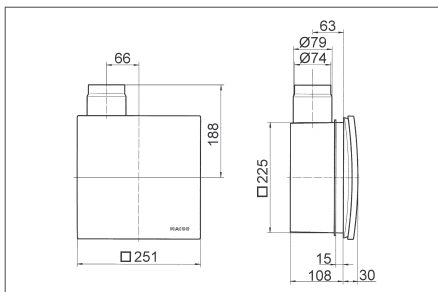
Details

Characteristic curve	p. 37
Accessory	p. 50
Wiring diagram	p. 237

Article	Art. No.	Model	U _{nom} V	Rotating speed 1/min	Air flow volume m ³ /h	Power consumption W	I _{Max} A	T _{Max} at I _{Max} °C	Sound pressure level dB(A)	Sound pressure level L _{WA7} dB(A)	Filter class	Degree of protection (IP)	Mains cable mm ²
ER 60	0084.0100	Standard model	230	1,250	62	21	0.16	40	36 ¹⁾	40	G2	X5	3 × 1.5
ER 60 VZ	0084.0101	Time delay switch	230	1,250	62	21	0.16	40	36 ¹⁾	40	G2	X5	5 × 1.5
ER 60 VZC	0084.0106	Adjustable time delay switch	230	1,250	62	21	0.16	40	36 ¹⁾	40	G2	X5	5 × 1.5
ER 60 F	0084.0102	Light control	230	1,250	62	21	0.16	40	36 ¹⁾	40	G2	X5	3 × 1.5
ER 60 G	0084.0103	Base load circuit	230	1,250/850	62	21/10	0.16/0.12	40	36/26 ¹⁾	40/30	G2	X5	5 × 1.5
ER 60 GVZ	0084.0107	Base load and delay time circuit	230	1,250/850	62	21/10	0.16/0.12	40	36/26 ¹⁾	40/30	G2	X5	4 × 1.5
ER 60 H	0084.0104	Humidity control	230	1,250/850	62	21/10	0.16/0.12	40	36/26 ¹⁾	30/40	G2	X5	5 × 1.5
ER 60 I	0084.0105	Interval control	230	1,250	62	21	0.16	40	36 ¹⁾	40	G2	X5	5 × 1.5
ER 100	0084.0130	Standard model	230	1,900	101	31	0.14	40	45 ¹⁾	49	G2	X5	3 × 1.5
ER 100 VZ	0084.0131	Time delay switch	230	1,900	101	31	0.14	40	45 ¹⁾	49	G2	X5	5 × 1.5
ER 100 VZC	0084.0136	Adjustable time delay switch	230	1,900	101	31	0.14	40	45 ¹⁾	49	G2	X5	5 × 1.5
ER 100 F	0084.0132	Light control	230	1,900	101	31	0.14	40	45 ¹⁾	49	G2	X5	3 × 1.5
ER 100 G	0084.0133	Base load circuit	230	1,900/850	101	31/9	0.14/0.09	40	45/26 ¹⁾	49/30	G2	X5	5 × 1.5
ER 100 GVZ	0084.0139	Base load and delay time circuit	230	1,900/850	101	31/9	0.14/0.09	40	45/26 ¹⁾	49/30	G2	X5	4 × 1.5
ER 100 H	0084.0134	Humidity control	230	1,900/850	101	31/9	0.14/0.09	40	45/26 ¹⁾	49/30	G2	X5	5 × 1.5
ER 100 I	0084.0135	Interval control	230	1,900	101	31	0.14	40	45 ¹⁾	49	G2	X5	5 × 1.5
ER 100 D	0084.0137	Model with three-speed switch	230	1,900/1,250/850	100	31/21/10	0.14/0.12/0.1	40	45/36/27 ¹⁾	49/40/31	G2	X5	4 × 1.5

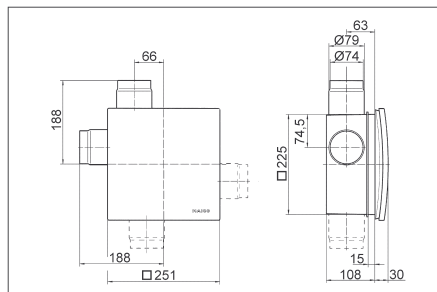
¹⁾ Details in accordance with DIN 18017-3 (1990) with an equivalent absorption area A_L = 10 m².

Dimensions [mm]



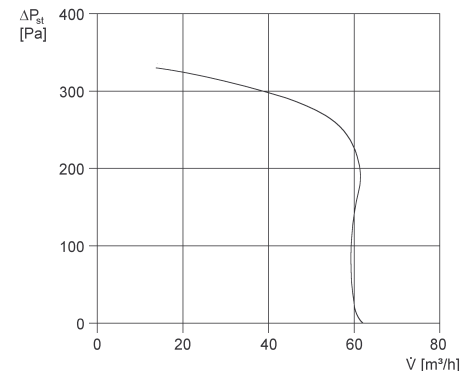
ER recessed housing

Dimensions [mm]



ER recessed housing with second room connection

Characteristic curve



Features

- Fan with cover and filter for installation in recessed housings.
- For single or second room air extraction using a single fan.
- Electrical plug connection for quick fan installation in the housing.
- Trouble-free filter exchange without using tools.
- It is possible to rotate the cover by ± 5°, to compensate for housings which have been fitted at an angle.
- The housing has easy to install snap-in fan fittings.
- All MAICO ER devices can be used in area 1 in accordance with DIN VDE 0100-701, even with water jets. For details, please refer to the planning instructions.
- Protection class II.
- Mark of conformity: VDE-GS.
- The extremely steep characteristic curve shows the high pressure capacity of the ER fans.
- Robust energy saving capacitor motor.
- Maintenance-free, with enclosed ball bearings on both sides.
- Available static pressure, 258 Pa.
- Volumetric flow characteristic curve and air leakage rate checked by TÜV Bayern e.V (German Technical Inspection Agency). Air leakage rate ≤ 0.01 m³/h.
- Shaft level difference according to DIN 4109, tested by IAB Oberursel (The Institute for Acoustics and Building Physics in Germany).

