Multileaf dampers
Attenuators
External weather louvres

2014

TROX® TECHNIK

The art of handling air

Multileaf dampers
Attenuators
External weather louvres

2014

The Multileaf Dampers / Attenuators / Weather Louvres catalogue corresponds to sections 3 and 6 of the previously used KLIMA 2 catalogue.

The TROX catalogues have been completely revised and now offer several new features:

- Hardcover editions
- Simplified navigation
- List of advantages of each product at a glance
- Different chapters for principal products, additional components and attachments

The following documentation is available to help you select and size TROX components and systems:

- Technical product documentation (catalogues)
- Design manuals
- Easy Product Finder design programme
- Compendium CD
- Website www.troxtechnik.com

This catalogue is a carbon neutral product.

TROX® TECHNIK

The art of handling air

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Catalogue structure

Air terminal devices

Air-Water Systems / Decentralised Ventilation

Multileaf Dampers / Attenuators / Weather Louvres

The Multileaf Dampers / Attenuators / Weather Louvres catalogue corresponds to sections 3 and 6 of the previously used KLIMA 2 catalogue.

Fire and Smoke Protection Systems

Control units

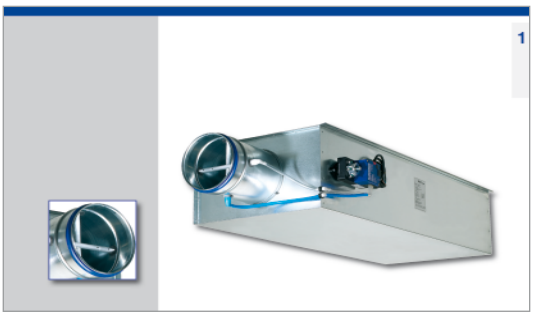
Control Systems

Filter Units / Filter Elements

X-CUBE – Air Handling Units

X-FANS – Building Fans

Documentation · Page numbering

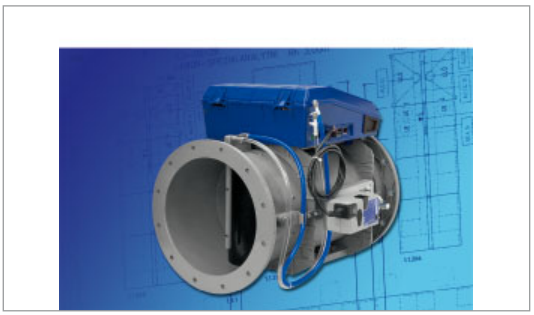


Technical document, or leaflet

Technical product documentation

… comprise:

- Product descriptions
- Information on the materials used
- Aerodynamic and acoustic data
- Dimensions
- Details on product characteristics
- Specification texts

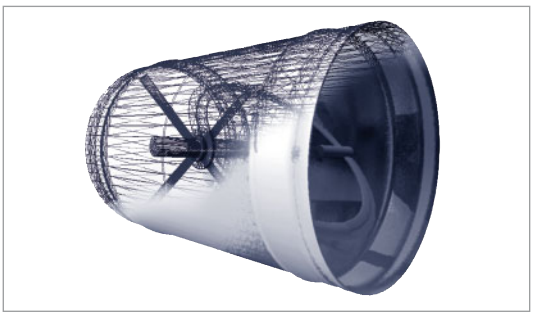


Design manual

Design manuals

… comprise:

- Basic information and technical concepts
- Step-by-step product design
- Overview and explanation on how to select the ideal system components



Design programme

Easy Product Finder design programme

… comprises everything to select and size our products:

- Technical data
- Diagrams, photos
- Order codes that can be edited
- CAD drawings(3D model; export function for DXF and other standard formats)
- Specification texts for each product and variant

Internet

Website www.troxtechnik.com

The entire documentation is available on the internet.

- Catalogue download center
- Individual product leaflets
- Installation examples
- References

Page numbering

K3 – 0.0 – 6 TROX® TECHNIK 03/2014 – DE/en

- K3 – 0.0 – 6: Continuing page numbers
- K3 – 0.0 – 6: Chapter
- K3 – 0.0 – 6: Product segment
- 03/2014 – DE/en: Edition
- 03/2014 – DE/en: Country
- 03/2014 – DE/en: Language

Table of contents

1 Multileaf dampers

Multileaf dampers are used in ducts or in wall or ceiling openings to shut off or restrict the airflow.

Multileaf dampers
Type JZ

Parallel blades

Opposed blades

Blade mechanism with gears

For shutting off the airflow in air conditioning systems

Rectangular multileaf dampers for volume flow and pressure control as well as for shutting off ducts and openings in walls and ceiling slabs

- Maximum dimensions of steel and stainless steel variants: 2000 × 1995 mm; of aluminium variant: 1200 × 1050 mm
- Casing air leakage to EN 1751, class C
- Aerofoil parallel or opposed action blades
- Steel and stainless steel variants: blades interconnected by external linkage (for parallel or opposed blade action)
- Aluminium variant: blades interconnected by gears (for opposed action)
- Installation with horizontal or vertical blades
- Available in standard sizes and many intermediate sizes
- Can be combined with external weather louvres

Optional equipment and accessories

- Actuators: Open/Close actuators, modulating actuators
- Explosion-proof construction with pneumatic actuator or spring return actuator (not for JZ-AL)
- Powder-coated construction
- Aluminium variant also as anodised construction

1

Type		Page
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Variants

Product examples

Multileaf damper, variant JZ-S

Multileaf damper with quadrant stay

Multileaf damper, variant JZ-P

Multileaf damper with installation subframe and actuator

Multileaf damper, variant JZ-S-A2

Multileaf damper with actuator

Multileaf damper, variant JZ-P-A2

Multileaf damper with actuator

Multileaf damper, variant JZ-AL

Multileaf damper with actuator

Description

For detailed information on attachments see Chapter K3 – 1.3

For detailed information on accessories see Chapter K3 – 1.2

Application

- Multileaf dampers of Type JZ are used as an acting element in the volume flow and pressure control in air conditioning systems
- For shutting off ducts and openings in walls and ceiling slabs
- Parallel action blades are preferably used for opening/closing
- Opposed action blades are due to their characteristics preferably used for variable operation
- Stainless steel and powder-coated constructions with increased corrosion resistance
- Temperature resistant up to 100 °C; beyond 100 °C with brass or stainless steel bearings (steel and stainless steel construction variants)
- Steel and stainless steel variants with brass or stainless steel bearings are suitable for use in potentially explosive atmospheres (ATEX)

Variants

- JZ-S: Multileaf damper with opposed blade action, made of galvanised sheet steel
- JZ-P: Multileaf damper with parallel blade action, made of galvanised sheet steel
- JZ-S-A2: Multileaf damper with opposed blade action, made of stainless steel
- JZ-P-A2: Multileaf damper with parallel blade action, made of stainless steel
- JZ-AL: Multileaf damper with opposed blade action, made of aluminium

Nominal sizes

JZ-*, JZ-*-A2

- B: 200, 400, 600, 800, 1000, 1200, 1400, 1600, 1800, 2000 mm (intermediate sizes: 201 – 1998 mm in increments of 1 mm)
- Width subdivided (BM): 2001 – 4150 mm, in increments of 1 mm
- H: 180, 345, 510, 675, 840, 1005, 1170, 1335, 1500, 1665, 1830, 1995 mm (intermediate sizes: 183 – 1998 mm, in increments of 1 mm)
- Height subdivided (HM): 1999 – 4066 mm, in increments of 1 mm
- Any combination of B × H

JZ-AL

- B: 200, 400, 600, 800, 1000, 1200 mm (intermediate sizes: 201 – 1199 mm, in increments of 1 mm)
- H: 100, 150, 200, 250, 300, 350, 400, 450, 500, 550, 600, 650, 700, 750, 800, 850, 900, 950, 1000, 1050 mm
- Any combination of B × H

Attachments

- Quadrant stays and limit switches: Quadrant stays to adjust the damper blades (stepless adjustment) and for capturing the end positions
- Open/Close actuators: Actuators for opening and closing multileaf dampers
- Modulating actuators: Actuators for stepless blade adjustment
- Pneumatic actuators: Pneumatic actuators for opening and closing multileaf dampers
- Explosion-proof actuators: Actuators for opening and closing multileaf dampers installed in potentially explosive atmospheres

Accessories

- Installation subframe: Installation subframe for the fast and simple installation of multileaf dampers

Special features

- Aerofoil blades
- Low-maintenance, robust construction
- No parts with silicone
- Available in standard sizes and many intermediate sizes

Standards and guidelines

- 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

Technical data

Nominal sizes	200 × 100 mm – 2000 × 1995 mm
Volume flow rate range	200 – 40,000 l/s
Volume flow rate range	720 – 143,640 m^3/h
Maximum static differential pressure	Up to 3500 Pa
Operating temperature	–20 to 150 °C

1 Function

Functional description

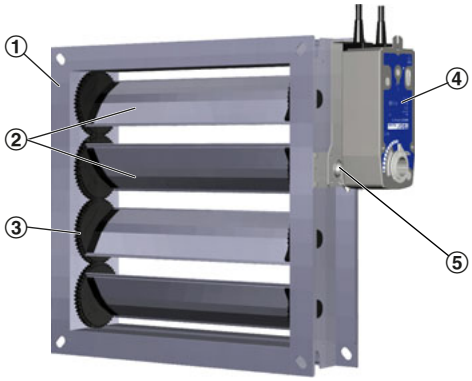
Linkage
Multileaf dampers with external linkage can have parallel action blades or opposed action blades. An external linkage transfers the synchronous rotational movement from the drive arm to the individual blades. Even very large multileaf dampers can be safely opened and closed with this type of linkage. Opposed action blades close at different speeds since the linkage includes a transverse link. This facilitates the closing process and reduces the closed blade air leakage.

Gears
Multileaf dampers with gears can only have opposed action blades. The internal gears transfer the synchronous rotational movement from the drive arm to the individual blades.

Schematic illustration of JZ-S

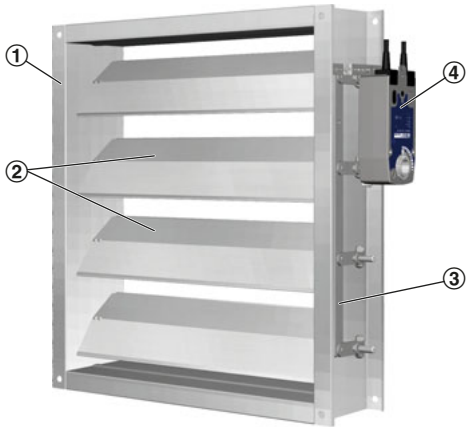
① Casing
② Opposed blades
③ External linkage
④ Actuator
⑤ Transverse link

Schematic illustration of JZ-AL



① Casing
② Opposed blades
③ Gears
④ Actuator
⑤ Bearing plate and drive shaft

Schematic illustration of JZ-P



① Casing
② Parallel blades
③ External linkage
④ Actuator

Order code

JZ

JZ – P – A2 – G – M – L / 1000×1005 / ER / Z64 / NC / P1 – RAL ...
1 2 3 4 5 6 7 8 9 10

1 Type
JZ Multileaf damper

2 Function
S Opposed (standard)
P Parallel

3 Material
No entry: galvanised steel
A2 Stainless steel

4 Construction
No entry: corner holes on both sides; plastic bearings
G Flange holes on both sides (no corner holes)
M Brass bearings
E Stainless steel bearings
M-V Brass bearings and reinforced blades (not for JZ-A2)
E-V Stainless steel bearings and reinforced blades (not for JZ-A2)
M, E, M-V, E-V can be combined with G

5 Operating side
No entry: on the right
L Left

6 Nominal size [mm]
B × H
B > 2000 = width subdivided
H > 1998 = height subdivided

7 Installation subframe
No entry: none
ER With (only for construction G)

8 Attachments
No entry: none
Z04 – Z07 Quadrant stay
Z12 – Z51 Actuators
ZF01 – ZF15 Spring return actuators
Z60 – Z77 Pneumatic actuators
Explosion-proof actuators
Z1EX, Z3EX Electric
Z60EX – Z77EX Pneumatic

9 Damper blade safety function
Only for spring return actuators or pneumatic actuators
NO Pressure off/power off to OPEN
NC Pressure off/power off to CLOSE

10 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

JZ–S–G–M–V–L/800×510/ER/Z43

Function	Opposed
Material	Galvanised steel
Construction	Flange holes on both sides, brass bearings and reinforced blades
Operating side	On the left
Nominal size	800 × 510 mm
Installation subframe	With
Attachments	Open/Close actuator NM230A
Surface	Standard construction

1

Order code

JZ–AL

JZ – AL / 1100×950 / ER / Z64 / NC / P1 – RAL ...
1 2 3 4 5 6 7

1 Type
JZ Multileaf damper

2 Material
AL Aluminium

3 Nominal size [mm]
B × H

4 Installation subframe
No entry: none
ER With

5 Attachments
No entry: none
Z04 – Z07 Quadrant stay
Z12 – Z51 Actuators
ZF01 – ZF15 Spring return actuators
Z60 – Z77 Pneumatic actuators

6 Damper blade safety function
Only for spring return actuators or pneumatic actuators
NO Pressure off/power off to OPEN
NC Pressure off/power off to CLOSE

7 Surface
No entry: standard construction
P1 Powder-coated, RAL CLASSIC colour
PS Powder-coated, DB colour
S3 Anodised to EURAS standard, E6-C-0
Gloss level:
RAL 9010 50 %
RAL 9006 30 %
All other RAL colours 70 %

Order example

JZ–AL/600×850/ZF01/NO/P1–RAL7001

Material	Aluminium
Nominal size	600 × 850 mm
Installation subframe	Without
Attachments	Spring return actuator NF24A
Damper blade position	Power off to OPEN
Surface	Powder-coated, RAL 7001, silver grey

Torque

The torque for closing a multileaf damper must be such that the damper can be safely opened and closed. For closure, the torque must suffice to ensure complete shut-off by the blades. Opening is initiated without aerodynamic forces. When air flows through the damper, the aerodynamic forces of the airflow create a closing force (torque) on the blades; this happens independent of the direction of the airflow. This closing force must be countered, or overcome. The blade position, or blade angle α, for which there is the largest torque depends, among other factors, on the fan characteristics.

Minimum torque for JZ-*, JZ-*-A2

H	B [mm]									
	200	400	600	800	1000	1200	1400	1600	1800	2000
mm	Nm									
180 – 1995	10	10	10	10	10	10	10	10	10	10

Minimum torque for JZ-AL

H	B [mm]					
	200	400	600	800	1000	1200
mm	Nm					
100 – 650	5	5	5	5	5	5
700 – 1050	10	10	10	10	10	10

Free area

Free area for steel and stainless steel multileaf dampers

H	B [mm]									
	200	400	600	800	1000	1200	1400	1600	1800	2000
mm	m^2									
180 – 344	0.03	0.06	0.09	0.12	0.15	0.18	0.21	0.24	0.27	0.30
345 – 509	0.06	0.11	0.17	0.23	0.28	0.34	0.40	0.45	0.51	0.57
510 – 674	0.08	0.17	0.25	0.33	0.42	0.50	0.58	0.67	0.75	0.83
675 – 839	0.11	0.22	0.33	0.44	0.55	0.66	0.77	0.88	0.99	1.10
840 – 1004	0.14	0.27	0.41	0.55	0.69	0.82	0.96	1.10	1.23	1.37
1005 – 1169	0.16	0.33	0.49	0.66	0.82	0.98	1.15	1.31	1.47	1.64
1170 – 1334	0.19	0.38	0.57	0.76	0.95	1.14	1.33	1.52	1.72	1.91
1335 – 1499	0.22	0.43	0.65	0.87	1.09	1.30	1.52	1.74	1.96	2.17
1500 – 1664	0.24	0.49	0.73	0.98	1.22	1.47	1.71	1.95	2.20	2.44
1665 – 1829	0.27	0.54	0.81	1.08	1.36	1.63	1.90	2.17	2.44	2.71
1830 – 1994	0.30	0.60	0.89	1.19	1.49	1.79	2.08	2.38	2.68	2.98
1995	0.32	0.65	0.97	1.30	1.62	1.95	2.27	2.60	2.92	3.25

Intermediate sizes: Intermediate widths can be interpolated

JZ-S, JZ-P, JZ-A2-S, JZ-A2-P

1

Free area

Free area for aluminium multileaf dampers

H	B [mm]										
	200	300	400	500	600	700	800	900	1000	1100	1200
mm	m^2										
100, 150	0.014	0.022	0.030	0.038	0.047	0.055	0.063	0.071	0.079	0.087	0.095
200, 250	0.028	0.045	0.061	0.077	0.093	0.109	0.126	0.142	0.158	0.174	0.19
300, 350	0.043	0.067	0.091	0.115	0.14	0.164	0.188	0.213	0.237	0.261	0.286
400, 450	0.057	0.089	0.122	0.154	0.186	0.219	0.251	0.284	0.316	0.348	0.381
500, 550	0.071	0.111	0.152	0.192	0.233	0.273	0.314	0.354	0.395	0.435	0.476
600, 650	0.085	0.134	0.182	0.231	0.279	0.328	0.377	0.425	0.474	0.522	0.571
700, 750	0.099	0.156	0.213	0.269	0.326	0.383	0.439	0.496	0.553	0.61	0.666
800, 850	0.113	0.178	0.243	0.308	0.373	0.437	0.502	0.567	0.632	0.697	0.761
900, 950	0.128	0.20	0.273	0.346	0.419	0.492	0.565	0.638	0.711	0.784	0.857
1000.1050	0.142	0.223	0.304	0.385	0.466	0.547	0.628	0.709	0.79	0.871	0.952

Intermediate sizes: Intermediate widths can be interpolated

JZ-AL

Maximum static differential pressure for a closed multileaf damper

Maximum static differential pressure for a closed multileaf damper

Construction	Width [mm]						
	800	1000	1200	1400	1600	1800	2000
	$\Delta p_{st\ max}$						
	Pa						
Standard construction	2500	2000	1650	1400	1250	1100	1000
Brass bearings (-M)	3000	2500	2200	1950	1750	1600	1500
Stainless steel bearings (-E)	3000	2500	2200	1950	1750	1600	1500
Reinforced blades (-M-V, -E-V)	3500	3000	2700	2500	2300	2100	2000

JZ-S, JZ-P, JZ-A2-S, JZ-A2-P

Maximum static differential pressurefor a closed multileaf damper JZ-AL

2000 Pa

Sound power level for a closed multileaf damper

Sound power level for a closed multileaf damper JZ-S or JZ-S-A2

Δp_{st}	Area B × H [m²]							
	0.14	0.2	0.4	0.6	0.8	1.2	2	4
	L_{WA}							
Pa	dB(A)							
100	57	58	61	63	64	66	68	71
200	63	65	68	69	71	72	75	77
500	71	72	76	78	79	81	83	84
1000	78	80	82	84	85	88	90	>90
1500	81	83	86	88	89	>90	>90	>90
2000	84	85	89	>90	>90	>90	>90	>90

Sound power level for a closed multileaf damper JZ-P or JZ-P-A2

Δp_{st}	Area B × H [m²]							
	0.14	0.2	0.4	0.6	0.8	1.2	2	4
	L_{WA}							
Pa	dB(A)							
100	57	58	61	63	64	64	68	71
200	63	65	68	69	71	71	75	78
500	71	72	76	78	79	79	85	87
1000	78	80	82	84	85	85	89	>90
1500	81	82	86	88	89	89	>90	>90
2000	84	86	89	>90	>90	>90	>90	>90

Sound power level for a closed multileaf damper JZ-AL

Δp_{st}	Area B × H [m²]								
	0.04	0.09	0.16	0.25	0.36	0.64	0.81	1	1.2
	L_{WA}								
Pa	dB(A)								
100	42	45	48	50	51	54	55	56	56
200	49	53	55	57	59	>60	>60	>60	>60
500	59	>60	>60	>60	>60	>60	>60	>60	>60
1000	>60	>60	>60	>60	>60	>60	>60	>60	>60
1500	>60	>60	>60	>60	>60	>60	>60	>60	>60
2000	>60	>60	>60	>60	>60	>60	>60	>60	>60

1 Quick sizing – differential pressure and sound power level

Quick sizing tables provide a good overview of the sound power levels and differential pressures that can be expected. Approximate intermediate values can be interpolated. Precise intermediate values and spectral data can be calculated with our Easy Product Finder design programme.

The sound power levels L_{WA} apply to multileaf dampers with a cross-sectional area (B × H) of 1 m^2.

The differential pressures apply to multileaf dampers installed in ducts (installation type A).

Quick sizing – differential pressure and sound power level for JZ-S, JZ-S-A2

v	Damper blade position α									
	OPEN		20°		40°		60°		80°	
	Δp_{st}	L_{WA}	Δp_{st}	L_{WA}	Δp_{st}	L_{WA}	Δp_{st}	L_{WA}	Δp_{st}	L_{WA}
m/s	Pa	dB(A)	Pa	dB(A)	Pa	dB(A)	Pa	dB(A)	Pa	dB(A)
0.5	<5	<30	<5	<30	<5	<30	22	44	255	67
1	<5	<30	<5	<30	8	38	85	59	1010	82
2	<5	31	<5	35	28	53	335	74	>2000	>90
4	<5	46	10	50	110	68	1395	89	>2000	>90
6	<5	55	22	59	250	77	>2000	>90	>2000	>90
8	8	61	40	65	440	83	>2000	>90	>2000	>90
10	14	66	60	70	690	88	>2000	>90	>2000	>90

Quick sizing – differential pressure and sound power level for JZ-P, JZ-P-A2

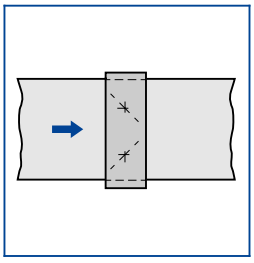
v	Damper blade position α									
	OPEN		20°		40°		60°		80°	
	Δp_{st}	L_{WA}	Δp_{st}	L_{WA}	Δp_{st}	L_{WA}	Δp_{st}	L_{WA}	Δp_{st}	L_{WA}
m/s	Pa	dB(A)	Pa	dB(A)	Pa	dB(A)	Pa	dB(A)	Pa	dB(A)
0.5	<5	<30	<5	<30	<5	<30	<5	<30	12	42
1	<5	<30	<5	<30	<5	<30	12	40	45	60
2	<5	<30	<5	30	10	41	45	57	185	77
4	<5	41	6	48	40	58	170	75	750	>90
6	<5	51	14	58	85	69	385	85	1685	>90
8	<5	58	25	65	150	76	685	>90	>2000	>90
10	<5	64	40	71	230	81	1070	>90	>2000	>90

Quick sizing – differential pressure and sound power level for JZ-AL

v	Damper blade position α									
	OPEN		20°		40°		60°		80°	
	Δp_{st}	L_{WA}	Δp_{st}	L_{WA}	Δp_{st}	L_{WA}	Δp_{st}	L_{WA}	Δp_{st}	L_{WA}
m/s	Pa	dB(A)	Pa	dB(A)	Pa	dB(A)	Pa	dB(A)	Pa	dB(A)
0.5	<5	<30	<5	<30	<5	<30	22	42	245	67
1	<5	<30	<5	<30	8	35	90	58	985	83
2	<5	<30	<5	32	32	51	350	74	>2000	>90
4	<5	43	12	48	125	67	1390	90	>2000	>90
6	<5	52	24	57	275	76	>2000	>90	>2000	>90
8	10	59	45	64	490	83	>2000	>90	>2000	>90
10	14	64	70	69	765	88	>2000	>90	>2000	>90

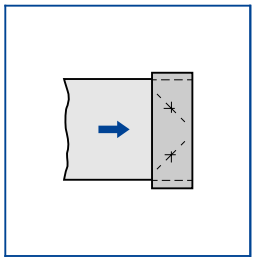
Installation types

Installation type A



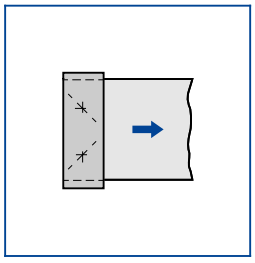
Ducts on both sides

Installation type B



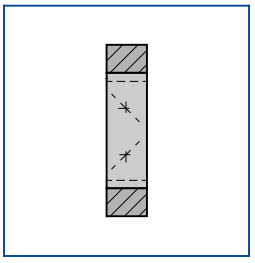
Air discharge

Installation type C



Air intake

Installation type D



Air transfer

Description

Multileaf damper, variant JZ-S

For ATEX classification see Chapter K3 – 1.3, Explosion-proof actuators

Variant

- JZ-S: Multileaf damper with opposed blade action, made of galvanised sheet steel

Construction

- Galvanised sheet steel, corner holes on both sides, plastic bearings, temperature resistant up to 100 °C
- G: Flange holes on both sides
- M: Brass bearings, temperature resistant up to 150 °C
- E: Stainless steel bearings, temperature resistant up to 150 °C (up to 200 °C while not being activated)
- V: Reinforced blades (only for -M, -E)
- BM: Width subdivided
- HM: Height subdivided

Combinations are available, with one exception: M cannot be combined with E

Parts and characteristics

- Ready-to-install shut-off damper
- Blades with external linkage
- Drive arm

Construction features

- Rectangular casing, welded (P1: casing with screws), material thickness 1.25 mm
- Blades, material thickness 1 mm
- Flanges on both sides, suitable for duct connection, either flange holes or corner holes
- External linkage, robust and durable, consisting of the coupling rod and horizontal arms
- Blade shafts, Ø12 mm, with notch to indicate the blade position
- The drive arm can be fixed to every blade (by others)
- Construction and materials comply with the EU directive and guidelines for use in potentially explosive atmospheres (ATEX) for variants with brass or stainless steel bearings (-M, -E)

Materials and surfaces

- Casing and blades made of galvanised sheet steel
- Blade shafts, drive arm and external linkage made of galvanised steel
- Plain bearings made of plastic
- P1: Powder-coated, RAL CLASSIC colour
- PS: Powder-coated, NCS or DB colour

Installation and commissioning

- With horizontal or vertical blades
- With or without installation subframe
- Torsion-free installation
- For widths exceeding 2000 mm or heights exceeding 1995 mm install two multileaf dampers side by side or one above the other

Weight

H	B [mm]									
	200	400	600	800	1000	1200	1400	1600	1800	2000
mm	kg									
180	4	6	8	9	11	13	14	16	18	19
345	6	8	10	12	15	17	19	21	24	26
510	7	10	13	16	19	22	25	27	30	33
675	10	13	16	20	23	27	30	33	37	40
840	11	15	19	23	28	32	37	41	46	50
1005	11	17	22	27	32	38	43	48	53	59
1170	13	19	25	31	37	43	49	55	61	67
1335	15	22	28	35	41	48	55	61	68	74
1500	16	23	30	37	44	51	59	66	73	80
1665	17	25	33	41	49	57	65	72	80	88
1830	18	27	35	44	52	61	69	78	86	95
1995	19	29	38	47	56	66	75	84	94	103

1

Dimensions

For detailed information on corner holes and flange holes see Dimensions – Duct connection

For detailed information on drive shafts see Dimensions – Drive shafts

Dimensional drawing of JZ-S standard sizes

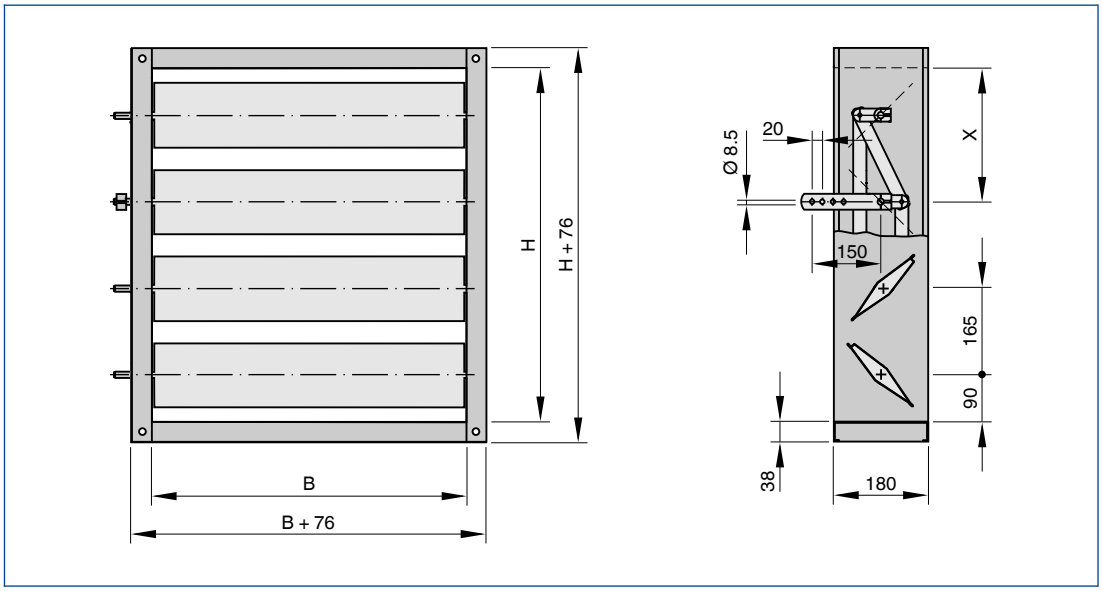


Illustration shows a multileaf damper with drive arm, operating side on the right

Dimensions

H	No. of blades	Position of drive arm	
		X	Blade
mm	–	mm	–
180	1	90	1
345	2	90	1
510	3	90	1
675	4	255	2
840	5	420	3
1005	6	420	3
1170	7	585	4
1335	8	585	4
1500	9	750	5
1665	10	750	5
1830	11	915	6
1995	12	915	6

Dimensional drawing of JZ-S intermediate sizes

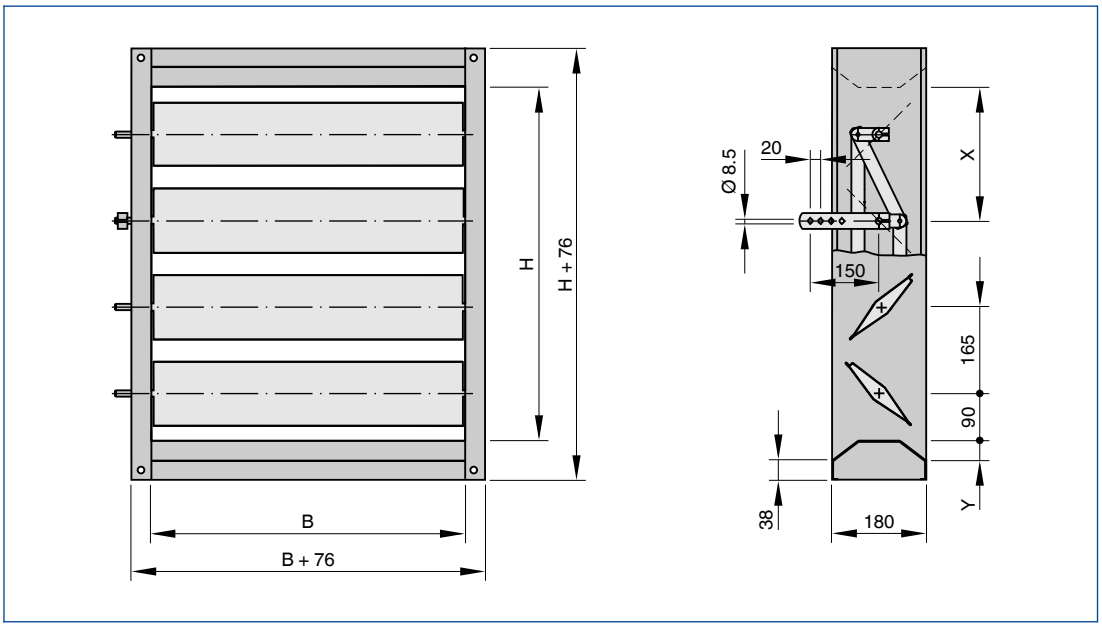


Illustration shows a multileaf damper with drive arm, operating side on the right

Dimensions

H	No. of blades	Position of drive arm		Y
		X	Blade	
mm	–	mm	–	mm
183 – 343	1	90	1	1.5 – 81.5
348 – 508	2	90	1	1.5 – 81.5
513 – 673	3	90	1	1.5 – 81.5
678 – 838	4	255	2	1.5 – 81.5
843 – 1003	5	420	3	1.5 – 81.5
1008 – 1168	6	420	3	1.5 – 81.5
1173 – 1333	7	585	4	1.5 – 81.5
1338 – 1498	8	585	4	1.5 – 81.5
1503 – 1663	9	750	5	1.5 – 81.5
1668 – 1828	10	750	5	1.5 – 81.5
1833 – 1993	11	915	6	1.5 – 81.5
1998	12	915	6	1.5

1

Description

Multileaf damper, variant JZ-P

For ATEX classification see Chapter K3 – 1.3, Explosion-proof actuators

Variant

– JZ-P: Multileaf damper with parallel blade action, made of galvanised sheet steel

Construction

– Galvanised sheet steel, corner holes on both sides, plastic bearings, temperature resistant up to 100 °C
– G: Flange holes on both sides
– M: Brass bearings, temperature resistant up to 150 °C
– E: Stainless steel bearings, temperature resistant up to 150 °C (up to 200 °C while not being activated)
– V: Reinforced blades (only for -M, -E)
– BM: Width subdivided
– HM: Height subdivided

Combinations are available, with one exception: M cannot be combined with E

Parts and characteristics

– Ready-to-install shut-off damper
– Blades with external linkage
– Drive arm

Construction features

– Rectangular casing, welded (P1: casing with screws), material thickness 1.25 mm
– Blades, material thickness 1 mm
– Flanges on both sides, suitable for duct connection, either flange holes or corner holes
– External linkage, robust and durable, consisting of the coupling rod and horizontal arms
– Blade shafts, Ø12 mm, with notch to indicate the blade position
– The drive arm can be fixed to every blade (by others)
– Construction and materials comply with the EU directive and guidelines for use in potentially explosive atmospheres (ATEX) for variants with brass or stainless steel bearings (-M, -E)

Materials and surfaces

– Casing and blades made of galvanised sheet steel
– Blade shafts, drive arm and external linkage made of galvanised steel
– Plain bearings made of plastic
– P1: Powder-coated, RAL CLASSIC colour
– PS: Powder-coated, NCS or DB colour

Installation and commissioning

– With horizontal or vertical blades
– With or without installation subframe
– Torsion-free installation
– For widths exceeding 2000 mm or heights exceeding 1995 mm install two multileaf dampers side by side or one above the other

Weight

H	B [mm]									
	200	400	600	800	1000	1200	1400	1600	1800	2000
mm	kg									
180	4	6	8	9	11	13	14	16	18	19
345	6	8	10	12	15	17	19	21	24	26
510	7	10	13	16	19	22	25	27	30	33
675	10	13	16	20	23	27	30	33	37	40
840	11	15	19	23	28	32	37	41	46	50
1005	11	17	22	27	32	38	43	48	53	59
1170	13	19	25	31	37	43	49	55	61	67
1335	15	22	28	35	41	48	55	61	68	74
1500	16	23	30	37	44	51	59	66	73	80
1665	17	25	33	41	49	57	65	72	80	88
1830	18	27	35	44	52	61	69	78	86	95
1995	19	29	38	47	56	66	75	84	94	103

Dimensions

For detailed information on corner holes and flange holes see Dimensions – Duct connection

For detailed information on drive shafts see Dimensions – Drive shafts

Dimensional drawing of JZ-P standard sizes

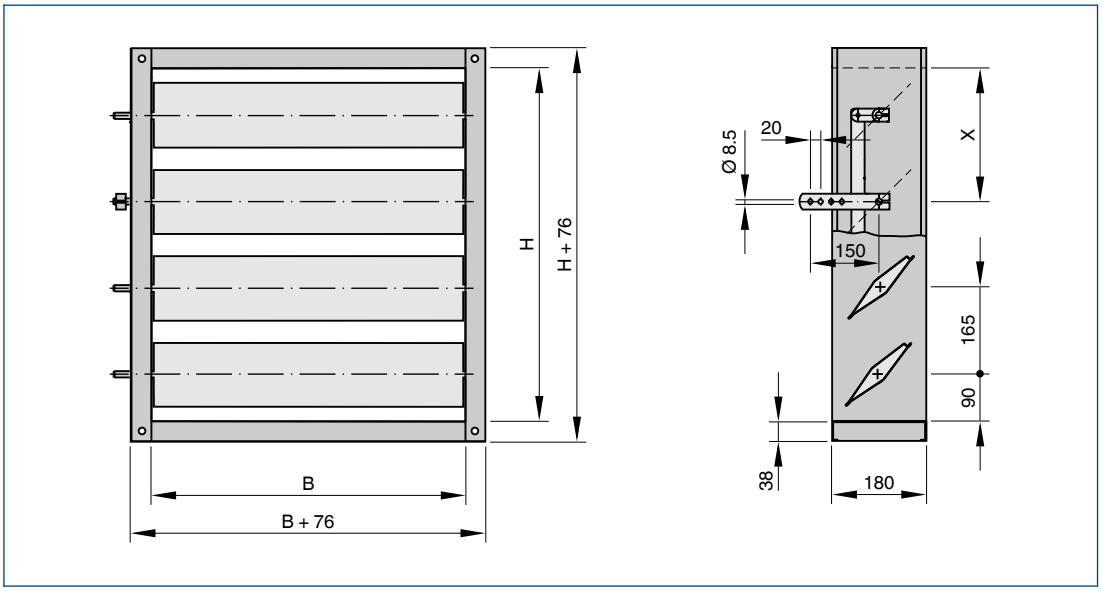


Illustration shows a multileaf damper with drive arm, operating side on the right

Dimensions

H	No. of blades	Position of drive arm	
		X	Blade
mm	–	mm	–
180	1	90	1
345	2	90	1
510	3	90	1
675	4	255	2
840	5	420	3
1005	6	420	3
1170	7	585	4
1335	8	585	4
1500	9	750	5
1665	10	750	5
1830	11	915	6
1995	12	915	6

1

Dimensional drawing of JZ-P intermediate sizes

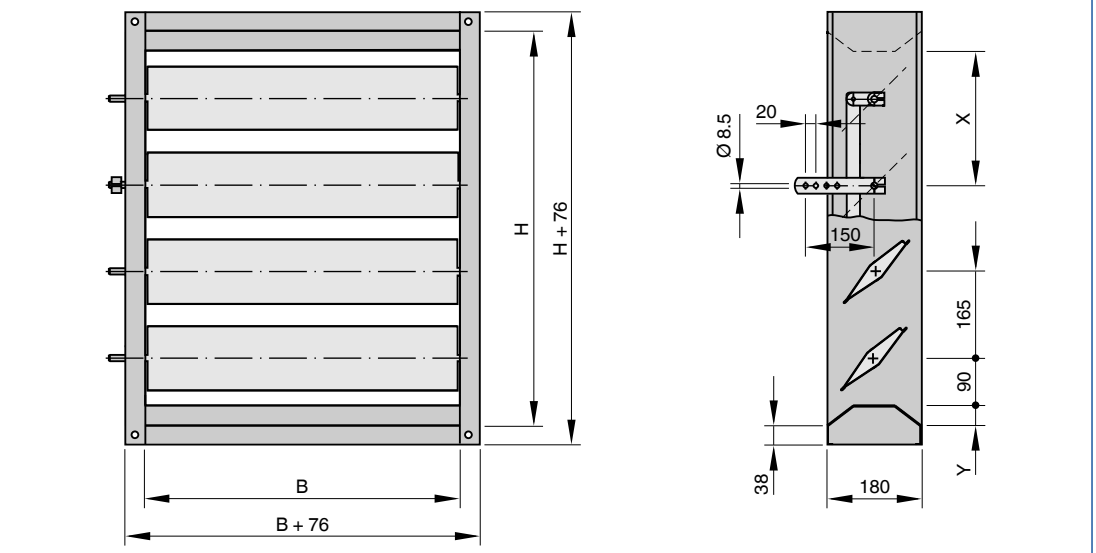


Illustration shows a multileaf damper with drive arm, operating side on the right

Dimensions

H	No. of blades	Position of drive arm		Y
		X	Blade	
mm	–	mm	–	mm
183 – 343	1	90	1	1.5 – 81.5
348 – 508	2	90	1	1.5 – 81.5
513 – 673	3	90	1	1.5 – 81.5
678 – 838	4	255	2	1.5 – 81.5
843 – 1003	5	420	3	1.5 – 81.5
1008 – 1168	6	420	3	1.5 – 81.5
1173 – 1333	7	585	4	1.5 – 81.5
1338 – 1498	8	585	4	1.5 – 81.5
1503 – 1663	9	750	5	1.5 – 81.5
1668 – 1828	10	750	5	1.5 – 81.5
1833 – 1993	11	915	6	1.5 – 81.5
1998	12	915	6	1.5

Description

Multileaf damper, variant JZ-S-A2

For ATEX classification see Chapter K3 – 1.3, Explosion-proof actuators

Variant

– JZ-S-A2: Multileaf damper with opposed blade action, made of stainless steel

Construction

– Stainless steel, corner holes on both sides, plastic bearings, temperature resistant up to 100 °C
– G: Flange holes on both sides
– M: Brass bearings, temperature resistant up to 150 °C
– E: Stainless steel bearings, temperature resistant up to 150 °C (up to 200 °C while not being activated)

Combinations are available, with one exception: M cannot be combined with E

Parts and characteristics

– Ready-to-install shut-off damper
– Blades with external linkage
– Drive arm

Construction features

– Rectangular casing, with screws, material thickness 1.25 mm
– Blades, material thickness 1 mm
– Flanges on both sides, suitable for duct connection, either flange holes or corner holes
– External linkage, robust and durable, consisting of the coupling rod and horizontal arms
– Blade shafts, Ø12 mm, with notch to indicate the blade position
– The drive arm can be fixed to every blade (by others)
– Construction and materials comply with the EU directive and guidelines for use in potentially explosive atmospheres (ATEX) for variants with brass or stainless steel bearings (-M, -E)

Materials and surfaces

– Casing, blades and external linkage made of stainless steel, material no. 1.4301
– Shafts made of stainless steel, material no. 1.4305
– Surface: pickled and passivated
– P1: Powder-coated, RAL CLASSIC colour
– PS: Powder-coated, NCS or DB colour

Installation and commissioning

– With horizontal or vertical blades
– With or without installation subframe
– Torsion-free installation
– For widths exceeding 2000 mm or heights exceeding 1995 mm install two multileaf dampers side by side or one above the other

Weight

H	B [mm]									
	200	400	600	800	1000	1200	1400	1600	1800	2000
mm	kg									
180	4	6	8	9	11	13	14	16	18	19
345	6	8	10	12	15	17	19	21	24	26
510	7	10	13	16	19	22	25	27	30	33
675	10	13	16	20	23	27	30	33	37	40
840	11	15	19	23	28	32	37	41	46	50
1005	11	17	22	27	32	38	43	48	53	59
1170	13	19	25	31	37	43	49	55	61	67
1335	15	22	28	35	41	48	55	61	68	74
1500	16	23	30	37	44	51	59	66	73	80
1665	17	25	33	41	49	57	65	72	80	88
1830	18	27	35	44	52	61	69	78	86	95
1995	19	29	38	47	56	66	75	84	94	103

1

Dimensions

For detailed information on corner holes and flange holes see Dimensions – Duct connection

For detailed information on drive shafts see Dimensions – Drive shafts

Dimensional drawing of JZ-S-A2 standard sizes

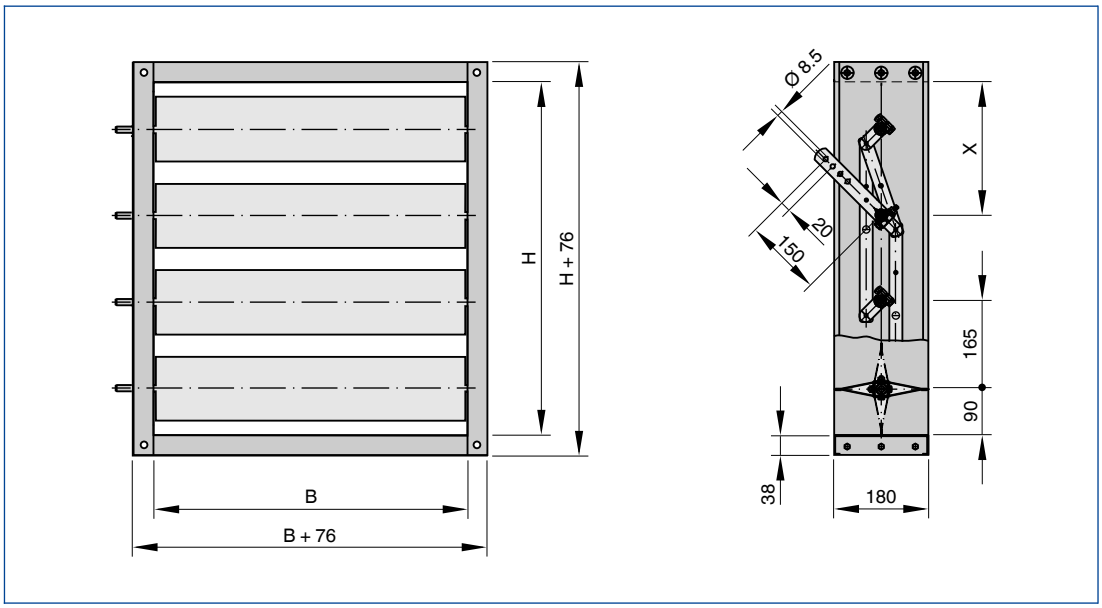


Illustration shows a multileaf damper with drive arm, operating side on the right

Dimensions

H	No. of blades	Position of drive arm	
		X	Blade
mm	–	mm	–
180	1	90	1
345	2	90	1
510	3	90	1
675	4	255	2
840	5	420	3
1005	6	420	3
1170	7	585	4
1335	8	585	4
1500	9	750	5
1665	10	750	5
1830	11	915	6
1995	12	915	6

Dimensional drawing of JZ-S-A2 intermediate sizes

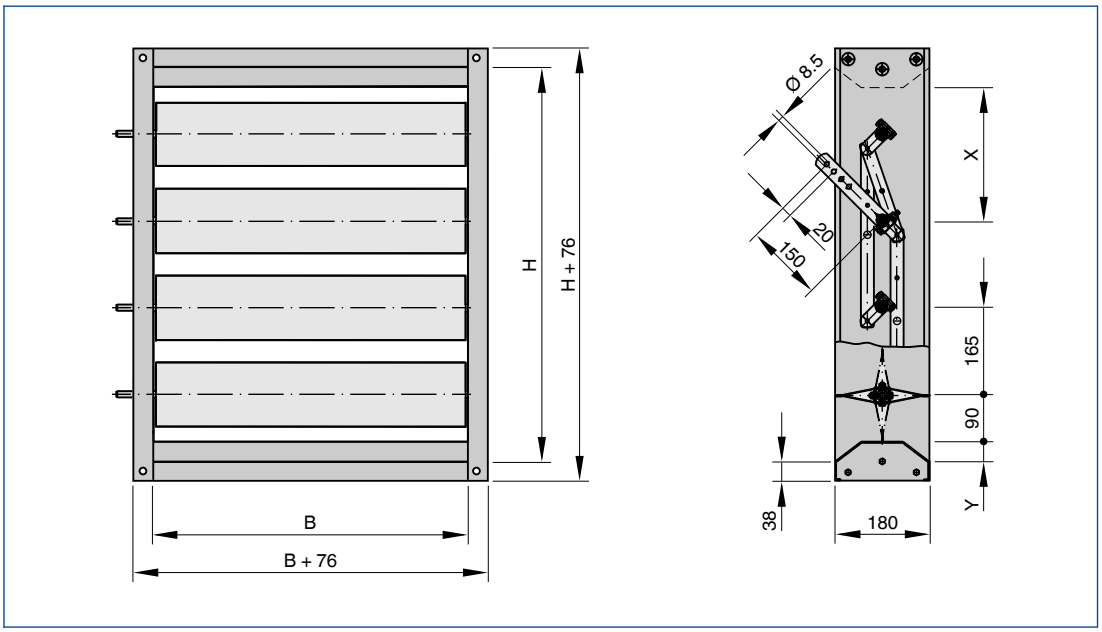


Illustration shows a multileaf damper with drive arm, operating side on the right

Dimensions

H	No. of blades	Position of drive arm		Y
		X	Blade	
mm	–	mm	–	mm
183 – 343	1	90	1	1.5 – 81.5
348 – 508	2	90	1	1.5 – 81.5
513 – 673	3	90	1	1.5 – 81.5
678 – 838	4	255	2	1.5 – 81.5
843 – 1003	5	420	3	1.5 – 81.5
1008 – 1168	6	420	3	1.5 – 81.5
1173 – 1333	7	585	4	1.5 – 81.5
1338 – 1498	8	585	4	1.5 – 81.5
1503 – 1663	9	750	5	1.5 – 81.5
1668 – 1828	10	750	5	1.5 – 81.5
1833 – 1993	11	915	6	1.5 – 81.5
1998	12	915	6	1.5

1

Description

Multileaf damper, variant JZ-P-A2

For ATEX classification see Chapter K3 – 1.3, Explosion-proof actuators

Variant
– JZ-P-A2: Multileaf damper with parallel blade action, made of stainless steel

Construction
– Stainless steel, corner holes on both sides, plastic bearings, temperature resistant up to 100 °C
– G: Flange holes on both sides
– M: Brass bearings, temperature resistant up to 150 °C
– E: Stainless steel bearings, temperature resistant up to 150 °C (up to 200 °C while not being activated)

Combinations are available, with one exception: M cannot be combined with E

Parts and characteristics
– Ready-to-install shut-off damper
– Blades with external linkage
– Drive arm

Construction features
– Rectangular casing, with screws, material thickness 1.25 mm
– Blades, material thickness 1 mm
– Flanges on both sides, suitable for duct connection, either flange holes or corner holes
– External linkage, robust and durable, consisting of the coupling rod and horizontal arms
– Blade shafts, Ø12 mm, with notch to indicate the blade position
– The drive arm can be fixed to every blade (by others)
– Construction and materials comply with the EU directive and guidelines for use in potentially explosive atmospheres (ATEX) for variants with brass or stainless steel bearings (-M, -E)

Materials and surfaces
– Casing, blades and external linkage made of stainless steel, material no. 1.4301
– Shafts made of stainless steel, material no. 1.4305
– Surface: pickled and passivated
– P1: Powder-coated, RAL CLASSIC colour
– PS: Powder-coated, NCS or DB colour

Installation and commissioning
– With horizontal or vertical blades
– With or without installation subframe
– Torsion-free installation
– For widths exceeding 2000 mm or heights exceeding 1995 mm install two multileaf dampers side by side or one above the other

Weight

H	B [mm]									
	200	400	600	800	1000	1200	1400	1600	1800	2000
mm	kg									
180	4	6	8	9	11	13	14	16	18	19
345	6	8	10	12	15	17	19	21	24	26
510	7	10	13	16	19	22	25	27	30	33
675	10	13	16	20	23	27	30	33	37	40
840	11	15	19	23	28	32	37	41	46	50
1005	11	17	22	27	32	38	43	48	53	59
1170	13	19	25	31	37	43	49	55	61	67
1335	15	22	28	35	41	48	55	61	68	74
1500	16	23	30	37	44	51	59	66	73	80
1665	17	25	33	41	49	57	65	72	80	88
1830	18	27	35	44	52	61	69	78	86	95
1995	19	29	38	47	56	66	75	84	94	103

Dimensions

For detailed information on corner holes and flange holes see Dimensions – Duct connection

For detailed information on drive shafts see Dimensions – Drive shafts

Dimensional drawing of JZ-P-A2 standard sizes

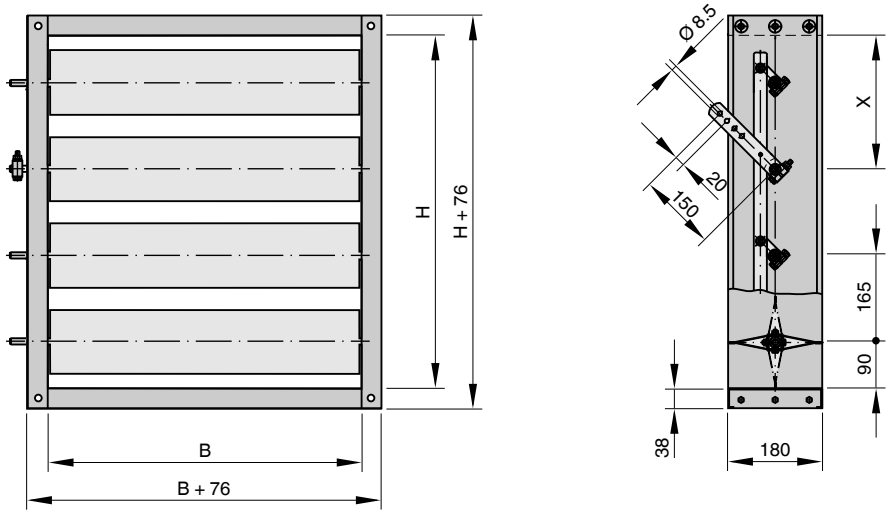


Illustration shows a multileaf damper with drive arm, operating side on the right

Dimensions

H	No. of blades	Position of drive arm	
		X	Blade
mm	–	mm	–
180	1	90	1
345	2	90	1
510	3	90	1
675	4	255	2
840	5	420	3
1005	6	420	3
1170	7	585	4
1335	8	585	4
1500	9	750	5
1665	10	750	5
1830	11	915	6
1995	12	915	6

1

Dimensional drawing of JZ-P-A2 intermediate sizes

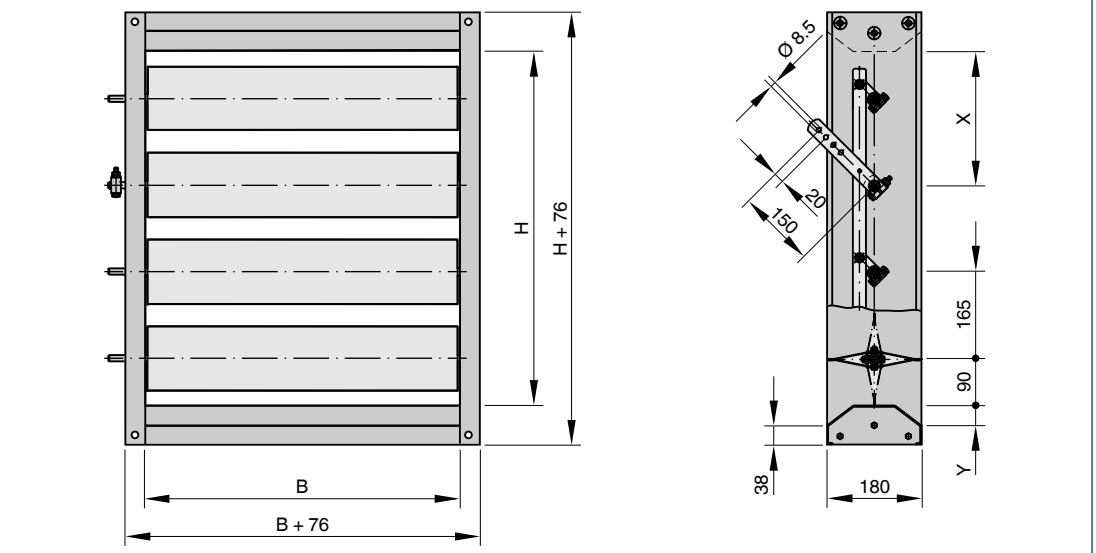


Illustration shows a multileaf damper with drive arm, operating side on the right

Dimensions

H	No. of blades	Position of drive arm		Y
		X	Blade	
mm	–	mm	–	mm
183 – 343	1	90	1	1.5 – 81.5
348 – 508	2	90	1	1.5 – 81.5
513 – 673	3	90	1	1.5 – 81.5
678 – 838	4	255	2	1.5 – 81.5
843 – 1003	5	420	3	1.5 – 81.5
1008 – 1168	6	420	3	1.5 – 81.5
1173 – 1333	7	585	4	1.5 – 81.5
1338 – 1498	8	585	4	1.5 – 81.5
1503 – 1663	9	750	5	1.5 – 81.5
1668 – 1828	10	750	5	1.5 – 81.5
1833 – 1993	11	915	6	1.5 – 81.5
1998	12	915	6	1.5

Description

Multileaf damper, variant JZ-AL

Variant

– JZ-AL: Multileaf damper with opposed blade action, made of aluminium

Construction

– Aluminium

Parts and characteristics

– Ready-to-install shut-off damper
– Blades with gears
– Drive arm with drive shaft and bearing plate
– Temperature resistant up to 90 °C

Construction features

– Rectangular casing, with screws, material thickness 1.5 mm
– Blades, material thickness 1.25 mm
– Flanges on both sides, suitable for duct connection, with corner holes
– Gears on both blade ends
– Blade shafts, Ø12 mm, with notch to indicate the blade position
– Bearings with ring seals

Materials and surfaces

– Casing and blades made of extruded aluminium profile
– Shafts, bearing plate and position indicator made of galvanised steel
– Gears made of special anti-static plastic
– P1: Powder-coated, RAL CLASSIC colour
– PS: Powder-coated, NCS or DB colour
– S3: Anodised to EURAS standard, E6-C-0

Installation and commissioning

– With horizontal or vertical blades
– With or without installation subframe
– Torsion-free installation

Weight

H	B [mm]										
	200	300	400	500	600	700	800	900	1000	1100	1200
mm	kg										
100	2	2	2	3	3	3	4	4	4	5	5
200	2	2	3	3	3	4	4	5	5	5	6
300	3	3	4	4	5	5	5	6	6	7	7
400	4	4	5	5	6	6	7	7	8	8	9
500	4	4	5	5	6	7	7	8	9	9	10
600	5	5	6	7	7	8	9	9	10	11	11
700	6	6	7	8	8	9	10	11	11	12	13
800	6	7	8	9	9	10	11	12	13	13	14
900	7	7	8	9	10	11	12	13	14	15	16
1000	6	7	9	10	11	12	13	14	15	16	17

1

Dimensions

For detailed information on corner holes and flange holes see Dimensions – Duct connection

For detailed information on drive shafts see Dimensions – Drive shafts

Dimensional drawing of JZ-AL standard sizes

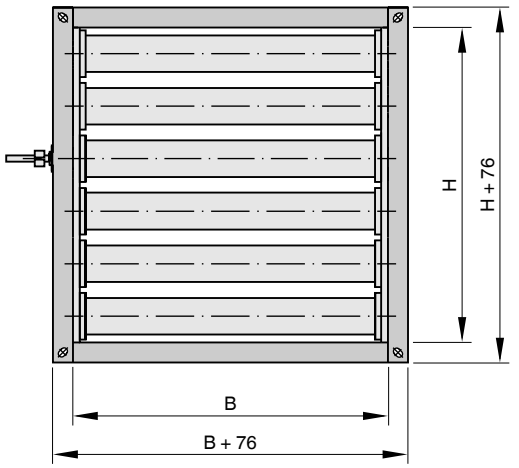


Illustration shows a multileaf damper with drive arm

Dimensions

H	No. of blades	Position of drive arm	
		X	Blade
mm	–	mm	–
100	1	50	1
200	2	50	1
300	3	50	1
400	4	250	3
500	5	250	3
600	6	250	3
700	7	250	3
800	8	250	3
900	9	250	3
1000	10	250	3

Dimensional drawing of JZ-AL intermediate sizes

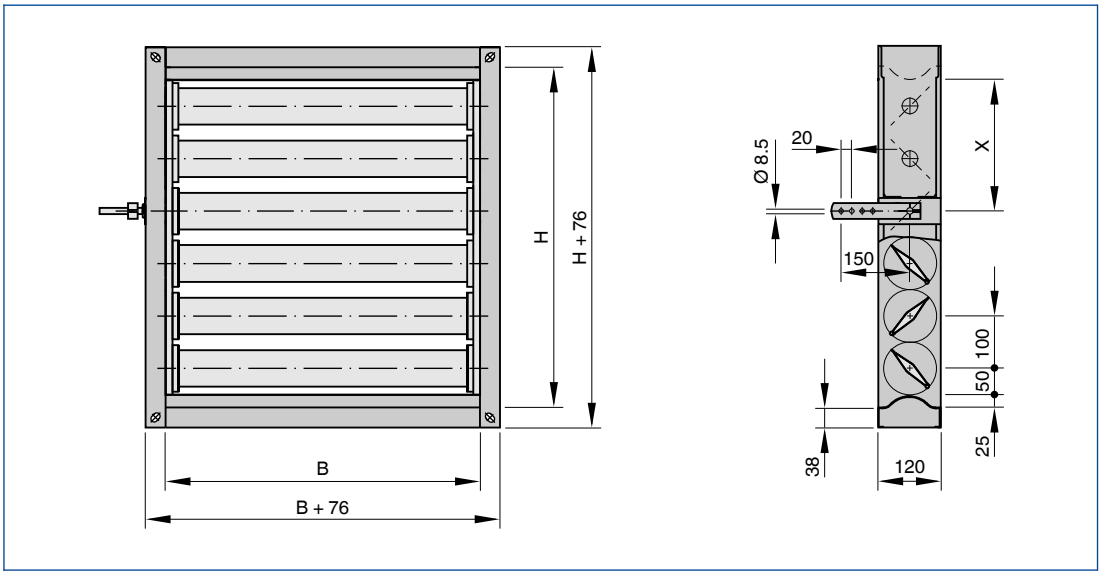


Illustration shows a multileaf damper with drive arm

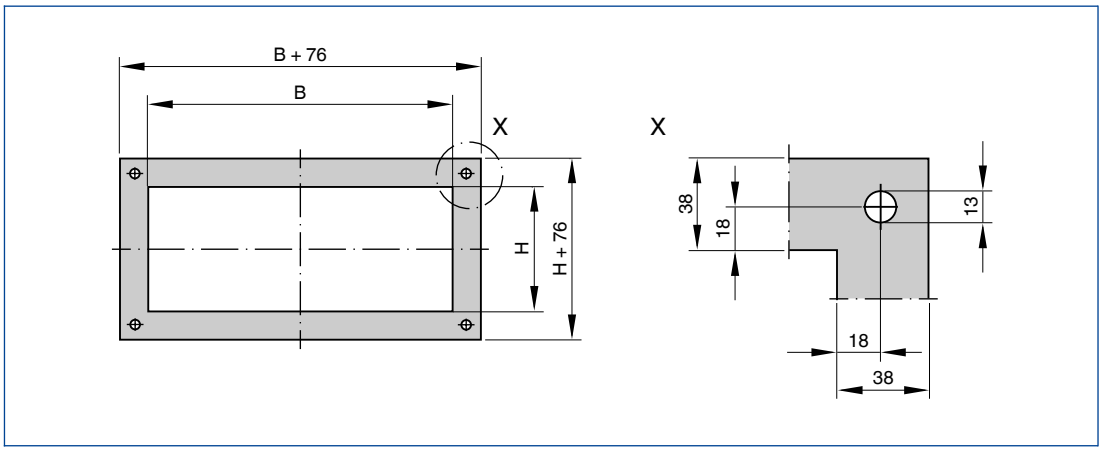
Dimensions

H	No. of blades	Position of drive arm	
		X	Blade
mm	–	mm	–
150	1	50	1
250	2	50	1
350	3	50	1
450	4	250	3
550	5	250	3
650	6	250	3
750	7	250	3
850	8	250	3
950	9	250	3
1050	10	250	3

1

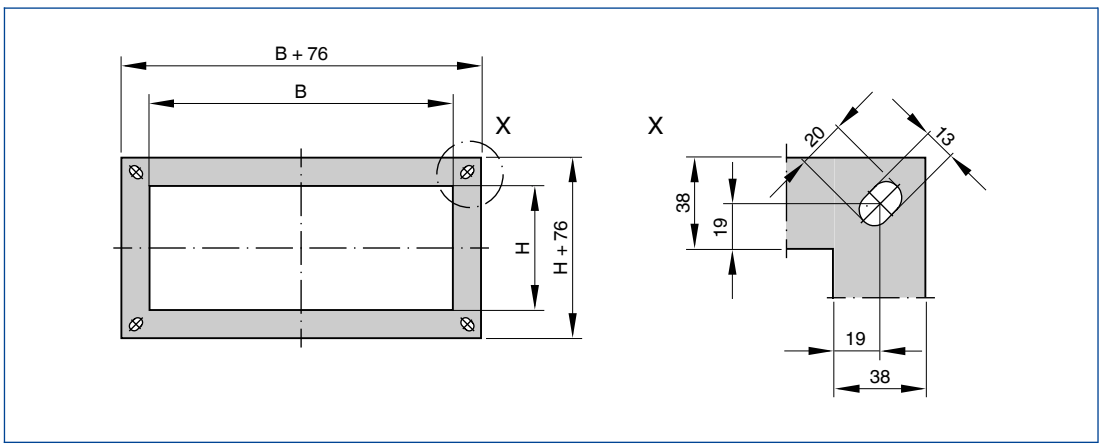
Corner holes

Corner holes – multileaf dampers made of steel or stainless steel



JZ-S, JZ-P, JZ-A2-S, JZ-A2-P

Corner holes – multileaf dampers made of aluminium



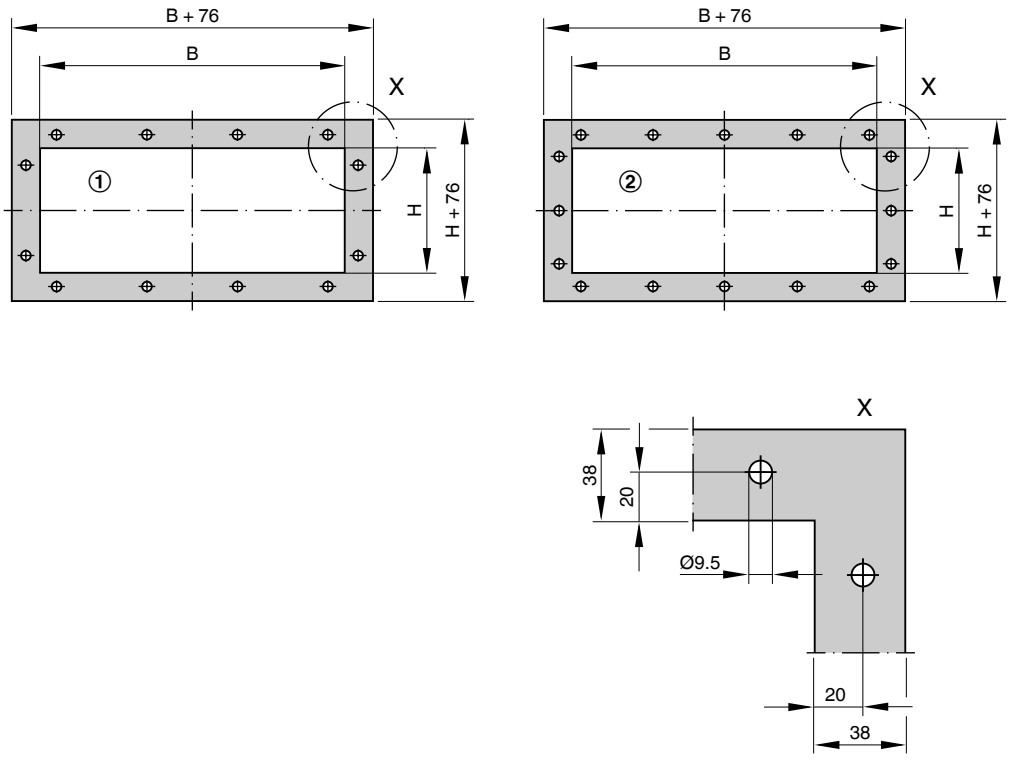
JZ-AL

Flange holes

Constructions with flange holes (-G) do not have corner holes.

Flange holes on casing sizes from width 288 mm and height 212 mm

Flange holes – multileaf dampers made of steel or stainless steel



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

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

JZ-S, JZ-P, JZ-A2-S, JZ-A2-P

No. of holes per side

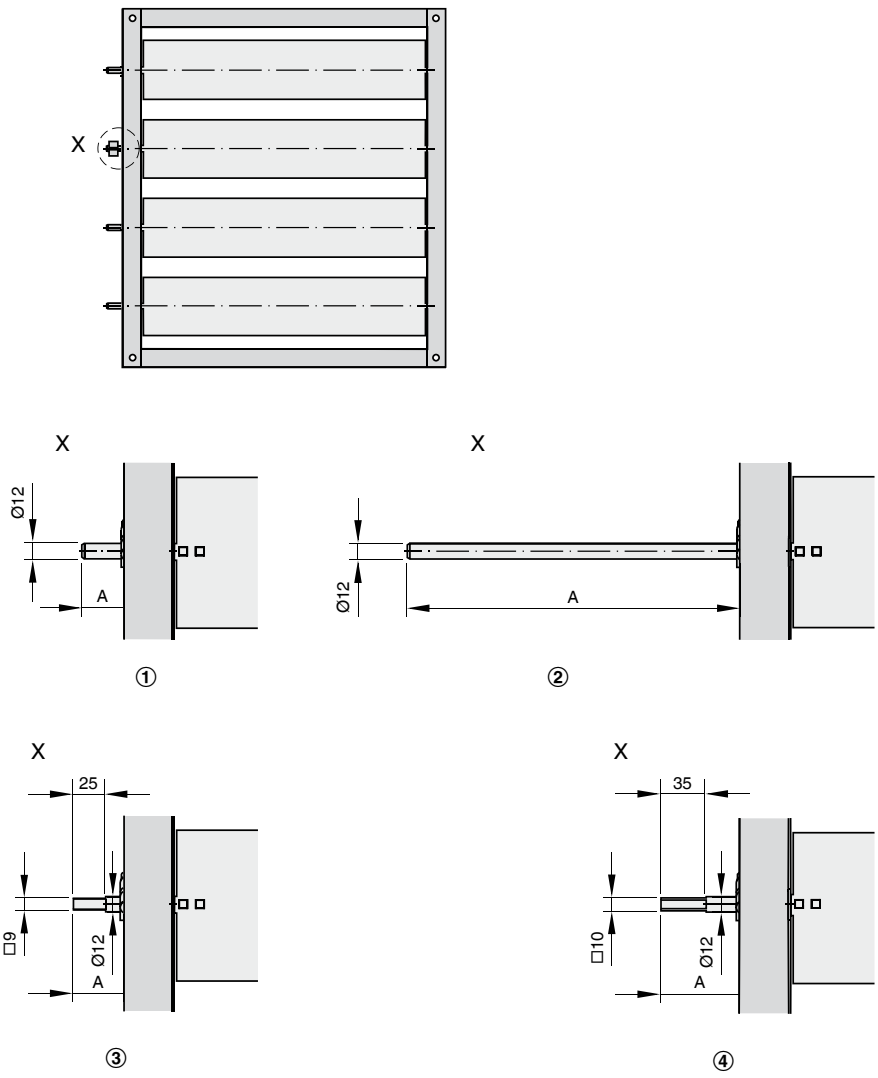
B	No. of holes
	n
mm	–
288 – 537	2
538 – 787	3
788 – 1037	4
1038 – 1287	5
1288 – 1537	6
1538 – 1787	7
1788 – 2000	8

No. of holes per side

H	No. of holes
	n
mm	–
212 – 461	2
462 – 711	3
712 – 961	4
962 – 1211	5
1212 – 1461	6
1462 – 1711	7
1712 – 1961	8
1962 – 1995	9

1 Drive shafts (special accessory) upon request.

Drive shafts for JZ-*, JZ-*-A2

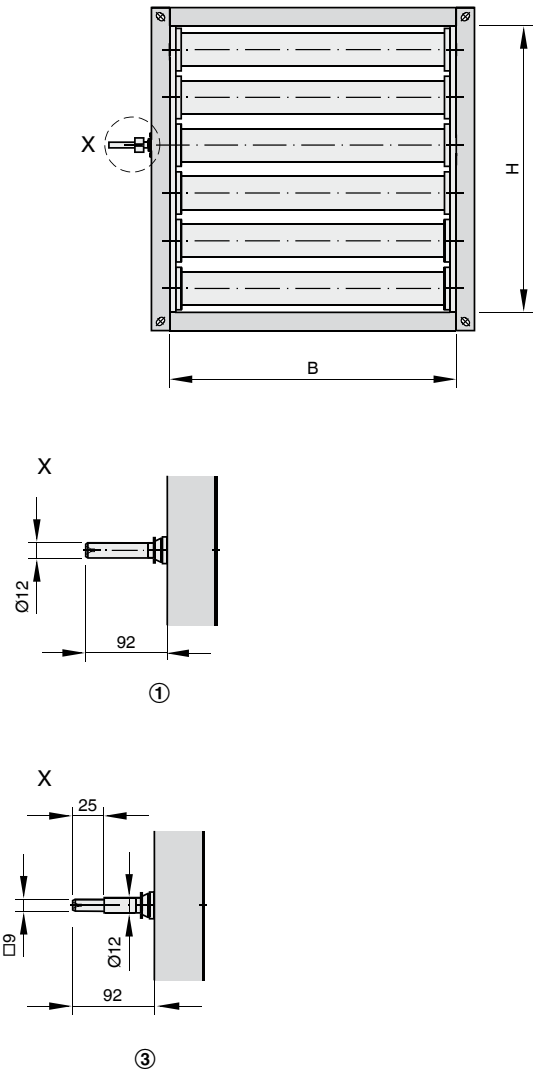


① Standard shaft
② ZS99 - extended drive shaft
③ ZS991 – square shaft 9 mm
④ ZS992 – square shaft 10 mm

Shaft end projection

Drive shaft	Multileaf damper			
	JZ-S	JZ-P	JZ-S-A2	JZ-P-A2
	A			
	mm			
① Standard	32.5	32.5	32.5	32.5
② Extended	255	255	190	190
③ Square 9 mm	38	38	45	45
④ Square 10 mm	60	60	–	–

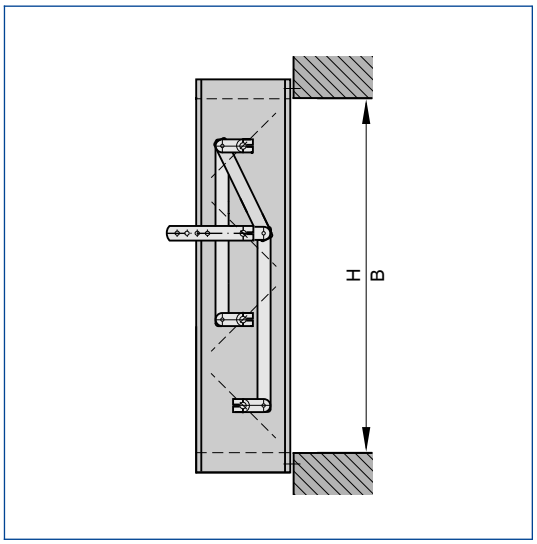
Drive shafts for JZ-AL



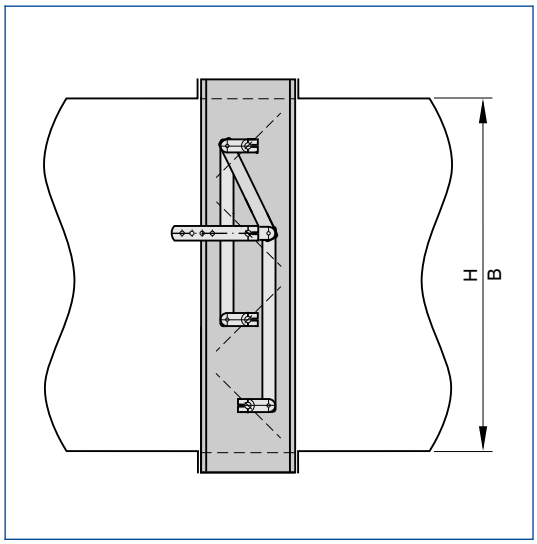
① Standard shaft
② ZS99 - extended drive shaft
③ ZS991 – square shaft

1

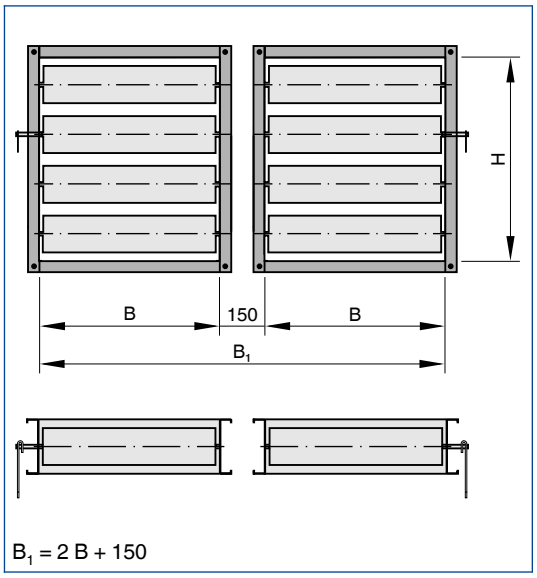
Wall installation without installation subframe



Duct installation



Width subdivided



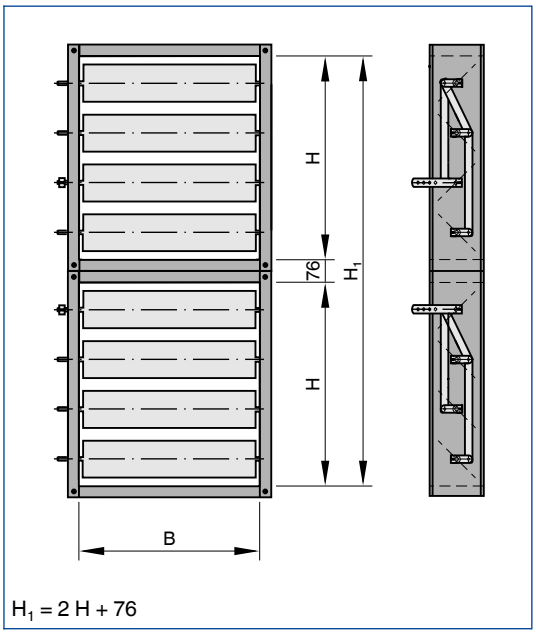
$B_1 = 2\ B + 150$

Steel and stainless steel variants only

Dimensions

B_1	B
mm	mm
2550	1200
2950	1400
3350	1600
3750	1800
4150	2000

Height subdivided



$H_1 = 2\,H + 76$

Steel and stainless steel variants only

Dimensions

H_1	H
mm	mm
2086	1005
2416	1170
2746	1335
3076	1500
3406	1665
3736	1830
4066	1995

1

Standard text

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

Rectangular multileaf dampers for volume flow and pressure control as well as for shutting off ducts and openings in walls and ceiling slabs. Suitable for duct pressures up to 1000 Pa. Ready-to-operate unit which consists of the casing, aerofoil blades and the blade mechanism. Flanges on both sides, suitable for duct connection.
The blade position is indicated externally by a notch in the blade shaft extension.
Casing air leakage to EN 1751, class C.

Special features

- Aerofoil blades
- Low-maintenance, robust construction
- No parts with silicone
- Available in standard sizes and many intermediate sizes

Technical data

- Nominal sizes: 200 × 100 mm – 2000 × 1995 mm
- Volume flow rate: 200 – 40,000 l/s or 720 – 143,640 m^3/h at 10 m/s
- Differential pressure range: 5 – 3500 Pa
- Operating temperature: –20 – 150 °C

Sizing data

- $\dot{V}$ _____ [m^3/h]
- Δp_{st} _____ [Pa]
- L_{PA} air-regenerated noise _____ [dB(A)]

Order options JZ-*, JZ-*-A2

1 Type

JZ Multileaf damper

2 Function

☐ **S** Opposed (standard)
☐ **P** Parallel

3 Material

No entry: galvanised steel
☐ **A2** Stainless steel

4 Construction

No entry: corner holes on both sides; plastic bearings
☐ **G** Flange holes on both sides (no corner holes)
☐ **M** Brass bearings
☐ **E** Stainless steel bearings
☐ **M-V** Brass bearings and reinforced blades (not for JZ-A2)
☐ **E-V** Stainless steel bearings and reinforced blades (not for JZ-A2)
M, E, M-V, E-V can be combined with G

5 Operating side

No entry: on the right
☐ **L** Left

6 Nominal size [mm]

B × H
B > 2000 = width subdivided
H > 1998 = height subdivided

7 Installation subframe

No entry: none
☐ **ER** With (only for construction G)

8 Attachments

No entry: none
☐ **Z04 – Z07** Quadrant stay
☐ **Z12 – Z51** Actuators
☐ **ZF01 – ZF15** Spring return actuators
☐ **Z60 – Z77** Pneumatic actuators

Explosion-proof actuators
☐ **Z1EX, Z3EX** Electric
☐ **Z60EX – Z77EX** Pneumatic

9 Damper blade safety function

Only for spring return actuators or pneumatic actuators
☐ **NO** Pressure off/power off to OPEN
☐ **NC** Pressure off/power off to CLOSE

10 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 %

JZ-AL

1 Type
JZ Multileaf damper

2 Material
AL Aluminium

3 Nominal size [mm]
B × H

4 Installation subframe
No entry: none
☐ **ER** With

5 Attachments
No entry: none
☐ **Z04 – Z07** Quadrant stay
☐ **Z12 – Z51** Actuators
☐ **ZF01 – ZF15** Spring return actuators
☐ **Z60 – Z77** Pneumatic actuators

6 Damper blade safety function
Only for spring return actuators or pneumatic actuators
☐ **NO** Pressure off/power off to OPEN
☐ **NC** Pressure off/power off to CLOSE

7 Surface
No entry: standard construction
☐ **P1** Powder-coated, RAL CLASSIC colour
☐ **PS** Powder-coated, DB colour
☐ **S3** Anodised to EURAS standard, E6-C-0
Gloss level:
RAL 9010 50 %
RAL 9006 30 %
All other RAL colours 70 %

Notes

Multileaf dampers
Type JZ – Low leakage

Opposed blades

Closed cell side seals

Encased gears

For low-leakage shut-off in air conditioning systems

Rectangular multileaf dampers for volume flow and pressure control as well as for low-leakage shut-off of ducts and openings in walls and ceiling slabs

- Maximum dimensions of steel and stainless steel variants: 2000 × 1995 mm; of aluminium variant: 1200 × 1050 mm
- Closed blade air leakage to EN 1751, classes 1 – 4, depending on variant
- Casing air leakage to EN 1751, class C
- Aerofoil opposed action blades
- Closed cell side seals meet increased hygiene requirements
- Steel and stainless steel variants: blades interconnected by external linkage
- Aluminium variant: blades interconnected by gears
- Available in standard sizes and many intermediate sizes

Optional equipment and accessories

- Actuators: Open/Close actuators, modulating actuators
- Explosion-proof construction with pneumatic actuator or spring return actuator (not for JZ-*L-AL)
- Powder-coated construction
- Aluminium variant also as anodised construction

1

Type		Page
JZ – Low leakage	General information	1.1 – 36
	Order code	1.1 – 40
	Technical data	1.1 – 42
	Quick sizing	1.1 – 45
	Dimensions and weight – JZ-LL	1.1 – 46
	Dimensions and weight – JZ-HL	1.1 – 49
	Dimensions and weight – JZ-LL-A2	1.1 – 52
	Dimensions and weight – JZ-LL-AL	1.1 – 55
	Dimensions and weight – JZ-HL-AL	1.1 – 58
	Dimensions – Duct connection	1.1 – 61
	Dimensions – Drive shafts	1.1 – 63
	Installation details	1.1 – 65
	Specification text	1.1 – 66
	Basic information and nomenclature	1.4 – 1

Variants

Product examples

Multileaf damper, variant JZ-LL

Multileaf damper with explosion-proof actuator

Multileaf damper, variant JZ-HL

Multileaf damper with actuator

Multileaf damper, variant JZ-LL-A2

Multileaf damper with actuator

Multileaf damper, variant JZ-LL-AL

Multileaf damper with actuator

Multileaf damper, variant JZ-HL-AL

Multileaf damper without accessories and attachments

Description

For detailed information on attachments see Chapter K3 – 1.3

For detailed information on accessories see Chapter K3 – 1.2

Application
- Multileaf dampers of Type JZ-Low leakage are used as an acting element in the volume flow and pressure control in air conditioning systems
- For low-leakage shut-off of ducts and openings in walls and ceiling slabs
- Stainless steel and powder-coated constructions with increased corrosion resistance if required
- Temperature resistant up to 100 °C (steel and stainless steel construction variants)
- Steel and stainless steel variants with brass or stainless steel bearings are suitable for use in potentially explosive atmospheres (ATEX)

Classification
Closed blade air leakage to EN 1751
JZ-LL, JZ-LL-A2
Test pressure up to 2000 Pa
- Up to B = 599 mm, class 3
- B = 600 – 1000 mm, class 4

Test pressure up to 1000 Pa
- Up to B = 599 mm, class 3
- B = 600 – 2000 mm, class 4

JZ-HL
Test pressure up to 2000 Pa
- Up to B = 599 mm, class 1
- From B = 600 mm, class 2

JZ-LL-AL
Test pressure up to 2000 Pa
- For all sizes, class 4

JZ-HL-AL
Test pressure up to 2000 Pa
- For all sizes, class 2

Variants
- JZ-LL: Multileaf damper with opposed blade action, made of galvanised sheet steel, to EN 1751, classes 3 – 4
- JZ-HL: Multileaf damper with opposed blade action, made of galvanised sheet steel, to EN 1751, classes 1 – 2
- JZ-LL-A2: Multileaf damper with opposed blade action, made of stainless steel, to EN 1751, classes 3 – 4
- JZ-LL-AL: Multileaf damper with opposed blade action, made of aluminium, to EN 1751, class 4
- JZ-HL-AL: Multileaf damper with opposed blade action, made of aluminium, to EN 1751, class 2

Nominal sizes
JZ-LL, JZ-HL, JZ-LL-A2
- B: 200, 400, 600, 800, 1000, 1200, 1400, 1600, 1800, 2000 mm (intermediate sizes: 201 – 1998 mm in increments of 1 mm)
- H: 180, 345, 510, 675, 840, 1005, 1170, 1335, 1500, 1665, 1830 and 1995 mm (intermediate sizes 183 – 1998 mm in increments of 1 mm)
- Any combination of B × H

JZ-LL-AL, JZ-HL-AL
- B: 200, 400, 600, 800, 1000, 1200 mm (intermediate sizes: 201 – 1199 mm, in increments of 1 mm)
- H: 100, 150, 200, 250, 300, 350, 400, 450, 500, 550, 600, 650, 700, 750, 800, 850, 900, 950, 1000, 1050 mm
- Any combination of B × H

Attachments
- Quadrant stays and limit switches: Quadrant stays to adjust the damper blades (stepless adjustment) and for capturing the end positions
- Open/Close actuators: Actuators for opening and closing multileaf dampers
- Modulating actuators: Actuators for stepless blade adjustment
- Pneumatic actuators: Pneumatic actuators for opening and closing multileaf dampers
- Explosion-proof actuators: Actuators for opening and closing multileaf dampers installed in potentially explosive atmospheres

Accessories
- Installation subframe: Installation subframe for the fast and simple installation of multileaf dampers

Special features
- Aerofoil blades
- Low-maintenance, robust construction
- No parts with silicone
- Available in standard sizes and many intermediate sizes
- Closed cell side seals meet increased hygiene requirements

Standards and guidelines
- Casing air leakage to EN 1751, class C
- JZ-LL, JZ-LL-A2, JZ-HL from B = 600 mm, JZ-LL-AL, and JZ-HL-AL meet the general requirements of DIN 1946, part 4, with regard to the maximum closed blade air leakage
- JZ-LL from B = 600 mm, JZ-LL-A2 from B = 600 mm, and JZ-LL-AL meet the general requirements of DIN 1946, part 4, with regard to the maximum closed blade air leakage

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

1

Technical data

Nominal sizes	200 × 100 mm – 2000 × 1995 mm
Volume flow rate range	200 – 40,000 l/s
Volume flow rate range	720 – 143,640 m^3/h
Maximum static differential pressure	Up to 3500 Pa
Operating temperature	0 – 100 °C

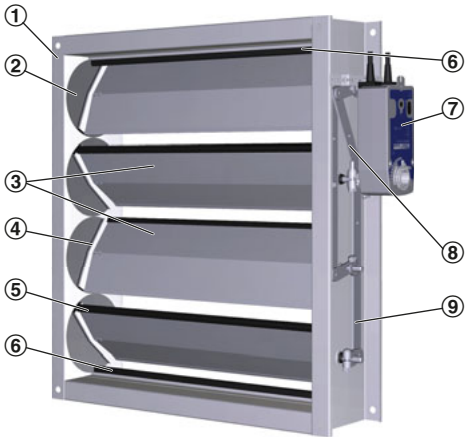
Function

Functional description

Linkage
Low-leakage multileaf dampers with external linkage have opposed action blades.
An external linkage transfers the synchronous rotational movement from the drive arm to the individual blades. Even very large multileaf dampers can be safely opened and closed with this type of linkage.
Opposed action blades close at different speeds since the linkage includes a transverse link. This facilitates the closing process and reduces the closed blade air leakage.

