

Pressure relief dampers

Type ARK2



For the prevention of excess pressure in rooms

Pressure relief dampers for gas fire extinguishing systems and transformer substations

- Air leakage with back pressure to EN 1751, class 4
- Maximum differential pressure: 5000 Pa
- Differential pressure can be adjusted from 50 – 1000 Pa (B > 600 mm: 600 Pa max.)
- Blades made of aluminium, casing made of galvanised steel
- Blades open when the maximum differential pressure is exceeded and close automatically when the pressure drops
- Blade locking with permanent magnet
- Robust, maintenance-free construction
- Available in standard sizes and many intermediate sizes
- Operating temperature 0 to 80 °C

Optional equipment and accessories

- Installation subframe
- Powder coating (RAL or DB)
- Stainless steel construction with stainless steel casing; blades made of aluminium



Closed blade



Open blade

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Application

Application

- Pressure relief dampers of Type ARK2 for the protection of internal spaces from differential pressures in excess of set maximum levels
- When the set maximum differential pressure is exceeded, the blades automatically open to relieve the excess pressure
- Pressure peaks will be reliably controlled
- Differential pressure can be adjusted from 50 – 1000 Pa (B > 600 mm: 600 Pa max.)

opening: 50 – 1000 Pa, depending on width

Nominal sizes

- B: 200, 400, 600, 800, 1000, 1200 mm (intermediate sizes: 201 – 1199 mm, in increments of 1 mm)
- H: 345, 675, 1005, 1335, 1665, 1995 mm (intermediate sizes 355 – 505, 685 – 835, 1015 – 1165, 1345 – 1495, 1675 – 1825 mm in increments of 1 mm)
- Any combination of B × H

Special characteristics

- Robust, maintenance-free construction
- Maximum differential pressure: 5000 Pa
- Air leakage with back pressure, in closing direction, to EN 1751, class 4
- Damper for negative or positive pressure (air extract or discharge)
- Operating temperature 0 to 80 °C
- Maintenance-free DU bearings with Teflon coating, bearing shafts made of stainless steel
- Each blade is locked with a factory set permanent magnet
- Adjustable differential pressure for blade

Description

Construction

- Galvanised sheet steel, duct connection without flange holes
- A2: Stainless steel
- G: Duct connection with flange holes

- Blades with perimeter seal, pressed against travel stop (angle section) when closed
- Blade shafts with maintenance-free metal-polymer bearings

Parts and characteristics

- Ready-to-install pressure relief damper
- Blades with low-friction bearings
- One retaining element with a permanent magnet for each blade
- Seal
- Travel stop (angle section)

Materials and surfaces

- Casing and travel stop (angle section) made of galvanised sheet steel, material no. EN 10327-DX51D+Z150-200-NAC
- A2 construction: Casing and travel stop (angle section) made of stainless steel, material no. 1.4301
- Blades made of aluminium, material no. AlMg3
- Blade holders made of stainless steel, material no. 1.4301
- Blade shafts made of stainless steel, material no. 1.4104
- Plate of the retaining element made of steel, material no. 1.0718
- Blade bearings made of metal-polymer composite, with an antifriction lining of PTEE/Pb

Construction features

- Rectangular casing, material thickness 2 mm
- Blades, material thickness 3 mm
- Flanges on both sides, suitable for duct connection, with or without flange holes
- Adjustable retaining element to adapt to different pressures (factory set as ordered)
- Blades can be moved independent of complementary to one another

- Neoprene seals
- P1: Powder-coated, RAL CLASSIC colour
- PS: Powder-coated, DB colour

Standards and guidelines

- Closed blade air leakage (against the intended airflow direction) to EN 1751, class 4
- Casing air leakage to EN 1751, class C

Maintenance

- Maintenance-free as construction and materials are not subject to wear
- Contamination should be removed as it may lead to corrosion and to increased closed blade air leakage

