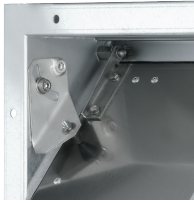


# Mechanical self-powered dampers

## ARK



Adjustable restrictor



Linkage



### For heavy-duty applications

Non-return dampers prevent unwanted airflows against the intended airflow direction when the system is not in operation

- Air leakage with back pressure to EN 1751, class 4
- Maximum differential pressure: 5000 Pa
- Blades made of aluminium, casing made of galvanised steel
- Available in standard sizes and many intermediate sizes
- Variant ARK (with linked blades) for variable volume flows
- Variant ARK-1 (with adjustable blade restrictors) for constant volume flows
- Installation in horizontal or vertical ducts

Optional equipment and accessories

- Installation subframe
- Powder coating (RAL or DB)
- Stainless steel construction with stainless steel casing; blades made of aluminium
- Temperature resistant up to 200 °C with Viton seal

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## General information

### Application

- Non-return dampers for the fresh air and exhaust air ducts of ventilation and air conditioning systems
- Prevention of unwanted airflows against the intended airflow direction when the system is not in operation
- Blades close automatically when the system is shut down
- Maximum differential pressure: 5000 Pa

### Special features

- Robust, maintenance-free construction
- Maximum differential pressure: 5000 Pa
- Closed blade 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
- Optional temperature resistant construction for up to 200 °C, with Viton seal
- Installation in horizontal or vertical ducts
- Maintenance-free DU bearings with Teflon coating, bearing shafts made of stainless steel

### 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

### Variants

- ARK: Non-return damper with linked blades, preferably for variable volume flows
- ARK-1: Non-return damper with adjustable blade restrictors, preferably for constant volume flows

### Construction

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

### Accessories

- Installation subframe for the fast and simple installation of mechanical self-powered dampers

### 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

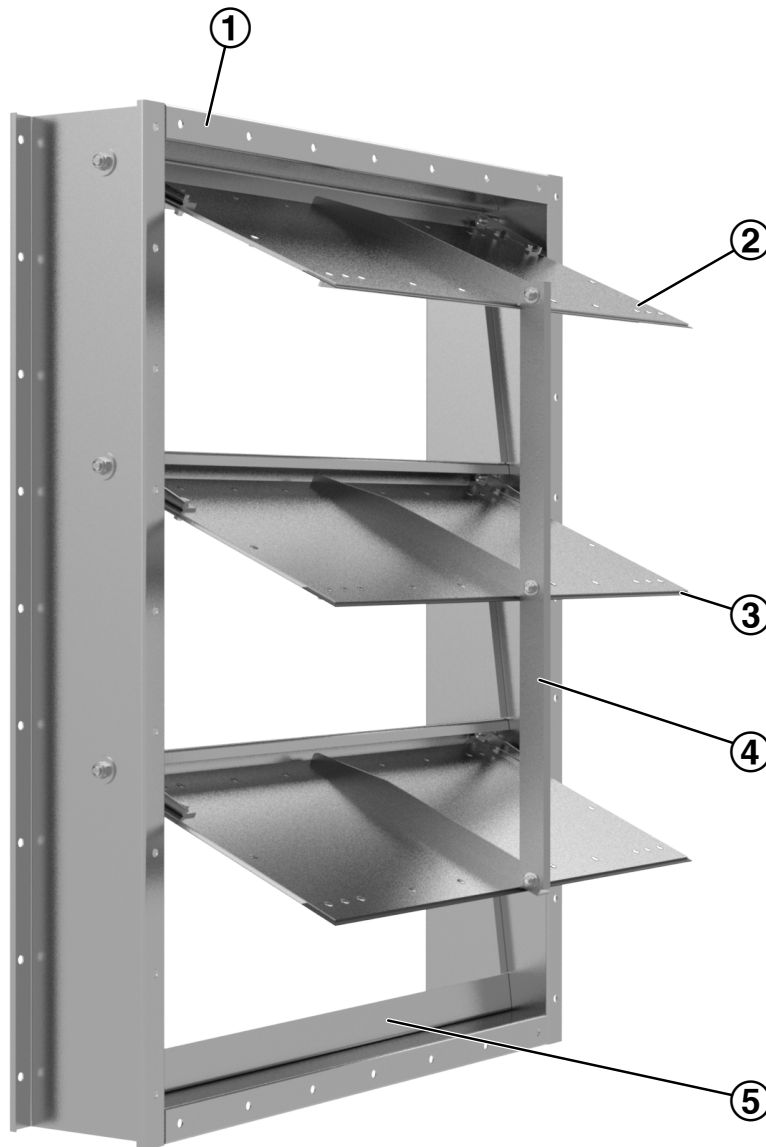
- Maintenance-free as construction and materials are not subject to wear
- Contamination should be removed as it may lead to corrosion and to increased closed blade air leakage