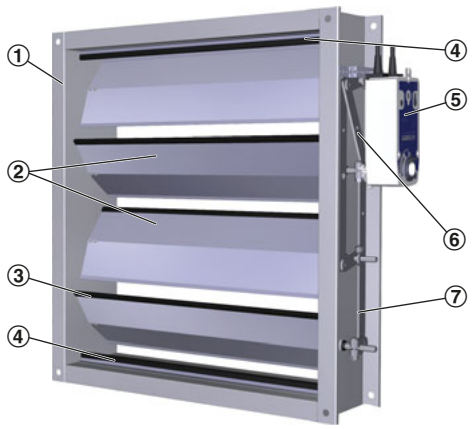
Gears
Multileaf dampers with gears can only have opposed action blades.
The internal gears transfer the synchronous rotational movement from the drive arm to the individual blades.

Schematic illustration of JZ-LL and JZ-LL-A2



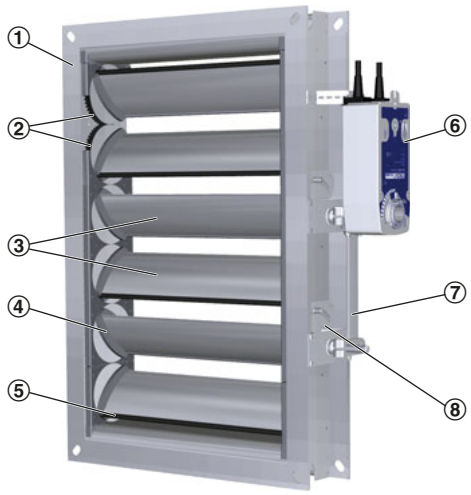
① Casing
② Slide disc
③ Opposed blades
④ Side seal
⑤ Blade tip seal
⑥ Travel stop (angle section with seal)
⑦ Actuator
⑧ Transverse link
⑨ External linkage

Schematic illustration of JZ-HL



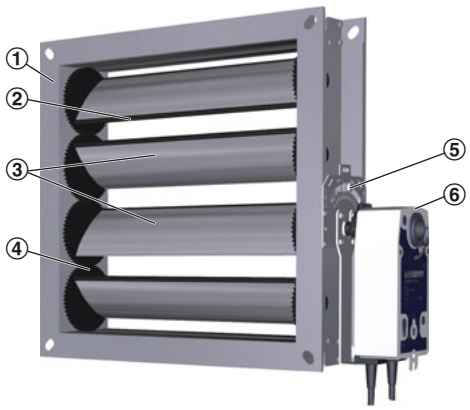
① Casing
② Opposed blades
③ Blade tip seal
④ Travel stop (angle section with seal)
⑤ Actuator
⑥ Transverse link
⑦ External linkage

Schematic illustration of JZ-LL-AL



① Casing
② Encased gears
③ Opposed blades
④ Side seal
⑤ Blade tip seal
⑥ Actuator
⑦ External linkage (from = 600 mm)
⑧ Bearing plate with quadrant stay

Schematic illustration of JZ-HL-AL



① Casing
② Blade tip seal
③ Opposed blades
④ Gears
⑤ Bearing plate with quadrant stay
⑥ Actuator

1

Order code

JZ–LL, JZ–HL

JZ – HL – A2 – G - E - V – L / 1000×1005 / ER / Z64 / NC / P1 – RAL ...

1 2 3 4 5 6 7 8 9 10

1 Type
JZ Multileaf damper

2 Classification
Closed blade air leakage to EN 1751
LL Classes 3 – 4
HL Classes 1 – 2

3 Material
No entry: galvanised steel
A2 Stainless steel (only for classification LL)

4 Construction
No entry: corner holes on both sides; plastic bearings
G Flange holes on both sides (no corner holes)
M Brass bearings
E Stainless steel bearings
M-V Brass plain bearings and reinforced blades (not for JZ-LL-A2)
E-V Stainless steel plain bearings and reinforced blades (not for JZ-LL-A2)
M, E, M-V, E-V can be combined with G

5 Operating side
No entry: on the right
L Left

6 Nominal size [mm]
B × H
B > 2000 = width subdivided
H > 1998 = height subdivided

7 Installation subframe
No entry: none
ER With (only for construction G)

8 Attachments
No entry: none
Z04 – Z07 Quadrant stay
Z12 – Z51 Actuators
ZF01 – ZF15 Spring return actuators
Z60 – Z77 Pneumatic actuators
Explosion-proof actuators
Z1EX, Z3EX Electric
Z60EX – Z77EX Pneumatic

9 Damper blade safety function
Only for spring return actuators or pneumatic actuators
NO Pressure off/power off to OPEN
NC Pressure off/power off to CLOSE

10 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

JZ–LL–G–L/1200×675/ER/ZF06/NC

Classification	Classes 3 – 4
Material	Galvanised steel
Construction	Flange holes on both sides
Operating side	On the left
Nominal size	1200 × 675 mm
Installation subframe	With
Attachments	Spring return actuator SF24A
Damper blade position	Power off to CLOSE
Surface	Standard construction

Order code

JZ–LL–AL, JZ–HL–AL

JZ – LL – AL / 1200×800 / ER / Z64 / NO / P1 – RAL ...

1 2 3 4 5 6 7 8

1 Type
JZ Multileaf damper

2 Classification
Closed blade air leakage to EN 1751
LL Class 4
HL Class 2

3 Material
AL Aluminium

4 Nominal size [mm]
B × H

5 Installation subframe
No entry: none
ER With installation subframe

6 Attachments
Z04 – Z07 Quadrant stay
Z12 – Z51 Actuators
ZF01 – ZF15 Spring return actuators
Z60 – Z77 Pneumatic actuators

7 Damper blade safety function
Only for spring return actuators or pneumatic actuators
NO Pressure off/power off to OPEN
NC Pressure off/power off to CLOSE

8 Surface
No entry: standard construction
P1 Powder-coated, RAL CLASSIC colour
PS Powder-coated, DB colour
S3 Anodised to EURAS standard, E6-C-0
Gloss level:
RAL 9010 50 %
RAL 9006 30 %
All other RAL colours 70 %

Order example

JZ–LL–AL/800×500/S3

Classification	Class 4
Material	Aluminium
Nominal size	800 × 500 mm
Installation subframe	Without
Attachments	Without
Surface	Anodised to EURAS standard, E6-C-0, natural colour

1

Torque

The torque for closing a multileaf damper must be such that the damper can be safely opened and closed.
For closing, the torque must suffice to ensure complete shut-off by the blades, i.e. the blades must be tightly pressed against the seals.
This is the prerequisite for maintaining the stated closed blade air leakage.
Opening is initiated without aerodynamic forces but then the blades must be moved away from the seals.
When air flows through the damper, the aerodynamic forces of the airflow create a closing force (torque) on the blades; this happens independent of the direction of the airflow.
This closing force must be countered, or overcome. The blade position, or blade angle α, for which there is the largest torque depends, among other factors, on the fan characteristics.

Minimum torque for JZ-LL, JZ-LL-A2

H	B [mm]									
	200	400	600	800	1000	1200	1400	1600	1800	2000
mm	Nm									
180	10	10	10	10	10	10	10	10	10	10
345	10	10	10	10	10	10	10	10	10	10
510	10	10	10	10	10	10	15	15	15	15
675	10	10	10	10	10	10	15	15	15	15
840	10	10	10	10	15	15	15	15	15	15
1005	10	10	15	15	15	15	15	15	20	20
1170	15	15	15	15	15	15	20	20	30	30
1335	15	15	15	15	20	20	30	30	30	30
1500	15	15	15	20	20	30	30	30	30	30
1665	20	20	20	20	30	30	30	30	30	30
1830	20	20	20	20	30	30	30	30	30	30
1995	20	20	20	20	30	30	30	30	30	30

Minimum torque for JZ-HL

H	B [mm]									
	200	400	600	800	1000	1200	1400	1600	1800	2000
mm	Nm									
180 – 1995	10	10	10	10	10	10	10	10	10	10

Minimum torque for JZ-LL-AL

H	B [mm]									
	200	400	500	600	700	800	900	1000	1100	1200
mm	Nm									
100 – 650	10	10	10	10	10	10	10	10	10	10
700 – 1050	20	20	20	20	20	20	20	20	20	20

Minimum torque for JZ-HL-AL

H	B [mm]									
	200	400	500	600	700	800	900	1000	1100	1200
mm	Nm									
100 – 450	5	5	5	5	5	5	5	5	5	5
500 – 1050	10	10	10	10	10	10	10	10	10	10

Free area

Free area for steel and stainless steel multileaf dampers

H	B [mm]									
	200	400	600	800	1000	1200	1400	1600	1800	2000
mm	m^2									
180 – 344	0.03	0.06	0.09	0.12	0.15	0.18	0.21	0.24	0.27	0.30
345 – 509	0.06	0.11	0.17	0.23	0.28	0.34	0.40	0.45	0.51	0.57
510 – 674	0.08	0.17	0.25	0.33	0.42	0.50	0.58	0.67	0.75	0.83
675 – 839	0.11	0.22	0.33	0.44	0.55	0.66	0.77	0.88	0.99	1.10
840 – 1004	0.14	0.27	0.41	0.55	0.69	0.82	0.96	1.10	1.23	1.37
1005 – 1169	0.16	0.33	0.49	0.66	0.82	0.98	1.15	1.31	1.47	1.64
1170 – 1334	0.19	0.38	0.57	0.76	0.95	1.14	1.33	1.52	1.72	1.91
1335 – 1499	0.22	0.43	0.65	0.87	1.09	1.30	1.52	1.74	1.96	2.17
1500 – 1664	0.24	0.49	0.73	0.98	1.22	1.47	1.71	1.95	2.20	2.44
1665 – 1829	0.27	0.54	0.81	1.08	1.36	1.63	1.90	2.17	2.44	2.71
1830 – 1994	0.30	0.60	0.89	1.19	1.49	1.79	2.08	2.38	2.68	2.98
1995	0.32	0.65	0.97	1.30	1.62	1.95	2.27	2.60	2.92	3.25

Intermediate sizes: Intermediate widths can be interpolated

JZ-LL, JZ-HL, JZ-LL-A2

Free area for aluminium multileaf dampers

H	B [mm]									
	200	300	400	500	600	700	800	900	1000	1100	1200
mm	m^2										
100, 150	0.014	0.022	0.030	0.038	0.047	0.055	0.063	0.071	0.079	0.087	0.095
200, 250	0.028	0.045	0.061	0.077	0.093	0.109	0.126	0.142	0.158	0.174	0.19
300, 350	0.043	0.067	0.091	0.115	0.14	0.164	0.188	0.213	0.237	0.261	0.286
400, 450	0.057	0.089	0.122	0.154	0.186	0.219	0.251	0.284	0.316	0.348	0.381
500, 550	0.071	0.111	0.152	0.192	0.233	0.273	0.314	0.354	0.395	0.435	0.476
600, 650	0.085	0.134	0.182	0.231	0.279	0.328	0.377	0.425	0.474	0.522	0.571
700, 750	0.099	0.156	0.213	0.269	0.326	0.383	0.439	0.496	0.553	0.61	0.666
800, 850	0.113	0.178	0.243	0.308	0.373	0.437	0.502	0.567	0.632	0.697	0.761
900, 950	0.128	0.20	0.273	0.346	0.419	0.492	0.565	0.638	0.711	0.784	0.857
1000.1050	0.142	0.223	0.304	0.385	0.466	0.547	0.628	0.709	0.79	0.871	0.952

Intermediate sizes: Intermediate widths can be interpolated

JZ-LL-AL, JZ-HL-AL

Maximum static differential pressure for a closed multileaf damper

Maximum static differential pressure for a closed multileaf damper

Construction	Width [mm]						
	800	1000	1200	1400	1600	1800	2000
	$\Delta p_{st\ max}$						
	Pa						
Standard construction	2500	2000	1650	1400	1250	1100	1000
Brass bearings (-M)	3000	2500	2200	1950	1750	1600	1500
Stainless steel bearings (-E)	3000	2500	2200	1950	1750	1600	1500
Reinforced blades (-M-V, -E-V)	3500	3000	2700	2500	2300	2100	2000

JZ-LL, JZ-HL, JZ-LL-A2

Maximum static differential pressure for a closed multileaf damper JZ-LL-AL or JZ-HL-AL

2000 Pa

1 Sound power level for a closed multileaf damper

Sound power level for a closed multileaf damper JZ-LL or JZ-LL-A2

Δp_{st}	Area [m²]							
	0.14	0.2	0.4	0.6	0.8	1.2	2	4
	L_{WA}							
Pa	dB(A)							
100	<35	35	38	39	41	42	45	48
200	41	42	45	47	48	50	53	56
500	51	52	55	57	58	60	62	65
1000	58	60	63	64	66	68	70	>70
1500	63	64	67	69	>70	>70	>70	>70
2000	65	67	70	>70	>70	>70	>70	>70

Sound power level for a closed multileaf damper JZ-HL

Δp_{st}	Area [m²]							
	0.14	0.2	0.4	0.6	0.8	1.2	2	4
	L_{WA}							
Pa	dB(A)							
100	43	45	48	50	51	53	55	58
200	51	53	56	58	59	61	63	66
500	62	63	66	68	69	>70	>70	>70
1000	69	>70	>70	>70	>70	>70	>70	>70
1500	>70	>70	>70	>70	>70	>70	>70	>70
2000	>70	>70	>70	>70	>70	>70	>70	>70

Sound power level for a closed multileaf damper JZ-LL-AL

Δp_{st}	Area [m²]								
	0.04	0.09	0.16	0.25	0.36	0.64	0.81	1	1.2
	L_{WA}								
Pa	dB(A)								
100	<10	<10	<10	<10	10	12	13	14	15
200	<10	14	16	17	19	22	22	23	25
500	22	26	28	30	32	34	35	36	37
1000	32	35	37	39	41	43	44	45	46
1500	37	41	43	44	46	49	50	51	52
2000	41	44	47	49	51	53	54	55	56

Sound power level for a closed multileaf damper JZ-HL-AL

Δp_{st}	Area [m²]								
	0.04	0.09	0.16	0.25	0.36	0.64	0.81	1	1.2
	L_{WA}								
Pa	dB(A)								
100	28	32	34	36	38	40	41	42	43
200	37	41	44	46	47	50	51	51	52
500	49	53	56	58	59	>60	>60	>60	>60
1000	59	>60	>60	>60	>60	>60	>60	>60	>60
1500	>60	>60	>60	>60	>60	>60	>60	>60	>60
2000	>60	>60	>60	>60	>60	>60	>60	>60	>60

Quick sizing – differential pressure and sound power level

Quick sizing tables provide a good overview of the sound power levels and differential pressures that can be expected. Approximate intermediate values can be interpolated. Precise intermediate values and spectral data can be calculated with our Easy Product Finder design programme.

The sound power levels L_{WA} apply to multileaf dampers with a cross-sectional area (B × H) of 1 m^2.

The differential pressures apply to multileaf dampers installed in ducts (installation type A).

Quick sizing – differential pressure and sound power level for JZ-LL, JZ-LL-A2 and JZ-HL

v	Damper blade position α									
	OPEN		20°		40°		60°		80°	
	Δp_{st}	L_{WA}	Δp_{st}	L_{WA}	Δp_{st}	L_{WA}	Δp_{st}	L_{WA}	Δp_{st}	L_{WA}
m/s	Pa	dB(A)	Pa	dB(A)	Pa	dB(A)	Pa	dB(A)	Pa	dB(A)
0.5	<5	<30	<5	<30	<5	7.5	22	34	250	63
1	<5	<30	<5	<30	8	26	85	53	1000	83
2	<5	<30	<5	<30	30	46	345	73	>2000	>90
4	<5	41	10	44	120	65	1385	>90	>2000	>90
6	<5	52	24	56	270	77	>2000	>90	>2000	>90
8	10	60	42	64	480	85	>2000	>90	>2000	>90
10	14	67	65	70	750	>90	>2000	>90	>2000	>90

Quick sizing – differential pressure and sound power level for JZ-LL-AL

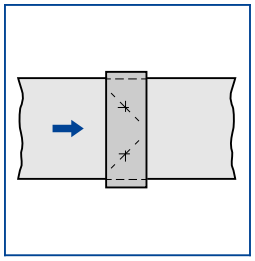
v	Damper blade position α									
	OPEN		20°		40°		60°		80°	
	Δp_{st}	L_{WA}	Δp_{st}	L_{WA}	Δp_{st}	L_{WA}	Δp_{st}	L_{WA}	Δp_{st}	L_{WA}
m/s	Pa	dB(A)	Pa	dB(A)	Pa	dB(A)	Pa	dB(A)	Pa	dB(A)
0.5	<5	<30	<5	<30	<5	15	18	35	146	57
1	<5	<30	<5	<30	9	31	71	51	585	73
2	<5	<30	5	<30	35	47	284	67	>2000	89
4	6	40	20	45	141	63	1136	83	>2000	>90
6	15	49	45	54	316	72	>2000	>90	>2000	>90
8	26	56	80	61	563	79	>2000	>90	>2000	>90
10	40	61	>90	66	879	84	>2000	>90	>2000	>90

Quick sizing – differential pressure and sound power level for JZ-HL-AL

v	Damper blade position α									
	OPEN		20°		40°		60°		80°	
	Δp_{st}	L_{WA}	Δp_{st}	L_{WA}	Δp_{st}	L_{WA}	Δp_{st}	L_{WA}	Δp_{st}	L_{WA}
m/s	Pa	dB(A)	Pa	dB(A)	Pa	dB(A)	Pa	dB(A)	Pa	dB(A)
0.5	<5	<30	<5	<30	<5	<30	22	42	245	67
1	<5	<30	<5	<30	8	35	90	58	985	83
2	<5	<30	<5	32	32	51	350	74	>2000	>90
4	<5	43	12	48	125	67	1390	90	>2000	>90
6	<5	52	24	57	275	76	>2000	>90	>2000	>90
8	10	59	45	64	490	83	>2000	>90	>2000	>90
10	14	64	70	69	765	88	>2000	>90	>2000	>90

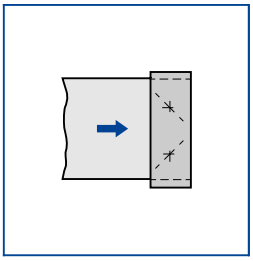
Installation types

Installation type A



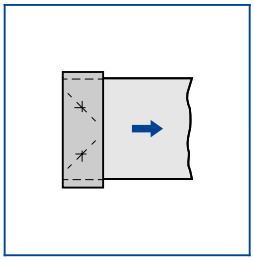
Ducts on both sides

Installation type B



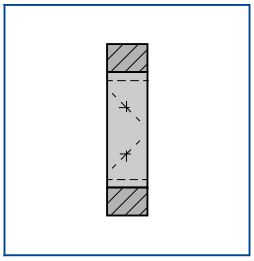
Air discharge

Installation type C



Air intake

Installation type D



Air transfer

1

Description

Multileaf damper, variant JZ-LL

For ATEX classification see Chapter K3 – 1.3, Explosion-proof actuators

Variant
– JZ-LL:
Multileaf damper with opposed blade action, made of galvanised sheet steel

Classification
Closed blade air leakage to EN 1751
Test pressure up to 2000 Pa
– Up to B = 599 mm, class 3
– B = 600 – 1000 mm, class 4
Test pressure up to 1000 Pa
– Up to B = 599 mm, class 3
– B = 600 – 2000 mm, class 4

Construction
– Galvanised sheet steel, corner holes on both sides, plastic bearings, temperature resistant up to 100 °C
– G: Flange holes on both sides
– M: Brass bearings
– E: Stainless steel bearings
– V: Reinforced blades (only for -M, -E)
– BM: Width subdivided
– HM: Height subdivided
Combinations are available, with one exception:
M cannot be combined with E

Parts and characteristics
– Ready-to-install shut-off damper
– Blades with external linkage
– Drive arm

Construction features
– Rectangular casing, welded (P1: casing with screws), material thickness 1.25 mm
– Blades, material thickness 1 mm
– Flanges on both sides, suitable for duct connection, either flange holes or corner holes
– External linkage, robust and durable, consisting of the coupling rod and horizontal arms
– Blade shafts, Ø12 mm, with notch to indicate the blade position
– Travel stop (angle section) ensures tight closure of the top and bottom blades
– Blade tip seals and side seals
– The drive arm can be fixed to every blade (by others)
– Construction and materials comply with the EU directive and guidelines for use in potentially explosive atmospheres (ATEX) for variants with brass or stainless steel bearings (-M, -E)

Materials and surfaces
– Casing and blades made of galvanised sheet steel
– Blade shafts, drive arm and external linkage made of galvanised steel
– Blade tip seals made of PP/PTV plastic
– Side seals made of closed cell PE foam
– P1: Powder-coated, RAL CLASSIC colour
– PS: Powder-coated, NCS or DB colour

Installation and commissioning
– With horizontal blades
– JZ-LL with vertical blades upon request
– With or without installation subframe
– Torsion-free installation
– For widths exceeding 2000 mm or heights exceeding 1995 mm install two multileaf dampers side by side or one above the other

Weight

H	B [mm]									
	200	400	600	800	1000	1200	1400	1600	1800	2000
mm	kg									
180	4	6	8	9	11	13	14	16	18	19
345	6	8	10	12	15	17	19	21	24	26
510	7	10	13	16	19	22	25	27	30	33
675	10	13	16	20	23	27	30	33	37	40
840	11	15	19	23	28	32	37	41	46	50
1005	11	17	22	27	32	38	43	48	53	59
1170	13	19	25	31	37	43	49	55	61	67
1335	15	22	28	35	41	48	55	61	68	74
1500	16	23	30	37	44	51	59	66	73	80
1665	17	25	33	41	49	57	65	72	80	88
1830	18	27	35	44	52	61	69	78	86	95
1995	19	29	38	47	56	66	75	84	94	103

1

Dimensions

For detailed information on corner holes and flange holes see Dimensions – Duct connection

For detailed information on drive shafts see Dimensions – Drive shafts

Dimensional drawing of JZ-LL standard sizes

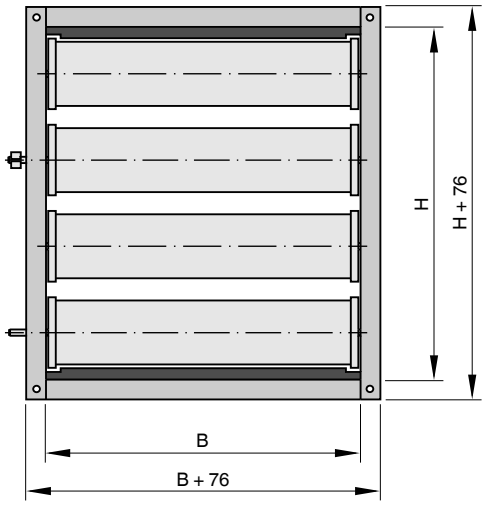


Illustration shows a multileaf damper with drive arm, operating side on the right

Dimensions

H	No. of blades	Position of drive arm	
		X	Blade
mm	–	mm	–
180	1	90	1
345	2	255	2
510	3	255	2
675	4	255	2
840	5	255	2
1005	6	255	2
1170	7	255	2
1335	8	255	2
1500	9	255	2
1665	10	255	2
1830	11	255	2
1995	12	255	2

1

Dimensional drawing of JZ-LL intermediate sizes

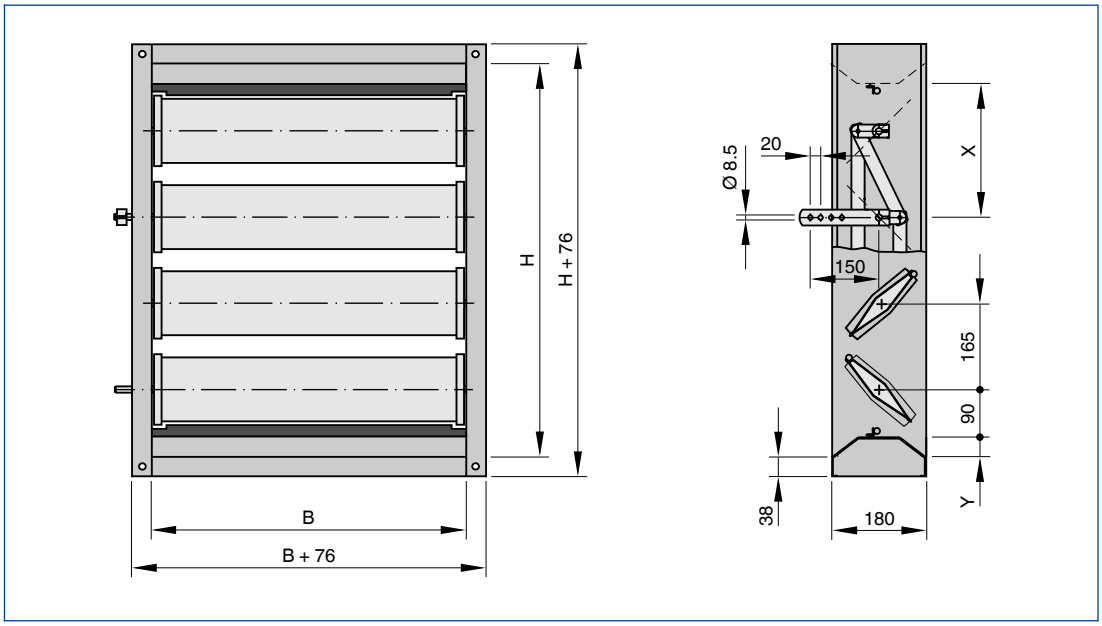


Illustration shows a multileaf damper with drive arm, operating side on the right

Dimensions

H	No. of blades	Position of drive arm		Y
		X	Blade	
mm	–	mm	–	mm
183 – 343	1	90	1	1.5 – 81.5
348 – 508	2	255	2	1.5 – 81.5
513 – 673	3	255	2	1.5 – 81.5
678 – 838	4	255	2	1.5 – 81.5
843 – 1003	5	255	2	1.5 – 81.5
1008 – 1168	6	255	2	1.5 – 81.5
1173 – 1333	7	255	2	1.5 – 81.5
1338 – 1498	8	255	2	1.5 – 81.5
1503 – 1663	9	255	2	1.5 – 81.5
1668 – 1828	10	255	2	1.5 – 81.5
1833 – 1993	11	255	2	1.5 – 81.5
1998	12	255	2	1.5

Description

Multileaf damper, variant JZ-HL

For ATEX classification see Chapter K3 – 1.3, Explosion-proof actuators

Variant

– JZ-HL:
Multileaf damper with opposed blade action, made of galvanised sheet steel

Classification

Closed blade air leakage to EN 1751
Test pressure up to 2000 Pa
– Up to B = 599 mm, class 1
– From B = 600 mm, class 2

Construction

– Galvanised sheet steel, corner holes on both sides, plastic bearings, temperature resistant up to 100 °C
– G: Flange holes on both sides
– M: Brass bearings
– E: Stainless steel bearings
– V: Reinforced blades (only for -M, -E)
– BM: Width subdivided
– HM: Height subdivided

Combinations are available, with one exception:
M cannot be combined with E

Parts and characteristics

– Ready-to-install shut-off damper
– Blades with external linkage
– Drive arm

Construction features

– Rectangular casing, welded (P1: casing with screws), material thickness 1.25 mm
– Blades, material thickness 1 mm
– Flanges on both sides, suitable for duct connection, either flange holes or corner holes
– External linkage, robust and durable, consisting of the coupling rod and horizontal arms
– Blade shafts, Ø12 mm, with notch to indicate the blade position
– Travel stop (angle section) ensures tight closure of the top and bottom blades
– Blade tip seals
– The drive arm can be fixed to every blade (by others)
– Construction and materials comply with the EU directive and guidelines for use in potentially explosive atmospheres (ATEX) for variants with brass or stainless steel bearings (-M, -E)

Materials and surfaces

– Casing and blades made of galvanised sheet steel
– Blade shafts, drive arm and external linkage made of galvanised steel
– Blade tip seals made of PP/PTV plastic
– P1: Powder-coated, RAL CLASSIC colour
– PS: Powder-coated, NCS or DB colour

Installation and commissioning

– With horizontal or vertical blades
– With or without installation subframe
– Torsion-free installation
– For widths exceeding 2000 mm or heights exceeding 1995 mm install two multileaf dampers side by side or one above the other

Weight

H	B [mm]									
	200	400	600	800	1000	1200	1400	1600	1800	2000
mm	kg									
180	4	6	8	9	11	13	14	16	18	19
345	6	8	10	12	15	17	19	21	24	26
510	7	10	13	16	19	22	25	27	30	33
675	10	13	16	20	23	27	30	33	37	40
840	11	15	19	23	28	32	37	41	46	50
1005	11	17	22	27	32	38	43	48	53	59
1170	13	19	25	31	37	43	49	55	61	67
1335	15	22	28	35	41	48	55	61	68	74
1500	16	23	30	37	44	51	59	66	73	80
1665	17	25	33	41	49	57	65	72	80	88
1830	18	27	35	44	52	61	69	78	86	95
1995	19	29	38	47	56	66	75	84	94	103

1

Dimensions

For detailed information on corner holes and flange holes see Dimensions – Duct connection

For detailed information on drive shafts see Dimensions – Drive shafts

Dimensional drawing of JZ-HL standard sizes

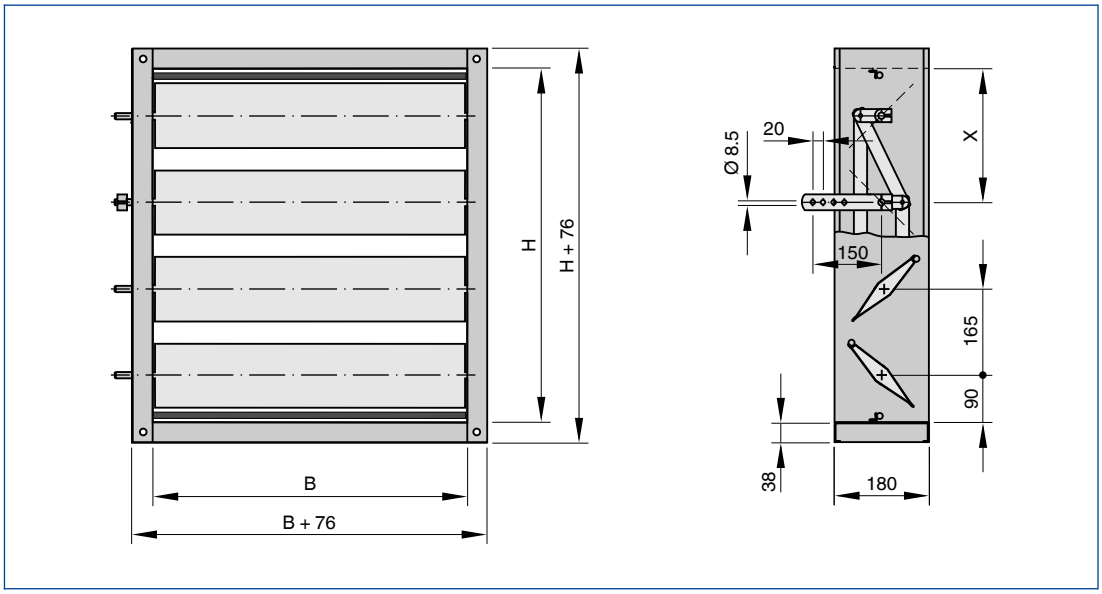


Illustration shows a multileaf damper with drive arm, operating side on the right

Dimensions

H	No. of blades	Position of drive arm	
		X	Blade
mm	–	mm	–
180	1	90	1
345	2	90	1
510	3	90	1
675	4	255	2
840	5	420	3
1005	6	420	3
1170	7	585	4
1335	8	585	4
1500	9	750	5
1665	10	750	5
1830	11	915	6
1995	12	915	6

Dimensional drawing of JZ-HL intermediate sizes

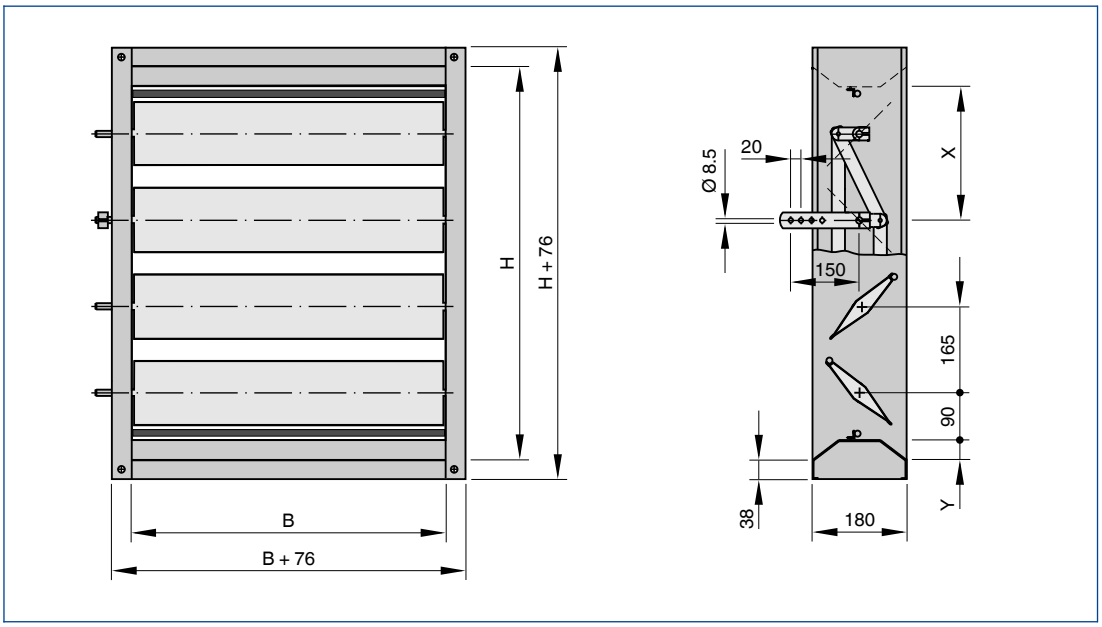


Illustration shows a multileaf damper with drive arm, operating side on the right

Dimensions

H	No. of blades	Position of drive arm		
		X	Blade	Y
mm	–	mm	–	mm
183 – 343	1	90	1	1.5 – 81.5
348 – 508	2	90	1	1.5 – 81.5
513 – 673	3	90	1	1.5 – 81.5
678 – 838	4	255	2	1.5 – 81.5
843 – 1003	5	420	3	1.5 – 81.5
1008 – 1168	6	420	3	1.5 – 81.5
1173 – 1333	7	585	4	1.5 – 81.5
1338 – 1498	8	585	4	1.5 – 81.5
1503 – 1663	9	750	5	1.5 – 81.5
1668 – 1828	10	750	5	1.5 – 81.5
1833 – 1993	11	915	6	1.5 – 81.5
1998	12	915	6	1.5

1

Description

Multileaf damper, variant JZ-LL-A2

For ATEX classification see Chapter K3 – 1.3, Explosion-proof actuators

Variant

– JZ-LL-A2:
Multileaf damper with opposed blade action, made of stainless steel

Classification

Closed blade air leakage to EN 1751
Test pressure up to 2000 Pa
– Up to B = 599 mm, class 3
– B = 600 – 1000 mm, class 4
Test pressure up to 1000 Pa
– Up to B = 599 mm, class 3
– B = 600 – 2000 mm, class 4

Construction

– Stainless steel, corner holes on both sides, plastic bearings, temperature resistant up to 100 °C
– G: Flange holes on both sides
– M: Brass bearings
– E: Stainless steel bearings

Combinations are available, with one exception: M cannot be combined with E

Parts and characteristics

– Ready-to-install shut-off damper
– Blades with external linkage
– Drive arm

Construction features

– Rectangular casing, with screws, material thickness 1.25 mm
– Blades, material thickness 1 mm
– Flanges on both sides, suitable for duct connection, either flange holes or corner holes
– External linkage, robust and durable, consisting of the coupling rod and horizontal arms
– Blade shafts, Ø12 mm, with notch to indicate the blade position
– Travel stop (angle section) ensures tight closure of the top and bottom blades
– Blade tip seals and side seals
– The drive arm can be fixed to every blade (by others)
– Construction and materials comply with the EU directive and guidelines for use in potentially explosive atmospheres (ATEX) for variants with brass or stainless steel bearings (-M, -E)

Materials and surfaces

– Casing, blades and external linkage made of stainless steel, material no. 1.4301
– Shafts made of stainless steel, material no. 1.4305
– Blade tip seals made of PP/PTV plastic
– Side seals made of closed cell PE foam
– P1: Powder-coated, RAL CLASSIC colour
– PS: Powder-coated, NCS or DB colour

Installation and commissioning

– With horizontal blades
– With or without installation subframe
– Torsion-free installation
– For widths exceeding 2000 mm or heights exceeding 1995 mm install two multileaf dampers side by side or one above the other

Weight

H	B [mm]									
	200	400	600	800	1000	1200	1400	1600	1800	2000
mm	kg									
180	4	6	8	9	11	13	14	16	18	19
345	6	8	10	12	15	17	19	21	24	26
510	7	10	13	16	19	22	25	27	30	33
675	10	13	16	20	23	27	30	33	37	40
840	11	15	19	23	28	32	37	41	46	50
1005	11	17	22	27	32	38	43	48	53	59
1170	13	19	25	31	37	43	49	55	61	67
1335	15	22	28	35	41	48	55	61	68	74
1500	16	23	30	37	44	51	59	66	73	80
1665	17	25	33	41	49	57	65	72	80	88
1830	18	27	35	44	52	61	69	78	86	95
1995	19	29	38	47	56	66	75	84	94	103

Dimensions

For detailed information on corner holes and flange holes see Dimensions – Duct connection

For detailed information on drive shafts see Dimensions – Drive shafts

Dimensional drawing of JZ-LL-A2 standard sizes

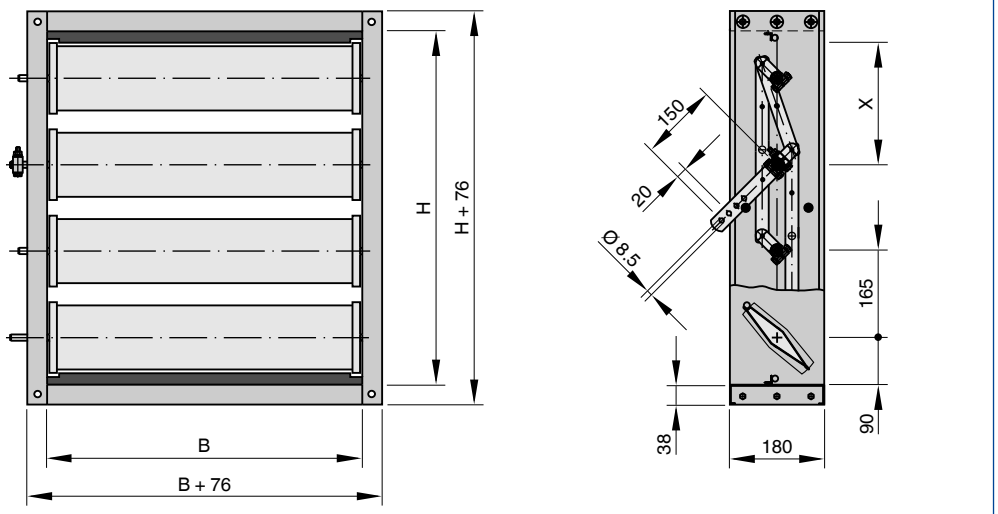


Illustration shows a multileaf damper with drive arm, operating side on the right

Dimensions

H	No. of blades	Position of drive arm	
		X	Blade
mm	–	mm	–
180	1	90	1
345	2	255	2
510	3	255	2
675	4	255	2
840	5	255	2
1005	6	255	2
1170	7	255	2
1335	8	255	2
1500	9	255	2
1665	10	255	2
1830	11	255	2
1995	12	255	2

1

Dimensional drawing of JZ-LL-A2 intermediate sizes

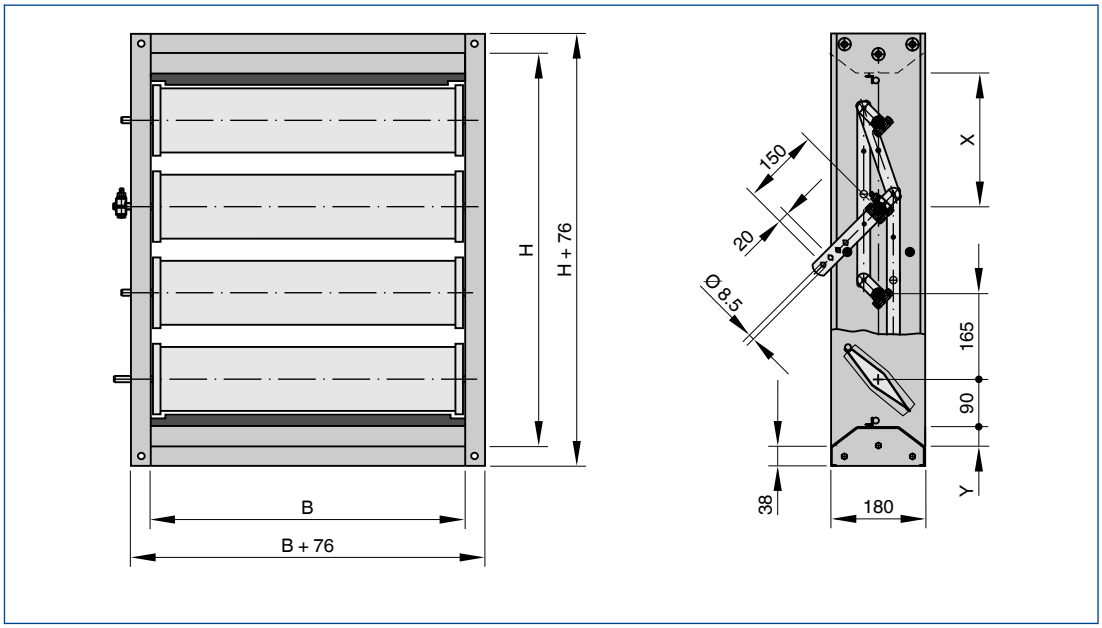


Illustration shows a multileaf damper with drive arm, operating side on the right

Dimensions

H	No. of blades	Position of drive arm		Y
		X	Blade	
mm	–	mm	–	mm
183 – 343	1	90	1	1.5 – 81.5
348 – 508	2	255	2	1.5 – 81.5
513 – 673	3	255	2	1.5 – 81.5
678 – 838	4	255	2	1.5 – 81.5
843 – 1003	5	255	2	1.5 – 81.5
1008 – 1168	6	255	2	1.5 – 81.5
1173 – 1333	7	255	2	1.5 – 81.5
1338 – 1498	8	255	2	1.5 – 81.5
1503 – 1663	9	255	2	1.5 – 81.5
1668 – 1828	10	255	2	1.5 – 81.5
1833 – 1993	11	255	2	1.5 – 81.5
1998	12	255	2	1.5

Description

Multileaf damper, variant JZ-LL-AL

Variant

– JZ-LL-AL:
Multileaf damper with opposed blade action, made of aluminium

Classification

Closed blade air leakage to EN 1751
Test pressure up to 2000 Pa
– For all sizes, class 4

Parts and characteristics

– Ready-to-install shut-off damper
– Blades with gears
– Drive arm
– Quadrant stay with blade position indicator
– Operating temperature 10 to 50 °C

Construction features

– Rectangular casing, with screws, material thickness 1.5 mm
– Blades, material thickness 1.25 mm
– Flanges on both sides, suitable for duct connection, with corner holes
– Encased gears on both blade ends
– Blade shafts, Ø12 mm, with notch to indicate the blade position
– From H = 600 mm with two drive shafts, with linkage
– Blade tip seals and side seals

Materials and surfaces

– Casing and blades made of extruded aluminium profile
– Blade shafts, bearing plate and drive arm made of galvanised steel
– Linkage (from H = 600 mm) made of galvanised steel
– Gears made of PBS plastic
– Blade tip seals made of PE/PTV plastic
– Side seals made of closed cell EVA foam
– P1: Powder-coated, RAL CLASSIC colour
– PS: Powder-coated, NCS or DB colour
– S3: Anodised to EURAS standard, E6-C-0

Installation and commissioning

– With horizontal or vertical blades
– With or without installation subframe
– Torsion-free installation

Weight

H	B [mm]										
	200	300	400	500	600	700	800	900	1000	1100	1200
mm	kg										
100	2	2	3	3	4	4	4	5	5	6	6
200	2	3	3	4	4	4	5	5	6	6	6
300	4	4	5	5	6	6	6	7	7	8	8
400	4	5	5	6	6	7	7	8	9	9	10
500	4	5	6	6	7	7	8	9	10	10	11
600	5	6	6	7	8	9	9	10	11	12	12
700	6	7	8	8	9	10	11	12	13	13	14
800	7	8	9	10	11	12	13	13	14	15	16
900	8	9	10	11	12	13	14	15	16	17	18
1000	9	10	11	12	13	15	16	17	18	19	21

1

Dimensions

For detailed information on corner holes and flange holes see Dimensions – Duct connection

For detailed information on drive shafts see Dimensions – Drive shafts

Dimensional drawing of JZ-LL-AL standard sizes

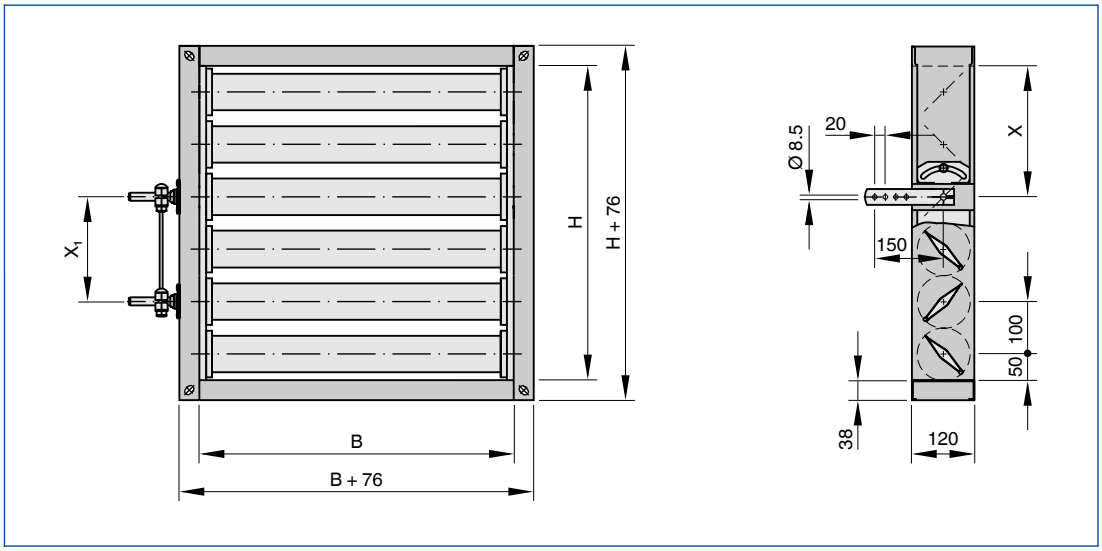


Illustration shows a multileaf damper with drive arm

Dimensions

H	No. of blades	Position of drive arm		Drive shaft 2	
		X	Blade	X_1	Blade
mm	–	mm	–	mm	–
100	1	50	1	–	–
200	2	50	1	–	–
300	3	50	1	–	–
400	4	250	3	–	–
500	5	250	3	–	–
600	6	250	3	200	5
700	7	250	3	200	5
800	8	250	3	200	5
900	9	250	3	400	7
1000	10	250	3	400	7

Dimensional drawing of JZ-LL-AL intermediate sizes

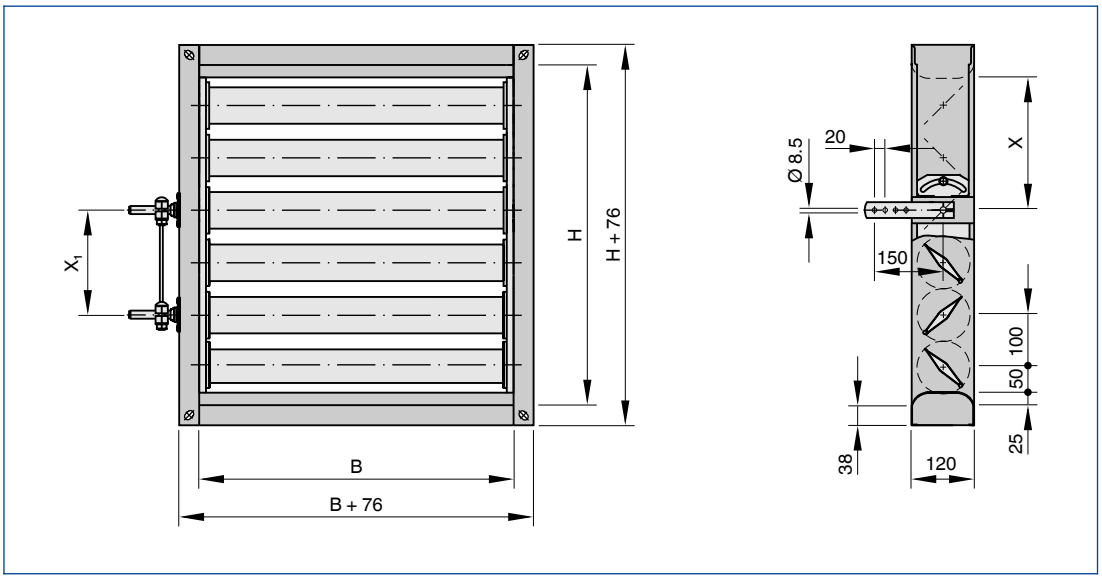


Illustration shows a multileaf damper with drive arm

Dimensions

H	No. of blades	Position of drive arm		Drive shaft 2	
		X	Blade	X_1	Blade
mm	–	mm	–	mm	–
150	1	50	1	–	–
250	2	50	1	–	–
350	3	50	1	–	–
450	4	250	3	–	–
550	5	250	3	–	–
650	6	250	3	200	5
750	7	250	3	200	5
850	8	250	3	200	5
950	9	250	3	400	7
1050	10	250	3	400	7

1

Description

Multileaf damper
JZ-HL-AL

Variant
– JZ-HL-AL:
Multileaf damper with opposed blade action, made of aluminium

Classification
Closed blade air leakage to EN 1751
Test pressure up to 2000 Pa
– For all sizes, class 2

Parts and characteristics
– Ready-to-install shut-off damper
– Blades with gears
– Drive arm
– Quadrant stay with blade position indicator
– Temperature resistant up to 90 °C

Construction features
– Rectangular casing, with screws, material thickness 1.5 mm
– Blades, material thickness 1.25 mm
– Flanges on both sides, suitable for duct connection, with corner holes
– Gears on both blade ends
– Blade shafts, Ø12 mm, with notch to indicate the blade position
– Blade tip seals

Materials and surfaces
– Casing and blades made of extruded aluminium profile
– Shafts, bearing plate and position indicator made of galvanised steel
– Gears made of PBT plastic
– Blade tip seals made of PE/PTV plastic
– P1: Powder-coated, RAL CLASSIC colour
– PS: Powder-coated, NCS or DB colour
– S3: Anodised to EURAS standard, E6-C-0

Installation and commissioning
– With horizontal or vertical blades
– With or without installation subframe
– Torsion-free installation

Weight

H	B [mm]										
	200	300	400	500	600	700	800	900	1000	1100	1200
mm	kg										
100	2	2	2	3	3	3	4	4	4	5	5
200	2	2	3	3	3	4	4	5	5	5	6
300	3	3	4	4	5	5	5	6	6	7	7
400	4	4	5	5	6	6	7	7	8	8	9
500	4	4	5	5	6	7	7	8	9	9	10
600	5	5	6	7	7	8	9	9	10	11	11
700	6	6	7	8	8	9	10	11	11	12	13
800	6	7	8	9	9	10	11	12	13	13	14
900	7	7	8	9	10	11	12	13	14	15	16
1000	6	7	9	10	11	12	13	14	15	16	17

Dimensions

For detailed information on corner holes and flange holes see Dimensions – Duct connection

For detailed information on drive shafts see Dimensions – Drive shafts

Dimensional drawing of JZ-HL-AL standard sizes

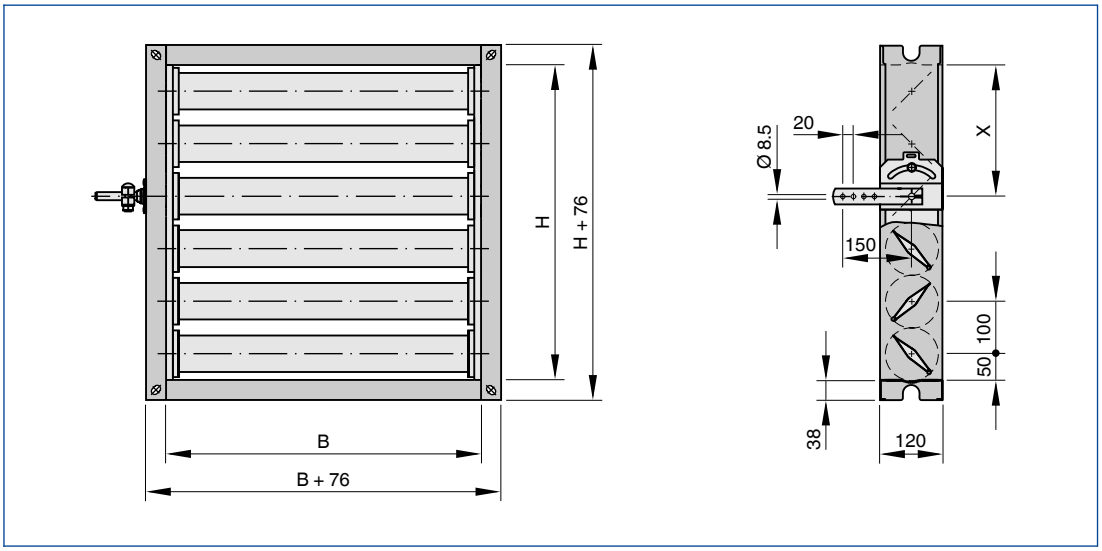


Illustration shows a multileaf damper with drive arm

Dimensions

H	No. of blades	Position of drive arm	
		X	Blade
mm	–	mm	–
100	1	50	1
200	2	50	1
300	3	50	1
400	4	250	3
500	5	250	3
600	6	250	3
700	7	250	3
800	8	250	3
900	9	250	3
1000	10	250	3

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Dimensional drawing of JZ-HL-AL intermediate sizes

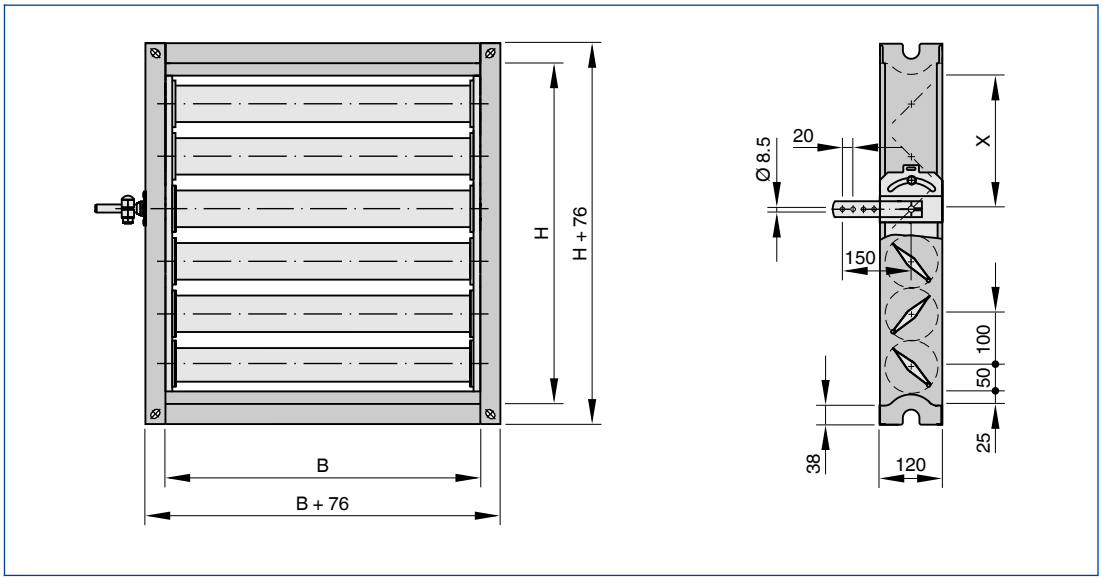


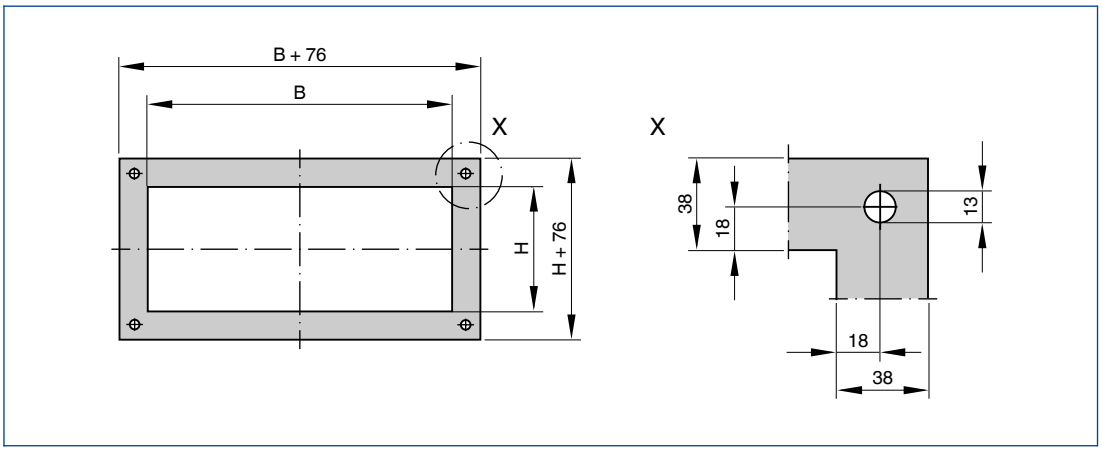
Illustration shows a multileaf damper with drive arm

Dimensions

H	No. of blades	Position of drive arm	
		X	Blade
mm	–	mm	–
150	1	50	1
250	2	50	1
350	3	50	1
450	4	250	3
550	5	250	3
650	6	250	3
750	7	250	3
850	8	250	3
950	9	250	3
1050	10	250	3

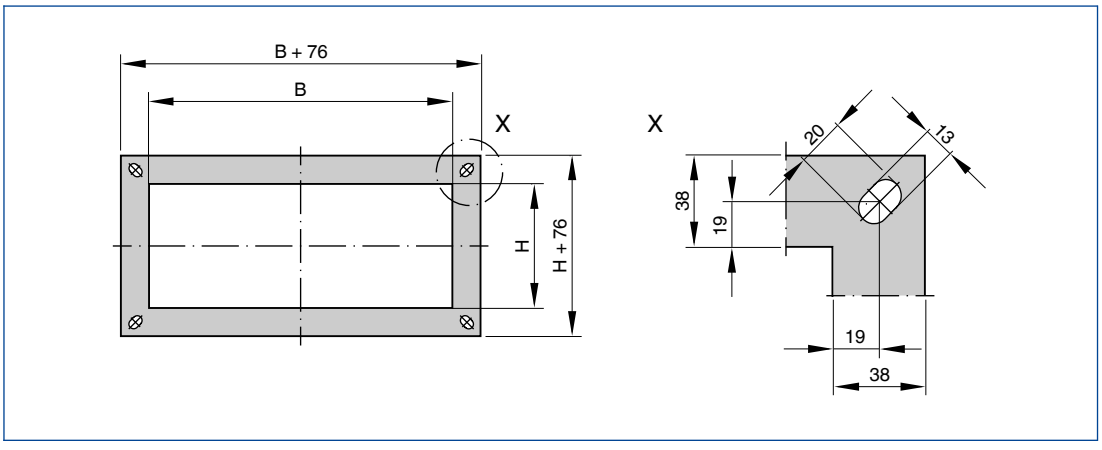
Corner holes

Corner holes – multileaf dampers made of steel or stainless steel



JZ-LL, JZ-HL, JZ-LL-A2

Corner holes – multileaf dampers made of aluminium



JZ-LL-AL, JZ-HL-AL

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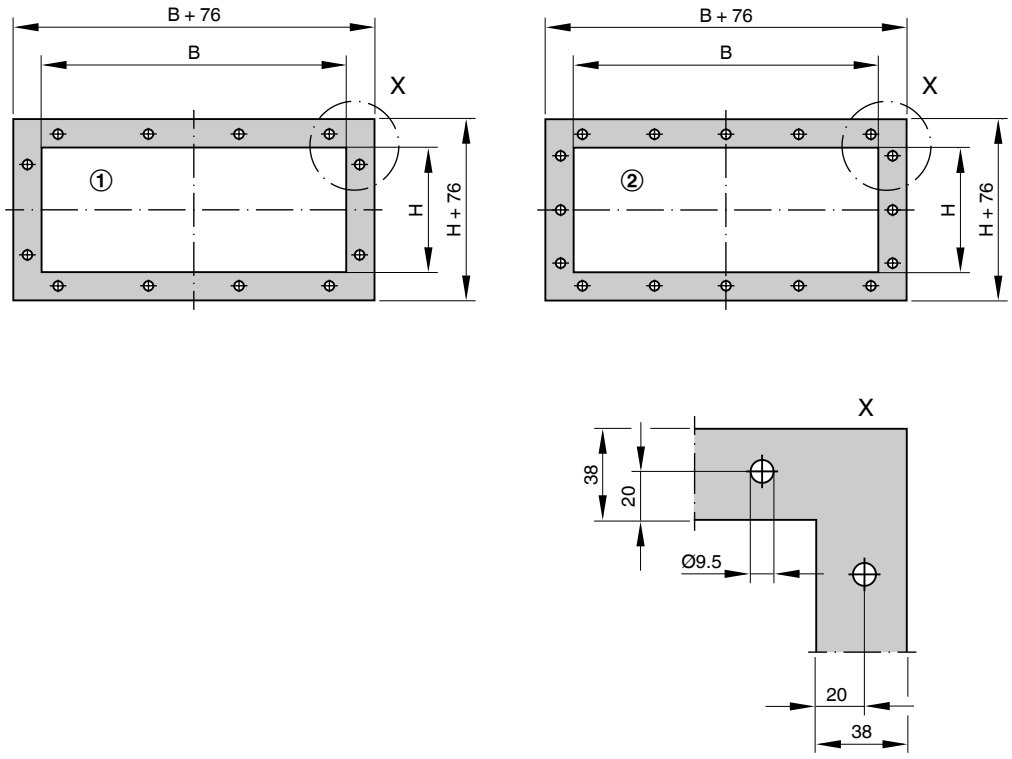
Flange holes

Constructions with flange holes (-G) do not have corner holes.

Flange holes on casing sizes from width 288 mm and height 212 mm

Flange holes – multileaf dampers made of steel or stainless steel



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

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

JZ-LL, JZ-HL, JZ-LL-A2

No. of holes per side

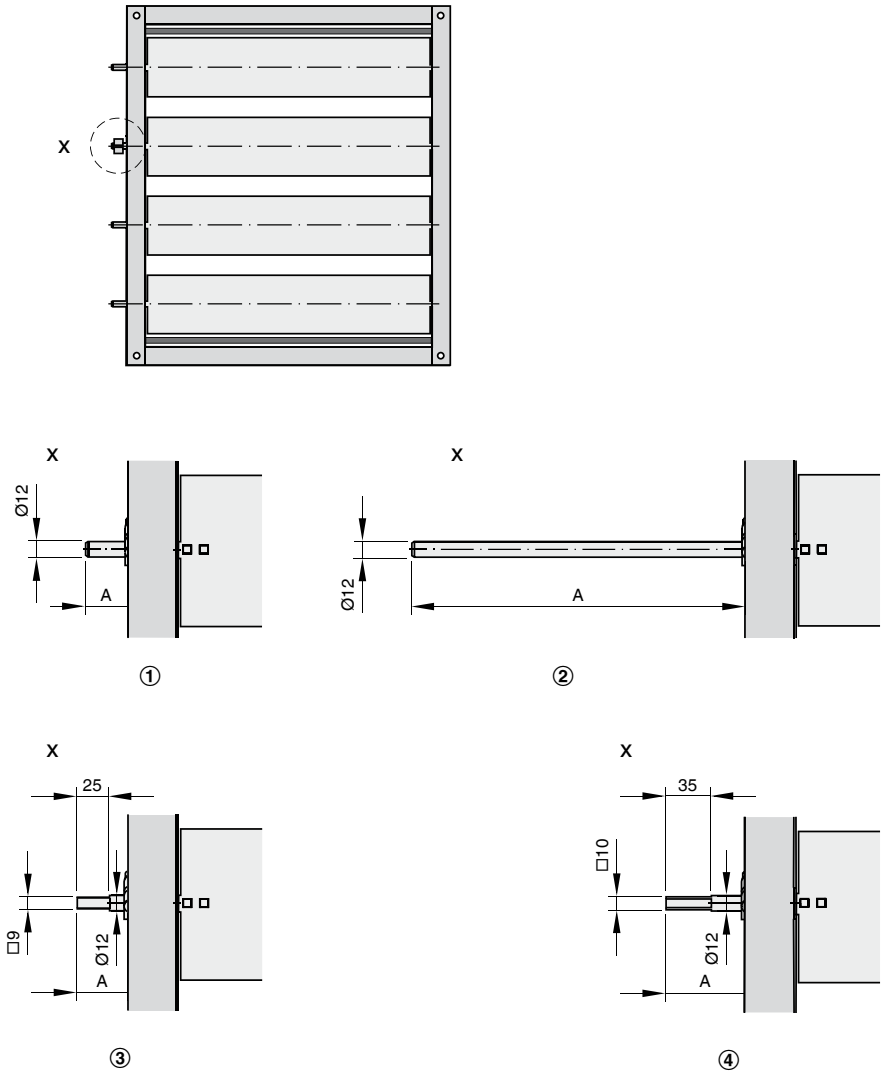
B	No. of holes
	n
mm	–
288 – 537	2
538 – 787	3
788 – 1037	4
1038 – 1287	5
1288 – 1537	6
1538 – 1787	7
1788 – 2000	8

No. of holes per side

H	No. of holes
	n
mm	–
212 – 461	2
462 – 711	3
712 – 961	4
962 – 1211	5
1212 – 1461	6
1462 – 1711	7
1712 – 1961	8
1962 – 1995	9

Drive shafts (special accessory) upon request.

Drive shafts for JZ-LL, JZ-HL, JZ-LL-A2



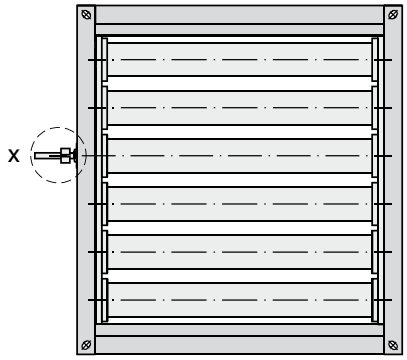
① Standard shaft
② ZS99 - extended drive shaft
③ ZS991 – square shaft 9 mm
④ ZS992 – square shaft 10 mm

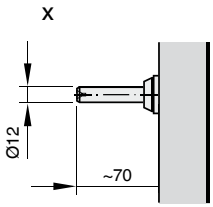
Shaft end projection

Drive shaft	Multileaf damper		
	JZ-LL	JZ-HL	JZ-LL-A2
	A		
	mm		
① Standard	30	30	26
② Extended	250	250	180
③ Square 9 mm	37	37	37
④ Square 10 mm	70	60	–

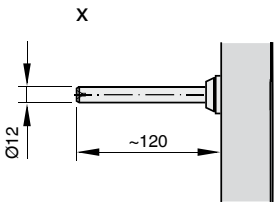
1

Drive shafts for JZ-*L-AL

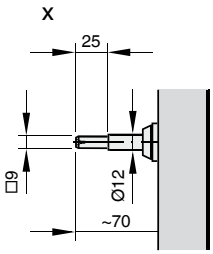




①



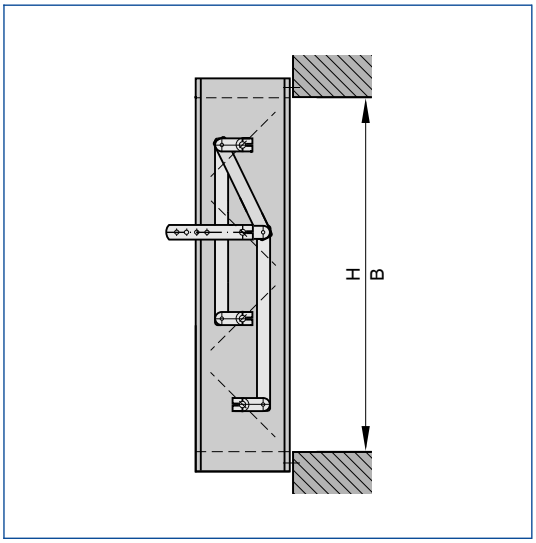
②



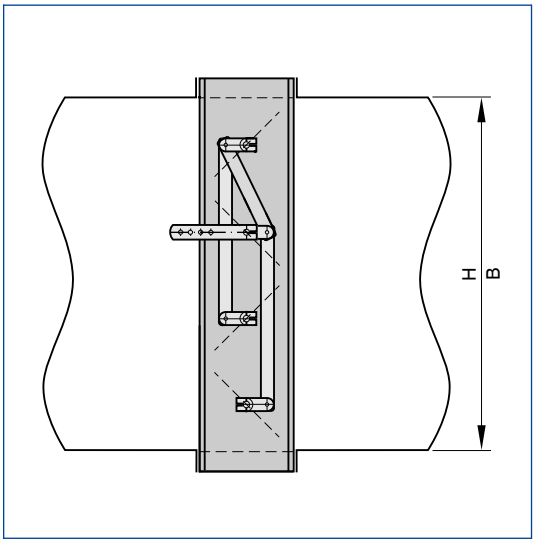
③

① Standard shaft
② ZS99 - extended drive shaft
③ ZS991 – square shaft 9 mm

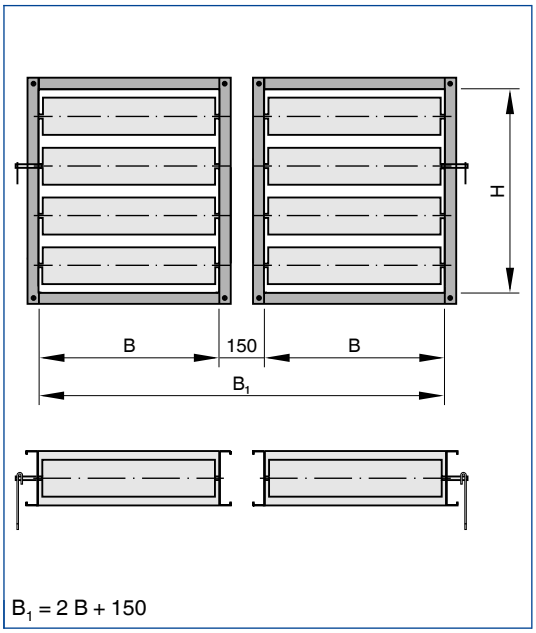
Wall installation without installation subframe



Duct installation



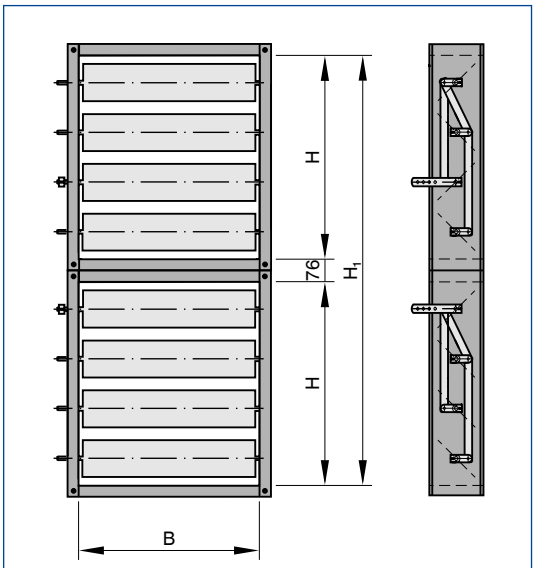
Width subdivided



$B_1 = 2\ B + 150$

Steel and stainless steel variants only

Height subdivided



$H_1 = 2\ H + 76$

Steel and stainless steel variants only

Dimensions

B_1	B
mm	mm
2550	1200
2950	1400
3350	1600
3750	1800
4150	2000

Dimensions

H_1	H
mm	mm
2086	1005
2416	1170
2746	1335
3076	1500
3406	1665
3736	1830
4066	1995

1

Standard text

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

Rectangular multileaf dampers for volume flow and pressure control as well as for low-leakage shut-off of ducts and openings in walls and ceiling slabs. Suitable for duct pressures up to 1000 Pa. Ready-to-operate unit which consists of the casing, aerofoil blades and the blade mechanism. Flanges on both sides, suitable for duct connection. The blade position is indicated externally by a notch in the blade shaft extension. Closed blade air leakage to EN 1751, class 4. Casing air leakage to EN 1751, class C.

Special features

- Aerofoil blades
- Low-maintenance, robust construction
- No parts with silicone
- Available in standard sizes and many intermediate sizes
- Closed cell side seals meet increased hygiene requirements

Technical data

- Nominal sizes: 200 × 100 mm – 2000 × 1995 mm
- Volume flow rate: 200 – 40,000 l/s or 720 – 143,640 m^3/h at 10 m/s
- Differential pressure range: 5 – 3500 Pa
- Operating temperature 0 to 100 °C

Sizing data

- $\dot{V}$ _____ [m^3/h]
- Δp_{st} _____ [Pa]
- L_{PA} air-regenerated noise _____ [dB(A)]

Order options JZ-LL, JZ-LL-A2, JZ-HL

1 Type

JZ Multileaf damper

2 Classification

Closed blade air leakage to EN 1751

☐ **LL** Classes 3 – 4
☐ **HL** Classes 1 – 2

3 Material

No entry: galvanised steel
☐ **A2** Stainless steel (only for classification LL)

4 Construction

No entry: corner holes on both sides; plastic bearings
☐ **G** Flange holes on both sides (no corner holes)
☐ **M** Brass bearings
☐ **E** Stainless steel bearings
☐ **M-V** Brass plain bearings and reinforced blades (not for JZ-LL-A2)
☐ **E-V** Stainless steel plain bearings and reinforced blades (not for JZ-LL-A2)
M, E, M-V, E-V can be combined with G

5 Operating side

No entry: on the right
☐ **L** Left

6 Nominal size [mm]

B × H

B > 2000 = width subdivided
H > 1998 = height subdivided

7 Installation subframe

No entry: none
☐ **ER** With (only for construction G)

8 Attachments

No entry: none
☐ **Z04 – Z07** Quadrant stay
☐ **Z12 – Z51** Actuators
☐ **ZF01 – ZF15** Spring return actuators
☐ **Z60 – Z77** Pneumatic actuators

Explosion-proof actuators
☐ **Z1EX, Z3EX** Electric
☐ **Z60EX – Z77EX** Pneumatic

9 Damper blade safety function

Only for spring return actuators or pneumatic actuators
☐ **NO** Pressure off/power off to OPEN
☐ **NC** Pressure off/power off to CLOSE

10 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 %

JZ-LL-AL, JZ-HL-AL

1 Type
JZ Multileaf damper

2 Classification
Closed blade air leakage to EN 1751
☐ **LL** Class 4
☐ **HL** Class 2

3 Material
AL Aluminium

4 Nominal size [mm]
B × H

5 Installation subframe
No entry: none
☐ **ER** With installation subframe

6 Attachments
☐ **Z04 – Z07** Quadrant stay
☐ **Z12 – Z51** Actuators
☐ **ZF01 – ZF15** Spring return actuators
☐ **Z60 – Z77** Pneumatic actuators

7 Damper blade safety function
Only for spring return actuators or pneumatic actuators
☐ **NO** Pressure off/power off to OPEN
☐ **NC** Pressure off/power off to CLOSE

8 Surface
No entry: standard construction
☐ **P1** Powder-coated, RAL CLASSIC colour
☐ **PS** Powder-coated, DB colour
☐ **S3** Anodised to EURAS standard, E6-C-0

Gloss level:
RAL 9010 50 %
RAL 9006 30 %
All other RAL colours 70 %

1

Notes

Accessories
Installation subframes

For the fast and simple installation of multileaf dampers

Installation subframes for the fast and precise installation of multileaf dampers. Installation subframes with fixing tabs are mortared into the wall opening, then the multileaf dampers are fastened to the subframes

- Angle sections made of galvanised steel or stainless steel
- Galvanised steel variant with screw-on fixing tabs
- Stainless steel variant with welded fixing tabs

Optional equipment and accessories

- Subdivided construction (width or height subdivided) for the installation of subdivided multileaf dampers (made of galvanised sheet steel) without support structure

Installation subframe

1

Type		Page
Installation subframe	General information	1.2 – 2
	Installation details	1.2 – 4
	Basic information and nomenclature	1.4 – 1

Description

Multileaf damper, variant JZ-P

Application

- For the installation of multileaf dampers in walls and ceiling slabs
- Simplified installation
- The installation subframe allows for the fast, simple and precise installation of multileaf dampers

Parts and characteristics

- Installation subframe consisting of angle sections
- Threaded studs
- Washers
- Hexagon nuts
- Fixing tabs

Materials and surfaces

JZ-S, JZ-P, JZ-LL, JZ-HL

- Installation subframe made of galvanised steel (angle section 35 × 35 × 3 mm)
- Screw-on fixing tabs, threaded studs, screws, nuts and washers made of galvanised steel

JZ-S-A2, JZ-P-A2, JZ-LL-A2

- Installation subframe made of stainless steel, material no. 1.4301
- Welded fixing tabs, threaded studs, nuts and washers made of stainless steel, material no. 1.4301

JZ-AL, JZ-LL-AL, JZ-HL-AL

- Installation subframe made of galvanised steel (standard flange)
- Screw-on fixing tabs, threaded studs, screws, nuts and washers made of galvanised steel

Installation and commissioning

Before mortaring in the installation subframe

- Fasten the threaded studs, washers and nuts to the installation subframe
- Fix the screw-on fixing tabs with hexagon nuts
- Fasten the remaining screw-on fixing tabs (regular spacing, about every 375 – 625 mm)

After mortaring in the installation subframe

- Unscrew the hexagon nuts
- Align the multileaf damper with the installation subframe and fasten it

... / **ER** / ...

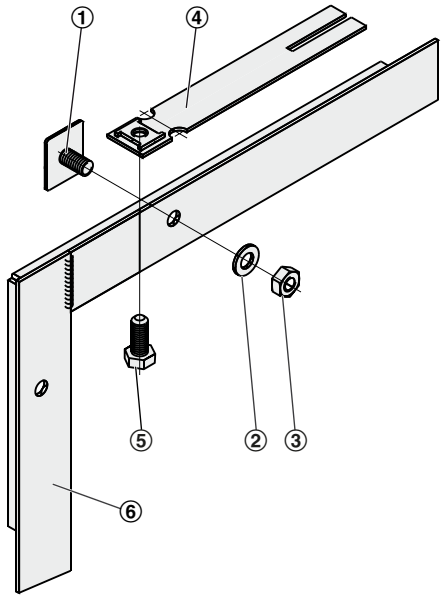
Order code detail

Any accessories are defined with the order code of the multileaf damper.

Installation subframe for multileaf dampers

Description	Multileaf damper, Type
Galvanised steel	JZ-S, JZ-P, JZ-LL, JZ-HL
Galvanised steel, width subdivided	JZ-S, JZ-P, JZ-LL, JZ-HL
Galvanised steel, height subdivided	JZ-S, JZ-P, JZ-LL, JZ-HL
Stainless steel	JZ-S-A2, JZ-P-A2, JZ-LL-A2
Aluminium	JZ-AL, JZ-LL-AL, JZ-HL-AL

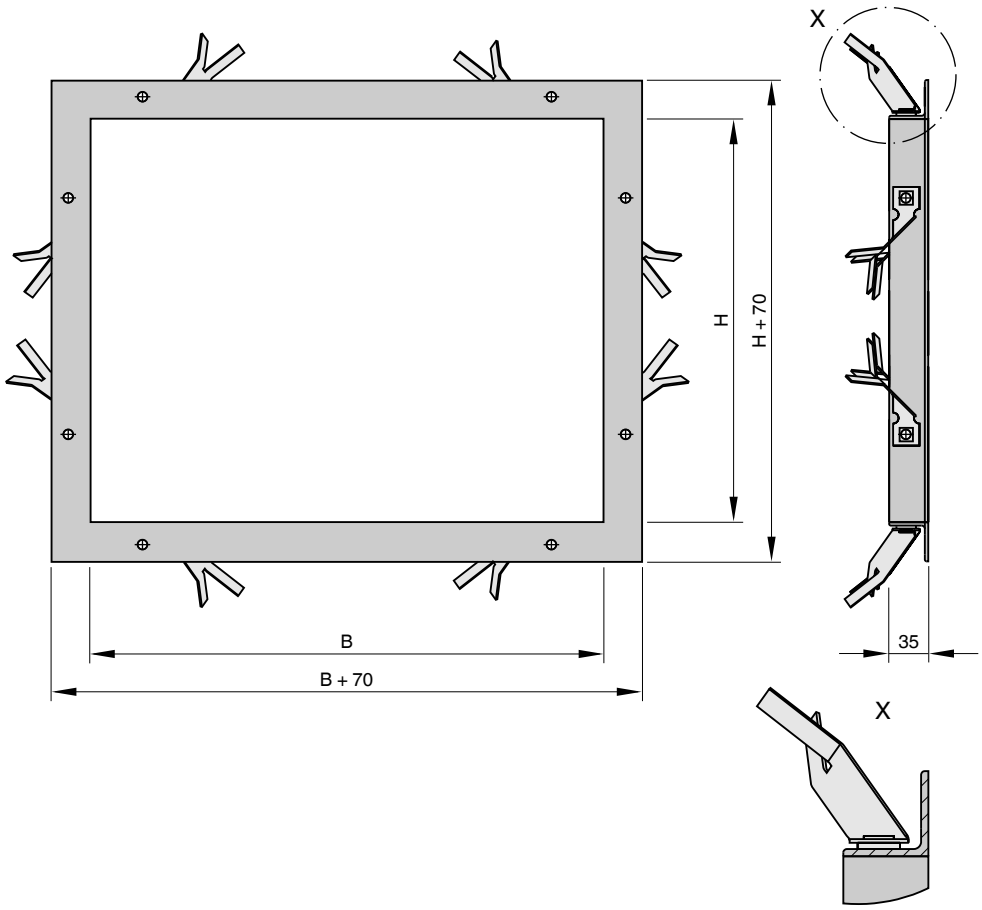
Installation subframe for multileaf dampers and for smoke control dampers



① Threaded stud
② Washer
③ Hexagon nut
④ Fixing tab
⑤ Hexagon head screw
⑥ Installation subframe

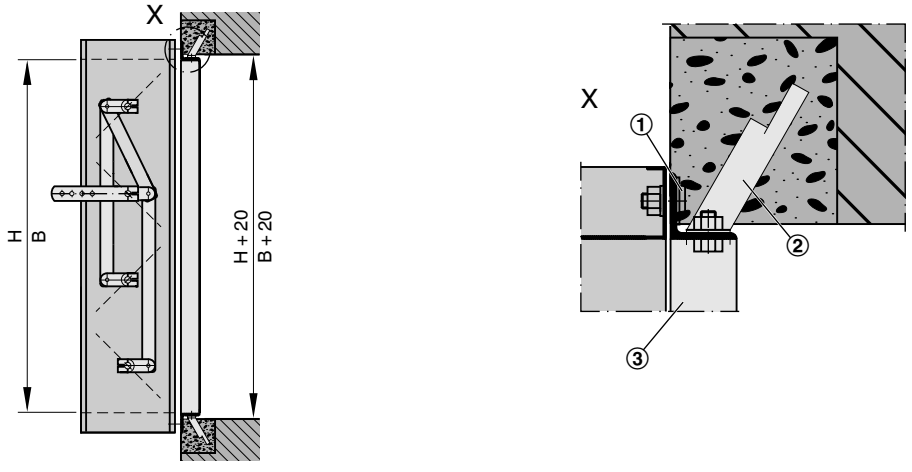
1

Installation subframe ready to be mortared in



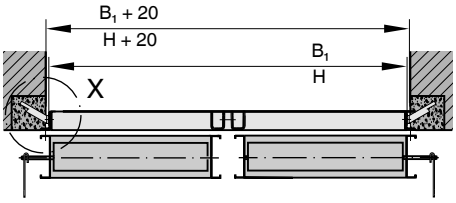
Before the subframe is mortared in, the fixing tabs must be bent and spread (by others).