Functional description

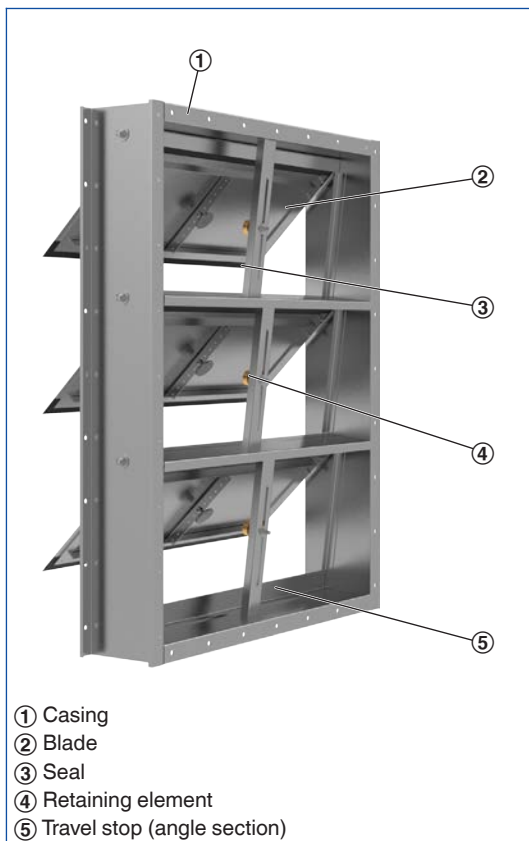
Pressure-relief dampers open and close automatically.

The blades are kept closed by magnets. If the differential pressure exceeds the set maximum value, the magnetic force is overcome, and the blades open. The airflow by which the

excess pressure has been caused can now flow through the damper. The pressure peak is immediately and reliably controlled. The blade opening angle depends on the differential pressure and the volume flow rate.

When the differential pressure drops below approx. 30 Pa, the blades close again.

Schematic illustration of ARK2



Closed blade



Open blade



| | |
|--|--|
| Nominal sizes | 200 × 345 to 1200 × 1995 mm |
| Volume flow rate range | 140 – 4790 l/s or 504 – 17244 m ³ /h at 50 Pa and 2 m/s |
| Adjustable differential pressure range | 50 – 1000 Pa (B > 600 mm: 600 Pa max.) |
| Airflow velocity | 2 m/s at 50 Pa |
| Maximum differential pressure in closing direction | 5000 Pa |
| Operating temperature | 0 – 80 °C |

Geometric free area – ARK2

| H | B [mm] | | | | | |
|------|----------------|-------|-------|-------|-------|-------|
| | 200 | 400 | 600 | 800 | 1000 | 1200 |
| mm | m ² | | | | | |
| 345 | 0.031 | 0.085 | 0.139 | 0.194 | 0.248 | 0.302 |
| 675 | 0.063 | 0.174 | 0.284 | 0.394 | 0.504 | 0.614 |
| 1005 | 0.096 | 0.262 | 0.428 | 0.594 | 0.761 | 0.927 |
| 1335 | 0.128 | 0.350 | 0.572 | 0.795 | 1.017 | 1.239 |
| 1665 | 0.160 | 0.438 | 0.717 | 0.995 | 1.273 | 1.552 |
| 1995 | 0.192 | 0.527 | 0.861 | 1.195 | 1.530 | 1.864 |

Intermediate sizes: Intermediate widths can be interpolated

Quick sizing tables provide a good overview of the volume flow rates with 50 Pa differential pressure and an airflow velocity of 2 m/s. Values for intermediate widths can be interpolated.