Multiple family unit air extraction

ER 60 / ER 100 Fan Insert



Recommended accessories	ER 60	ER 60 VZ	ER 60 VZC	ER 60 F	ER 60 G	ER 60 GVZ	ER 60 H	ER 60 I	see
Door ventilation grilles	MLK	MLK	MLK	MLK	MLK	MLK	MLK	MLK	p. 54
Supply air elements	ZE 45 F white ZE 10 T ZE 10 IB	ZE 45 F white ZE 10 T ZE 10 IB	ZE 45 F white ZE 10 T ZE 10 IB	ZE 45 F white ZE 10 T ZE 10 IB	ZE 45 F white ZE 10 T ZE 10 IB	ZE 45 F white ZE 10 T ZE 10 IB	ZE 45 F white ZE 10 T ZE 10 IB	ZE 45 F white ZE 10 T ZE 10 IB	p. 84
Radio switches	XS1	XS1	XS1	XS1	XS1	XS1	XS1	XS1	p. 57
Masking frames	ER-AP	ER-AP	ER-AP	ER-AP	ER-AP	ER-AP	ER-AP	ER-AP	p. 54
Radio receivers	XE1	XE1	XE1	XE1	XE1	XE1	XE1	XE1	p. 57
Air filters, replacement	ZF 60/100 bulk container ZF 60/100	ZF 60/100 bulk container ZF 60/100	ZF 60/100 bulk container ZF 60/100	ZF 60/100 bulk container ZF 60/100	ZF 60/100 bulk container ZF 60/100	ZF 60/100 bulk container ZF 60/100	ZF 60/100 bulk container ZF 60/100	ZF 60/100 bulk container ZF 60/100	p. 56
Flexible steel ducts	SFR 80	SFR 80	SFR 80	SFR 80	SFR 80	SFR 80	SFR 80	SFR 80	p. 52
Flexible aluminium ducts	AFR	AFR	AFR	AFR	AFR	AFR	AFR	AFR	p. 52
Roof outlets	DF	DF	DF	DF	DF	DF	DF	DF	p. 53
Roofing tiles	DP	DP	DP	DP	DP	DP	DP	DP	p. 53
Mounting clamps	BS	BS	BS	BS	BS	BS	BS	BS	p. 53
Rain protection grilles	RG	RG	RG	RG	RG	RG	RG	RG	p. 53
Supply air elements, replacement filter	ZEF 10 T ZEF 10 IB ZEF 45 F	ZEF 10 T ZEF 10 IB ZEF 45 F	ZEF 10 T ZEF 10 IB ZEF 45 F	ZEF 10 T ZEF 10 IB ZEF 45 F	ZEF 10 T ZEF 10 IB ZEF 45 F	ZEF 10 T ZEF 10 IB ZEF 45 F	ZEF 10 T ZEF 10 IB ZEF 45 F	ZEF 10 T ZEF 10 IB ZEF 45 F	p. 84
Supply air channels	ZEK 45 F	ZEK 45 F	ZEK 45 F	ZEK 45 F	ZEK 45 F	ZEK 45 F	ZEK 45 F	ZEK 45 F	p. 84
Spacing frames	DR 60/100	DR 60/100	DR 60/100	DR 60/100	DR 60/100	DR 60/100	DR 60/100	DR 60/100	p. 55
Wall frames	ER-MR	ER-MR	ER-MR	ER-MR	ER-MR	ER-MR	ER-MR	ER-MR	p. 55
Time delay switches	VZ 6, VZ 12 VZ 24 C	-	-	-	-	-	-	-	p. 226
Interval switches	VZI 10	-	-	-	-	-	-	-	p. 226
Automatic timers	ZA 4	-	-	-	-	-	-	-	p. 227
Hygrostats	HY 5, HY 5 I	-	-	-	-	-	-	-	p. 232
Door contact switches	TS 8	TS 8	-	-	TS 8	TS 8	-	-	p. 236
Timers	-	-	-	-	ZS 3	-	-	-	p. 227