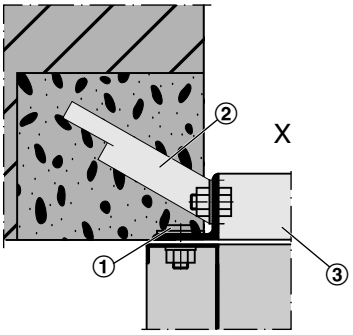
Installation subframe for variants JZ-*, JZ-*-A2, JZ-LL, JZ-HL



① Threaded stud
② Fixing tab
③ Installation subframe

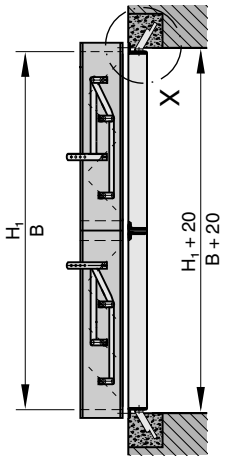
Installation subframe, width subdivided

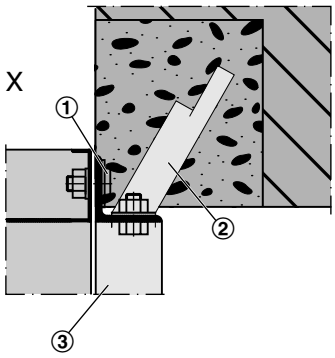




① Threaded stud
② Fixing tab
③ Installation subframe

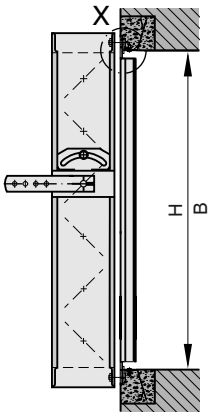
Installation subframe, height subdivided

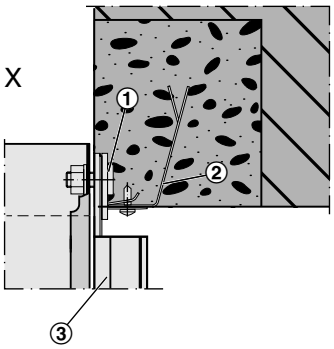




① Threaded stud
② Fixing tab
③ Installation subframe

Installation subframe for variants JZ-AL, JZ-*L-AL





① Threaded stud
② Fixing tab
③ Installation subframe

Notes

Attachments
Quadrant stays and limit switches

Quadrant stay
with two limit switches
for JZ-LL-AL

Quadrant stay for
JZ-AL and JZ-HL-AL

Quadrant stay
and limit switches for
JZ-S, JZ-S-A2, JZ-LL,
JZ-HL and JZ-LL-A2

For locking the blades of multileaf dampers after manual operation

Quadrant stay for the stepless adjustment and locking of multileaf dampers without an actuator. Limit switches for OPEN and/or CLOSED positions may be fitted additionally

- Micro switch with connecting cable
- Quadrant stay with position indicator
- Steel and stainless steel constructions
- Limit switches for capturing the end positions of multileaf dampers

1

Description

Application

- For multileaf dampers without an actuator
- Quadrant stay for the stepless adjustment of the blades
- Locking of the blade position after manual operation
- In dampers with only one blade (without linkage) the quadrant stay is also used as a travel stop when opening or closing the damper
- Limit switches for capturing the end positions (OPEN and/or CLOSED) of multileaf dampers
- Electric signals of limit switches are integrated with system control

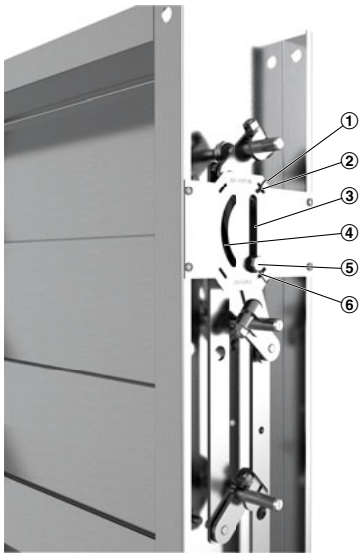
Any attachments are defined with the order code of the multileaf damper.

Quadrant stays and limit switches for multileaf dampers

Order code detail	Attachment
Z04	Quadrant stay
Z05	Quadrant stay and limit switch for damper blade position CLOSED
Z06	Quadrant stay and limit switch for damper blade position OPEN
Z07	Quadrant stay and 2 limit switches for damper blade positions OPEN and CLOSED

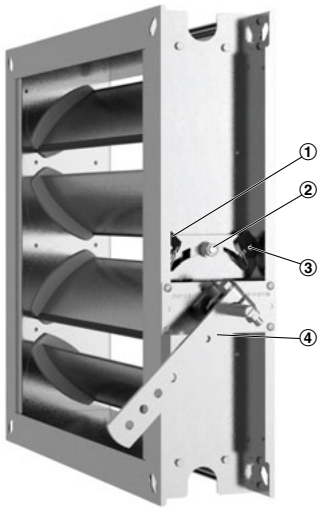
Function

Schematic illustration of the quadrant stay and limit switch (steel multileaf dampers)



① Spring clip
② Limit switch OPEN
③ Adjustment range for opposed blades
④ Adjustment range for parallel blades
⑤ Locking screw
⑥ Limit switch CLOSED

Schematic illustration of the quadrant stay and limit switch (aluminium multileaf dampers)



① Limit switch OPEN
② Locking screw
③ Limit switch OPEN
④ Lever

1

Description

/ **Z04** /

Order code detail

Construction features

– Locking screw as part of the position indicator
– Locking screw to lock the blade position

Materials and surfaces

JZ-S, JZ-P, JZ-AL, JZ-LL, JZ-HL, JZ-LL-AL, JZ-HL-AL
– Quadrant stay and position indicator made of galvanised steel

JZ-S-A2, JZ-P-A2, JZ-LL-A2
– Quadrant stay and position indicator made of stainless steel, material no. 1.4301

Variants

The standard constructions of multileaf dampers JZ-HL-AL and JZ-LL-AL are already fitted with a quadrant stay (Z04).

Quadrant stay and limit switches for JZ-P and JZ-P-A2

Quadrant stay and limit switches for JZ-S, JZ-S-A2, JZ-LL, JZ-HL and JZ-LL-A2

Quadrant stay for JZ-AL and JZ-HL-AL

Quadrant stay with two limit switches for JZ-LL-AL

1

Description

/ **Z05** /
/ **Z06** /
/ **Z07** /

Order code detail

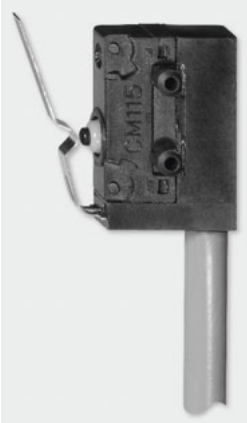
Variants

– Z05: Quadrant stay and limit switch for damper blade position CLOSED
– Z06: Quadrant stay and limit switch for damper blade position OPEN
– Z07: Quadrant stay and 2 limit switches for damper blade positions OPEN and CLOSED

Construction features

– The position indicator of the quadrant stay actuates the limit switch or switches
– The limit switch is clip fixed to the quadrant stay

Technical data



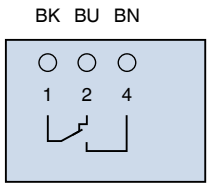
Limit switch

Micro switch

Type of contact	1 changeover contact
Max. switching voltage (AC)	250 V AC
Max. switching current (AC)	0.5 A
Max. switching voltage (DC)	30 V DC
Max. switching current (DC)	0.5 A
Connecting cable	3 × 0.34 mm², 1 m long
IEC protection class	II (protective insulation)
Protection level	IP 66
EC conformity	EMC to 2004/108/EG, low voltage to 2006/95/EG
Operating temperature	–20 to 85 °C

Wiring

Connecting cable core identification



1: Common contact
2: Normally closed contact
4: Normally open contact

Attachments
Open/Close actuators

For the opening and closing of dampers in air conditioning systems

Actuators for Type JZ and JZ-Low leakage multileaf dampers

- Change of the damper blade position for two different operating situations
- Supply voltage 24 V AC/DC or 230 V AC
- Control input signal: 1-wire control or 2-wire control (3-point)
- Mechanical stops
- Retrofit possible

Optional equipment and accessories

- Fast-running actuators and spring return actuators
- Auxiliary switch

Spring return actuator

Fast-running actuator

Multileaf damper with actuator

1

Description

Application

- Actuators for opening and closing
- Opening and closing of Type JZ and JZ-Low leakage multileaf dampers

Parts and characteristics

- Mechanical stops for limiting the damper blade positions
- Actuators with overload protection
- Control input signal: 1-wire control or 2-wire control (3-point, open/close)
- Optional spring return actuator for damper blade safety function
- Optional auxiliary switch for capturing the end positions
- Release button or crank handle for manual operation

Any attachments are defined with the order code of the multileaf damper.

Actuators for multileaf dampers

Order code detail	Actuator		Auxiliary switch		Torque	Supply voltage
	Part no.	Type	Part no.	Type		
Z12	M466DD6	SM230A	–	–	20 Nm	230 V
Z13	M466DG3	GM230A	–	–	40 Nm	230 V
Z14	M466DD5	SM24A	–	–	20 Nm	24 V
Z15	M466DG1	GM24A	–	–	40 Nm	24 V
Z16	M466DD6	SM230A	M536AI3	S2A	20 Nm	230 V
Z17	M466DG3	GM230A	M536AI3	S2A	40 Nm	230 V
Z18	M466DD5	SM24A	M536AI3	S2A	20 Nm	24 V
Z19	M466DG1	GM24A	M536AI3	S2A	40 Nm	24 V
Z42	M466DU4	LM230A	–	–	5 Nm	230 V
Z43	M466EM8	NM230A	–	–	10 Nm	230 V
Z44	M466DU5	LM24A	–	–	5 Nm	24 V
Z45	M466EM9	NM24A	–	–	10 Nm	24 V
Z46	M466DU4	LM230A	M536AI3	S2A	5 Nm	230 V
Z47	M466EM8	NM230A	M536AI3	S2A	10 Nm	230 V
Z48	M466DU5	LM24A	M536AI3	S2A	5 Nm	24 V
Z49	M466EM9	NM24A	M536AI3	S2A	10 Nm	24 V

Fast-running actuators for multileaf dampers

Order code detail	Actuator		Auxiliary switch		Torque	Supply voltage
	Part no.	Type	Part no.	Type		
ZS21	M466EU4	SMQ24A	–	–	16 Nm	24 V
ZS22	M466EU4	SMQ24A	M536AI3	S2A	16 Nm	24 V

Spring return actuators for multileaf dampers

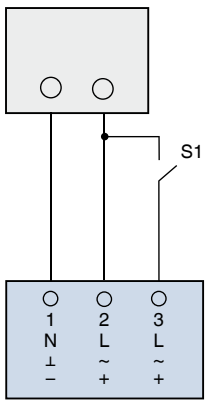
Order code detail	Actuator		Auxiliary switch	Torque	Supply voltage
	Part number	Type			
ZF01	M466ET0	NF24A	–	10 Nm	24 V
ZF02	M466ET1	NFA	–	10 Nm	24 – 240 V AC 24 – 125 V DC
ZF03	M466ET2	NF24A-S2	integrated	10 Nm	24 V
ZF04	M466ET3	NFA-S2	integrated	10 Nm	24 – 240 V AC 24 – 125 V DC
ZF06	M466ER9	SF24A	–	20 Nm	24 V
ZF07	M466ER8	SFA	–	20 Nm	24 – 240 V AC 24 – 125 V DC
ZF08	M466ER6	SF24A-S2	integrated	20 Nm	24 V
ZF09	M466ER7	SFA-S2	integrated	20 Nm	24 – 240 V AC 24 – 125 V DC
ZF11	M466ET5	EF24A	–	30 Nm	24 V
ZF12	M466ET6	EF230A	–	30 Nm	230 V
ZF13	M466ET7	EF24A-S2	integrated	30 Nm	24 V
ZF14	M466ET8	EF230A-S2	integrated	30 Nm	230 V

1 Function

Functional description

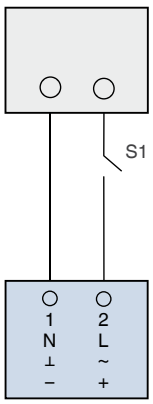
The actuator moves the blades
of a multileaf damper into OPEN or CLOSED position.
1-wire control or 2-wire control (3-point) can be used.
1-wire control is actually an open/close control.

1-wire control



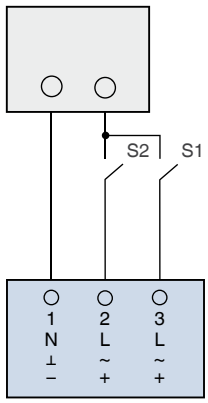
Switch functions
S1 closed: Direction of rotation 1
S1 open: Direction of rotation 2

1-wire control (control input signal for spring return actuator)



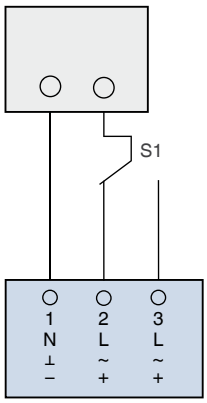
Switch functions
S1 closed: Direction of rotation 1
S1 open: Direction of rotation 2
Safe damper blade position
(OPEN or CLOSED) as an option

2-wire control (3-point)



Switch functions
S1 and S2 open: Actuator has stopped (any position)
S1 closed: Direction of rotation 1
S1 open, S2 closed: Direction of rotation 2

2-wire control (open/close)



Switch functions
S1 not actuated: Direction of rotation 1
S1 actuated: Direction of rotation 2

Description

/ **Z12** /
/ **Z16** /

Order code detail

Application

- Actuator SM230A
- Opening and closing of multileaf dampers

Variants

- Z16: with auxiliary switch for capturing the end positions

Parts and characteristics

- Supply voltage 100 – 240 V AC
- 1-wire control or 2-wire control (3-point)
- Mechanical stops
- Direction of action can be reversed
- Release button to allow for manual operation

Technical data

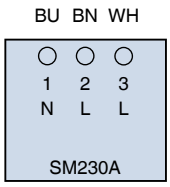
Actuator SM230A

Actuator SM230A

Supply voltage	85 – 265 V AC, 50/60 Hz
Power rating	6 VA max.
Torque	20 Nm
Running time for 90°	150 s
Control input signal	1-wire control or 2-wire control (3-point)
Connecting cable	3 × 0.75 mm², 1 m long
IEC protection class	II (protective insulation)
Protection level	IP 54
EC conformity	EMC to 2004/108/EG, low voltage to 2006/95/EG
Operating temperature	–30 to 50 °C
Weight	1.0 kg

Wiring

Connecting cable core identification



1 N: Neutral
2 L: Control voltage for direction of rotation 1
3 L: Control voltage for direction of rotation 2

1

Description

/ **Z13** /
/ **Z17** /

Order code detail

Application

- Actuator GM230A
- Opening and closing of multileaf dampers

Variants

- Z17: with auxiliary switch for capturing the end positions

Parts and characteristics

- Supply voltage 100 – 240 V AC
- 1-wire control or 2-wire control (open/close)
- Mechanical stops
- Direction of action can be reversed
- Release button to allow for manual operation

Technical data

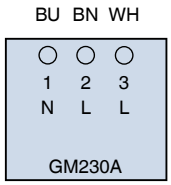
Actuator GM230A

Actuator GM230A

Supply voltage	85 – 265 V AC, 50/60 Hz
Power rating	9 VA max.
Torque	40 Nm
Running time for 90°	150 s
Control input signal	1-wire control or 2-wire control (open/close)
Connecting cable	3 × 0.75 mm², 1 m long
IEC protection class	II (protective insulation)
Protection level	IP 54
EC conformity	EMC to 2004/108/EG, low voltage to 2006/95/EG
Operating temperature	–30 to 50 °C
Weight	1.7 kg

Wiring

Connecting cable core identification



1 N: Neutral
2 L: Control voltage for direction of rotation 1
3 L: Control voltage for direction of rotation 2

Description

/ **Z14** /
/ **Z18** /

Order code detail

Application

- Actuator SM24A
- Opening and closing of multileaf dampers

Variants

- Z18: with auxiliary switch for capturing the end positions

Parts and characteristics

- Supply voltage 24 V AC/DC
- 1-wire control or 2-wire control (3-point)
- Mechanical stops
- Direction of action can be reversed
- Release button to allow for manual operation

Technical data

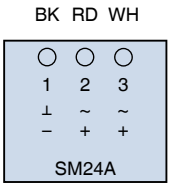
Actuator SM24A

Actuator SM24A

Supply voltage (AC)	24 V AC ± 20 %, 50/60 Hz
Supply voltage (DC)	24 V DC –10 %, +20 %
Power rating (AC)	4 VA max.
Power rating (DC)	2 W max.
Torque	20 Nm
Running time for 90°	150 s
Control input signal	1-wire control or 2-wire control (3-point)
Connecting cable	3 × 0.75 mm², 1 m long
IEC protection class	III (protective extra-low voltage)
Protection level	IP 54
EC conformity	EMC according to 2004/108/EG
Operating temperature	–30 to 50 °C
Weight	1.0 kg

Wiring

Connecting cable core identification



1 ⊥, –:	Ground, neutral
2 ~, +:	Control voltage for direction of rotation 1
3 ~, +:	Control voltage for direction of rotation 2

1

Description

/ **Z15** /
/ **Z19** /

Order code detail

Application

- Actuator GM24A
- Opening and closing of multileaf dampers

Variants

- Z19: with auxiliary switch for capturing the end positions

Parts and characteristics

- Supply voltage 24 V AC/DC
- 1-wire control or 2-wire control (open/close)
- Mechanical stops
- Direction of action can be reversed
- Release button to allow for manual operation

Technical data

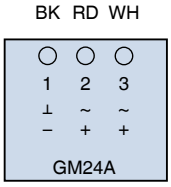
Actuator GM24A

Actuator GM24A

Supply voltage (AC)	24 V AC ± 20 %, 50/60 Hz
Supply voltage (DC)	24 V DC ± 20 %
Power rating (AC)	6 VA max.
Power rating (DC)	4 W max.
Torque	40 Nm
Running time for 90°	150 s
Control input signal	1-wire control or 2-wire control (open/close)
Connecting cable	3 × 0.75 mm², 1 m long
IEC protection class	III (protective extra-low voltage)
Protection level	IP 54
EC conformity	EMC according to 2004/108/EG
Operating temperature	–30 to 50 °C
Weight	1.7 kg

Wiring

Connecting cable core identification



1 ⊥, –: Ground, neutral
2 ~, +: Control voltage for direction of rotation 1
3 ~, +: Control voltage for direction of rotation 2

Description

/ **Z42** /
/ **Z46** /

Order code detail

Application

- Actuator LM230A
- Opening and closing of multileaf dampers

Variants

- Z46: with auxiliary switch for capturing the end positions

Parts and characteristics

- Supply voltage 100 – 240 V AC
- 1-wire control or 2-wire control (3-point)
- Mechanical stops
- Direction of action can be reversed
- Release button to allow for manual operation

Technical data

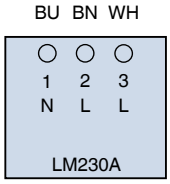
Actuator LM230A

Actuator LM230A

Supply voltage	85 – 265 V AC, 50/60 Hz
Power rating	4 VA max.
Torque	5 Nm
Running time for 90°	150 s
Control input signal	1-wire control or 2-wire control (3-point)
Connecting cable	3 × 0.75 mm², 1 m long
IEC protection class	II (protective insulation)
Protection level	IP 54
EC conformity	EMC to 2004/108/EG, low voltage to 2006/95/EG
Operating temperature	–30 to 50 °C
Weight	0.5 kg

Wiring

Connecting cable core identification



1 N: Neutral
2 L: Control voltage for direction of rotation 1
3 L: Control voltage for direction of rotation 2

1

Description

/ **Z43** /
/ **Z47** /

Order code detail

Application

– Actuator NM230A
– Opening and closing of multileaf dampers

Variants

– Z47: with auxiliary switch for capturing the end positions

Parts and characteristics

– Supply voltage 100 – 240 V AC
– 1-wire control or 2-wire control (3-point)
– Mechanical stops
– Direction of action can be reversed
– Release button to allow for manual operation

Technical data

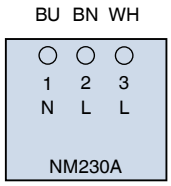
Actuator NM230A

Actuator NM230A

Supply voltage	85 – 265 V AC, 50/60 Hz
Power rating	5.5 VA max.
Torque	10 Nm
Running time for 90°	150 s
Control input signal	1-wire control or 2-wire control (3-point)
Connecting cable	3 × 0.75 mm², 1 m long
IEC protection class	II (protective insulation)
Protection level	IP 54
EC conformity	EMC to 2004/108/EG, low voltage to 2006/95/EG
Operating temperature	–30 to 50 °C
Weight	0.75 kg

Wiring

Connecting cable core identification



1 N: Neutral
2 L: Control voltage for direction of rotation 1
3 L: Control voltage for direction of rotation 2

Description

/ **Z44** /
/ **Z48** /

Order code detail

Application

– Actuator LM24A
– Opening and closing of multileaf dampers

Variants

– Z48: with auxiliary switch for capturing the end positions

Parts and characteristics

– Supply voltage 24 V AC/DC
– 1-wire control or 2-wire control (3-point)
– Mechanical stops
– Direction of action can be reversed
– Release button to allow for manual operation

Technical data

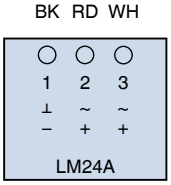
Actuator LM24A

Actuators LM24A and LM24A-F

Supply voltage (AC)	24 V AC ± 20 %, 50/60 Hz
Supply voltage (DC)	24 V DC ± 20 %
Power rating (AC)	2 VA max.
Power rating (DC)	1 W max.
Torque	5 Nm
Running time for 90°	150 s
Control input signal	1-wire control or 2-wire control (3-point)
Connecting cable	3 × 0.75 mm², 1 m long
IEC protection class	III (protective extra-low voltage)
Protection level	IP 54
EC conformity	EMC according to 2004/108/EG
Operating temperature	–30 to 50 °C
Weight	0.5 kg

Wiring

Connecting cable core identification



1 ⊥, –: Ground, neutral
2 ~, +: Control voltage for direction of rotation 1
3 ~, +: Control voltage for direction of rotation 2

LM24A and LM24A-F

1

Description

/ **Z45** /
/ **Z49** /

Order code detail

Application

- Actuator NM24A
- Opening and closing of multileaf dampers

Variants

- Z49: with auxiliary switch for capturing the end positions

Parts and characteristics

- Supply voltage 24 V AC/DC
- 1-wire control or 2-wire control (3-point)
- Mechanical stops
- Direction of action can be reversed
- Release button to allow for manual operation

Technical data

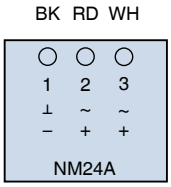
Actuator NM24A

Actuator NM24A

Supply voltage (AC)	24 V AC ± 20 %, 50/60 Hz
Supply voltage (DC)	24 V DC –10 %, +20 %
Power rating (AC)	3.5 VA max.
Power rating (DC)	1.5 W max.
Torque	10 Nm
Running time for 90°	150 s
Control input signal	1-wire control or 2-wire control (3-point)
Connecting cable	3 × 0.75 mm², 1 m long
IEC protection class	III (protective extra-low voltage)
Protection level	IP 54
EC conformity	EMC according to 2004/108/EG
Operating temperature	–30 to 50 °C
Weight	0.75 kg

Wiring

Connecting cable core identification



1 ⊥, –: Ground, neutral
2 ~, +: Control voltage for direction of rotation 1
3 ~, +: Control voltage for direction of rotation 2

NM24A and NM24A-F

Description

/ **ZS21** /
/ **ZS22** /

Order code detail

Application

- Fast-running actuator SMQ24A
- Opening and closing of multileaf dampers

Variants

- Z22: with auxiliary switch for capturing the end positions

Parts and characteristics

- Supply voltage 24 V AC/DC
- 1-wire control
- Mechanical stops
- Direction of action can be reversed
- Release button to allow for manual operation

Technical data

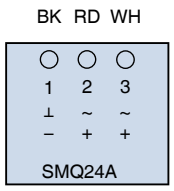
Actuator SMQ24A

Actuator SMQ24A

Supply voltage (AC)	24 V AC ± 20 %, 50/60 Hz
Supply voltage (DC)	24 V DC –10 %, +20 %
Power rating (AC)	26 VA max.
Power rating (DC)	15 W max.
Torque	16 Nm
Running time for 90°	7 s
Control input signal	1-wire control
Connecting cable	3 × 0.75 mm², 1 m long
IEC protection class	III (protective extra-low voltage)
Protection level	IP 54
EC conformity	EMC according to 2004/108/EG
Operating temperature	–30 to 40 °C
Weight	1.7 kg

Wiring

Connecting cable core identification



1 ⊥, –: Ground, neutral
2 ~, +: Control voltage for direction of rotation 1
3 ~, +: Control voltage for direction of rotation 2

1

Description

/ **Z16 – Z19** /
/ **Z46 – Z49** /
/ **ZS22** /

Order code detail

Application

- Auxiliary switch S2A for capturing damper blade end positions (end positions reached through actuator operation)
- Volt-free contacts for signalling or activating switch functions
- Two integral switches, e.g. for damper blade OPEN and damper blade CLOSED
- Potentiometer for setting any switch point

Technical data

Auxiliary switch S2A

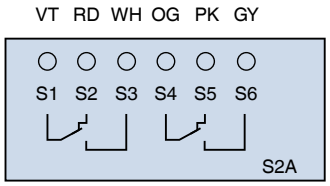
Auxiliary switch S2A

Type of contact	2 changeover contacts[1)]
Max. switching voltage (AC)	250 V AC
Max. switching current (AC)	3 A (resistive load); 0.5 A (inductive load)
Max. switching voltage (DC)	110 V DC
Max. switching current (DC)	0.5 A (resistive load); 0.2 A (inductive load)
Connecting cable	6 × 0.75 mm², 1 m long
IEC protection class	II (protective insulation)
Protection level	IP 54
EC conformity	EMC to 2004/108/EG, low voltage to 2006/95/EG
Operating temperature	–30 to 50 °C
Weight	0.25 kg

[1)] If both auxiliary switches are used the switching voltages must be the same

Wiring

Connecting cable core identification



S1: Common contact
S2: Mechanical stop 1 < x
S3: Mechanical stop 1 > x
S4: Common contact
S5: Mechanical stop 2 < x
S6: Mechanical stop 2 > x
x: 0 – 100 %

Description

/ ZF01 / NC

Order code detail

Application

- Spring return actuator NF24A
- Opening and closing with safety function
- The multileaf damper safety function is defined with the order code

Variants

- NO: Power off to OPEN
- NC: Power off to CLOSE

Parts and characteristics

- Supply voltage 24 V AC/DC
- Control input signal: Supply voltage on/off
- Mechanical stops
- Manual operation using crank handle and position lock

Technical data

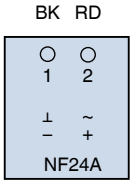
Spring return actuator NF24A

Spring return actuator NF24A

Supply voltage (AC)	24 V AC ± 20 %, 50/60 Hz
Supply voltage (DC)	24 V DC –10 %, +20 %
Power rating (AC)	8.5 VA max.
Power rating (DC)	6 W max.
Torque	10 Nm
Motor running time for 90°	< 75 s
Spring return time	20 s (< –20 °C max. 60 s)
Control input signal	Supply voltage on/off
Connecting cable	2 × 0.75 mm², 1 m long
IEC protection class	III (protective extra-low voltage)
Protection level	IP 54
EC conformity	EMC according to 2004/108/EG
Operating temperature	–30 to 50 °C
Weight	1.8 kg

Wiring

Connecting cable core identification



1 ⊥, –: Ground, neutral
2 ~, +: Control voltage for direction of rotation 1

1

Description

/ **ZF02** / **NC**

Order code detail

Application

- Spring return actuator NFA
- Opening and closing with safety function
- The multileaf damper safety function is defined with the order code

Variants

- NO: Power off to OPEN
- NC: Power off to CLOSE

Parts and characteristics

- Supply voltage 24 – 240 V AC or 24 – 125 V DC
- Control input signal: Supply voltage on/off
- Mechanical stops
- Manual operation using crank handle and position lock

Technical data

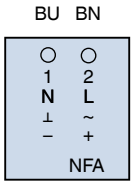
Spring return actuator NFA

Spring return actuator NFA

Supply voltage (AC)	19.2 – 264 V AC, 50/60 Hz
Supply voltage (DC)	21.6 – 137 V DC
Power rating (AC)	9.5 VA max.
Power rating (DC)	6 W max.
Torque	10 Nm
Motor running time for 90°	< 75 s
Spring return time	20 s (< –20 °C max. 60 s)
Control input signal	Supply voltage on/off
Connecting cable	2 × 0.75 mm², 1 m long
IEC protection class	II (protective insulation)
Protection level	IP 54
EC conformity	EMC to 2004/108/EG, low voltage to 2006/95/EG
Operating temperature	–30 to 50 °C
Weight	2.0 kg

Wiring

Connecting cable core identification



1 N ⊥, –: Ground, neutral
2 L ~, +: Control voltage for direction of rotation 1

Description

/ ZF03 / NC

Order code detail

Application

- Spring return actuator NF24A-S2 with integral auxiliary switches
- Opening and closing with safety function
- The multileaf damper safety function is defined with the order code

Variants

- NO: Power off to OPEN
- NC: Power off to CLOSE

Parts and characteristics

- Supply voltage 24 V AC/DC
- Control input signal: Supply voltage on/off
- Mechanical stops
- Manual operation using crank handle and position lock
- Two auxiliary switches with volt-free contacts for signalling or activating switch functions
- Fixed auxiliary switch, switching point 10 %
- Adjustable auxiliary switch, switching point 10 – 90 %

Technical data

Spring return actuator NF24A-S2

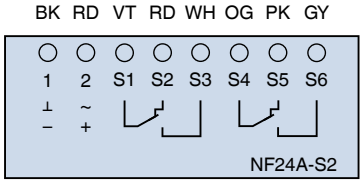
Spring return actuator NF24A-S2

Supply voltage (AC)	24 V AC ± 20 %, 50/60 Hz
Supply voltage (DC)	24 V DC –10 %, +20 %
Power rating (AC)	8.5 VA max.
Power rating (DC)	6 W max.
Torque	10 Nm
Motor running time for 90°	< 75 s
Spring return time	20 s (< –20 °C max. 60 s)
Control input signal	Supply voltage on/off
Auxiliary switch: type of contact	2 changeover contacts [1]
Max. switching voltage (AC)	250 V AC
Max. switching current (AC)	3 A (resistive load); 0.5 A (inductive load)
Max. switching voltage (DC)	110 V DC
Max. switching current (DC)	0.5 A (resistive load); 0.2 A (inductive load)
Connecting cable – actuator	2 × 0.75 mm², 1 m long
Connecting cable – auxiliary switch	6 × 0.75 mm², 1 m long
IEC protection class	III (protective extra-low voltage)
Protection level	IP 54
EC conformity	EMC according to 2004/108/EG
Operating temperature	–30 to 50 °C
Weight	2.0 kg

[1] If both auxiliary switches are used the switching voltages must be the same

Wiring

Connecting cable core identification



1 ⊥, –:	Ground, neutral
2 ~, +:	Control voltage for direction of rotation 1
S1:	Common contact
S2:	Mechanical stop 1 < x
S3:	Mechanical stop 1 > x
S4:	Common contact
S5:	Mechanical stop 2 < y
S6:	Mechanical stop 2 > y
x:	10 %
y:	10 ... 90 %

1

Description

/ ZF04 / NC

Order code detail

Application

- Spring return actuator NFA-S2 with integral auxiliary switches
- Opening and closing with safety function
- The multileaf damper safety function is defined with the order code

Variants

- NO: Power off to OPEN
- NC: Power off to CLOSE

Parts and characteristics

- Supply voltage 24 – 240 V AC or 24 – 125 V DC
- Control input signal: Supply voltage on/off
- Mechanical stops
- Manual operation using crank handle and position lock
- Two auxiliary switches with volt-free contacts for signalling or activating switch functions
- Fixed auxiliary switch, switching point 10 %
- Adjustable auxiliary switch, switching point 10 – 90 %

Technical data

Spring return actuator NFA-S2

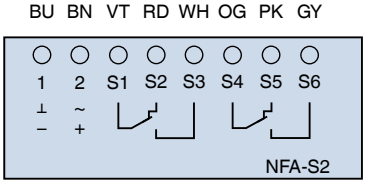
Spring return actuator NFA-S2

Supply voltage (AC)	19.2 – 264 V AC, 50/60 Hz
Supply voltage (DC)	21.6 – 137 V DC
Power rating (AC)	9.5 VA max.
Power rating (DC)	6 W max.
Torque	10 Nm
Motor running time for 90°	< 75 s
Spring return time	20 s (< –20 °C max. 60 s)
Control input signal	Supply voltage on/off
Auxiliary switch: type of contact	2 changeover contacts [1]
Max. switching voltage (AC)	250 V AC
Max. switching current (AC)	3 A (resistive load); 0.5 A (inductive load)
Max. switching voltage (DC)	110 V DC
Max. switching current (DC)	0.5 A (resistive load); 0.2 A (inductive load)
Connecting cable – actuator	2 × 0.75 mm², 1 m long
Connecting cable – auxiliary switch	6 × 0.75 mm², 1 m long
IEC protection class	II (protective insulation)
Protection level	IP 54
EC conformity	EMC to 2004/108/EG, low voltage to 2006/95/EG
Operating temperature	–30 to 50 °C
Weight	2.2 kg

[1] If both auxiliary switches are used the switching voltages must be the same

Wiring

Connecting cable core identification



1 N, ⊥, –: Ground, neutral
2 L_1,~, +: Control voltage for direction of rotation 1
S1: Common contact
S2: Mechanical stop 1 < x
S3: Mechanical stop 1 > x
S4: Common contact
S5: Mechanical stop 2 < y
S6: Mechanical stop 2 > y
x: 10 %
y: 10 ... 90 %

Description

/ ZF06 / NC

Order code detail

Application

- Spring return actuator SF24A
- Opening and closing with safety function
- The multileaf damper safety function is defined with the order code

Variants

- NO: Power off to OPEN
- NC: Power off to CLOSE

Parts and characteristics

- Supply voltage 24 V AC/DC
- Control input signal: Supply voltage on/off
- Mechanical stops
- Manual operation using crank handle and position lock

Technical data

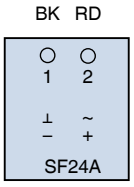
Actuator SF24A

Actuator SF24A

Supply voltage (AC)	24 V AC ± 20 %, 50/60 Hz
Supply voltage (DC)	24 V DC –10 %, +20 %
Power rating (AC)	7 VA max.
Power rating (DC)	5 W max.
Torque	20 Nm
Motor running time for 90°	< 75 s
Spring return time	20 s (for < –20 °C up to 60 s)
Control input signal	Supply voltage on/off
Connecting cable	2 x 0.75 mm², 1 m long
IEC protection class	III (protective extra-low voltage)
Protection level	IP 54
EC conformity	EMC according to 2004/108/EG
Operating temperature	–30 to 50 °C
Weight	2.1 kg

Wiring

Connecting cable core identification



1 ⊥, –: Ground, neutral
2 ~, +: Control voltage for direction of rotation 1

1

Description

/ **ZF07** / **NC**

Order code detail

Application

- Spring return actuator SFA
- Opening and closing with safety function
- The multileaf damper safety function is defined with the order code

Variants

- NO: Power off to OPEN
- NC: Power off to CLOSE

Parts and characteristics

- Supply voltage 24 – 240 V AC or 24 – 125 V DC
- Control input signal: Supply voltage on/off
- Mechanical stops
- Manual operation using crank handle and position lock

Technical data

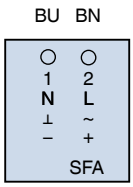
Actuator SFA

Actuator SFA

Supply voltage (AC)	19.2 – 264 V AC, 50/60 Hz
Supply voltage (DC)	21.6 – 137 V DC
Power rating (AC)	18 VA max.
Power rating (DC)	7 W max.
Torque	20 Nm
Motor running time for 90°	< 75 s
Spring return time	20 s (for < –20 °C up to 60 s)
Control input signal	Supply voltage on/off
Connecting cable	2 × 0.75 mm², 1 m long
IEC protection class	II (protective insulation)
Protection level	IP 54
EC conformity	EMC to 2004/108/EG, low voltage to 2006/95/EG
Operating temperature	–30 to 50 °C
Weight	2.2 kg

Wiring

Connecting cable core identification



1 N ⊥, –: Ground, neutral
2 L ~, +: Control voltage for direction of rotation 1

Description

/ ZF08 / NC

Order code detail

Application

- Spring return actuator SF24A-S2 with integral auxiliary switches
- Opening and closing with safety function
- The multileaf damper safety function is defined with the order code

Variants

- NO: Power off to OPEN
- NC: Power off to CLOSE

Parts and characteristics

- Supply voltage 24 V AC/DC
- Control input signal: Supply voltage on/off
- Mechanical stops
- Manual operation using crank handle and position lock
- Two auxiliary switches with volt-free contacts for signalling or activating switch functions
- Fixed auxiliary switch, switching point 10 %
- Adjustable auxiliary switch, switching point 10 – 90 %

Technical data

Actuator SF24A-S2

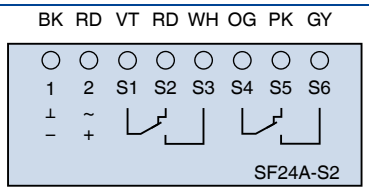
Actuator SF24A-S2

Supply voltage (AC)	24 V AC ± 20 %, 50/60 Hz
Supply voltage (DC)	24 V DC ±10 %
Power rating (AC)	7.5 VA max.
Power rating (DC)	5 W max.
Torque	20 Nm
Motor running time for 90°	< 75 s
Spring return time	20 s (< –20 °C max. 60 s)
Control input signal	Supply voltage on/off
Auxiliary switch: type of contact	2 changeover contacts [1]
Max. switching voltage (AC)	250 V AC
Max. switching current (AC)	3 A (resistive load); 0.5 A (inductive load)
Max. switching voltage (DC)	110 V DC
Max. switching current (DC)	0.5 A (resistive load); 0.2 A (inductive load)
Connecting cable – actuator	2 × 0.75 mm², 1 m long
Connecting cable – auxiliary switch	6 × 0.75 mm², 1 m long
IEC protection class	III (protective extra-low voltage)
Protection level	IP 54
EC conformity	EMC to 2004/108/EG, low voltage to 2006/95/EG
Operating temperature	–30 to 50 °C
Weight	2.3 kg

[1] If both auxiliary switches are used the switching voltages must be the same

Wiring

Connecting cable core identification



1 ⊥, –:	Ground, neutral
2 ~, +:	Control voltage for direction of rotation 1
S1:	Common contact
S2:	Mechanical stop 1 < x
S3:	Mechanical stop 1 > x
S4:	Common contact
S5:	Mechanical stop 2 < y
S6:	Mechanical stop 2 > y
x:	10 %
y:	10 ... 90 %

1

Description

/ ZF09 / NC

Order code detail

Application

- Spring return actuator SFA-S2 with integral auxiliary switches
- Opening and closing with safety function
- The multileaf damper safety function is defined with the order code

Variants

- NO: Power off to OPEN
- NC: Power off to CLOSE

Parts and characteristics

- Supply voltage 24 – 240 V AC or 24 – 125 V DC
- Control input signal: Supply voltage on/off
- Mechanical stops
- Manual operation using crank handle and position lock
- Two auxiliary switches with volt-free contacts for signalling or activating switch functions
- Fixed auxiliary switch, switching point 10 %
- Adjustable auxiliary switch, switching point 10 – 90 %

Technical data

Actuator SFA-S2

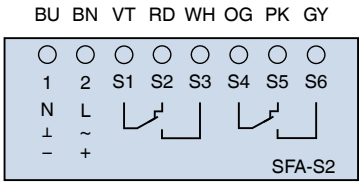
Spring return actuator SFA-S2

Supply voltage (AC)	19.2 – 264 V AC, 50/60 Hz
Supply voltage (DC)	21.6 – 137 V DC
Power rating (AC)	18 VA max.
Power rating (DC)	7 W max.
Torque	20 Nm
Motor running time for 90°	< 75 s
Spring return time	20 s (< –20 °C max. 60 s)
Control input signal	Supply voltage on/off
Auxiliary switch: type of contact	2 changeover contacts [1]
Max. switching voltage (AC)	250 V AC
Max. switching current (AC)	3 A (resistive load); 0.5 A (inductive load)
Max. switching voltage (DC)	110 V DC
Max. switching current (DC)	0.5 A (resistive load); 0.2 A (inductive load)
Connecting cable – actuator	2 × 0.75 mm², 1 m long
Connecting cable – auxiliary switch	6 × 0.75 mm², 1 m long
IEC protection class	II (protective insulation)
Protection level	IP 54
EC conformity	EMC to 2004/108/EG, low voltage to 2006/95/EG
Operating temperature	–30 to 50 °C
Weight	2.4 kg

[1] If both auxiliary switches are used the switching voltages must be the same

Wiring

Connecting cable core identification



1 ⊥, –: Ground, neutral
2 ~, +: Control voltage max. / open
S1: Common contact
S2: Mechanical stop 1 < x
S3: Mechanical stop 1 > x
S4: Common contact
S5: Mechanical stop 2 < y
S6: Mechanical stop 2 > y
x: 10 %
y: 10 ... 90 %

1

Description

/ ZF11 / NC

Order code detail

Application

- Spring return actuator EF24A
- Opening and closing with safety function
- The multileaf damper safety function is defined with the order code

Variants

- NO: Power off to OPEN
- NC: Power off to CLOSE

Parts and characteristics

- Supply voltage 24 V AC/DC
- Control input signal: Supply voltage on/off
- Mechanical stops
- Manual operation using crank handle and position lock

Technical data

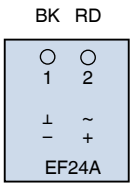
Actuator EF24A

Actuator EF24A

Supply voltage (AC)	24 V AC ± 20 %, 50/60 Hz
Supply voltage (DC)	24 V DC ±10 %
Power rating (AC)	16 VA max.
Power rating (DC)	9.5 W max.
Torque	30 Nm
Motor running time for 90°	< 75 s
Spring return time	20 s (for < –20 °C up to 60 s)
Control input signal	Supply voltage on/off
Connecting cable	2 × 0.75 mm², 1 m long
IEC protection class	III (protective extra-low voltage)
Protection level	IP 54
EC conformity	EMC according to 2004/108/EG
Operating temperature	–30 to 50 °C
Weight	4.3 kg

Wiring

Connecting cable core identification



1 ⊥, –: Ground, neutral
2 ~, +: Control voltage for direction of rotation 1

1

Description

/ **ZF12** / **NC**

Order code detail

Application

- Spring return actuator EF230A
- Opening and closing with safety function
- The multileaf damper safety function is defined with the order code

Variants

- NO: Power off to OPEN
- NC: Power off to CLOSE

Parts and characteristics

- Supply voltage 230 V AC
- Control input signal: Supply voltage on/off
- Mechanical stops
- Manual operation using crank handle and position lock

Technical data

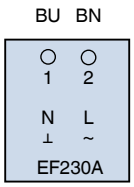
Actuator EF230A

Actuator EF230A

Supply voltage (AC)	85 – 265 V AC, 50/60 Hz
Power rating (AC)	21 VA max.
Torque	30 Nm
Motor running time for 90°	< 75 s
Spring return time	20 s (for < –20 °C up to 60 s)
Control input signal	Supply voltage on/off
Connecting cable	2 × 0.75 mm², 1 m long
IEC protection class	II (protective insulation)
Protection level	IP 54
EC conformity	EMC to 2004/108/EG, low voltage to 2006/95/EG
Operating temperature	–30 to 50 °C
Weight	4.2 kg

Wiring

Connecting cable core identification



1 N, ⊥: Ground, neutral
2 L, ~: Control voltage for direction of rotation 1

Description

/ ZF13 / NC

Order code detail

Application

- Spring return actuator EF24A-S2 with integral auxiliary switches
- Opening and closing with safety function
- The multileaf damper safety function is defined with the order code

Variants

- NO: Power off to OPEN
- NC: Power off to CLOSE

Parts and characteristics

- Supply voltage 24 V AC/DC
- Control input signal: Supply voltage on/off
- Mechanical stops
- Manual operation using crank handle and position lock
- Two auxiliary switches with volt-free contacts for signalling or activating switch functions
- Fixed auxiliary switch, switching point 10 %
- Adjustable auxiliary switch, switching point 10 – 90 %

Technical data

Actuator EF24A-S2

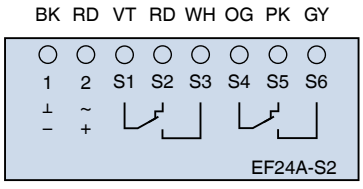
Actuator EF24A-S2

Supply voltage (AC)	24 V AC ± 20 %, 50/60 Hz
Supply voltage (DC)	24 V DC ±10 %
Power rating (AC)	16 VA max.
Power rating (DC)	9.5 W max.
Torque	30 Nm
Motor running time for 90°	< 75 s
Spring return time	20 s (for < –20 °C up to 60 s)
Control input signal	Supply voltage on/off
Auxiliary switch: type of contact	2 changeover contacts [1]
Max. switching voltage (AC)	250 V AC
Max. switching current (AC)	3 A (resistive load); 0.5 A (inductive load)
Max. switching voltage (DC)	110 V DC
Max. switching current (DC)	0.5 A (resistive load); 0.2 A (inductive load)
Connecting cable – actuator	2 × 0.75 mm², 1 m long
Connecting cable – auxiliary switch	6 × 0.75 mm², 1 m long
IEC protection class	III (protective extra-low voltage)
Protection level	IP 54
EC conformity	EMC according to 89/336/EWG
Operating temperature	–30 to 50 °C
Weight	4.4 kg

[1] If both auxiliary switches are used the switching voltages must be the same

Wiring

Connecting cable core identification



1 ⊥, –:	Ground, neutral
2 ~, +:	Control voltage for direction of rotation 1
S1:	Common contact
S2:	Mechanical stop 1 < x
S3:	Mechanical stop 1 > x
S4:	Common contact
S5:	Mechanical stop 2 < y
S6:	Mechanical stop 2 > y
x:	10 %
y:	10 ... 90 %

1

Description

/ ZF14 / NC

Order code detail

Application

- Spring return actuator EF230A-S2 with integral auxiliary switches
- Opening and closing with safety function
- The multileaf damper safety function is defined with the order code

Variants

- NO: Power off to OPEN
- NC: Power off to CLOSE

Parts and characteristics

- Supply voltage 230 V AC
- Control input signal: Supply voltage on/off
- Mechanical stops
- Manual operation using crank handle and position lock
- Two auxiliary switches with volt-free contacts for signalling or activating switch functions
- Fixed auxiliary switch, switching point 10 %
- Adjustable auxiliary switch, switching point 10 – 90 %

Technical data

Actuator EF230A-S2

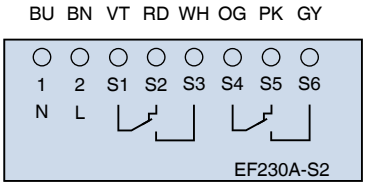
Actuator EF230A-S2

Supply voltage (AC)	85 – 265 V AC, 50/60 Hz
Power rating (AC)	21 VA max.
Torque	30 Nm
Motor running time for 90°	< 75 s
Spring return time	20 s (for < –20 °C up to 60 s)
Control input signal	Supply voltage on/off
Auxiliary switch: type of contact	2 changeover contacts [1]
Max. switching voltage (AC)	250 V AC
Max. switching current (AC)	3 A (resistive load); 0.5 A (inductive load)
Max. switching voltage (DC)	110 V DC
Max. switching current (DC)	0.5 A (resistive load); 0.2 A (inductive load)
Connecting cable – actuator	2 × 0.75 mm², 1 m long
Connecting cable – auxiliary switch	6 × 0.75 mm², 1 m long
IEC protection class	II (protective insulation)
Protection level	IP 54
EC conformity	EMC to 2004/108/EG, low voltage to 2006/95/EG
Operating temperature	–30 to 50 °C
Weight	4.6 kg

[1] If both auxiliary switches are used the switching voltages must be the same

Wiring

Connecting cable core identification



1 N, –: Ground, neutral
2 L: Control voltage for direction of rotation 1
S1: Common contact
S2: Mechanical stop 1 < x
S3: Mechanical stop 1 > x
S4: Common contact
S5: Mechanical stop 2 < y
S6: Mechanical stop 2 > y
x: 10 %
y: 10 ... 90 %

Attachments
Modulating actuators

For stepless adjustment and for the opening and closing of dampers in air conditioning systems

Modulating actuators for Type JZ and JZ-Low leakage multileaf dampers

- Various damper blade positions
- Supply voltage 24 V AC/DC
- Control input signal: Signal voltage 2 – 10 V for modulating actuators
- Mechanical stops
- Retrofit possible

Spring return actuator

Multileaf damper with actuator

1

Type		Page
Modulating actuators	General information	1.3 – 32
	Special information – Z20	1.3 – 34
	Special information – Z21	1.3 – 35
	Special information – Z50	1.3 – 36
	Special information – Z51	1.3 – 37
	Special information – ZF05	1.3 – 38
	Special information – ZF10	1.3 – 39
	Special information – ZF15	1.3 – 40
	Basic information and nomenclature	1.4 – 1

Description

Application
- Actuators for variable adjustment
- Variable adjustment of Type JZ and JZ-Low leakage multileaf dampers

Parts and characteristics
- Mechanical stops for limiting the damper blade positions
- Supply voltage 24 V AC/DC
- Overload protection
- Setpoint value signal 2 – 10 V DC
- Optional spring return actuator for damper blade safety function
- Release button or crank handle for manual operation

Any attachments are defined with the order code of the multileaf damper.

Actuators for the variable adjustment of multileaf dampers

Order code detail	Actuator		Torque	Supply voltage
	Part number	Type		
Z20	M466DF2	SM24A-SR	20 Nm	24 V
Z21	M466DG2	GM24A-SR	40 Nm	24 V
Z50	M466DT6	LM24A-SR-F	5 Nm	24 V
Z51	M466EN0	NM24A-SR	10 Nm	24 V

Spring return actuators for the variable adjustment of multileaf dampers

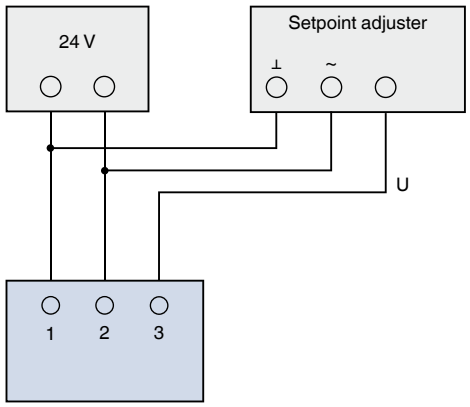
Order code detail	Actuator		Torque	Supply voltage
	Part number	Type		
ZF05	M466ET4	NF24A-SR	10 Nm	24 V
ZF10	M466ES0	SF24A-SR	20 Nm	24 V
ZF15	M466ET9	EF24A-SR	30 Nm	24 V

Function

Functional description

The actuator moves the blades
of a multileaf damper to any position between
the OPEN and CLOSED positions.
The control input signal is a voltage signal.

Control initiated by a voltage signal



U Voltage signal 0 – 10 V DC or 2 – 10 V DC

1

Description

/ **Z20** /

Order code detail

Application

- Actuator SM24A-SR
- Stepless adjustment as well as opening and closing of multileaf dampers

Parts and characteristics

- Supply voltage 24 V AC/DC
- Control input signal: Setpoint value signal 2 – 10 V DC, corresponds to the total rotation range (90°), working range is limited by mechanical stops
- Output: Actual value signal 2 – 10 V
- Mechanical stops
- Direction of action can be reversed
- Release button to allow for manual operation

Technical data

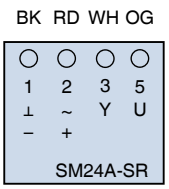
Actuator SM24A-SR

Actuator SM24A-SR

Supply voltage (AC)	24 V AC – 10 %, + 20 %, 50/60 Hz
Supply voltage (DC)	24 V DC ± 20 %
Power rating (AC)	4 VA max.
Power rating (DC)	2 W max.
Torque	20 Nm
Running time for 90°	150 s
Control signal	2 – 10 V DC, R_a > 100 kΩ
Connecting cable	4 × 0.75 mm², 1 m long
IEC protection class	III (protective extra-low voltage)
Protection level	IP 54
EC conformity	EMC according to 2004/108/EG
Operating temperature	–30 to 50 °C
Weight	1.1 kg

Wiring

Connecting cable core identification



1 ⊥, –: Ground, neutral
2 ~, +: Supply voltage
3 Y: Setpoint value signal
4 U: Actual value signal

Description

/ **Z21** /

Order code detail

Application

- Actuator GM24A-SR
- Stepless adjustment as well as opening and closing of multileaf dampers

Parts and characteristics

- Supply voltage 24 V AC/DC
- Control input signal: Setpoint value signal 2 – 10 V DC, corresponds to the total rotation range (90°), working range is limited by mechanical stops
- Output: Actual value signal 2 – 10 V
- Mechanical stops
- Direction of action can be reversed
- Release button to allow for manual operation

Technical data

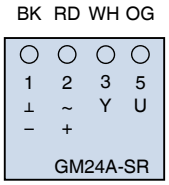
Actuator GM24A-SR

Actuator GM24A-SR

Supply voltage (AC)	24 V AC ± 20 %, 50/60 Hz
Supply voltage (DC)	24 V DC ± 20 %
Power rating (AC)	6.5 VA max.
Power rating (DC)	4.5 W max.
Torque	40 Nm
Running time for 90°	150 s
Control signal	2 – 10 V DC, R_a > 100 kΩ
Connecting cable	4 × 0.75 mm², 1 m long
IEC protection class	III (protective extra-low voltage)
Protection level	IP 54
EC conformity	EMC according to 2004/108/EG
Operating temperature	–30 to 50 °C
Weight	1.7 kg

Wiring

Connecting cable core identification



1 ⊥, –:	Ground, neutral
2 ~, +:	Supply voltage
3 Y:	Setpoint value signal
4 U:	Actual value signal

1

Description

/ **Z50** /

Order code detail

Application

- Actuator LM24A-SR-F
- Stepless adjustment as well as opening and closing of multileaf dampers

Parts and characteristics

- Supply voltage 24 V AC/DC
- Control input signal: Setpoint value signal 2 – 10 V DC, corresponds to the total rotation range (90°), working range is limited by mechanical stops
- Output: Actual value signal 2 – 10 V
- Mechanical stops
- Direction of action can be reversed
- Positive lock connection with damper blade shaft
- Release button to allow for manual operation

Technical data

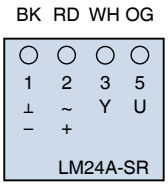
Actuator LM24A-SR-F

Actuators LM24A-SR and LM24A-SR-F

Supply voltage (AC)	24 V AC ± 20 %, 50/60 Hz
Supply voltage (DC)	24 V DC ± 20 %
Power rating (AC)	2 VA
Power rating (DC)	1 W
Torque	5 Nm
Running time for 90°	150 s
Control signal	2 – 10 V DC, R_a > 100 kΩ
Connecting cable	4 × 0.75 mm², 1 m long
IEC protection class	III (protective extra-low voltage)
Protection level	IP 54
EC conformity	EMC according to 2004/108/EG
Operating temperature	–30 to 50 °C
Weight	0.5 kg

Wiring

Connecting cable core identification



1 ⊥, –: Ground, neutral
2 ~, +: Supply voltage
3 Y: Setpoint value signal
5 U: Actual value signal

LM24A-SR and LM24A-SR-F

Description

/ **Z51** /

Order code detail

Application

- Actuator NM24A-SR
- Stepless adjustment as well as opening and closing of multileaf dampers

Parts and characteristics

- Supply voltage 24 V AC/DC
- Control input signal: Setpoint value signal 2 – 10 V DC, corresponds to the total rotation range (90°), working range is limited by mechanical stops
- Output: Actual value signal 2 – 10 V
- Mechanical stops
- Direction of action can be reversed
- Release button to allow for manual operation

Technical data

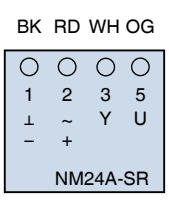
Actuator NM24A-SR

Actuator NM24A-SR

Supply voltage (AC)	24 V AC ± 20 %, 50/60 Hz
Supply voltage (DC)	24 V DC ± 20 %
Power rating (AC)	4 VA max.
Power rating (DC)	2 W max.
Torque	10 Nm
Running time for 90°	150 s
Control signal	2 – 10 V DC, R_a > 100 kΩ
Connecting cable	4 × 0.75 mm², 1 m long
IEC protection class	III (protective extra-low voltage)
Protection level	IP 54
EC conformity	EMC according to 2004/108/EG
Operating temperature	–30 to 50 °C
Weight	0.8 kg

Wiring

Connecting cable core identification



1 ⊥, –:	Ground, neutral
2 ~, +:	Supply voltage
3 Y:	Setpoint value signal
4 U:	Actual value signal

1

Description

/ ZF05 / NO

Order code detail

Application

- Spring return actuator NF24A-SR
- Stepless adjustment as well as opening and closing of multileaf dampers with safety function
- The multileaf damper safety function is defined with the order code

Variants

- NO: Power off to OPEN
- NC: Power off to CLOSE

Parts and characteristics

- Supply voltage 24 V AC/DC
- Control input signal: Setpoint value signal 2 – 10 V DC, corresponds to the total rotation range (90°), working range is limited by mechanical stops
- Output: Actual value signal 2 – 10 V
- Mechanical stops
- Manual operation using crank handle and position lock

Technical data

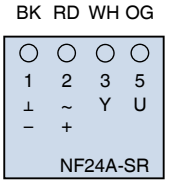
Actuator NF24A-SR

Actuator NF24A-SR

Supply voltage (AC)	24 V AC –10 %, + 20 %, 50/60 Hz
Supply voltage (DC)	24 V DC ± 20 %
Power rating (AC)	5.5 VA max.
Power rating (DC)	3.5 W max.
Torque	10 Nm
Motor running time for 90°	150 s
Spring return	20 s (for < –20 °C up to 60 s)
Control signal	2 – 10 V DC, R_a > 100 kΩ
Connecting cable	4 × 0.75 mm², 1 m long
IEC protection class	III (protective extra-low voltage)
Protection level	IP 54
EC conformity	EMC according to 2004/108/EG
Operating temperature	–30 to 50 °C
Weight	1.8 kg

Wiring

Connecting cable core identification



1 ⊥, –: Ground, neutral
2 ~, +: Supply voltage
3 Y: Setpoint value signal
4 U: Actual value signal

Description

/ ZF10 / NO

Order code detail

Application

- Spring return actuator SF24A-SR
- Stepless adjustment as well as opening and closing of multileaf dampers with safety function
- The multileaf damper safety function is defined with the order code

Variants

- NO: Power off to OPEN
- NC: Power off to CLOSE

Parts and characteristics

- Supply voltage 24 V AC/DC
- Control input signal: Setpoint value signal 2 – 10 V DC, corresponds to the total rotation range (90°), working range is limited by mechanical stops
- Output: Actual value signal 2 – 10 V
- Mechanical stops
- Manual operation using crank handle and position lock

Technical data

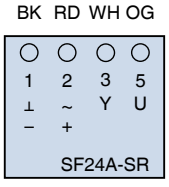
Actuator SF24A-SR

Actuator SF24A-SR

Supply voltage (AC)	24 V AC –10 %, + 20 %, 50/60 Hz
Supply voltage (DC)	24 V DC ± 20 %
Power rating (AC)	7 VA max.
Power rating (DC)	5 W max.
Torque	20 Nm
Motor running time for 90°	150 s
Spring return	20 s (for < –20 °C up to 60 s)
Control signal	2 – 10 V DC, R_a > 100 kΩ
Connecting cable	4 × 0.75 mm², 1 m long
IEC protection class	III (protective extra-low voltage)
Protection level	IP 54
EC conformity	EMC according to 2004/108/EG
Operating temperature	–30 to 50 °C
Weight	2.1 kg

Wiring

Connecting cable core identification



1 ⊥, –:	Ground, neutral
2 ~, +:	Supply voltage
3 Y:	Setpoint value signal
4 U:	Actual value signal

1

Description

/ ZF15 / NO

Order code detail

Application

- Spring return actuator EF24A-SR
- Stepless adjustment as well as opening and closing of multileaf dampers with safety function
- The multileaf damper safety function is defined with the order code

Variants

- NO: Power off to OPEN
- NC: Power off to CLOSE

Parts and characteristics

- Supply voltage 24 V AC/DC
- Control input signal: Setpoint value signal 2 – 10 V DC, corresponds to the total rotation range (90°), working range is limited by mechanical stops
- Output: Actual value signal 2 – 10 V
- Mechanical stops
- Manual operation using crank handle and position lock

Technical data

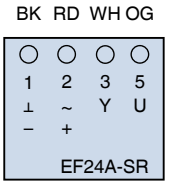
Actuator EF24A-SR

Actuator EF24A-SR

Supply voltage (AC)	24 V AC –10 %, + 20 %, 50/60 Hz
Supply voltage (DC)	24 V DC ± 20 %
Power rating (AC)	12 VA max.
Power rating (DC)	7 W max.
Torque	30 Nm
Motor running time for 90°	150 s
Spring return	20 s (for < –20 °C up to 60 s)
Control signal	2 – 10 V DC, R_a > 100 kΩ
Connecting cable	4 × 0.75 mm², 1 m long
IEC protection class	III (protective extra-low voltage)
Protection level	IP 54
EC conformity	EMC according to 2004/108/EG
Operating temperature	–30 to 50 °C
Weight	4.3 kg

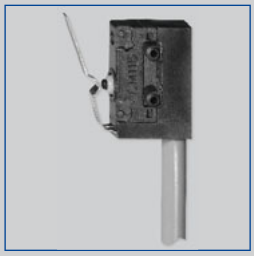
Wiring

Connecting cable core identification



1 ⊥, –:	Ground, neutral
2 ~, +:	Supply voltage
3 Y:	Setpoint value signal
4 U:	Actual value signal

Attachments
Pneumatic actuators



Limit switch

Solenoid valve

Multileaf damper
with pneumatic actuator

Pneumatic actuators for the opening and closing of dampers in air conditioning systems

Pneumatic actuators for Type JZ and JZ-Low leakage multileaf dampers

- Change of the damper blade position for two different operating situations
- Control input signal: Operating pressure of 1.2 – 6 bar
- Pneumatic actuator, single acting or double acting
- Torque 8 – 70 Nm
- Retrofit possible

Optional equipment and accessories

- Solenoid valve 24 V or 230 V
- Limit switch

1

Type		Page
Pneumatic actuators	General information	1.3 – 42
	Special information – Z60 – Z65	1.3 – 46
	Special information – Z66 – Z71	1.3 – 47
	Special information – Z72 – Z77	1.3 – 48
	Special information – Limit switches	1.3 – 49
	Special information – Solenoid valve 24 V	1.3 – 50
	Special information – Solenoid valve 230 V	1.3 – 51
	Basic information and nomenclature	1.4 – 1

Description

Application
- Pneumatic actuators for opening and closing
- Opening and closing of Type JZ and JZ-Low leakage multileaf dampers

Special features
- Different opening and closing times can be set using throttle valves
- Interdependent torque and operating pressure (double acting actuator)
- Maintaining the blade position without additional power
- Short running times
- Resistant to overload, temperature fluctuations and electromagnetic effects
- Compressed air is easy to store

Parts and characteristics
- Pneumatic actuators, single acting or double acting
- Control input signal: 1-wire control of a solenoid valve
- Optional limit switch for capturing the end positions
- Safety function with double acting actuators (power off)
- Safety function with single acting actuators (pressure off)

Any attachments are defined with the order code of the multileaf damper.

Double acting pneumatic actuators for multileaf dampers

Order code detail	Actuator		Limit switch	Torque at 6 bar	Solenoid valve	Damper blade safety function
	Part no.	Type	Part no.			
Z60	M452DD0	DR030	–	35 Nm	–	
Z61	M452DD0	DR030	–	35 Nm	24 V	①
Z62	M452DD0	DR030	–	35 Nm	230 V	①
Z63	M452DD0	DR030	2 × M536AI3	35 Nm	–	
Z64	M452DD0	DR030	2 × M536AI3	35 Nm	24 V	①
Z65	M452DD0	DR030	2 × M536AI3	35 Nm	230 V	①
Z66	M452DD1	DR060	–	70 Nm	–	
Z67	M452DD1	DR060	–	70 Nm	24 V	①
Z68	M452DD1	DR060	–	70 Nm	230 V	①
Z69	M452DD1	DR060	2 × M536AI3	70 Nm	–	
Z70	M452DD1	DR060	2 × M536AI3	70 Nm	24 V	①
Z71	M452DD1	DR060	2 × M536AI3	70 Nm	230 V	①

① Power off to close/open
Operating pressure 1.2 – 6 bar

Single acting pneumatic actuators for multileaf dampers

Order code detail	Actuator	Limit switch	Torque at 6 bar	Solenoid valve	Damper blade safety function
	Type	Part no.			
Z72	SC060 / SO060	–	30 Nm	–	①
Z73	SC060 / SO060	–	30 Nm	24 V	②
Z74	SC060 / SO060	–	30 Nm	230 V	②
Z75	SC060 / SO060	2 × M536AI3	30 Nm	–	①
Z76	SC060 / SO060	2 × M536AI3	30 Nm	24 V	②
Z77	SC060 / SO060	2 × M536AI3	30 Nm	230 V	②

① Power off to close/open
② Power off and pressure off to close/open
Operating pressure 6 bar

1 Function

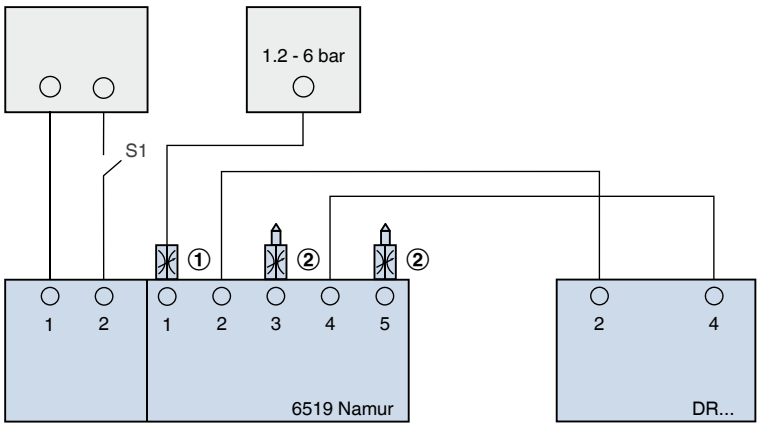
Functional description

The actuator moves the blades of a multileaf damper into OPEN or CLOSED position. The easiest way to generate the control input signal is electrically, using solenoid valves. Different opening and closing times can be set using throttle valves.

Double acting pneumatic actuators
The multileaf damper is opened and closed with compressed air. For this purpose, the actuator has two tube connections. Compressed air is applied to one tube connection while the other connection remains open such that the air can escape from the corresponding chamber of the actuator. For the other direction of rotation, the process is reversed.

Single acting pneumatic actuators
The multileaf damper is closed with compressed air and opened with spring force. The actuator has one tube connection. This tube connection is for compressed air. For the other direction of rotation the connection remains open.

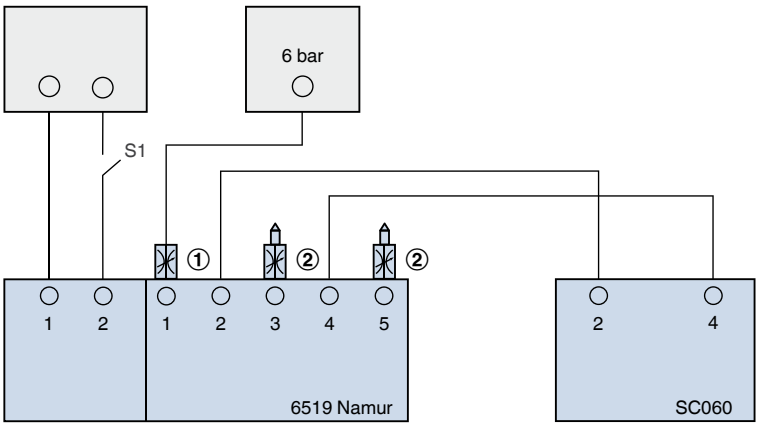
Control of a double acting pneumatic actuator using a solenoid valve



Switch functions
S1 closed: Direction of rotation 1
S1 open: Direction of rotation 2

① Throttle valve
② Flow reducer (noise reduction)

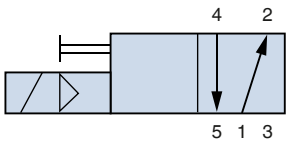
Control of a single acting pneumatic actuator using a solenoid valve



Switch functions
S1 closed: Direction of rotation 1
S1 open: Direction of rotation 2

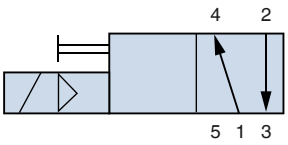
① Throttle valve
② Flow reducer (noise reduction)

Solenoid valve, power off



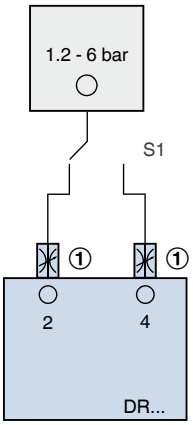
2: Direction of rotation 1

Solenoid valve, power on



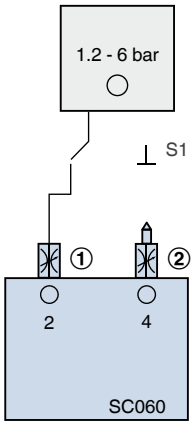
4: Direction of rotation 2

Control of a double acting pneumatic actuator without a solenoid valve



Switch functions
S1 closed: Direction of rotation 1
S1 open: Direction of rotation 2
① Throttle valve

Control of a single acting pneumatic actuator without a solenoid valve



Switch functions
S1 closed: Direction of rotation 1
S1 open: Direction of rotation 2
① Throttle valve
② Flow reducer (noise reduction)

1

Description

/ **Z60** /
/ **Z61** /
/ **Z62** /
/ **Z63** /
/ **Z64** /
/ **Z65** /

Order code detail

Application

- Double acting pneumatic actuator DR030
- Opening and closing of multileaf dampers
- Different opening and closing times can be set using throttle valves

Variants

Z61, Z62, Z64, Z65
- NO: Power off to OPEN
- NC: Power off to CLOSE

Parts and characteristics

- Operating pressure 1.2 – 6.0 bar
- Control input signal: Pneumatic, operating pressure on 2 or 4, solenoid valve 24 V or 230 V recommended
- The actuator transforms the operating pressure directly into a rotating movement (no linkage required)
- Position indicator

Technical data

Pneumatic actuator DR030

Actuator DR030

Operating pressure	1.2 bar – 6.0 bar
Maximum pressure	8 bar
Torque at 6 bar	35 Nm
Running time for 90°	0.3 s
Air volume OPEN/CLOSE	0.16/0.26 l
Compressed air	Compressed air for instruments, free of oil, water and dust
Air connection	G 1/8"
Operating temperature	–40 to 80 °C
Weight	1.6 kg

Torque depending on operating pressure

Operating pressure [bar]	1.2	2.5	3	4	5	6
Torque [Nm]	8	15	18	24	29	35

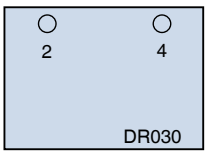
Tubing

/ **Z60** /
/ **Z63** /

Order code detail

For actuators without solenoid valve the tube connections 2 and 4 must be allocated by others.

Tube connections



2: Direction of rotation 1
4: Direction of rotation 2

Description

/ **Z66** /
/ **Z67** /
/ **Z68** /
/ **Z69** /
/ **Z70** /
/ **Z71** /

Order code detail

Application

- Double acting pneumatic actuator DR060
- Opening and closing of multileaf dampers
- Different opening and closing times can be set using throttle valves

Variants

Z67, Z68, Z70, Z71

- NO: Power off to OPEN
- NC: Power off to CLOSE

Parts and characteristics

- Operating pressure 1.2 – 6.0 bar
- Control input signal: Pneumatic, operating pressure on 2 or 4, solenoid valve 24 V or 230 V recommended
- The actuator transforms the operating pressure directly into a rotating movement (no linkage required)
- Position indicator

Technical data

Pneumatic actuator DR060

Actuator DR060

Operating pressure	1.2 bar – 6.0 bar
Maximum pressure	8 bar
Torque at 6 bar	70 Nm
Running time for 90°	0.5 s
Air volume OPEN/CLOSE	0.31/0.49 l
Compressed air	Compressed air for instruments, free of oil, water and dust
Air connection	G 1/8"
Operating temperature	–40 to 80 °C
Weight	2.7 kg

Torque depending on operating pressure

Operating pressure [bar]	1.2	2.5	3	4	5	6
Torque [Nm]	14	30	36	47	58	70

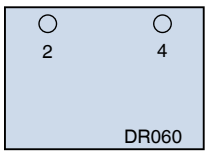
Tubing

/ **Z66** /
/ **Z69** /

Order code detail

For actuators without solenoid valve the tube connections 2 and 4 must be allocated by others.

Tube connections



2: Direction of rotation 1
4: Direction of rotation 2

1

Description

/ **Z72** / **NC**
/ **Z73** / **NC**
/ **Z74** / **NC**
/ **Z75** / **NC**
/ **Z76** / **NC**
/ **Z77** / **NC**

Order code detail

Application

- Single acting pneumatic actuator SC060, SO060
- Opening and closing of multileaf dampers with safety function
- The multileaf damper safety function is defined with the order code
- Different opening and closing times can be set using throttle valves

Variants

Z72, Z75
- NO: Pressure off to OPEN
- NC: Pressure off to CLOSE

Z73, Z74, Z76, Z77
- NO: Power off and pressure off to OPEN
- NC: Power off and pressure off to CLOSED

Parts and characteristics

- Operating pressure: 6.0 bar
- Control input signal: Pneumatic, operating pressure on 2 or 4, solenoid valve 24 V or 230 V recommended
- The actuator transforms the operating pressure directly into a rotating movement (no linkage required)
- The multileaf damper is opened or closed with spring force.
- Position indicator

Technical data

Pneumatic actuator SC060

Pneumatic actuator SC060, SO060

Operating pressure	6.0 bar
Maximum pressure	6 bar
Torque at 6 bar	30 Nm
Running time for 90°	0.5 s
Air volume OPEN/CLOSE	0.31/0.49 l
Compressed air	Compressed air for instruments, free of oil, water and dust
Air connection	G 1/8"
Operating temperature	–40 to 80 °C
Weight	3.2 kg

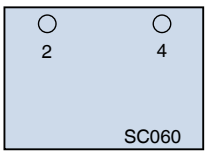
Tubing

/ **Z72** /
/ **Z75** /

Order code detail

For actuators without solenoid valve tube connection 2 must be allocated by others.

Tube connections



2: Direction of rotation 1
4: Venting

SC060 and SO060

Description

/ **Z63** /
/ **Z64** /
/ **Z65** /
/ **Z69** /
/ **Z70** /
/ **Z71** /
/ **Z75** /
/ **Z76** /
/ **Z77** /

Order code detail

Application

– Limit switch: micro switch
– Volt-free contacts for signalling or activating switch functions

Parts and characteristics

– Clip fix

Technical data

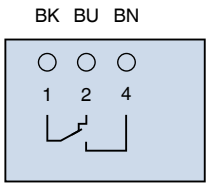
Limit switches
on multileaf dampers
with pneumatic actuator

Micro switch

Type of contact	1 changeover contact
Max. switching voltage (AC)	250 V AC
Max. switching current (AC)	0.5 A
Max. switching voltage (DC)	30 V DC
Max. switching current (DC)	0.5 A
Connecting cable	3 × 0.34 mm², 1 m long
IEC protection class	II (protective insulation)
Protection level	IP 66
EC conformity	EMC to 2004/108/EG, low voltage to 2006/95/EG
Operating temperature	–20 to 85 °C

Wiring

Connecting cable core identification



1: Common contact
2: Normally closed contact
4: Normally open contact

1

Description

/ **Z61** /
/ **Z64** /
/ **Z67** /
/ **Z70** /
/ **Z73** /
/ **Z76** /

Order code detail

Application

– Solenoid valve 6519 Namur 24 V, with connector

Parts and characteristics

– Supply voltage 24 V DC ± 10 %
– Control input signal: Supply voltage on/off
– Connector
– Namur interface for direct assembly on the pneumatic actuator

Technical data

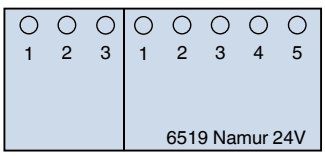
Solenoid valve

Solenoid valve 24 V

Supply voltage	24 V DC ± 10 %
Power rating	2 W
Pressure range	1.2 – 8.0 bar
Nominal flow rate Q_{Nn}	900 l/min
Compressed air	Compressed air for instruments, free of oil, water and dust
Air connection	G 1/8"
Connector	To EN 175301-803, type A
IEC protection class	III (protective extra-low voltage)
Protection level	With IP 65 connector
EC conformity	EMC according to 2004/108/EG
Weight	0.46 kg

Wiring

Terminal connections and pneumatic connections



Electrical connections
1: Ground, neutral
2: Control voltage for direction of rotation 1
3: Earth
Pneumatic connections
1: Operating pressure, throttle valve
2: Direction of rotation 1
3 : Flow reducer (noise reduction)
4: Direction of rotation 2
5 : Flow reducer (noise reduction)

Description

/ **Z62** /
/ **Z65** /
/ **Z68** /
/ **Z71** /
/ **Z74** /
/ **Z77** /

Order code detail

Application

– Solenoid valve 6519 Namur 230 V, with connector

Parts and characteristics

– Supply voltage 230 V DC ± 10 %
– Control input signal: Supply voltage on/off
– Connector
– Namur interface for direct assembly on the pneumatic actuator

Technical data

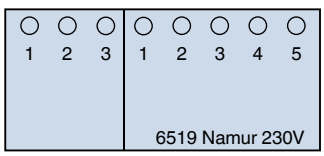
Solenoid valve

Solenoid valve 230 V

Supply voltage	230 V AC ± 10 %, 50/60 Hz
Power rating	2 W
Pressure range	1.2 – 8.0 bar
Nominal flow rate Q_{Nn}	900 l/min
Compressed air	Compressed air for instruments, free of oil, water and dust
Air connection	G 1/8"
Connector	To EN 175301-803, type A
IEC protection class	II (protective insulation)
Protection level	With IP 65 connector
EC conformity	EMC according to 2004/108/EG
Weight	0.46 kg

Wiring

Terminal connections and pneumatic connections



Electrical connections
1: Ground, neutral
2: Control voltage for direction of rotation 1
3: Earth
Pneumatic connections
1: Operating pressure, throttle valve
2: Direction of rotation 1
3 : Flow reducer (noise reduction)
4: Direction of rotation 2
5 : Flow reducer (noise reduction)

Notes

Limit switch

Solenoid valve

Pneumatic actuator

Electric actuator

Multileaf damper with explosion-proof actuator

Attachments

Explosion-proof actuators

For opening and closing multileaf dampers installed in potentially explosive atmospheres (ATEX)

Explosion-proof actuators for Type JZ and JZ-Low leakage multileaf dampers

- ATEX-compliant construction and parts
- Approved for gases, mists and vapours in zones 1 and 2, and for dusts in zones 21 and 22
- Supply voltage 24 V AC/DC or 230 V AC
- Pneumatic actuators with torque 8 – 70 Nm
- Electric actuator with torque 15 or 30 Nm
- Pneumatic: Double acting or single acting actuator for a positive lock connection with a multileaf damper
- Electric: Spring return actuator for a positive lock connection with a multileaf damper

Optional equipment and accessories

- Solenoid valve 24 V or 230 V
- Limit switch

1

Description

Application
- Explosion-proof actuators for opening and closing
- Opening and closing of Type JZ and JZ-Low leakage multileaf dampers
- For use in potentially explosive atmospheres (ATEX)
- For steel or stainless steel multileaf dampers with brass or stainless steel bearings

Classification
Multileaf damper
- Test certificate: SEV 05 ATEX 0141
- II 2 GD c 80 °C (T6)

Subassembly: Multileaf damper with actuator
- Test certificate: SEV 05 ATEX 0142
- II 2 GD or II 2/3 GD or II 3 GD

Special features
- ATEX mark and certification
- Approved for gases, mists and vapours in zones 1 and 2, and for dusts in zones 21 and 22

Parts and characteristics
Construction and materials comply with the EU directive and guidelines for use in potentially explosive atmospheres (ATEX)

Electric
- Actuators with overload protection
- Control input signal: 2-wire control (3-point, open/close)
- Spring return actuator for damper blade safety function
- Auxiliary switch for capturing the end positions
- Crank handle for manual operation

Pneumatic
- Pneumatic actuators, single acting or double acting
- Control input signal: 1-wire control of a solenoid valve
- Optional limit switch for capturing the end positions
- Safety function with double acting actuators (power off)
- Safety function with single acting actuators (pressure off)

Any attachments are defined with the order code of the multileaf damper.

Electric explosion-proof spring return actuators for multileaf dampers

Order code detail	Actuator			Torque	Supply voltage
	Part number	Type	Auxiliary switch		
Z1EX	M466EM1	ExMax15-SF	integrated	15 Nm	24 – 230 V
Z3EX	M466EM3	ExMax30-SF	integrated	30 Nm	24 – 230 V

Explosion-proof double acting pneumatic actuators for multileaf dampers

Order code detail	Actuator		Limit switch	Torque at 6 bar	Solenoid valve	Damper blade safety function
	Part no.	Type	Part no.			
Z60EX	M452DD0	DR030	–	35 Nm	–	
Z61EX	M452DD0	DR030	–	35 Nm	24 V	①
Z62EX	M452DD0	DR030	–	35 Nm	230 V	①
Z63EX	M452DD0	DR030	2 × M536AJ3	35 Nm	–	
Z64EX	M452DD0	DR030	2 × M536AJ3	35 Nm	24 V	①
Z65EX	M452DD0	DR030	2 × M536AJ3	35 Nm	230 V	①
Z66EX	M452DD1	DR060	–	70 Nm	–	
Z67EX	M452DD1	DR060	–	70 Nm	24 V	①
Z68EX	M452DD1	DR060	–	70 Nm	230 V	①
Z69EX	M452DD1	DR060	2 × M536AJ3	70 Nm	–	
Z70EX	M452DD1	DR060	2 × M536AJ3	70 Nm	24 V	①
Z71EX	M452DD1	DR060	2 × M536AJ3	70 Nm	230 V	①

① Power off to close/open
Operating pressure 1.2 – 6 bar

Explosion-proof single acting pneumatic actuators for multileaf dampers

Order code detail	Actuator	Limit switch	Torque at 6 bar	Solenoid valve	Damper blade safety function
	Type	Part no.			
Z72EX	SC060 / SO060	–	30 Nm	–	①
Z73EX	SC060 / SO060	–	30 Nm	24 V	②
Z74EX	SC060 / SO060	–	30 Nm	230 V	②
Z75EX	SC060 / SO060	2 × M536AJ3	30 Nm	–	①
Z76EX	SC060 / SO060	2 × M536AJ3	30 Nm	24 V	②
Z77EX	SC060 / SO060	2 × M536AJ3	30 Nm	230 V	②

① Power off to close/open
② Power off and pressure off to close/open
Operating pressure 6 bar

1 Function

Functional description

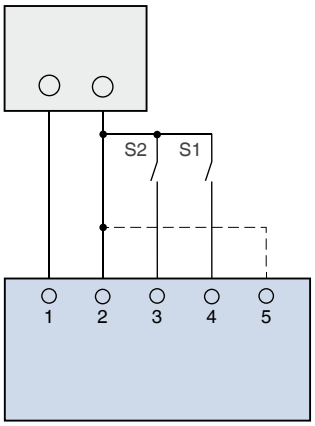
The actuator moves the blades of a multileaf damper into OPEN or CLOSED position.