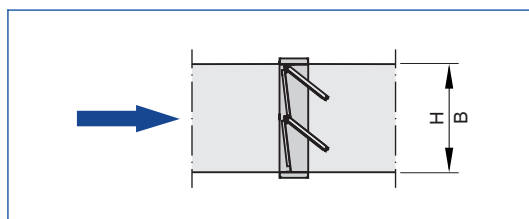
ARK2: Maximum volume flow rate

| H | B [mm] | | | | | | | | | | | |
|------|--------|-------------------|------|-------------------|------|-------------------|------|-------------------|------|-------------------|------|-------------------|
| | 200 | | 400 | | 600 | | 800 | | 1000 | | 1200 | |
| mm | l/s | m ³ /h | l/s | m ³ /h | l/s | m ³ /h | l/s | m ³ /h | l/s | m ³ /h | l/s | m ³ /h |
| 345 | 140 | 504 | 275 | 990 | 415 | 1494 | 550 | 1980 | 690 | 2484 | 830 | 2988 |
| 675 | 270 | 972 | 540 | 1944 | 810 | 2916 | 1080 | 3888 | 1350 | 4860 | 1620 | 5832 |
| 1005 | 400 | 1440 | 805 | 2898 | 1210 | 4356 | 1610 | 5796 | 2010 | 7236 | 2410 | 8676 |
| 1335 | 535 | 1926 | 1070 | 3852 | 1600 | 5760 | 2140 | 7704 | 2670 | 9612 | 3200 | 11520 |
| 1665 | 665 | 2394 | 1330 | 4788 | 2000 | 7200 | 2660 | 9576 | 3330 | 11988 | 4000 | 14400 |
| 1995 | 800 | 2880 | 1600 | 5760 | 2390 | 8604 | 3190 | 11484 | 3990 | 14364 | 4790 | 17244 |

Airflow velocity

| Δp_t | v |
|--------------|-----|
| Pa | m/s |
| 35 | 1 |
| 50 | 2 |
| 65 | 3 |
| 80 | 4 |
| 90 | 5 |

Horizontal airflow



Sizing example

Given data

Pressure relief damper ARK2/600×1005
Maximum differential pressure 400 Pa
Differential pressure when the blade is open:
50 Pa

Quick sizing

Maximum volume flow rate 1210 l/s (4356 m³/h)

Calculation procedure

$A = 0.600 \times 1.005 = 0.603 \text{ m}^2$
 $\dot{V} = v \times A = 2.0 \times 0.603 (\times 1000) = 1206 \text{ l/s or } 4342 \text{ m}^3/\text{h}$
Result: Up to 1206 l/s or 4342 m³/h may overflow at 50 Pa

This specification text describes the general properties of the product. Texts for variants can be generated with our Easy Product Finder design programme.

Rectangular pressure relief dampers for the protection of internal spaces from differential pressures in excess of set maximum levels. Ready-to-install component which consists of a casing, blades with low-friction bearings, magnets, and travel stop and sealing parts.

Special characteristics

- Robust, maintenance-free construction
- Maximum differential pressure: 5000 Pa
- Air leakage with back pressure, in closing direction, to EN 1751, class 4
- Damper for negative or positive pressure (air extract or discharge)
- Operating temperature 0 to 80 °C
- Maintenance-free DU bearings with Teflon coating, bearing shafts made of stainless steel
- Each blade is locked with a factory set permanent magnet
- Adjustable differential pressure for blade opening: 50 – 1000 Pa, depending on width

Materials and surfaces

- Casing and travel stop (angle section) made of galvanised sheet steel, material no. EN 10327-DX51D+Z150-200-NAC
- A2 construction: Casing and travel stop (angle section) made of stainless steel, material no. 1.4301
- Blades made of aluminium, material no. AlMg3
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- Blade shafts made of stainless steel, material no. 1.4104
- Plate of the retaining element made of steel, material no. 1.0718
- Blade bearings made of metal-polymer composite, with an antifriction lining of PTEE/Pb
- Neoprene seals
- P1: Powder-coated, RAL CLASSIC colour
- PS: Powder-coated, DB colour

Construction

- Galvanised sheet steel, duct connection without flange holes
- A2: Stainless steel
- G: Duct connection with flange holes

Technical data

- Nominal sizes: 200 × 345 to 1200 × 1995 mm
- Volume flow rate range: 140 – 4790 l/s or 504 – 17244 m³/h at 50 Pa, 2 m/s
- Adjustable differential pressure range: 50 – 1000 Pa (B > 600 mm: 600 Pa max.)
- Airflow velocity: 2 m/s at 50 Pa
- Maximum differential pressure: 5000 Pa
- Operating temperature: 0 to 80 °C

Sizing data

- Δp_{zul} _____ [Pa]
- \dot{V} _____ [m³/h]
- Δp_{st} _____ [Pa]