Recommended accessories	ER 100	ER 100 VZ	ER 100 VZC	ER 100 F	ER 100 G	ER 100 GVZ	ER 100 H	ER 100 I	ER 100 D	see
Door ventilation grilles	MLK	MLK	MLK	MLK	MLK	MLK	MLK	MLK	MLK	p. 54
Supply air elements	ZE 45 F white ZE 10 T ZE 10 IB	ZE 45 F white ZE 10 T ZE 10 IB	ZE 45 F white ZE 10 T ZE 10 IB	ZE 45 F white ZE 10 T ZE 10 IB	ZE 45 F white ZE 10 T ZE 10 IB	ZE 45 F white ZE 10 T ZE 10 IB	ZE 45 F white ZE 10 T ZE 10 IB	ZE 45 F white ZE 10 T ZE 10 IB	ZE 45 F white ZE 10 T ZE 10 IB	p. 84
Radio switches	XS1	XS1	XS1	XS1	XS1	XS1	XS1	XS1	XS1	p. 57
Masking frames	ER-AP	ER-AP	ER-AP	ER-AP	ER-AP	ER-AP	ER-AP	ER-AP	ER-AP	p. 54
Radio receivers	XE1	XE1	XE1	XE1	XE1	XE1	XE1	XE1	XE1	p. 57
Air filters, replacement	ZF 60/100 bulk container ZF 60/100 ZRF	ZF 60/100 bulk container ZF 60/100 ZRF	ZF 60/100 bulk container ZF 60/100 ZRF	ZF 60/100 bulk container ZF 60/100	ZF 60/100 bulk container ZF 60/100 ZRF	ZF 60/100 bulk container ZF 60/100 ZRF	ZF 60/100 bulk container ZF 60/100	ZF 60/100 bulk container ZF 60/100 ZRF	ZF 60/100 bulk container ZF 60/100 ZRF	p. 56
Flexible steel ducts	SFR 80	SFR 80	SFR 80	SFR 80	SFR 80	SFR 80	SFR 80	SFR 80	SFR 80	p. 52
Flexible aluminium ducts	AFR	AFR	AFR	AFR	AFR	AFR	AFR	AFR	AFR	p. 52
Roof outlets	DF	DF	DF	DF	DF	DF	DF	DF	DF	p. 53
Roofing tiles	DP	DP	DP	DP	DP	DP	DP	DP	DP	p. 53
Mounting clamps	BS	BS	BS	BS	BS	BS	BS	BS	BS	p. 53
Rain protection grilles	RG	RG	RG	RG	RG	RG	RG	RG	RG	p. 53
Supply air elements, replacement filter	ZEF 10 T ZEF 10 IB ZEF 45 F	ZEF 10 T ZEF 10 IB ZEF 45 F	ZEF 10 T ZEF 10 IB ZEF 45 F	ZEF 10 T ZEF 10 IB ZEF 45 F	ZEF 10 T ZEF 10 IB ZEF 45 F	ZEF 10 T ZEF 10 IB ZEF 45 F	ZEF 10 T ZEF 10 IB ZEF 45 F	ZEF 10 T ZEF 10 IB ZEF 45 F	ZEF 10 T ZEF 10 IB ZEF 45 F	p. 84
Supply air channels	ZEK 45 F	ZEK 45 F	ZEK 45 F	ZEK 45 F	ZEK 45 F	ZEK 45 F	ZEK 45 F	ZEK 45 F	ZEK 45 F	p. 84
Spacing frames	DR 60/100	DR 60/100	DR 60/100	DR 60/100	DR 60/100	DR 60/100	DR 60/100	DR 60/100	DR 60/100	p. 55
Wall frames	ER-MR	ER-MR	ER-MR	ER-MR	ER-MR	ER-MR	ER-MR	ER-MR	ER-MR	p. 55
Interval switches	VZI 10	-	-	-	-	-	-	-	-	p. 226
Automatic timers	ZA 4	-	-	-	-	-	-	-	-	p. 227
Hygrostats	HY 5, HY 5 I	-	-	-	-	-	-	-	-	p. 232
Door contact switches	TS 8	TS 8	-	-	TS 8	TS 8	-	-	-	p. 236
Timers	-	-	-	-	ZS 3	-	-	-	-	p. 227
Second room extraction systems	ER-ZR	ER-ZR	ER-ZR	-	ER-ZR	ER-ZR	-	ER-ZR	ER-ZR	p. 53
Speed controllers	ST 1, STU 1	-	-	-	-	-	-	-	-	p. 222
Speed controllers, distribution board	STS 2,5	-	-	-	-	-	-	-	-	p. 223
Step switches, reversing switches	FS 4	-	-	-	-	-	-	-	-	p. 233
Room air controls	-	-	-	-	-	-	-	-	RLS3	p. 86
3-step switches	-	-	-	-	-	-	-	-	DS 3N	p. 57

Single room ventilation

- For installation in domestic kitchens, bathrooms and WCs.
- Synthetic material exhaust socket with air-stream operated synthetic backflow preventer.
- Installation inside and outside the wall and roof shafts is possible.
- Reduced overall depth of the recessed housing and the cover.
- Approved for upward, right-hand or left-hand exhaust air directions.
- DN 75/80 connection diameter.
- Synthetic material parts are normally inflammable in accordance with class B 2 (building material classification).
- With plaster protective cover.

- General official approval, Approval no.: Z-51.1-7.

- Certificates of approval on request or on our home page - www.maico.de.

Second room ventilation system

- ER-ZR second room connection kit for second room ventilation.
- Predetermined breaking points for the additional couplings on the right, left and lower side have been fitted in the ER-UP/G housing.
- Fan types that can be used for second room ventilation: ER 100, ER 100 VZ, ER 100 VZC, ER 100 G, ER 100 I or ER 100 D.
- Main room: 60 m³/h
- Second room: 40 m³/h

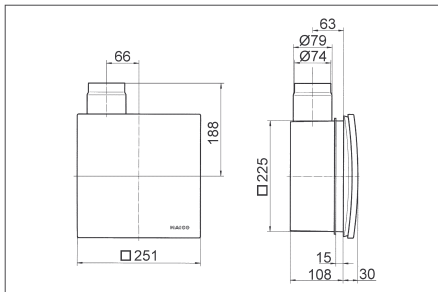


Short description

- Housing without fire-protection equipment may be combined with ceiling barrier, if required.
- Connection kit for direct extraction at the WC.
- General official approval, Approval no. Z-51.1-7.

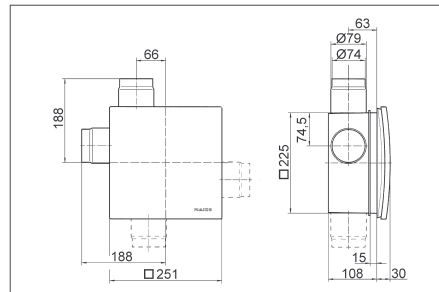
Exhaust air system	installable	Note
aeroduct fire protection system	No	–
PAM-GLOBAL L cast ventilation system	No	–
Ceiling barrier system	Yes	within and outside the shaft, connecting duct with flexible aluminium duct, second room connection with flexible aluminium duct
System with fire-proof shaft	No	–
Air extraction system without fire protection	Yes	within and outside the shaft, connecting duct with flexible aluminium duct, second room connection with flexible aluminium duct

Dimensions [mm]



ER-UP/G

Dimensions [mm]