Electric spring return actuator
Control input signal with 2-wire control (3-point).

Double acting pneumatic actuators
The easiest way to generate the control input signal is electrically, using solenoid valves. The multileaf damper is opened and closed with compressed air. For this purpose, the actuator has two tube connections. Compressed air is applied to one tube connection while the other connection remains open such that the air can escape from the corresponding chamber of the actuator. For the other direction of rotation, the process is reversed.

Single acting pneumatic actuators
The easiest way to generate the control input signal is electrically, using solenoid valves. The multileaf damper is closed with compressed air and opened with spring force. The actuator has one tube connection. This tube connection is for compressed air. For the other direction of rotation the connection remains open.

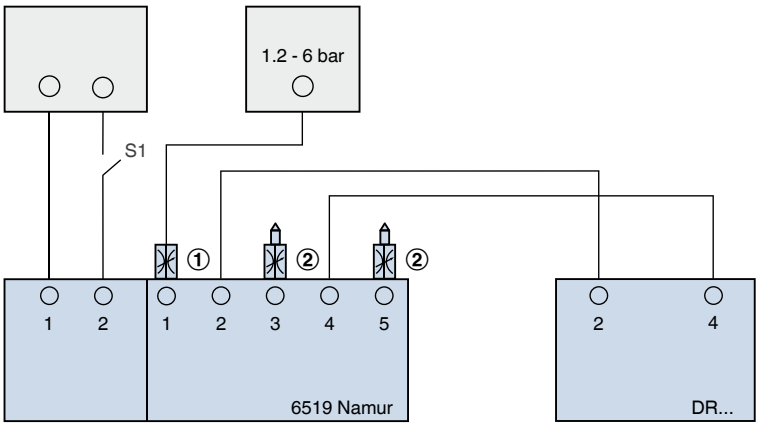
Control input signal for open/close spring return actuator



Switch functions
S1 closed: Direction of rotation 1
S1 closed: Direction of rotation 2
Safe damper blade position as an option

Terminal 5 input only Z1EX

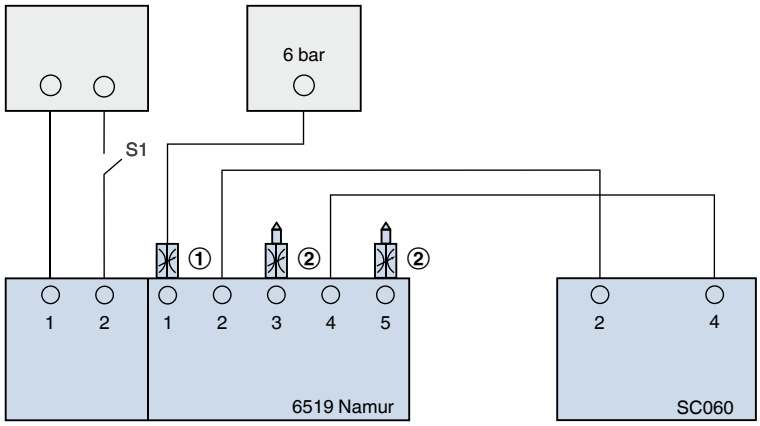
Control of a double acting pneumatic actuator using a solenoid valve



Switch functions
S1 closed: Direction of rotation 1
S1 open: Direction of rotation 2

① Throttle valve
② Flow reducer (noise reduction)

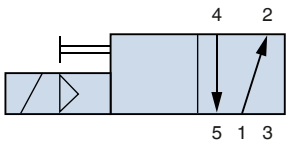
Control of a single acting pneumatic actuator using a solenoid valve



Switch functions
S1 closed: Direction of rotation 1
S1 open: Direction of rotation 2

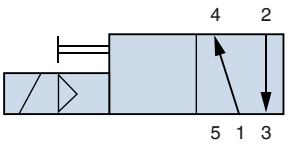
① Throttle valve
② Flow reducer (noise reduction)

Solenoid valve, power off



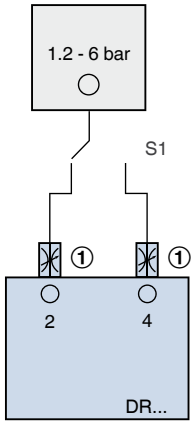
2: Direction of rotation 1

Solenoid valve, power on



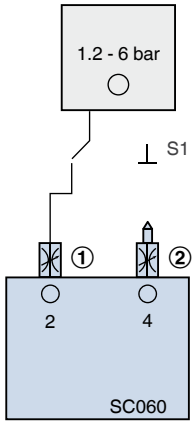
4: Direction of rotation 2

Control of a double acting pneumatic actuator without a solenoid valve



Switch functions
S1 closed: Direction of rotation 1
S1 open: Direction of rotation 2
① Throttle valve

Control of a single acting pneumatic actuator without a solenoid valve



Switch functions
S1 closed: Direction of rotation 1
S1 open: Direction of rotation 2
① Throttle valve
② Flow reducer (noise reduction)

1

Description

/ Z1EX / NC

Order code detail

Application

- Explosion-proof spring return actuator ExMax15-SF with integral auxiliary switches
- Opening and closing of multileaf dampers with safety function
- The multileaf damper safety function is defined with the order code

Variants

- NO: Power off to OPEN
- NC: Power off to CLOSE

Parts and characteristics

- Supply voltage 24 – 230 V AC/DC
- Automatic voltage detection
- Control input signal: 2-wire control (3-point)
- Integral controlled heating
- Two auxiliary switches with volt-free contacts for signalling or activating switch functions
- Auxiliary switches, factory set switching points at 5° and 85°
- Terminal box ExBox-Y/S

Technical data

Explosion-proof actuator ExMax 15-BF-TR

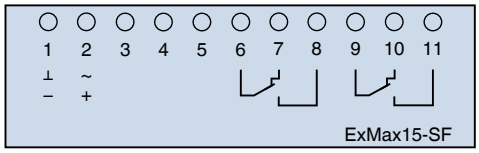
Actuator ExMax15-SF

Supply voltage (AC)	19.2 – 264 V AC, 50/60 Hz
Supply voltage (DC)	19.2 – 264 V DC
Power rating (AC)	23 – 115 VA, depending on running time
Power rating (DC)	10 – 115 W, depending on running time
Torque	15 Nm
Motor running time for 90°	3, 15, 30, 60, 120 s, adjustable
Spring return time	3 – 10 s, adjustable
Control input signal	2-wire control (3-point)
Auxiliary switch: type of contact	2 changeover contacts [1]
Max. switching voltage (AC)	250 V AC
Max. switching current (AC)	3 A (resistive load); 0.5 A (inductive load)
Max. switching voltage (DC)	24 V DC
Max. switching current (DC)	0.25 A (resistive load); 0.1 A (inductive load)
IEC protection class	I (protective earth)
Protection level	IP 66
EC conformity	EMC to 2004/108/EG, low voltage to 2006/95/EG, ATEX to 94/9/EG
Operating temperature	–40 to 40 °C
Weight	4.3 kg (including Ex Box)

[1] If both auxiliary switches are used the switching voltages must be the same

Wiring

Terminal connections in the terminal box ExBox-Y/S



1 ⊥, –
2 ~, +
3: Control voltage for direction of rotation 1
4: Control voltage for direction of rotation 2
5 : Input for 2–5 wire link, spring return ~3s
6 : Common contact
7 : Mechanical stop 1 < 5°
8 : Mechanical stop 1 > 5°
9 : Common contact
10 : Mechanical stop 2 < 85°
11 : Mechanical stop 2 > 85°

1

Description

/ Z3EX / NC

Order code detail

Application

- Explosion-proof spring return actuator ExMax30-SF with integral auxiliary switches
- Opening and closing of multileaf dampers with safety function
- The multileaf damper safety function is defined with the order code

Variants

- NO: Power off to OPEN
- NC: Power off to CLOSE

Parts and characteristics

- Supply voltage 24 – 230 V AC/DC
- Automatic voltage detection
- Control input signal: 2-wire control (3-point)
- Integral controlled heating
- Two auxiliary switches with volt-free contacts for signalling or activating switch functions
- Auxiliary switches, factory set switching points at 5° and 85°
- Terminal box ExBox-Y/S

Technical data

Explosion-proof actuator ExMax 30

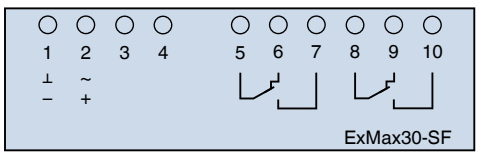
Actuator ExMax30-SF

Supply voltage (AC)	19.2 – 264 V AC, 50/60 Hz
Supply voltage (DC)	19.2 – 264 V DC
Power rating (AC)	23 – 115 VA, depending on running time
Power rating (DC)	10 – 115 W, depending on running time
Torque	30 Nm
Motor running time for 90°	40, 60, 90, 120, 150 s, adjustable
Spring return time	20 s
Control input signal	2-wire control (3-point)
Auxiliary switch: type of contact	2 changeover contacts [1]
Max. switching voltage (AC)	250 V AC
Max. switching current (AC)	3 A (resistive load); 0.5 A (inductive load)
Max. switching voltage (DC)	24 V DC
Max. switching current (DC)	0.25 A (resistive load); 0.1 A (inductive load)
IEC protection class	I (protective earth)
Protection level	IP 66
EC conformity	EMC to 2004/108/EG, low voltage to 2006/95/EG, ATEX to 94/9/EG
Operating temperature	–40 to 40 °C
Weight	10 kg (including Ex Box)

[1] If both auxiliary switches are used the switching voltages must be the same

Wiring

Terminal connections in the terminal box ExBox-Y/S



1 ⊥, –
2 ~, +
3: Control voltage for direction of rotation 1
4: Control voltage for direction of rotation 2
5 : Common contact
6 : Mechanical stop 1 < 5°
7 : Mechanical stop 1 > 5°
8 : Common contact
9 : Mechanical stop 2 < 85°
10 : Mechanical stop 2 > 85°

1

Description

/ **Z60EX** /
/ **Z61EX** /
/ **Z62EX** /
/ **Z63EX** /
/ **Z64EX** /
/ **Z65EX** /

Order code detail

Application

- Double acting pneumatic actuator DR030
- Opening and closing of multileaf dampers
- Different opening and closing times can be set using throttle valves

Variants

Z61EX, Z62EX, Z64EX, Z65EX
- NO: Power off to OPEN
- NC: Power off to CLOSE

Parts and characteristics

- Operating pressure 1.2 – 6.0 bar
- Control input signal: Pneumatic, operating pressure on 2 or 4, solenoid valve 24 V or 230 V recommended
- The actuator transforms the operating pressure directly into a rotating movement (no linkage required)
- Position indicator

Technical data

Pneumatic actuator DR030

Actuator DR030

Operating pressure	1.2 bar – 6.0 bar
Maximum pressure	8 bar
Torque at 6 bar	35 Nm
Running time for 90°	0.3 s
Air volume OPEN/CLOSE	0.16/0.26 l
Compressed air	Compressed air for instruments, free of oil, water and dust
Air connection	G 1/8"
Operating temperature	–40 to 80 °C
Weight	1.6 kg

Torque depending on operating pressure

Operating pressure [bar]	1.2	2.5	3	4	5	6
Torque [Nm]	8	15	18	24	29	35

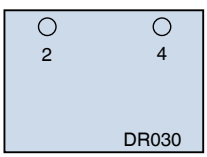
Wiring

/ **Z60EX** /
/ **Z63EX** /

Order code detail

For actuators without solenoid valve the tube connections 2 and 4 must be allocated by others.

Tube connections



2: Direction of rotation 1
4: Direction of rotation 2

Description

/ **Z66EX** /
/ **Z67EX** /
/ **Z68EX** /
/ **Z69EX** /
/ **Z70EX** /
/ **Z71EX** /

Order code detail

Application

- Double acting pneumatic actuator DR060
- Opening and closing of multileaf dampers
- Different opening and closing times can be set using throttle valves

Variants

Z67EX, Z68EX, Z70EX, Z71EX
- NO: Power off to OPEN
- NC: Power off to CLOSE

Parts and characteristics

- Operating pressure 1.2 – 6.0 bar
- Control input signal: Pneumatic, operating pressure on 2 or 4, solenoid valve 24 V or 230 V recommended
- The actuator transforms the operating pressure directly into a rotating movement (no linkage required)
- Position indicator

Technical data

Pneumatic actuator DR060

Actuator DR060

Operating pressure	1.2 bar – 6.0 bar
Maximum pressure	8 bar
Torque at 6 bar	70 Nm
Running time for 90°	0.5 s
Air volume OPEN/CLOSE	0.31/0.49 l
Compressed air	Compressed air for instruments, free of oil, water and dust
Air connection	G 1/8"
Operating temperature	–40 to 80 °C
Weight	2.7 kg

Torque depending on operating pressure

Operating pressure [bar]	1.2	2.5	3	4	5	6
Torque [Nm]	14	30	36	47	58	70

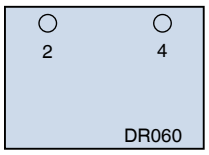
Wiring

/ **Z66EX** /
/ **Z69EX** /

Order code detail

For actuators without solenoid valve the tube connections 2 and 4 must be allocated by others.

Tube connections



2: Direction of rotation 1
4: Direction of rotation 2

1

Description

/ **Z72EX** / **NC**
/ **Z73EX** / **NC**
/ **Z74EX** / **NC**
/ **Z75EX** / **NC**
/ **Z76EX** / **NC**
/ **Z77EX** / **NC**

Order code detail

Application

- Single acting pneumatic actuator SC060, SO060
- Opening and closing of multileaf dampers with safety function
- The multileaf damper safety function is defined with the order code
- Different opening and closing times can be set using throttle valves

Variants

Z72EX, Z75EX
- NO: Pressure off to OPEN
- NC: Pressure off to CLOSE

Z73EX, Z74EX, Z76EX, Z77EX
- NO: Power off and pressure off to OPEN
- NC: Power off and pressure off to CLOSED

Parts and characteristics

- Operating pressure: 6.0 bar
- Control input signal: Pneumatic, operating pressure on 2 or 4, solenoid valve 24 V or 230 V recommended
- The actuator transforms the operating pressure directly into a rotating movement (no linkage required)
- The multileaf damper is opened or closed with spring force.
- Position indicator

Technical data

Pneumatic actuator SC060

Pneumatic actuator SC060, SO060

Operating pressure	6.0 bar
Maximum pressure	6 bar
Torque at 6 bar	30 Nm
Running time for 90°	0.5 s
Air volume OPEN/CLOSE	0.31/0.49 l
Compressed air	Compressed air for instruments, free of oil, water and dust
Air connection	G 1/8"
Operating temperature	–40 to 80 °C
Weight	3.2 kg

Wiring

/ **Z72EX** /
/ **Z75EX** /

Order code detail

For actuators without solenoid valve tube connection 2 must be allocated by others.

Tube connections

2: Direction of rotation 1
4: Venting

SC060 and SO060

Description

/ **Z63EX** /
/ **Z64EX** /
/ **Z65EX** /
/ **Z69EX** /
/ **Z70EX** /
/ **Z71EX** /
/ **Z75EX** /
/ **Z76EX** /
/ **Z77EX** /

Order code detail

Application

- Limit switch: Bartec limit switch
- Volt-free contacts for signalling or activating switch functions

Parts and characteristics

- Two limit switches, screwed onto a console of the multileaf damper
- Actuated with a lever on the external linkage

Technical data

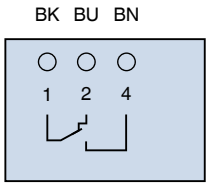
Limit switch

Bartec limit switch

Type of contact	1 changeover contact
Max. switching voltage (AC)	400 V AC
Max. switching current (AC)	3 A (resistive load); 3 A at 250 V AC (inductive load)
Max. switching voltage (DC)	250 V DC
Max. switching current (DC)	0.4 A (resistive load); 0.03 A (inductive load)
IEC protection class	II (protective insulation)
Protection level	IP 66
EC conformity	EMC to 2004/108/EG, low voltage to 2006/95/EG
Weight	0.2 kg

Wiring

Connecting cable core identification



1: Common contact
2: Normally closed contact
4: Normally open contact

1

Description

/ **Z61EX** /
/ **Z64EX** /
/ **Z67EX** /
/ **Z70EX** /
/ **Z73EX** /
/ **Z76EX** /

Order code detail

Application

– Solenoid valve 6519 Namur 24 V, with connector

Parts and characteristics

– Supply voltage 24 V DC ± 10 %
– Control input signal: Supply voltage on/off
– Connector with connecting cable
– Namur interface for direct assembly on the pneumatic actuator

Technical data

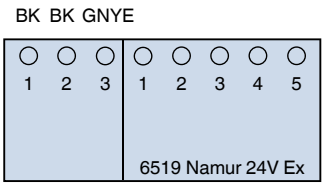
Solenoid valve

Solenoid valve 24 V EEx m

Supply voltage	24 V DC ± 10 %
Power rating	3 W
Pressure range	1.2 – 8.0 bar
Flow rate Q Nn	900 l/min
Compressed air	Containing oil, oil-free, or nitrogen or instrument air
Air connection	G 1/8"
IEC protection class	III (protective extra-low voltage)
Protection level	With IP 65 connector
EC conformity	EMC to 2004/108/EG, ATEX to 94/9/EG
Weight	0.46 kg

Wiring

Connecting cable core identification and pneumatic connections



Electrical connections
1: Ground, neutral
2: Control voltage for direction of rotation 1
3: Earth
Pneumatic connections
1: Operating pressure, throttle valve
2: Direction of rotation 1
3 : Flow reducer (noise reduction)
4: Direction of rotation 2
5 : Flow reducer (noise reduction)

Special information – Solenoid valve 230 V Explosion-proof actuators

Description

/ **Z62EX** /
/ **Z65EX** /
/ **Z68EX** /
/ **Z71EX** /
/ **Z74EX** /
/ **Z77EX** /

Order code detail

Application

– Solenoid valve 6519 Namur 230 V, with connector

Parts and characteristics

– Supply voltage 230 V DC ± 10 %
– Control input signal: Supply voltage on/off
– Connector with connecting cable
– Namur interface for direct assembly on the pneumatic actuator

Technical data

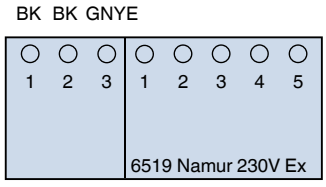
Solenoid valve

Solenoid valve 230 V EEx m

Supply voltage	230 V AC ± 10 %
Power rating	3 W
Pressure range	1.2 – 8.0 bar
Flow rate Q Nn	900 l/min
Compressed air	Containing oil, oil-free, or nitrogen or instrument air
Air connection	G 1/8"
IEC protection class	II (protective insulation)
Protection level	With IP 65 connector
EC conformity	EMC to 2004/108/EG, ATEX to 94/9/EG
Weight	0.46 kg

Wiring

Connecting cable core identification and pneumatic connections



Electrical connections
1: Ground, neutral
2: Control voltage for direction of rotation 1
3: Earth
Pneumatic connections
1: Operating pressure, throttle valve
2: Direction of rotation 1
3 : Flow reducer (noise reduction)
4: Direction of rotation 2
5 : Flow reducer (noise reduction)

Notes

Multileaf dampers
Basic information and nomenclature

- Product selection
- Principal dimensions
- Nomenclature
- Colour codes according to IEC 60757
- Sizing and sizing example

1

Product selection
Multileaf dampers

	Variant				
	JZ-S	**JZ-P**	**JZ-S-A2**	**JZ-P-A2**	**JZ-AL**
Casing and blades					
Galvanised sheet steel	●	●			
Stainless steel			●	●	
Aluminium					●
Rotation					
Parallel		●		●	
Opposed	●		●		●
Duct connection					
Corner holes	●	●	●	●	●
Flange holes	●	●	●	●	
Bearings					
Plastic, 100°C max.	●	●	●	●	
Brass, 150°C max.	●	●	●	●	
Stainless steel, 150°C max.	●	●	●	●	
Dynamics					
External linkage	●	●	●	●	
Gears (inside) 90°C max.					●
Blades					
Reinforced construction	●	●			
Nominal sizes					
Width	200 – 2000 mm				200 – 1200 mm
Increment	1 mm				1 mm
Width subdivided	– 4150				
Height	180 – 1995 mm				100 – 1050 mm
Increment	1 mm				50 mm
Height subdivided	– 4066				
Casing					
Length	180 mm				120 mm
Casing air leakage to EN 1751	Class C				
Special areas					
Areas with explosive atmospheres	●	●	●	●	
●	Possible				
	Not possible				

Product selection
Low-leakage multileaf dampers

	Variant				
	JZ-LL	**JZ-HL**	**JZ-LL-A2**	**JZ-LL-AL**	**JZ-HL-AL**
Closed blade air leakage					
To EN 1751	Classes 3 – 4	Classes 1 – 2	Classes 3 – 4	Class 4	Class 2
Casing and blades					
Galvanised sheet steel	●	●			
Stainless steel			●		
Aluminium				●	●
Rotation					
Opposed	●	●	●	●	●
Duct connection					
Corner holes	●	●	●	●	●
Flange holes	●	●	●		
Bearings					
Plastic	●	●	●		
Brass	●	●	●		
Stainless steel	●	●	●		
Dynamics					
External linkage	●	●	●		
Gears (inside)				●	●
Blades					
Reinforced construction	●	●			
Nominal sizes					
Width	200 – 2000 mm			200 – 1200 mm	
Increment	1 mm			1 mm	
Width subdivided	– 4150				
Height	180 – 1995 mm			100 – 1050 mm	
Increment	1 mm			50 mm	
Height subdivided	– 4066				
Casing					
Length	180 mm			120 mm	
Casing air leakage to EN 1751	Class C				
Areas of application					
Temperature resistance	100 °C			50 °C	90 °C
Special areas					
Areas with explosive atmospheres	●	●	●		
●	Possible				
	Not possible				

1

Principal dimensions

B [mm]
Duct width

H [mm]
Duct height

n [ ]
Number of flange screw holes

m [kg]
Weight

Nomenclature

L_{WA} [dB(A)]
A-weighted sound pressure level
of air-regenerated noise for the multileaf damper

α [°]
Damper blade position, 0°: OPEN, 90°: CLOSED

A [m^2]
Upstream cross section

v [m/s]
Airflow velocity based
on the upstream cross section (B × H)

$\dot{V}$ [m^3/h] and [l/s]
Volume flow rate

Δp_{st} [Pa]
Static differential pressure

$\Delta p_{st\ max}$ [Pa]
Maximum static differential pressure

All sound power levels are based on 1 pW.

Wiring

Colour codes according to IEC 60757

Code	Colour
BK	black
BN	brown
RD	red
OG	orange
YE	yellow
GN	green
BU	blue

Colour codes according to IEC 60757

Code	Colour
VT	violet
GY	grey
WH	white
PK	pink
TQ	turquoise
GNYE	green-yellow

Sizing with the help of this catalogue

This catalogue provides convenient
quick sizing tables for multileaf dampers.
Sound power levels of the air-regenerated noise
and differential pressures are given for various
airflow velocities.

Sizing example

Given data
Duct B × H = 600 × 675 mm
Multileaf damper JZ-S
Installation type A
$\dot{V}$ = 2400 l/s (8640 m^3/h)

Calculation procedure
A = 0.60 × 0.675 = 0.405 m^2
v = $\dot{V}$/A = 2400/0.405 (/1000) = 5.9 m/s

Quick sizing
Δp_{st} = <5 Pa
L_{WA} = 55 dB(A)

Notes

2 External weather louvres

External weather louvres give good protection against the direct ingress of rain, leaves and birds into the fresh air and exhaust air openings of air conditioning systems. Combinations of external weather louvres and multileaf dampers or non-return dampers have a dual function. They provide not only weather protection but also a means for shut-off, and they prevent air from flowing against the intended airflow direction

External weather louvres
Type WG

For the most diverse applications, available also in large sizes

External weather louvres as a protection of air conditioning systems against the direct ingress of rain, leaves and birds into fresh air and exhaust air openings

- Maximum width of 2400 mm, maximum height of 2310 mm, maximum area of 4 m^2 (aluminium variant also for continuous horizontal runs)
- Low differential pressure due to aerofoil blades
- Low air-regenerated noise
- All aerodynamic data is measured in aerodynamics and acoustics laboratories
- Available in standard sizes and many intermediate sizes
- Simple and quick installation due to perimeter border
- Variants made of galvanised sheet steel, aluminium or stainless steel
- Flexible arrangement of sections for covering large areas (should then be fixed on a support structure which is to be provided by others)

Optional equipment and accessories

- Installation subframe
- Can be combined with multileaf or non-return dampers
- Insect screen
- Powder-coated or anodised

Bottom blade

Regular blades

2

Variants

Product examples

External weather louvre, variant WG

External weather louvre made of galvanised steel sections

External weather louvre, variant WG-AL

External weather louvre made of aluminium sections

External weather louvre, variant WG-B-AL

External weather louvre, horizontal run, aluminium

Description

For detailed information on accessories see Chapter K3 – 2.2

Application

- External weather louvres of Type WG for the fresh air and exhaust air openings of air conditioning systems
- Protection against the direct ingress of rain as well as against leaves and birds
- Recommended face velocity for fresh air openings: 2 – 2.5 m/s max.

Variants

- WG: External weather louvre made of galvanised sheet steel
- WG-A2: External weather louvre made of stainless steel
- WG-AL: External weather louvre made of aluminium
- WG-B-AL: External weather louvre made of aluminium, for continuous horizontal runs

Nominal sizes

- B: 200, 400, 600, 800, 1000, 1200, 1400, 1600, 1800, 2000, 2200, 2400 mm (intermediate sizes 201 – 2399 mm in increments of 1 mm)
- Width subdivided max. = 4900 mm (intermediate sizes 2401 – 4899 mm in increments of 1 mm)
- H: 165, 330, 495, 660, 825, 990, 1155,1320, 1485, 1650, 1815, 1980, 2145, 2310 mm (intermediate sizes 166 – 2309 mm in increments of 1 mm)
- Hight subdivided max. = 4720 mm (intermediate sizes 2311 – 4719 mm in increments of 1 mm)
- Any combination of B × H
- Undivided construction up to 4 m^2

WG-B-AL

- WG-B-AL-M (middle section) B: 2000 mm
- WG-B-AL-E (end section) B: 1000 – 2000 mm (intermediate sizes 1001 – 1999 mm in increments of 1 mm)
- H: 165 – 1980 mm (intermediate sizes 166 – 1979 mm in increments of 1 mm)

Accessories

- Installation subframe: Installation subframe for the fast and simple installation of external weather louvres

Special features

- Large areas can be provided by arranging multiple single sections horizontally and/or vertically (subdivided construction); single sections made of aluminium can also be combined into continuous horizontal runs
- Low differential pressure and low air-regenerated noise due to aerofoil blades
- Simple and quick installation due to perimeter border
- Free area of approx. 60 % (with insect screen approx. 45 %)
- Silicone free

Maintenance

- Maintenance-free as construction and materials are not subject to wear

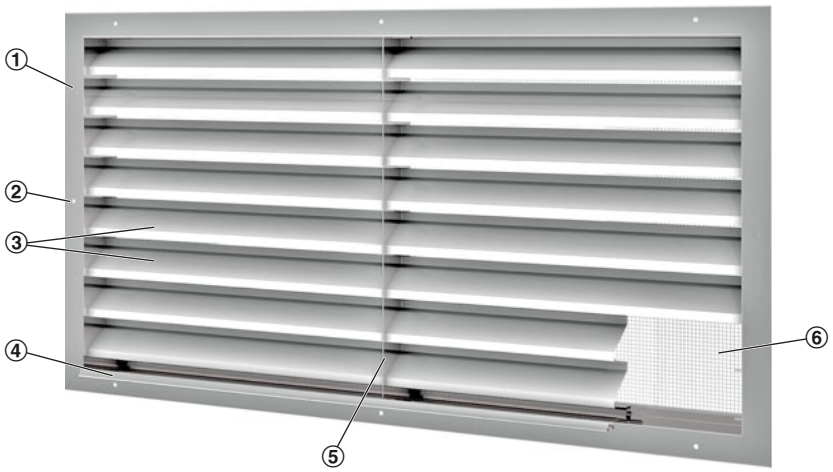
Technical data

Nominal sizes	200 × 165 – 2400 × 1650 / 1600 × 2310 mm
Width subdivided	Up to 4900 mm
Height subdivided	Up to 4720 mm
Horizontal runs (WG-B-AL)	H: 165 – 1980 mm
Volume flow rate range (undivided construction)	40 – 13350 l/s at 2.5 m/s
Volume flow rate range (undivided construction)	144 – 48660 m^3/h at 2.5 m/s
Free area	Approx. 60 % (with insect screen approx. 45 %)
Total differential pressure – exhaust air	30 Pa at 2.5 m/s
Total differential pressure – fresh air	35 Pa at 2.5 m/s

Functional description

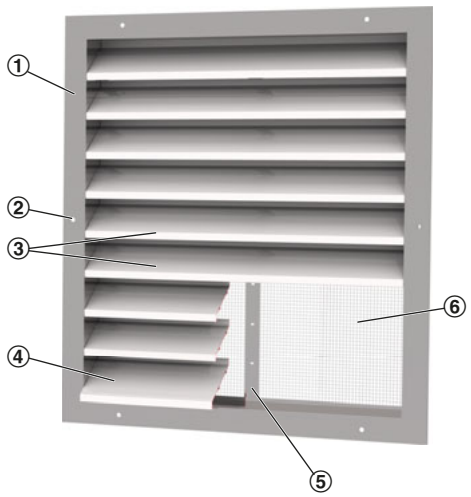
External weather louvres are externally mounted air transfer devices for the fresh air and exhaust air of air conditioning systems. They are installed in external walls and façades. Their narrowly arranged blades give good protection against the direct ingress of rain as well as against leaves and birds. Under certain unfavourable conditions, such as heavy rain, and depending on the airflow velocity it might happen that slight quantities of water enter together with the air. This is why the airflow velocity in fresh air openings should not exceed 2 – 2.5 m/s.

Schematic illustration of WG, WG-A2



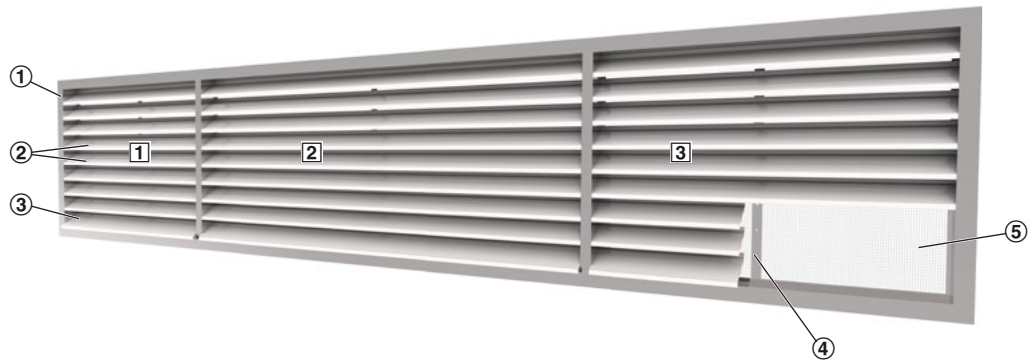
① Border
② Fixing holes
③ Regular blades
④ Bottom blade
⑤ Mullion from B = 1385
⑥ Wire mesh; additional insect screen as an option

Schematic illustration of WG-AL



① Border
② Fixing holes
③ Regular blades
④ Bottom blade
⑤ Stabilising mullion at the rear, from B = 1385
⑥ Wire mesh; additional insect screen as an option

Schematic illustration of WG-B-AL



[1] Left end section
[2] Middle section
[3] Right end section
① Border
② Regular blades
③ Bottom blade
④ Stabilising mullion at the rear, from E/M = 1300
⑤ Wire mesh; additional insect screen as an option

Order code

WG

WG – AL – 2 – U / 600×1155 / ER / P1 – RAL ...
1 2 3 4 5 6

1 Type
WG External weather louvres

2 Material
No entry: glvanised sheet steel
A2 Stainless steel
AL Aluminium

3 Construction
No entry: wire mesh, galvanised steel
1 Insect screen, galvanised steel (only WG, WG-AL)
2 Wire mesh, stainless steel (only WG-AL)
3 Wire mesh and insect screen, stainless steel (only WG-AL, WG-A2)
U Border without fixing holes
1, 2, 3 can be combined with U

4 Nominal size [mm]
B × H
(B × H > 4 m² when subdivided)

5 Installation subframe
No entry: none
ER With (not for construction U)

6 Surface
No entry: standard construction
P1 Powder-coated, RAL CLASSIC colour
PS Powder-coated, DB colour
Only for WG-AL
S2 Anodised to EURAS standard, E6-C-31...35
S3 Anodised to EURAS standard, E6-C-0
Gloss level:
RAL 9010 50 %
RAL 9006 30 %
All other RAL colours 70 %

Order example

WG–AL–1–U/1200×1150/S2–E6-C-31

Material	Aluminium
Construction	Insect screen, galvanised steel, border without fixing holes
Nominal size	1200×1150 mm
Installation subframe	Without
Surface	Anodised to EURAS standard, E6-C-31, pale bronze

Order code

WG-B-AL

WG - B – AL – E – R – 2 – U / 5500×1320 / ER / P1 – RAL ...

1 2 3 4 5 6 7

1 Type
WG-B External weather louvre, for continuous horizontal runs of any width

2 Material
AL Aluminium

3 Section
No entry: complete horizontal run, nominal size
E-R Right end section
E-L Left end section
M Middle section

4 Construction
No entry: wire mesh, galvanised steel
1 Insect screen, galvanised steel
2 Wire mesh, stainless steel
3 Wire mesh and insect screen, stainless steel
U Border without fixing holes
1, 2, 3 can be combined with U

5 Nominal size [mm]
B × H
For complete horizontal run:
B ≤ 4 m: 2 end sections (E)
B > 4 m: 2 end sections (E) and n intermediate sections (M)

6 Installation subframe
No entry: none
ER With (not for construction U)

7 Surface
No entry: raw aluminium
P1 Powder-coated, RAL CLASSIC colour
PS Powder-coated, NCS or DB colour
S2 Anodised to EURAS standard, E6-C-31...35
S3 Anodised to EURAS standard, E6-C-0
Gloss level:
RAL 9010 50 %
RAL 9006 30 %
All other RAL colours 70 %

Order example

WG–B–AL/4500×1980/ER

Material	Aluminium
Section	1 right end section of 1250 mm, 1 middle section of 2000 mm, 1 left end section of 1250 mm
Construction	Wire mesh
Nominal size	4500×1980 mm
Installation subframe	With
Surface	Standard construction

Quick sizing tables provide a good overview of the volume flow rates with an airflow velocity of 2.5 m/s. Values for intermediate widths can be interpolated. Precise intermediate values and volume flow rates for other airflow velocities can be calculated with our Easy Product Finder design programme.

2

Quick sizing – volume flow rate at 2.5 m/s

Height	Width [mm]							
	200		400		600		800	
mm	l/s	m³/h	l/s	m³/h	l/s	m³/h	l/s	m³/h
165	40	144	80	288	120	432	160	576
330	125	450	245	882	370	1332	490	1764
495	205	738	410	1476	615	2214	820	2952
660	290	1044	575	2070	865	3114	1150	4140
825	370	1332	740	2664	1110	3996	1480	5328
990	455	1638	905	3258	1360	4896	1810	6516
1155	535	1926	1070	3852	1605	5778	2140	7704
1320	620	2232	1235	4446	1855	6678	2470	8892
1485	700	2520	1400	5040	2100	7560	2800	10080
1650	785	2826	1565	5634	2350	8460	3130	11268
1815	865	3114	1730	6228	2595	9342	3460	12456
1980	950	3420	1895	6822	2845	10242	3790	13644
2145	1030	3708	2060	7416	3090	11124	4120	14832
2310	1115	4014	2225	8010	3340	12024	4450	16020
2740	1235	4446	2470	8892	3705	13338	4940	17784
3070	1400	5040	2800	10080	4200	15120	5600	20160
3400	1565	5634	3130	11268	4695	16902	6260	22536
3730	1730	6228	3460	12456	5190	18684	6920	24912
4060	1895	6822	3790	13644	5690	20484	7580	27288
4390	2060	7416	4120	14832	6180	22248	8240	29664
4720	2225	8010	4450	16020	6680	24048	8900	32040

Quick sizing – volume flow rate at 2.5 m/s

Height	Width [mm]							
	1400		1600		1800		2000	
mm	l/s	m³/h	l/s	m³/h	l/s	m³/h	l/s	m³/h
165	280	1008	320	1152	360	1296	400	1440
330	860	3096	980	3528	1105	3978	1225	4410
495	1435	5166	1640	5904	1845	6642	2050	7380
660	2015	7254	2300	8280	2590	9324	2875	10350
825	2590	9324	2960	10656	3330	11988	3700	13320
990	3170	11412	3620	13032	4075	14670	4525	16290
1155	3745	13482	4280	15408	4815	17334	5350	19260
1320	4325	15570	4940	17784	5560	20016	6180	22248
1485	4900	17640	5600	20160	6300	22680	7000	25200
1650	5480	19728	6260	22536	7040	25344	7830	28188
1815	6060	21816	6920	24912	7790	28044	8650	31140
1980	6630	23868	7580	27288	8530	30708	9480	34128
2145	7210	25956	8240	29664	9270	33372	10300	37080
2310	7790	28044	8900	32040	10010	36036	11130	40068
2740	8650	31140	9880	35568	11120	40032	12350	44460
3070	9800	35280	11200	40320	12600	45360	14000	50400
3400	10960	39456	12520	45072	14090	50724	15650	56340
3730	12110	43596	13840	49824	15570	56052	17300	62280
4060	13270	47772	15160	54576	17060	61416	18950	68220
4390	14420	51912	16480	59328	18540	66744	20600	74160
4720	15580	56088	17800	64080	20030	72108	22250	80100

Quick sizing – volume flow rate at 2.5 m/s

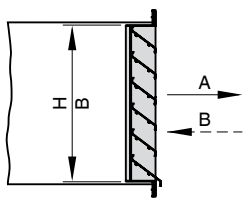
Height	Width [mm]											
	2900		3300		3700		4100		4500		4900	
mm	l/s	m³/h	l/s	m³/h	l/s	m³/h	l/s	m³/h	l/s	m³/h	l/s	m³/h
165	560	2016	640	2304	720	2592	800	2880	880	3168	960	3456
330	1715	6174	1960	7056	2205	7938	2450	8820	2695	9702	2940	10584
495	2870	10332	3280	11808	3690	13284	4100	14760	4510	16236	4920	17712
660	4025	14490	4600	16560	5180	18648	5750	20700	6330	22788	6900	24840
825	5180	18648	5920	21312	6660	23976	7400	26640	8140	29304	8800	31968
990	6340	22824	7240	26064	8150	29340	9050	32580	9960	35856	10860	39096
1155	7490	26964	8560	30816	9630	34668	10700	38520	11770	42372	12840	46224
1320	8650	31140	9880	35568	11120	40032	12350	44460	13590	48924	14820	53352
1485	9800	35280	11200	40320	12600	45360	14000	50400	15400	55440	16800	60480
1650	10960	39456	12520	45072	14090	50724	15650	56340	17220	61992	18780	67608
1815	12110	43596	13840	49824	15570	56052	17300	62280	19030	68508	20750	74736
1980	13270	47772	15160	54576	17060	61416	18950	68220	20850	75060	22750	81864
2145	14420	51912	16480	59328	18540	66744	20600	74160	22660	81576	24700	88992
2310	15580	56088	17800	64080	20030	72108	22250	80100	24480	88128	26700	96120
2740	17290	62244	19760	71136	22230	80028	24700	88920	27170	97812	29650	106704
3070	19600	70560	22400	80640	25200	90720	28000	100800	30800	110880	33600	120960
3400	21910	78876	25040	90144	28170	101412	31300	112680	34430	123948	37550	135216
3730	24220	87192	27680	99648	31140	112104	34600	124560	38060	137016	41500	149472
4060	26530	95508	30320	109152	34110	122796	37900	136440	41690	150084	45500	163728
4390	28840	103824	32960	118656	37080	133488	41200	148320	45320	163152	49450	177984
4720	31150	112140	35600	128160	40050	144180	44500	160200	48950	176220	53400	192240

The sound power levels L_{WA} apply to external weather louvres with a flow cross section of 1 m².

Quick sizing – differential pressure and sound power level

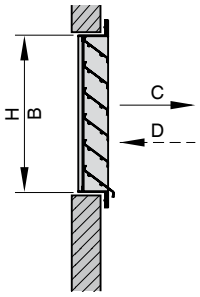
v	Installation type			
	A and C		B and D	
	Δp_t	L_{WA}	Δp_t	L_{WA}
m/s	Pa	dB(A)	Pa	dB(A)
1.5	10	32	14	34
2	20	41	25	43
2.5	30	48	35	50
3	45	54	55	56
4	75	63	95	66
5	115	70	145	73
6	170	76	210	79

Duct installation (installation types A and B)



A Exhaust air
B Fresh air

Plenum installation (installation types C and D)



C Exhaust air
D Fresh air

2

Description

External weather louvre, variant WG

Variant
- WG: External weather louvre made of galvanised sheet steel

Construction
- Galvanised sheet steel
- 1: With insect screen, galvanised steel
- U: Border without fixing holes 1 can be combined with U

Parts and characteristics
- Border
- Regular blades and bottom blade
- Wire mesh
- Optional insect screen
- Visible mullion from B = 1385 mm

Construction features
- Border, material thickness 1.5 mm
- Blades, material thickness 0.63 mm
- Free area of approx. 60 %, with insect screen approx. 45 %, based on B × (H – 0.085)
- Wire mesh at the rear, mesh aperture 20 × 20 × 1.8 mm
- Optional insect screen at the rear, mesh aperture 1.25 × 1.25 × 0.4 mm
- Border fixing holes

Materials and surfaces
- Border, mullion and blades made of formed galvanised sheet steel
- Wire mesh made of galvanised steel
- P1: Powder-coated, RAL CLASSIC colour
- PS: Powder-coated, NCS or DB colour

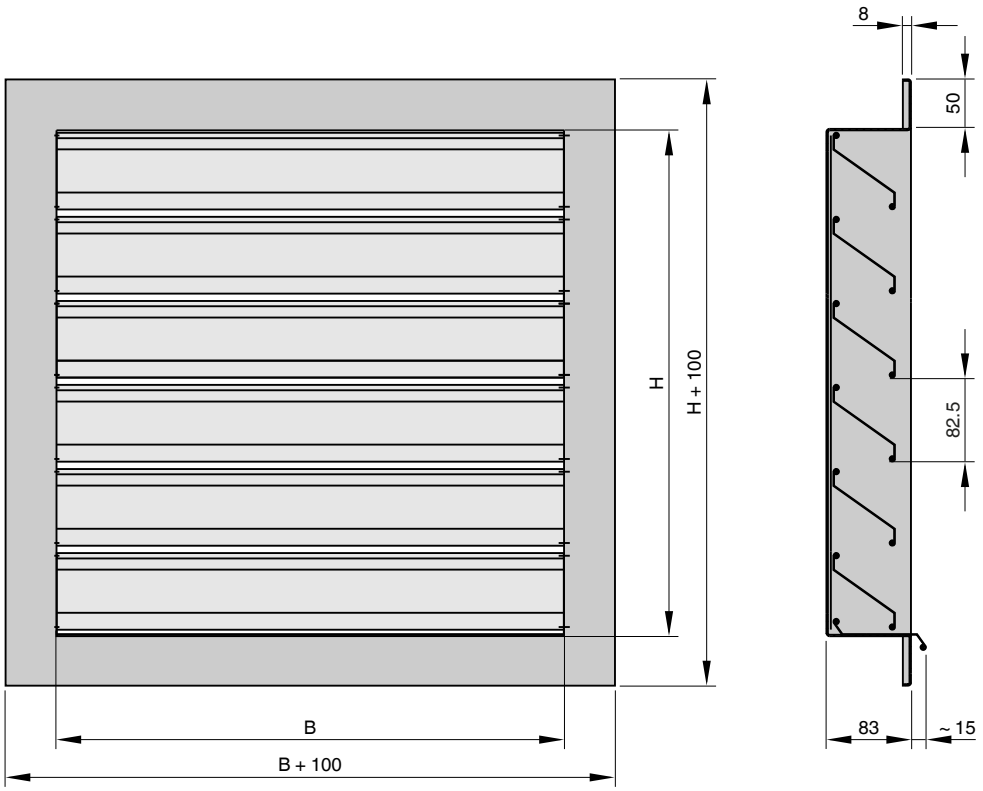
Installation and commissioning
- Install with or without installation subframe (construction U only without installation subframe)
- Install subdivided constructions either horizontally next to each other or vertically on top of each other
- Install louvres for large areas on a support structure (to be provided by others)

Dimensions
Undivided construction

Flow cross section
to calculate the airflow
velocity:
$A = B \times (H - 0.085)$

Unit of measure
for B and H: m

Dimensional drawing of WG, WG-A2



Weight

H	B [mm]											
	200	400	600	800	1000	1200	1400	1600	1800	2000	2200	2400
mm	kg											
165	3	4	5	6	8	9	11	13	14	15	17	19
330	3	5	6	7	9	11	13	14	15	17	19	20
495	5	6	8	9	11	13	16	18	19	21	24	25
660	6	7	9	11	13	16	19	21	22	26	28	30
825	8	9	12	13	16	18	22	24	26	30	33	36
990	9	10	13	15	18	21	25	28	30	34	38	41
1155	11	12	15	17	20	24	28	31	33	39	43	46
1320	12	14	16	18	22	26	31	35	37	43	48	52
1485	14	16	18	20	24	29	34	38	41	47	52	57
1650	15	16	20	22	27	31	37	41	44	51	57	62
1815	17	18	21	24	29	34	40	45	48	56	62	
1980	18	19	22	26	31	37	43	48	52	60		
2145	20	21	23	28	33	39	46	52	56			
2310	21	23	25	30	35	42	49	55				

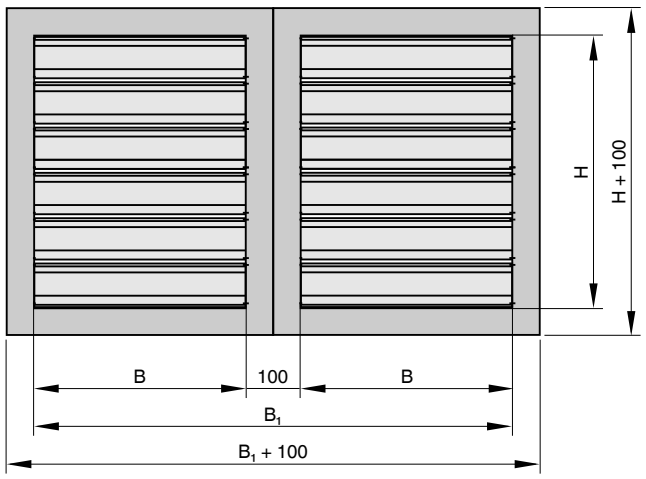
Width subdivided

Flow cross section
to calculate the airflow
velocity: A = 2B × (H – 0.085)

Unit of measure
for B and H: m

2

Dimensional drawing of WG, WG-A2, WG-AL, width subdivided



Weight

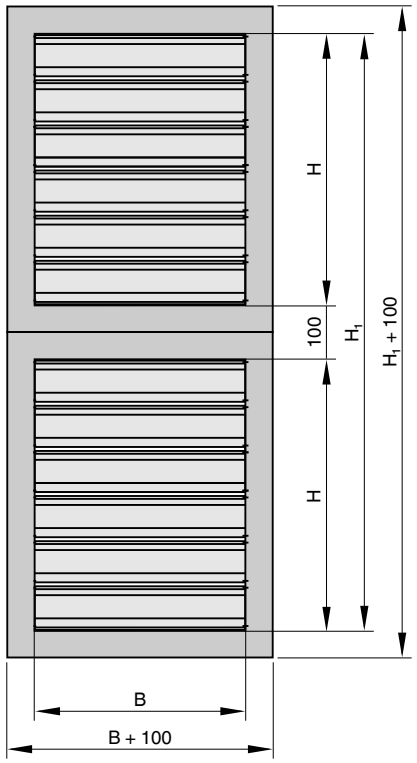
H	B1 [mm]									
	1900	2100	2300	2500	2900	3300	3700	4100	4500	4900
	B [mm]									
	900	1000	1100	1200	1400	1600	1800	2000	2200	2400
mm	kg									
165	14	15	17	18	22	25	27	30	34	37
330	16	18	20	21	26	28	30	34	38	40
495	20	22	24	26	32	35	37	43	47	50
660	24	27	29	31	38	42	44	51	57	61
825	28	31	34	37	44	49	52	60	66	71
990	32	36	39	42	50	56	59	68	76	82
1155	37	40	44	47	56	62	67	77	86	93
1320	41	44	48	52	62	69	74	86	95	103
1485	45	49	53	57	68	76	81	94	105	114
1650	49	53	58	63	74	83	89	103	114	124
1815	53	58	63	68	80	90	96	111	124	
1980	57	62	68	73	86	96	104	120		
2145	61	66	72	78	92	103	111			
2310	65	71	77	83	98	110				

Height subdivided

Flow cross section
to calculate the airflow
velocity: A = B × 2(H – 0.085)

Unit of measure
for B and H: m

Dimensional drawing of WG, WG-A2, WG-AL, height subdivided



Weight

H_1	H	B [mm]					
		200	400	600	800	1000	1200
mm		kg					
2330	1155	21	24	30	33	40	47
2740	1320	24	28	33	37	44	52
3070	1485	27	31	37	41	49	57
3400	1650	30	32	40	44	53	63
3730	1815	33	36	42	48	58	68
4060	1980	36	38	44	52	62	73
4390	2145	39	42	46	56	66	78
4720	2310	42	46	50	60	71	83

Weight

H_1	H	B [mm]					
		1400	1600	1800	2000	2200	2400
mm		kg					
2330	1155	56	62	67	77	86	93
2740	1320	62	69	74	86	95	103
3070	1485	68	76	81	94	105	114
3400	1650	74	83	89	103	114	124
3730	1815	80	90	96	111	124	
4060	1980	86	96	104	120		
4390	2145	92	103	111			
4720	2310	98	110				

2

Description

External weather louvre, variant WG

Variant
- WG-A2: External weather louvre made of stainless steel

Construction
- Stainless steel
- 3: With insect screen, stainless steel
- U: Border without fixing holes 3 can be combined with U

Parts and characteristics
- Border
- Regular blades and bottom blade
- Wire mesh
- Optional insect screen
- Visible mullion from B = 1385 mm

Construction features
- Border, material thickness 1.5 mm
- Blades, material thickness 0.63 mm
- Free area of approx. 60 %, with insect screen approx. 45 %, based on B × (H – 0.085)
- Wire mesh at the rear, mesh aperture 20 × 20 × 1.8 mm
- Optional insect screen at the rear, mesh aperture 1.25 × 1.25 × 0.4 mm
- Border fixing holes

Materials and surfaces
- Border, mullion, blades and wire mesh made of stainless steel, material no. 1.4301
- P1: Powder-coated, RAL CLASSIC colour
- PS: Powder-coated, NCS or DB colour

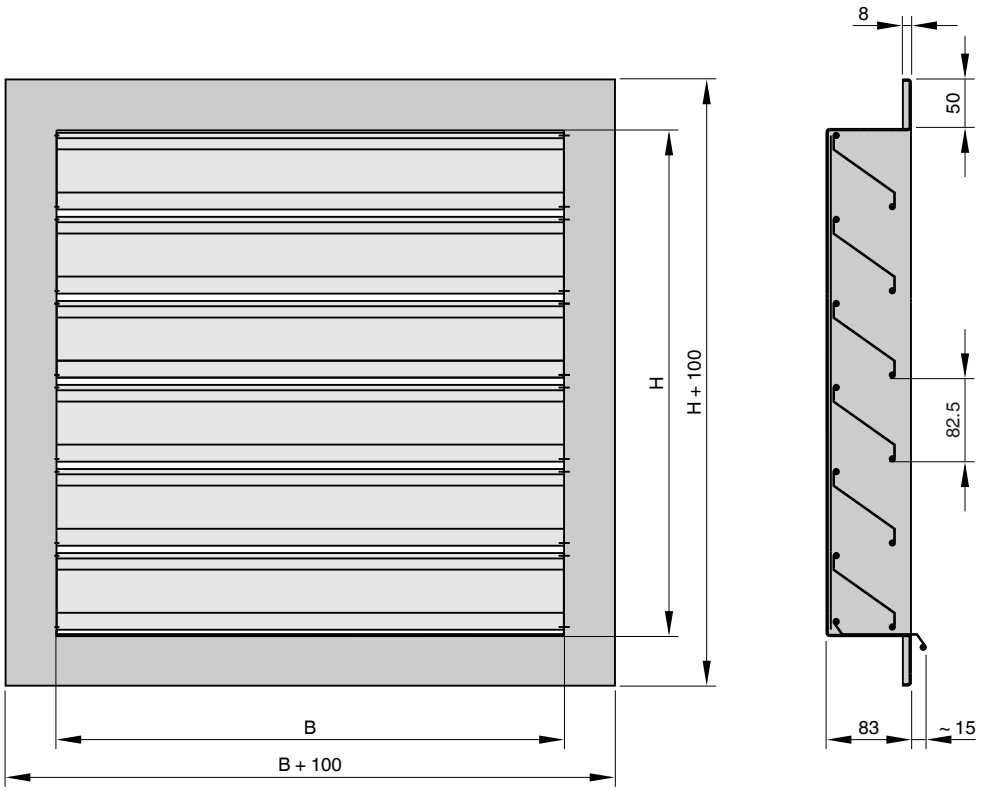
Installation and commissioning
- Install with or without installation subframe (construction U only without installation subframe)
- Install subdivided constructions either horizontally next to each other or vertically on top of each other
- Install louvres for large areas on a support structure (to be provided by others)

Dimensions
Undivided construction

Flow cross section
to calculate the airflow
velocity: A = B × (H – 0.085)

Unit of measure
for B and H: m

Dimensional drawing of WG, WG-A2



Weight

H	B [mm]											
	200	400	600	800	1000	1200	1400	1600	1800	2000	2200	2400
mm	kg											
165	3	4	5	6	8	9	11	13	14	15	17	19
330	3	5	6	7	9	11	13	14	15	17	19	20
495	5	6	8	9	11	13	16	18	19	21	24	25
660	6	7	9	11	13	16	19	21	22	26	28	30
825	8	9	12	13	16	18	22	24	26	30	33	36
990	9	10	13	15	18	21	25	28	30	34	38	41
1155	11	12	15	17	20	24	28	31	33	39	43	46
1320	12	14	16	18	22	26	31	35	37	43	48	52
1485	14	16	18	20	24	29	34	38	41	47	52	57
1650	15	16	20	22	27	31	37	41	44	51	57	62
1815	17	18	21	24	29	34	40	45	48	56	62	
1980	18	19	22	26	31	37	43	48	52	60		
2145	20	21	23	28	33	39	46	52	56			
2310	21	23	25	30	35	42	49	55				

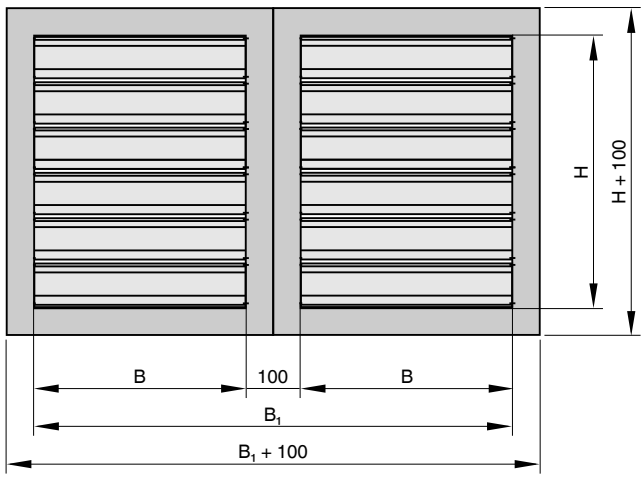
Width subdivided

Flow cross section
to calculate the airflow
velocity: A = 2B × (H – 0.085)

Unit of measure
for B and H: m

2

Dimensional drawing of WG, WG-A2, WG-AL, width subdivided



Weight

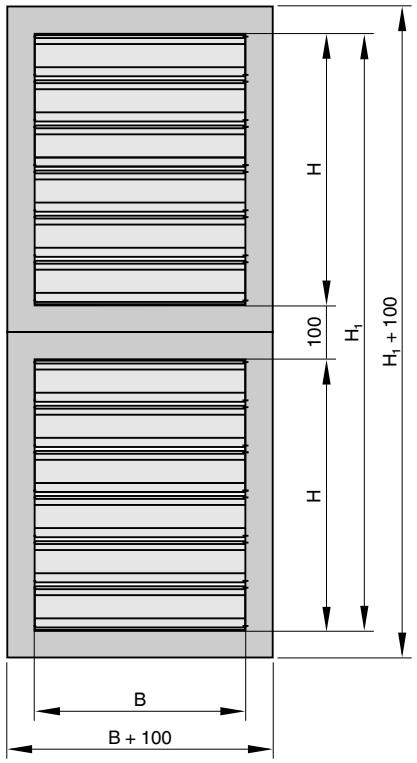
H	B1 [mm]									
	1900	2100	2300	2500	2900	3300	3700	4100	4500	4900
	B [mm]									
	900	1000	1100	1200	1400	1600	1800	2000	2200	2400
mm	kg									
165	14	15	17	18	22	25	27	30	34	37
330	16	18	20	21	26	28	30	34	38	40
495	20	22	24	26	32	35	37	43	47	50
660	24	27	29	31	38	42	44	51	57	61
825	28	31	34	37	44	49	52	60	66	71
990	32	36	39	42	50	56	59	68	76	82
1155	37	40	44	47	56	62	67	77	86	93
1320	41	44	48	52	62	69	74	86	95	103
1485	45	49	53	57	68	76	81	94	105	114
1650	49	53	58	63	74	83	89	103	114	124
1815	53	58	63	68	80	90	96	111	124	
1980	57	62	68	73	86	96	104	120		
2145	61	66	72	78	92	103	111			
2310	65	71	77	83	98	110				

Height subdivided

Flow cross section
to calculate the airflow
velocity: A = B × 2(H – 0.085)

Unit of measure
for B and H: m

Dimensional drawing of WG, WG-A2, WG-AL, height subdivided



Weight

H_1	H	B [mm]					
		200	400	600	800	1000	1200
mm		kg					
2330	1155	21	24	30	33	40	47
2740	1320	24	28	33	37	44	52
3070	1485	27	31	37	41	49	57
3400	1650	30	32	40	44	53	63
3730	1815	33	36	42	48	58	68
4060	1980	36	38	44	52	62	73
4390	2145	39	42	46	56	66	78
4720	2310	42	46	50	60	71	83

Weight

H_1	H	B [mm]					
		1400	1600	1800	2000	2200	2400
mm		kg					
2330	1155	56	62	67	77	86	93
2740	1320	62	69	74	86	95	103
3070	1485	68	76	81	94	105	114
3400	1650	74	83	89	103	114	124
3730	1815	80	90	96	111	124	
4060	1980	86	96	104	120		
4390	2145	92	103	111			
4720	2310	98	110				

2

Description

External weather louvre, variant WG-AL

Variant
- WG-AL: External weather louvre made of aluminium

Construction
- Aluminium
- 1: With insect screen, galvanised steel
- 2: With wire mesh, stainless steel
- 3: With insect screen and wire mesh, stainless steel
- U: Border without fixing holes 1, 2, 3 can be combined with U

Parts and characteristics
- Border
- Regular blades and bottom blade
- Wire mesh
- Optional insect screen
- Stabilising mullion at the rear, from B = 1385 mm

Construction features
- Border, material thickness 1.7 mm
- Blades, material thickness 1.35 mm
- Free area of approx. 60 %, with insect screen approx. 45 %, based on B × (H – 0.085)
- Wire mesh at the rear, mesh aperture 20 × 20 × 1.8 mm
- Optional insect screen at the rear, mesh aperture 1.25 × 1.25 × 0.4 mm
- Border fixing holes

Materials and surfaces
- Border, stabilising mullion and blades made of extruded aluminium sections, material nr. EN AW-6060 T66
- Wire mesh made of galvanised steel
- P1: Powder-coated, RAL CLASSIC colour
- PS: Powder-coated, NCS or DB colour
- S2: Anodised to EURAS standard, E6-C-31...35
- S3: Anodised to EURAS standard, E6-C-0

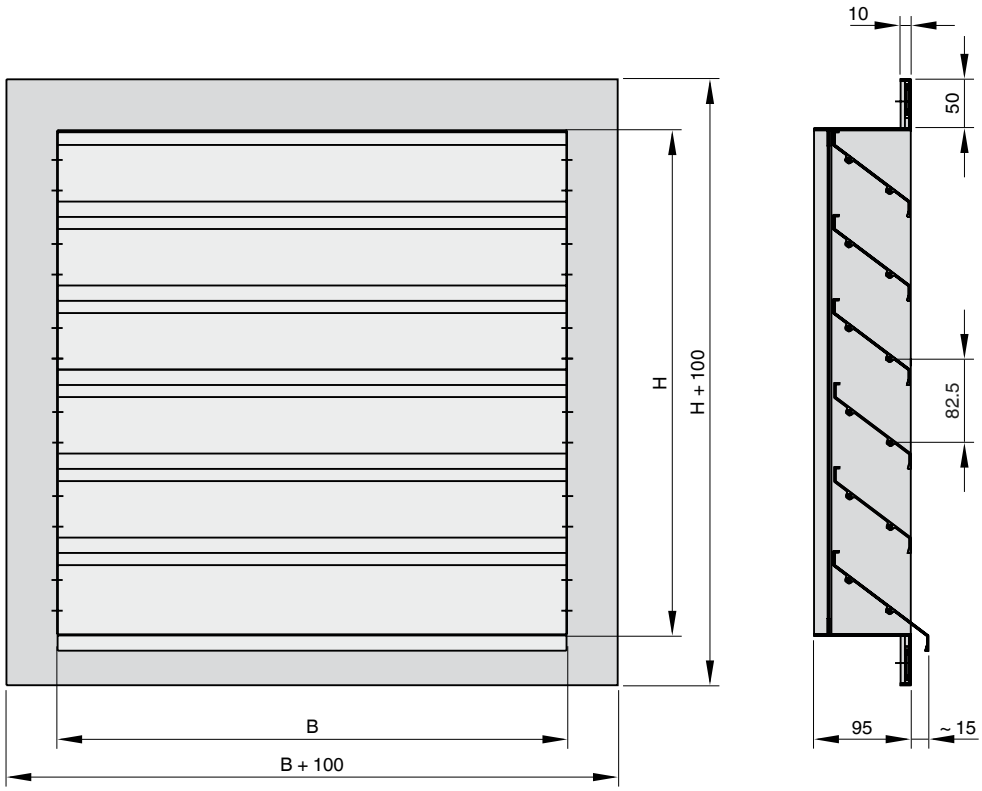
Installation and commissioning
- Install with or without installation subframe (construction U only without installation subframe)
- Install subdivided constructions either horizontally next to each other or vertically on top of each other
- Install louvres for large areas on a support structure (to be provided by others)

Dimensions
Undivided construction

Flow cross section
to calculate the airflow
velocity: A = B × (H – 0.085)

Unit of measure
for B and H: m

Dimensional drawing of WG-AL



Weight

H	B [mm]											
	200	400	600	800	1000	1200	1400	1600	1800	2000	2200	2400
mm	kg											
165	2	3	4	5	6	7	8	9	10	11	12	13
330	2	3	4	5	6	7	8	9	10	11	12	13
495	3	4	5	6	7	8	9	10	11	14	16	19
660	4	5	6	7	8	10	12	14	15	17	19	22
825	5	6	7	8	10	12	14	16	19	21	24	26
990	6	7	8	10	12	15	17	19	21	24	27	30
1155	7	8	10	12	14	16	18	21	24	27	30	33
1320	8	10	12	14	16	18	21	24	27	30	33	36
1485	10	12	14	16	18	21	24	27	30	33	36	39
1650	12	14	16	18	21	24	27	30	33	36	39	42
1815	14	16	18	21	24	27	30	33	36	39	42	
1980	16	18	20	24	27	30	33	36	39	42		
2145	18	20	22	27	30	33	36	39	42			
2310	20	22	24	29	33	36	39	42				

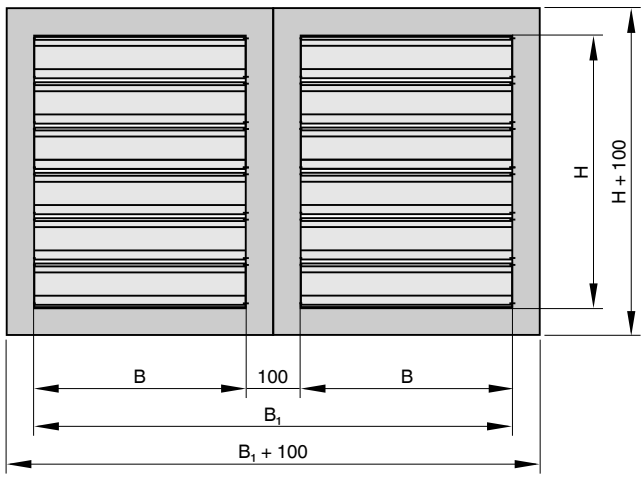
Width subdivided

Flow cross section
to calculate the airflow
velocity: A = 2B × (H – 0.085)

Unit of measure
for B and H: m

2

Dimensional drawing of WG, WG-A2, WG-AL, width subdivided



Weight

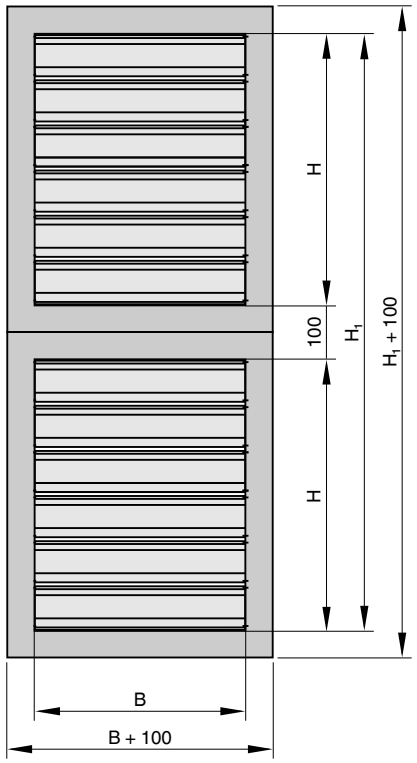
H	B1 [mm]									
	1900	2100	2300	2500	2900	3300	3700	4100	4500	4900
	B [mm]									
	900	1000	1100	1200	1400	1600	1800	2000	2200	2400
mm	kg									
165	10	11	12	13	15	17	19	21	23	25
330	11	12	13	14	16	18	20	22	24	26
495	13	14	15	16	18	20	22	28	32	38
660	15	16	18	20	24	28	30	34	38	44
825	18	20	22	24	28	32	38	42	48	52
990	22	24	27	30	34	38	42	48	54	60
1155	26	28	30	32	36	42	48	54	60	66
1320	30	32	34	36	42	48	54	60	66	72
1485	34	36	39	42	48	54	60	66	72	78
1650	39	42	45	48	54	60	66	72	78	84
1815	45	48	51	54	60	66	72	78	84	
1980	51	54	57	60	66	72	78	84		
2145	57	60	63	66	72	78	84			
2310	62	66	69	72	78	84				

Height subdivided

Flow cross section
to calculate the airflow
velocity: A = B × 2(H – 0.085)

Unit of measure
for B and H: m

Dimensional drawing of WG, WG-A2, WG-AL, height subdivided



Weight

H_1	H	B [mm]					
		200	400	600	800	1000	1200
mm		kg					
2330	1155	14	16	20	24	28	32
2740	1320	16	20	24	28	32	36
3070	1485	20	24	28	32	36	42
3400	1650	24	28	32	36	42	48
3730	1815	28	32	36	42	48	54
4060	1980	32	36	40	48	54	60
4390	2145	36	40	44	54	60	66
4720	2310	40	44	48	58	66	72

Weight

H_1	H	B [mm]					
		1400	1600	1800	2000	2200	2400
mm		kg					
2330	1155	36	42	48	54	60	66
2740	1320	42	48	54	60	66	72
3070	1485	48	54	60	66	72	78
3400	1650	54	60	66	72	78	84
3730	1815	60	66	72	78	84	90
4060	1980	66	72	78	84	90	96
4390	2145	72	78	84	90	96	102
4720	2310	78	84	90	96	102	108

2

Description

External weather louvre, variant WG-B-AL

Variant
- WG-B-AL: External weather louvre made of aluminium, for continuous horizontal runs

Construction
- Aluminium
- 1: With insect screen, galvanised steel
- 2: With wire mesh, stainless steel
- 3: With insect screen and wire mesh, stainless steel
- U: Border without fixing holes 1, 2, 3 can be combined with U

Parts and characteristics
- Border
- Regular blades and bottom blade
- Wire mesh
- Optional insect screen
- Stabilising mullion at the rear (for stability), from E/M = 1300 mm

Construction features
- Continuous horizontal runs include either two end sections (up to B = 4000 mm) or two end sections plus any number of middle sections (from B = 4001 mm)
- Border, material thickness 1.7 mm
- Blades, material thickness 1.35 mm
- Free area of approx. 60 %, with insect screen approx. 45 %, based on B × (H – 0.085)
- Wire mesh at the rear, mesh aperture 20 × 20 × 1.8 mm
- Optional insect screen at the rear, mesh aperture 1.25 × 1.25 × 0.4 mm
- Border fixing holes

Materials and surfaces
- Border, stabilising mullion and blades made of extruded aluminium sections, material nr. EN AW-6060 T66
- Wire mesh made of galvanised steel
- P1: Powder-coated, RAL CLASSIC colour
- PS: Powder-coated, NCS or DB colour
- S2: Anodised to EURAS standard, E6-C-31...35
- S3: Anodised to EURAS standard, E6-C-0

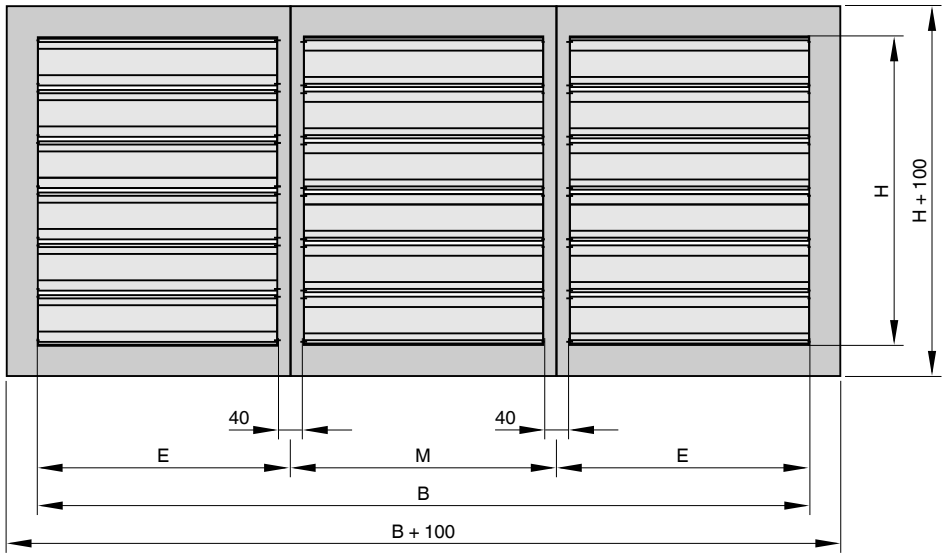
Installation and commissioning
- Install with or without installation subframe (construction U only without installation subframe)
- Install end and middle sections individually, one after the other

Continuous horizontal runs

Flow cross section to calculate the airflow velocity:
A = ((E – 0.02) + n(M – 0.04) + (E – 0.02)) × (H – 0.085)A = B × 2(H – 0.085)

Unit of measure for B and H: m

Dimensional drawing of WG-B-AL

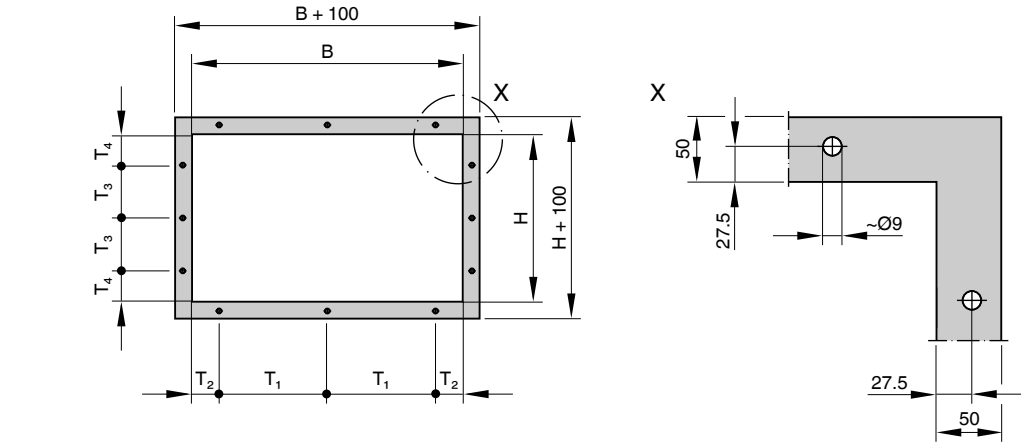


Weight

H	M [mm]	E [mm]					
	2000	1000	1200	1400	1600	1800	2000
mm	kg						
165	10	5	6	7	8	9	10
330	11	6	7	8	9	10	11
495	14	7	8	9	10	11	14
660	17	8	10	12	14	15	17
825	21	10	12	14	16	19	21
990	24	12	15	17	19	21	24
1155	27	14	16	18	21	24	27
1320	30	16	18	21	24	27	30
1485	33	18	21	24	27	30	33
1650	36	21	24	27	30	33	36
1815	39	24	27	30	33	36	39
1980	42	27	30	33	36	39	42

2

Border fixing holes – WG, WG-A2, WG-AL



Standard sizes

Dimensions

Width B	No. of holes n	T_1	T_2
mm		mm	
200	1	–	100
400	2	240	80
600	2	440	80
800	2	640	80
1000	3	420	80
1200	3	520	80
1400	3	620	80
1600	4	480	80
1800	4	547	80
2000	4	613	80
2200	5	510	80
2400	5	560	80

Dimensions

Height H	No. of holes n	T_3	T_4
mm		mm	
165	1	–	83
330	1	–	165
495	1	–	248
660	1	–	330
825	1	–	413
990	1	–	495
1155	1	–	578
1320	2	445	437
1485	2	500	492
1650	2	555	547
1815	2	610	602
1980	3	499	491
2145	3	540	533
2310	3	581	574

Intermediate sizes

Dimensions

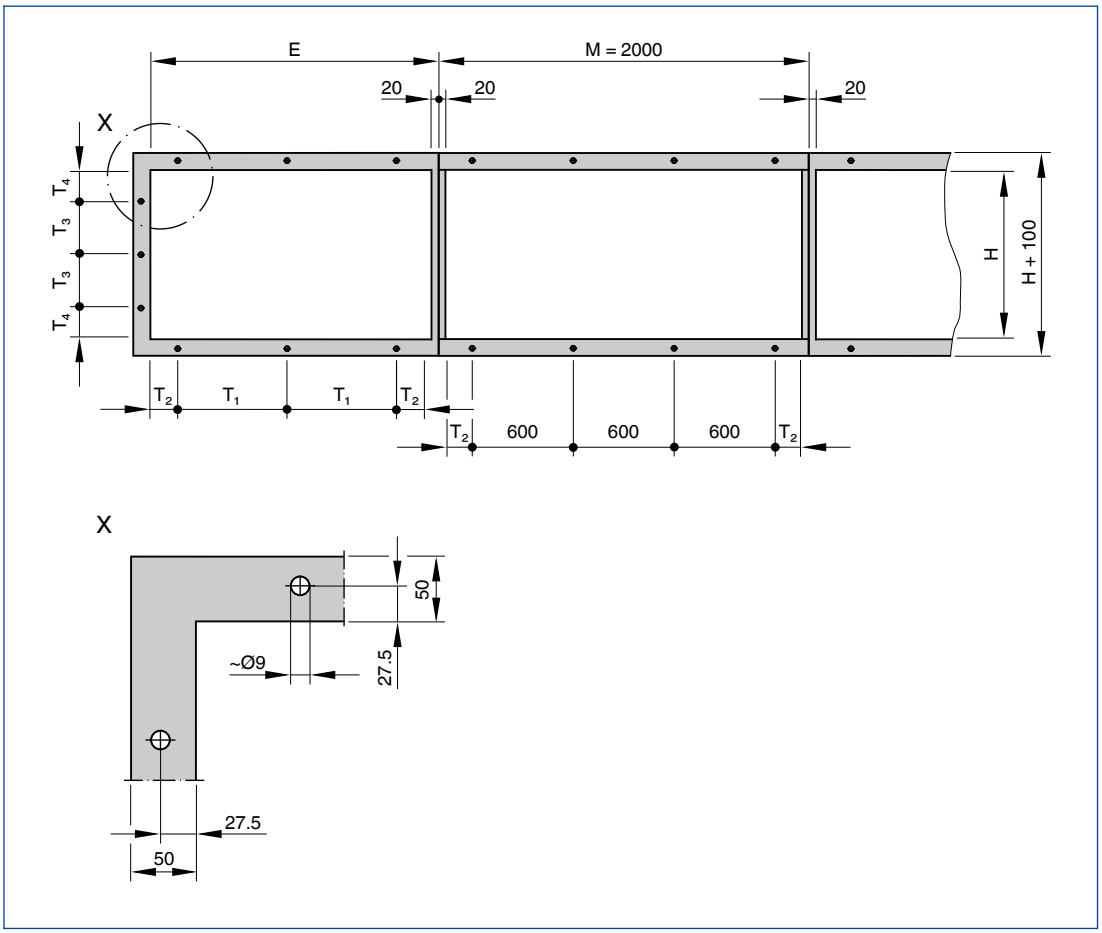
Width B	No. of holes n	T_1	T_2
mm		mm	
165 – 384	1	–	B/2
385 – 881	2	B – 160	80
882 – 1481	3	(B – 160)/2	80
1482 – 2081	4	(B – 160)/3	80
2082 – 2399	5	(B – 160)/4	80

Dimensions

Height H	No. of holes n	T_3	T_4
mm		mm	
166 – 1319	1	–	H/2
1321 – 1979	2	(H + 15)/3	T_3 – 7.5
1981 – 2309	3	(H + 15)/4	T_3 – 7.5

Continuous horizontal runs

Border fixing holes – WG-B-AL



Standard sizes

Dimensions

End section E mm	No. of holes n	T_1 mm	T_2 mm
1000	3	410	80
1200	3	510	80
1400	4	407	80
1600	4	473	80
1800	4	540	80
2000	4	607	80

Dimensions

Height H mm	No. of holes n	T_3 mm	T_4 mm
165	1	–	83
330	1	–	165
495	1	–	248
660	1	–	330
825	1	–	413
990	1	–	495
1155	1	–	578
1320	2	445	437
1485	2	500	492
1650	2	555	547
1815	2	610	602
1980	3	499	491

Intermediate sizes

Dimensions

End section E mm	No. of holes n	T_1 mm	T_2 mm
1001 – 1481	3	(E – 180)/2	80
1482 – 1999	4	(E – 180)/3	80

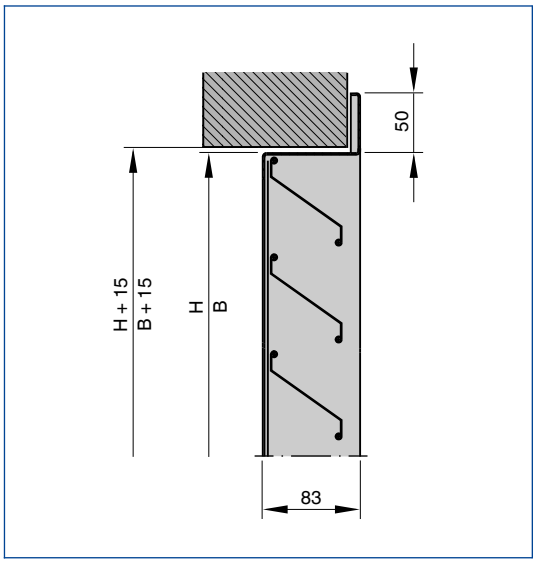
Dimensions

Height H mm	No. of holes n	T_3 mm	T_4 mm
1001 – 1319	1	–	H/2
1321 – 1979	2	(H + 15)/3	T_3 – 7.5

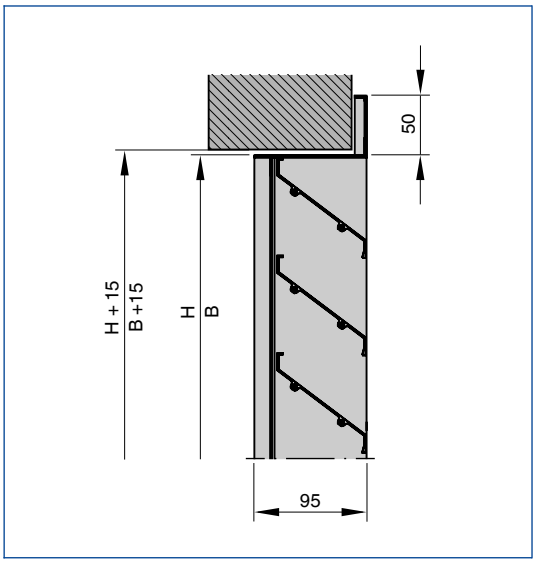
2

Installation dimensions

Wall installation without installation subframe WG, WG-A2



Wall installation without installation subframe WG-AL



Width or height subdivided

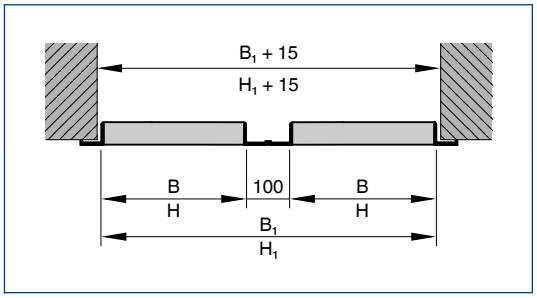
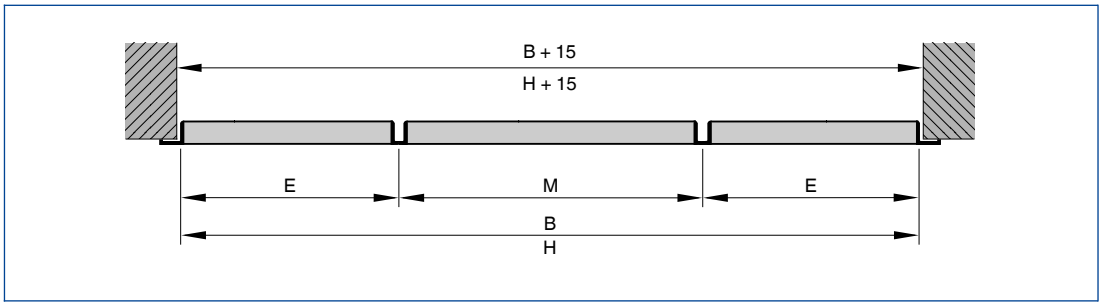


Illustration shows width subdivided

Horizontal runs of WG-B-AL



Standard text

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

Rectangular external weather louvre as a protection of air conditioning systems against the direct ingress of rain, leaves and birds into fresh air and exhaust air openings. Weather and noise protection with a compact-depth unit. Ready-to-install component which consists of a border, aerofoil rain defence blades, and a bird mesh at the rear. Insertion loss measured according to ISO 7235.