ARK2

| | | | | | | |
|---|----------|----------|----------|----------|----------|---|
| ARK2 – A2 – G / 600×1005 / ER / ...Pa / P1 – RAL ... | | | | | | |
| ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ |
| 1 | 2 | 3 | 4 | 5 | 6 | |

1 Type

ARK2 Pressure relief damper

2 Material

No entry: galvanised steel,
with aluminium blades

A2 Stainless steel with aluminium blades

3 Construction

No entry: duct connection without flange
holes

G Duct connection with flange holes

4 Nominal size [mm]

B × H

5 Installation subframe

No entry: none

ER With (only for construction G)

6 Maximum differential pressure [Pa]

Specify value in Pa

7 Surface

No entry: standard construction

P1 Powder-coated, RAL CLASSIC colour

PS Powder-coated, DB colour

Gloss level

RAL 9010 50 %

RAL 9006 30 %

All other RAL colours 70 %

Order example: ARK2-G/800×1995/100 Pa

| | |
|--------------------------------------|---|
| Material | Galvanised steel, with aluminium blades |
| Construction | Flange holes on both sides |
| Nominal size | 800 × 1995 mm |
| Installation subframe | Without |
| Maximum differential pressure | 100 Pa |
| Surface | Standard construction |

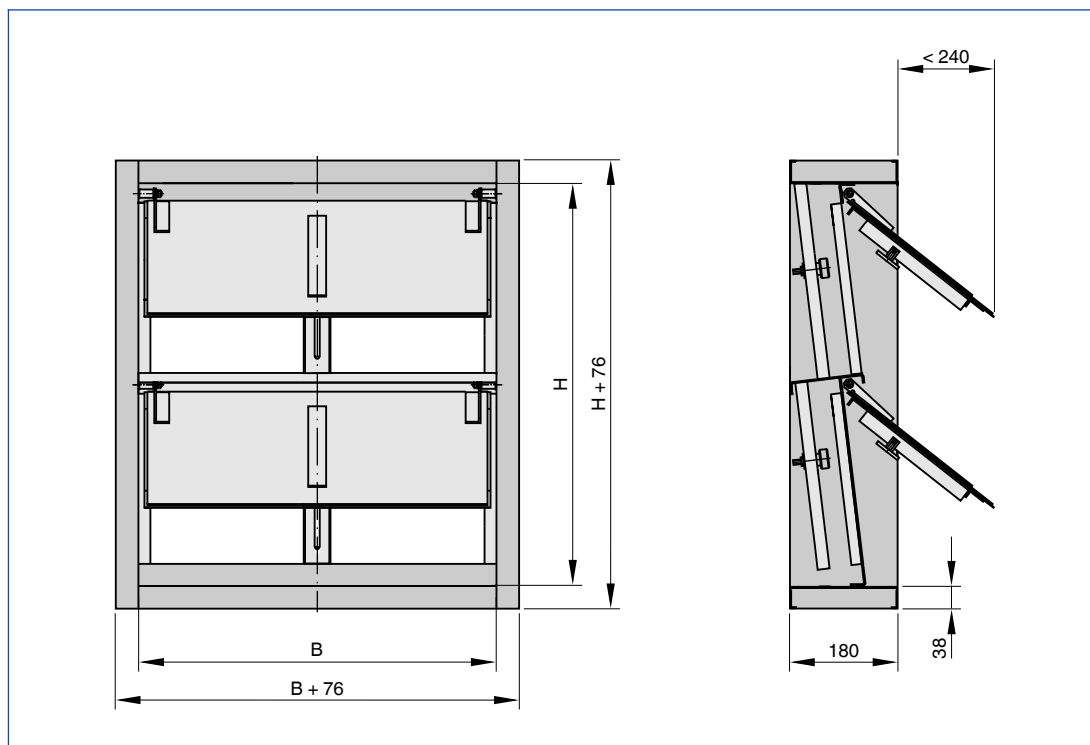
- B: 200 – 1200 mm, intermediate sizes 201 – 1199 in increments of 1 mm
- H: 345 – 1995 mm, intermediate sizes 355 – 505, 685 – 835, 1015 – 1165, 1345 – 1495, 1675 – 1825 mm in increments of 1 mm