ER-UP/G with second room connection



Article	Art. No.
ER-UP/G	0093.0995

Recommended accessories	ER-UP/G	see
Door ventilation grilles	MLK	p. 54
Masking frames	ER-AP	p. 54
Air filters, replacement	ZF 60/100 bulk container ZF 60/100	p. 56
Flexible aluminium ducts	AFR 80	p. 52
Roof outlets	DF	p. 53
Roofing tiles	DP	p. 53
Mounting clamps	BS	p. 53
Rain protection grilles	RG	p. 53
Mounting supports	UPM 60/100	p. 54
Spacing frames	DR 60/100	p. 55
Wall frames	ER-MR	p. 55
Second room extraction systems	ER-ZR	p. 53
Air extraction sockets	ER-AS	p. 55
Sponge rubber sets	ER-MO	p. 56

Details

Accessory	p. 50
Wiring diagram	p. 237



Short description

- Housing with maintenance-free K 90-18017 fire protection shutter, for combination with Maico-Aeroduct-System or Saint-Gobain cast duct PAM-GLOBAL L.
- Connection kit for direct extraction at the WC.
- General official approval, Approval no. Z-51.1-46.



Single room ventilation

- Recessed housings for fitting a ER 60 or ER 100 fan
- With K 90-18017 maintenance-free fire protection shut-off device against spread of fire.
- DN 80 metal exhaust socket with airstream operated metal backflow preventer.
- For installation in domestic kitchens, bathrooms and WCs.
- Installation inside and outside the wall and roof shafts is possible.
- Reduced overall depth of the recessed housing and the cover.
- Approved for upward, right-hand or left-hand exhaust air directions.
- Connected to the main duct using a flexible steel duct.
- Simple to remove backflow preventer, which ensures easy and quick cleaning.

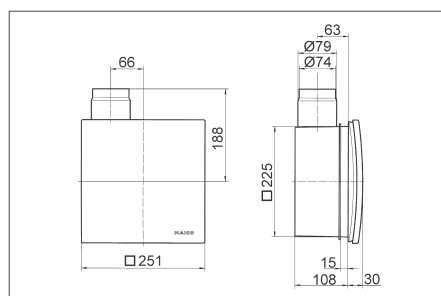
- Synthetic material parts are normally inflammable in accordance with class B 2 (building material classification).
- With plaster protective cover.
- General official approval, Approval no.: Z-51.1-46.
- Certificates of approval on request or on our home page - www.maico.de.

Second room ventilation system

- ER-ZR second room connection kit for second room ventilation.
- Predetermined breaking points for the additional couplings on the right, left and lower side have been fitted in the ER-UPD housing.
- Fan types that can be used for second room ventilation: ER 100, ER 100 VZ, ER 100 VZC, ER 100 G, ER 100 I or ER 100 D.
- Main room: 60 m³/h
- Second room: 40 m³/h

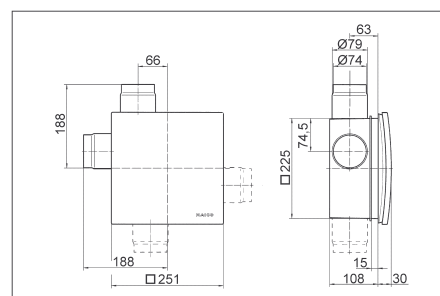
Exhaust air system	installable	Note
aeroduct fire protection system	Yes	within and outside the shaft, connecting duct with flexible steel duct, second room connection with flexible aluminium duct
PAM-GLOBAL L cast ventilation system	Yes	within and outside the shaft, connecting duct with flexible steel duct, second room connection with flexible aluminium duct
Ceiling barrier system	No	-
System with fire-proof shaft	Yes	within and outside the shaft, connecting duct with flexible steel duct, second room connection with flexible aluminium duct
Air extraction system without fire protection	No	-

Dimensions [mm]



ER-UPD

Dimensions [mm]



ER-UPD with second room connection

Article	Art. No.
ER-UPD	0093.0972

Recommended accessories	ER-UPD	see
Door ventilation grilles	MLK	p. 54
Masking frames	ER-AP	p. 54
Air filters, replacement	ZF 60/100 bulk container, ZF 60/100	p. 56
Flexible steel ducts	SFR 80	p. 52
Roof cowls	DF, DP, BS, RG	p. 53
Mounting supports	UPM 60/100	p. 54
Spacing frames	DR 60/100	p. 55
Wall frames	ER-MR	p. 55
Second room extraction systems	ER-ZR	p. 53
Air extraction sockets	ER-AS	p. 55
Sponge rubber sets	ER-MO	p. 56

Details

Accessory p. 50

Wiring diagram p. 237

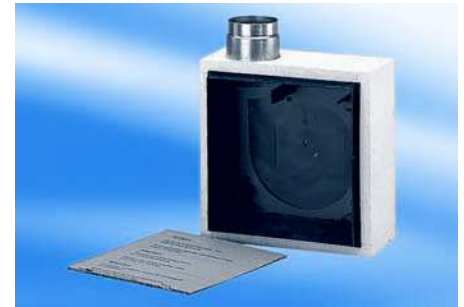
Single room ventilation

- Fire-proof housings for fitting an ER 60 or ER 100 fan
- With K 90-18017 maintenance-free fire protection shut-off device against spread of fire.
- DN 75/80 metal exhaust socket with air-stream operated metal backflow preventer.
- For installation in domestic kitchens, bathrooms and WCs.
- Simple to remove backflow preventer, which ensures easy and quick cleaning.
- Reduced overall depth of the recessed housing and the cover.
- With plaster protective cover.
- General official approval, Approval no.: Z-51.1-46.

- Certificates of approval on request or on our home page - www.maico.de.
- Approved for wall installation with upward, right-hand or left-hand exhaust air directions.