Special features

- Large areas can be provided by arranging multiple single sections horizontally and/or vertically (subdivided construction); single sections made of aluminium can also be combined into continuous horizontal runs
- Low differential pressure and low air-regenerated noise due to aerofoil blades
- Simple and quick installation due to perimeter border
- Free area of approx. 60 % (with insect screen approx. 45 %)
- Silicone free

Technical data

- Nominal sizes: 200 × 165 – 2400 × 1650/ 1600 × 2310 mm
- Width subdivided: up to 4900 mm
- Height subdivided: up to 4720 mm
- Continuous horizontal runs (WG-B-AL): Height 165 – 1980 mm
- Volume flow rate range (undivided construction): 40 – 13350 l/s or 144 – 48660 m^3/h at 2.5 m/s
- Free area of approx. 60 % (with insect screen approx. 45 %)
- Total differential pressure – exhaust air: 30 Pa at 2.5 m/s
- Total differential pressure – fresh air: 35 Pa at 2.5 m/s

Sizing data

- $\dot{V}$ _____ [m^3/h]
- Δp_t _____ [Pa]
- L_{WA} air-regenerated noise _____ [dB(A)]

2

Order options

1 Type

WG External weather louvres

2 Material

No entry: glvanised sheet steel
☐ **A2** Stainless steel
☐ **AL** Aluminium

3 Construction

No entry: wire mesh, galvanised steel
☐ **1** Insect screen, galvanised steel (only WG, WG-AL)
☐ **2** Wire mesh, stainless steel (only WG-AL)
☐ **3** Wire mesh and insect screen, stainless steel (only WG-AL, WG-A2)
☐ **U** Border without fixing holes
1, 2, 3 can be combined with U

4 Nominal size [mm]

B × H
(B × H > 4 m^2 when subdivided)

5 Installation subframe

No entry: none
☐ **ER** With (not for construction U)

6 Surface

No entry: standard construction
☐ **P1** Powder-coated, RAL CLASSIC colour
☐ **PS** Powder-coated, DB colour

Only for WG-AL
☐ **S2** Anodised to EURAS standard, E6-C-31...35
☐ **S3** Anodised to EURAS standard, E6-C-0

Gloss level:
RAL 9010 50 %
RAL 9006 30 %
All other RAL colours 70 %

Notes

External weather louvres
Type WGK

With small blade pitch

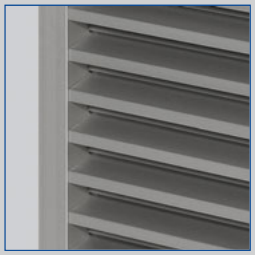
External weather louvres as a protection of air conditioning systems against the direct ingress of rain, leaves and birds into fresh air and exhaust air openings

- Maximum width of 1997 mm, maximum height of 1997 mm
- Low differential pressure due to aerofoil blades
- Low air-regenerated noise
- All aerodynamic data is measured in aerodynamics and acoustics laboratories
- Available in standard sizes and many intermediate sizes
- Simple and quick installation due to perimeter border

Optional equipment and accessories

- Installation subframe
- Insect screen
- Powder-coated or anodised

Bottom blade



Regular blades

Description

External weather louvre, variant WGK

For detailed information on accessories see Chapter K3 – 2.2

Application
- External weather louvres of Type WGK, with small blade pitch, for the fresh air and exhaust air openings of air conditioning systems
- Protection against the direct ingress of rain as well as against leaves and birds
- Recommended face velocity for fresh air openings: 2 – 2.5 m/s max.

Construction
- Aluminium
- 1: With insect screen, galvanised steel
- 3: With insect screen, stainless steel
- U: Border without fixing holes 1, 3 can be combined with U

Nominal sizes
- B: 97, 147, 197, 297, 397, 497, 597, 797, 997, 1197, 1397, 1597, 1797, 1997 mm (intermediate sizes 98 – 1996 mm in increments of 1 mm)
- H: 97,147, 197, 247, 297, 347, 397, 447, 497, 597, 797, 997, 1197, 1397, 1597, 1797, 1997 mm (intermediate sizes 122 – 1972 mm in increments of 25 mm)
- Any combination of B × H

Accessories
- Installation subframe: Installation subframe for the fast and simple installation of external weather louvres

Special features
- Low differential pressure and low air-regenerated noise due to aerofoil blades
- Simple and quick installation due to perimeter border
- Free area of approx. 60 %, with insect screen approx. 45 %, based on B × (H – 0.028 m)
- Silicone free

Parts and characteristics
- Border
- Regular blades and bottom blade
- Wire mesh
- Optional insect screen
- Visible stabilising mullion from B = 597 mm, two mullions from B = 1198 mm, three mullions from B = 1797 mm

Construction features
- Border, material thickness 1.3 mm
- Blades, material thickness 1.35 mm
- Free area of approx. 60 %, with insect screen approx. 45 %, based on B × (H – 0.028)
- Wire mesh at the rear, mesh aperture 6 × 6 × 0.63 mm
- Optional insect screen at the rear, mesh aperture 1.25 × 1.25 × 0.4 mm
- Border fixing holes

Materials and surfaces
- Border, blades and stabilising mullions made of extruded aluminium sections, material no. EN AW-6060 T66, anodised to EURAS standard, E6-C-0, natural colour
- Wire mesh made of galvanised steel
- P1: Powder-coated, RAL CLASSIC colour
- PS: Powder-coated, NCS or DB colour

Installation and commissioning
- Installation with or without installation subframe

Maintenance
- Maintenance-free as construction and materials are not subject to wear

Technical data

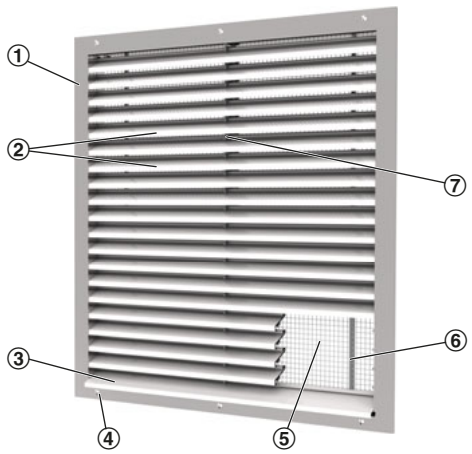
Nominal sizes	97 × 97 – 1997 × 997mm / 1197 × 1997 mm
Volume flow rate range	15 – 5890 l/s at 2.5 m/s
	54 – 21204 m^3/h at 2.5 m/s
Free area	Approx. 60 % (with insect screen approx. 45 %)
Total differential pressure – exhaust air	30 Pa at 2.5 m/s
Total differential pressure – fresh air	35 Pa at 2.5 m/s

Function

Functional description

External weather louvres are externally mounted air transfer devices for the fresh air and exhaust air of air conditioning systems. They are installed in external walls and façades. Their narrowly arranged blades give good protection against the direct ingress of rain as well as against leaves and birds.
Under certain unfavourable conditions, such as heavy rain, and depending on the airflow velocity it might happen that slight quantities of water enter together with the air.
This is why the airflow velocity in fresh air openings should not exceed 2 – 2.5 m/s.

Schematic illustration of WGK-AL



① Border
② Regular blades
③ Bottom blade
④ Fixing holes
⑤ Wire mesh; additional insect screen as an option
⑥ Reinforcing strut from H = 597
⑦ Stabilising mullion from B = 597

Order code

WGK-AL

WGK – AL – 3 – U / 1197×797 / ER / P1 – RAL ...
1 2 3 4 5 6

1 Type
WGK External weather louvre with small blade pitch

2 Material
AL Anodised aluminium

3 Construction
No entry: wire mesh, galvanised steel
1 Insect screen, galvanised steel
3 Insect screen, stainless steel
U Border without fixing holes
1, 3 can be combined with U

4 Nominal size [mm]
B × H

5 Installation subframe
No entry: none
ER With (not for construction U)

6 Surface
No entry: anodised to EURAS standard, E6-C-0, S3, natural colour
P1 Powder-coated, RAL CLASSIC colour
PS Powder-coated, DB colour
S2 Anodised to EURAS standard, E6-C-… (31 to 35)
Gloss level:
RAL 9010 50 %
RAL 9006 30 %
All other RAL colours 70 %

Order example

WGK–AL–1/997×1622/P1–RAL 9006

Material	Aluminium
Construction	Insect screen, galvanised steel
Nominal size	997×1622 mm
Installation subframe	Without
Surface	Powder-coated, RAL 9006, white aluminium

Quick sizing tables provide a good overview of the volume flow rates with an airflow velocity of 2.5 m/s. Values for intermediate widths can be interpolated. Precise intermediate values and volume flow rates for other airflow velocities can be calculated with our Easy Product Finder design programme.

Quick sizing – volume flow rate at 2.5 m/s

Height	Width [mm]											
	97		147		197		297		397		497	
mm	l/s	m³/h	l/s	m³/h	l/s	m³/h	l/s	m³/h	l/s	m³/h	l/s	m³/h
97	15	54	25	90	35	126	50	180	70	252	85	306
147	30	108	45	162	60	216	90	324	120	432	150	540
197	40	144	60	216	85	306	125	450	170	612	210	756
247	55	198	80	288	110	396	165	594	215	774	270	972
297	65	234	100	360	130	468	200	720	265	954	335	1206
347	75	270	115	414	155	558	235	846	315	1134	395	1422
397	90	324	135	486	180	648	275	990	365	1314	460	1656
447	100	360	155	558	205	738	310	1116	415	1494	520	1872
497	115	414	170	612	230	828	350	1260	465	1674	585	2106
597	140	504	210	756	280	1008	420	1512	565	2034	705	2538
797	185	666	285	1026	380	1368	570	2052	765	2754	955	3438
997	235	846	355	1278	475	1710	720	2592	960	3456	1205	4338
1197	285	1026	430	1548	575	2070	870	3132	1160	4176	1450	5220
1397	330	1188	505	1818	675	2430	1015	3654	1360	4896	1700	6120
1597	380	1368	575	2070	775	2790	1165	4194	1555	5598	1950	7020
1797	430	1548	650	2340	870	3132	1315	4734	1755	6318	2200	7920
1997	475	1710	725	2610	970	3492	1460	5256	1955	7038	2445	8802

Quick sizing – volume flow rate at 2.5 m/s

Height	Width [mm]											
	597		797		997		1197		1397		1597	
mm	l/s	m³/h	l/s	m³/h	l/s	m³/h	l/s	m³/h	l/s	m³/h	l/s	m³/h
97	105	378	135	486	170	612	205	738	240	864	275	990
147	180	648	235	846	295	1062	355	1278	415	1494	475	1710
197	250	900	335	1206	420	1512	505	1818	590	2124	675	2430
247	325	1170	435	1566	545	1962	655	2358	765	2754	875	3150
297	400	1440	535	1926	670	2412	805	2898	940	3384	1075	3870
347	475	1710	635	2286	795	2862	955	3438	1115	4014	1275	4590
397	550	1980	735	2646	920	3312	1105	3978	1290	4644	1475	5310
447	625	2250	835	3006	1045	3762	1255	4518	1465	5274	1675	6030
497	700	2520	935	3366	1170	4212	1405	5058	1640	5904	1870	6732
597	850	3060	1135	4086	1420	5112	1705	6138	1985	7146	2270	8172
797	1150	4140	1530	5508	1915	6894	2300	8280	2685	9666	3070	11052
997	1445	5202	1930	6948	2415	8694	2900	10440	3385	12186	3870	13932
1197	1745	6282	2330	8388	2915	10494	3500	12600	4085	14706	4665	16794
1397	2045	7362	2730	9828	3410	12276	4095	14742	4780	17208		
1597	2340	8424	3125	11250	3910	14076	4695	16902				
1797	2640	9504	3525	12690	4410	15876	5290	19044				
1997	2940	10584	3925	14130	4910	17676	5890	21204				

2

Quick sizing – volume flow rate at 2.5 m/s

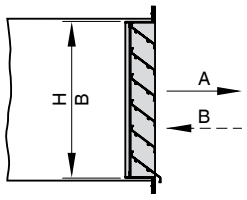
Height	Width [mm]			
	1797		1997	
mm	l/s	m^3/h	l/s	m^3/h
97	310	1116	345	1242
147	535	1926	595	2142
197	760	2736	845	3042
247	985	3546	1095	3942
297	1210	4356	1345	4842
347	1435	5166	1595	5742
397	1660	5976	1840	6624
447	1880	6768	2090	7524
497	2105	7578	2340	8424
597	2555	9198	2840	10224
797	3455	12438	3840	13824
997	4355	15678	4840	17424

The sound power levels L_{WA} apply to external weather louvres with a flow cross section of 1 m^2.

Quick sizing – differential pressure and sound power level

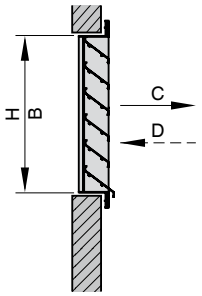
v	Installation type			
	A and C		B and D	
	Δp_t	L_{WA}	Δp_t	L_{WA}
m/s	Pa	dB(A)	Pa	dB(A)
1.5	10	32	14	34
2	20	41	25	43
2.5	30	48	35	50
3	45	54	55	56
4	75	63	95	66
5	115	70	145	73
6	170	76	210	79

Duct installation (installation types A and B)



A Exhaust air
B Fresh air

Plenum installation (installation types C and D)



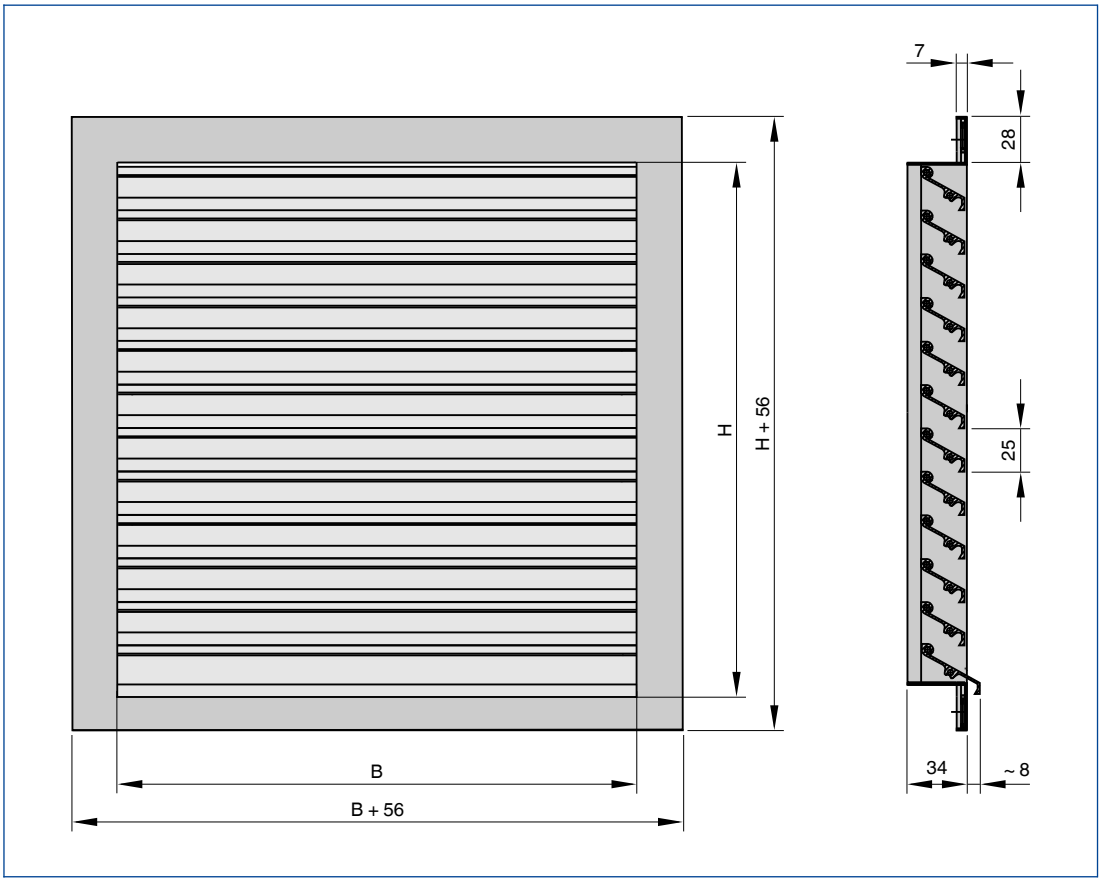
C Exhaust air
D Fresh air

Dimensions

Flow cross section
to calculate the airflow
velocity: A = B × (H – 0.028)

Unit of measure
for B and H: m

Dimensional drawing of WGK

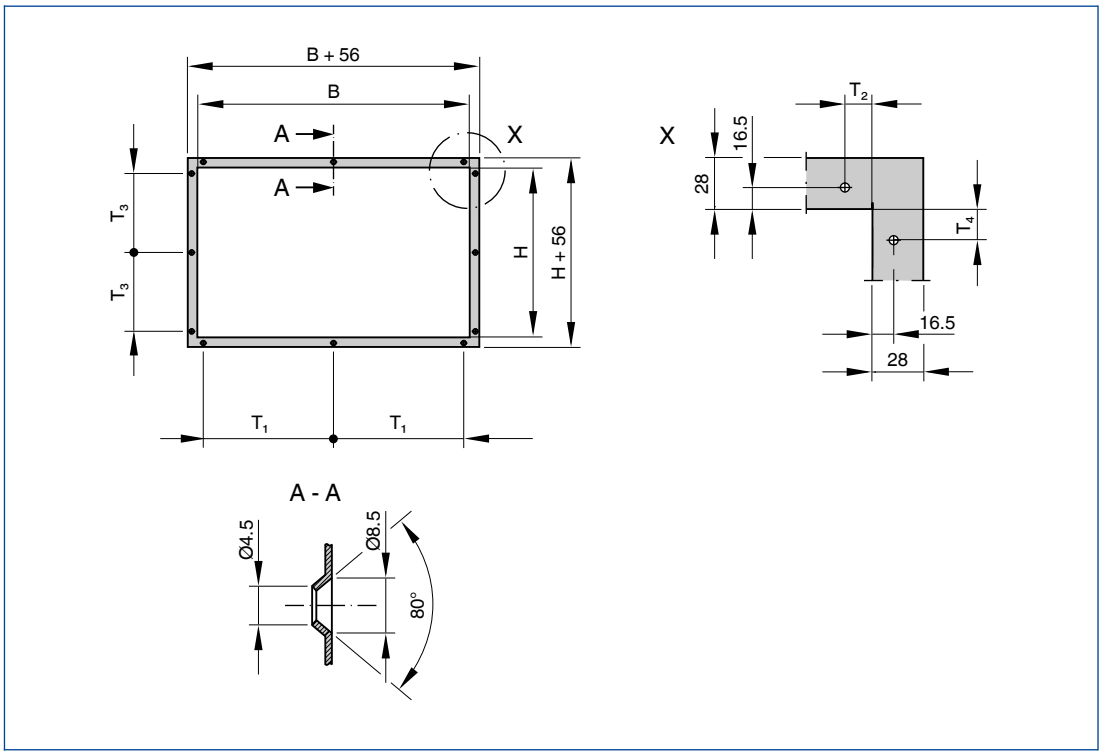


Weight

H	B [mm]													
	97	147	197	297	397	497	597	697	797	897	997	1097	1197	1297
mm	kg													
97	1	1	1	1	1	1	1	1	1	1	2	2	2	2
147	1	1	1	1	1	1	1	1	2	2	2	2	2	3
197	1	1	1	1	1	2	2	2	2	2	3	3	3	3
247	1	1	1	1	2	2	2	2	3	3	3	3	4	4
297	1	1	1	2	2	2	3	3	3	3	4	4	4	5
347	1	1	1	2	2	3	3	3	4	4	4	5	5	5
397	1	1	2	2	2	3	3	4	4	4	5	5	6	6
447	1	1	2	2	3	3	4	4	4	5	5	6	6	7
497	1	1	2	2	3	3	4	4	5	5	6	6	7	7
597	1	2	2	3	3	4	5	5	6	6	7	8	8	9
797	1	2	3	4	4	5	6	7	8	8	9	10	11	12
997	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1197	2	3	4	5	6	8	9	10	11	12	14	15	16	17
1397	2	3	5	6	7	9	10	12	13	14	16	17	19	20
1597	2	4	5	7	8	10	12	13	15	16	18	20	21	23
1797	2	4	6	8	9	11	13	15	17	18	20	22		
1997	2	4	6	8	10	12	14	16	18	20	22			

2

Border fixing holes – WGK



Standard sizes

Dimensions

Width B mm	No. of holes n	T_1 mm	T_2 mm
97	1	–	B/2
147	1	–	B/2
197	1	–	B/2
297	2	262	17.5
397	2	362	17.5
497	3	231	17.5
597	3	281	17.5
797	3	381	17.5
997	4	321	17.5
1197	4	387	17.5
1397	5	341	17.5
1597	5	391	17.5
1797	6	352	17.5
1997	6	392	17.5

Dimensions

Height H mm	No. of holes n	T_3 mm	T_4 mm
97	0	–	–
147	0	–	–
197	0	–	–
297	0	–	–
397	0	–	–
497	0	–	–
597	3	281	17.5
797	3	381	17.5
997	4	321	17.5
1197	4	387	17.5
1397	5	341	17.5
1597	5	391	17.5
1797	6	352	17.5
1997	6	392	17.5

Intermediate sizes

Dimensions

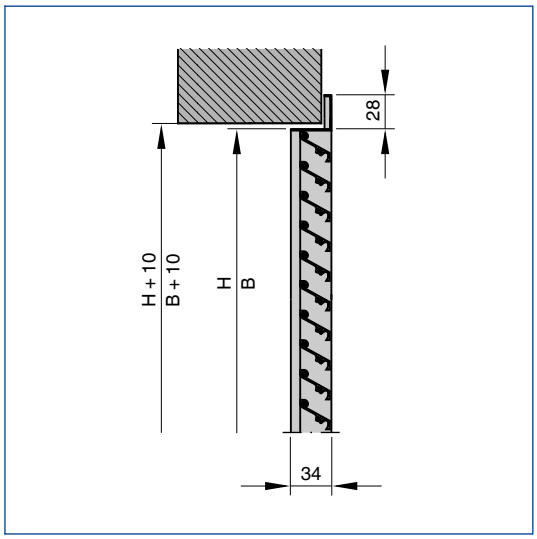
Width B mm	No. of holes n	T_1 mm	T_2 mm
97 – 296	1	–	B/2
298 – 396	2	B – 35	17.5
398 – 796	3	(B – 35)/2	17.5
798 – 1396	4	(B – 35)/3	17.5
1398 – 1796	5	(B – 35)/4	17.5
1798 – 1996	6	(B – 35)/5	17.5

Dimensions

Height H mm	No. of holes n	T_3 mm	T_4 mm
122 – 572	0	–	–
622 – 772	3	(H – 35)/2	17.5
822 – 1372	4	(H – 35)/3	17.5
1422 – 1772	5	(H – 35)/4	17.5
1822 – 1972	6	(H – 35)/5	17.5

Installation dimensions

Wall installation without installation subframe



2

Standard text

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

Rectangular external weather louvre as a protection of air conditioning systems against the direct ingress of rain, leaves and birds into fresh air and exhaust air openings. Weather and noise protection with a compact-depth unit. Ready-to-install component which consists of a border, aerofoil rain defence blades, and a bird mesh at the rear. Insertion loss measured according to ISO 7235.

Special features
- Low differential pressure and low air-regenerated noise due to aerofoil blades
- Simple and quick installation due to perimeter border
- Free area of approx. 60 %, with insect screen approx. 45 %, based on B × (H – 0.028 m)
- Silicone free

Materials and surfaces
- Border, blades and stabilising mullions made of extruded aluminium sections, material no. EN AW-6060 T66, anodised to EURAS standard, E6-C-0, natural colour
- Wire mesh made of galvanised steel
- P1: Powder-coated, RAL CLASSIC colour
- PS: Powder-coated, NCS or DB colour

Construction
- Aluminium
- 1: With insect screen, galvanised steel
- 3: With insect screen, stainless steel
- U: Border without fixing holes 1, 3 can be combined with U

Technical data
- Nominal sizes: 97 × 97 – 1997 × 997 mm / 1197 × 1997 mm
- Volume flow rate range: 15 – 5890 l/s or 54 – 21204 m^3/h at 2.5 m/s
- Free area of approx. 60 % (with insect screen approx. 45 %)
- Total differential pressure – exhaust air: 30 Pa at 2.5 m/s
- Total differential pressure – fresh air: 35 Pa at 2.5 m/s

Sizing data
- $\dot{V}$ _____ [m^3/h]
- Δp_t _____ [Pa]
- L_{WA} air-regenerated noise _____ [dB(A)]

Order options

1 Type
WGK External weather louvre with small blade pitch

2 Material
☐ **AL** Anodised aluminium

3 Construction
No entry: wire mesh, galvanised steel
☐ **1** Insect screen, galvanised steel
☐ **3** Insect screen, stainless steel
☐ **U** Border without fixing holes
1, 3 can be combined with U

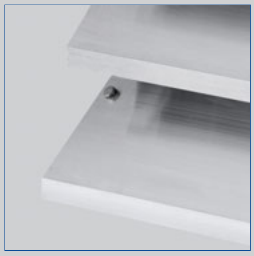
4 Nominal size [mm]
B × H

5 Installation subframe
No entry: none
☐ **ER** With (not for construction U)

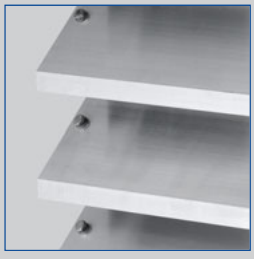
6 Surface
No entry: anodised to EURAS standard, E6-C-0, S3, natural colour
☐ **P1** Powder-coated, RAL CLASSIC colour
☐ **PS** Powder-coated, DB colour
☐ **S2** Anodised to EURAS standard, E6-C-… (31 to 35)
Gloss level:
RAL 9010 50 %
RAL 9006 30 %
All other RAL colours 70 %

External weather louvres
Type WGF

Serrated angle section



Bottom blade



Regular blades

Specifically for façade installation

External weather louvres – specifically for façade installation – as a protection of air conditioning systems against the direct ingress of rain, leaves and birds into fresh air and exhaust air openings

- Maximum width of 2000 mm, maximum height of 2500 mm per section
- For the installation into façades or for the construction of enclosures for machinery or electrical equipment
- Low differential pressure due to aerofoil blades
- Low air-regenerated noise
- All aerodynamic data is measured in aerodynamics and acoustics laboratories
- Variants made of galvanised sheet steel or aluminium
- Flexible arrangement of sections for covering large areas (should then be fixed on a support structure which is to be provided by others)

Optional equipment and accessories

- Corner section
- Insect screen
- Powder-coated or anodised

Description

External weather louvre, variant WGF-AL-T

Application
- External weather louvres of Type WGF for the fresh air and exhaust air openings of air conditioning systems
- Protection against the direct ingress of rain as well as against leaves and birds
- Recommended face velocity for fresh air openings: 2 – 2.5 m/s max.

Variants
- WGF-T: Façade weather louvre made of galvanised sheet steel, middle section
- WGF-E: Façade weather louvre made of galvanised sheet steel, corner section
- WGF-AL-T: Façade weather louvre made of aluminium, middle section
- WGF-AL-E: Façade weather louvre made of aluminium, corner section

Construction
- Wire mesh made of galvanised steel
- 2: Wire mesh, stainless steel (only WGF-AL)

Nominal sizes
Middle section
- B: 200, 400, 600, 800, 1000, 1200, 1400, 1600, 1800, 2000 mm (intermediate sizes: 201 – 1999 mm in increments of 1 mm)
- H: 250, 375, 500, 625 , 750, 875, 1000, 1250, 1500, 1750, 2000, 2250, 2500 mm (intermediate sizes 1125 – 2375 mm in increments of 125 mm)
- Any combination of B × H

Corner section
- B: 600 × 600 mm (angle)
- H: 250, 375, 500, 625 , 750, 875, 1000, 1250, 1500, 1750, 2000, 2250, 2500 mm (intermediate sizes 1125 – 2375 mm in increments of 125 mm)

Special features
- Low differential pressure and low noise due to aerofoil blades
- Large-size covering of complete façades, or of air intake and discharge openings on external walls; uniform look with regular blades, without distracting flanges
- Robust construction
- Very large dimensions (height and width) are available since any number of sections can be fitted side by side or on top of each other (support structure required)
- Free area of approx. 50 %, based on B × (H – 0.125 m)

Parts and characteristics
- Serrated angle sections (left and right)
- Regular blades and bottom blade
- Wire mesh
- Optional insect screen
- Fixing elements for the blades, serrated angle section (if B > 2000 mm: combination of several serrated angle sections) and wire mesh

Construction features
- Blades, material thickness of 1.25 mm for steel, 2 mm for aluminium
- Free area of approx. 50 %, based on B × (H – 0.125 m)
- Serrated angle section, with fixing holes on side and rear, material thickness 3 mm
- Wire mesh at the rear, mesh aperture 20 × 20 × 1.8 mm
- Optional insect screen at the rear, mesh aperture 1.25 × 1.25 × 0.4 mm

Materials and surfaces
WGF (steel)
- Blades and serrated angle sections made of formed galvanised sheet steel, material no. DX51D+Z150-200-NAC
- Wire mesh made of galvanised steel
- Serrated angle sections, powder-coated black (RAL 9005)
- P1: Powder-coated, RAL CLASSIC colour
- PS: Powder-coated, NCS or DB colour

WGF-AL (aluminium)
- Aluminium blades, material no. EN AW-6060 T66
- Serrated angle sections made of formed galvanised sheet steel, material no. DX51D+Z150-200-NAC
- Wire mesh made of galvanised steel
- Serrated angle sections, powder-coated black (RAL 9005)
- P1: Powder-coated, RAL CLASSIC colour
- PS: Powder-coated, NCS or DB colour
- S2: Anodised to EURAS standard, E6-C-31...35
- S3: Anodised to EURAS standard, E6-C-0

Installation and commissioning

- Fix the top and bottom blades to both serrated angle sections
- Align the serrated angle sections with both blades to the support structure and fix it (fixing material to be provided by others)
- Fix the remaining blades to the serrated angle sections
- Fix wire mesh to the rear of the blades
- Install additional sections
- Connect the serrated angle sections of the individual louvre sections with each other

Maintenance

- Maintenance-free as construction and materials are not subject to wear

Technical data

Nominal sizes (middle section)	1000 × 500 to 2000 × 2500 mm
Volume flow rate range (middle section)	940 – 11880 l/s
	3384 – 42768 m^3/h
Free area	Approx. 50 %
Total differential pressure – exhaust air	50 Pa at 2.5 m/s (façade installation)
Total differential pressure – fresh air	60 Pa at 2.5 m/s (façade installation)

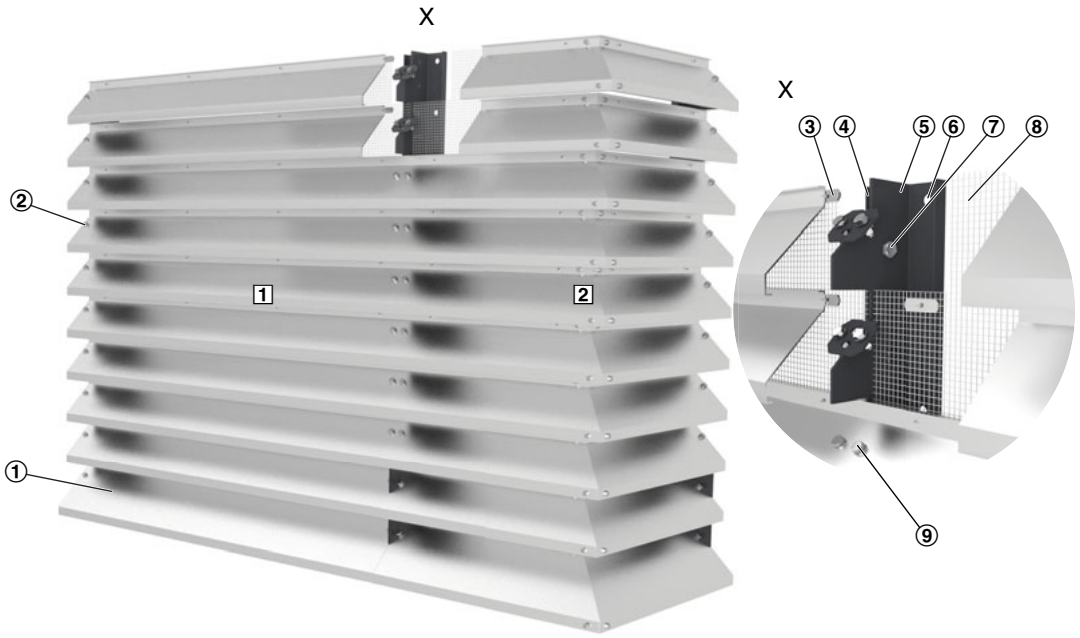
Function

Functional description

External weather louvres are externally mounted air transfer devices for the fresh air and exhaust air of air conditioning systems. They are installed in external walls and façades. Their narrowly arranged blades give good protection against the direct ingress of rain as well as against leaves and birds. Under certain unfavourable conditions, such as heavy rain, and depending on the airflow velocity it might happen that slight quantities of water enter together with the air. This is why the airflow velocity in fresh air openings should not exceed 2 – 2.5 m/s.

2

Schematic illustration of WGF



[1] Middle section WGF-AL-T
[2] Corner section WGF-AL-E
① Bottom blade
② Regular blades
③ Fixing element for wire mesh
④ Serrated angle section, right side
⑤ Serrated angle section, left side
⑥ Fixing holes
⑦ Fixing element to join serrated angle sections
⑧ Wire mesh; additional insect screen as an option
⑨ Fixing element for blades

Order code

If middle sections and corner sections are arranged in vertical tiers, the upper sections will have only regular blades; only the lower sections will have a bottom blade. Sections to be used as upper sections must be specified when ordering.

WGF

WGF – AL – E – 2 / 1400×875 / P1 – RAL ...

1 2 3 4 5 6

1 Type

WGF External weather louvres for façades

2 Material

No entry: galvanised steel
AL Aluminium

3 Section

E Corner section
T Middle section

4 Construction

No entry: wire mesh, galvanised steel
2 Wire mesh, stainless steel (only for material AL)

5 Nominal size [mm]

B × H

6 Surface

No entry: standard construction
P1 Powder-coated, RAL CLASSIC colour
PS Powder-coated, NCS or DB colour

Only for WGF-AL
S2 Anodised to EURAS standard, E6-C-31...35
S3 Anodised to EURAS standard, E6-C-0

Gloss level:
RAL 9010 50 %
RAL 9006 30 %
All other RAL colours 70 %

Order example

WGF–T/1600×1250/P1–RAL 7001

Material	Galvanised steel
Section	Middle section
Construction	Wire mesh, galvanised steel
Nominal size	1600×1250 mm
Surface	Powder-coated, RAL 7001, silver grey

Quick sizing tables provide a good overview of the volume flow rates with an airflow velocity of 2.5 m/s. Values for intermediate widths can be interpolated. Precise intermediate values and volume flow rates for other airflow velocities can be calculated with our Easy Product Finder design programme.

2

Quick sizing – volume flow rate at 2.5 m/s

Height	Width [mm]											
	1000		1200		1400		1600		1800		2000	
mm	l/s	m³/h	l/s	m³/h	l/s	m³/h	l/s	m³/h	l/s	m³/h	l/s	m³/h
500	940	3384	1125	4050	1315	4734	1500	5400	1690	6084	1875	6750
625	1250	4500	1500	5400	1750	6300	2000	7200	2250	8100	2500	9000
750	1565	5634	1875	6750	2190	7884	2500	9000	2815	10134	3125	11250
875	1875	6750	2250	8100	2625	9450	3000	10800	3375	12150	3750	13500
1000	2190	7884	2625	9450	3065	11034	3500	12600	3940	14184	4375	15750
1250	2815	10134	3375	12150	3940	14184	4500	16200	5060	18216	5630	20268
1500	3440	12384	4125	14850	4815	17334	5500	19800	6190	22284	6880	24768
1750	4065	14634	4875	17550	5690	20484	6500	23400	7310	26316	8130	29268
2000	4690	16884	5630	20268	6560	23616	7500	27000	8440	30384	9380	33768
2250	5310	19116	6380	22968	7440	26784	8500	30600	9560	34416	10630	38268
2500	5940	21384	7130	25668	8310	29916	9500	34200	10690	38484	11880	42768

Corner section

Quick sizing – volume flow rate at 2.5 m/s

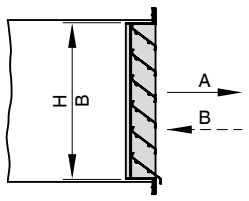
Height	Corner section 90° [mm]	
	600/600	
mm	l/s	m³/h
500	1125	4050
625	1500	5400
750	1875	6750
875	2250	8100
1000	2625	9450
1250	3375	12150
1500	4125	14850
1750	4875	17550
2000	5630	20268
2250	6380	22968
2500	7130	25668

The sound power levels L_{WA} apply to external weather louvres with a flow cross section of 1 m^2.

Quick sizing – differential pressure and sound power level

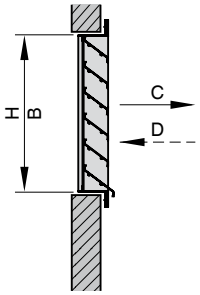
v	Installation type					
	A and B		C		D	
	Δp_t	L_{WA}	Δp_t	L_{WA}	Δp_t	L_{WA}
m/s	Pa	dB(A)	Pa	dB(A)	Pa	dB(A)
1.5	22	40	18	38	25	45
2	38	49	32	47	40	54
2.5	60	56	50	54	55	61
3	85	62	75	59	90	66
4	150	70	130	68	160	75
5	230	77	200	75	250	82
6	335	83	290	81	360	88

Duct installation (installation types A and B)



A Exhaust air
B Fresh air

Plenum installation (installation types C and D)



C Exhaust air
D Fresh air

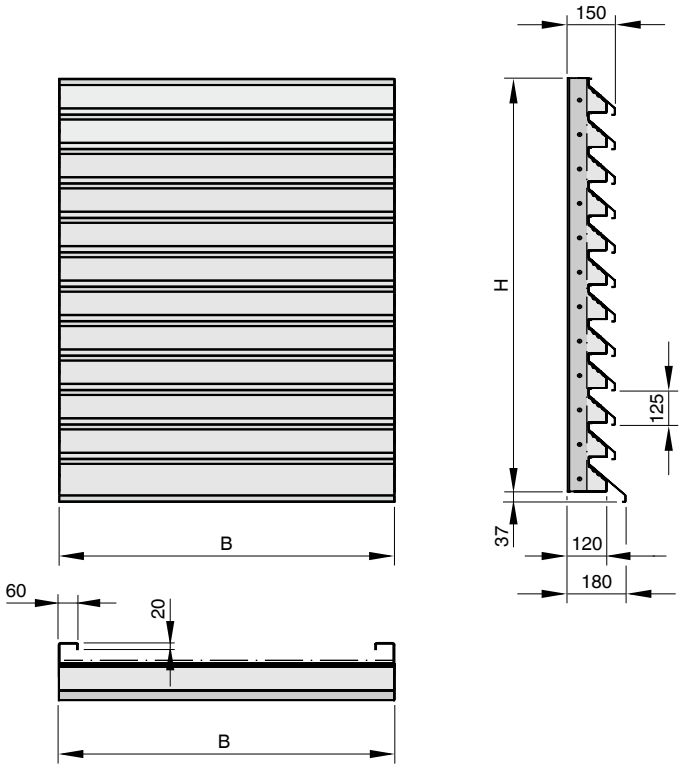
2

Dimensions

Flow cross section
to calculate the airflow
velocity: A = B × (H – 0.125)

Unit of measure
for B and H: m

Dimensional drawing of WGF middle section



Weight

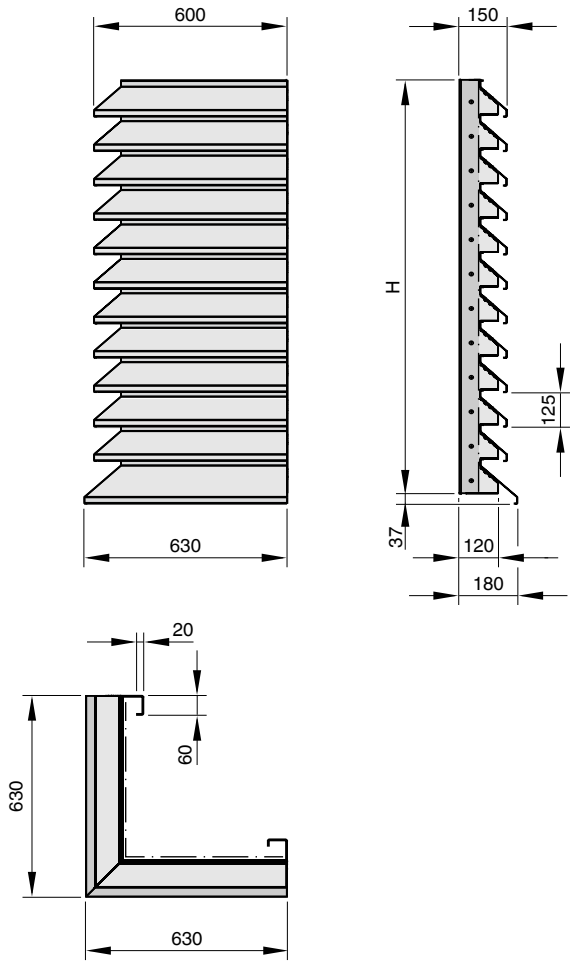
H	WGF-T						WGF-AL-T					
	B [mm]											
	1000	1200	1400	1600	1800	2000	1000	1200	1400	1600	1800	2000
mm	kg											
500	16	17	18	21	23	25	12	13	14	15	16	17
625	19	22	24	27	29	32	14	16	17	18	19	21
750	23	26	29	32	35	38	17	19	20	22	23	26
875	27	30	34	37	41	44	20	22	24	25	27	30
1000	31	35	39	43	47	51	23	25	27	29	31	34
1250	33	38	43	48	53	61	28	31	34	36	39	42
1500	43	50	56	61	68	73	34	37	41	44	47	51
1750	51	59	65	71	79	86	39	43	48	51	55	59
2000	59	67	74	82	90	97	45	49	55	59	63	68
2250	67	76	83	91	102	109	50	55	62	66	71	76
2500	74	84	93	102	112	121	56	61	69	74	79	85

Dimensions

Flow cross section
to calculate the airflow
velocity: A = B × (H – 0.125)

Unit of measure
for B and H: m

Dimensional drawing of WGF corner section



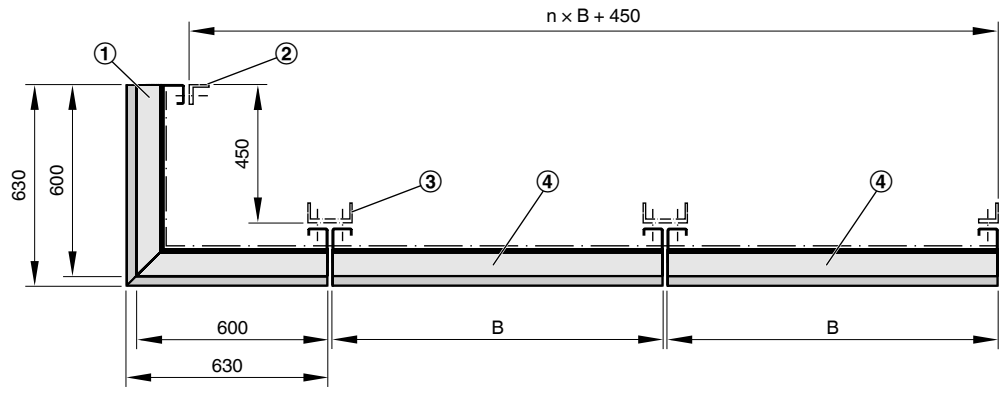
Weight

H	WGF-E	WGF-AL-E
	B [mm]	
	600 × 600	
mm	kg	
500	17	13
625	22	16
750	26	19
875	30	22
1000	35	25
1250	38	31
1500	50	37
1750	59	43
2000	67	49
2250	76	55
2500	84	61

2

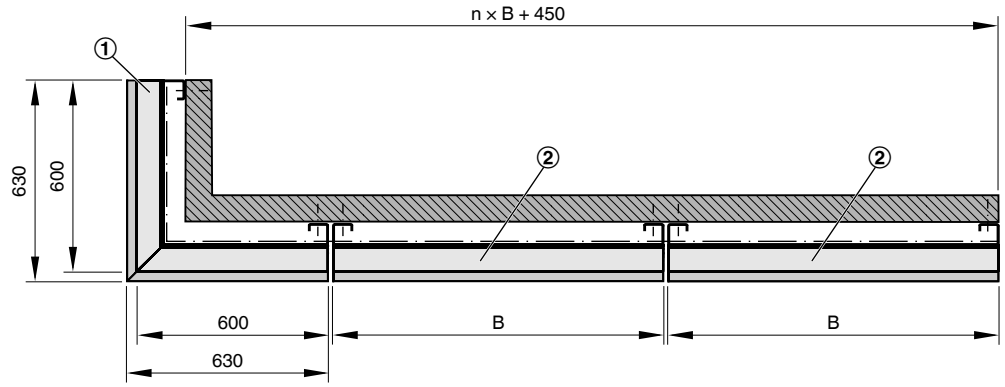
Installation dimensions

Façade installation on support structure



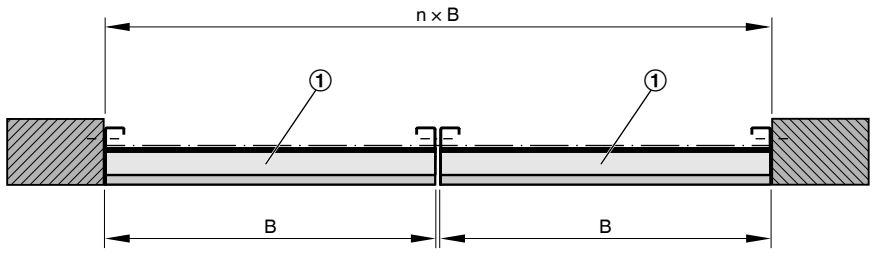
n = any number of middle sections
① Corner section (WGF-E)
② Support structure provided by others, e.g. angle sections
③ Support structure provided by others, e.g. U-channel sections
④ Middle section (WGF-T)

Installation on the face of a wall



n = any number of middle sections
① Corner section (WGF-E)
② Middle section (WGF-T)

Installation into a wall



n = any number of middle sections
① Middle section (WGF-T)

Standard text

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

Rectangular external weather louvres for façade installation, as a protection of air conditioning systems against the direct ingress of rain, leaves and birds into fresh air and exhaust air openings. Ready-to-install component which consists of a rain resistant border and aerofoil blades, and a wire mesh at the rear.

Special features

- Low differential pressure and low noise due to aerofoil blades
- Large-size covering of complete façades, or of air intake and discharge openings on external walls; uniform look with regular blades, without distracting flanges
- Robust construction
- Very large dimensions (height and width) are available since any number of sections can be fitted side by side or on top of each other (support structure required)
- Free area of approx. 50 %, based on B × (H – 0.125 m)

Materials and surfaces

WGF (steel)
- Blades and serrated angle sections made of formed galvanised sheet steel, material no. DX51D+Z150-200-NAC
- Wire mesh made of galvanised steel
- Serrated angle sections, powder-coated black (RAL 9005)
- P1: Powder-coated, RAL CLASSIC colour
- PS: Powder-coated, NCS or DB colour

WGF-AL (aluminium)
- Aluminium blades, material no. EN AW-6060 T66
- Serrated angle sections made of formed galvanised sheet steel, material no. DX51D+Z150-200-NAC
- Wire mesh made of galvanised steel
- Serrated angle sections, powder-coated black (RAL 9005)
- P1: Powder-coated, RAL CLASSIC colour
- PS: Powder-coated, NCS or DB colour
- S2: Anodised to EURAS standard, E6-C-31...35
- S3: Anodised to EURAS standard, E6-C-0

Construction

- Wire mesh made of galvanised steel
- 2: Wire mesh, stainless steel (only WGF-AL)

Technical data

- Nominal sizes (middle section): 1000 × 500 – 2000 × 2500 mm
- Volume flow rate range (middle section): 940 – 11880 l/s
- Volume flow rate range (middle section): 3384 – 42768 m^3/h
- Free area: approx. 50 %
- Total differential pressure – exhaust air: 50 Pa at 2.5 m/s (façade installation)
- Total differential pressure – fresh air: 60 Pa at 2.5 m/s (façade installation)

Sizing data

- $\dot{V}$ _____ [m^3/h]
- Δp_t _____ [Pa]
- L_{WA} air-regenerated noise _____ [dB(A)]

Order options

1 Type
WGF External weather louvres for façades

2 Material
No entry: galvanised steel
☐ **AL** Aluminium

3 Section
☐ **E** Corner section
☐ **T** Middle section

4 Construction
No entry: wire mesh, galvanised steel
☐ **2** Wire mesh, stainless steel (only for material AL)

5 Nominal size [mm]
B × H

6 Surface
No entry: standard construction
☐ **P1** Powder-coated, RAL CLASSIC colour
☐ **PS** Powder-coated, NCS or DB colour
Only for WGF-AL
☐ **S2** Anodised to EURAS standard, E6-C-31...35
☐ **S3** Anodised to EURAS standard, E6-C-0
Gloss level:
RAL 9010 50 %
RAL 9006 30 %
All other RAL colours 70 %

Notes

External weather louvres
Type WG-JZ

Combination with a multileaf damper

Combinations of external weather louvres and multileaf dampers as a protection against the direct ingress of rain, leaves and birds, and for shut-off and control

- Maximum width of 2000 mm, maximum height of 1995 mm
- Low differential pressure due to aerofoil blades
- Low air-regenerated noise
- All aerodynamic data is measured in aerodynamics and acoustics laboratories
- Aerofoil parallel or opposed hollow blades
- Casing air leakage to EN 1751, class C
- Available in standard sizes and many intermediate sizes
- Pre-assembled combination, hence fast and easy to install

Optional equipment and accessories

- Installation subframe
- Insect screen
- Powder-coated or anodised surface
- Actuators: Open/Close actuators, modulating actuators

2

Combination of external weather louvre and multileaf damper, variant WG-AL-JZ-S

Combination of external weather louvre and multileaf damper, variant WG-AL-JZ-S

Description

For detailed information on Type WG external weather louvres see Chapter K3 – 2.1

For detailed information on multileaf dampers see Chapter K3 – 1.1

For detailed information on accessories see Chapter K3 – 2.2

Application

- Combinations of Type WG external weather louvres and Type JZ multileaf dampers for protecting fresh air and exhaust air openings in air conditioning systems
- Protection against the direct ingress of rain as well as against leaves and birds
- Recommended face velocity for fresh air openings: 2 – 2.5 m/s max.
- As an acting element in the volume flow and pressure control
- For shutting off ducts and openings in walls
- Parallel action blades are preferably used for opening/closing
- Opposed action blades are due to their characteristics preferably used for variable operation

Variants

- WG-JZ-S: External weather louvre and multileaf damper with opposed blade action, both made of galvanised sheet steel
- WG-JZ-P: External weather louvre and multileaf damper with parallel blade action, both made of galvanised sheet steel
- WG-AL-JZ-S: External weather louvre made of aluminium and multileaf damper with opposed blade action made of galvanised sheet steel
- WG-AL-JZ-P: External weather louvre made of aluminium and multileaf damper with parallel blade action made of galvanised sheet steel

Nominal sizes

- B: 200, 400, 600, 800, 1000, 1200, 1400, 1600, 1800, 2000 mm (intermediate sizes: 201 – 1998 mm in increments of 1 mm)
- H: 180, 345, 510, 675, 840, 1005, 1170, 1335, 1500, 1665, 1830, 1995 mm (intermediate sizes: 183 – 1998 mm, in increments of 1 mm)
- Any combination of B × H

Attachments

- Quadrant stays and limit switches: Quadrant stays to adjust the damper blades (stepless adjustment) and for capturing the end positions
- Open/Close actuators: Actuators for opening and closing multileaf dampers
- Modulating actuators: Actuators for stepless blade adjustment
- Pneumatic actuators: Pneumatic actuators for opening and closing multileaf dampers
- Explosion-proof actuators: Actuators for opening and closing multileaf dampers installed in potentially explosive atmospheres

Accessories

- Installation subframe: Installation subframe for the fast and simple installation of external weather louvres

Special features
- Any intermediate sizes within the standard size range are available
- Low installation effort on site since external weather louvre and multileaf damper are factory combined and assembled
- Aerofoil parallel or opposed hollow blades
- Temperature resistant up to 100 °C
- For very large sizes, several combinations can be arranged side by side or on top of each other
- Low-maintenance, robust construction
- Low differential pressure and low noise due to aerofoil blades
- Subdivided construction or stainless steel construction upon request

Installation and commissioning
- With or without installation subframe
- Torsion-free installation

Note
- Multileaf dampers without actuators have shorter shafts; it is not possible to retrofit actuators
- Combinations with multileaf dampers that allow for retrofitting an actuator are available upon request

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

Technical data

Nominal sizes	200 × 180 to 2000 × 1995 mm
Volume flow rate range	40 – 9480 l/s at 2.5 m/s
	144 – 34128 m^3/h at 2.5 m/s
Free area	Approx. 60 % (with insect screen approx. 45 %)
Total differential pressure – exhaust air	30 Pa at 2.5 m/s
Total differential pressure – fresh air	35 Pa at 2.5 m/s

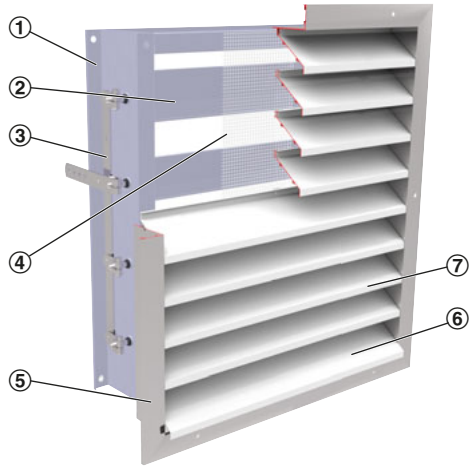
Function

Functional description

External weather louvres are externally mounted air transfer devices for the fresh air and exhaust air of air conditioning systems. They are installed in external walls and façades. Their narrowly arranged blades give good protection against the direct ingress of rain as well as against leaves and birds. Under certain unfavourable conditions, such as heavy rain, and depending on the airflow velocity it might happen that slight quantities of water enter together with the air. This is why the airflow velocity in fresh air openings should not exceed 2 – 2.5 m/s.

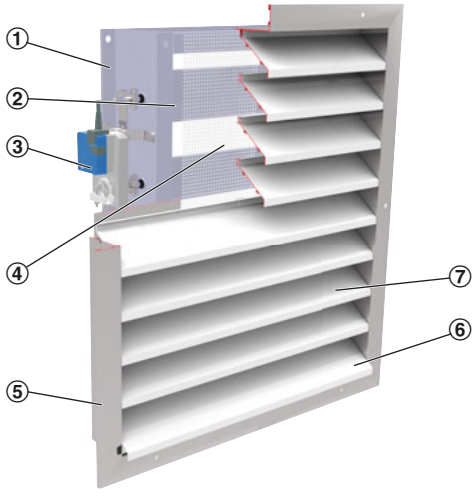
Linkage
Multileaf dampers with external linkage can have parallel action blades or opposed action blades. An external linkage transfers the synchronous rotational movement from the drive arm to the individual blades. Even very large multileaf dampers can be safely opened and closed with this type of linkage. Opposed action blades close at different speeds since the linkage includes a transverse link. This facilitates the closing process and reduces the closed blade air leakage.

Schematic illustration of WG-JZ



① JZ casing
② JZ blade
③ JZ linkage
④ Wire mesh; additional insect screen as an option
⑤ WG border
⑥ WG bottom blade
⑦ WG regular blades

Schematic illustration of WG-JZ with attachments



① JZ casing
② JZ blade
③ JZ actuator
④ Wire mesh; additional insect screen as an option
⑤ WG border
⑥ WG bottom blade
⑦ WG regular blades

Order code

WG-JZ

WG – AL – 2 – JZ – P – L / 600×510 / ER / Z04 / NC / P1 – RAL ...
1 2 3 1 4 5 6 7 8 9 10

1 Type
WG-JZ Combination of external weather louvre and multileaf damper

2 Material – WG
No entry: galvanised steel
AL Aluminium

3 Construction – WG
No entry: wire mesh
1 Insect screen, galvanised steel
2 Wire mesh, stainless steel (only WG-AL)
3 Insect screen and wire mesh made of stainless steel (only WG-AL)
U Border without fixing holes
1, 2, 3 can be combined with U

4 Function – JZ
S Opposed (standard)
P Parallel

5 Operating side – JZ
No entry: on the right
L Left

6 Nominal size [mm]
B × H

7 Installation subframe – WG
No entry: none
ER With (not for construction U)

8 Attachments – JZ
No entry: none
Z04 – Z07 Quadrant stay
Z12 – Z51 Actuators
ZF01 – ZF15 Spring return actuators
Z60 – Z77 Pneumatic actuators

9 Damper blade safety function – JZ
Only for spring return actuators or pneumatic actuators
NO Pressure off/power off to OPEN
NC Pressure off/power off to CLOSE

10 Surface – WG
No entry: standard construction
P1 Powder-coated, RAL CLASSIC colour
PS Powder-coated, NCS or DB colour
Only for WG-AL
S2 Anodised to EURAS standard, E6-C-31...35
S3 Anodised to EURAS standard, E6-C-0
Gloss level:
RAL 9010 50 %
RAL 9006 30 %
All other RAL colours 70 %

Order example

WG–AL–1–JZ–S–L/1600×1995/ER/Z12/P1–RAL 7001

Material – WG	Aluminium
Construction – WG	Insect screen, galvanised steel
Function – JZ	Opposed
Operating side – JZ	On the left
Nominal size	1600×1995 mm
Installation subframe – WG	With
Attachments – JZ	Actuator SM230A
Surface – WG	Powder-coated, RAL 7001, silver grey

2

WG-JZ-S

Description

Variant
- WG-JZ-S: External weather louvre and multileaf damper with opposed blade action, both made of galvanised sheet steel

Construction
- Wire mesh
- 1: With insect screen
- U: Border without fixing holes 1 can be combined with U

Materials and surfaces
External louvre
- P1: Powder-coated, RAL CLASSIC colour
- PS: Powder-coated, NCS or DB colour

WG-JZ-P

Variant
- WG-JZ-P: External weather louvre and multileaf damper with parallel blade action, both made of galvanised sheet steel

Construction
- Wire mesh
- 1: With insect screen
- U: Border without fixing holes 1 can be combined with U

Materials and surfaces
External louvre
- P1: Powder-coated, RAL CLASSIC colour
- PS: Powder-coated, NCS or DB colour

WG-AL-JZ-S

Variant
- WG-AL-JZ-S: External weather louvre made of aluminium and multileaf damper with opposed blade action made of galvanised sheet steel

Construction
- Wire mesh
- 1: With insect screen
- 2: With wire mesh, stainless steel
- 3: With insect screen and wire mesh, stainless steel
- U: Border without fixing holes 1, 2, 3 can be combined with U

Materials and surfaces
External louvre
- P1: Powder-coated, RAL CLASSIC colour
- PS: Powder-coated, NCS or DB colour
- S2: Anodised to EURAS standard, E6-C-31...35
- S3: Anodised to EURAS standard, E6-C-0

WG-AL-JZ-P

Variant
- WG-AL-JZ-P: External weather louvre made of aluminium and multileaf damper with parallel blade action made of galvanised sheet steel

Construction
- Wire mesh
- 1: With insect screen
- 2: With wire mesh, stainless steel
- 3: With insect screen and wire mesh, stainless steel
- U: Border without fixing holes 1, 2, 3 can be combined with U

Materials and surfaces
External louvre
- P1: Powder-coated, RAL CLASSIC colour
- PS: Powder-coated, NCS or DB colour
- S2: Anodised to EURAS standard, E6-C-31...35
- S3: Anodised to EURAS standard, E6-C-0

Dimensions

Dimensional drawing of WG-JZ

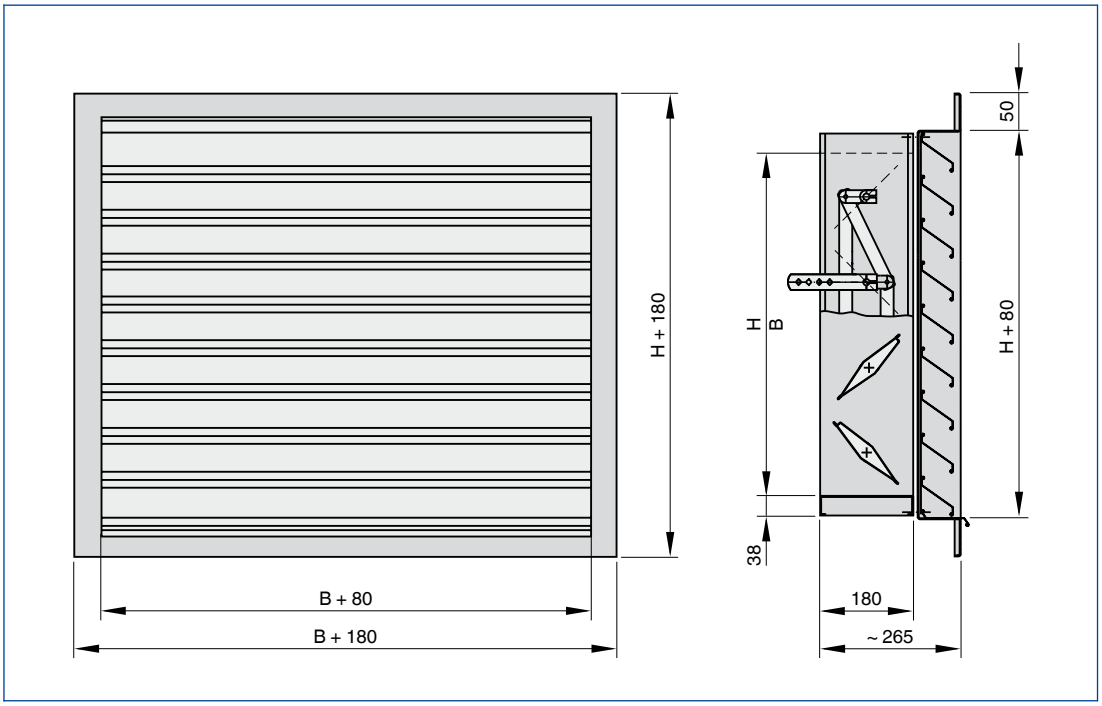


Illustration shows a multileaf damper with drive arm, operating side on the right

Weight – WG-JZ

H	B [mm]									
	200	400	600	800	1000	1200	1400	1600	1800	2000
mm	kg									
180	10	15	20	24	29	33	38	42	47	51
345	11	16	21	26	31	36	41	46	51	56
510	13	19	25	31	37	43	49	55	61	67
675	16	23	30	37	44	51	58	65	72	79
840	18	26	34	42	50	58	66	74	82	90
1005	20	28	37	45	54	62	71	79	88	96
1170	23	32	42	51	61	70	80	89	99	108
1335	26	36	47	57	68	78	89	99	110	120
1500	30	41	52	63	74	85	96	107	118	129
1665	34	46	58	70	82	94	106	118	130	142
1830	38	51	64	77	90	103	116	129	142	155
1995	40	56	72	88	104	120	136	152	168	184

2

Weight – WG-AL-JZ

H	B [mm]									
	200	400	600	800	1000	1200	1400	1600	1800	2000
mm	kg									
180	9	14	18	23	27	31	34	38	43	47
345	10	14	19	24	28	33	36	41	46	50
510	12	17	22	28	33	38	42	47	54	60
675	14	21	27	33	39	45	51	58	65	70
840	16	23	30	37	44	52	58	66	75	81
1005	17	25	32	40	48	56	63	70	79	86
1170	19	28	37	47	55	63	70	79	89	97
1335	22	32	42	53	61	70	79	88	100	107
1500	27	38	48	59	68	77	86	96	107	115
1665	31	44	54	66	76	87	96	107	119	127
1830	36	49	61	74	85	96	106	117	130	138
1995	38	55	70	86	100	114	126	140	155	166

Dimensional drawing of WG-JZ with actuator

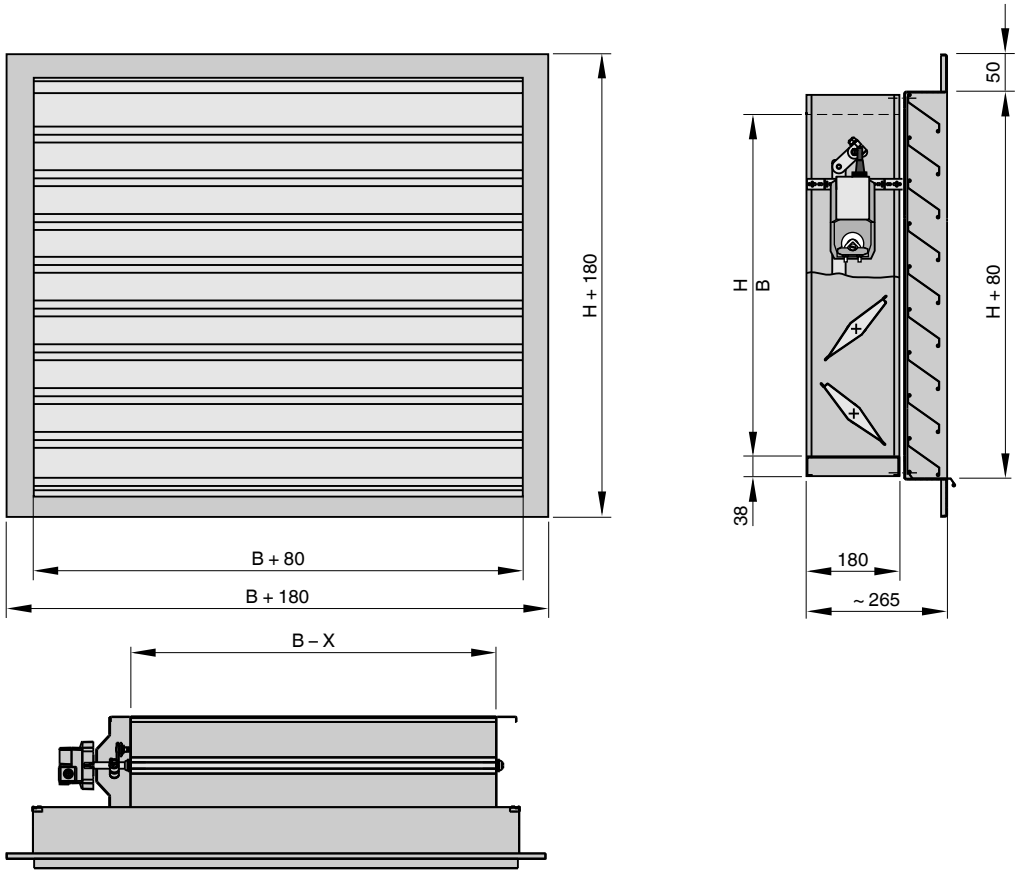


Illustration shows a multileaf damper with actuator, operating side on the right

In WG-JZ combinations with an attachment the width of the multileaf damper is by X mm shorter than the external weather louvre.

Space required for attachments

Attachments	X
	mm
Z12 – Z51	180
ZS21 – ZS22	180
ZF01 – ZF15	180
ZS99	180
Z60 – Z77	200
ZEX1, ZEX60 – ZEX77	200
ZEX3	300

2

Wall installation without installation subframe

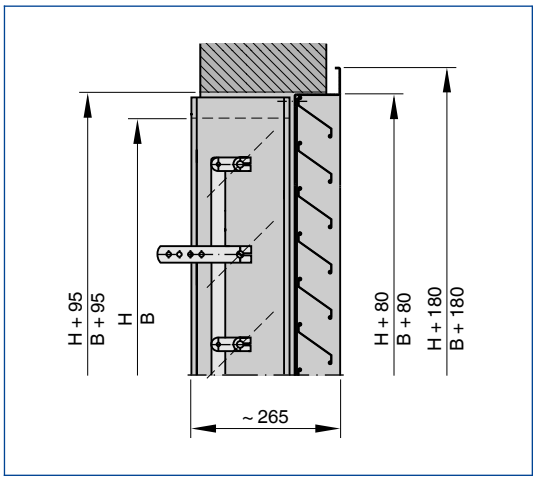


Illustration shows WG-JZ-P, operating side on the right

Standard text

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

Combinations of an external weather louvre and a multileaf damper. Rectangular external weather louvre as a protection of air conditioning systems against the direct ingress of rain, leaves and birds into fresh air and exhaust air openings. Rectangular multileaf damper for volume flow and pressure control as well as for shutting off ducts and openings in walls and ceiling slabs. Ready-to-install component which consists of a border, aerofoil rain defence blades, and a wire mesh at the rear.
Shut-off damper which consists of the casing, aerofoil blades and the blade mechanism. Suitable for duct pressures up to 1000 Pa. With flange, suitable for duct connection. The blade position is indicated externally by a notch in the blade shaft extension. Casing air leakage to EN 1751, class C.

Special features

- Any intermediate sizes within the standard size range are available
- Low installation effort on site since external weather louvre and multileaf damper are factory combined and assembled
- Aerofoil parallel or opposed hollow blades
- Temperature resistant up to 100 °C
- For very large sizes, several combinations can be arranged side by side or on top of each other
- Low-maintenance, robust construction
- Low differential pressure and low noise due to aerofoil blades
- Subdivided construction or stainless steel construction upon request

Technical data

- Nominal sizes: 200 × 180 to 2000 × 1995 mm
- Volume flow rate range: 40 – 9480 l/s or 144 – 34128 m^3/h at 2.5 m/s
- Free area of approx. 60 % (with insect screen approx. 45 %)
- Total differential pressure – exhaust air: 30 Pa at 2.5 m/s
- Total differential pressure – fresh air: 35 Pa at 2.5 m/s

Sizing data

- $\dot{V}$ _____ [m^3/h]
- Δp_t _____ [Pa]
- L_{WA} air-regenerated noise _____ [dB(A)]

2

Order options

1 Type
WG-JZ Combination of external weather louvre and multileaf damper

2 Material – WG
No entry: galvanised steel
☐ **AL** Aluminium

3 Construction – WG
No entry: wire mesh
☐ **1** Insect screen, galvanised steel
☐ **2** Wire mesh, stainless steel (only WG-AL)
☐ **3** Insect screen and wire mesh made of stainless steel (only WG-AL)
☐ **U** Border without fixing holes
1, 2, 3 can be combined with U

4 Function – JZ
☐ **S** Opposed (standard)
☐ **P** Parallel

5 Operating side – JZ
No entry: on the right
☐ **L** Left

6 Nominal size [mm]
B × H

7 Installation subframe – WG
No entry: none
☐ **ER** With (not for construction U)

8 Attachments – JZ
No entry: none
☐ **Z04 – Z07** Quadrant stay
☐ **Z12 – Z51** Actuators
☐ **ZF01 – ZF15** Spring return actuators
☐ **Z60 – Z77** Pneumatic actuators

9 Damper blade safety function – JZ
Only for spring return actuators or pneumatic actuators
☐ **NO** Pressure off/power off to OPEN
☐ **NC** Pressure off/power off to CLOSE

10 Surface – WG
No entry: standard construction
☐ **P1** Powder-coated, RAL CLASSIC colour
☐ **PS** Powder-coated, NCS or DB colour
Only for WG-AL
☐ **S2** Anodised to EURAS standard, E6-C-31...35
☐ **S3** Anodised to EURAS standard, E6-C-0
Gloss level:
RAL 9010 50 %
RAL 9006 30 %
All other RAL colours 70 %

External weather louvres
Type WG-KUL

Combination with a non-return damper

Combinations of external weather louvres and non-return dampers as a protection against the direct ingress of rain, leaves and birds, and to prevent air from flowing against the intended airflow direction.

- Maximum width of 2000 mm, maximum height of 1665 mm
- Low differential pressure due to aerofoil blades
- Low air-regenerated noise
- All aerodynamic data is measured in aerodynamics and acoustics laboratories
- Maximum differential pressure: 100 Pa
- Available in standard sizes and many intermediate sizes
- Pre-assembled combination, hence fast and easy to install

Optional equipment and accessories

- Installation subframe
- Insect screen
- Powder-coated or anodised surface

Type		Page
WG-KUL	General information	2.1 – 64
	Order code	2.1 – 66
	Dimensions and weight	2.1 – 67
	Installation details	2.1 – 69
	Specification text	2.1 – 70
	Basic information and nomenclature	2.3 – 1

2

Description

Combination of external weather louvre and non-return damper, variant WG-AL-KUL-1

For detailed information on Type WG external weather louvres see Chapter K3 – 2.1

For detailed information on Type KUL non-return dampers see Chapter K3 – 3.1

For detailed information on accessories see Chapter K3 – 2.2

Application

- Combinations of Type WG external weather louvres and Type KUL non-return dampers for protecting fresh air and exhaust air openings in air conditioning systems
- Protection against the direct ingress of rain as well as against leaves and birds
- Recommended face velocity for fresh air openings: 2 – 2.5 m/s max.
- 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

Variants

- WG-KUL: External weather louvre made of galvanised sheet steel, with non-return damper
- WG-AL-KUL: External weather louvre made of aluminium, with non-return damper
- 1: Fresh air opening
- 2: Exhaust air opening

Nominal sizes

- B: 200, 400, 600, 800, 1000, 1200, 1400, 1600 mm (intermediate sizes: 201 – 1599 mm in increments of 1 mm)
- H: 180, 345, 510, 675, 840, 1005, 1170, 1335, 1500, 1665 mm (intermediate sizes: 183 – 1664 mm, in increments of 1 mm)
- Any combination of B × H

Accessories

- Installation subframe: Installation subframe for the fast and simple installation of external weather louvres

Special features

- Any intermediate sizes within the standard size range are available
- Low installation effort on site since external weather louvre and non-return damper are factory combined and assembled
- Temperature resistant up to 80 °C
- For very large sizes, several combinations can be arranged side by side or on top of each other
- Maximum pressure of 100 Pa
- Low differential pressure due to aerofoil blades
- Non-return dampers are opened and closed by the airflow; no actuator is required

Installation and commissioning

- With or without installation subframe
- Vertical installation
- Straight upstream section required (at least B + H) on the pressure side of fans
- Ensure gradual start-up of fans to avoid sudden pressure increase

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

Technical data

Nominal sizes	200 × 180 to 1600 × 1665 mm
Volume flow rate range	40 – 6260 l/s at 2.5 m/s
	144 – 22536 m^3/h at 2.5 m/s
Free area	Approx. 60 % (with insect screen approx. 45 %)
Total differential pressure – exhaust air	55 Pa at 2.5 m/s
Total differential pressure – fresh air	60 Pa at 2.5 m/s

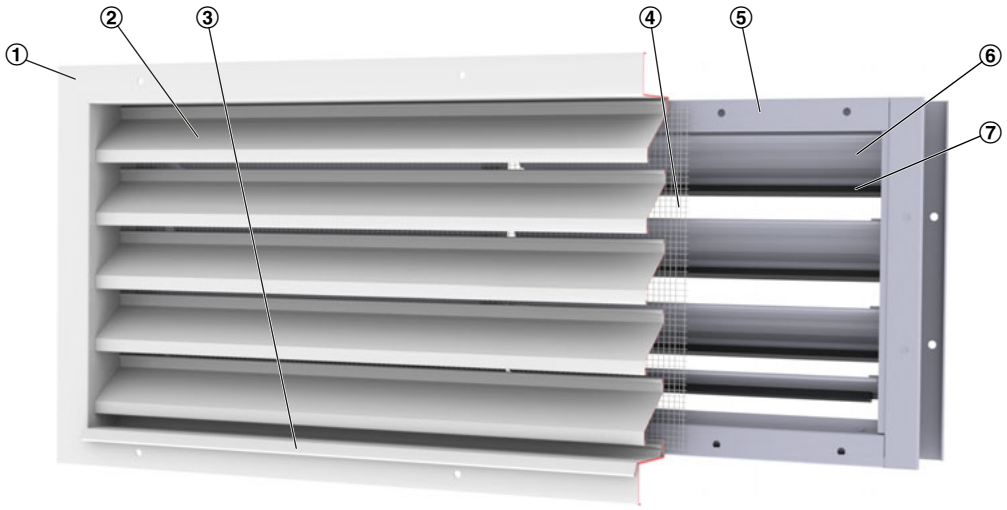
Function

Functional description

External weather louvres are externally mounted air transfer devices for the fresh air and exhaust air of air conditioning systems. They are installed in external walls and façades. Their narrowly arranged blades give good protection against the direct ingress of rain as well as against leaves and birds.
Under certain unfavourable conditions, such as heavy rain, and depending on the airflow velocity it might happen that slight quantities of water enter together with the air.
This is why the airflow velocity in fresh air openings should not exceed 2 – 2.5 m/s.

Non-return dampers close automatically.
When the system is in operation, the blades open when air flows.
When the system is shut down, the blades close due to their weight and safely prevent air from flowing against the intended airflow direction.

Schematic illustration of WG-KUL



① WG border
② WG regular blades
③ WG bottom blade
④ WG wire mesh
⑤ KUL casing
⑥ KUL blade
⑦ KUL blade tip seal

2

Order code

WG-KUL

WG – AL – 2 – KUL – 1 / 600×510 / ER / P1 – RAL ...
1 2 3 1 4 5 6 7

1 Type
WG-KUL Combination of external weather louvre and non-return damper

2 Material – WG
No entry: galvanised steel
AL Aluminium

3 Construction – WG
No entry: wire mesh
1 Insect screen, galvanised steel
2 Wire mesh, stainless steel (only WG-AL)
3 Insect screen and wire mesh made of stainless steel (only WG-AL)
U Border without fixing holes
1, 2, 3 can be combined with U

4 Airflow direction
1 Fresh air opening
2 Exhaust air opening

5 Nominal size [mm]
B × H

6 Installation subframe – WG
No entry: none
ER With (not for construction U)

7 Surface – WG
No entry: standard construction
P1 Powder-coated, RAL CLASSIC colour
PS Powder-coated, NCS or DB colour
Only for WG-AL
S2 Anodised to EURAS standard, E6-C-31...35
S3 Anodised to EURAS standard, E6-C-0
Gloss level:
RAL 9010 50 %
RAL 9006 30 %
All other RAL colours 70 %

Order example

WG–KUL–1/1600×600/ER

Material – WG	Galvanised steel
Construction – WG	Wire mesh
Direction of airflow	Fresh air opening
Nominal size	1600×600 mm
Installation subframe – WG	With
Surface – WG	Standard construction

WG-KUL

Description

Variants
- WG-KUL: External weather louvre made of galvanised sheet steel, with non-return damper
- 1: Fresh air opening
- 2: Exhaust air opening

Materials and surfaces
External louvre
- P1: Powder-coated, RAL CLASSIC colour
- PS: Powder-coated, NCS or DB colour

WG-AL-KUL

Variants
- WG-AL-KUL: External weather louvre made of aluminium, with non-return damper
- 1: Fresh air opening
- 2: Exhaust air opening

Materials and surfaces
External louvre
- P1: Powder-coated, RAL CLASSIC colour
- PS: Powder-coated, NCS or DB colour
- S2: Anodised to EURAS standard, E6-C-31...35
- S3: Anodised to EURAS standard, E6-C-0

Dimensions

Dimensional drawing of WG-KUL-1, WG-AL-KUL-1

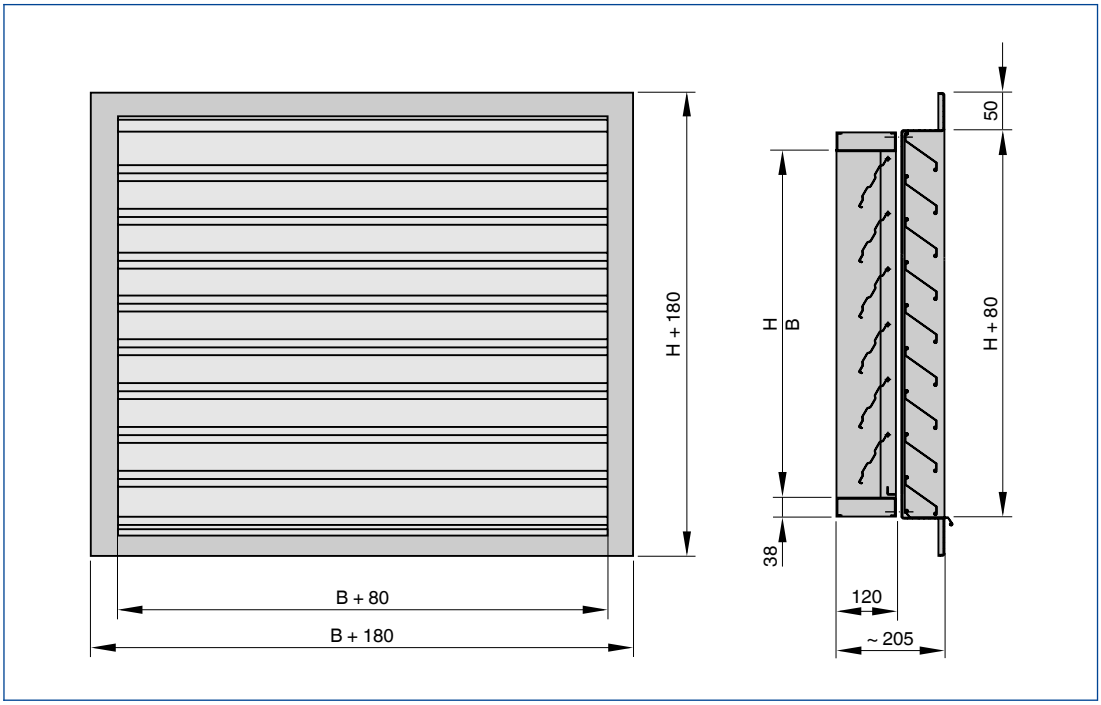


Illustration shows WG-KUL-1

2

Dimensional drawing of WG-KUL-2, WG-AL-KUL-2

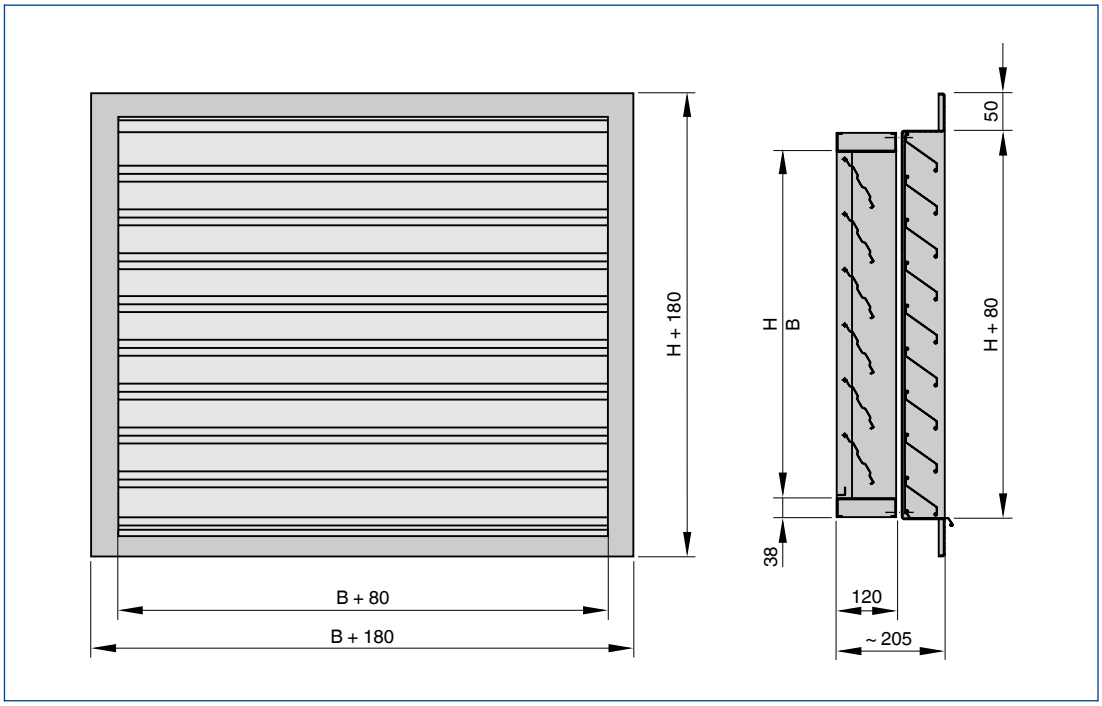


Illustration shows WG-KUL-2

Weight – WG-KUL

H	B [mm]							
	200	400	600	800	1000	1200	1400	1600
mm	kg							
180	9	10	14	18	22	26	30	34
345	12	14	18	22	26	30	34	38
510	15	18	22	27	31	36	41	46
675	17	22	27	33	38	44	49	54
840	18	24	29	35	40	46	52	58
1005	21	27	33	40	46	53	59	65
1170	23	31	38	45	52	59	66	72
1335	25	33	41	49	56	64	71	79
1500	27	35	43	51	59	67	75	83
1665	30	38	46	54	62	70	78	86

Weight– WG-AL-KUL

H	B [mm]							
	200	400	600	800	1000	1200	1400	1600
mm	kg							
180	8	9	13	17	20	24	27	30
345	11	12	16	20	23	27	29	33
510	14	16	19	24	27	31	34	38
675	15	20	24	29	33	38	42	47
840	16	21	25	30	34	40	44	50
1005	18	24	28	35	40	47	51	56
1170	20	27	33	41	46	52	56	62
1335	21	29	37	45	50	56	61	68
1500	24	32	39	47	53	59	65	72
1665	27	36	42	50	56	63	68	75

Wall installation without installation subframe

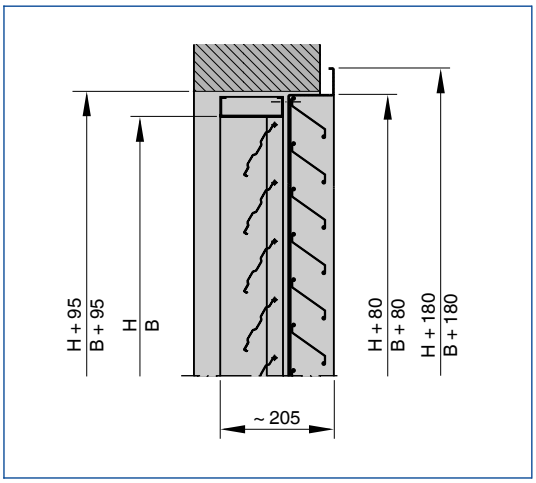


Illustration shows WG-KUL-1

2

Standard text

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

Combinations of an external weather louvre and a non-return damper. Rectangular external weather louvre as a protection of air conditioning systems against the direct ingress of rain, leaves and birds into fresh air and exhaust air openings. Rectangular non-return damper to prevent air from flowing against the intended airflow direction. Ready-to-install component which consists of a border, aerofoil rain defence blades, and a wire mesh at the rear. Non-return damper which consists of a casing, blades with low-friction bearings, and travel stop and sealing parts.