- The weight for the next larger size applies
Flow cross section to calculate the airflow velocity

- $A = B \times H$

Unit of measure for B and H: m

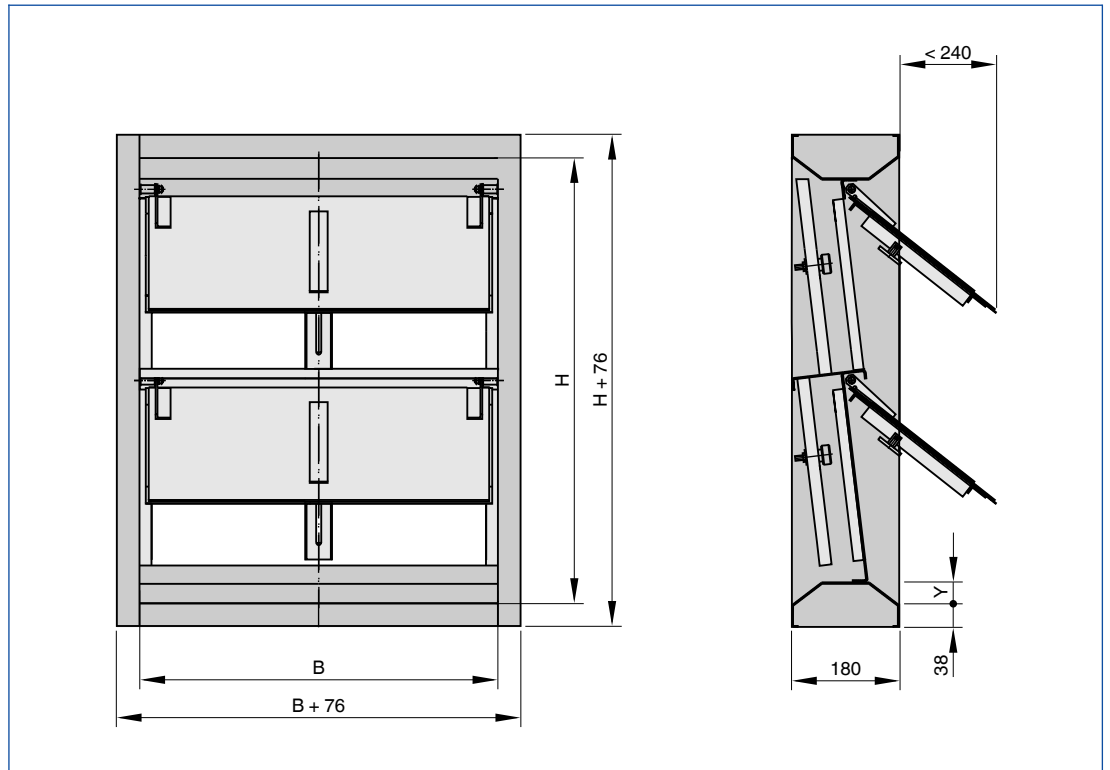
ARK2 standard sizes



ARK2: Standard sizes, dimensions

| H | No. of blades |
|------|---------------|
| mm | - |
| 345 | 1 |
| 675 | 2 |
| 1005 | 3 |
| 1335 | 4 |
| 1665 | 5 |
| 1995 | 6 |