## Function

Non-return dampers open and close automatically. When the system is in operation, the blades open when air flows. The blade opening angle depends on the differential pressure and the volume flow rate; for variant ARK-1 the opening angle is limited

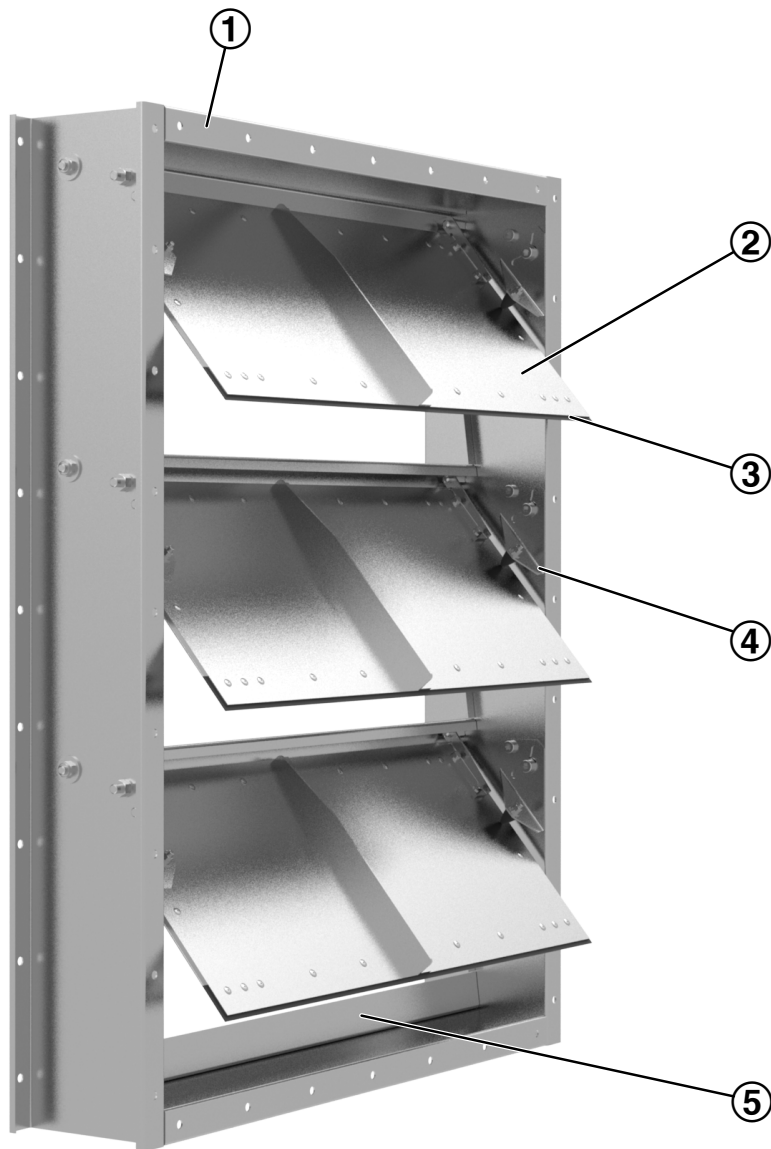
by adjustable blade restrictors. When the system is shut down, the blades close due to their weight. They safely prevent air from flowing against the intended airflow direction.