Special features

- Any intermediate sizes within the standard size range are available
- Low installation effort on site since external weather louvre and non-return damper are factory combined and assembled
- Temperature resistant up to 80 °C
- For very large sizes, several combinations can be arranged side by side or on top of each other
- Maximum pressure of 100 Pa
- Low differential pressure due to aerofoil blades
- Non-return dampers are opened and closed by the airflow; no actuator is required

Technical data

- Nominal sizes: 200 × 180 to 1600 × 1665 mm
- Volume flow rate range: 40 – 6260 l/s or 144 – 22536 m^3/h at 2.5 m/s
- Free area of approx. 60 % (with insect screen approx. 45 %)
- Total differential pressure – exhaust air: 55 Pa at 2.5 m/s
- Total differential pressure – fresh air: 60 Pa at 2.5 m/s

Sizing data

- $\dot{V}$ _____ [m^3/h]
- Δp_t _____ [Pa]
- L_{WA} air-regenerated noise _____ [dB(A)]

Order options

1 Type

WG-KUL Combination of external weather louvre and non-return damper

2 Material – WG

No entry: galvanised steel

☐ **AL** Aluminium

3 Construction – WG

No entry: wire mesh

☐ **1** Insect screen, galvanised steel

☐ **2** Wire mesh, stainless steel (only WG-AL)

☐ **3** Insect screen and wire mesh made of stainless steel (only WG-AL)

☐ **U** Border without fixing holes
1, 2, 3 can be combined with U

4 Airflow direction

☐ **1** Fresh air opening

☐ **2** Exhaust air opening

5 Nominal size [mm]

B × H

6 Installation subframe – WG

No entry: none

☐ **ER** With (not for construction U)

7 Surface – WG

No entry: standard construction

☐ **P1** Powder-coated, RAL CLASSIC colour

☐ **PS** Powder-coated, NCS or DB colour

Only for WG-AL

☐ **S2** Anodised to EURAS standard, E6-C-31...35

☐ **S3** Anodised to EURAS standard, E6-C-0

Gloss level:
RAL 9010 50 %
RAL 9006 30 %
All other RAL colours 70 %

External weather louvres
Type NL

With sound reduction characteristics

Acoustic louvres as a protection of air conditioning systems against the direct ingress of rain, leaves and birds into fresh air and exhaust air openings

- Maximum width of 1800 mm, maximum height of 2250 mm
- Low differential pressure due to aerofoil blades
- Low air-regenerated noise
- All aerodynamic data is measured in aerodynamics and acoustics laboratories
- Absorption material faced with glass fibre fabric and retained by perforated sheet metal
- Double bank of louvre blades for demanding acoustic requirements
- Non-active section, without acoustic function, for a uniform appearance
- Multi-section constructions for large dimensions

Optional equipment and accessories

- Powder-coated or anodised

Description

Acoustic louvre, variant NL-A

Application
- Acoustic louvres of Type NL for the fresh air and exhaust air openings of air conditioning systems
- Protection against the direct ingress of rain as well as against leaves and birds
- Recommended face velocity for fresh air openings: 2 – 2.5 m/s max.
- Weather and noise protection with a compact-depth unit

Variants
- NL: Acoustic louvre
- NL-H: Double bank for demanding acoustic requirements
- NL-D: Non-active section for a uniform appearance

Construction
- S: Galvanised sheet steel
- A: Aluminium

Nominal sizes
- B: 300, 450, 600, 750, 900, 1050, 1200, 1350, 1500, 1650, 1800 mm
- Width subdivided: 1950, 2100, 2250, 2400, 2550, 2700, 2850, 3000, 3150, 3300, 3450, 3600 mm
- H: 300, 450, 600, 750, 900, 1050, 1200, 1350, 1500, 1650, 1800, 1950, 2100, 2250 mm
- Height subdivided: 2400, 2550, 2700, 2850, 3000, 3150, 3300, 3450, 3600, 3750, 3900, 4050, 4200, 4350, 4500 mm
- Any combination of B × H
- Other dimensions upon request

Special features
- Two construction depths for normal and demanding acoustic requirements
- Aerofoil blades
- Absorbtion material retained by perforated sheet metal

Installation and commissioning
- Installation either without installation subframe or with timber subframe, fixing angles, or steel frame made of angle sections (to be provided by others)
- Install subdivided constructions either horizontally next to each other or vertically on top of each other
- Seal perimeter gap with mastic
- Fix cover strips

Standards and guidelines
- Insertion loss and sound power level of air-regenerated noise tested to ISO 7235

Maintenance
- Maintenance-free as construction and materials are not subject to wear

Technical data

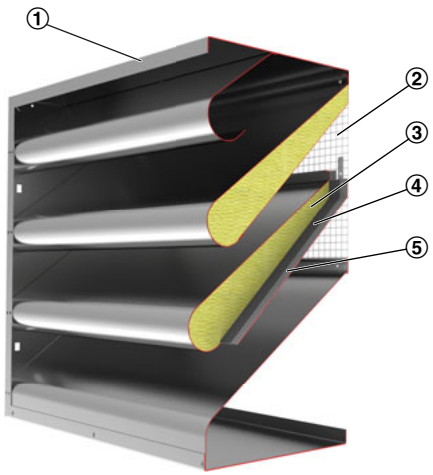
Nominal sizes	300 × 450 to 1800 × 2250 mm
Width subdivided	Up to 3600 mm
Height subdivided	Up to 4500 mm
Volume flow rate range (undivided construction)	185 – 6770 l/s at 1.75 m/s
	666 – 24372 m^3/h at 1.75 m/s
Total differential pressure – exhaust air (single louvre)	30 – 100 Pa at 1.75 m/s (depending on height)
Total differential pressure – fresh air (single louvre)	25 – 75 Pa at 1.75 m/s (depending on height)

Function

Functional description

External weather louvres are externally mounted air transfer devices for the fresh air and exhaust air of air conditioning systems. They are installed in external walls and façades. Their narrowly arranged blades give good protection against the direct ingress of rain as well as against leaves and birds. Under certain unfavourable conditions, such as heavy rain, and depending on the airflow velocity it might happen that slight quantities of water enter together with the air. This is why the airflow velocity in fresh air openings should not exceed 2 – 2.5 m/s.

Schematic illustration of NL



① Casing
② Bird mesh
③ Absorption material
④ Glass fibre fabric
⑤ Perforated sheet metal

Order code

NL

NL – H – A / 1800×2250 / P1 – RAL ...

1 2 3 4 5

1 Type
NL Acoustic louvre

2 Acoustic performance
No entry: standard requirement, single louvre
H High, double bank
D Non-active section

3 Material
S Galvanised steel
A Raw aluminium

4 Nominal size [mm]
B × H

5 Surface
No entry: standard construction
P1 Powder-coated, RAL CLASSIC colour
Gloss level:
RAL 9010 50 %
RAL 9006 30 %
All other RAL colours 70 %

Order example

NL–H–S/1050×750

Acoustic performance	High
Material	Galvanised steel
Nominal size	1050×750 mm
Surface – WG	Standard construction

Insertion loss and sound reduction index

Insertion loss and sound reduction index measured with sound transmission from inside to outside.

Insertion loss

Variant	Centre frequency fm [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e							
	dB							
NL	3	4	7	8	13	15	13	15
NL-H	3	6	9	16	21	24	24	30

Sound reduction index

Variant	Centre frequency fm [Hz]							
	63	125	250	500	1000	2000	4000	
	R							R_w
	dB							
NL	3	4	7	8	13	15	13	12
NL-H	–	7	9	16	25	27	–	21

Quick sizing tables provide a good overview of the volume flow rates with an airflow velocity of 2.5 m/s. Values for intermediate widths can be interpolated. Precise intermediate values and volume flow rates for other airflow velocities can be calculated with our Easy Product Finder design programme.

Quick sizing – volume flow rate at 2.5 m/s max.

Height	Width [mm]											
	300		450		600		750		900		1050	
mm	l/s	m³/h	l/s	m³/h	l/s	m³/h	l/s	m³/h	l/s	m³/h	l/s	m³/h
450	120	432	180	648	240	864	300	1080	360	1296	420	1512
600	240	864	360	1296	480	1728	600	2160	720	2592	840	3024
750	360	1296	540	1944	720	2592	900	3240	1080	3888	1260	4536
900	480	1728	720	2592	960	3456	1200	4320	1440	5184	1680	6048
1050	600	2160	900	3240	1200	4320	1500	5400	1800	6480	2100	7560
1200	720	2592	1080	3888	1440	5184	1800	6480	2160	7776	2520	9072
1350	840	3024	1260	4536	1680	6048	2100	7560	2520	9072	2940	10584
1500	960	3456	1440	5184	1920	6912	2400	8640	2880	10368	3360	12096
1650	1080	3888	1620	5832	2160	7776	2700	9720	3240	11664	3780	13608
1800	1200	4320	1800	6480	2400	8640	3000	10800	3600	12960	4200	15120
1950	1320	4752	1980	7128	2640	9504	3300	11880	3960	14256	4620	16632
2100	1440	5184	2160	7776	2880	10368	3600	12960	4320	15552	5040	18144
2250	1560	5616	2340	8424	3120	11232	3900	14040	4680	16848	5460	19656

Quick sizing – volume flow rate at 2.5 m/s max.

Height	Width [mm]									
	1200		1350		1500		1650		1800	
mm	l/s	m³/h	l/s	m³/h	l/s	m³/h	l/s	m³/h	l/s	m³/h
450	480	1728	540	1944	600	2160	660	2376	720	2592
600	960	3456	1080	3888	1200	4320	1320	4752	1440	5184
750	1440	5184	1620	5832	1800	6480	1980	7128	2160	7776
900	1920	6912	2160	7776	2400	8640	2640	9504	2880	10368
1050	2400	8640	2700	9720	3000	10800	3300	11880	3600	12960
1200	2880	10368	3240	11664	3600	12960	3960	14256	4320	15552
1350	3360	12096	3780	13608	4200	15120	4620	16632	5040	18144
1500	3840	13824	4320	15552	4800	17280	5280	19008	5760	20736
1650	4320	15552	4860	17496	5400	19440	5940	21384	6480	23328
1800	4800	17280	5400	19440	6000	21600	6600	23760	7200	25920
1950	5280	19008	5940	21384	6600	23760	7260	26136	7920	28512
2100	5760	20736	6480	23328	7200	25920	7920	28512	8640	31104
2250	6240	22464	7020	25272	7800	28080	8580	30888	9360	33696

The sound power levels L_{WA} apply to external weather louvres with a flow cross section of 1 m^2.

Quick sizing – differential pressure and sound power level for NL

v	v_t	Installation type							
		A		B		C		D	
		Δp_t	L_{WA}	Δp_t	L_{WA}	Δp_t	L_{WA}	Δp_t	L_{WA}
m/s		Pa	dB(A)	Pa	dB(A)	Pa	dB(A)	Pa	dB(A)
1.5	0.2 – 0.4	2	<15	2	<15	2	<15	1	<15
2	0.2 – 0.6	4	<15	4	<15	4	<15	4	<15
4	0.4 – 1.2	18	32	14	28	18	29	14	27
6	0.7 – 1.7	40	44	30	40	40	41	28	39
8	0.9 – 2.3	70	52	50	48	65	49	50	47
10	1.1 – 2.9	110	58	80	54	105	55	75	53

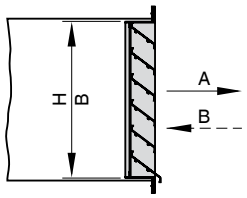
Flow cross section to calculate the airflow velocity:
$A = B \times (H - 0.3) / 3$

Unit of measure for B and H: m

Quick sizing – differential pressure and sound power level for NL-H

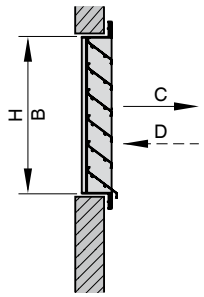
v	v_t	Installation type							
		A		B		C		D	
		Δp_t	L_{WA}	Δp_t	L_{WA}	Δp_t	L_{WA}	Δp_t	L_{WA}
m/s		Pa	dB(A)	Pa	dB(A)	Pa	dB(A)	Pa	dB(A)
1	0.1 – 0.3	2	<15	2	<15	2	<15	2	<15
2	0.2 – 0.6	8	26	6	19	6	18	6	18
3	0.3 – 0.9	16	37	12	30	12	29	12	29
4	0.4 – 1.2	26	45	20	38	20	37	20	37
5	0.6 – 1.5	40	52	30	45	30	44	30	44
7	0.8 – 2.0	80	61	65	54	60	53	60	53

Duct installation (installation types A and B)



A Exhaust air
B Fresh air

Plenum installation (installation types C and D)



C Exhaust air
D Fresh air

Description

Variant
– NL: Acoustic louvre

Parts and characteristics
– Casing
– Sound absorbing blades
– Bird mesh

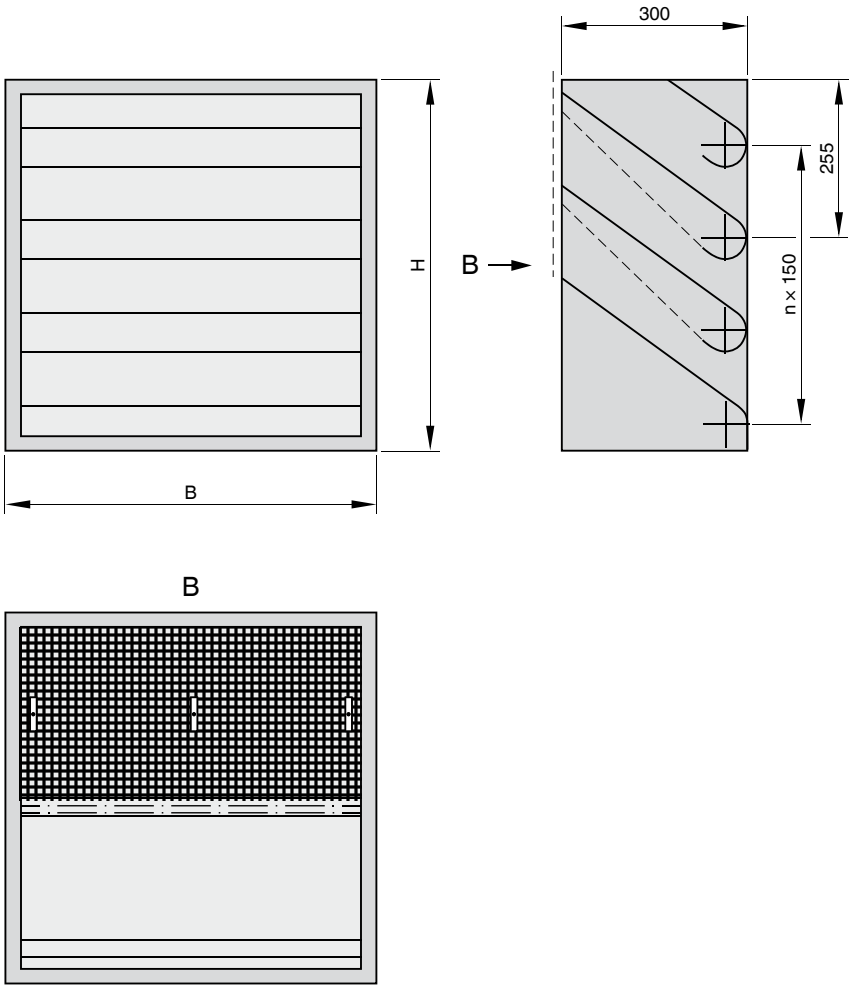
Construction features
– Aerofoil blades, 150 mm blade pitch
– Casing with fixing holes for wall installation
– Absorption material faced with glass fibre fabric and retained by perforated sheet metal
– Bird mesh 12 × 12 × 1 mm

Materials and surfaces
– Casing and blades made of galvanised sheet steel (S) or aluminium (A)
– Perforated sheet metal to retain absorption material is made of galvanised sheet steel
– Bird mesh made of galvanised steel
– Absorption material is mineral wool

Mineral wool
– To EN 13501, fire rating class A1, non-combustible
– RAL quality mark RAL-GZ 388
– Biosoluble and hence hygienically safe according to the German TRGS 905 (Technical Rules for Hazardous Substances) and EU directive 97/69/EG
– Faced with glass fibre fabric as protection against erosion through airflow velocities of up to 20 m/s
– Inert to fungal and bacterial growth

Dimensions Undivided construction

Dimensional drawing of NL



2

Weight – WG-JZ

H	B [mm]										
	300	450	600	750	900	1050	1200	1350	1500	1650	1800
mm	kg										
450	7	10	13	16	19	23	26	29	32	36	39
600	9	13	17	22	26	30	35	39	43	48	52
750	11	16	22	27	32	38	43	49	54	59	65
900	13	19	26	32	39	45	52	58	65	71	78
1050	15	23	30	38	45	53	61	68	76	83	91
1200	17	26	35	43	52	61	69	78	86	95	104
1350	19	29	39	49	58	68	78	88	97	107	117
1500	22	32	43	54	65	76	86	97	108	119	130
1650	24	36	48	59	71	83	95	107	119	131	143
1800	26	39	52	65	78	91	104	117	130	143	156
1950	28	42	56	70	84	98	112	126	140	154	169
2100	30	45	61	76	91	106	121	136	151	166	181
2250	32	49	65	81	97	113	130	146	162	178	194

Weight – NL-A

H	B [mm]										
	300	450	600	750	900	1050	1200	1350	1500	1650	1800
mm	kg										
450	5	7	10	12	14	17	19	21	24	26	28
600	6	10	13	16	19	22	25	28	32	35	38
750	8	12	16	20	24	28	32	35	39	43	47
900	10	14	19	24	28	33	38	43	47	52	57
1050	11	17	22	28	33	39	44	50	55	61	66
1200	13	19	25	32	38	44	50	57	63	69	76
1350	14	21	28	35	43	50	57	64	71	78	85
1500	16	24	32	39	47	55	63	71	79	87	95
1650	17	26	35	43	52	61	69	78	87	95	104
1800	19	28	38	47	57	66	76	85	95	104	113
1950	21	31	41	51	61	72	82	92	102	113	123
2100	22	33	44	55	66	77	88	99	110	121	132
2250	24	35	47	59	71	83	95	106	118	130	142

Description

Variant
– NL-H: High performance acoustic louvre (double bank)

Parts and characteristics
– Casing
– Sound absorbing blades
– Bird mesh

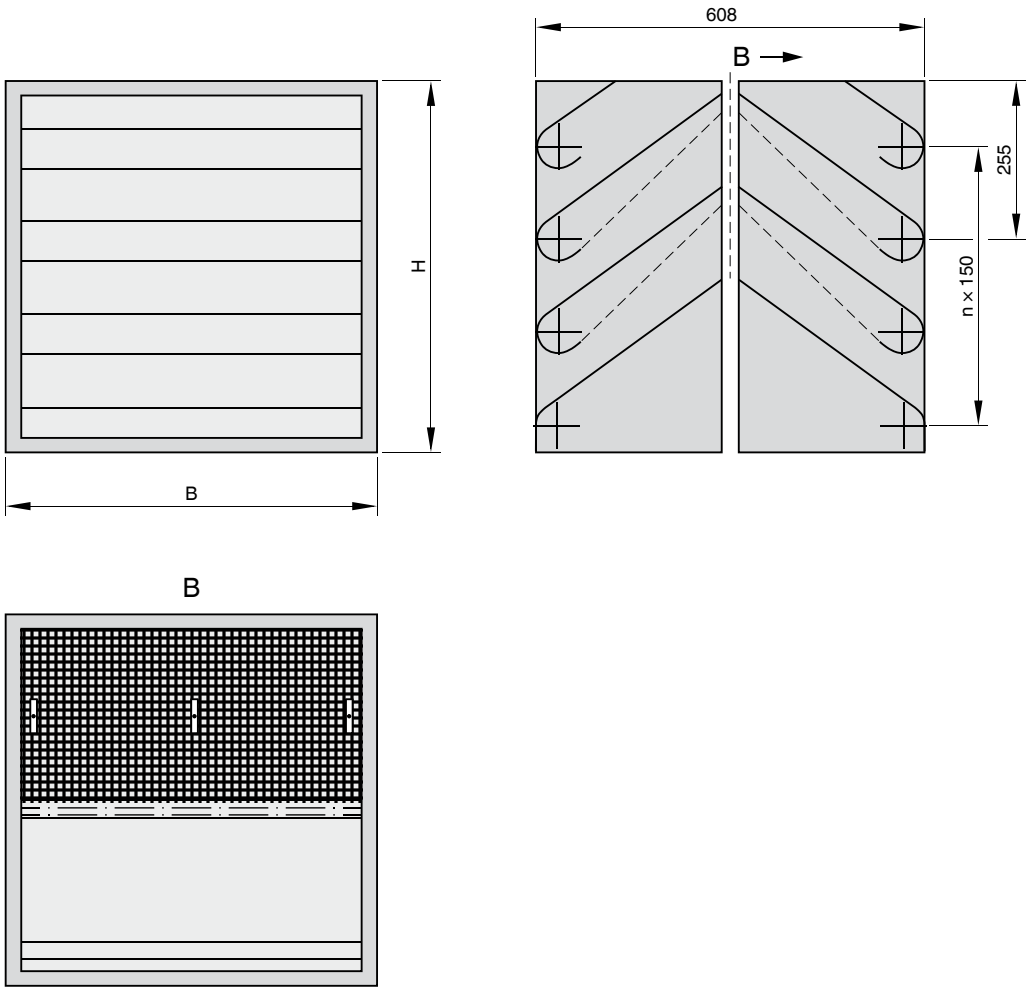
Construction features
– Aerofoil blades, 150 mm blade pitch
– Casing with fixing holes for wall installation
– Absorption material faced with glass fibre fabric and retained by perforated sheet metal
– Bird mesh 12 × 12 × 1 mm

Materials and surfaces
– Casing and blades made of galvanised sheet steel (S) or aluminium (A)
– Perforated sheet metal to retain absorption material is made of galvanised sheet steel
– Bird mesh made of galvanised steel
– Absorption material is mineral wool

Mineral wool
– To EN 13501, fire rating class A1, non-combustible
– RAL quality mark RAL-GZ 388
– Biosoluble and hence hygienically safe according to the German TRGS 905 (Technical Rules for Hazardous Substances) and EU directive 97/69/EG
– Faced with glass fibre fabric as protection against erosion through airflow velocities of up to 20 m/s
– Inert to fungal and bacterial growth

Dimensions Undivided construction

Dimensional drawing of NL-H



2

Weight – NL-H-S

H	B [mm]										
	300	450	600	750	900	1050	1200	1350	1500	1650	1800
mm	kg										
450	13	19	26	32	39	45	52	58	65	71	78
600	17	26	35	43	52	61	69	78	86	95	104
750	22	32	43	54	65	76	86	97	108	119	130
900	26	39	52	65	78	91	104	117	130	143	156
1050	30	45	61	76	91	106	121	136	151	166	181
1200	35	52	69	86	104	121	138	156	173	190	207
1350	39	58	78	97	117	136	156	175	194	214	233
1500	43	65	86	108	130	151	173	194	216	238	259
1650	48	71	95	119	143	166	190	214	238	261	285
1800	52	78	104	130	156	181	207	233	259	285	311
1950	56	84	112	140	169	197	225	253	281	309	337
2100	61	91	121	151	181	212	242	272	302	333	363
2250	65	97	130	162	194	227	259	292	324	356	389

Weight – NL-H-A

H	B [mm]										
	300	450	600	750	900	1050	1200	1350	1500	1650	1800
mm	kg										
450	10	14	19	24	28	33	38	43	47	52	57
600	13	19	25	32	38	44	50	57	63	69	76
750	16	24	32	39	47	55	63	71	79	87	95
900	19	28	38	47	57	66	76	85	95	104	113
1050	22	33	44	55	66	77	88	99	110	121	132
1200	25	38	50	63	76	88	101	113	126	139	151
1350	28	43	57	71	85	99	113	128	142	156	170
1500	32	47	63	79	95	110	126	142	158	173	189
1650	35	52	69	87	104	121	139	156	173	191	208
1800	38	57	76	95	113	132	151	170	189	208	227
1950	41	61	82	102	123	143	164	184	205	225	246
2100	44	66	88	110	132	154	176	199	221	243	265
2250	47	71	95	118	142	165	189	213	236	260	284

Description

Variant
– NL-D: Non-active section for a uniform appearance

Parts and characteristics
– Casing
– Blades
– Rear blanking plate

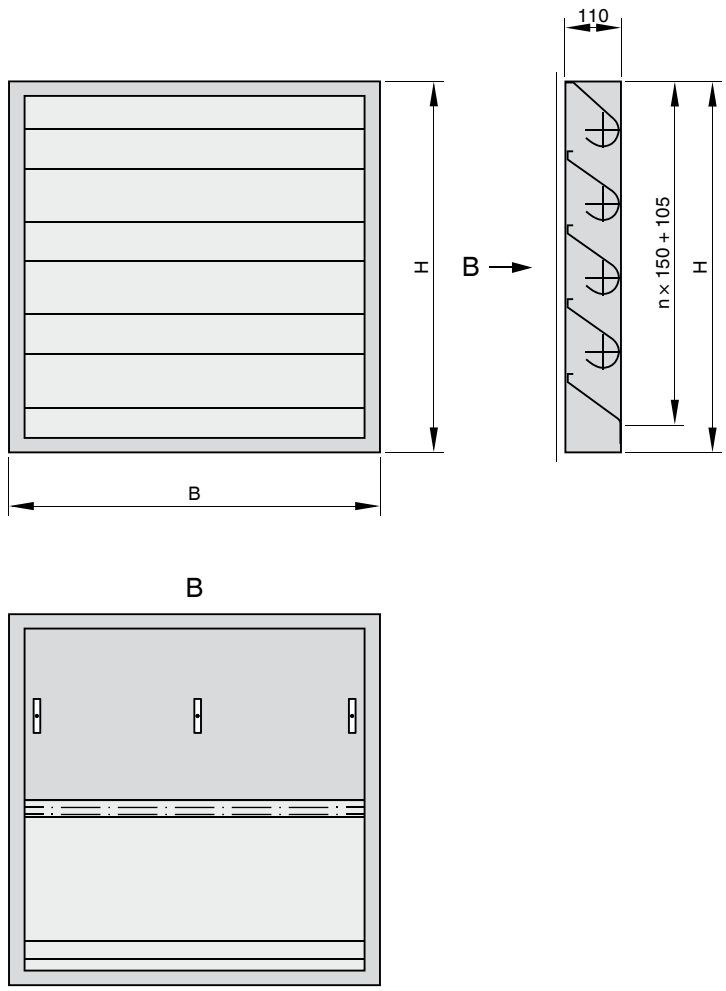
Construction features
– Aerofoil blades, 150 mm blade pitch
– Casing with fixing holes for wall installation

Materials and surfaces
– Casing and blades made of galvanised sheet steel (S) or aluminium (A)

2

Dimensions
Undivided construction

Dimensional drawing of NL-D



2

Weight – NL-D-S

H	B [mm]										
	300	450	600	750	900	1050	1200	1350	1500	1650	1800
mm	kg										
450	3	5	7	8	10	11	13	15	16	18	19
600	4	7	9	11	13	15	17	19	22	24	26
750	5	8	11	14	16	19	22	24	27	30	32
900	7	10	13	16	19	23	26	29	32	36	39
1050	8	11	15	19	23	27	30	34	38	42	45
1200	9	13	17	22	26	30	35	39	43	48	52
1350	10	15	19	24	29	34	39	44	49	54	58
1500	11	16	22	27	32	38	43	49	54	59	65
1650	12	18	24	30	36	42	48	54	59	65	71
1800	13	19	26	32	39	45	52	58	65	71	78
1950	14	21	28	35	42	49	56	63	70	77	84
2100	15	23	30	38	45	53	61	68	76	83	91
2250	16	24	32	41	49	57	65	73	81	89	97

Weight – NL-D-A

H	B [mm]										
	300	450	600	750	900	1050	1200	1350	1500	1650	1800
mm	kg										
450	2	4	5	6	7	8	10	11	12	13	14
600	3	5	6	8	10	11	13	14	16	17	19
750	4	6	8	10	12	14	16	18	20	22	24
900	5	7	10	12	14	17	19	21	24	26	28
1050	6	8	11	14	17	19	22	25	28	30	33
1200	6	10	13	16	19	22	25	28	32	35	38
1350	7	11	14	18	21	25	28	32	35	39	43
1500	8	12	16	20	24	28	32	35	39	43	47
1650	9	13	17	22	26	30	35	39	43	48	52
1800	10	14	19	24	28	33	38	43	47	52	57
1950	10	15	21	26	31	36	41	46	51	56	61
2100	11	17	22	28	33	39	44	50	55	61	66
2250	12	18	24	30	35	41	47	53	59	65	71

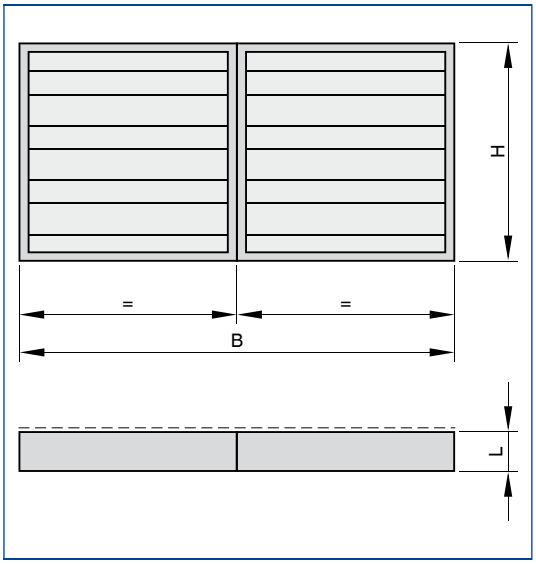
Description

Application
- For widths exceeding 1800 mm
- For heights exceeding 2250 mm

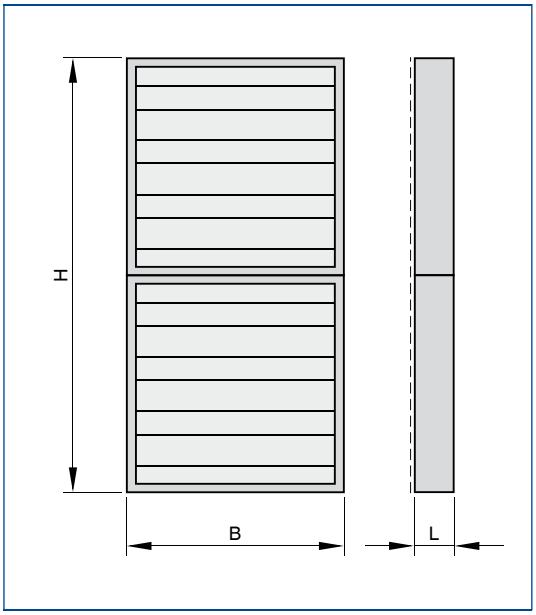
Installation and commissioning
- Assembly of multi-section louvres to be performed by others

Dimensions

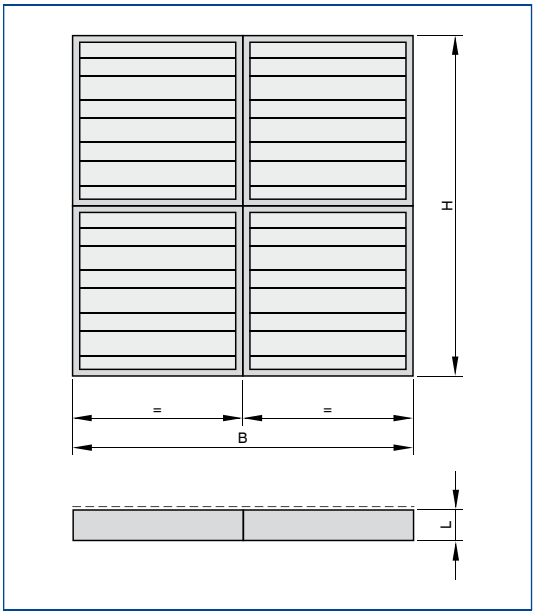
Dimensional drawing of NL, width subdivided



Dimensional drawing of NL, height subdivided



Dimensional drawing of NL, width and height subdivided



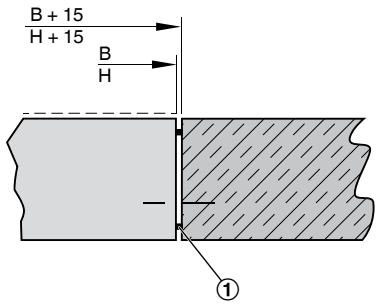
2

Description

Installation details
– Casing with slotted holes of 10 × 15 mm along the side panels

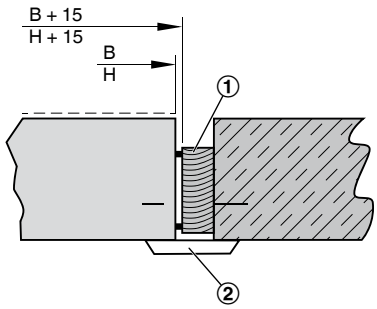
Installation dimensions

Installation into a wall



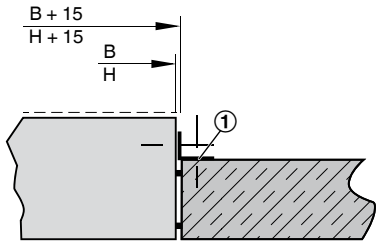
① Mastic, to be provided by others

Wall installation with a timber frame



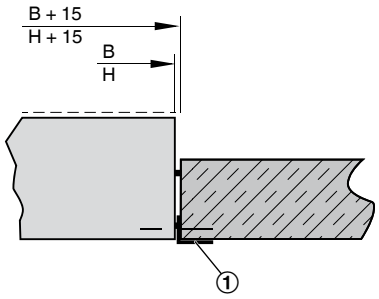
① Timber frame, to be provided by others
② Optional cover strip

Wall installation with mounting brackets



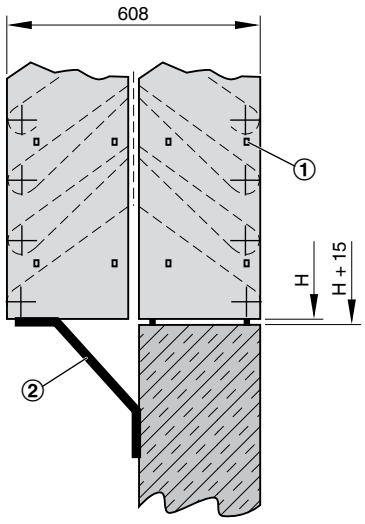
① Mounting brackets, to be provided by others

Wall installation with a steel frame made of angle sections



① Steel frame made of angle sections, to be provided by others

Wall installation of NL-H



① 10 mm wide slotted holes, 300 mm pitch (from centre line to centre line)
② Support for mesh at the rear, to be provided by others

Standard text

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

Rectangular acoustic louvres as a protection of air conditioning systems against the direct ingress of rain, leaves and birds into fresh air and exhaust air openings. Ready-to-install component which consists of a border, aerofoil rain defence blades, and a wire mesh at the rear. Insertion loss measured according to ISO 7235.

Special features

- Two construction depths for normal and demanding acoustic requirements
- Aerofoil blades
- Absorbtion material retained by perforated sheet metal

Construction

- S: Galvanised sheet steel
- A: Aluminium

Sizing data

- $\dot{V}$ _____ [m^3/h]
- Δp_t _____ [Pa]
- L_{WA} air-regenerated noise _____ [dB(A)]

Order options

1 Type

NL Acoustic louvre

2 Acoustic performance

No entry: standard requirement, single louvre

☐ **H** High, double bank

☐ **D** Non-active section

3 Material

☐ **S** Galvanised steel

☐ **A** Raw aluminium

4 Nominal size [mm]

B × H

5 Surface

No entry: standard construction

☐ **P1** Powder-coated, RAL CLASSIC colour

Gloss level:
RAL 9010 50 %
RAL 9006 30 %
All other RAL colours 70 %

Notes

Accessories
Installation subframes

For the fast and simple installation of external weather louvres

Installation subframes for the fast and precise installation of external weather louvres. Installation subframes with fixing tabs are mortared into the wall opening, then the louvres are fastened to the subframes

- Angle sections made of galvanised steel or stainless steel
- Fixing tabs with nuts to screw on the external weather louvre
- Subframe for external weather louvres of Type WGK, shipped as individual frame sections for push fit assembly

Optional equipment and accessories

- Multi-section constructions, with width or height subdivided

2

Description

Installation subframe

Application
- For the installation of louvres in walls
- Simplified installation
- The installation subframe allows for the fast, simple and precise installation of louvres

Parts and characteristics
- Installation subframe consisting of angle sections
- Hexagon head screws
- Washers
- Fixing tabs with integral nuts

Materials and surfaces
WG, WG-AL, WG-JZ, WG-AL-JZ, WG-KUL, WG-AL-KUL
- Installation subframe made of galvanised steel (angle section 35 × 35 × 3 mm)
- Welded fixing tabs with integral nuts, screws and washers made of galvanised steel

WG-A2
- Installation subframe made of stainless steel, material no. 1.4301
- Welded fixing tabs with integral nuts, screws and washers made of stainless steel, material no. 1.4301

WGK
- Installation subframe made of formed galvanised sheet steel, with fixing tabs
- Screws and washers made of galvanised steel

Installation and commissioning
Before mortaring in the installation subframe
- Bend and spread the fixing tabs

After mortaring in the installation subframe
- Align the louvre with the installation subframe and fasten it

... / **ER** / ...

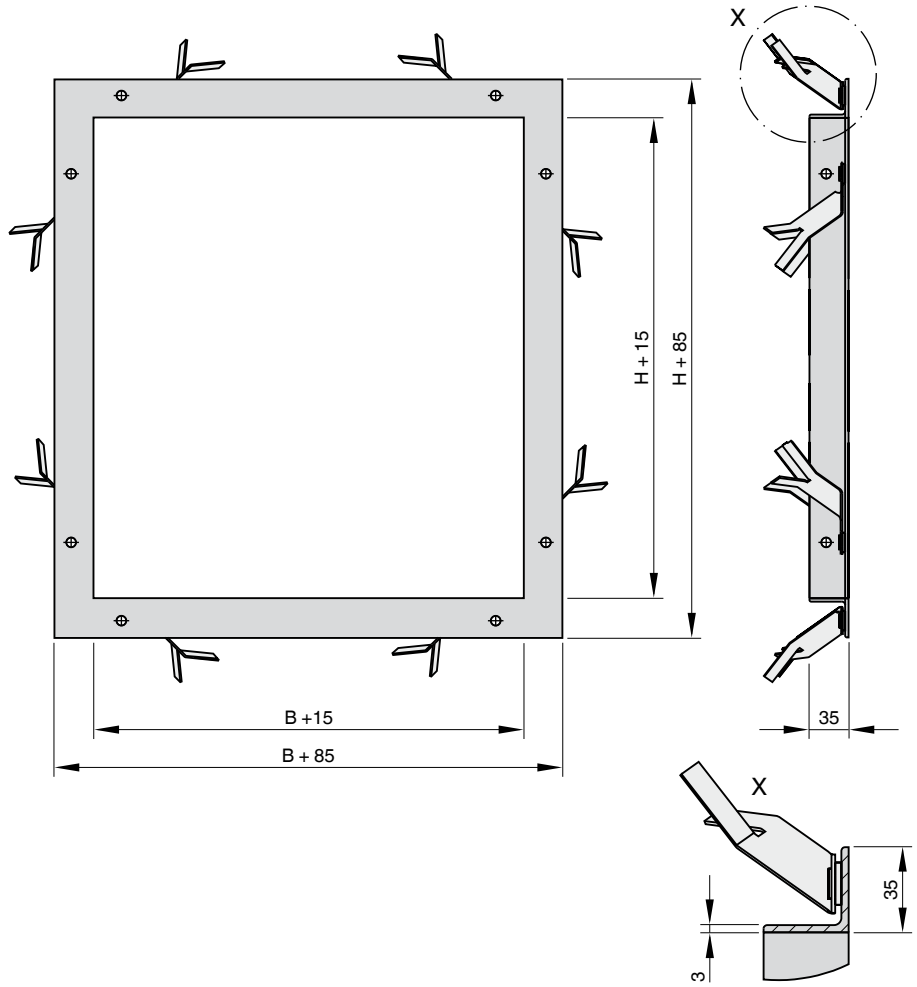
Order code detail

Any accessories are defined with the order code of the louvre.

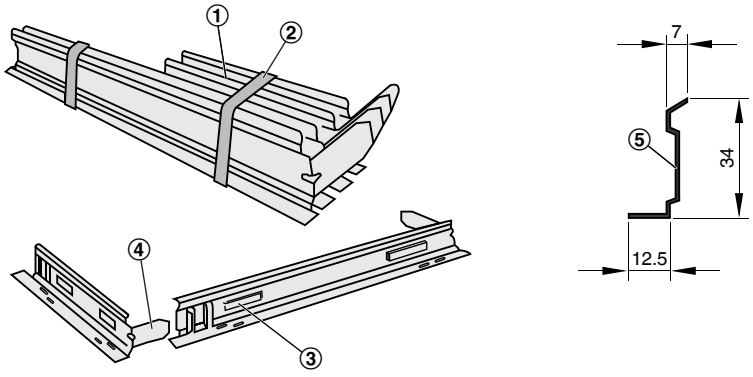
Installation subframe for external weather louvres

Description	External weather louvre (Type)
Galvanised steel	WG, WG-AL, WG-JZ, WG-AL-JZ, WG-KUL, WG-AL-KUL
Galvanised steel, width subdivided	WG, WG-AL
Galvanised steel, height subdivided	WG, WG-AL
Galvanised steel, horizontal runs	WG-B-AL
Stainless steel	WG-A2
Stainless steel, width subdivided	WG-A2
Stainless steel, height subdivided	WG-A2
Galvanised steel	WGK

Installation subframe, made of steel, for external weather louvres



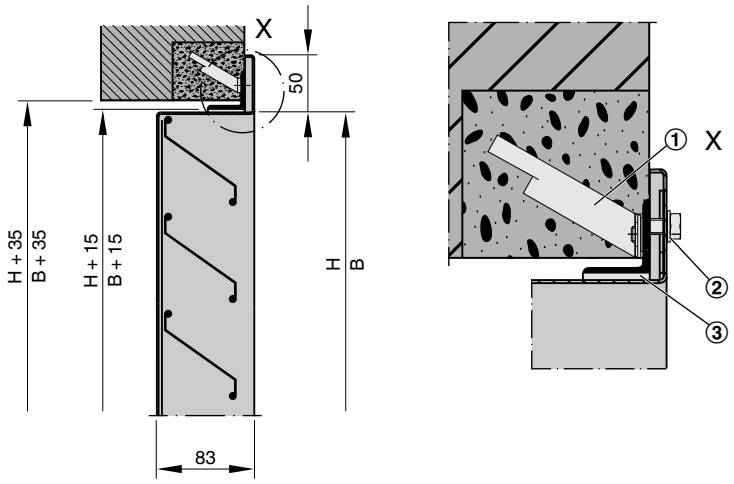
Installation subframe for ventilation grilles



① Frame sections
② Colour-coded tape
③ Fixing tab
④ Push fit connection
⑤ Frame profile

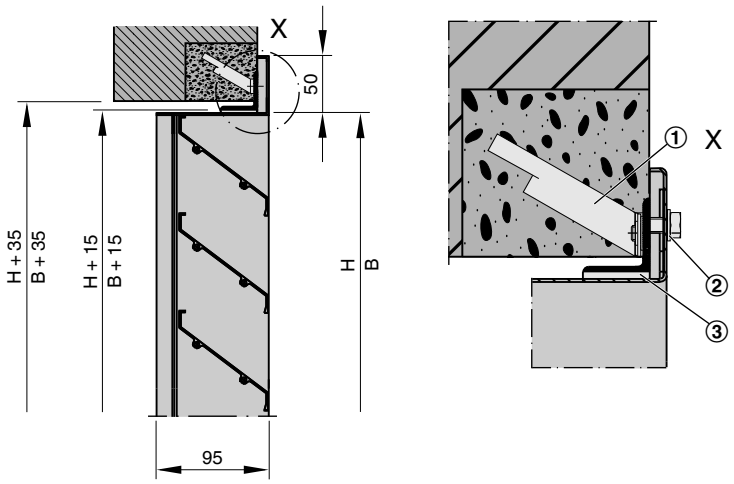
2

Installation dimensions – WG, WG-A2



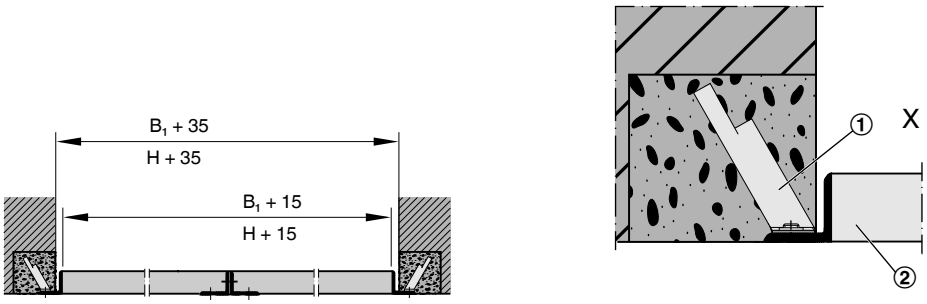
① Fixing tab
② Hexagon head screw with washer
③ Installation subframe

Installation dimensions – WG-AL



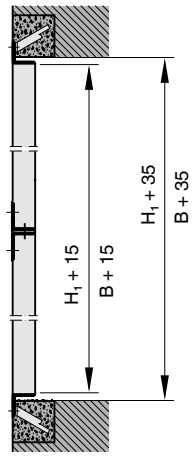
① Fixing tab
② Hexagon head screw with washer
③ Installation subframe

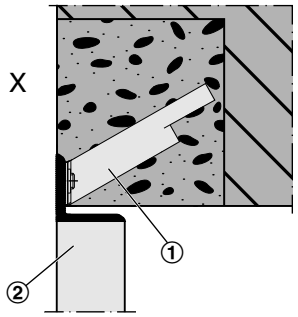
Installation subframe, width subdivided



① Fixing tab
② Installation subframe

Installation subframe, height subdivided

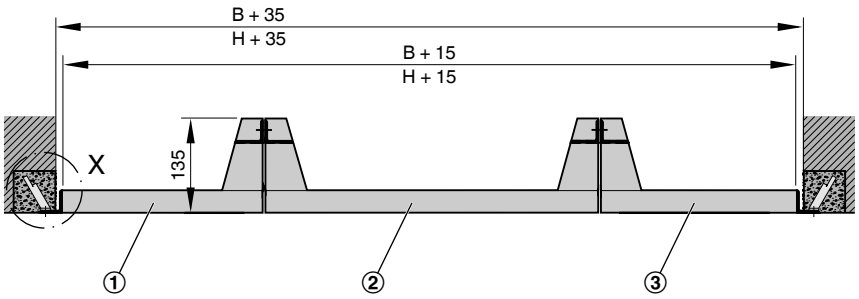


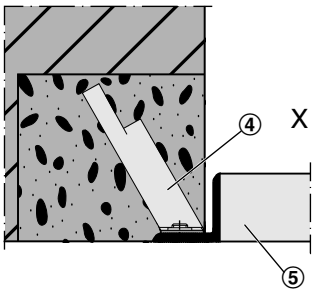


① Fixing tab

② Installation subframe

Horizontal runs of WG-B-AL



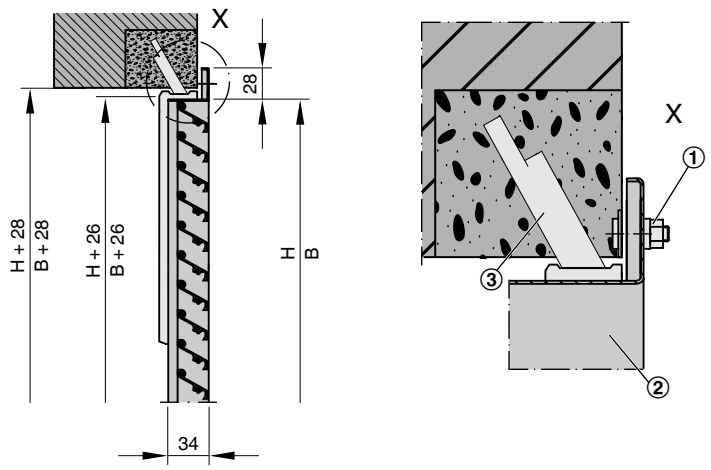


① for left end section
② for middle section
③ for right end section

④ Fixing tab
⑤ Installation subframe

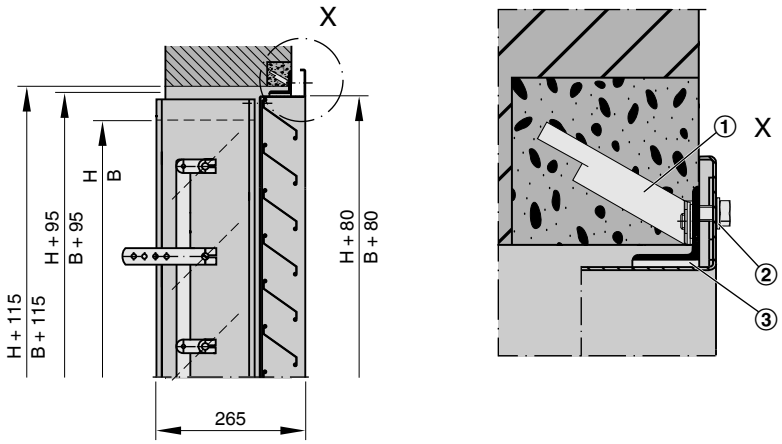
2

Installation dimensions – WGK



① Threaded stud
② Installation subframe
③ Fixing tab

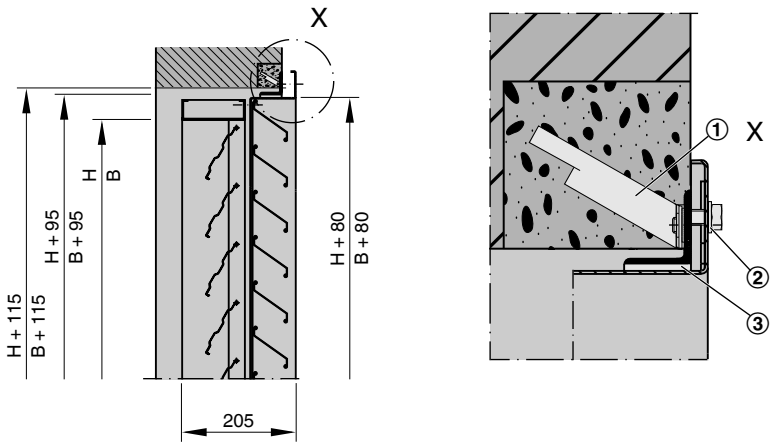
Installation dimensions – WG-JZ-P, WG-JZ-S, WG-AL-JZ-P, WG-AL-JZ-S



① Fixing tab
② Installation subframe
③ Hexagon head screw with washer

Illustration shows WG-J-P

Installation dimensions – WG-KUL-1, WG-KUL-2, WG-AL-KUL-1, WG-AL-KUL-2



① Fixing tab
② Installation subframe
③ Hexagon head screw with washer

Illustration shows WG-KUL-1

Notes

External weather louvres

Basic information and nomenclature

- Product selection
- Principal dimensions
- Nomenclature
- Sizing and sizing example

Product selection

	Type					
	WG	WGK	WGF	WG-JZ	WG-KUL	NL
Casing and blades						
Galvanised sheet steel	●		●	●	●	●
Stainless steel	●					
Aluminium	●	●	●	●	●	●
Blade pitch	82.5 mm	25 mm	125 mm	82.5 mm	82.5 mm	150 mm
Casing depth	83 / 95 mm	34 mm		265 mm	205 mm	300 / 600 mm
Border						
Without holes	●	●		●	●	
Flange holes	●	●		●	●	
Wire mesh						
Galvanised steel	●	●	●	●	●	
Stainless steel	●		●	●	●	
Insect screen						
Galvanised sheet steel	●	●		●	●	
Stainless steel	●	●		●	●	
Combinations						
Multileaf damper				●		
Non-return damper					●	
Sound reduction						●
Nominal sizes						
Width	200 – 2400 mm	97 – 1997 mm	200 – 2000 mm		200 – 1600 mm	300 – 1800 mm
Increment	1 mm	1 mm	1 mm	1 mm	1 mm	150 mm
Width subdivided	– 4900 mm		>			– 3600 mm
Continuous horizontal runs	●					
Height	165 – 2310 mm	97 – 1997 mm	250 – 2500 mm	180 – 1995 mm	180 – 1665 mm	300 – 2250 mm
Increment	1 mm	1 mm	125 mm	1 mm	1 mm	150 mm
Height subdivided	– 4720 mm		>			– 4500 mm
Free area						
External weather louvre only	60 %	60 %	50 %			11 – 29 %
With insect screen	45 %	45 %				
Accessories						
Installation subframe	●	●		●	●	
Surfaces						
Powder-coated	●	●	●	●	●	●
Anodised	●	●	●	●	●	
●	Possible					
	Not possible					

Principal dimensions

B [mm]
Duct width

B_1 [mm]
Duct width for subdivided louvres

H [mm]
Duct height

H_1 [mm]
Duct height for subdivided louvres

n [ ]
Number of flange screw holes

m [kg]
Weight

Nomenclature

L_{WA} [dB(A)]
A-weighted sound pressure level of air-regenerated noise for the louvre

A [m^2]
Upstream cross section

v [m/s]
Airflow velocity based on the upstream cross section

$\dot{V}$ [m^3/h] and [l/s]
Volume flow rate

Δp_t [Pa]
Total differential pressure

All sound power levels are based on 1 pW.

Sizing with the help of this catalogue

This catalogue provides convenient quick sizing tables for louvres.
The tables give volume flow rates for all nominal sizes at an airflow velocity of 2.5 m/s.
Sound power levels of the air-regenerated noise and differential pressures are given for various airflow velocities.

Sizing example

Given data
$\dot{V}$ =1400 l/s (5040 m^3/h)
v = 2.5 m/s
Fresh air, installation type B
Maximum width: 800 mm

Quick sizing
WG/800 × 825 mm

Calculation procedure
$A = 0.80 \times (0.825 - 0.085) = 0.592\ m^2$
$v = \dot{V}/A = 1400/0.592\ (/1000) = 2.4$ m/s
$\Delta p_{st} = 35$ Pa
$L_{WA} = 50$ dB(A)

3 Mechanically self-powered dampers

The non-return dampers for fresh air and exhaust air openings of air conditioning systems prevent unwanted airflows against the intended airflow direction when the system is shut down. Pressure relief dampers for the protection of air handling units, ductwork, and rooms from the exceeding of permissible differential pressures.

Non-return dampers
Type UL

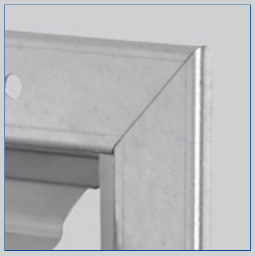
For the fresh air and exhaust air openings of air conditioning systems

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

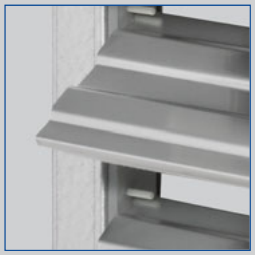
- Maximum pressure of 100 Pa
- Angle section border to be installed in wall openings
- Available in standard sizes and many intermediate sizes
- Non-return damper with formed aluminium blades for normal requirements; blades are fitted with seals for sound attenuation

Optional equipment and accessories

- Installation subframe
- Powder coating (RAL, NCS or DB)



Border



Bearings

3

Description

Non-return damper, variant UL-1

For detailed information on accessories see Chapter K3 – 3.3

Application
- Non-return dampers of Type UL for the fresh air and exhaust air openings of 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 total differential pressure: 100 Pa
- Non-return dampers in exhaust air openings give also protection against the direct ingress of rain

Variants
- UL-1: Non-return damper for exhaust air openings
- UL-2: Non-return damper for fresh air openings

Nominal sizes
- B: 200, 400, 600, 800, 1000, 1200, 1400, 1600 mm (intermediate sizes: 201 – 1599 mm in increments of 1 mm)
- H: 215, 315, 415, 515, 615, 715, 815, 1015, 1215, 1415, 1615 mm (intermediate sizes: 216 – 1614 mm, in increments of 1 mm)
- Any combination of B × H

Accessories
- Installation subframe: Installation subframe for the fast and simple installation of mechanically self-powered dampers

Special features
- Any intermediate sizes within the standard size range are available
- Temperature resistant up to 80 °C
- Maximum pressure of 100 Pa
- Non-return dampers are opened and closed by the airflow; no actuator is required
- Non-return damper with formed aluminium blades for normal requirements; blades are fitted with seals for sound attenuation

Parts and characteristics
- Border
- Blades with low-friction bearings
- Blade restrictors
- Blade tip seals
- Bottom travel stop (angle section)
- Visible mullion from B = 1000 mm

Construction features
- Border, material thickness 1.75 mm
- Blades, material thickness 1.0 mm
- Additional side bar with fixing holes to accommodate the blade shafts and integral blade restrictors (pins)
- Blade restrictors prevent the blades from opening beyond a certain angle
- Border fixing holes

Materials and surfaces
- Border and travel stop (angle section) made of galvanised sheet steel
- Blades made of formed aluminium
- Mullion (from B = 1000 mm) made of galvanised sheet steel
- Blade shafts made of brass
- Side bar made of PVC plastic
- Blade tip seals made of foamed polyester
- Blade restrictors made of plastic
- P1: Powder-coated, RAL CLASSIC colour
- PS: Powder-coated, NCS or DB colour

Installation and commissioning
- Horizontal airflow: Vertical installation
- Vertical airflow: allowed for exhaust air openings; horizontal installation
- Straight upstream section required (at least B + H) on the pressure side of fans
- Ensure gradual start-up of fans to avoid sudden pressure increase

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

Technical data

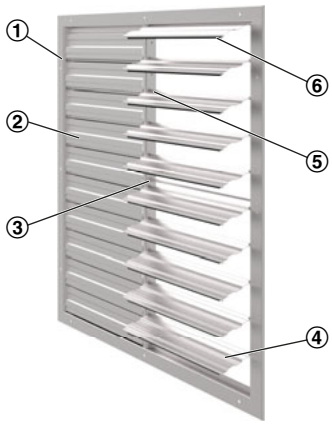
Nominal sizes	200 × 215 to 1600 × 1615 mm
Volume flow rate range	110 – 6460 l/s at 2.5 m/s
	396 – 23256 m^3/h at 2.5 m/s
Total differential pressure – exhaust air	25 Pa at 2.5 m/s
Total differential pressure – fresh air	

Function

Functional description

Non-return dampers open and close automatically. When the system is in operation, the blades open when air flows. When the system is shut down, the blades close due to their weight and safely prevent air from flowing against the intended airflow direction. Non-return dampers in exhaust air openings give also protection against the direct ingress of rain.

Schematic illustration of UL-1



① Border
② Blades (closed)
③ Mullion from B = 1000 mm
④ Blades (open)
⑤ Blade restrictor
⑥ Seal

Schematic illustration of UL-2

① Border
② Blades (closed)
③ Mullion from B = 1000 mm
④ Blades (open)
⑤ Blade restrictor
⑥ Seal

Order code

UL

UL – 1 / 800×515 / ER / P1 – RAL ...

1 2 3 4 5

1 Type

UL Non-return damper

2 Airflow direction

1 Exhaust air opening
2 Fresh air opening

3 Nominal size [mm]

B × H

4 Installation subframe

No entry: none
ER With

5 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

UL–2/600×1615/ER

Direction of airflow	Fresh air opening
Nominal size	600 × 1615 mm
Installation subframe	With
Surface	Standard construction

Quick sizing tables provide a good overview of the volume flow rates with an airflow velocity of 2.5 m/s. Intermediate values can be interpolated. Precise intermediate values and volume flow rates for other airflow velocities can be calculated with our Easy Product Finder design programme.

Quick sizing – volume flow rate at 2.5 m/s

Height	Width [mm]									
	200		300		400		500		600	
mm	l/s	m³/h	l/s	m³/h	l/s	m³/h	l/s	m³/h	l/s	m³/h
215	110	396	160	576	215	774	270	972	325	1170
315	160	576	235	846	315	1134	395	1422	475	1710
415	210	756	310	1116	415	1494	520	1872	625	2250
515	260	936	385	1386	515	1854	645	2322	775	2790
615	310	1116	460	1656	615	2214	770	2772	925	3330
715	360	1296	535	1926	715	2574	895	3222	1070	3852
815	410	1476	610	2196	815	2934	1020	3672	1220	4392
1015	510	1836	760	2736	1020	3672	1270	4572	1520	5472
1215	610	2196	910	3276	1220	4392	1520	5472	1820	6552
1415	710	2556	1060	3816	1420	5112	1770	6372	2120	7632
1615	810	2916	1210	4356	1620	5832	2020	7272	2420	8712

3

Quick sizing – volume flow rate at 2.5 m/s

Height	Width [mm]									
	800		1000		1200		1400		1600	
mm	l/s	m³/h	l/s	m³/h	l/s	m³/h	l/s	m³/h	l/s	m³/h
215	430	1548	540	1944	645	2322	755	2718	860	3096
315	630	2268	790	2844	945	3402	1100	3960	1260	4536
415	830	2988	1040	3744	1250	4500	1450	5220	1660	5976
515	1030	3708	1290	4644	1550	5580	1800	6480	2060	7416
615	1230	4428	1540	5544	1850	6660	2150	7740	2460	8856
715	1430	5148	1790	6444	2150	7740	2500	9000	2860	10296
815	1630	5868	2040	7344	2450	8820	2850	10260	3260	11736
1015	2030	7308	2540	9144	3050	10980	3550	12780	4060	14616
1215	2430	8748	3040	10944	3650	13140	4250	15300	4860	17496
1415	2830	10188	3540	12744	4250	15300	4950	17820	5660	20376
1615	3230	11628	4040	14544	4850	17460	5650	20340	6460	23256

Quick sizing – differential pressure

v	Exhaust air	Fresh air
	Δp_t	
m/s	Pa	
0.5	10	12
1	16	18
2	20	24
3	25	30
4	30	40
5	40	55
6	45	65

Description

Dimensions

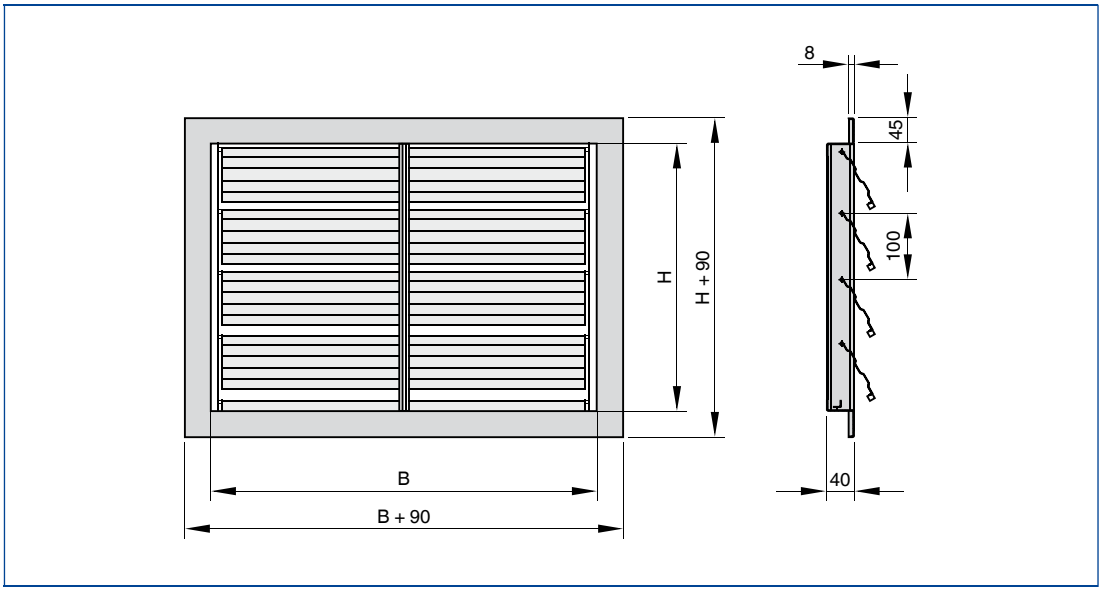
Flow cross section to calculate the airflow velocity: A = B × H

Unit of measure for B and H: m

Variant

– Non-return damper for exhaust air openings

Dimensional drawing of UL-1



Weight

H	B [mm]									
	200	300	400	500	600	800	1000	1200	1400	1600
mm	kg									
215	3	3	3	4	4	5	6	7	8	9
315	3	3	4	4	5	6	7	8	9	10
415	3	4	4	5	5	6	7	8	9	10
515	4	4	5	5	6	7	8	9	10	11
615	4	5	5	6	7	8	9	10	11	12
715	5	5	6	7	8	9	10	11	12	13
815	5	6	7	8	9	10	11	12	13	14
1015	7	8	9	10	11	12	13	14	15	16
1215	9	10	11	12	13	14	15	16	17	18
1415	11	12	13	14	15	16	17	18	19	20
1615	13	14	15	16	17	18	19	20	21	22

Description

Dimensions

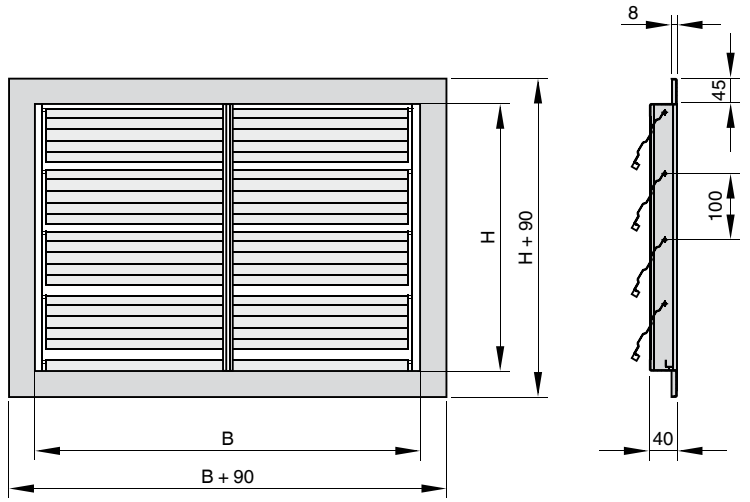
Flow cross section
to calculate the airflow
velocity: A = B × H

Unit of measure
for B and H: m

Variant

– Non-return damper for fresh air openings

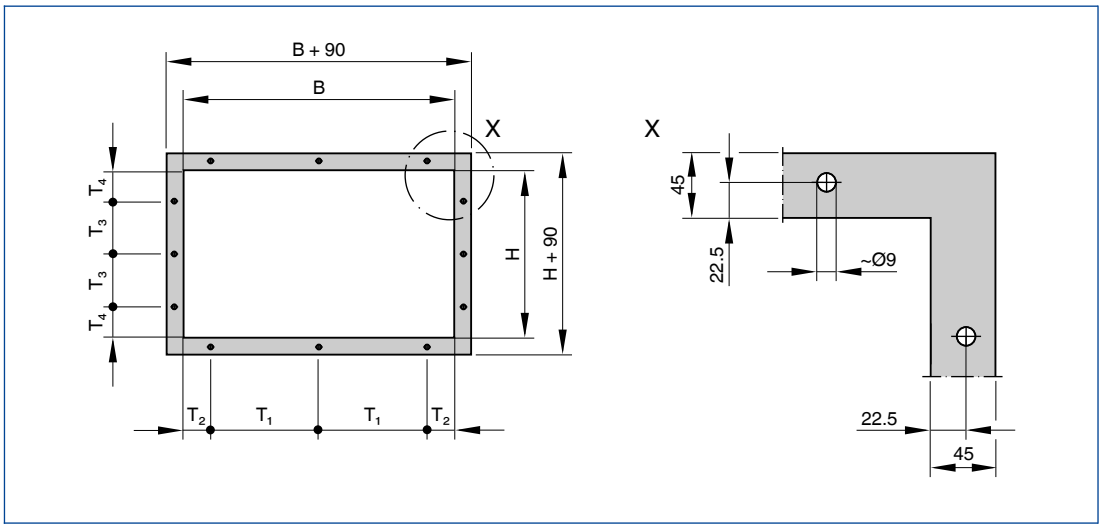
Dimensional drawing of UL-2



Weight

H	B [mm]									
	200	300	400	500	600	800	1000	1200	1400	1600
mm	kg									
215	3	3	3	4	4	5	6	7	8	9
315	3	3	4	4	5	6	7	8	9	10
415	3	4	4	5	5	6	7	8	9	10
515	4	4	5	5	6	7	8	9	10	11
615	4	5	5	6	7	8	9	10	11	12
715	5	5	6	7	8	9	10	11	12	13
815	5	6	7	8	9	10	11	12	13	14
1015	7	8	9	10	11	12	13	14	15	16
1215	9	10	11	12	13	14	15	16	17	18
1415	11	12	13	14	15	16	17	18	19	20
1615	13	14	15	16	17	18	19	20	21	22

Border fixing holes – UL



3

Standard sizes

Dimensions

Width B	No. of holes n	T_1	T_2
mm		mm	
200	1	–	100
300	1	–	150
400	2	303	48.5
500	2	403	48.5
600	3	252	48.5
800	3	352	48.5
1000	3	452	48.5
1200	3	552	48.5
1400	3	652	48.5
1600	4	501	48.5

Dimensions

Height H	No. of holes n	T_3	T_4
mm		mm	
215	1	–	107.5
315	1	–	157.5
415	1	–	207.5
515	1	–	257.5
615	2	320	48.5
715	2	420	48.5
815	3	260	48.5
1015	3	360	48.5
1215	3	460	48.5
1415	3	560	48.5
1615	4	440	48.5

Intermediate sizes

Dimensions

Width B	No. of holes n	T_1	T_2
mm		mm	
201 – 396	1	–	B/2
397 – 596	2	B – 97	48.5
597 – 1596	3	(B – 97)/2	48.5
1597 – 1599	4	(B – 97)/3	48.5

Dimensions

Height H	No. of holes n	T_3	T_4
mm		mm	
216 – 614	1	–	H/2
616 – 814	2	H – 295	48.5
816 – 1614	3	(H – 295)/2	48.5

Installation dimensions

Wall installation without installation subframe

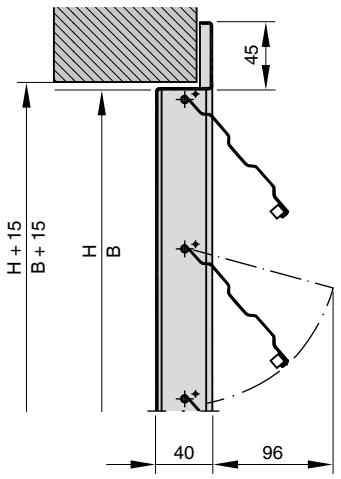
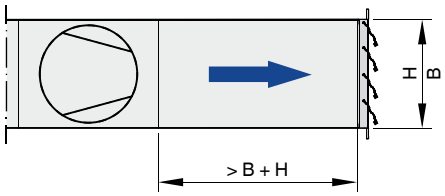


Illustration shows variant UL-1

Upstream conditions

Installation on the pressure side of a fan



The airflow downstream of a fan is characterised by strong turbulence, and the velocity profile is not uniform. As a consequence, the blades of the non-return dampers are not uniformly subject to the airflow, and this may result in individual blades becoming subject to forces that might lead to mechanical damage.
Safe operation requires a straight upstream section of at least B + H.

Standard text

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

Rectangular non-return dampers to prevent air from flowing against the intended airflow direction through fresh air and exhaust air openings of air conditioning systems. Ready-to-install component which consists of a border, blades with low-friction bearings, and travel stop and sealing parts.

Special features

- Any intermediate sizes within the standard size range are available
- Temperature resistant up to 80 °C
- Maximum pressure of 100 Pa
- Non-return dampers are opened and closed by the airflow; no actuator is required
- Non-return damper with formed aluminium blades for normal requirements; blades are fitted with seals for sound attenuation

Materials and surfaces

- Border and travel stop (angle section) made of galvanised sheet steel
- Blades made of formed aluminium
- Mullion (from B = 1000 mm) made of galvanised sheet steel
- Blade shafts made of brass
- Side bar made of PVC plastic
- Blade tip seals made of foamed polyester
- Blade restrictors made of plastic
- P1: Powder-coated, RAL CLASSIC colour
- PS: Powder-coated, NCS or DB colour

Technical data

- Nominal sizes: 200 × 215 to 1600 × 1615 mm
- Volume flow rate range: 110 – 6460 l/s or 396 – 23256 m^3/h at 2.5 m/s
- Total differential pressure – exhaust air: 25 Pa at 2.5 m/s
- Total differential pressure – fresh air: 25 Pa at 2.5 m/s

Sizing data

- $\dot{V}$ _____ [m^3/h]
- Δp_{st} _____ [Pa]
- L_{WA} air-regenerated noise _____ [dB(A)]

3

Order options

1 Type
UL Non-return damper

2 Airflow direction
☐ **1** Exhaust air opening
☐ **2** Fresh air opening

3 Nominal size [mm]
B × H

4 Installation subframe
No entry: none
☐ **ER** With

5 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 %

Non-return dampers
Type KUL

For installation into ductwork

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

- Maximum pressure of 100 Pa
- Casing with U-profile connection suitable for rectangular ducts
- Available in standard sizes and many intermediate sizes
- Non-return damper with formed aluminium blades for normal requirements; blades are fitted with seals for sound attenuation

Optional equipment and accessories

- Installation subframe
- Powder coating (RAL, NCS or DB)

Casing and duct connection

Bearings

3

Description

Non-return damper, variant KUL-G

For detailed information on accessories see Chapter K3 – 3.3

Application
- Non-return dampers of Type KUL for the fresh air and exhaust air ducts of 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 total differential pressure: 100 Pa

Variants
- KUL: Non-return damper, duct connection without flange holes
- KUL-G: Non-return damper, duct connection with flange holes

Nominal sizes
- B: 200, 400, 600, 800, 1000, 1200, 1400, 1600 mm (intermediate sizes: 201 – 1599 mm in increments of 1 mm)
- H: 215, 315, 415, 515, 615, 715, 815, 1015, 1215, 1415, 1615 mm (intermediate sizes: 216 – 1614 mm, in increments of 1 mm)
- Any combination of B × H

Accessories
- Installation subframe: Installation subframe for the fast and simple installation of mechanically self-powered dampers

Special features
- Any intermediate sizes within the standard size range are available
- Temperature resistant up to 80 °C
- Maximum pressure of 100 Pa
- Non-return dampers are opened and closed by the airflow; no actuator is required
- Non-return damper with formed aluminium blades for normal requirements; blades are fitted with seals for sound attenuation

Parts and characteristics
- Casing
- Blades with low-friction bearings
- Blade restrictors
- Blade tip seals
- Bottom travel stop (angle section)
- Visible mullion from B = 1000 mm

Construction features
- Casing, material thickness 1.25 mm
- Blades, material thickness 1.0 mm
- Flanges on both sides, suitable for duct connection
- Additional side bar with fixing holes to accommodate the blade shafts and integral blade restrictors (pins)
- Blade restrictors prevent the blades from opening beyond a certain angle

Materials and surfaces
- Casing and travel stop (angle section) made of galvanised sheet steel
- Blades made of formed aluminium
- Mullion (from B = 1000 mm) made of galvanised sheet steel
- Blade shafts made of brass
- Side bar made of PVC plastic
- Blade tip seals made of foamed polyester
- Blade restrictors made of plastic

Installation and commissioning
- Horizontal airflow: Vertical installation
- Vertical airflow: allowed for exhaust air openings; horizontal installation
- Straight upstream section required (at least B + H) on the pressure side of fans
- Ensure gradual start-up of fans to avoid sudden pressure increase

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

Technical data

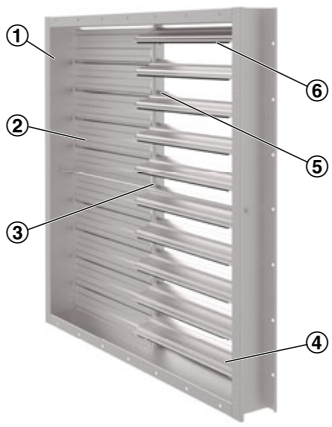
Nominal sizes	200 × 215 to 1600 × 1615 mm
Volume flow rate range	110 – 6460 l/s at 2.5 m/s
	396 – 23256 m^3/h at 2.5 m/s
Total differential pressure – exhaust air	25 Pa at 2.5 m/s
Total differential pressure – fresh air	

Function

Functional description

Non-return dampers open and close automatically. When the system is in operation, the blades open when air flows. When the system is shut down, the blades close due to their weight and safely prevent air from flowing against the intended airflow direction.

Schematic illustration of KUL



① Border
② Blades (closed)
③ Mullion from B = 1000 mm
④ Blades (open)
⑤ Blade restrictor
⑥ Seal

Order code

KUL

KUL – G / 800×1015 / ER / P1 – RAL ...
1 2 3 4 5

1 Type
KUL Non-return damper

2 Construction
No entry:
duct connection without flange holes
G Duct connection,
flange holes on both sides

3 Nominal size [mm]
B × H

4 Installation subframe
No entry: none
ER With (only KUL-G)

5 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

KUL–G/600×1200

Construction	Duct connection, flange holes on both sides
Nominal size	600 × 1200 mm
Installation subframe	Without
Surface	Standard construction

Quick sizing tables provide a good overview of the volume flow rates with an airflow velocity of 2.5 m/s. Intermediate values can be interpolated. Precise intermediate values and volume flow rates for other airflow velocities can be calculated with our Easy Product Finder design programme.

Quick sizing – volume flow rate at 2.5 m/s

Height	Width [mm]									
	200		300		400		500		600	
mm	l/s	m³/h	l/s	m³/h	l/s	m³/h	l/s	m³/h	l/s	m³/h
215	110	396	160	576	215	774	270	972	325	1170
315	160	576	235	846	315	1134	395	1422	475	1710
415	210	756	310	1116	415	1494	520	1872	625	2250
515	260	936	385	1386	515	1854	645	2322	775	2790
615	310	1116	460	1656	615	2214	770	2772	925	3330
715	360	1296	535	1926	715	2574	895	3222	1070	3852
815	410	1476	610	2196	815	2934	1020	3672	1220	4392
1015	510	1836	760	2736	1020	3672	1270	4572	1520	5472
1215	610	2196	910	3276	1220	4392	1520	5472	1820	6552
1415	710	2556	1060	3816	1420	5112	1770	6372	2120	7632
1615	810	2916	1210	4356	1620	5832	2020	7272	2420	8712

3

Quick sizing – volume flow rate at 2.5 m/s

Height	Width [mm]									
	800		1000		1200		1400		1600	
mm	l/s	m³/h	l/s	m³/h	l/s	m³/h	l/s	m³/h	l/s	m³/h
215	430	1548	540	1944	645	2322	755	2718	860	3096
315	630	2268	790	2844	945	3402	1100	3960	1260	4536
415	830	2988	1040	3744	1250	4500	1450	5220	1660	5976
515	1030	3708	1290	4644	1550	5580	1800	6480	2060	7416
615	1230	4428	1540	5544	1850	6660	2150	7740	2460	8856
715	1430	5148	1790	6444	2150	7740	2500	9000	2860	10296
815	1630	5868	2040	7344	2450	8820	2850	10260	3260	11736
1015	2030	7308	2540	9144	3050	10980	3550	12780	4060	14616
1215	2430	8748	3040	10944	3650	13140	4250	15300	4860	17496
1415	2830	10188	3540	12744	4250	15300	4950	17820	5660	20376
1615	3230	11628	4040	14544	4850	17460	5650	20340	6460	23256

Quick sizing – differential pressure

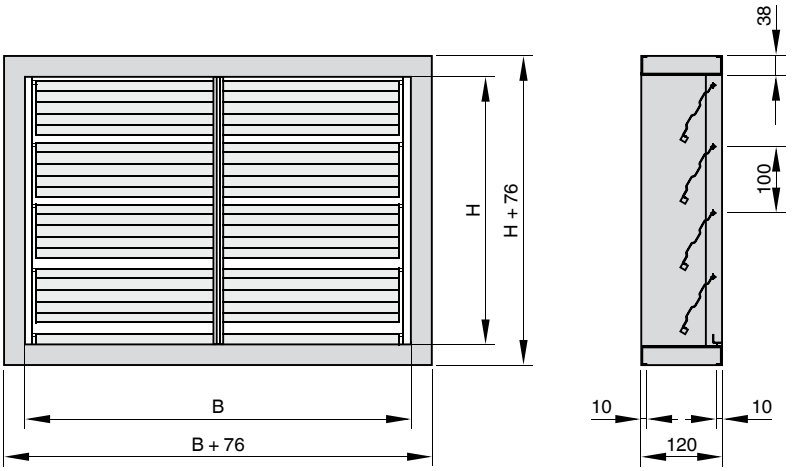
v	Δp_t
m/s	Pa
0.5	10
1	15
2	20
3	25
4	30
5	40
6	45

Dimensions

Flow cross section to calculate the airflow velocity: A = B × H

Unit of measure for B and H: m

Dimensional drawing of KUL

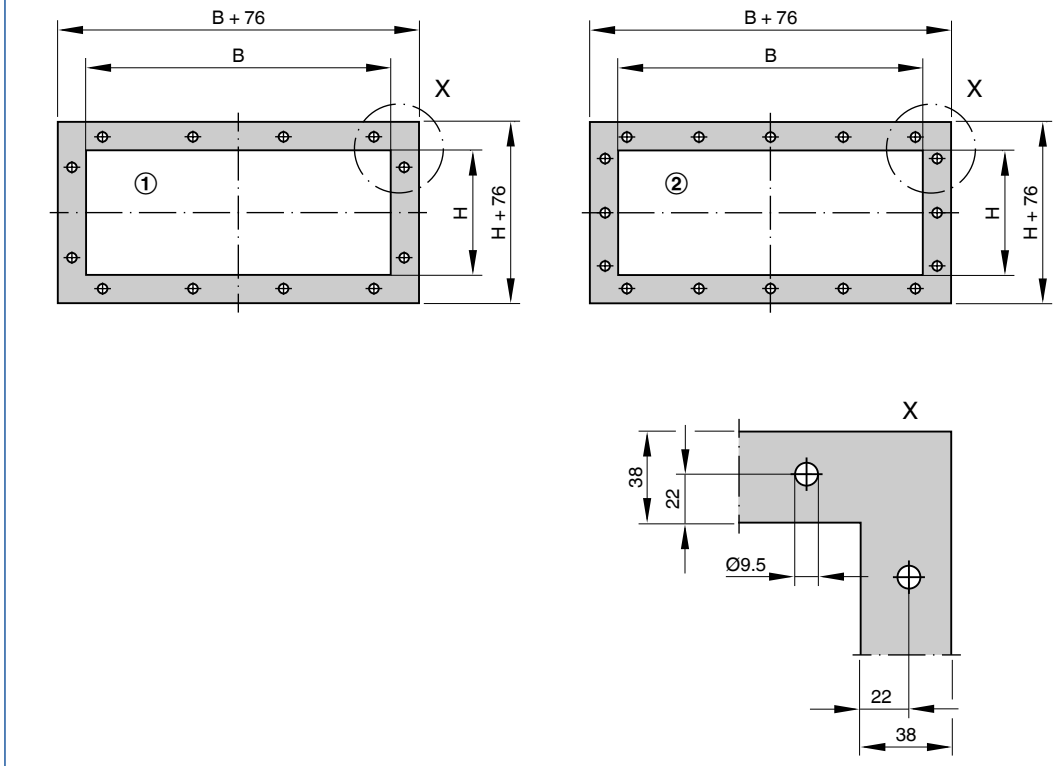


Weight

H	B [mm]									
	200	300	400	500	600	800	1000	1200	1400	1600
mm	kg									
215	2	3	3	4	4	5	6	8	10	11
315	2	3	4	4	5	6	7	9	10	11
415	3	4	4	5	6	7	8	10	11	13
515	3	4	5	6	6	7	9	11	12	15
615	4	5	5	6	7	8	10	12	13	17
715	4	5	6	7	8	8	11	13	15	18
815	5	6	6	8	9	9	13	16	17	19
1015	5	6	7	9	10	11	15	18	19	20
1215	6	7	7	10	11	13	17	20	20	22
1415	6	7	8	11	12	15	18	21	22	24
1615	7	8	8	11	13	17	19	22	24	26

Flange holes

Flange holes – KUL



① Even number of holes (hole pitch = 150 mm)

② Uneven number of holes (hole pitch = 150 mm)

No. of flange holes (n) per side

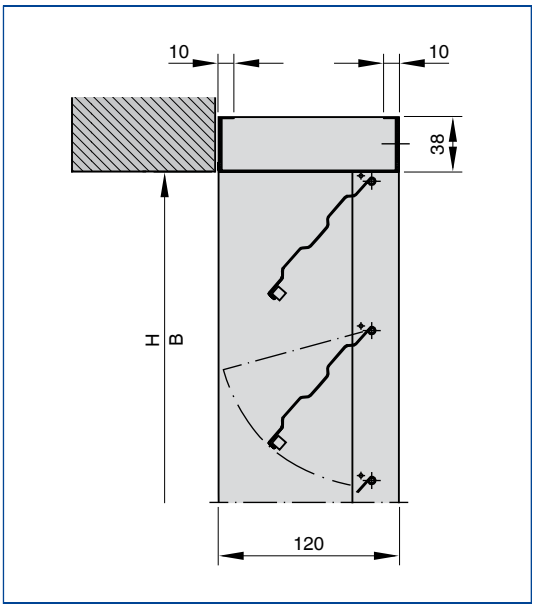
Width	No. of holes
	n
mm	–
200 – 346	2
347 – 496	3
497 – 646	4
647 – 796	5
797 – 946	6
947 – 1096	7
1097 – 1246	8
1247 – 1396	9
1397 – 1546	10
1547 – 1600	11

No. of flange holes (n) per side

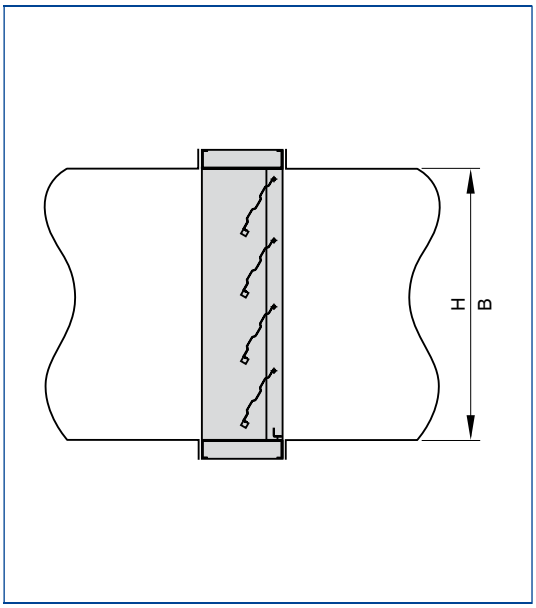
Height	No. of holes
H	n
mm	–
215 – 362	2
363 – 512	3
513 – 662	4
663 – 812	5
813 – 962	6
963 – 1112	7
1113 – 1262	8
1263 – 1412	9
1413 – 1562	10
1563 – 1615	11

Installation dimensions

Wall installation without installation subframe

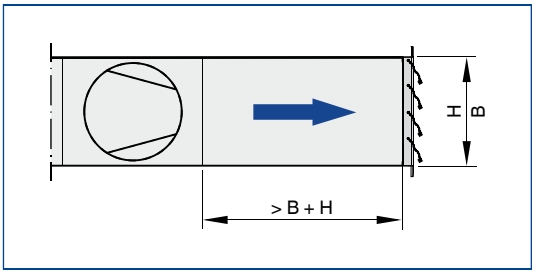


Duct installation



Upstream conditions

Installation on the pressure side of a fan



The airflow downstream of a fan is characterised by strong turbulence, and the velocity profile is not uniform. As a consequence, the blades of the non-return dampers are not uniformly subject to the airflow, and this may result in individual blades becoming subject to forces that might lead to mechanical damage.
Safe operation requires a straight upstream section of at least B + H.