ARK2 intermediate sizes



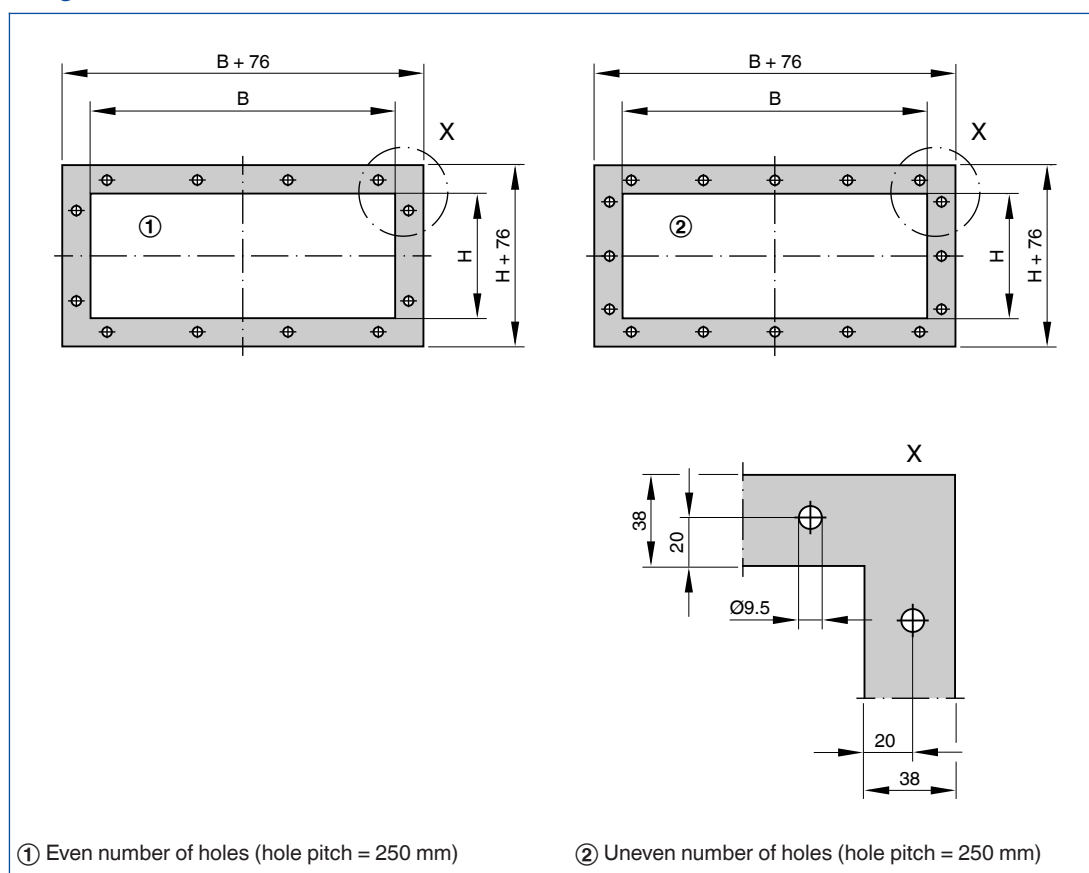
ARK2: Intermediate sizes, dimensions

| H | No. of blades | Y |
|-------------|---------------|--------|
| mm | - | mm |
| 355 – 505 | 1 | 5 – 80 |
| 685 – 835 | 2 | 5 – 80 |
| 1015 – 1165 | 3 | 5 – 80 |
| 1345 – 1495 | 4 | 5 – 80 |
| 1675 – 1825 | 5 | 5 – 80 |

ARK2: Weights

| H | B [mm] | | | | | |
|------|--------|-----|-----|-----|------|------|
| | 200 | 400 | 600 | 800 | 1000 | 1200 |
| mm | kg | | | | | |
| 345 | 9 | 11 | 13 | 16 | 19 | 22 |
| 675 | 13 | 17 | 20 | 24 | 28 | 33 |
| 1005 | 19 | 24 | 28 | 33 | 38 | 43 |
| 1335 | 24 | 30 | 35 | 41 | 47 | 53 |
| 1665 | 30 | 37 | 43 | 50 | 57 | 64 |
| 1995 | 35 | 43 | 50 | 58 | 66 | 74 |

Flange holes – ARK, ARK-1, ARK2



ARK, ARK-1, ARK2: width, no. of flange holes

| B | No. of holes | |
|-------------|--------------|---|
| | n | |
| mm | - | |
| 200 – 287 | | 1 |
| 288 – 537 | | 2 |
| 538 – 787 | | 3 |
| 788 – 1037 | | 4 |
| 1038 – 1200 | | 5 |