### Schematic illustration of ARK



- ① Casing
- ② Blade
- ③ Seal
- ④ Linkage
- ⑤ Travel stop (angle section)

## Schematic illustration of ARK-1



- ① Casing
- ② Blade
- ③ Seal
- ④ Adjustable blade restrictor
- ⑤ Travel stop (angle section)

## Technical data

Nominal sizes	200 × 345 – 1200 × 1995 mm
Volume flow rate range	690 – 23,950 l/s or 2484 – 86,220 m <sup>3</sup> /h at 10 m/s
Total differential pressure (horizontal airflow)	115 Pa at 10 m/s
Total differential pressure (vertical airflow)	45 Pa at 10 m/s
Maximum permissible differential pressure in closing direction	5000 Pa
Operating temperature	0 to 80 °C

### ARK, free cross-sectional area [m<sup>2</sup>]

H	B					
	200	400	600	800	1000	1200
345	0.043	0.097	0.152	0.206	0.26	0.314
675	0.088	0.198	0.309	0.419	0.529	0.639
1005	0.133	0.299	0.466	0.632	0.798	0.964
1335	0.178	0.4	0.622	0.845	1.067	1.289
1665	0.223	0.501	0.779	1.058	1.336	1.614
1995	0.268	0.602	0.936	1.271	1.605	1.94

Intermediate sizes: Interpolate values between widths.

## Quick sizing

Quick sizing tables provide a good overview of the volume flow rates with an airflow velocity of 10 m/s. Values for intermediate widths can be interpolated.

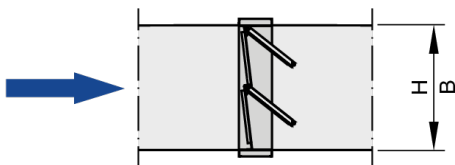
### ARK, maximum volume flow rate

H	B											
	200		400		600		800		1000		1200	
	l/s	m <sup>3</sup> /h	l/s	m <sup>3</sup> /h	l/s	m <sup>3</sup> /h	l/s	m <sup>3</sup> /h	l/s	m <sup>3</sup> /h	l/s	m <sup>3</sup> /h
345	690	2484	1380	4968	2070	7452	2760	9936	3450	12420	4140	14904
675	1350	4860	2700	9720	4050	14580	5400	19440	6760	24336	8100	29160
1005	2010	7236	4020	14472	6040	21744	8040	28944	10050	36180	12050	43380
1335	2670	9612	5340	19224	8020	28872	10700	38520	13350	48060	16000	57600
1665	3330	11988	6660	23976	10000	36000	13300	47880	16650	59940	20000	72000
1995	3990	14364	7980	28728	11950	43020	15950	57420	19950	71820	23950	86220

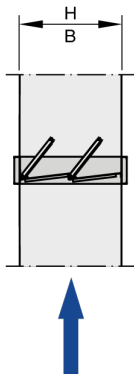
### Differential pressure $\Delta p_{st}$ [Pa]

v [m/s]	Airflow	
	horizontal	vertical
2	50	135
4	75	125
6	95	105
8	110	65
10	115	45

#### Horizontal airflow



#### Vertical airflow



## Specification text

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

### Specification text

Rectangular non-return dampers to prevent air from flowing against the intended airflow direction through fresh air and exhaust air ducts of air conditioning systems.

Ready-to-install component which consists of a casing, blades with low-friction bearings, and travel stop and sealing parts.

### Special features

- Robust, maintenance-free construction
- Maximum differential pressure: 5000 Pa
- Closed blade 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
- Optional temperature resistant construction for up to 200 °C, with Viton seal
- Installation in horizontal or vertical ducts
- Maintenance-free DU bearings with Teflon coating, bearing shafts made of stainless steel

### 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: 690 – 23,950 l/s or 2484 – 86,220 m<sup>3</sup>/h at 10 m/s
- Total differential pressure (horizontal airflow): 115 Pa at 10 m/s
- Total differential pressure (vertical airflow): 45 Pa at 10 m/s
- Maximum differential pressure in closing direction: 5000 Pa
- Operating temperature: 0 to 80 °C
- Maximum pressure: 5000 Pa

### Sizing data

- $q_v$  [m<sup>3</sup>/h]
- $\Delta p_{st}$  [Pa]

Air-regenerated noise

- $L_{WA}$  [dB(A)]

Order code

ARK - 1 - A2 - G / 600 × 1005 / ER / P1 - RAL ...  
 |     |     |     |     |     |     |  
 1     2     3     4     5     6     7