Standard text

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

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

- Any intermediate sizes within the standard size range are available
- Temperature resistant up to 80 °C
- Maximum pressure of 100 Pa
- Non-return dampers are opened and closed by the airflow; no actuator is required
- Non-return damper with formed aluminium blades for normal requirements; blades are fitted with seals for sound attenuation

Materials and surfaces

- Casing and travel stop (angle section) made of galvanised sheet steel
- Blades made of formed aluminium
- Mullion (from B = 1000 mm) made of galvanised sheet steel
- Blade shafts made of brass
- Side bar made of PVC plastic
- Blade tip seals made of foamed polyester
- Blade restrictors made of plastic

Technical data

- Nominal sizes: 200 × 215 to 1600 × 1615 mm
- Volume flow rate range: 110 – 6460 l/s or 396 – 23256 m^3/h at 2.5 m/s
- Total differential pressure – exhaust air: 25 Pa at 2.5 m/s
- Total differential pressure – fresh air: 25 Pa at 2.5 m/s

Sizing data

- $\dot{V}$ _____ [m^3/h]
- Δp_{st} _____ [Pa]
- L_{WA} air-regenerated noise _____ [dB(A)]

3

Order options

1 Type

KUL Non-return damper

2 Construction

No entry: duct connection without flange holes

☐ **G** Duct connection, flange holes on both sides

3 Nominal size [mm]

B × H

4 Installation subframe

No entry: none

☐ **ER** With (only KUL-G)

5 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 %

Notes

Non-return dampers
Type ARK

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 pressure loading of 5000 Pa
- Blades made of salt-water resistant AlMg3, 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, NCS or DB)
- Stainless steel construction with stainless steel casing; blades made of AlMg3
- Temperature resistant up to 200 °C with Viton seal

Adjustable restrictor

Linkage

Non-return damper, variant ARK

Non-return damper with linkage

Non-return damper, variant ARK-1

Non-return damper with adjustable blade restrictor

Description

Non-return damper, variant ARK

For detailed information on accessories see Chapter K3 – 3.3

Application

- Non-return dampers of Type ARK for the fresh air and exhaust air ducts of 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 of 5000 Pa

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

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

Accessories

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

Special features

- Blades made of salt-water resistant AlMg3
- Robust, maintenance-free construction
- Maximum pressure loading of 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)
- Temperature resistant up 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

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

3

Technical data

Nominal sizes	200 × 345 to 1200 × 1995 mm
Volume flow rate range	690 – 23950 l/s at 10 m/s
	2484 – 86220 m^3/h at 10 m/s
Differential pressure (horizontal airflow)	115 Pa at 10 m/s
Differential pressure (vertical airflow)	45 Pa at 10 m/s

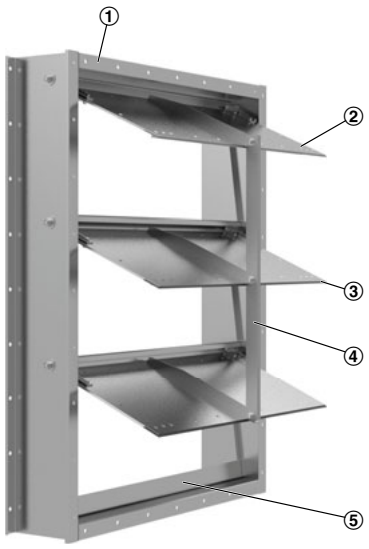
Function

Functional description

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 and safely prevent air from flowing against the intended airflow direction.

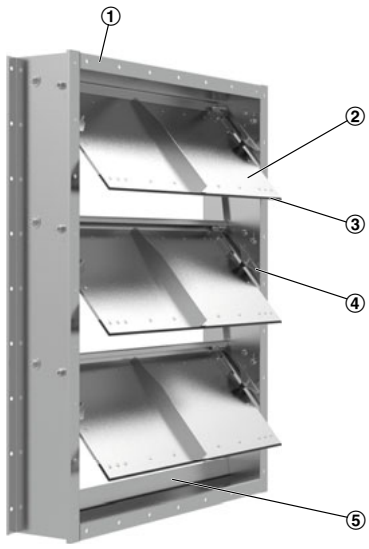
3

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)

Order code

ARK

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: linked blades
1 Blades with adjustable restrictors

3 Material
No entry: galvanised steel, with aluminium blades
A2 Stainless steel with aluminium blades

4 Construction
No entry: duct connection without flange holes
G Duct connection with flange holes

5 Nominal size [mm]
B × H

6 Installation subframe
No entry: none
ER With (only for construction G)

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 %

3

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
Surface	Powder-coated, RAL 7001, silver grey

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.

Quick sizing – maximum volume flow rate

Height	Width [mm]											
	200		400		600		800		1000		1200	
mm	l/s	m³/h	l/s	m³/h	l/s	m³/h	l/s	m³/h	l/s	m³/h	l/s	m³/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

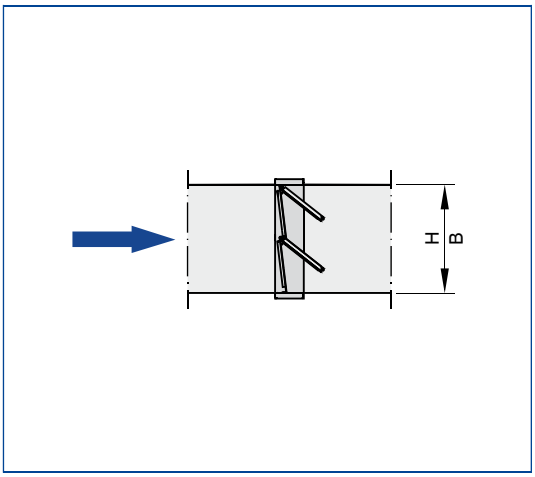
Flow cross section to calculate the airflow velocity: A = B × H

Unit of measure for B and H: m

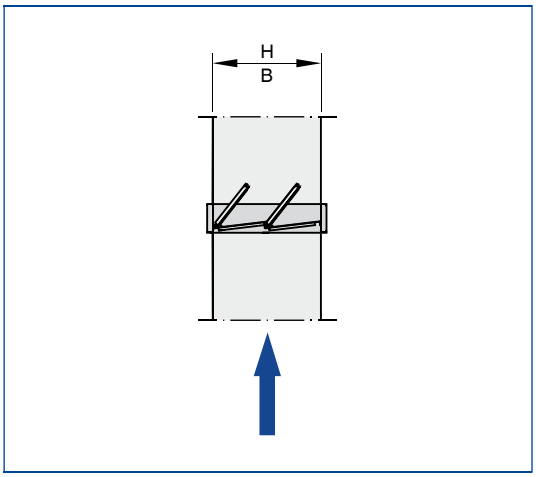
Quick sizing – differential pressure

v	Airflow	
	horizontal	vertical
	Δp_{st}	
m/s	Pa	
2	50	135
4	75	125
6	95	105
8	110	65
10	115	45

Horizontal airflow



Vertical airflow



Geometric free area – ARK

H	B [mm]					
	200	400	600	800	1000	1200
mm	m²					
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	0.40	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: Intermediate widths can be interpolated

Description

Non-return damper, variant ARK

Variant

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

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 metal-polymer bearings

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 and linkage 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
- 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, NCS or DB colour

Installation and commissioning

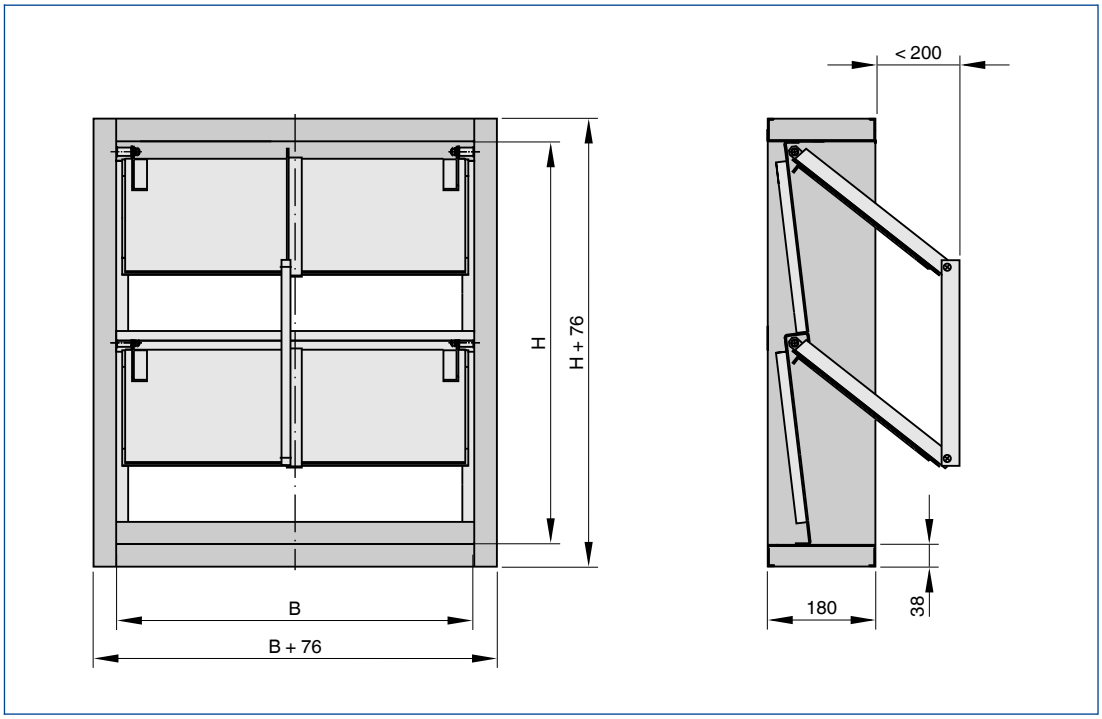
- Installation orientation: Horizontal airflow, any airflow direction; or vertical airflow with airflow from bottom to top

Weight

H	B [mm]					
	200	400	600	800	1000	1200
mm	kg					
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

Dimensions

Dimensional drawing of ARK standard sizes

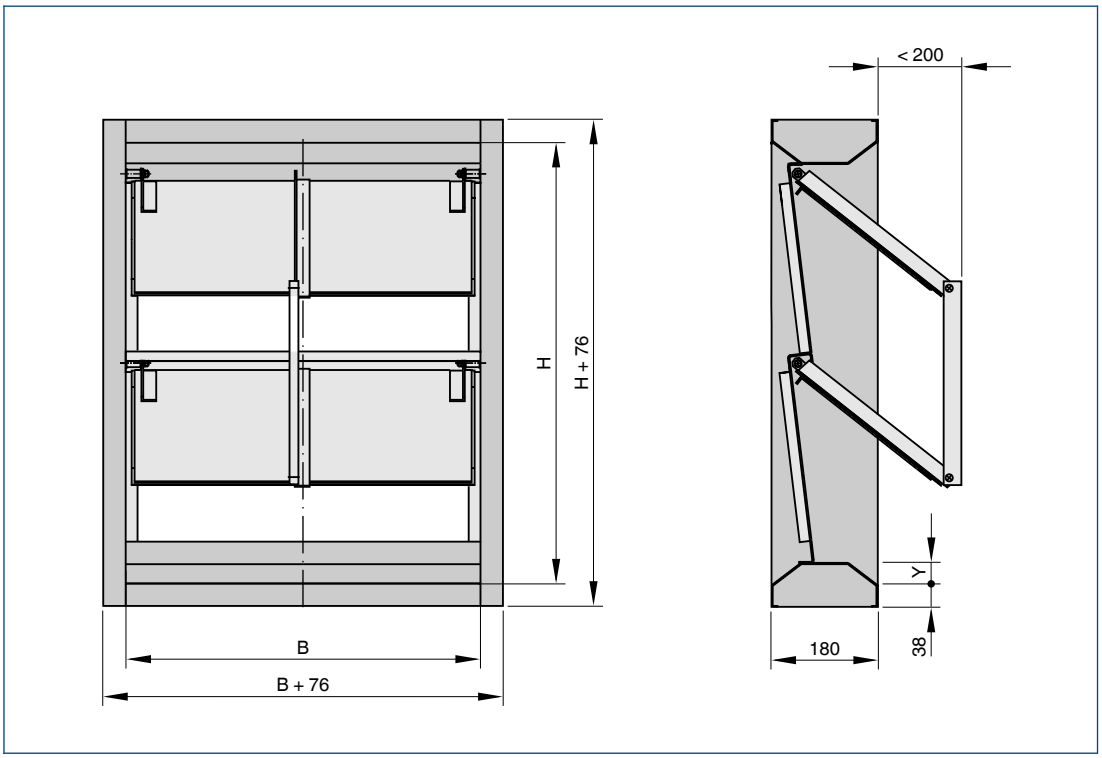


Dimensions

H	No. of blades	No. of coupling rods
mm	–	
345	1	0
675	2	1
1005	3	1
1335	4	2
1665	5	2
1995	6	2

Dimensions

Dimensional drawing of ARK intermediate sizes



Dimensions

H	No. of blades	No. of coupling rods	Y
mm	–		mm
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

Description

Non-return damper, variant ARK-1

Variant

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

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

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 and restrictors made of stainless steel, material no. 1.4301
- Blade shafts made of stainless steel, material no. 1.4104
- 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, NCS or DB colour

Installation and commissioning

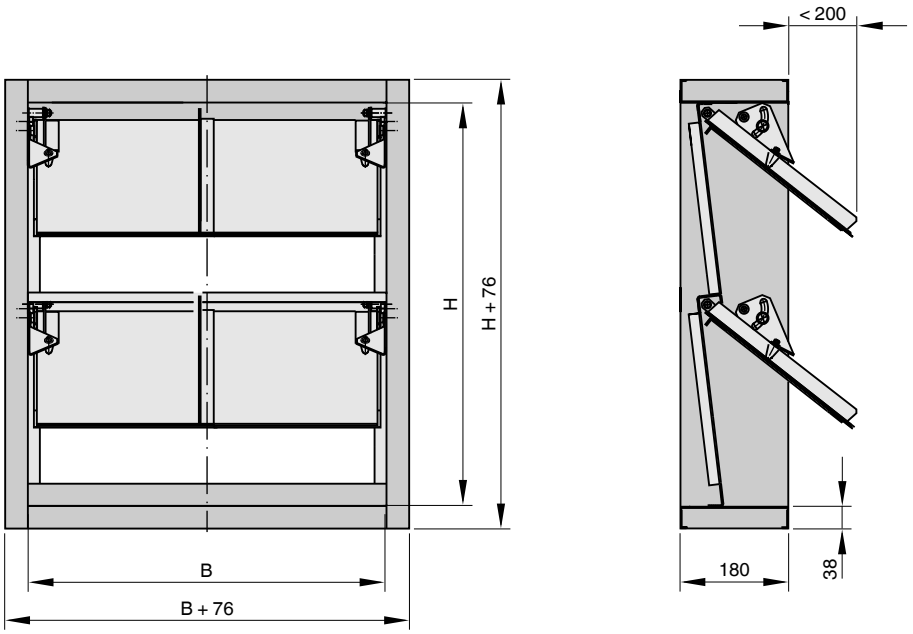
- Installation orientation: Horizontal airflow, any airflow direction; or vertical airflow with airflow from bottom to top
- Adjusting the restrictors to limit the opening angle for each blade

Weight

H	B [mm]					
	200	400	600	800	1000	1200
mm	kg					
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

Dimensions

Dimensional drawing of ARK-1 standard sizes

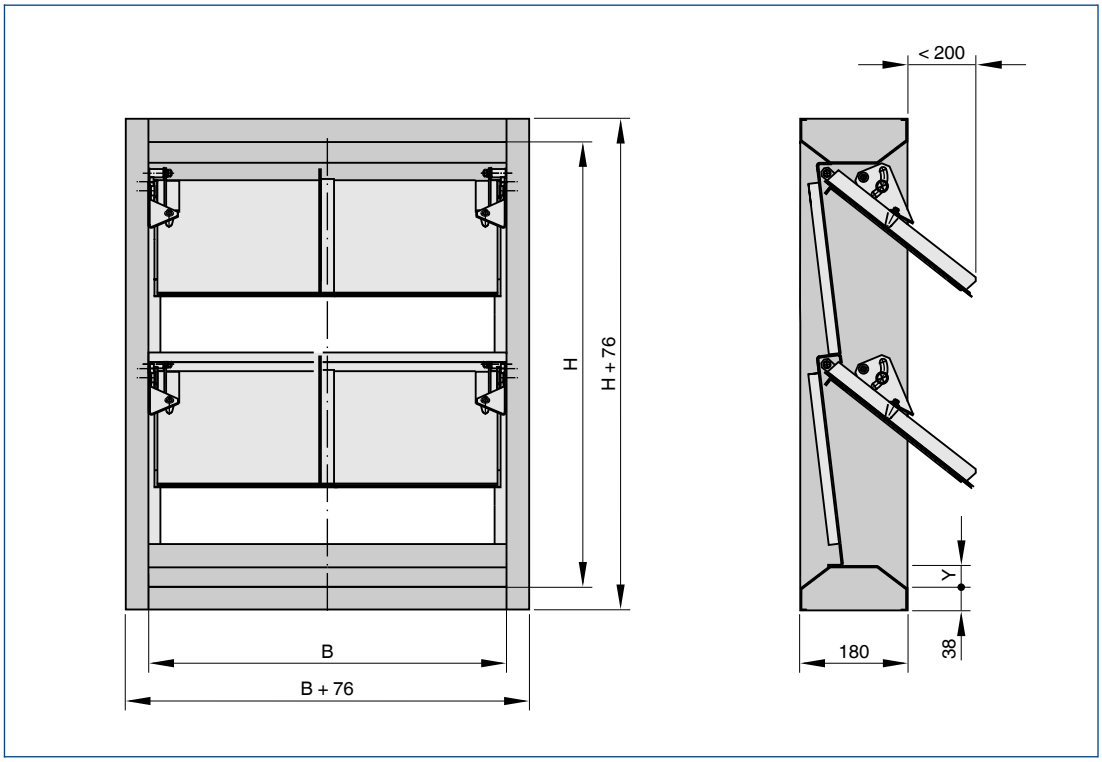


Dimensions

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

Dimensions

Dimensional drawing of ARK-1 intermediate sizes

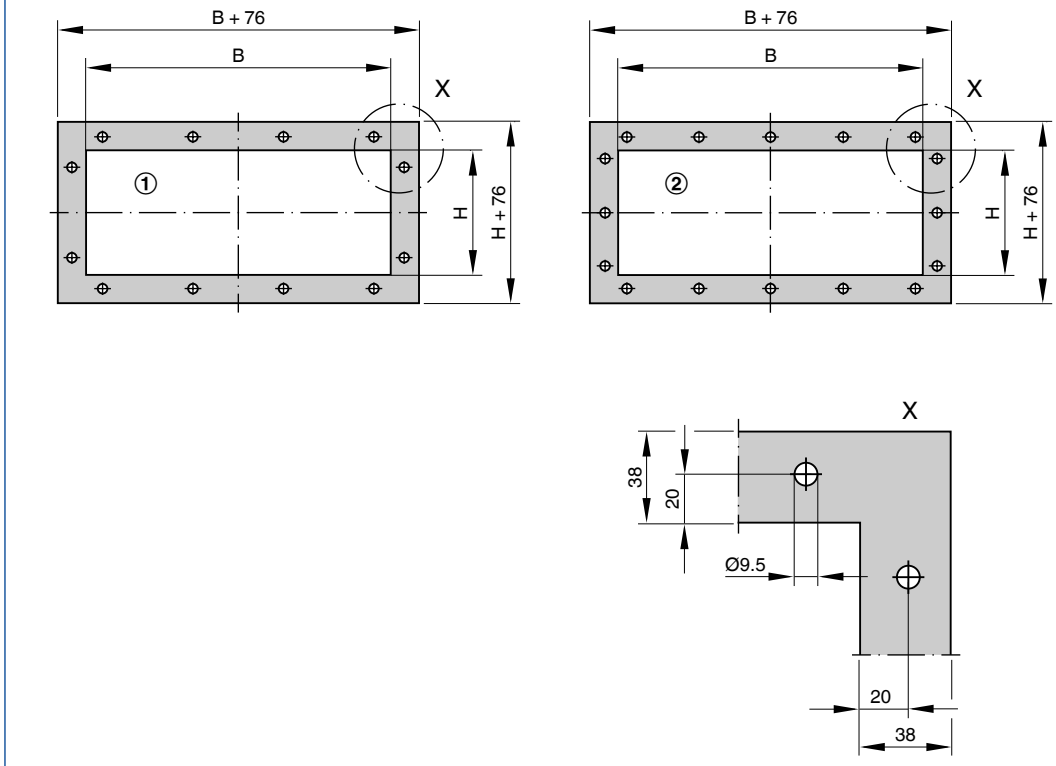


Dimensions

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

Flange holes

Flange holes – ARK, ARK2



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

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

No. of holes per side

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

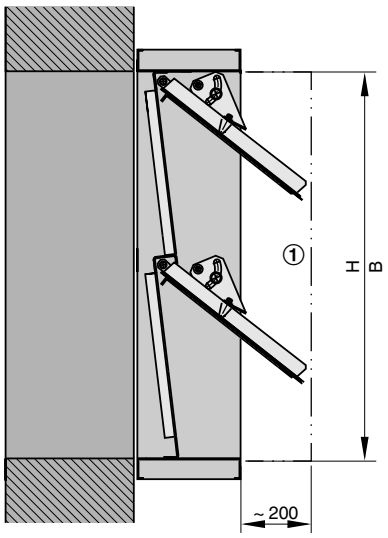
No. of holes per side

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

3

Installation dimensions

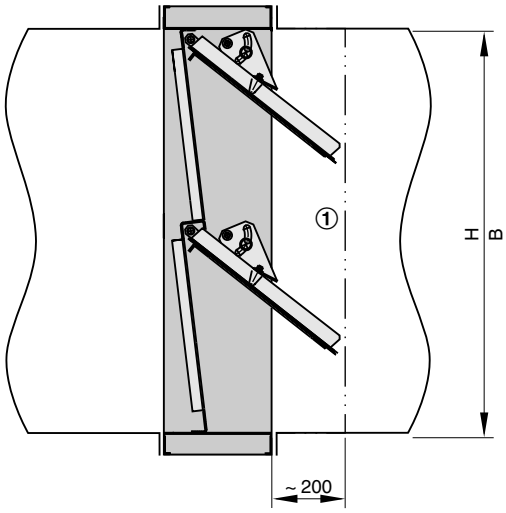
Wall installation without installation subframe



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

Standard text

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

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

- Blades made of salt-water resistant AlMg3
- Robust, maintenance-free construction
- Maximum pressure loading of 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)
- Temperature resistant up 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 – 23950 l/s or 2484 – 86220 m^3/h at 10 m/s
- Differential pressure (horizontal airflow): 115 Pa at 10 m/s
- Differential pressure (vertical airflow): 45 Pa at 10 m/s

Sizing data

- $\dot{V}$ _____ [m^3/h]
- Δp_{st} _____ [Pa]
- L_{WA} air-regenerated noise _____ [dB(A)]

3

Order options

1 Type
ARK Non-return damper

2 Blade mechanism
No entry: linked blades
☐ **1** Blades with adjustable restrictors

3 Material
No entry: galvanised steel, with aluminium blades
☐ **A2** Stainless steel with aluminium blades

4 Construction
No entry: duct connection without flange holes
☐ **G** Duct connection with flange holes

5 Nominal size [mm]
B × H

6 Installation subframe
No entry: none
☐ **ER** With (only for construction G)

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 %

Notes

Pressure relief damper
Type ARK2

For the prevention of excess pressure in rooms and air conditioning systems

Pressure relief dampers for pressurisation systems, gas fire extinguishing systems, internal spaces with explosive atmospheres or transformer substations

- Air leakage with back pressure to EN 1751, class 4
- Maximum pressure loading of 5000 Pa
- Differential pressure can be adjusted from 50 – 1000 Pa
- Blades made of salt-water resistant AlMg3, 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
- Temperature resistant up to 80 °C

Optional equipment and accessories

- Installation subframe
- Powder coating (RAL, NCS or DB)
- Stainless steel construction with stainless steel casing; blades made of AlMg3
- Temperature resistant up to 200 °C with Viton seal

Closed blade

Open blade

Description

Pressure relief damper, variant ARK2

For detailed information on accessories see Chapter K3 – 3.3

Application
- Pressure relief dampers of Type ARK2 for the protection of ventilation and air conditioning equipment, ductwork and 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 such as those resulting from rapidly closing fire dampers or shut-off dampers will be reliably controlled
- Differential pressure can be adjusted from 50 – 1000 Pa (B > 600 mm: 600 Pa max.)

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

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 features
- Blades made of salt-water resistant AlMg3
- Robust, maintenance-free construction
- Maximum pressure loading of 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)
- Temperature resistant up to 80 °C
- Optional temperature resistant construction for up to 200 °C, with Viton seal
- 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

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)

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
- Blades can be moved independent of each other
- Blades with perimeter seal, pressed against travel stop (angle section) when closed
- Blade shafts with maintenance-free metal-polymer bearings

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

Installation and commissioning
- Installation orientation: Horizontal airflow

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

Technical data

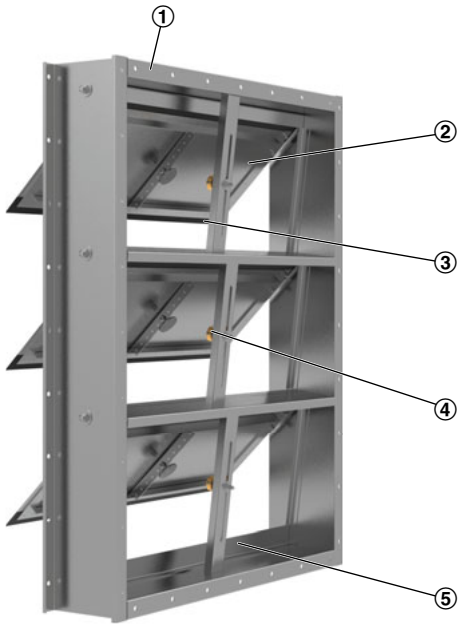
Nominal sizes	200 × 345 to 1200 × 1995 mm
Volume flow rate range	2 m/s 140 – 4790 l/s at 50 Pa
	2 m/s 504 – 17244 m^3/h at 50 Pa
Adjustable differential pressure range	50 – 1000 Pa (B > 600 mm: 600 Pa max.)
Airflow velocity	2 m/s at 50 Pa

Function

Functional description

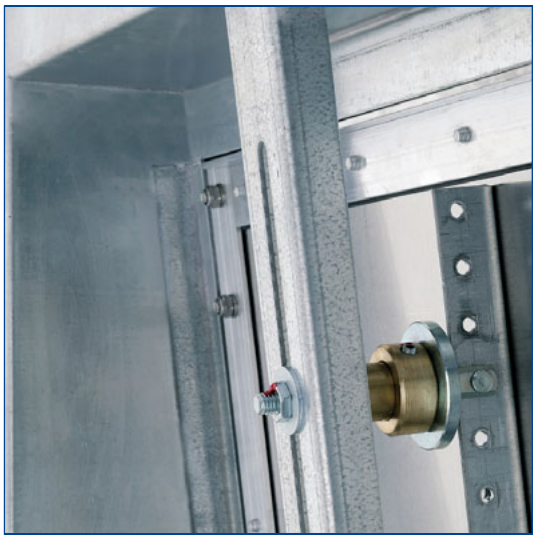
Pressure-relief dampers open and close automatically. The blades are kept closed by magnets. If the differential pressure exceeds the set maximum value, the magnetic force is overcome, and the blades open. The airflow by which the excess pressure has been caused can now flow through the damper. The pressure 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

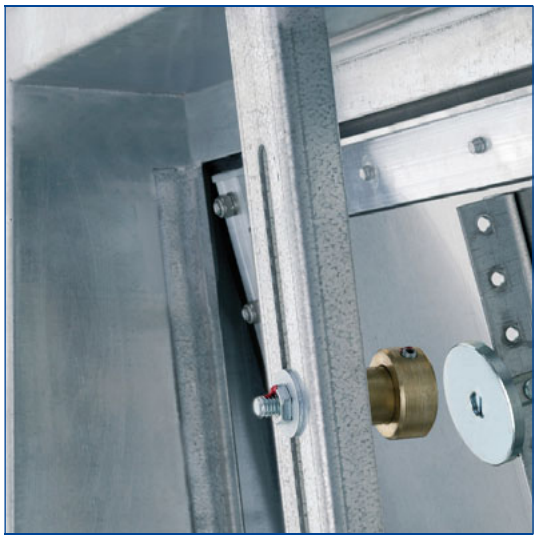


① Casing
② Blade
③ Seal
④ Retaining element
⑤ Travel stop (angle section)

Closed blade



Open blade



Order code

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	Galavanised 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

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.

Quick sizing – maximum volume flow rate

Height	Width [mm]											
	200		400		600		800		1000		1200	
mm	l/s	m³/h	l/s	m³/h	l/s	m³/h	l/s	m³/h	l/s	m³/h	l/s	m³/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

3

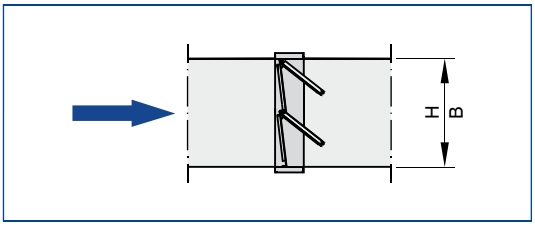
Flow cross section to calculate the airflow velocity: A = B × H

Unit of measure for B and H: m

Quick sizing – airflow velocity

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

Horizontal airflow



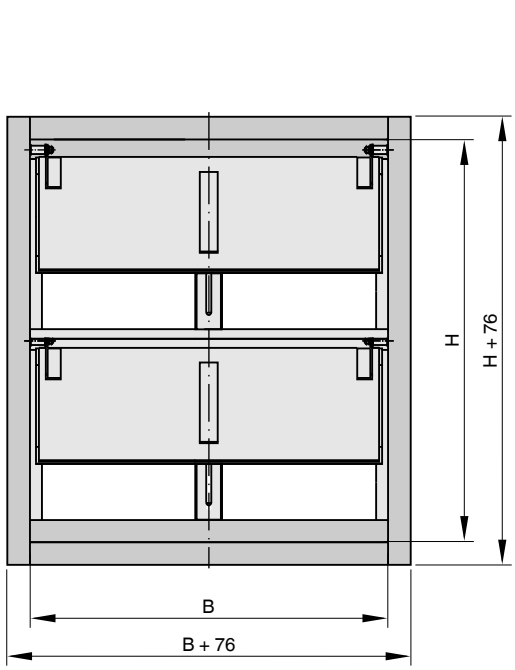
Geometric free area – ARK2

H	B [mm]					
	200	400	600	800	1000	1200
mm	m²					
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	0.35	0.572	0.795	1.017	1.239
1665	0.16	0.438	0.717	0.995	1.273	1.552
1995	0.192	0.527	0.861	1.195	1.53	1.864

Intermediate sizes: Intermediate widths can be interpolated

Dimensions

Dimensional drawing of ARK2 standard sizes

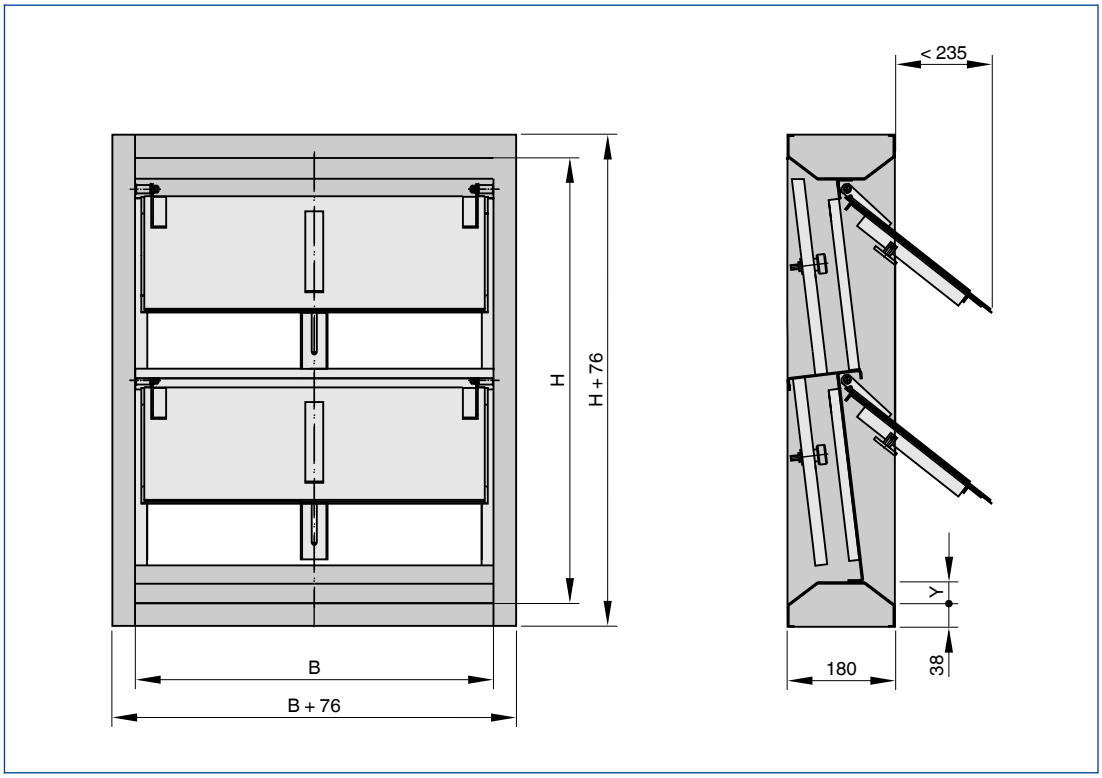


Dimensions

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

Dimensions

Dimensional drawing of ARK2 intermediate sizes



Dimensions

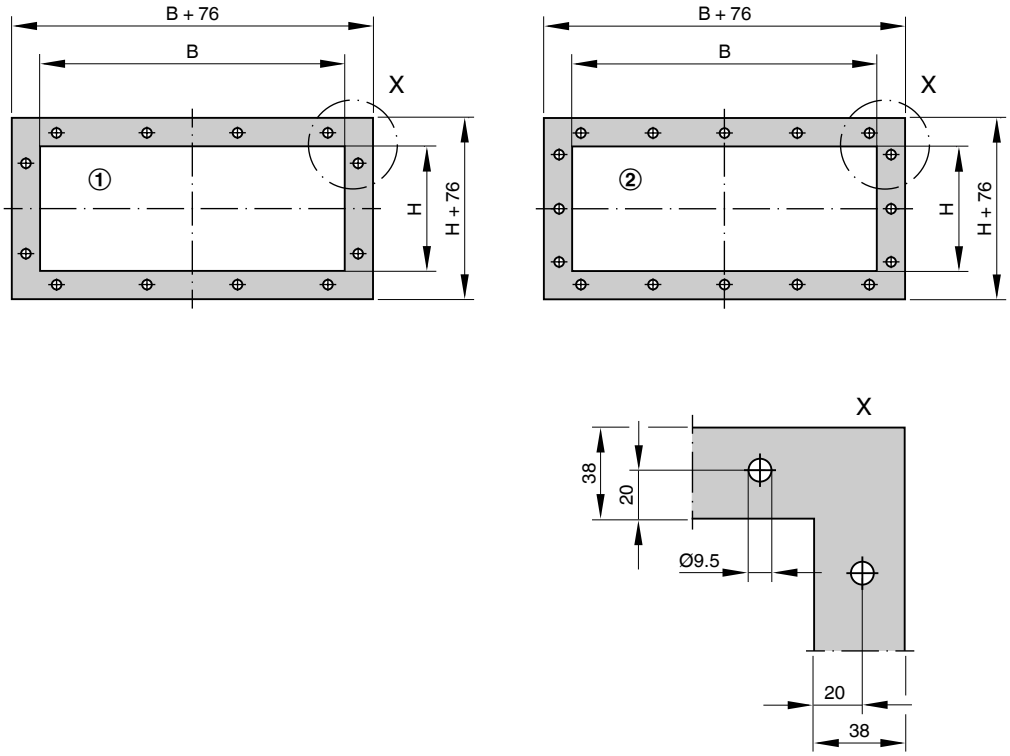
H	No. of blades	Y
mm	–	mm
355 – 505	1	5 – 80
685 – 835	2	5 – 80
1015 – 1165	3	5 – 80
1345 – 1495	4	5 – 80
1675 – 1825	5	5 – 80

Weight

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

Flange holes – ARK, ARK2



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

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

No. of holes per side

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

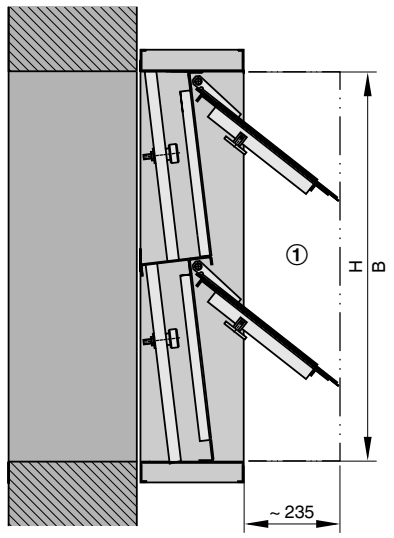
No. of holes per side

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

3

Installation dimensions

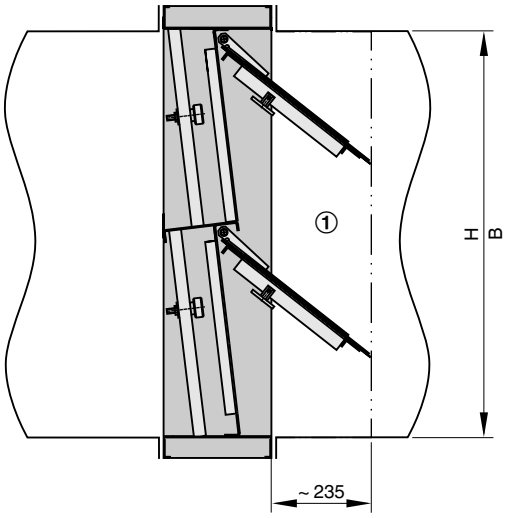
Wall installation without installation subframe



① Blade movement area must be kept clear

Illustration shows ARK2

Duct installation



① Blade movement area must be kept clear

Illustration shows ARK2

Standard text

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 air handling units, ductwork and internal spaces from differential pressures in excess of acceptable levels
Ready-to-install component which consists of a casing, blades with low-friction bearings, magnets, and travel stop and sealing parts.

Special features
- Blades made of salt-water resistant AlMg3
- Robust, maintenance-free construction
- Maximum pressure loading of 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)
- Temperature resistant up to 80 °C
- Optional temperature resistant construction for up to 200 °C, with Viton seal
- 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
- 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
- Neoprene seals
- P1: Powder-coated, RAL CLASSIC colour
- PS: Powder-coated, NCS or 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 m^3/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

Sizing data
- Δp_{zul} _____ [Pa]
- $\dot{V}$ _____ [m^3/h]
- Δp_{st} _____ [Pa]

3

Order options

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 %

Notes

Accessories
Installation subframes

For the fast and simple installation of non-return dampers and pressure-relief dampers

Installation subframe for the fast and precise installation of non-return dampers and pressure-relief dampers. Installation subframes with fixing tabs are mortared into the wall opening, then the dampers are fastened to the subframes

- Angle sections made of galvanised steel or stainless steel
- Galvanised steel variant with screw-on fixing tabs
- Stainless steel variant with welded fixing tabs

Description

Non-return damper, variant ARK

Application

- For the installation of non-return dampers and pressure-relief dampers in walls and ceiling slabs
- Simplified installation
- The installation subframe allows for the fast, simple and precise installation of non-return dampers and pressure-relief dampers

Parts and characteristics

- Installation subframe consisting of angle sections
- Threaded studs or hexagon head screws
- Washers
- Hexagon nuts
- Fixing tabs

Materials and surfaces

UL-1, UL-2
- Installation subframe made of galvanised steel (angle section 35 × 35 × 3 mm)
- Welded fixing tabs with integral nuts, screws and washers made of galvanised steel

KUL, ARK, ARK2
- Installation subframe made of galvanised steel (angle section 35 × 35 × 3 mm)
- Screw-on fixing tabs, threaded studs, screws, nuts and washers made of galvanised steel

ARK-A2, ARK2-A2
- Installation subframe made of stainless steel, material no. 1.4301
- Welded fixing tabs, threaded studs, nuts and washers made of stainless steel, material no. 1.4301

Installation and commissioning

UL
Before mortaring in the installation subframe
- Bend and spread the fixing tabs

After mortaring in the installation subframe
- Align the non-return damper with the subframe and fasten it

KUL, ARK, ARK2
Before mortaring in the installation subframe
- Fasten the threaded studs, washers and nuts to the installation subframe
- Fix the screw-on fixing tabs with hexagon nuts
- Fasten the remaining screw-on fixing tabs (regular spacing, about every 375 – 625 mm)

After mortaring in the installation subframe
- Unscrew the hexagon nuts
- Align the non-return damper or pressure-relief damper with the subframe and fasten it

Maintenance

- Maintenance-free as construction and materials are not subject to wear

... / **ER** / ...

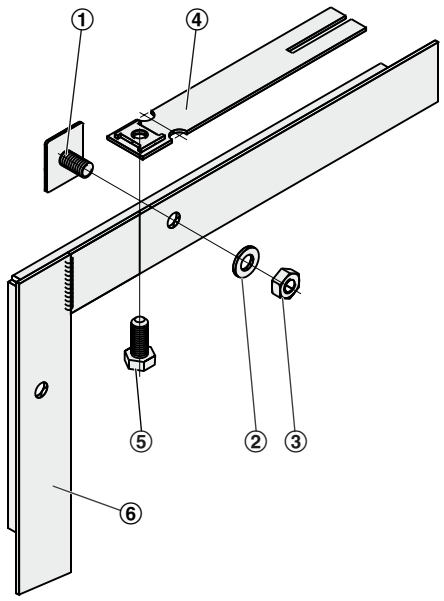
Order code detail

Any accessories are defined with the order code of the non-return damper or pressure-relief damper.

Installation subframe for non-return dampers and pressure-relief dampers

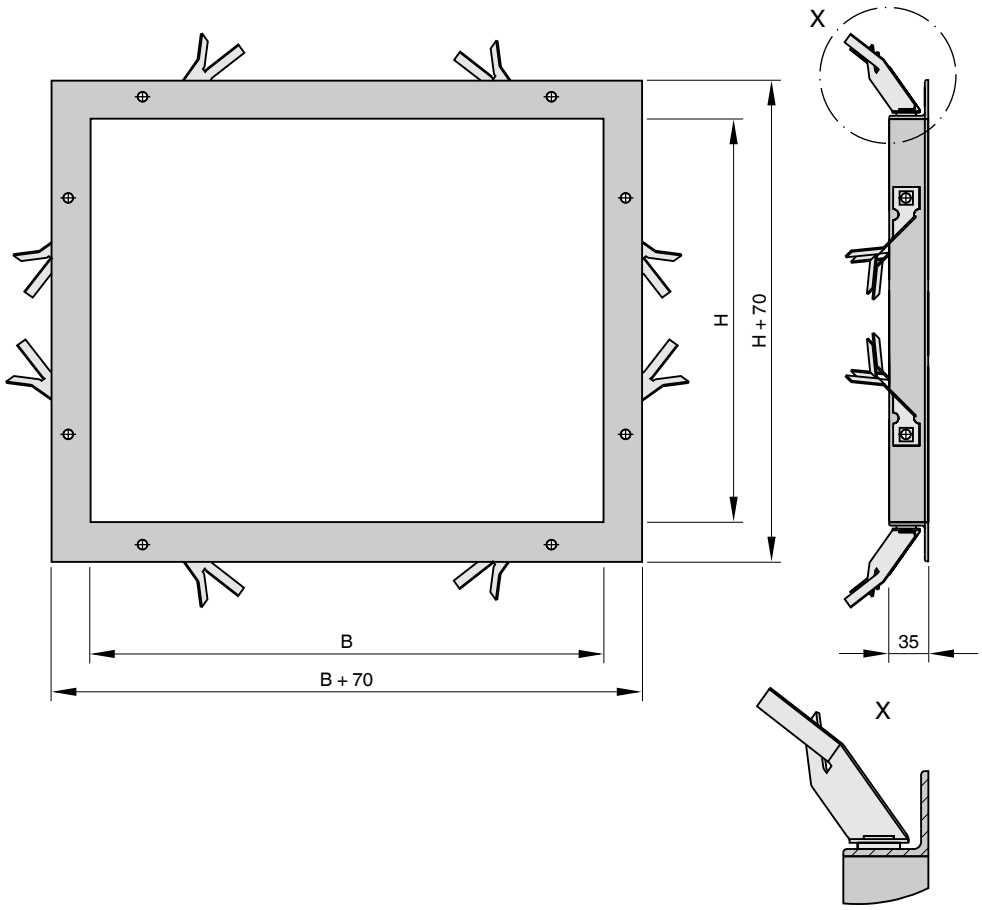
Description	Type
Galvanised steel	UL, KUL, ARK, ARK2
Stainless steel	ARK-A2, ARK2-A2

Installation subframe made of galvanised steel for non-return dampers and pressure-relief dampers



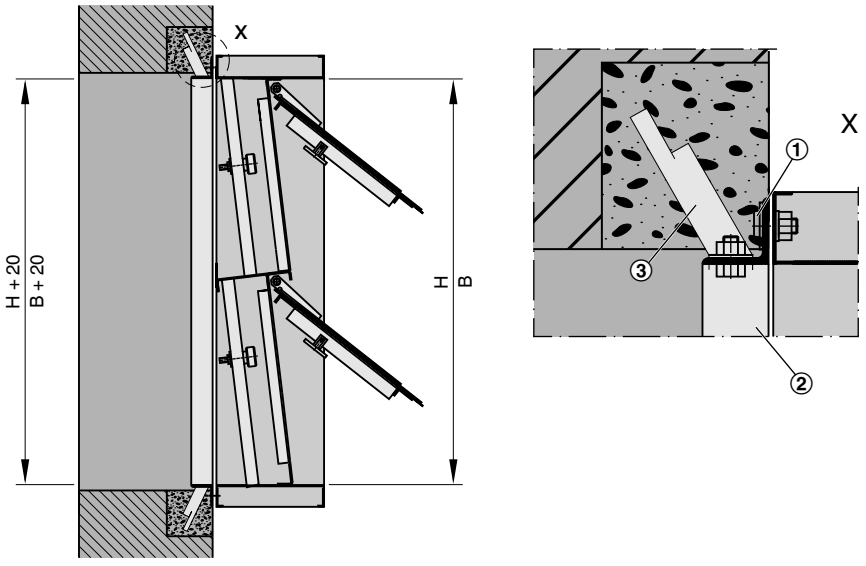
① Threaded stud
② Washer
③ Hexagon nut
④ Fixing tab
⑤ Hexagon head screw
⑥ Installation subframe

Installation subframe ready to be mortared in



Before the subframe is mortared in, the fixing tabs must be bent and spread (by others).

Installation on the face of walls



① Threaded stud
② Installation subframe
③ Fixing tab

Illustration shows ARK2

Mechanically self-powered dampers

Basic information and nomenclature

- Product selection
- Principal dimensions
- Nomenclature
- Sizing and sizing example

Product selection

	Type			
	UL	**KUL**	**ARK**	**ARK2**
Function				
Non-return damper	●	●	●	
Pressure relief damper				●
Maximum differential pressure	100 Pa	100 Pa	5000 Pa	5000 Pa
Casing				
Galvanised sheet steel	●	●	●	●
Stainless steel			●	●
Blades				
Aluminium	●	●	●	●
Border / duct connection				
Without holes		●	●	●
Flange holes	●	●	●	●
Bearings				
Plastic / brass	●	●		
DU bearing / stainless steel			●	●
Seals				
Material	Foamed polyester		Neoprene	
Dynamics				
Linkage			●	
Adjustable blade restrictor			●	
Adjustable differential pressure for blade opening				●
Nominal sizes				
Width	200 – 1600 mm		200 – 1200 mm	
Increment	1 mm			
Height	215 – 1615 mm		345 – 1995 mm	
Increment	1 mm			
Surface				
Powder-coated	●	●	●	●
Casing				
Length	40 mm	120 mm	180 mm	
Casing air leakage to EN 1751	Class C			
Installation				
Duct		●	●	●
Wall	●		●	●
Ceiling			●	
Airflow				
Horizontal	●	●	●	●
Vertical			●	
●	Possible			
	Not possible			

Basic information and nomenclature

Principal dimensions

B [mm]
Duct width

H [mm]
Duct height

n [ ]
Number of flange screw holes

m [kg]
Weight

Nomenclature

L_{WA} [dB(A)]
A-weighted sound pressure level of air-regenerated noise for the mechanically self-powered damper

A [m^2]
Upstream cross section

v [m/s]
Airflow velocity based on the upstream cross section

$\dot{V}$ [m^3/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.

Sizing with the help of this catalogue

This catalogue provides convenient quick sizing tables for non-return dampers and pressure-relief dampers. The tables give volume flow rates for all nominal sizes at an airflow velocity of 2.5 m/s. Differential pressures are given for various airflow velocities.

Selection examples

Given data
$\dot{V}$ =2000 l/s (7200 m^3/h)
v = 2.5 m/s
Fresh air
Maximum width: 1000 mm

Quick sizing
UL-2/1000×815

Calculation procedure
$A = 1000 \times 0.815 = 0.815\ m^2$
$v = \dot{V}/A = 2000/0.815\ (/1000) = 2.5$ m/s
$\Delta p_t = 30$ Pa

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

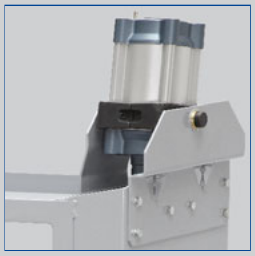
Quick sizing
Maximum volume flow rate 1210 l/s (4356 m^3/h)

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

4 Gas-tight shut-off dampers

Gas-tight shut-off dampers are used for isolating sections of an air conditioning system with a very high level of sealing; this can be required for safety reasons in certain operational conditions.

Shut-off dampers
Type NAK



Pneumatic actuator

Electric actuator

Hand wheel

For the gas-tight shut-off of ducts

Gas-tight shut-off dampers are designed to ensure the level of tightness required by KTA Guideline 3601 (German Nuclear Safety Standards Commission, KTA) and by DIN 25414 even when the power supply or compressed air supply fails.

- Compact design and robust actuator mechanism allow for any installation orientation
- Maximum air leakage rate is 0.0028 (l/s)/m^2 or 0.01 (m^3/h)/m^2 at a differential pressure of 2000 Pa
- Gas-tight closure, even when there is no power, due to special over centre locking mechanism
- Variants with hand wheel, pneumatic actuator or electric actuator
- Brass or stainless steel bearings
- Powder-coated casing and blades
- Maximum pressure loading of 5000 Pa, in closing direction
- Available in standard sizes and many intermediate sizes

Optional equipment and accessories

- Flange holes
- Limit switch
- Double acting pneumatic actuator, with optional solenoid valve
- Electric actuator 3 × 230 V AC (400 V AC) or 230 V AC

Variants

Product examples

Gas-tight shut-off damper, variant NAK-H

Gas-tight shut-off damper with hand wheel

Gas-tight shut-off damper, variant NAK-E/-E1

Gas-tight shut-off damper with electric actuator

Gas-tight shut-off damper, variant NAK-P

Gas-tight shut-off damper with pneumatic actuator

Description

For detailed information on attachments see Chapter K3 – 4.2

Application

- Shut-off dampers of Type NAK for shutting off ducts in air conditioning systems with the most critical safety requirements for tightness (gas-tight)
- Gas-tight shut-off dampers ensure the level of tightness required by KTA Guideline 3601 (German Nuclear Safety Standards Commission, KTA) and by DIN 25414 even when the power supply or compressed air supply fails

Variants

- NAK-H: Gas-tight shut-off damper with hand wheel
- NAK-P: Gas-tight shut-off damper with pneumatic actuator
- NAK-E: Gas-tight shut-off damper with electric actuator (400 V AC, 50 Hz)
- NAK-E1: Gas-tight shut-off damper with electric actuator (230 V AC, 50 Hz)

Construction

- Duct connection without flange holes
- G: Flange holes on both sides

Nominal sizes

- B: 200, 400, 600, 800,1000 mm (intermediate sizes: 201 – 999 mm, in increments of 1 mm)
- H: 270, 510, 755, 1000 mm
- Any combination of B × H

Attachments

- Attachments: For opening and closing, and for capturing the blade end positions

Special features

- Compact design and robust actuator mechanism allow for any installation orientation
- Gas-tight closure, even when there is no power, due to special over centre locking mechanism
- Maximum closed blade leakage rate is 0.0028 (l/s)/m^2 or 0.01 (m^3/h)/m^2 at a differential pressure of 2000 Pa
- Maximum pressure loading of 5000 Pa, in closing direction

Construction features
- Casing made of welded U-channel sections, material thickness 3 mm
- Blades and special sealing frame, material thickness 2 mm
- External blade mechanism (over centre locking)
- OPEN blades rest against the travel stops
- CLOSED blades are pressed against the seal
- Special sealing frame fitted with glued-in seals, welded into the casing

Materials and surfaces
- Casing made of sheet steel, material no. EN 10142-DX51D+Z150-200
- Blades and sealing frame made of sheet steel, material no. EN 10327-DX51D+Z150-200-NAC
- Linkage, travel stops and further attachments made of galvanised steel
- Brass or stainless steel bearings
- Seals made of neoprene rubber foam, temperature resistant up to 80 °C
- Powder-coated casing and blades, grey (RAL 7001)

Installation and commissioning
- Any installation orientation
- System pressure must act into the direction of blade closure

NAK-P:
- Operation requires filtered compressed air, operating pressure 6 bar

NAK-E/NAK-E1:
- Connect linear and torque switches before commissioning as otherwise the blade mechanism may become damaged
- Make electrical connections according to wiring diagrams

Standards and guidelines
- Closed blade air leakage to KTA 3601 Guideline (German Nuclear Safety Standards Commission, KTA) and DIN 25414
- Casing air leakage to EN 1751, class C

Maintenance
- Contamination should be removed as it may lead to corrosion
- Lubricate friction points and bearings
- NAK-H, NAK-E, NAK-E1: Lubricate threaded spindle
- Lubricating intervals depend on the application: every six to twelve months or after a maximum of 2000 switching cycles
- Use only oil or grease that is free of resins or acids

4

Technical data

Nominal sizes	400 × 270 – 1000 × 1000 mm
Maximum differential pressure	5000 Pa, in closing direction
Closed blade air leakage	< 0.0028 (l/s)/m² or 0.01 (m³/h)/m²
Operating temperature	80 °C

NAK-E

Supply voltage	3 × 230 V AC (400 V AC), 50 Hz
Nominal current	0.7 A
Current at maximum torque	1.0 A
Switch-on current	3.0 A
Torque	60 Nm
Actuator speed	22 1/min
Motor rating	0.12 kW S2-15 min
Heating	230 V AC
Running time required to fully close or fully open the damper	Approx. 60 s
Protection level of actuator	IP 68
EC conformity	EMC to 2004/108/EG, low voltage to 2006/95/EG
Operating temperature	–25 to 80 °C
Weight	20 kg

NAK-E1

Supply voltage	220 – 240 V AC, 50 Hz
Nominal current	1.2 A
Current at maximum torque	1.7 A
Switch-on current	5.2 A
Torque	60 Nm
Actuator speed	22 1/min
Motor rating	0.12 kW S2-15 min
Heating	230 V AC
Running time required to fully close or fully open the damper	Approx. 60 s
Protection level of actuator	IP 68
EC conformity	EMC to 2004/108/EG, low voltage to 2006/95/EG
Operating temperature	–25 to 80 °C
Weight	25 kg

NAK-P

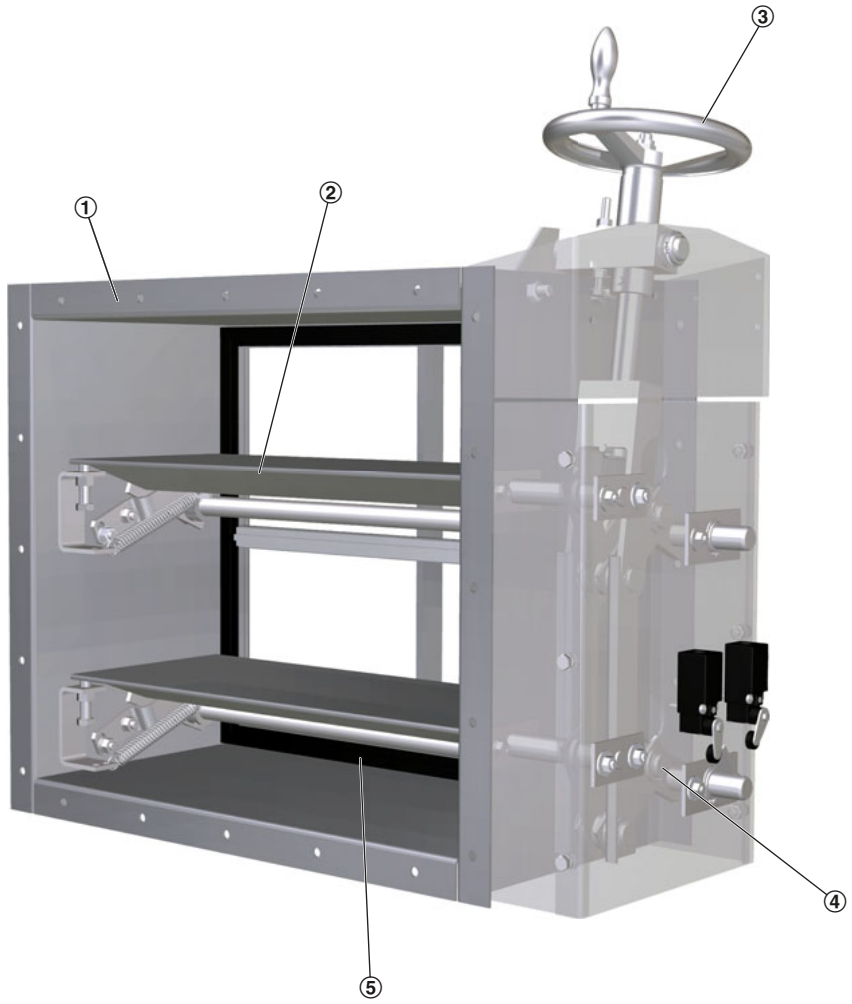
Function	Pneumatic, double acting
Operating pressure	6 bar
Running time required to fully close or fully open the damper	At least 2 s
Air consumption	4.4 nl/stroke
Compressed air	Filtered
Weight	5 kg

Function

Functional description

The shut-off damper is opened and closed manually, by turning a hand wheel. Turning the hand wheel approx. 30 times moves the blades into the corresponding end position. Turning the hand wheel clockwise closes the damper.

Schematic illustration of NAK-H



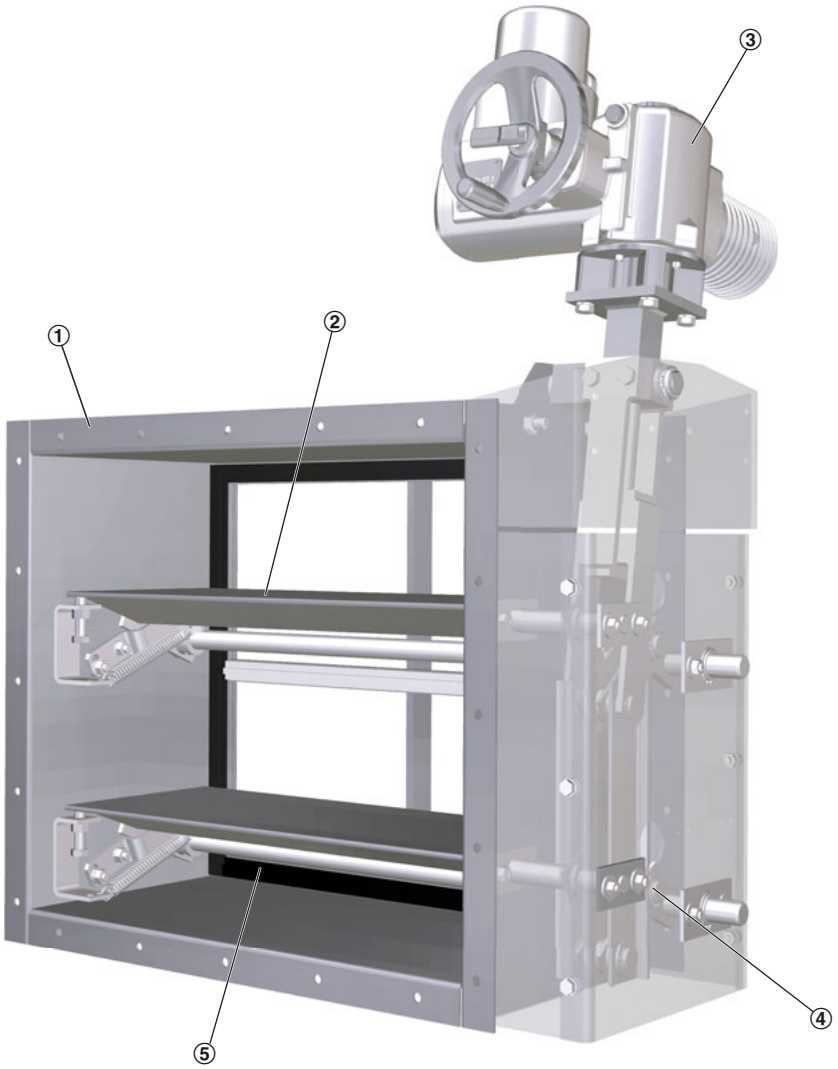
① Casing
② Blade
③ Hand wheel
④ Linkage (over centre locking)
⑤ Seal

Function

Functional description

The shut-off damper is opened and closed with an electric actuator. The control input signal is provided by others. In case of a power failure the shut-off damper can be opened or closed manually by turning the hand wheel.

Schematic illustration of NAK-E



① Casing
② Blade
③ Electric actuator with hand wheel
④ Linkage (over centre locking)
⑤ Seal

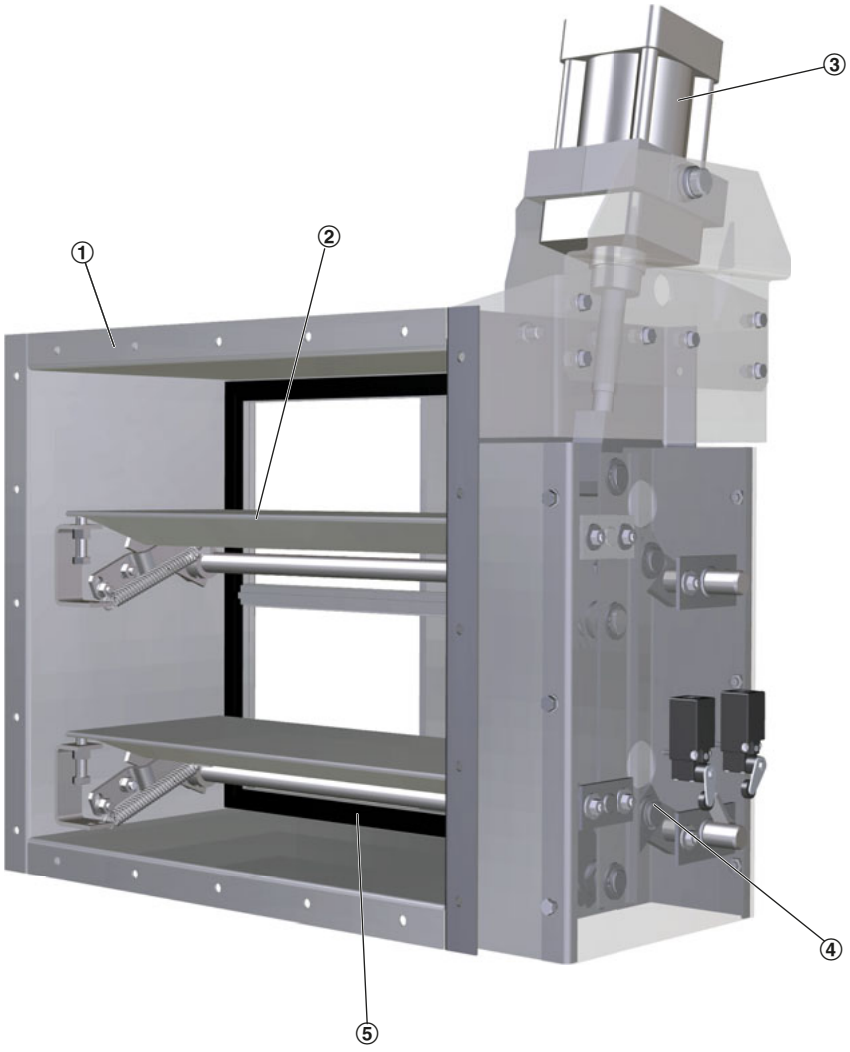
4

Function

Functional description

The shut-off damper is opened and closed with a double acting pneumatic actuator. The easiest way to generate the control input signal is electrically, using solenoid valves. Different opening and closing times can be set using throttle valves.The running time is at least 2 seconds.

Schematic illustration of NAK-P



① Casing
② Blade
③ Pneumatic actuator
④ Linkage (over centre locking)
⑤ Seal

Order code

NAK

NAK – P – G – R / 800×755 / Z05

1 2 3 4 5 6

1 Type
NAK Shut-off damper, gas-tight

2 Function
H Hand wheel
P Pneumatic actuator
E Electric actuator 400 V
E1 Electric actuator 230 V

3 Construction
No entry:
duct connection without flange holes
G Duct connection with flange holes

4 Operating side
R Right
L Left

5 Nominal size [mm]
B × H

6 Attachments
No entry: none
Z01 – Z07

4

Order example

NAK–E–G–R/600×755/Z03

Function	Electric actuator 3 x 230 V AC
Construction	Duct connection with flange holes
Operating side	On the right
Nominal size	600 × 755 mm
Attachments	Limit switches, indicating blade OPEN and CLOSED

Free area – NAK

H	B [mm]			
	400	600	800	1000
mm	m^2			
270	0.06	0.096	0.13	0.16
510	0.12	0.19	0.26	0.33
755	0.18	0.29	0.39	0.5
1000	0.24	0.38	0.52	0.66

Quick sizing – differential pressure

v	Δp_{st}
m/s	Pa
2	4
4	10
6	30
8	60
10	70

Description

Gas-tight shut-off damper, variant NAK-H

Variant

– NAK-H:
  Gas-tight shut-off damper with hand wheel

Parts and characteristics

– Ready-to-install shut-off damper
– Blades with linkage (over centre locking)
– Sealing frame with seal
– Hand wheel

Dimensions

Dimensional drawing of NAK-H

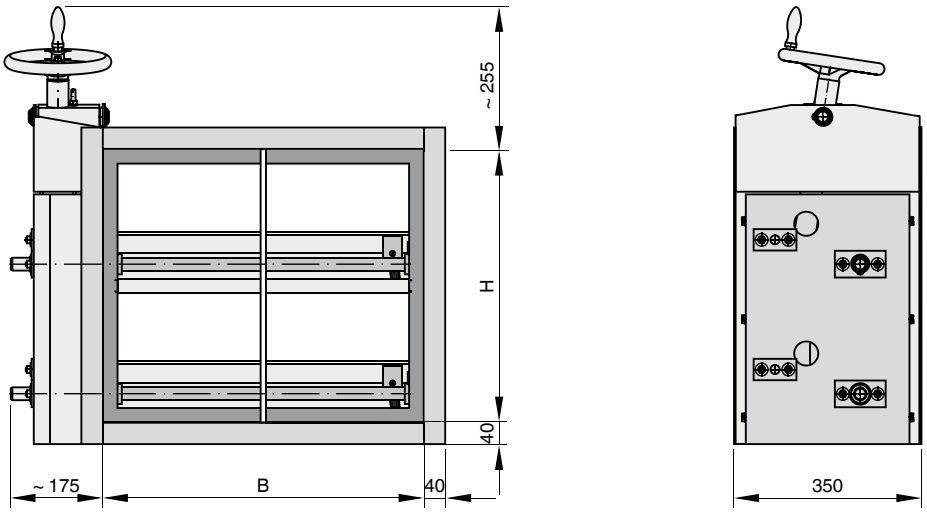


Illustration shows operating side on the right

Weight

H	B [mm]			
	400	600	800	1000
mm	kg			
270	34	45	56	67
510	57	70	82.5	95
755	81	95	109	123
1000	103.5	120	136	153

Description

Gas-tight shut-off damper, variant NAK-E/-E1

Variant

– NAK-E:
  Gas-tight shut-off damper with electric actuator (3 × 230 (400 V AC), 50 Hz

Parts and characteristics

– Ready-to-install shut-off damper
– Blades with linkage (over centre locking)
– Sealing frame with seal
– Electric actuator (3 × 230 (400 V AC), 50 Hz)

Dimensions

Dimensional drawing of NAK-E

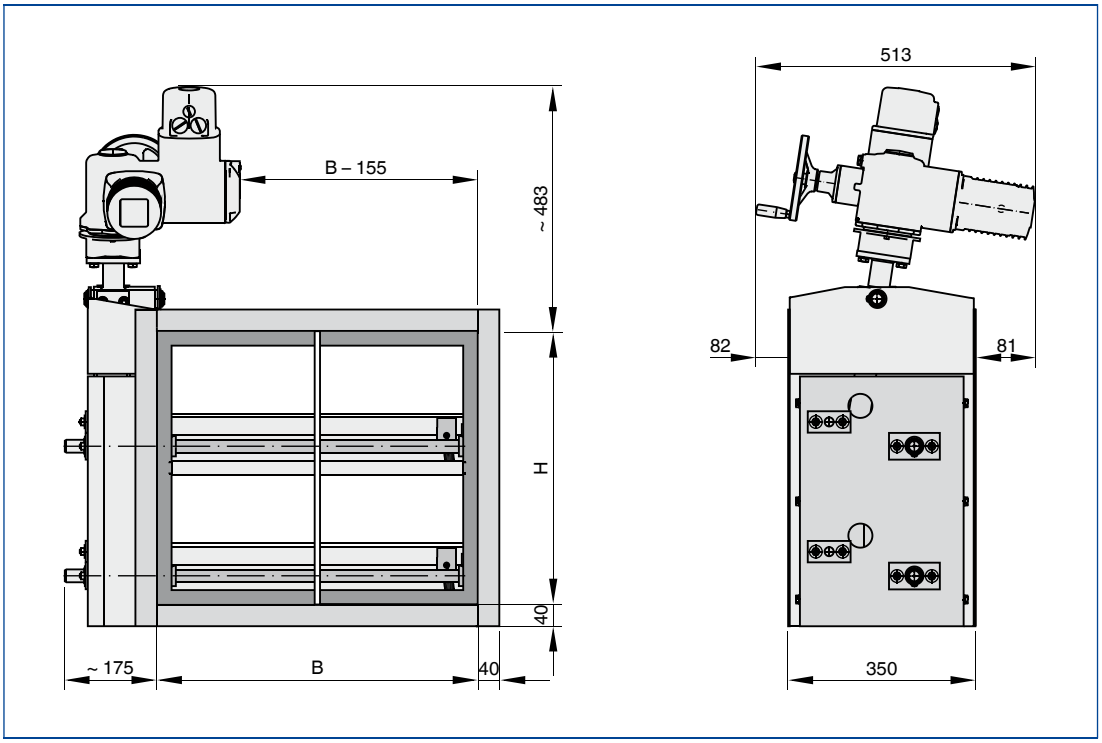


Illustration shows operating side on the right

Weight – NAK-E

H	B [mm]			
	400	600	800	1000
mm	kg			
270	57	68	79	90
510	80	93	106	118
755	104	118	132	146
1000	127	143	159	176

Description

Variant

– NAK-E1:
  Gas-tight shut-off damper with electric actuator
  (230 V AC, 50 Hz)

Parts and characteristics

– Ready-to-install shut-off damper
– Blades with linkage (over centre locking)
– Sealing frame with seal
– Electric actuator 230 V AC

Dimensions

Dimensional drawing of NAK-E1

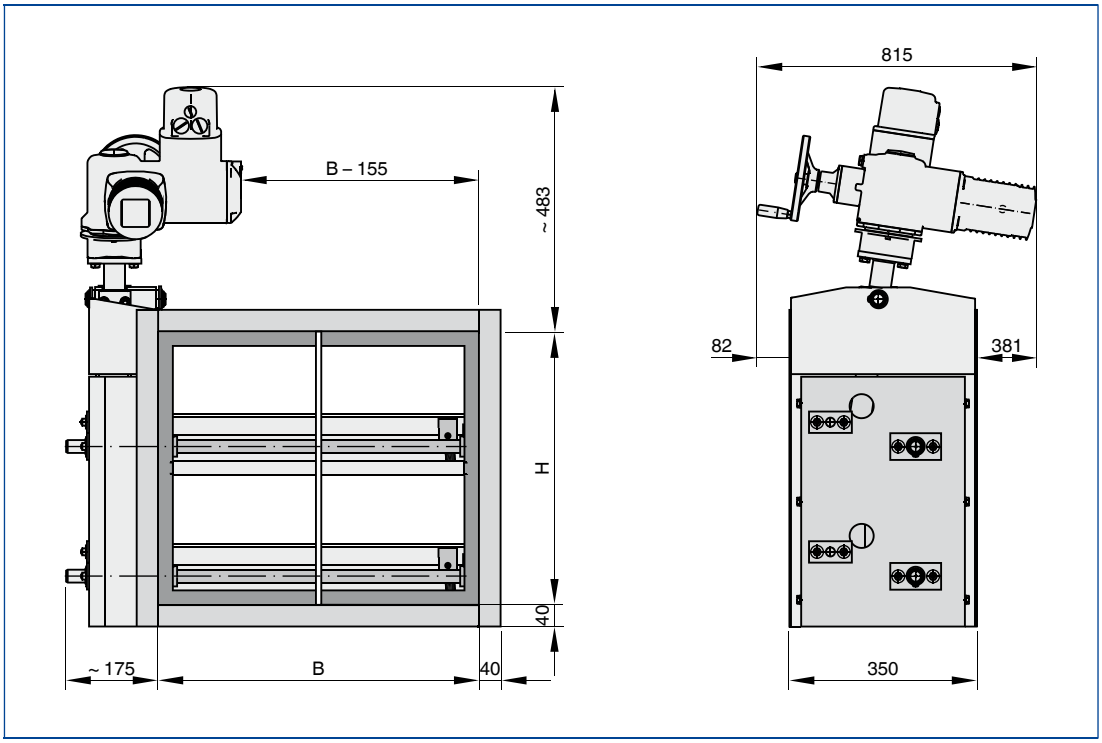


Illustration shows operating side on the right

Weight – NAK-E1

H	B [mm]			
	400	600	800	1000
mm	kg			
270	59	70	81	92
510	82	95	107.5	120
755	106	120	134	148
1000	128.5	145	161	178

Description

Gas-tight shut-off damper, variant NAK-P

Variant

– NAK-P:
Gas-tight shut-off damper with pneumatic actuator (operating pressure 6 bar)

Parts and characteristics

– Ready-to-install shut-off damper
– Blades with linkage (over centre locking)
– Sealing frame with seal
– Double acting pneumatic actuator with adjustable throttle valves

Dimensions

For detailed information on making the tube connections for the actuator see Chapter K3 – 4.2

Dimensional drawing of NAK-P

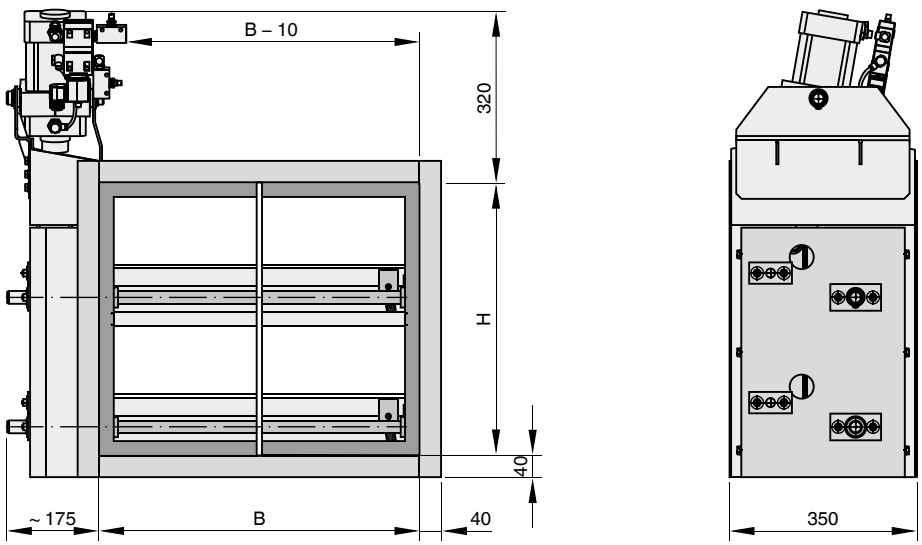


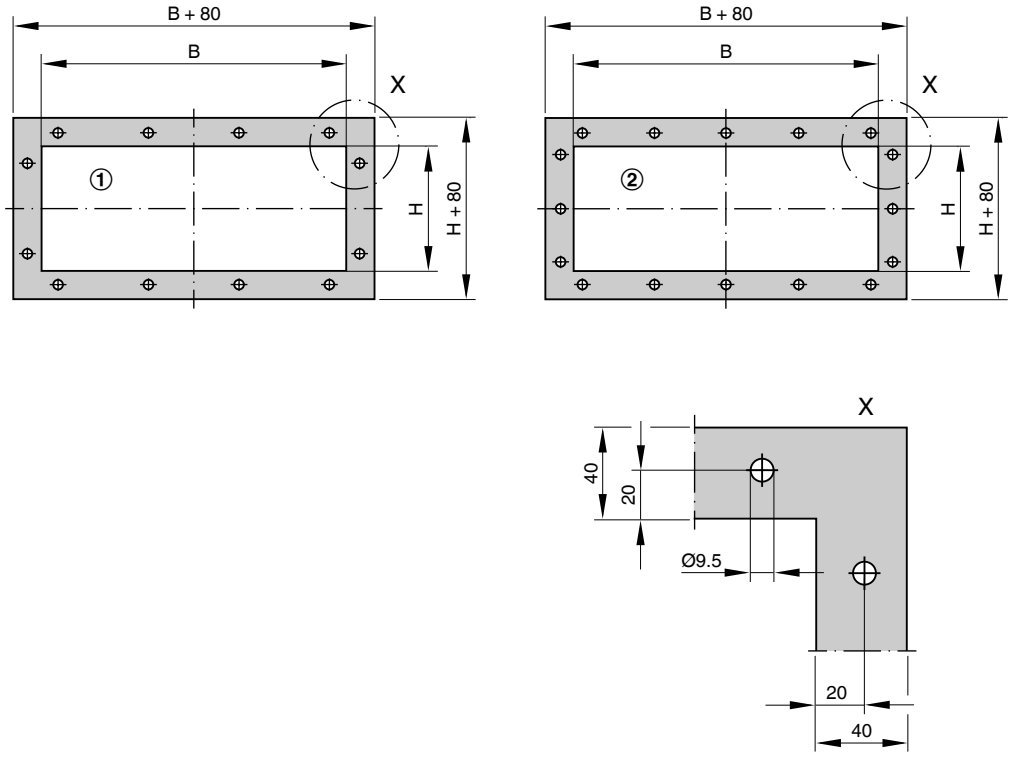
Illustration shows operating side on the right

Weight

H	B [mm]			
	400	600	800	1000
mm	kg			
270	40	51	62	73
510	63	76	89	101
755	87	101	115	129
1000	110	126	142	159

Dimensions

Flange holes – NAK



① Even number of holes (hole pitch = 125 mm)

② Uneven number of holes (hole pitch = 125 mm)

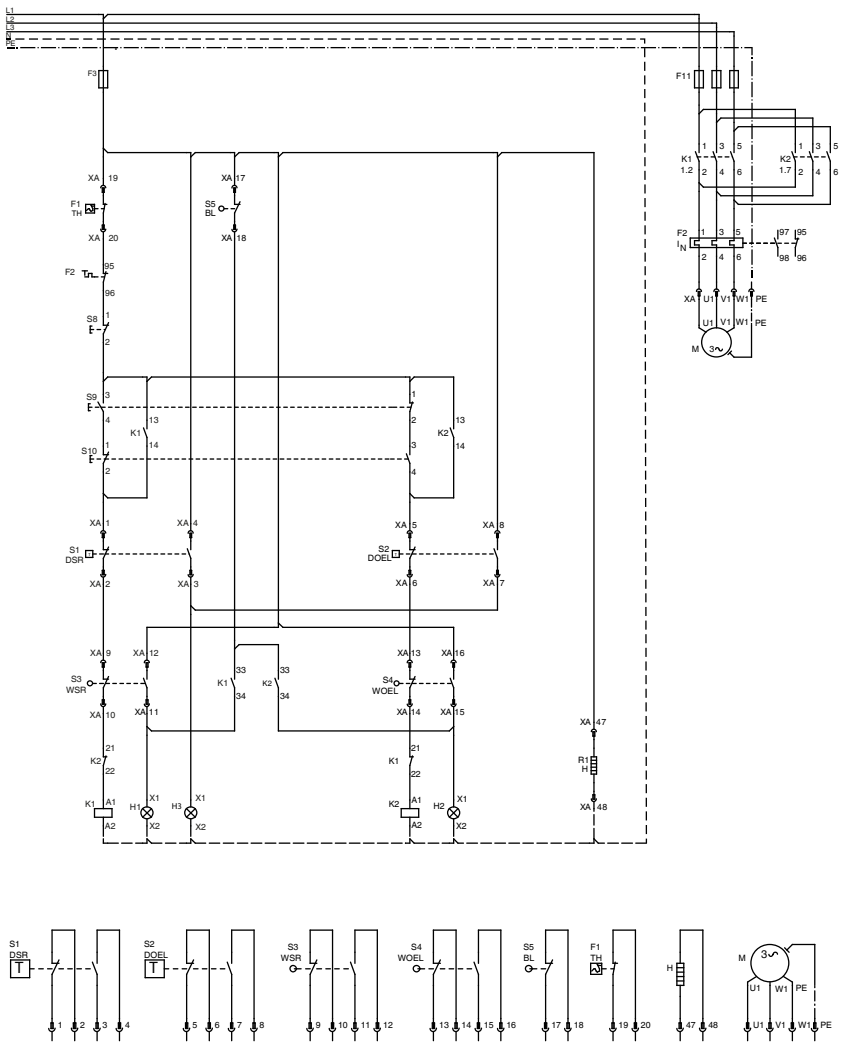
No. of holes per side

B	No. of holes
	n
mm	–
200 – 274	2
275 – 399	3
400 – 524	4
525 – 649	5
650 – 774	6
775 – 899	7
900 – 1000	8

No. of holes per side

H	No. of holes
	n
mm	–
270	3
510	5
755	7
1000	9

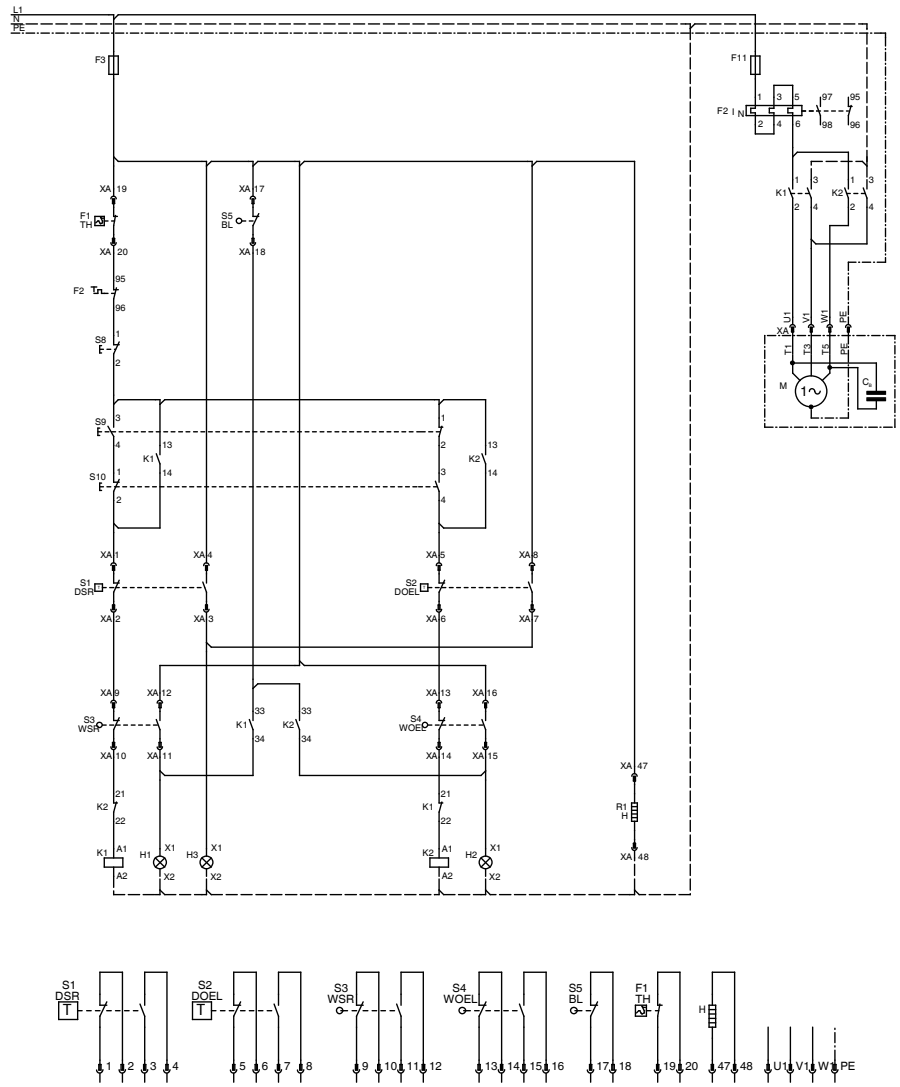
Type NAK-E – wiring diagram for actuator 3 x 400 V AC



S1 Torque switch, clockwise (DSR) – CLOSE damper
S2 Torque switch, anticlockwise (DOEL) – OPEN damper
S3 Limit switch, clockwise (WSR) – CLOSE damper
S4 Limit switch, anticlockwise (WSR) – OPEN damper
S5 Flasher (BL)
F1 Motor protection switch (TH)
F2 Thermal switch (TH)
R1 Heating (TH)

External control
S8 Push button – Stop
S9 Push button – CLOSE damper
S10 Push button – OPEN damper
K1 Contactor – CLOSE damper
K2 Contactor – OPEN damper
H1 Message – Close damper
H2 Message – Open damper
H3 Message – Error

Type NAK-E – wiring diagram for actuator 230 V AC



S1 Torque switch, clockwise (DSR) – CLOSE damper
S2 Torque switch, anticlockwise (DOEL) – OPEN damper
S3 Linear switch, clockwise (WSR) – CLOSE damper
S4 Linear switch, anticlockwise (WSR) – OPEN damper
S5 Flasher (BL)
F1 Motor protection switch (TH)
F2 Thermal switch (TH)
R1 Heating (TH)
C Operating capacitor (CB)

External control
S8 Push button – Stop
S9 Push button – CLOSE damper
S10 Push button – OPEN damper
K1 Contactor – CLOSE damper
K2 Contactor – OPEN damper
H1 Message – Close damper
H2 Message – Open damper
H3 Message – Error

Standard text

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

Rectangular shut-off dampers for shutting off ducts (gas-tight). Level of tightness required by KTA Guideline 3601 (German Nuclear Safety Standards Commission, KTA) and by DIN 25414 even when the power supply or compressed air supply fails. Ready-to-operate unit which consists of the casing, blades and the blade mechanism (over centre locking). Flanges on both sides, suitable for duct connection. Suitable for duct pressures up to 5000 Pa.