Second room ventilation system

- ER-UPB housings including second room connection kit can be supplied for second room ventilation:
- UPB/R : right.
- UPB/L : left
- UPB/U : below.
- Fan types that can be used for second room ventilation: ER 100, ER 100 VZ, ER 100 VZC, ER 100 G, ER 100 I or ER 100 D.
- Main room: 60 m³/h
- Second room: 40 m³/h



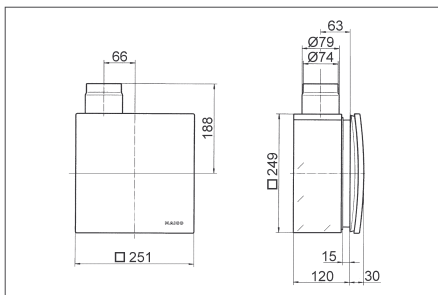
Short description

- Housing with maintenance-free K 90-18017 fire protection shutter and fire-protection cover, for use in fire-proof extraction shafts.
- General official approval, Approval no. Z-51.1-46.



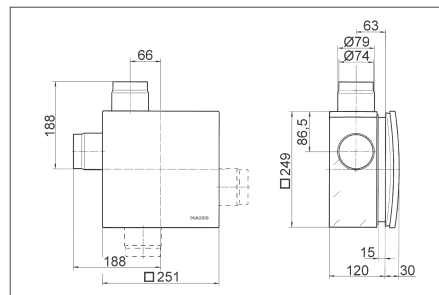
Exhaust air system	installable	Note
aeroduct fire protection system	No	-
PAM-GLOBAL L cast ventilation system with fire-proof shaft	Yes	within the shaft, connecting duct with flexible aluminium duct, second room connection with flexible steel duct
Ceiling barrier system	No	-
System with fire-proof shaft	Yes	within the shaft, connecting duct with flexible aluminium duct, second room connection with flexible steel duct
Air extraction system without fire protection	No	-

Dimensions [mm]



ER-UPB

Dimensions [mm]



ER-UPB with second room connection

Article	Art. No.
ER-UPB	0093.0968
ER-UPB/R	0093.0969
ER-UPB/L	0093.0970
ER-UPB/U	0093.0971

Recommended accessories	ER-UPB	ER-UPB/R	ER-UPB/L	ER-UPB/U	see
Door ventilation grilles	MLK	MLK	MLK	MLK	p. 54
Masking frames	ER-AP	ER-AP	ER-AP	ER-AP	p. 54
Air filters, replacement	ZF 60/100 bulk container ZF 60/100	ZF 60/100 bulk container ZF 60/100	ZF 60/100 bulk container ZF 60/100	ZF 60/100 bulk container ZF 60/100	p. 56
Flexible aluminium ducts	AFR	AFR	AFR	AFR	p. 52
Roof cowls	DF, DP, BS, RG	DF, DP, BS, RG	DF, DP, BS, RG	DF, DP, BS, RG	p. 53
Mounting supports	UPM 60/100	UPM 60/100	UPM 60/100	UPM 60/100	p. 54
Spacing frames	DR 60/100	DR 60/100	DR 60/100	DR 60/100	p. 55
Wall frames	ER-MR	ER-MR	ER-MR	ER-MR	p. 55
Second room extraction systems	ER-ZR	ER-ZR	ER-ZR	ER-ZR	p. 53

Details

- Accessory p. 50
- Wiring diagram p. 237

Multiple family unit air extraction ER-AP Surface-Mounted Fan



Short description

- Surface-mounted design, fan insert integrated in the housing.
- With exhaust air filter and backflow preventer.
- Without fire protection, may be combined with ceiling barrier, if required.
- Many controller models. Please refer to "Models".

Application examples

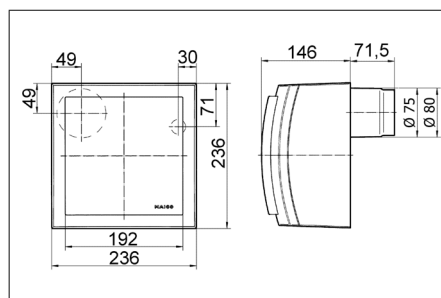
- Bathroom
- Kitchen
- Multiple family unit
- Day room
- Dining room
- Flat occupying the whole of one floor
- Low energy house
- Room without window

Features

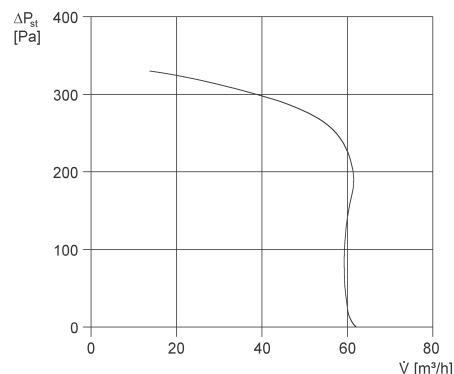
- Surface-mounted fan for air extraction from domestic kitchens, bathrooms or WCs.
- Trouble-free filter exchange without using tools.
- Housing can be turned, so the exhaust socket can be connected on the upper left or right main duct side.
- DN 75/80 exhaust socket with airstream operated metal backflow preventer.
- The extremely steep characteristic curve shows the high pressure capacity of the ER fans.
- Available static pressure for ER-AP 60: 204 Pa.
- All MAICO ER devices can be used in area 1 in accordance with DIN VDE 0100-701, even with water jets. For details, please refer to the planning instructions.
- Protection class II.
- Robust energy saving capacitor motor.
- Maintenance-free, with enclosed ball bearings on both sides.
- Mark of conformity: VDE-GS.
- Electrical plug connection for quick fan installation in the housing.
- General official approval, Approval no.: Z-51.1-42.
- Certificates of approval on request or on our home page - www.maico.de.
- Volumetric flow characteristic curve and air leakage rate checked by TÜV Bayern e.V (German Technical Inspection Agency). Air leakage rate $\leq 0.01 \text{ m}^3/\text{h}$.
- Shaft level difference according to DIN 4109, tested by IAB Oberursel (The Institute for Acoustics and Building Physics in Germany).