**1 Type**

ARK Non-return damper

**2 Blade mechanism**

No entry required: linked blades

**1** Blades with adjustable restrictors

**3 Material**

No entry required: galvanised steel, with aluminium blades

**A2** Stainless steel with aluminium blades

**4 Construction**

No entry required: duct connection without flange holes

**G** Duct connection with flange holes

**5 Nominal size [mm]**

B × H

**6 Installation subframe**

No entry required: None

**ER** With (only for construction G)

**7 Surface**

No entry required: standard construction

**P1** powder-coated, specify RAL CLASSIC colour

Gloss level

RAL 9010 50 %

RAL 9006 30 %

All other RAL colours 70 %

**Order example: ARK-1-A2/1000×1995/P1-RAL 7001**

**Blade mechanism**

Blades with adjustable restrictors

**Material**

Stainless steel with aluminium blades

**Construction**

Without holes

**Nominal size**

1000 × 1995 mm

**Installation subframe**

Without

**User interface**

Powder-coated, RAL 7001, silver



## Variants

### Non-return damper, variant ARK



Non-return damper with linkage

### ARK

#### Variant

- Non-return damper with linked blades, preferably for variable volume flows

#### 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

#### Parts and characteristics

- Ready-to-install non-return damper
- Blades with low-friction bearings
- Seal
- Travel stop (angle section)
- Linkage

#### 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
- Linkage for synchronous blade movement
- Blades with perimeter seal, pressed against travel stop (angle section) when closed
- Blade shafts with maintenance-free plastic bearings

#### Materials and surfaces

- Casing and travel stop (angle section) made of galvanised sheet steel, material no. EN 10346-DX51D+Z140-200
- A2 construction: Casing and travel stop (angle section) made of stainless steel, material no. 1.4301
- Blades and linkage made of aluminium, material no. AIMg3
- Blade holders made of stainless steel, material no. 1.4301
- Blade shafts made of stainless steel, material no. 1.4104
- Plastic bearing made of PPS

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

#### Non-return damper, variant ARK-1



Non-return damper with adjustable blade restrictor

#### ARK-1

##### Variant

- Non-return damper with adjustable blade restrictors, preferably for constant volume flows

##### 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

##### Parts and characteristics

- Ready-to-install non-return damper
- Blades with low-friction bearings
- Seal
- Travel stop (angle section)
- Two adjustable restrictors per blade

##### 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
- Restrictors, adjustable from the outside, to limit the opening angle for each blade
- Blades can be moved independently of one another
- Blades with perimeter seal, pressed against travel stop (angle section) when closed
- Blade shafts with maintenance-free plastic bearings

##### Materials and surfaces

- Casing and travel stop (angle section) made of galvanised sheet steel, material no. EN 10346-DX51D+Z140-200
- 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 and restrictors made of stainless steel, material no. 1.4301
- Blade shafts made of stainless steel, material no. 1.4104
- Plastic bearing made of PPS
- Neoprene seals
- P1: Powder-coated, RAL CLASSIC colour
- PS: Powder-coated, DB colour

## Dimensions

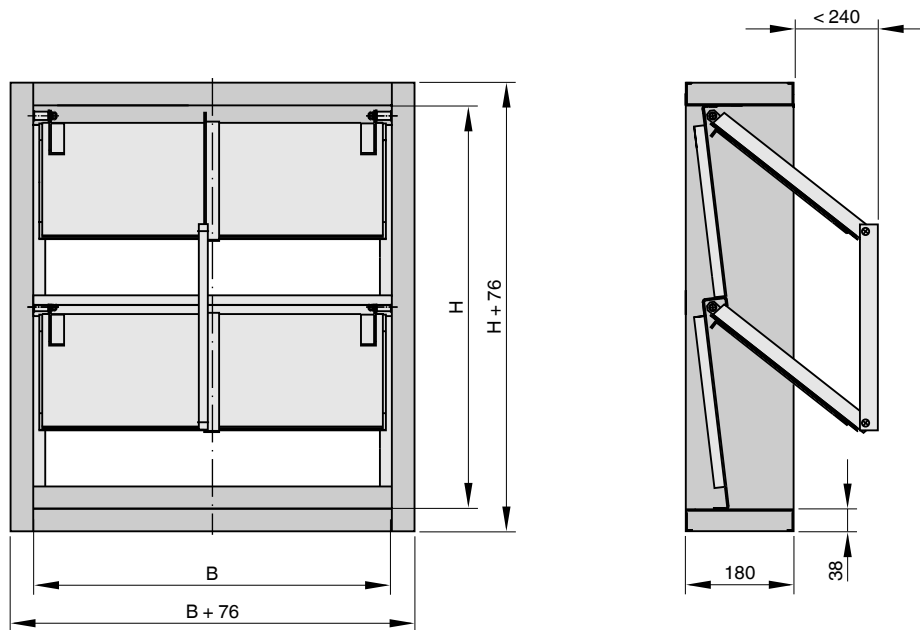
- B: 200 – 1200 mm, intermediate sizes 201 – 1199 in increments of 1 mm
- H: 345 – 1995 mm, intermediate sizes 355 – 505, 685 – 835, 1015 – 1165, 1345 – 1495, 1675 – 1825 mm in increments of 1 mm
- The weight for the next larger size applies