ARK, ARK-1, ARK2: height, no. of flange holes

| H | No. of holes | |
|-------------|--------------|---|
| | n | |
| mm | - | |
| 345 – 461 | | 2 |
| 462 – 711 | | 3 |
| 712 – 961 | | 4 |
| 962 – 1211 | | 5 |
| 1212 – 1461 | | 6 |
| 1462 – 1711 | | 7 |
| 1712 – 1961 | | 8 |
| 1962 – 1995 | | 9 |

Installation and commissioning

- Installation orientation: Horizontal airflow
- For installation in internal spaces
- Type ARK2 pressure relief dampers are not suitable for use in the protection of air ducts or similar. designed as vibration, turbulence and tolerances have a negative impact on the set opening pressure of the flap
- To avoid malfunctions, any disturbing effects should be kept to a minimum, and there should be a sufficient difference between the permitted maximum differential pressure and the 'normal' system pressure.

Note

Tolerances:

- System or system-related influences can not be taken into account when adjusting the opening pressure, which can lead to deviations on site
- Temperature fluctuations (in the released temperature range) have influences on the holding torque of the holding element, which can lead to tolerances on the set opening pressure

Installation into an internal wall, without installation subframe

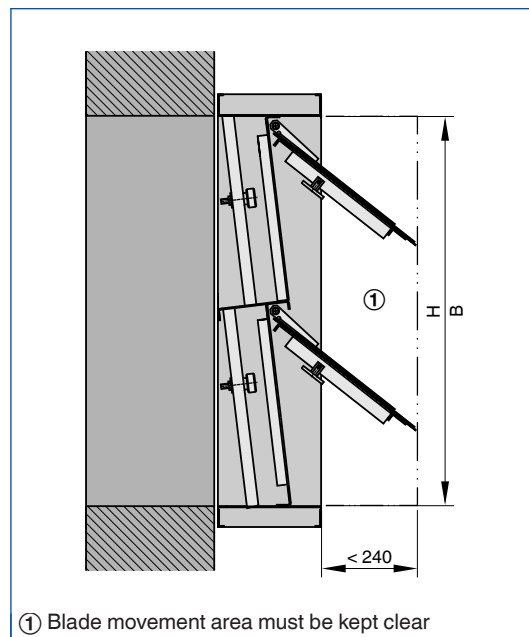


Illustration shows ARK2

Duct installation

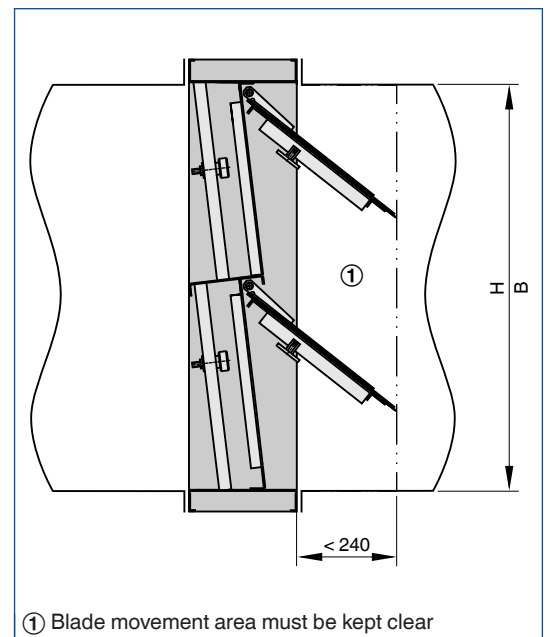


Illustration shows ARK2

Nomenclature

L_{WA} [dB(A)]

A-weighted sound power level of air-regenerated noise for the mechanically self-powered damper

A [m²]

Upstream cross section

v [m/s]

Airflow velocity based on the upstream cross section

\dot{V} [m³/h] and [l/s]

Volume flow rate

Δp_{st} [Pa]

Static differential pressure

Δp_t [Pa]

Total differential pressure

All sound power levels are based on 1 pW.

Principal dimensions

B [mm]

Duct width

H [mm]

Duct height

n []

Number of flange screw holes

m [kg]

Weight