Exhaust air system	can be used	Note
aeroduct Fire protection system	No	-
PAM-GLOBAL L cast ventilation system	No	-
Ceiling barrier system	Yes	within and outside the shaft, connecting duct with flexible aluminium duct, second room connection with flexible aluminium duct
System with fire-proof shaft	No	-
Air extraction system without fire protection	Yes	within and outside the shaft, connecting duct with flexible aluminium duct, second room connection with flexible aluminium duct

Dimensions [mm]



Characteristic curve



Product Design Award

Industrie Forum Design Hannover



Details

- Characteristic curve p. 42
- Accessory p. 50
- Wiring diagram p. 237

Article	Art. No.	Model	U _{nom} V	f _{nom} Hz	Rotating speed 1/min	Air flow volume m ³ /h	Power consumption W	I _{Max} A	T _{Max} at I _{Max} °C	Sound pressure level dB(A)	Sound pressure level L _{WA7} dB(A)	Mains cable mm ²
ER-AP 60	0084.0150	Standard model	230	50	1,250	61	21	0.17	40	40 ¹⁾	43	3 × 1.5
ER-AP 60 VZ	0084.0151	Time delay switch	230	50	1,250	61	21	0.17	40	40 ¹⁾	43	5 × 1.5
ER-AP 60 F	0084.0152	Light control	230	50	1,250	61	21	0.17	40	40 ¹⁾	43	3 × 1.5
ER-AP 60 G	0084.0153	Base load circuit	230	50	1,250/900	61	21/11	0.17/0.13	40	40/33 ¹⁾	43/37	5 × 1.5
ER-AP 60 H	0084.0154	Humidity control	230	50	1,250/900	61	21/11	0.17/0.13	40	40/33 ¹⁾	43/37	5 × 1.5
ER-AP 100	0084.0170	Standard model	230	50	1,850	100	31	0.15	40	49 ¹⁾	53	3 × 1.5
ER-AP 100 VZ	0084.0171	Time delay switch	230	50	1,850	100	31	0.15	40	49 ¹⁾	53	5 × 1.5
ER-AP 100 F	0084.0172	Light control	230	50	1,850	100	31	0.15	40	49 ¹⁾	53	3 × 1.5
ER-AP 100 G	0084.0173	Base load circuit	230	50	1,850/900	100	31/10	0.15/0.09	40	49/33 ¹⁾	53/37	3 × 1.5
ER-AP 100 H	0084.0174	Humidity control	230	50	1,850/900	100	31/10	0.15/0.09	40	49/33 ¹⁾	53/37	5 × 1.5

¹⁾ Details in accordance with DIN 18017-3 (1990) with an equivalent absorption area A_L = 10 m².

Recommended accessories	ER-AP 60	ER-AP 60 VZ	ER-AP 60 F	ER-AP 60 G	ER-AP 60 H	see
Door ventilation grilles	MLK	MLK	MLK	MLK	MLK	p. 54
Supply air elements	ZE 45 F white ZE 10 T ZE 10 IB	ZE 45 F white ZE 10 T ZE 10 IB	ZE 45 F white ZE 10 T ZE 10 IB	ZE 45 F white ZE 10 T ZE 10 IB	ZE 45 F white ZE 10 T ZE 10 IB	p. 84
Radio switches	XS1	XS1	XS1	XS1	XS1	p. 57
Radio receivers	XE1	XE1	XE1	XE1	XE1	p. 57
Air filters, replacement	ZF 60/100 bulk container ZF 60/100	ZF 60/100 bulk container ZF 60/100	ZF 60/100 bulk container ZF 60/100	ZF 60/100 bulk container ZF 60/100	ZF 60/100 bulk container ZF 60/100	p. 56
Flexible aluminium ducts	AFR	AFR	AFR	AFR	AFR	p. 52
Roof cowls	DF, DP, BS, RG	DF, DP, BS, RG	DF, DP, BS, RG	DF, DP, BS, RG	DF, DP, BS, RG	p. 53
Supply air elements, replacement filter	ZEF 10 T ZEF 10 IB ZEF 45 F	ZEF 10 T ZEF 10 IB ZEF 45 F	ZEF 10 T ZEF 10 IB ZEF 45 F	ZEF 10 T ZEF 10 IB ZEF 45 F	ZEF 10 T ZEF 10 IB ZEF 45 F	p. 84
Supply air channels	ZEK 45 F	ZEK 45 F	ZEK 45 F	ZEK 45 F	ZEK 45 F	p. 84
Time delay switches	VZ 6, VZ 12, VZ 24 C	–	–	–	–	p. 226
Interval switches	VZI 10	–	–	–	–	p. 226
Automatic timers	ZA 4	–	–	–	–	p. 227
Hygrostats	HY 5, HY 5 I	–	–	–	–	p. 232
Door contact switches	TS 8	TS 8	–	TS 8	–	p. 236
Timers	–	–	–	ZS 3	–	p. 227