Flow cross section to calculate the airflow velocity

- $A = B \times H$

Unit of measure for B and H: m

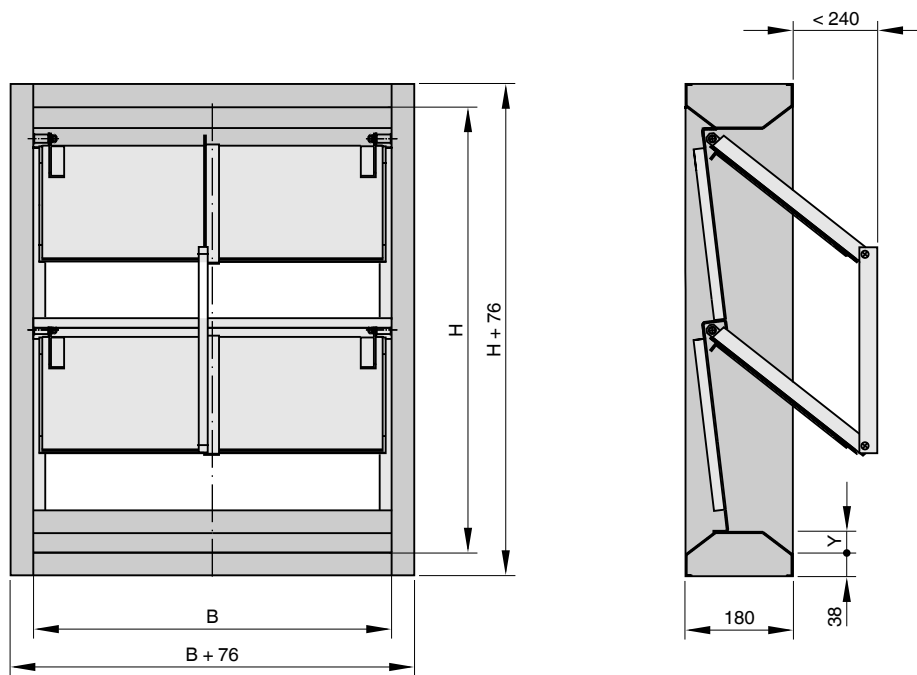
### ARK, standard sizes



### ARK: Standard sizes, dimensions

H	No. of blades	No. of coupling rods
345	1	
675	2	1
1005	3	1
1335	4	2
1665	5	2
1995	6	2