Recommended accessories	ER-AP 100	ER-AP 100 VZ	ER-AP 100 F	ER-AP 100 G	ER-AP 100 H	see
Door ventilation grilles	MLK	MLK	MLK	MLK	MLK	p. 54
Supply air elements	ZE 45 F white ZE 10 T ZE 10 IB	ZE 45 F white ZE 10 T ZE 10 IB	ZE 45 F white ZE 10 T ZE 10 IB	ZE 45 F white ZE 10 T ZE 10 IB	ZE 45 F white ZE 10 T ZE 10 IB	p. 84
Radio switches	XS1	XS1	XS1	XS1	XS1	p. 57
Radio receivers	XE1	XE1	XE1	XE1	XE1	p. 57
Air filters, replacement	ZF 60/100 bulk container ZF 60/100	ZF 60/100 bulk container ZF 60/100	ZF 60/100 bulk container ZF 60/100	ZF 60/100 bulk container ZF 60/100	ZF 60/100 bulk container ZF 60/100	p. 56
Flexible aluminium ducts	AFR	AFR	AFR	AFR	AFR	p. 52
Roof cowls	DF, DP, BS, RG	DF, DP, BS, RG	DF, DP, BS, RG	DF, DP, BS, RG	DF, DP, BS, RG	p. 53
Supply air elements, replacement filter	ZEF 10 T ZEF 10 IB ZEF 45 F	ZEF 10 T ZEF 10 IB ZEF 45 F	ZEF 10 T ZEF 10 IB ZEF 45 F	ZEF 10 T ZEF 10 IB ZEF 45 F	ZEF 10 T ZEF 10 IB ZEF 45 F	p. 84
Supply air channels	ZEK 45 F	ZEK 45 F	ZEK 45 F	ZEK 45 F	ZEK 45 F	p. 84
Time delay switches	VZ 6, VZ 12, VZ 24 C	–	–	–	–	p. 226
Interval switches	VZI 10	–	–	–	–	p. 226
Automatic timers	ZA 4	–	–	–	–	p. 227
Hygrostats	HY 5, HY 5 I	–	–	–	–	p. 232
Door contact switches	TS 8	TS 8	–	TS 8	–	p. 236
Timers	–	–	–	ZS 3	–	p. 227
Speed controllers	ST 1, STU 1	–	–	–	–	p. 222
Speed controllers, distribution board	STS 2,5	–	–	–	–	p. 223
Step switches, reversing switches	FS 4	–	–	–	–	p. 233

Multiple family unit air extraction

ER-APB Surface-Mounted Fan



Features

- Surface-mounted fan for air extraction from domestic kitchens, bathrooms or WCs.
- With K 90-18017 maintenance-free fire protection shut-off device against spread of fire.
- Housing can be turned, so the exhaust socket can be connected on the upper left or right main duct side.
- Trouble-free filter exchange without using tools.
- DN 80 exhaust socket with airstream operated metal backflow preventer.
- The extremely steep characteristic curve shows the high pressure capacity of the ER fans.
- Available static pressure for ER-APB 60: 204 Pa.
- Robust energy saving capacitor motor.
- Maintenance-free, with enclosed ball bearings on both sides.
- Electrical plug connection for quick fan installation in the housing.
- Mark of conformity: VDE-GS.
- All MAICO ER devices can be used in area 1 in accordance with DIN VDE 0100-701, even with water jets. For details, please refer to the planning instructions.
- Protection class II.
- General official approval, Approval no.: Z-51.1-45.
- Certificates of approval on request or on our home page - www.maico.de.
- Volumetric flow characteristic curve and air leakage rate checked by TÜV Bayern e.V (German Technical Inspection Agency). Air leakage rate $\leq 0.01 \text{ m}^3/\text{h}$.
- Shaft level difference according to DIN 4109, tested by IAB Oberursel (The Institute for Acoustics and Building Physics in Germany).

Short description

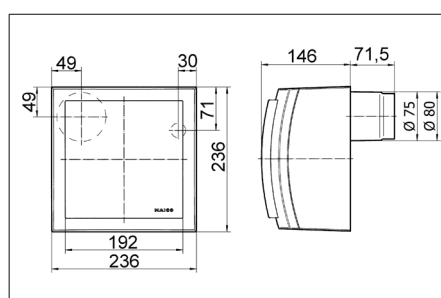
- Surface-mounted design, fan insert integrated in the housing.
- Housing with maintenance-free K 90-18017 fire protection shutter, for combination with Maico-Aeroduct-System, Saint-Gobain cast duct PAM-GLOBAL L or fire-proof shaft.
- Many controller models. Please refer to "Models".

Application examples

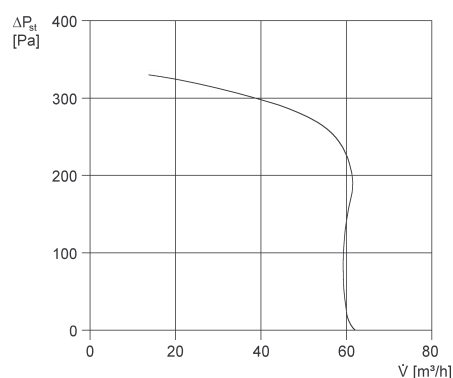
- Bathroom
- Kitchen
- Multiple family unit
- Day room
- Dining room
- Flat occupying the whole of one floor
- Low energy house
- Room without window

Exhaust air system	can be used	Note
aeroduct Fire protection system	Yes	on and outside the shaft, Connecting duct with flexible steel duct
PAM-GLOBAL L cast ventilation system	Yes	on and outside the shaft, Connecting duct with flexible steel duct
Ceiling barrier system	No	-
System with fire-proof shaft	Yes	on and outside the shaft, on the shaft: Connecting duct with flexible aluminium duct outside the shaft: Connecting duct with flexible steel duct
Air extraction system without fire protection	No	-

Dimensions [mm]