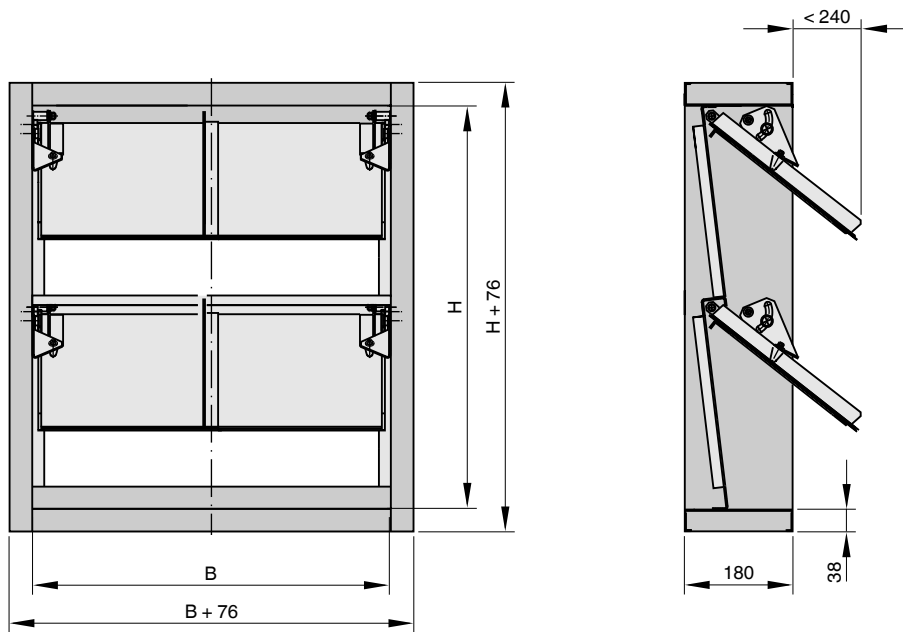
ARK, intermediate sizes



ARK: Intermediate sizes, dimensions

H	No. of blades	No. of coupling rods	Y
355 – 505	1	0	5 – 80
685 – 835	2	1	5 – 80
1015 – 1165	3	1	5 – 80
1345 – 1495	4	2	5 – 80
1675 – 1825	5	2	5 – 80

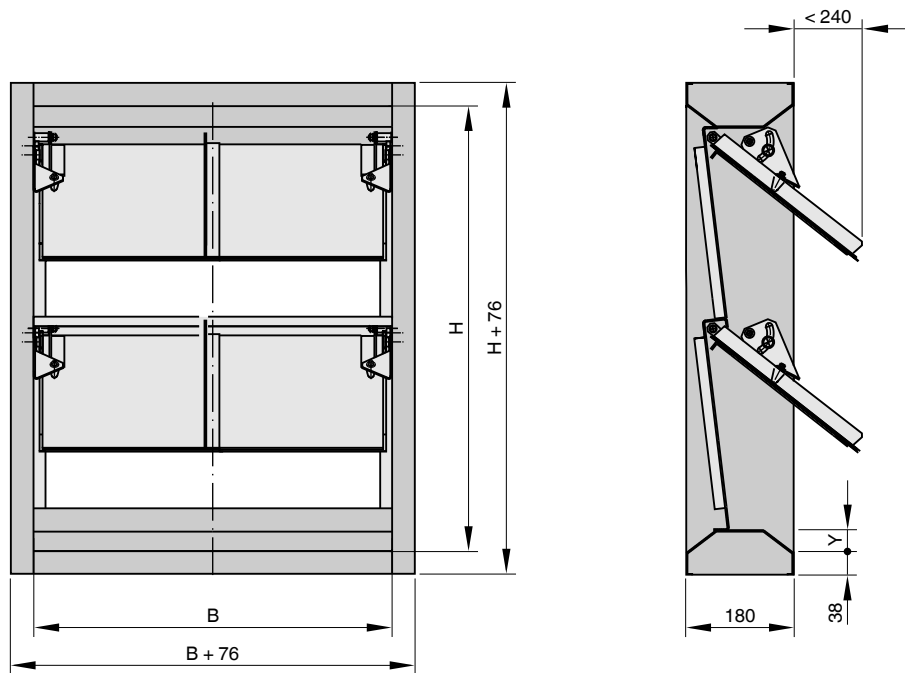
ARK-1, standard sizes



ARK-1: Standard sizes, dimensions

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

ARK-1, intermediate sizes



ARK-1: Intermediate sizes, dimensions

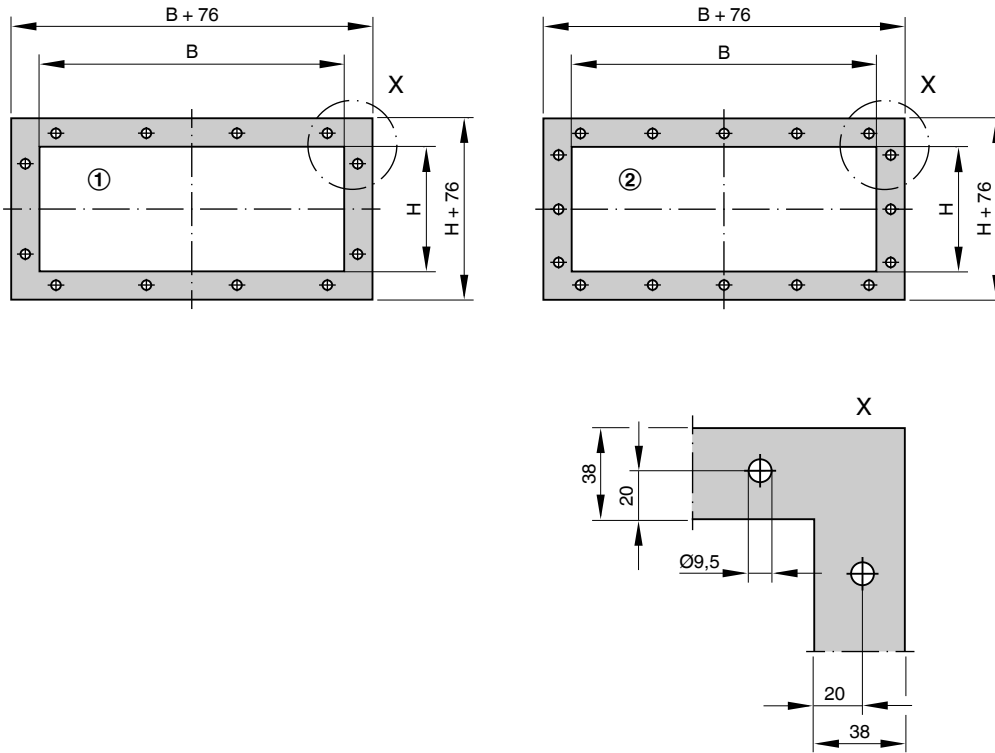
H	No. of blades	Y
355 – 505	1	5 – 80
685 – 835	2	5 – 80
1015 – 1165	3	5 – 80
1345 – 1495	4	5 – 80
1675 – 1825	5	5 – 80

ARK, ARK-1, weights [kg]

H	B					
	200	400	600	800	1000	1200
345	8	10	12	15	18	21
675	12	16	19	23	27	32
1005	17	22	26	31	36	41
1335	22	28	33	39	45	51
1665	27	34	40	47	54	61
1995	32	40	47	55	63	71

**Product details**

**Flange holes, ARK**



- ① Even number of holes (hole pitch = 250 mm)
- ② Uneven number of holes (hole pitch = 250 mm)

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

H	Number of holes n
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	Number of holes n
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**

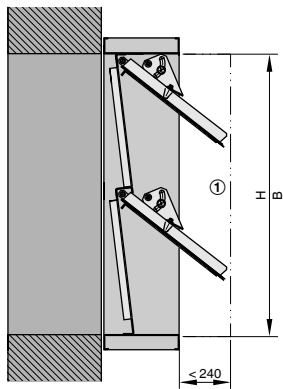
**ARK**

- Installation orientation: Horizontal airflow, any airflow direction; or vertical airflow with airflow from bottom to top
- Only for installation in internal spaces

**ARK-1**

- Installation orientation: Horizontal airflow, any airflow direction; or vertical airflow with airflow from bottom to top
- Only for installation in internal spaces
- Adjusting the restrictors to limit the opening angle for each blade

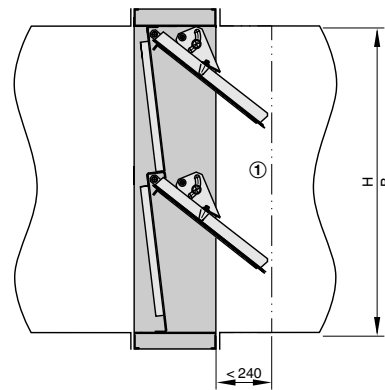
**Installation into an internal wall, without installation subframe**



① Blade movement area must be kept clear

Illustration shows ARK-1

**Duct installation**



① Blade movement area must be kept clear

Illustration shows ARK-1

## Nomenclature

### Definitions

$L_{WA}$  [dB(A)]

Sound power level of air-regenerated noise for the mechanical self-powered damper, A-rated

$A$  [m<sup>2</sup>]

Upstream cross section

$v$  [m/s]

Airflow velocity based on the upstream cross section

$q_v$  [m<sup>3</sup>/h]; [l/s]

Volume flow rate

$\Delta p_{st}$  [Pa]

Static differential pressure

$\Delta p_t$  [Pa]

Total differential pressure

### Principal dimensions

$B$  [mm]

Duct width

$H$  [mm]

Duct height

$n$  [ ]

Number of flange screw holes

$m$  [kg]

Weight

### Lengths

All lengths are given in millimetres [mm] unless stated otherwise