Characteristic curve



Details

- Characteristic curve p. 44
- Accessory p. 50
- Wiring diagram p. 237

Article	Art. No.	Model	U _{nom} V	f _{nom} Hz	Rotating speed 1/min	Air flow volume m ³ /h	Power consumption W	I _{Max} A	Sound pressure level dB(A)	Sound pressure level L _{WA7} dB(A)	Mains cable mm ²
ER-APB 60	0084.0156	Standard model	230	50	1,250	61	21	0.17	43 ¹⁾	46	3 × 1.5
ER-APB 60 VZ	0084.0157	Time delay switch	230	50	1,250	61	21	0.17	43 ¹⁾	46	5 × 1.5
ER-APB 60 F	0084.0158	Light control	230	50	1,250	61	21	0.17	43 ¹⁾	46	3 × 1.5
ER-APB 60 G	0084.0159	Base load circuit	230	50	1,250/900	61	21/11	0.17/0.13	43/33 ¹⁾	46/37	5 × 1.5
ER-APB 60 H	0084.0160	Humidity control	230	50	1,250/900	61	21/11	0.17/0.13	43/33 ¹⁾	46/37	5 × 1.5
ER-APB 100	0084.0176	Standard model	230	50	1,850	100	31	0.15	49 ¹⁾	53	3 × 1.5
ER-APB 100 VZ	0084.0177	Time delay switch	230	50	1,850	100	31	0.15	49 ¹⁾	53	5 × 1.5
ER-APB 100 F	0084.0178	Light control	230	50	1,850	100	31	0.15	49 ¹⁾	53	3 × 1.5
ER-APB 100 G	0084.0179	Base load circuit	230	50	1,850/900	100	31/10	0.15/0.09	49/33 ¹⁾	53/37	5 × 1.5
ER-APB 100 H	0084.0180	Humidity control	230	50	1,850/900	100	31/10	0.15/0.09	49/33 ¹⁾	53/37	5 × 1.5

¹⁾ Details in accordance with DIN 18017-3 (1990) with an equivalent absorption area A_L = 10 m².

Recommended accessories	ER-APB 60	ER-APB 60 VZ	ER-APB 60 F	ER-APB 60 G	ER-APB 60 H	see
Door ventilation grilles	MLK	MLK	MLK	MLK	MLK	p. 54
Supply air elements	ZE 45 F white ZE 10 T ZE 10 IB	ZE 45 F white ZE 10 T ZE 10 IB	ZE 45 F white ZE 10 T ZE 10 IB	ZE 45 F white ZE 10 T ZE 10 IB	ZE 45 F white ZE 10 T ZE 10 IB	p. 84
Radio switches	XS1	XS1	XS1	XS1	XS1	p. 57
Radio receivers	XE1	XE1	XE1	XE1	XE1	p. 57
Air filters, replacement	ZF 60/100 bulk container ZF 60/100	ZF 60/100 bulk container ZF 60/100	ZF 60/100 bulk container ZF 60/100	ZF 60/100 bulk container ZF 60/100	ZF 60/100 bulk container ZF 60/100	p. 56
Flexible steel ducts	SFR 80	SFR 80	SFR 80	SFR 80	SFR 80	p. 52
Flexible aluminium ducts	AFR	AFR	AFR	AFR	AFR	p. 52
Roof cowls	DF, DP, BS, RG	DF, DP, BS, RG	DF, DP, BS, RG	DF, DP, BS, RG	DF, DP, BS, RG	p. 53
Supply air elements, replacement filter	ZEF 10 T ZEF 10 IB ZEF 45 F	ZEF 10 T ZEF 10 IB ZEF 45 F	ZEF 10 T ZEF 10 IB ZEF 45 F	ZEF 10 T ZEF 10 IB ZEF 45 F	ZEF 10 T ZEF 10 IB ZEF 45 F	p. 84
Supply air channels	ZEK 45 F	ZEK 45 F	ZEK 45 F	ZEK 45 F	ZEK 45 F	p. 84
Time delay switches	VZ 6, VZ 12, VZ 24 C	–	–	–	–	p. 226
Interval switches	VZI 10	–	–	–	–	p. 226
Automatic timers	ZA 4	–	–	–	–	p. 227
Hygrostats	HY 5, HY 5 I	–	–	–	–	p. 232
Door contact switches	TS 8	TS 8	–	TS 8	–	p. 236
Timers	–	–	–	ZS 3	–	p. 227

Recommended accessories	ER-APB 100	ER-APB 100 VZ	ER-APB 100 F	ER-APB 100 G	ER-APB 100 H	see
Door ventilation grilles	MLK	MLK	MLK	MLK	MLK	p. 54
Supply air elements	ZE 45 F white ZE 10 T ZE 10 IB	ZE 45 F white ZE 10 T ZE 10 IB	ZE 45 F white ZE 10 T ZE 10 IB	ZE 45 F white ZE 10 T ZE 10 IB	ZE 45 F white ZE 10 T ZE 10 IB	p. 84
Radio switches	XS1	XS1	XS1	XS1	XS1	p. 57
Radio receivers	XE1	XE1	XE1	XE1	XE1	p. 57
Air filters, replacement	ZF 60/100 bulk container ZF 60/100	ZF 60/100 bulk container ZF 60/100	ZF 60/100 bulk container ZF 60/100	ZF 60/100 bulk container ZF 60/100	ZF 60/100 bulk container ZF 60/100	p. 56
Flexible steel ducts	SFR 80	SFR 80	SFR 80	SFR 80	SFR 80	p. 52
Flexible aluminium ducts	AFR	AFR	AFR	AFR	AFR	p. 52
Roof cowls	DF, DP, BS, RG	DF, DP, BS, RG	DF, DP, BS, RG	DF, DP, BS, RG	DF, DP, BS, RG	p. 53
Supply air elements, replacement filter	ZEF 10 T ZEF 10 IB ZEF 45 F	ZEF 10 T ZEF 10 IB ZEF 45 F	ZEF 10 T ZEF 10 IB ZEF 45 F	ZEF 10 T ZEF 10 IB ZEF 45 F	ZEF 10 T ZEF 10 IB ZEF 45 F	p. 84
Supply air channels	ZEK 45 F	ZEK 45 F	ZEK 45 F	ZEK 45 F	ZEK 45 F	p. 84
Interval switches	VZI 10	–	–	–	–	p. 226
Automatic timers	ZA 4	–	–	–	–	p. 227
Hygrostats	HY 5, HY 5 I	–	–	–	–	p. 232
Door contact switches	TS 8	TS 8	–	TS 8	–	p. 236
Timers	–	–	–	ZS 3	–	p. 227
Speed controllers	ST 1, STU 1	–	–	–	–	p. 222
Speed controllers, distribution board	STS 2,5	–	–	–	–	p. 223
Step switches, reversing switches	FS 4	–	–	–	–	p. 233