Special features

- Compact design and robust actuator mechanism allow for any installation orientation
- Gas-tight closure, even when there is no power, due to special over centre locking mechanism
- Maximum closed blade leakage rate is 0.0028 (l/s)/m² or 0.01 (m³/h)/m² at a differential pressure of 2000 Pa
- Maximum pressure loading of 5000 Pa, in closing direction

Materials and surfaces

- Casing made of sheet steel, material no. EN 10142-DX51D+Z150-200
- Blades and sealing frame made of sheet steel, material no. EN 10327-DX51D+Z150-200-NAC
- Linkage, travel stops and further attachments made of galvanised steel
- Brass or stainless steel bearings
- Seals made of neoprene rubber foam, temperature resistant up to 80 °C
- Powder-coated casing and blades, grey (RAL 7001)

Construction

- Duct connection without flange holes
- G: Flange holes on both sides

Technical data

- Nominal sizes: 400 × 270 to 1000 × 1000 mm
- Maximum differential pressure: 5000 Pa, in closing direction
- Closed blade air leakage: < 0.0028 (l/s)/m² or 0.01 (m³/h)/m²

4

Order options

1 Type

NAK Shut-off damper, gas-tight

2 Function

☐ **H** Hand wheel
☐ **P** Pneumatic actuator
☐ **E** Electric actuator 400 V
☐ **E1** Electric actuator 230 V

3 Construction

No entry:
duct connection without flange holes
☐ **G** Duct connection with flange holes

4 Operating side

☐ **R** Right
☐ **L** Left

5 Nominal size [mm]

B × H

6 Attachments

No entry: none
☐ **Z01 – Z07**

Notes

Attachments

Attachments

For capturing the end positions (OPEN and/or CLOSED) of dampers and providing the control input signal for pneumatic actuators

Limit switches for gas-tight shut-off dampers, solenoid valves for gas-tight shut-off dampers with pneumatic actuators

- Limit switches for capturing the end positions of gas-tight shut-off dampers
- Solenoid valve to provide the control input signal for NAK-P
- Different opening and closing times can be set using throttle valves (at least 2 s)

Solenoid valve

Limit switch

Description

Application

- Limit switches for capturing the end positions (OPEN and/or CLOSED) of gas-tight shut-off dampers
- Electric signals of limit switches are integrated with system control
- Solenoid valve to provide the electric control input signal for double acting pneumatic actuators

Any attachments are defined with the order code of the gas-tight shut-off damper.

4

Attachments for gas-tight shut-off dampers NAK-H, NAK-E, NAK-E1

Order code detail	Limit switch
Z01	1, damper CLOSED
Z02	1, damper OPEN
Z03	2, damper OPEN and CLOSED

Attachments for gas-tight shut-off dampers NAK-P

Order code detail	Solenoid valve	Limit switch
Z04	1	–
Z05	1	1, damper CLOSED
Z06	1	1, damper OPEN
Z07	1	2, damper OPEN and CLOSED

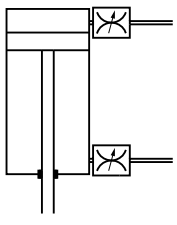
Function

Functional description

The actuator moves the blades of a gas-tight shut-off damper into OPEN or CLOSED position. The easiest way to generate the control input signal is electrically, using solenoid valves. Different opening and closing times can be set using throttle valves.

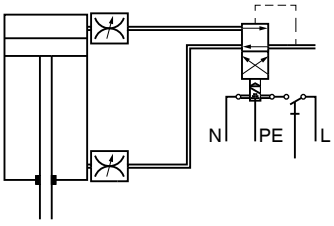
Double acting pneumatic actuators
The shut-off damper is opened and closed with compressed air. For this purpose, the actuator has two tube connections. Compressed air is applied to one tube connection while the other connection remains open such that the air can escape from the corresponding chamber of the actuator. For the other direction of rotation, the process is reversed.

Control of a double acting pneumatic actuator without a solenoid valve



Compressed air connection (operating pressure 6 bar)

Control of a double acting pneumatic actuator with a solenoid valve



Compressed air connection (operating pressure 6 bar)

Description

/ **Z01** /
/ **Z02** /
/ **Z03** /
/ **Z05** /
/ **Z06** /
/ **Z07** /

Order code detail

Application

– Limit switch
– Volt-free contacts for signalling or activating switch functions

Technical data

Limit switch

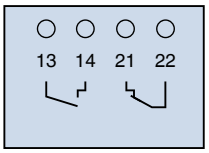
Limit switch

Type of contact	1 normally closed contact, 1 normally open contact, double throw
Switch rating	AC15, 6A, 230 V AC
Service life	10^7 switching cycles
Cable gland	PG13.5
IEC protection class	II (protective insulation)
Protection level	IP 66
EC conformity	EMC to 2004/108/EG, low voltage to 2006/95/EG
Operating temperature	–20 to 80 °C

4

Wiring

Terminal connections



13, 14: Normally open contact
21, 22: Normally closed contact

Description

/ **Z04** /
/ **Z05** /
/ **Z06** /
/ **Z07** /

Order code detail

Application

– Solenoid valve 5413 Namur 230 V, with connector

Parts and characteristics

– Supply voltage 230 V DC ± 10 %
– Control input signal: Supply voltage on/off
– Connector

Technical data

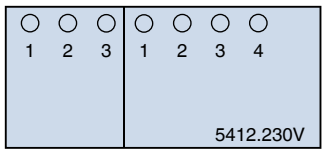
Solenoid valve

Solenoid valve 5413, 230 V

Supply voltage	230 V AC ± 10 %, 50/60 Hz
Power rating	2 W
Pressure range	6.0 bar
Flow rate Q Nn	900 l/min
Compressed air	Neutral media such as compressed air containing oil or oil-free compressed air
Air connection	G 1/4"
Connector	2508, to DIN 43650, type A
Protection level	With IP 65 connector
EC conformity	EMC according to 2004/108/EG
Weight	0.4 kg

Wiring

Terminal connections and pneumatic connections



Electrical connections
1: Ground, neutral
2: Control voltage for direction of rotation 1
3: Earth
Pneumatic connections
1: Operating pressure, throttle valve
2 : OPEN Damper
3 : Throttle valve
4 : CLOSE damper

Gas-tight shut-off dampers
Basic information and nomenclature

- Product selection

Product selection

	Variant			
	NAK-H	**NAK-E**	**NAK-E1**	**NAK-P**
Casing and blades				
Galvanised sheet steel, powder-coated	●	●	●	●
Duct connection				
Without holes	●	●	●	●
Flange holes	●	●	●	●
Dynamics				
Hand wheel	●	●	●	
Actuator		Electric 3 × 230 V AC (400 V AC)	Electric 230 V AC	Pneumatic
Running time for 90°	30 turns	~ 60 s		> 2 s
Nominal sizes				
Width	200 – 1000 mm			
Increment	1 mm			
Height	270 – 1000 mm			
Casing				
Length	350 mm			
●	Possible			
	Not possible			

4

Notes

5 Doors

Low-leakage steel doors and inspection access doors are used as separating elements for walk-in plant rooms, storage rooms, air handling units, filter chambers, or enclosures for machinery or electrical equipment.

5

Double lever locking device – interior lever

Removable front locking lever (of double lever locking device)

Pressure relief valve

Cylinder rim lock

Inspection window

Doors
Type ST

Single and double leaf hinged doors for plant rooms, storage rooms, air handling units, filter chambers, or enclosures for machinery or electrical equipment

Rectangular single leaf or double leaf doors that are robust and ensure only minimal leakage even in case of large differential pressures

- Maximum width of 1100 mm, maximum height of 2115 mm
- Maximum pressure loading of 1000 Pa, in closing direction; reinforced construction for up to 2000 Pa
- Air leakage rate of approx. 0.6 l/s or 2 m^3/h at 1000 Pa (for each door leaf)
- Reinforced door leaf for higher pressure loading
- Double skin door leaf made of galvanised sheet steel and with mineral wool infill
- Door frame made of angle sections or U-channel sections
- Two double lever locking devices, can be operated from both sides
- APT rubber seal, temperature resistant up to 90 °C
- Available in standard sizes and many intermediate sizes

Optional equipment and accessories

- Sound insulating lining
- Any combination of cylinder rim lock, mortice lock, pressure relief valve, inspection window and removable exterior locking levers
- Powder-coated for outdoor installation

Variants

Product examples

Low-leakage steel door, variant ST-R/Z15

Steel door with inspection window, pressure relief valve and cylinder rim lock

Low-leakage steel door, variant ST-D/Z15

Two leaf hinged steel door with inspection window, pressure relief valve and cylinder rim lock

Description

Low-leakage steel door, variant ST-R/Z15

For detailed information on attachments see Chapter K3 – 5.3

Application

- Low-leakage steel doors of Type ST are used as separating elements for walk-in plant rooms, storage rooms, air handling units, filter chambers, or enclosures for machinery or electrical equipment.
- Robust construction with very low air leakage rate even in case of large differential pressures
- Powder-coated construction with increased corrosion resistance
- Maximum pressure on the opening side is 1000 Pa (2000 Pa for reinforced construction)

Variants

- ST: Low-leakage steel door
- ST-V: Low-leakage steel door with reinforced leaf
- ST-X: Low-leakage steel door with sound insulating lining
- ST-X-V: Low-leakage steel door with sound insulating lining and reinforcing elements
- ST-D: Double leaf low-leakage steel door
- ST-D-V: Double leaf low-leakage steel door with reinforced leaves
- ST-D-X: Double leaf low-leakage steel door with sound insulating lining
- ST-D-X-V: Double leaf low-leakage steel door with sound insulating lining and reinforcing elements
- R: Right hinge
- L: Left hinge

Nominal sizes

ST (single leaf)
- B: 500, 600, 800 and 940 mm (intermediate sizes 400 – 1100 mm in increments of 1 mm)
- H: 1500, 1600, 1800 and 1940 mm (intermediate sizes 800 – 2115 mm in increments of 1 mm)
- Any combination of B × H

ST-D (double leaf)
- B: 1080, 1280, 1680 and 1960 mm (intermediate sizes 1080 – 2280 mm in increments of 1 mm)
- H: 1500, 1600, 1800 and 1940 mm (intermediate sizes 800 – 2115 mm in increments of 1 mm)

Any combination of B × H

Attachments

- 11: Angle section frame with welded fixing tabs
- 13: U-channel frame 115 × 40 × 4 mm
- 15: U-channel frame 240 × 40 × 4 mm with welded fixing tabs
- 21: Angle section frame without fixing tabs
- Locks, inspection window, pressure relief valve, front locking lever: for the improvement and extension of the range of applications

Special features

- Variants with additional sound insulating lining (X construction variants) provide good sound absorption
- U-value: 1.02 W/(m²K) at 8 W/(m²K) for internal spaces (air not in motion) and 25 W/(m²K) for outside (air in motion)
- Optional door frame without fixing tabs (-21) but with flange holes

Materials and surfaces

- Door leaf and stiffeners made of galvanised sheet steel
- Absorption material is mineral wool
- Door frame made of galvanised steel
- Double lever locking devices made of aluminium diecast
- APT rubber seal
- Sound absorbing Bitumen K57 slabs
- P1: Powder-coated, RAL CLASSIC colour
- PS: Powder-coated, NCS or DB colour

Mineral wool
- To DIN 4102, fire rating class A2, non-combustible
- RAL quality mark RAL-GZ 388
- Biosoluble and hence hygienically safe according to the German TRGS 905 (Technical Rules for Hazardous Substances) and EU directive 97/69/EG
- Inert to fungal and bacterial growth

Installation and commissioning

- Align the frame precisely before mortaring it in
- When the door is closed, the perimeter seal must be in full contact with the frame

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 door air leakage

5

Technical data

Nominal sizes (single leaf)	400 × 800 – 1100 × 2115 mm
Nominal sizes (double leaf)	1080 × 800 – 2280 × 2115 mm
Maximum pressure on the opening side	1000 Pa (2000 Pa with reinforced construction (-V))
Weighted sound reduction index (with sound absorbing infill)	Single leaf door 43 – 46 dB, double leaf door 44 – 47 dB, doors on both sides of the wall opening 58 – 61 dB

Sound reduction index

Weighted sound reduction index

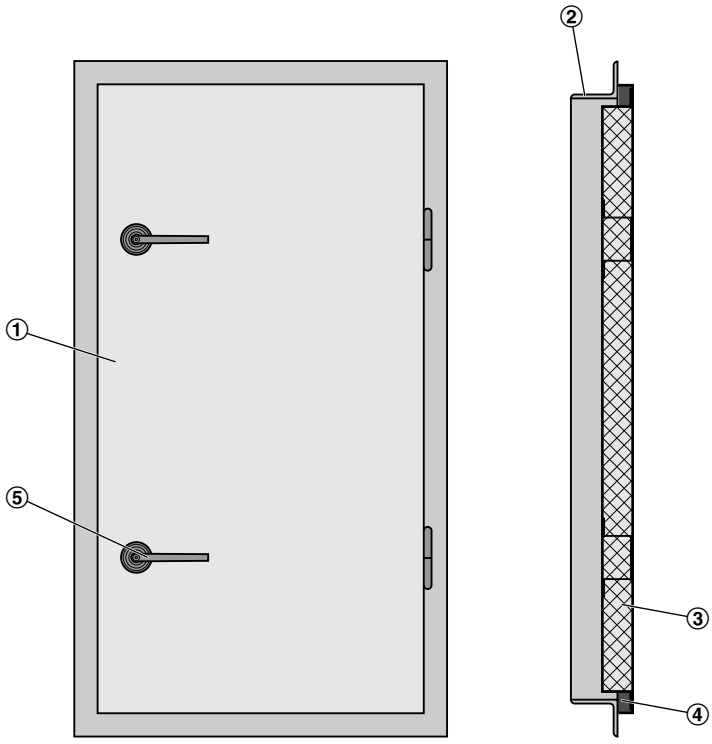
Variant	Centre frequency fm [Hz]				
	125	250	500	1000	2000
	R_W				
	dB				
ST-X, ST-X-V	26	38	44	46	46
ST-D-X, ST-D-X-V	28	41	45	49	46
2 × ST-X, ST-X-V, doors on both sides of the wall opening	48	52	59	62	65

Function

Functional description

Low-leakage steel doors are low-leakage separating elements for rooms or other enclosures. When the door is being closed, i.e. when the double locking levers are being turned, the perimeter seal is fully pressed against the frame. As a consequence, the air leakage rate is extremely low even in case of high differential pressures.

Schematic illustration of ST



① Door
② Door frame
③ Absorption material
④ Seal
⑤ Double lever locking device

Order code

ST

ST – R – X – V / 500×1500 / 11 / Z01 / P1 – RAL ...
1 2 3 4 5 6 7 8

1 Type
ST Low-leakage steel door

2 Hinge
R Right
L Left

3 Sound insulating lining
No entry: none
X With

4 Construction of door
No entry: standard construction
V Reinforced door leaf

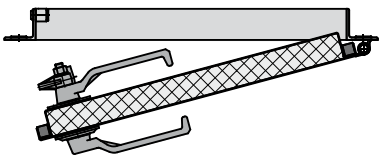
5 Nominal size [mm]
B × H

6 Door frame
11 Angle section 50/50/4, with welded fixing tabs
13 U-channel 115/40/4, with welded fixing tabs
15 U-channel 240/40/4, with welded fixing tabs
21 Angle section, without fixing tabs

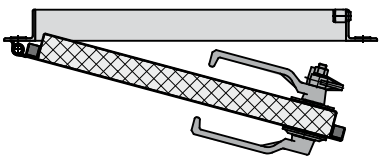
7 Attachments
No entry: none
Z01 – Z09

8 Surface
No entry: standard construction
P1 Powder-coated, RAL CLASSIC colour
PS Powder-coated, NCS or DB colour
Gloss level:
RAL 9010 50 %
RAL 9006 30 %
All other RAL colours 70 %

Right hinge



Left hinge



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Order example

ST–R/800×1800/21/Z06

Hinge	On the right
Sound insulating lining	Without
Construction of door	Standard construction
Nominal size	800 × 1800 mm
Door frame	Angle section, without fixing tabs
Attachments	Standard construction with inspection window and cylinder rim lock
Surface	Standard construction

Order code

ST-D

ST – D – X – V / 1080×1500 / 11 / Z01 / P1 – RAL ...
1 2 3 4 5 6 7 8

1 Type
ST Low-leakage steel door

2 Number of door leaves
D Double leaf low-leakage steel door

3 Sound insulating lining
No entry: none
X With

4 Construction of door
No entry: standard construction
V Reinforced door leaf

5 Nominal size [mm]
B × H

6 Door frame
11 Angle section 50/50/4, with welded fixing tabs
13 U-channel 115/40/4, with welded fixing tabs
15 U-channel 240/40/4, with welded fixing tabs
21 Angle section, without fixing tabs

7 Attachments
No entry: none
Z01 – Z09

8 Surface
No entry: standard construction
P1 Powder-coated, RAL CLASSIC colour
PS Powder-coated, NCS or DB colour
Gloss level:
RAL 9010 50 %
RAL 9006 30 %
All other RAL colours 70 %

5

Order example

ST–D/1680×1800/21/Z06

Number of door leaves	Double leaf low-leakage steel door
Sound insulating lining	Without
Construction of door	Standard construction
Nominal size	1680 × 1800 mm
Door frame	Angle section, without fixing tabs
Attachments	Standard construction with inspection window and cylinder rim lock
Surface	Standard construction

ST

Description

Variant
– ST: Low-leakage steel door

Parts and characteristics
– Door with perimeter seal
– Double lever locking devices
– Absorption material
– Hinges
– Door frame

Construction features
– Double skin door leaf; skin thickness of 1 mm and 1.25 mm (opening side), respectively
– Stiffeners at the level of the double lever locking devices
– Additional central stiffener from H = 1800 mm
– Double lever locking devices can be operated from both sides
– Seal is temperature resistant up to 90 °C
– Maximum pressure loading of 1000 Pa, in closing direction); air leakage rate of 0.6 l/s or 2 m^3/h

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ST-V

Variant
– ST-V: Low-leakage steel door with reinforced leaf

Parts and characteristics
– Reinforced door leaf with perimeter seal
– Double lever locking devices
– Absorption material
– Hinges
– Door frame

Construction features
– Double skin door leaf; skin thickness of 1 mm and 1.25 mm (opening side), respectively
– Stiffeners at the level of the double lever locking devices
– Additional central stiffener from H = 1800 mm
– Screw-fixed stiffeners
– Double lever locking devices can be operated from both sides
– Seal is temperature resistant up to 90 °C
– Maximum pressure loading of 2000 Pa, (in closing direction); air leakage rate of 1.1 l/s or 4 m^3/h

ST-X

Variant
- ST-X: Low-leakage steel door with sound insulating lining

Parts and characteristics
- Door with perimeter seal
- Double lever locking devices
- Absorption material
- Sound insulating boards fitted to the inside of the door skins
- Hinges
- Door frame

Construction features
- Double skin door leaf; skin thickness of 1 mm and 1.25 mm (opening side), respectively
- Stiffeners at the level of the double lever locking devices
- Additional central stiffener from H = 1800 mm
- Double lever locking devices can be operated from both sides
- Seal is temperature resistant up to 90 °C
- Maximum pressure loading of 1000 Pa, (in closing direction); air leakage rate of 0.6 l/s or 2 m^3/h

ST-X-V

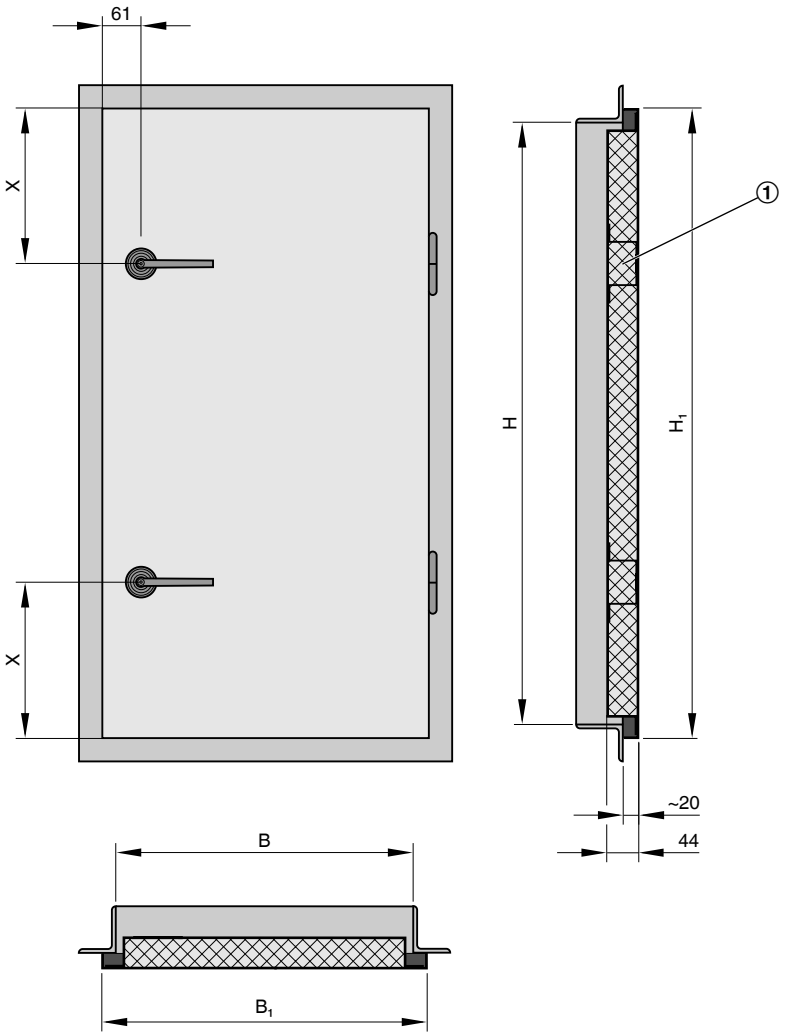
Variant
- ST-X-V: Low-leakage steel door with sound insulating lining and reinforcing elements

Parts and characteristics
- Reinforced door leaf with perimeter seal
- Double lever locking devices
- Absorption material
- Sound insulating boards fitted to the inside of the door skins
- Hinges
- Door frame

Construction features
- Double skin door leaf; skin thickness of 1 mm and 1.25 mm (opening side), respectively
- Stiffeners at the level of the double lever locking devices
- Additional central stiffener from H = 1800 mm
- Double lever locking devices can be operated from both sides
- Seal is temperature resistant up to 90 °C
- Maximum pressure loading of 2000 Pa, in closing direction); air leakage rate of 1.1 l/s or 4 m^3/h

Dimensions

Dimensional drawing of ST



① Reinforcing elements

Illustration shows right hinge

Dimensions

B	B1
mm	mm
< 500	B + 30
500	530
600	630
800	830
940	970

Dimensions

H	H1	X
mm	mm	
< 1500	H + 30	249.5
1500	1530	349.5
1600	1630	349.5
1800	1830	349.5
1940	1970	349.5

Weight – ST, ST-V

H	B [mm]			
	500	600	800	940
mm	kg			
1500	33	40	53	62
1600	34	41	54	64
1800	35	42	56	66
1940	36	43	57	67

Weight – ST-X, ST-X-V

H	B [mm]			
	500	600	800	940
mm	kg			
1500	36	43	58	68
1600	37	44	59	70
1800	38	46	61	71
1940	39	46	62	73

ST-D

Description

Variant
- ST-D: Double leaf low-leakage steel door

Parts and characteristics
- Two door leaves, both with a perimeter seal
- Mullion
- Double lever locking devices
- Absorption material
- Hinges
- Door frame

Construction features
- Double skin door leaf; skin thickness of 1 mm and 1.25 mm (opening side), respectively
- Stiffeners at the level of the double lever locking devices
- Additional central stiffener from H = 1800 mm
- Double lever locking devices can be operated from both sides
- Seal is temperature resistant up to 90 °C
- Maximum pressure loading of 1000 Pa, in closing direction); air leakage rate of 1.1 l/s or 4 m^3/h

ST-D-V

Variant
- ST-D-V: Double leaf low-leakage steel door with reinforced leaves

Parts and characteristics
- Two door leaves, both with reinforcing elements and a perimeter seal
- Mullion
- Double lever locking devices
- Absorption material
- Hinges
- Door frame

Construction features
- Double skin door leaf; skin thickness of 1 mm and 1.25 mm (opening side), respectively
- Stiffeners at the level of the double lever locking devices
- Additional central stiffener from H = 1800 mm
- Screw-fixed stiffeners
- Double lever locking devices can be operated from both sides
- Seal is temperature resistant up to 90 °C
- Maximum pressure loading of 2000 Pa, in closing direction); air leakage rate of 2.2 l/s or 8 m^3/h

ST-D-X

Variant
- ST-D-X: Double leaf low-leakage steel door with sound insulating lining

Parts and characteristics
- Two door leaves, both with a perimeter seal
- Mullion
- Double lever locking devices
- Absorption material
- Sound insulating boards fitted to the inside of the door skins
- Hinges
- Door frame

Construction features
- Double skin door leaf; skin thickness of 1 mm and 1.25 mm (opening side), respectively
- Stiffeners at the level of the double lever locking devices
- Additional central stiffener from H = 1800 mm
- Double lever locking devices can be operated from both sides
- Seal is temperature resistant up to 90 °C
- Maximum pressure loading of 1000 Pa, in closing direction); air leakage rate of 1.1 l/s or 4 m^3/h

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ST-D-X-V

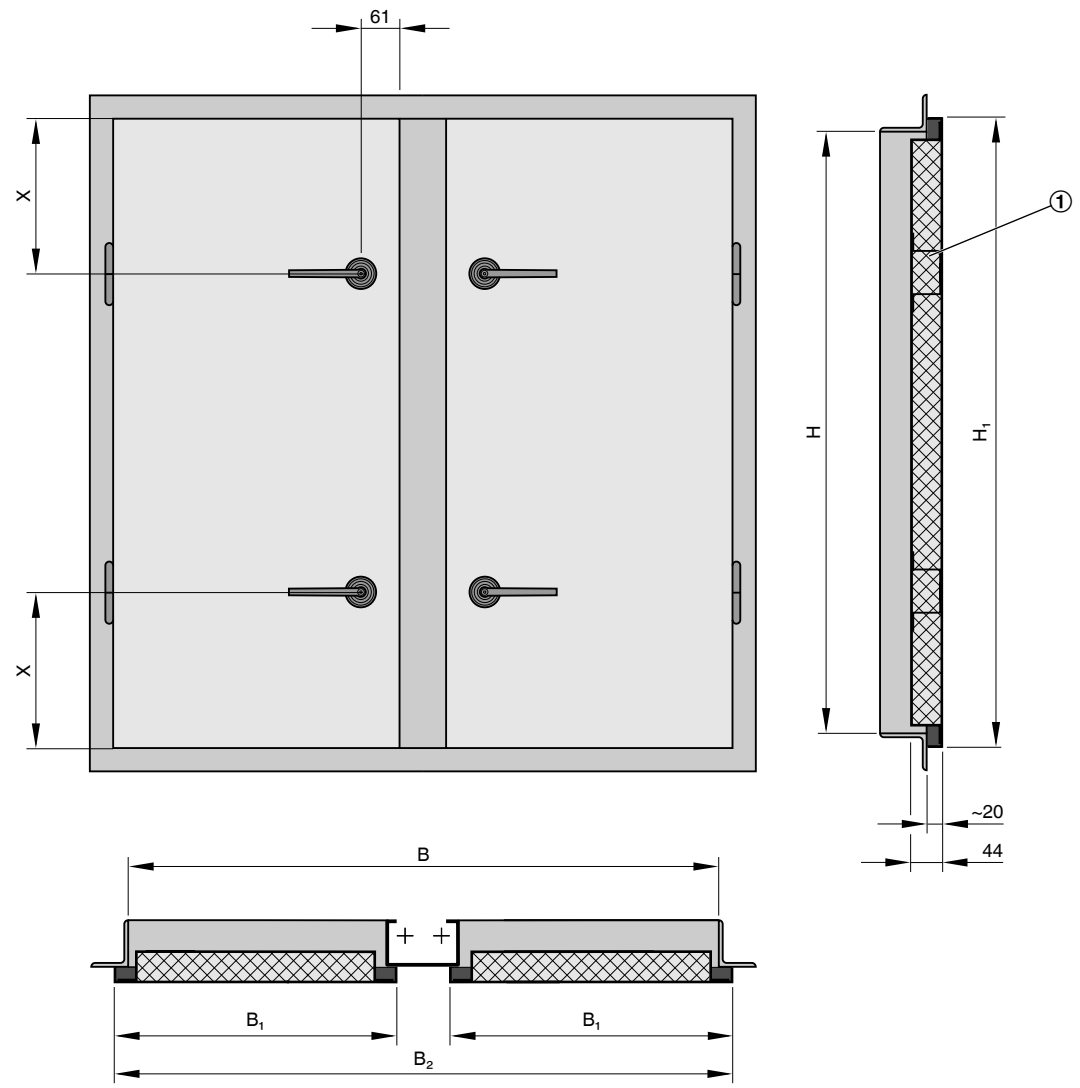
Variant
- ST-D-X-V: Double leaf low-leakage steel door with sound insulating lining and reinforcing elements

Parts and characteristics
- Two door leaves, both with reinforcing elements and a perimeter seal
- Mullion
- Double lever locking devices
- Absorption material
- Sound insulating boards fitted to the inside of the door skins
- Hinges
- Door frame

Construction features
- Double skin door leaf; skin thickness of 1 mm and 1.25 mm (opening side), respectively
- Stiffeners at the level of the double lever locking devices
- Additional central stiffener from H = 1800 mm
- Screw-fixed stiffeners
- Double lever locking devices can be operated from both sides
- Seal is temperature resistant up to 90 °C
- Maximum pressure loading of 2000 Pa, in closing direction); air leakage rate of 2.2 l/s or 8 m^3/h

Dimensions

Dimensional drawing of ST-D



① Reinforcing elements

Dimensions

B	B_1	B_2
mm	mm	
B < 1080	(B – 20)/2	B + 30
1080	530	1110
1280	630	1310
1680	830	1710
1960	970	1990

Dimensions

H	H_1	X
mm	mm	
< 1500	H + 30	249.5
1500	1530	349.5
1600	1630	349.5
1800	1830	349.5
1940	1970	349.5

Weight – ST-D, ST-D-V

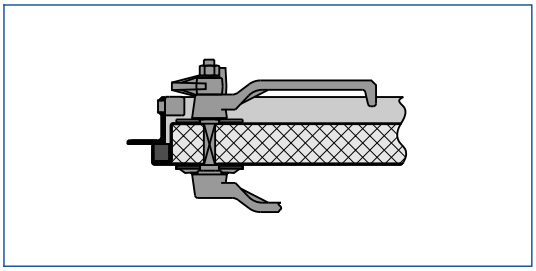
H	B [mm]			
	1080	1280	1680	1960
mm	kg			
1500	66	78	102	120
1600	68	81	106	123
1800	70	83	109	127
1940	72	86	113	131

Weight – ST-D-X, ST-D-X-V

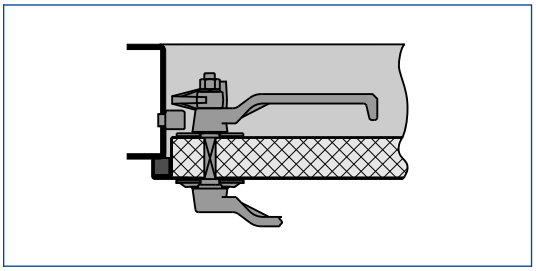
H	B [mm]			
	1080	1280	1680	1960
mm	kg			
1500	72	86	113	131
1600	75	88	116	135
1800	77	91	119	139
1940	80	95	124	145

Double lever locking device

Double lever locking device on angle section door frame



Double lever locking device on U-channel door frame

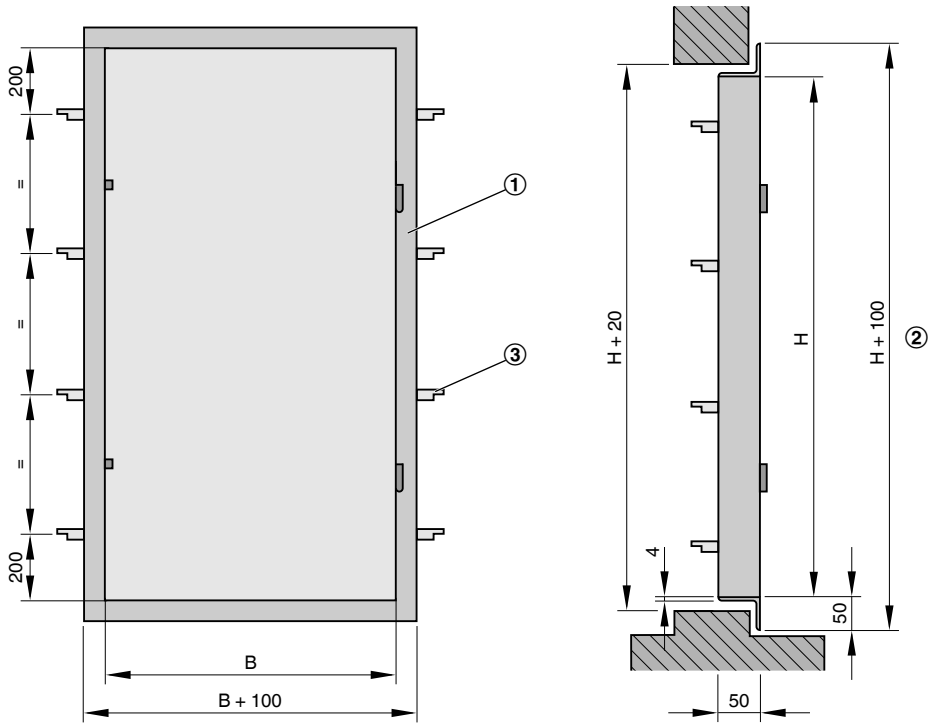


Installation dimensions

/ **11** /
/ **21** /

Order code detail

Installation of angle section door frame



① Angle section door frame
② Opening side
③ Fixing tab

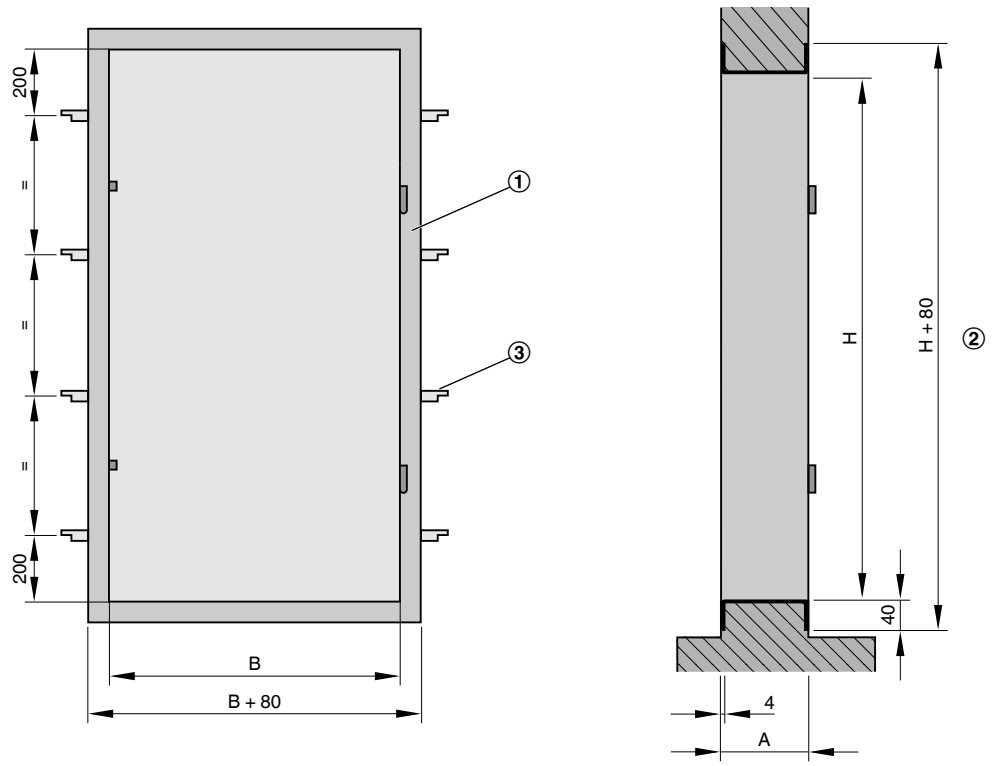
No. of fixing tabs

H	ST	ST-D
1500	6	8
1600	6	8
1800	8	10
1940	8	10

/ **13** /
/ **15** /

Order code detail

Installation of U-channel frame



① U-channel door frame
② Opening side
③ Fixing tab

Dimensions

Order code detail	A
	mm
13	115
15	240

Standard text

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

Low-leakage steel doors as separating elements for walk-in plant rooms, storage rooms, air handling units, filter chambers, or enclosures for machinery or electrical equipment. Ready-to-install component that consists of a door leaf with double lever locking devices, absorption material, seal and hinges, and a frame. Air leakage rate on the opening side is approx. 0.6 l/s or 2 m^3/h at 1000 Pa (single leaf door).

Special features

- Variants with additional sound insulating lining (X construction variants) provide good sound absorption
- U-value: 1.02 W/(m^2K) at 8 W/(m^2K) for internal spaces (air not in motion) and 25 W/(m^2K) for outside (air in motion)
- Optional door frame without fixing tabs (-21) but with flange holes

Materials and surfaces

- Door leaf and stiffeners made of galvanised sheet steel
- Absorption material is mineral wool
- Door frame made of galvanised steel
- Double lever locking devices made of aluminium diecast
- APT rubber seal
- Sound absorbing Bitumen K57 slabs
- P1: Powder-coated, RAL CLASSIC colour
- PS: Powder-coated, NCS or DB colour

Mineral wool

- To DIN 4102, fire rating class A2, non-combustible
- RAL quality mark RAL-GZ 388
- Biosoluble and hence hygienically safe according to the German TRGS 905 (Technical Rules for Hazardous Substances) and EU directive 97/69/EG
- Inert to fungal and bacterial growth

Technical data

- Nominal sizes (single leaf): 400 × 800 – 1100 × 2115 mm
- Nominal sizes (double leaf): 1080 × 800 – 2280 × 2115 mm
- Maximum pressure on the opening side is 1000 Pa (2000 Pa for reinforced construction -V)
- Weighted sound reduction index (with sound absorbing infill): single leaf door 43 – 46 dB, double leaf door 44 – 47 dB, on the left and right of the wall opening 58 – 61 dB

5

Order options

1 Type
ST Low-leakage steel door

2 Hinge
☐ **R** Right
☐ **L** Left

3 Sound insulating lining
No entry: none
☐ **X** With

4 Construction of door
No entry: standard construction
☐ **V** Reinforced door leaf

5 Nominal size [mm]
B × H

6 Door frame
☐ **11** Angle section 50/50/4, with welded fixing tabs
☐ **13** U-channel 115/40/4, with welded fixing tabs
☐ **15** U-channel 240/40/4, with welded fixing tabs
☐ **21** Angle section, without fixing tabs

7 Attachments
No entry: none
☐ **Z01 – Z09**

8 Surface
No entry: standard construction
☐ **P1** Powder-coated, RAL CLASSIC colour
☐ **PS** Powder-coated, NCS or DB colour
Gloss level:
RAL 9010 50 %
RAL 9006 30 %
All other RAL colours 70 %

Order options

1 Type
ST Low-leakage steel door

2 Number of door leaves
☐ **D** Double leaf low-leakage steel door

3 Sound insulating lining
No entry: none
☐ **X** With

4 Construction of door
No entry: standard construction
☐ **V** Reinforced door leaf

5 Nominal size [mm]
B × H

6 Door frame
☐ **11** Angle section 50/50/4, with welded fixing tabs
☐ **13** U-channel 115/40/4, with welded fixing tabs
☐ **15** U-channel 240/40/4, with welded fixing tabs
☐ **21** Angle section, without fixing tabs

7 Attachments
No entry: none
☐ **Z01 – Z09**

8 Surface
No entry: standard construction
☐ **P1** Powder-coated, RAL CLASSIC colour
☐ **PS** Powder-coated, NCS or DB colour

Gloss level:
RAL 9010 50 %
RAL 9006 30 %
All other RAL colours 70 %

5

Doors
Type BS

Double lever locking device – interior lever

Removable front locking lever (of double lever locking device)

Cylinder rim lock

Inspection window

Inspection access doors for filter chambers, air handling units or other enclosures with machinery or equipment

Rectangular single leaf inspection access doors that are robust and ensure only minimal leakage even in case of large differential pressures

- Maximum width of 800 mm, maximum height of 800 mm
- Maximum pressure loading of 2000 Pa, in closing direction
- Air leakage rate of approx. 1.1 l/s or 4 m^3/h at 2000 Pa
- Double skin door leaf made of galvanised sheet steel and with mineral wool infill
- Door frame made of angle sections
- Double lever locking device, can be operated from both sides
- APT rubber seal, temperature resistant up to 90 °C
- Available in standard sizes and many intermediate sizes

Optional equipment and accessories

- Cylinder rim lock, mortice lock, inspection window and removable exterior locking lever
- Powder-coated for outdoor installation

Description

Low-leakage inspection access door, variant BS-R

For detailed information on attachments see Chapter K3 – 5.3

Application
- Low-leakage inspection access doors of Type BS are used as separating elements for air handling units, filter chambers, or enclosures for machinery or electrical equipment
- Robust construction with very low air leakage rate even in case of large differential pressures
- Powder-coated construction with increased corrosion resistance
- Maximum pressure on the opening side is 2000 Pa

Variants
- R: Right hinge
- L: Left hinge

Nominal sizes
- B: 500, 600 mm (intermediate sizes: 300 – 800 mm, in increments of 1 mm)
- H: 500, 600 mm (intermediate sizes: 300 – 800 mm, in increments of 1 mm)
- Any combination of B × H

Attachments
- Locks, inspection window, front locking lever: for the improvement and extension of the range of applications

Special features
- U-value: 1.02 W/(m²K) at 8 W/(m²K) for internal spaces (air not in motion) and 25 W/(m²K) for outside (air in motion)
- Optional door frame without fixing tabs (-21) but with flange holes

Parts and characteristics
- Door with perimeter seal
- Double lever locking devices
- Absorption material
- Hinges
- Frame

Construction features
- Double skin door leaf; skin thickness of 1 mm and 1.25 mm (opening side), respectively
- Stiffeners at the level of the double lever locking devices
- Double lever locking device, can be operated from both sides
- Seal is temperature resistant up to 90 °C
- Maximum pressure loading of 2000 Pa, in closing direction); air leakage rate of 1.1 l/s or 4 m³/h

Materials and surfaces
- Door leaf and stiffeners made of galvanised sheet steel
- Absorption material is mineral wool
- Door frame made of galvanised steel
- Double lever locking devices made of aluminium diecast
- APT rubber seal
- P1: Powder-coated, RAL CLASSIC colour
- PS: Powder-coated, NCS or DB colour

Mineral wool
- To DIN 4102, fire rating class A2, non-combustible
- RAL quality mark RAL-GZ 388
- Biosoluble according to TRGS 905 and EU directive 97/69/EG
- Inert to fungal and bacterial growth

Installation and commissioning
- Align the frame precisely before mortaring it in
- When the door is closed, the perimeter seal must be in full contact with the frame

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 door air leakage

Technical data

Nominal sizes	300 × 300 – 800 × 800 mm
Maximum pressure on the opening side	2000 Pa
Weighted sound reduction index	43 – 46 dB

Sound reduction index

Weighted sound reduction index

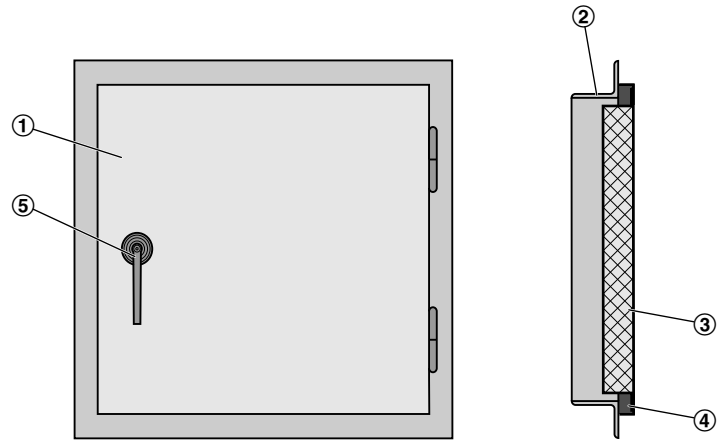
Centre frequency fm [Hz]				
125	250	500	1000	2000
R_W	R_W			
dB	dB			
26	38	44	46	46

Function

Functional description

Low-leakage inspection access doors are low-leakage separating elements for rooms or other enclosures. When the door is being closed, i.e. when the double locking levers are being turned, the perimeter seal is fully pressed against the frame. As a consequence, the air leakage rate is extremely low even in case of high differential pressures.

Schematic illustration of BS



① Door
② Frame
③ Absorption material
④ Seal
⑤ Double lever locking device

Order code

BS

BS – R / 500×500 / Z03 / P1 – RAL ...

1 2 3 4 5

1 Type
BS Low-leakage inspection access door

2 Construction
R Right
L Left

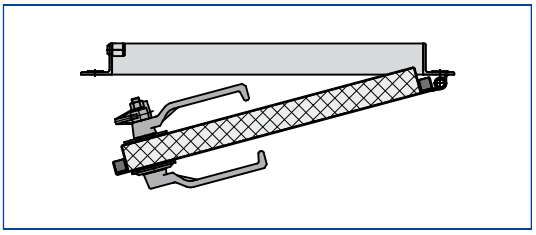
3 Nominal size [mm]
B × H

4 Attachments
No entry: none
Z01 – Z03
Z05

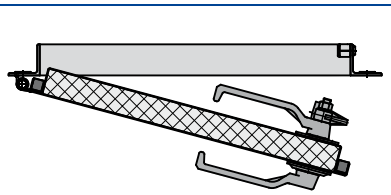
5 Surface
No entry: standard construction
P1 Powder-coated, RAL CLASSIC colour
PS Powder-coated, NCS or DB colour

Gloss level:
RAL 9010 50 %
RAL 9006 30 %
All other RAL colours 70 %

Right hinge



Left hinge



5

Order example

BS–L/500×650/Z03

Variant	Left hinge
Nominal size	500 × 650 mm
Attachments	With inspection window
Surface	Standard construction

Dimensions

Dimensional drawing of BS

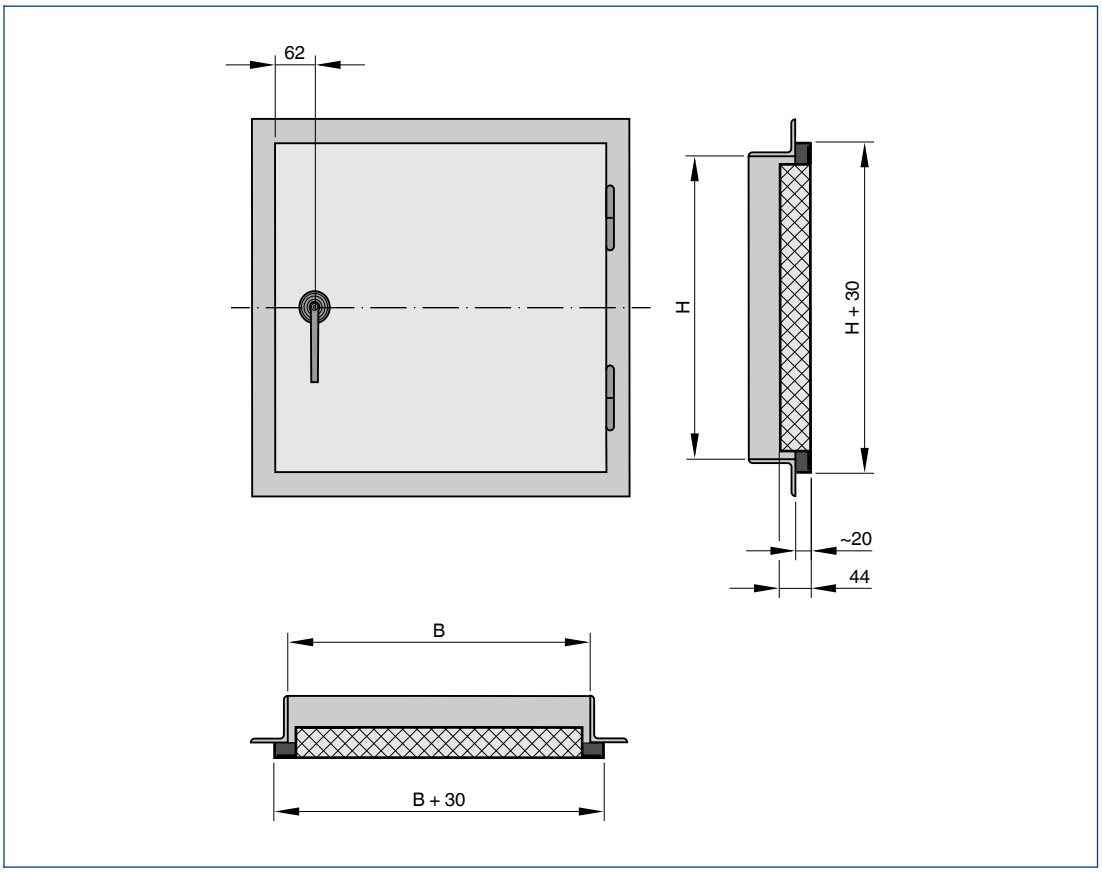


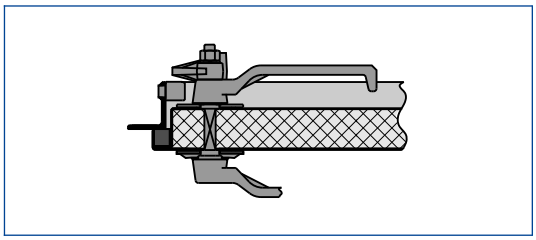
Illustration shows right hinge

Weight

H	B [mm]			
	400	500	600	800
mm	kg			
400	12	15	18	24
500	13	16	19	25
600	13	17	20	26
800	14	18	21	27

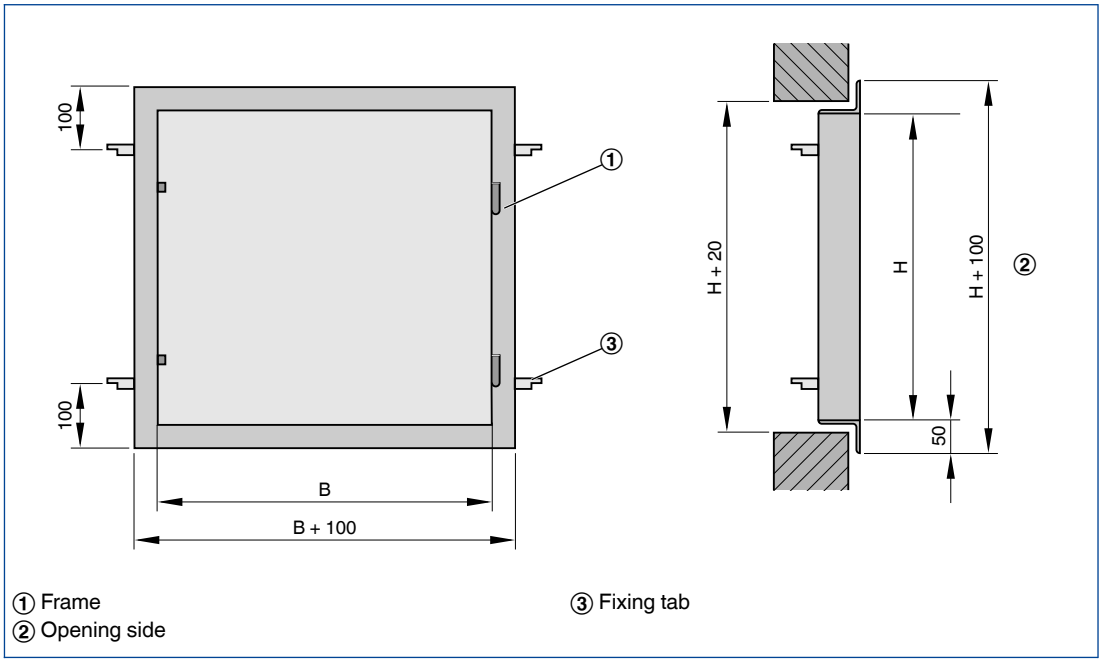
Double lever locking device

Double lever locking device on angle section door frame



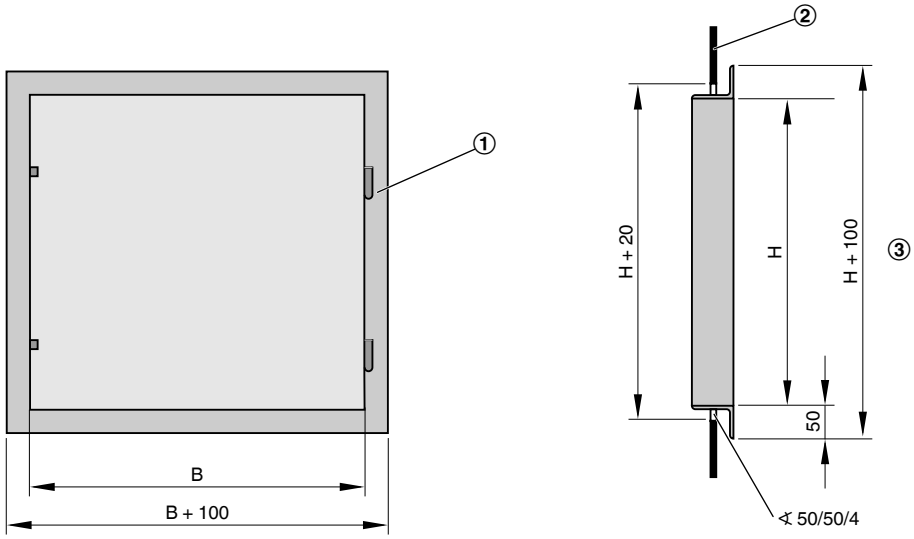
Installation dimensions

Installation into a wall



① Frame
② Opening side
③ Fixing tab

Installation into an enclosure



① Frame
② Enclosure, e.g. filter chamber
③ Opening side

No. of fixing tabs on each side

Sizes	n
mm	–
300 – 499	1
500 – 800	2

Standard text

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

Low-leakage inspection access doors as separating elements for air handling units, filter chambers, or enclosures for machinery or electrical equipment. Ready-to-install component that consists of a door leaf with double lever locking device, absorption material, seal and hinges, and a frame. Air leakage rate on the opening side is approx. 0.6 l/s or 2 m^3/h at 2000 Pa.

Special features

- U-value: 1.02 W/(m^2K) at 8 W/(m^2K) for internal spaces (air not in motion) and 25 W/(m^2K) for outside (air in motion)
- Optional door frame without fixing tabs (-21) but with flange holes

Materials and surfaces

- Door leaf and stiffeners made of galvanised sheet steel
- Absorption material is mineral wool
- Door frame made of galvanised steel
- Double lever locking devices made of aluminium diecast
- APT rubber seal
- P1: Powder-coated, RAL CLASSIC colour
- PS: Powder-coated, NCS or DB colour

Mineral wool

- To DIN 4102, fire rating class A2, non-combustible
- RAL quality mark RAL-GZ 388
- Biosoluble according to TRGS 905 and EU directive 97/69/EG
- Inert to fungal and bacterial growth

Technical data

- Nominal sizes: 300 × 300 – 800 × 800 mm
- Maximum pressure on the opening side is 2000 Pa
- Weighted sound reduction index: 43 – 46 dB

5

Order options

1 Type

BS Low-leakage inspection access door

2 Construction

☐ **R** Right
☐ **L** Left

3 Nominal size [mm]

B × H

4 Attachments

No entry: none
☐ **Z01 – Z03**
☐ **Z05**

5 Surface

No entry: standard construction
☐ **P1** Powder-coated, RAL CLASSIC colour
☐ **PS** Powder-coated, NCS or DB colour

Gloss level:
RAL 9010 50 %
RAL 9006 30 %
All other RAL colours 70 %

Attachments

Attachments

Removable front locking lever
(of double lever locking device)

Pressure relief valve

Pressure relief valve

Inspection window

For the improvement and extension of the range of applications

Attachments for low-leakage steel doors and inspection access doors to meet demanding requirements and extend the range of applications

- Cylinder rim lock to lock the door using either a rotary knob or a key
- Mortice lock, ready to accommodate a profile cylinder, to lock the door
- Double skin inspection window
- Pressure relief valve for pressure equalisation between the rooms on either side of the door; allows the door to be opened without much effort
- Double lever locking device with removable front locking lever; without the front lever the door cannot be opened from the outside
- Any combination of attachments for steel doors

Description

Application

– For the improvement and extension of the range of applications of low-leakage steel doors and inspection access doors

Any attachments are defined with the order code of low-leakage doors.

Attachments for low-leakage doors

Order code detail	Cylinder rim lock	Mortice lock	Inspection window	Pressure relief valve	Removable front locking lever
	Z01	Z02	Z03	Z04	Z05
Z01	×				
Z02		×			
Z03			×		
Z04				×	
Z05					×
Z06	×		×		
Z07		×	×		
Z08			×	×	
Z09			×		×
Z10	×			×	
Z11		×		×	
Z12				×	×
Z13	×				×
Z14		×			×
Z15	×		×	×	
Z16		×	×	×	
Z17			×	×	×
Z18	×		×		×
Z19		×	×		×
Z20	×			×	×
Z21		×		×	×
Z22	×		×	×	×
Z23		×	×	×	×

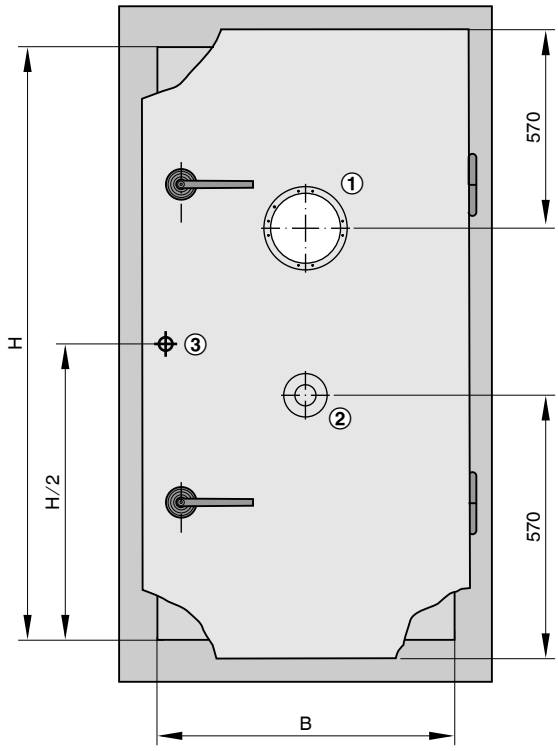
Combinations with Z03 and Z04 from H=1500 mm

Attachments for low-leakage inspection access doors

Order code detail	Cylinder rim lock	Mortice lock	Inspection window	Removable front locking lever
	Z01	Z02	Z03	Z05
Z01	×			
Z02		×		
Z03			×	
Z05				×

BS < 400 × 400 only with Z05

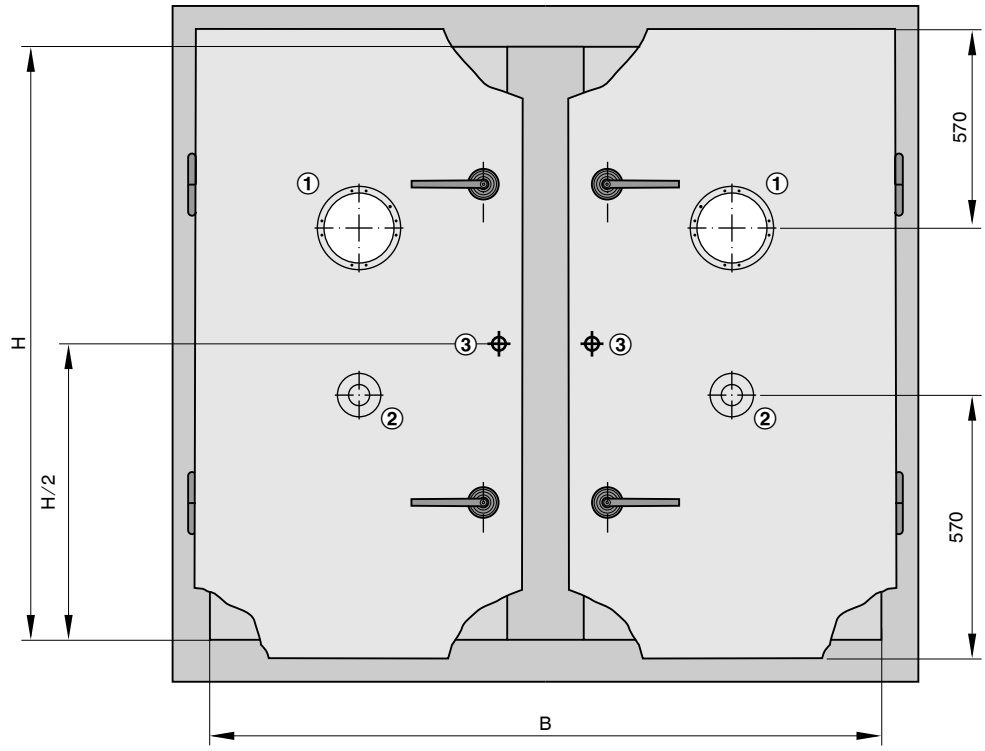
Arrangement of attachments for single leaf low-leakage steel door of Type ST



① Inspection window (H < 1500 at H/2)
② Pressure relief valve
③ Lock

Right hinge

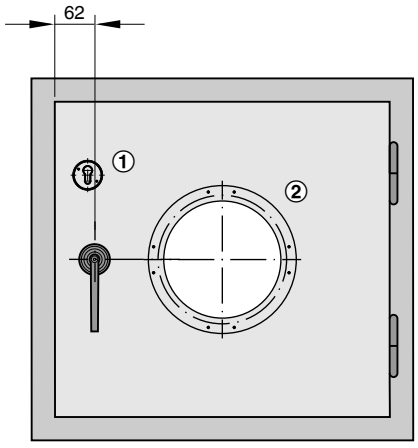
Arrangement of attachments for double leaf low-leakage steel door, variant ST-D



① Inspection window (H < 1500 at H/2)
② Pressure relief valve
③ Lock

5

Arrangement of attachments for low-leakage inspection access doors of Type BS



① Lock
② Inspection window

Right hinge

Description

Cylinder rim lock

/ **Z01** /

Order code detail

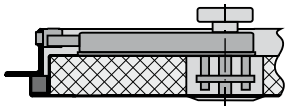
Application

- Used to lock the door
  and to manually open it from the inside

Parts and characteristics

- BKS rim lock
- BKS cylinder with three keys
- For double leaf doors: two identical cylinders

Cylinder rim lock



Description

Cylinder rim lock

/ **Z02** /

Order code detail

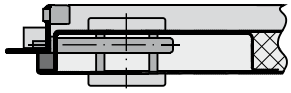
Application

- Used to lock the door,
  ready to accommodate a profile cylinder

Parts and characteristics

- Mortice lock for profile cylinders,
  22 mm inside length, 35 mm outside length
- Profile cylinder, e.g. BKS no. 3100
- Two escutcheons

Mortice lock



Description

Inspection window

/ **Z03** /

Order code detail

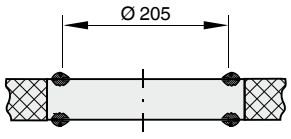
Application

- For the improvement
  and extension of the range of applications
  of low-leakage steel doors
  and inspection access doors

Parts and characteristics

- Double skin inspection window
- Fixed with clamping profiles

Inspection window



Description

Pressure relief valve

/ **Z04** /

Order code detail

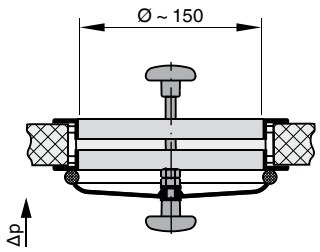
Application

- Used for manual equalisation between the rooms on either side of the door; allows the door to be opened without much effort

Parts and characteristics

- Pressure relief valve made of aluminium diecast
- Perimeter foam rubber seals on both sides
- Two star grips

Pressure relief valve



Description

Removable front locking lever (of double lever locking device)

/ **Z05** /

Order code detail

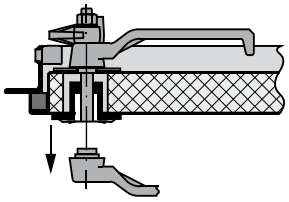
Application

- Without the front lever the door cannot be opened from the outside

Parts and characteristics

- Double lever locking device with removable front locking lever
- Front locking lever made of aluminium diecast
- Fits square shafts
- One removable front locking lever per door

Removable front locking lever (of double lever locking device)



5

Doors
Basic information and nomenclature

- Product selection

Product selection

	Type	
	ST	BS
Variants		
Single leaf door	●	
Double leaf door	●	
Inspection access door		●
Door		
Sound insulating lining	●	
Reinforced construction	●	
Maximum pressure loading	1000 Pa 2000 Pa (reinforced construction)	2000 Pa
Hinge		
On the right	●	●
On the left	●	●
Nominal sizes		
Width / double leaf door	400 – 1100 / – 2280 mm	300 – 800 mm
Increment	1 mm	1 mm
Height	800 – 2115 mm	300 – 800 mm
Increment	1	1
Attachments		
U-channel door frame	●	
Angle section frame	●	●
Accessories		
Cylinder rim lock	●	●
Mortice lock	●	●
Inspection window	●	●
Pressure relief valve	●	
Removable front locking lever	●	●
●	Possible	
	Not possible	

5

6 Sound attenuators

Sound attenuators are used for the reduction of noise in air conditioning systems. Various construction styles allow for the installation into circular and rectangular ducts as well as in air handling units. The sound attenuators are acoustically and aerodynamically optimised and provide good insertion loss across a large bandwidth and at a low differential pressure. This saves energy costs and/or space.

6

Splitter sound attenuators
Type MSA

For increased insertion loss and broadband attenuation even in the low frequency range

Splitter sound attenuators with integral splitters with resonating panels, suitable for air conditioning systems

- Attenuation effect due to resonance and absorption
- Energy efficient due to aerodynamically profiled frame (radius > 15 mm)
- Acoustic data measured to ISO 7235
- Absorption material is biosoluble and hence hygienically safe
- Absorption material faced with glass fibre fabric as a protection against erosion due to airflow velocities up to 20 m/s
- Absorption material non-combustible, to EN 13501, fire rating class A1
- Available in standard sizes and many intermediate sizes
- For use in zones 1 and 2 as well as in zones 21 and 22 according to EU Directive 94/9/EG (ATEX)
- Operating temperature up to 100 °C

Optional equipment and accessories

- Additional perforated sheet metal to protect the absorption material
- Powder-coated
- Stainless steel
- Brine and salt-water resistant aluminium construction (AlMg3)

Splitter frames with folded edges

HYGIENISCH GETESTET TROX® TECHNIK VDI 6022

Tested to VDI 6022

6

Variants

Product examples

Splitter sound attenuator, variant MSA-100

Splitter thickness 100 mm

Splitter sound attenuator, variant MSA-200

Splitter thickness 200 mm

Description

Application

- Splitter sound attenuators of Type MSA used for the reduction of fan noise and air-regenerated noise in air conditioning systems
- Attenuation effect due to absorption and resonance
- Broadband attenuation even in the low frequency range of critical fan noise
- Hygiene tested and certified to VDI 6022
- For use in potentially explosive atmospheres (ATEX), zones 1, 2, 21 and 22 (outside)

Variants

- MSA-100: splitter thickness of 100 mm
- MSA-200: splitter thickness of 200 mm
- MSA-230: splitter thickness of 230 mm

Construction

Surface of splitter area not covered by a resonating panel
- F: Glass fibre fabric
- L: Glass fibre fabric and perforated sheet metal

Duct connection
- P: Standard flange 30 mm
- W: Angle section frame 35 × 35 × 3 mm

Nominal sizes

- B: 200, 400, 600, 800, 1000, 1200, 1400, 1600, 1800, 2000, 2200, 2400 mm (intermediate sizes 140 – 2399 mm in increments of 1 mm)
- Width subdivided: 2401 – 4800 mm, in increments of 1 mm
- H: 300, 600, 900, 1200, 1500, 1800 mm (intermediate sizes 150 – 1799 mm in increments of 1 mm)
- Height subdivided: 1801 – 4800 mm, in increments of 1 mm
- L: 500, 750, 1000, 1250, 1500 mm (intermediate sizes 501 – 1499 mm in increments of 1 mm)
- Length subdivided: 1750, 2000, 2250, 2500, 2750, 3000 mm (intermediate sizes 1501 – 2999 mm in increments of 1 mm)

Special features

- Resonating panels ensure increased insertion loss in the frequency range of critical fan noise
- Up to 30 % lower differential pressure
- Energy efficient and/or space saving due to aerodynamically profiled frame
- Hygiene tested and certified
- Multi-section construction available for large dimensions

Parts and characteristics
- Casing
- Aerodynamically profiled frame
- Absorption material and resonating panels fitted to reduce air-regenerated noise by absorption and resonance

Construction features
- Casing with grooves for increased rigidity; larger sizes are extra reinforced
- Aerodynamically profiled splitter frame (radius > 15 mm) that enables a reduction of turbulence both upstream and downstream; frame with grooves for increased rigidity
- Frame edges are folded to protect the infill
- Subdivided construction with angle section frame
- Operating temperature up to 100 °C

Materials and surfaces
- Casing, splitter frames, partitioning panels and resonating panels made of galvanised sheet steel
- Standard flange and angle sections made of galvanised steel
- Absorption material is mineral wool

Mineral wool
- To EN 13501, fire rating class A1, non-combustible
- RAL quality mark RAL-GZ 388
- Biosoluble and hence hygienically safe according to the German TRGS 905 (Technical Rules for Hazardous Substances) and EU directive 97/69/EG
- Faced with glass fibre fabric as protection against erosion through airflow velocities of up to 20 m/s
- Inert to fungal and bacterial growth

Installation and commissioning
- Observe installation information and the general codes of good practice in order to achieve the given performance data
- Vertical installation should be preferred
- The length (L) of sound attenuator splitters and splitter attenuators refers always to the airflow direction. Remember this with regard to vertical ducting.
- Installation in ducts outside of closed rooms requires sufficient protection against the effects of weather

Standards and guidelines
- Insertion loss and sound power level of air-regenerated noise tested to ISO 7235
- Meets the hygiene requirements of VDI 6022, DIN 1946, parts 1 and 2 as well as of VDI 3803
- Directive 94/9/EC: Equipment and protective systems intended for use in potentially explosive atmospheres

Maintenance
- Maintenance-free as construction and materials are not subject to wear

Technical data

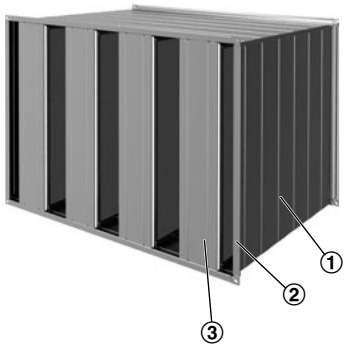
Splitter thickness	100, 200, 230 mm
Nominal sizes	140 × 150 × 500 mm – 2400 × 1800 × 1500 mm
Width subdivided	up to 4800 mm
Height subdivided	up to 3600 mm
Length subdivided	up to 3000 mm
Operating temperature	– 100 °C

Function

Functional description

Splitter sound attenuators of Type MSA contain splitters of Type MKA.
The attenuation effect of the splitters is due to absorption and resonance.
The splitters have a mineral wool infill as absorption material. Part of the splitter surface that runs parallel to the airflow is covered with resonating panels. These panels start oscillating due to the sound (resonance) and hence absorb sound energy.
Resonance works best in the frequency range of critical fan noise.
There is a higher attenuation across a wider frequency range when compared to mere absorption splitters.

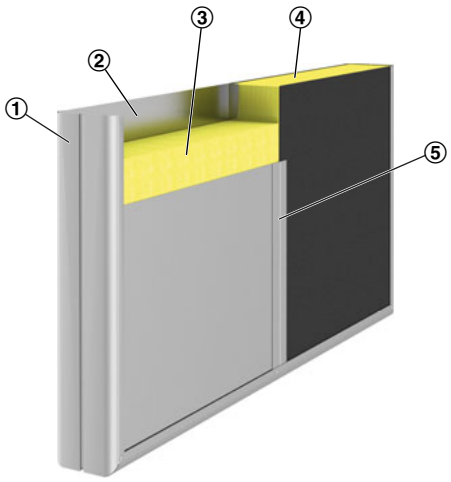
Schematic illustration of MSA, XSA



① Casing
② Duct connection
③ Splitter

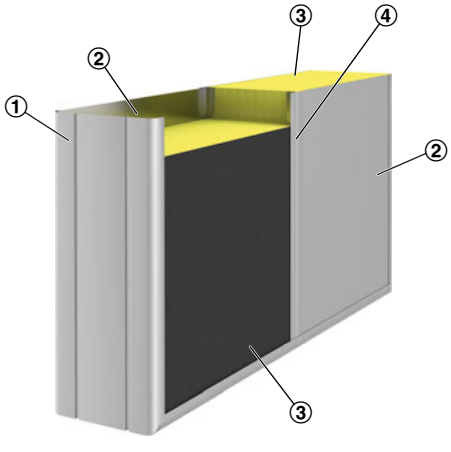
Sound attenuator splitter

Schematic illustration of MKA-100



① Splitter frame, 100 mm wide
② Opposing resonating panels
③ Absorption material
④ Absorption material faced on both sides with glass fibre fabric
⑤ Partitioning panel

Schematic illustration of MKA-200



① Splitter frame, 200 mm wide
② Offset resonating panels
③ Absorption material faced on one side with glass fibre fabric
④ Partitioning panel

Order code

The length (L) of sound attenuator splitters and splitter attenuators refers always to the airflow direction. Remember this with regard to vertical ducting.

MSA

MSA 200 – 100 – 3 – P F / 900×600×1500
1 2 3 4 5 6 7 8 9

1 Type
MSA Splitter sound attenuator with casing

2 Splitter thickness [mm]
100
200
230

3 Airway width (distance between splitters) [mm]

4 Number of splitters

5 Duct connection
P Standard flange 30 mm
W Angle section frame 35 × 35 × 3 mm (required for sound attenuators with width and/or height subdivided)

6 Splitter surface
F Glass fibre fabric
L Glass fibre fabric and perforated sheet metal

7 Nominal width B [mm]

8 Nominal height H [mm]

9 Nominal length in airflow direction L [mm]

Order example

MSA–100–100–2–W–L/400×1500×1500

Splitter thickness	100 mm
Airway width	100 mm
No. of splitters	2
Connecting frame	Angle section frame
Splitter surface	Glass fibre fabric and perforated sheet metal
Width	400 mm
Height	1500 mm
Length (in airflow direction)	1500 mm

Splitter thickness 100 mm

Insertion loss values for other lengths (intermediate sizes) and airway widths can be determined with the Easy Product Finder design programme.

MKA100 / MSA100 – Length L = 500 mm

Airway width	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e dB							
40	4	10	11	13	21	27	24	18
60	3	9	9	11	18	23	20	15
100	3	4	5	8	13	15	11	8
200	0	2	2	4	7	4	3	3

MKA100 / MSA100 – Length L = 1000 mm

Airway width	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e dB							
40	5	13	20	23	31	38	32	26
60	5	11	17	19	28	32	27	21
100	3	8	9	13	21	22	15	11
200	0	5	5	9	15	9	6	6

MKA100 / MSA100 – Length L = 1500 mm

Airway width	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e dB							
40	6	16	30	32	42	48	40	34
60	6	14	25	28	38	41	33	27
100	4	10	14	19	29	28	19	14
200	2	7	7	13	20	12	7	7

MKA100 / MSA100 – Length L = 2000 mm

Airway width	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e dB							
40	8	19	39	42	50	50	49	42
60	7	16	32	36	47	50	40	34
100	5	12	19	25	37	35	23	16
200	3	9	10	17	25	15	9	8

MKA100 / MSA100 – Length L = 2500 mm

Airway width	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e dB							
40	9	22	48	50	50	50	50	50
60	8	19	40	45	50	50	47	40
100	6	14	24	30	45	41	27	19
200	3	12	12	21	33	19	12	11

MKA100 / MSA100 – Length L = 3000 mm

Airway width	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e dB							
40	10	25	50	50	50	50	50	50
60	9	22	48	50	50	50	50	46
100	7	16	28	36	50	47	31	22
200	2	14	15	26	41	24	16	14

Splitter thickness 200 mm

MKA200 / MSA200 – Length L = 500 mm

Airway width	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e dB							
50	5	7	19	21	26	22	17	14
100	2	4	12	12	15	11	9	8
200	1	3	7	6	7	6	5	4
400	0	2	4	4	4	3	2	2

MKA200 / MSA200 – Length L = 1000 mm

Airway width	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e dB							
50	6	16	33	39	41	39	26	20
100	4	10	22	23	26	19	13	11
200	2	7	13	12	12	10	8	6
400	1	4	7	5	6	4	3	3

MKA200 / MSA200 – Length L = 1500 mm

Airway width	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e dB							
50	9	22	44	50	50	50	34	25
100	5	15	32	33	37	25	16	14
200	3	9	19	18	15	12	10	7
400	1	6	10	8	8	6	4	4

MKA200 / MSA200 – Length L = 2000 mm

Airway width	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e dB							
50	12	29	50	50	50	50	43	29
100	6	19	42	44	47	31	19	17
200	4	12	25	23	18	15	12	9
400	1	8	13	10	10	8	5	5

MKA200 / MSA200 – Length L = 2500 mm

Airway width	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e							
	dB							
50	14	38	50	50	50	50	49	35
100	8	25	50	50	50	38	23	18
200	5	16	30	29	23	16	13	10
400	2	10	16	13	12	9	6	5

MKA200 / MSA200 – Length L = 3000 mm

Airway width	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e							
	dB							
50	17	48	50	50	50	50	50	40
100	10	30	50	50	50	44	26	19
200	6	19	35	35	27	17	15	11
400	3	13	19	15	14	10	7	6

Splitter thickness 230 mm

MKA230 / MSA230 – Length L = 500 mm

Airway width	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e							
	dB							
60	3	7	16	19	21	17	14	14
115	2	5	11	12	13	10	9	10
230	1	3	6	5	5	2	4	6
460	0	2	1	0	0	0	0	2

MKA230 / MSA230 – Length L = 1000 mm

Airway width	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e							
	dB							
60	7	13	27	30	35	25	18	18
115	4	10	20	20	22	15	12	13
230	1	7	12	10	8	4	6	8
460	0	3	4	0	0	0	0	2

MKA230 / MSA230 – Length L = 1500 mm

Airway width	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e							
	dB							
60	11	19	38	41	49	33	21	21
115	7	14	28	28	30	20	15	15
230	2	10	18	15	10	6	9	9
460	0	5	7	1	0	0	2	3

MKA230 / MSA230 – Length L = 2000 mm

Airway width	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e							
	dB							
60	15	24	50	50	50	42	25	25
115	9	19	37	36	39	26	18	18
230	3	13	24	19	13	8	11	10
460	0	7	10	3	0	0	3	3

MKA230 / MSA230 – Length L = 2500 mm

Airway width	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e							
	dB							
60	19	30	50	50	50	50	29	28
115	12	24	46	44	47	31	21	20
230	4	16	29	24	16	11	13	12
460	0	9	13	4	0	0	5	3

MKA230 / MSA230 – Length L = 3000 mm

Airway width	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e							
	dB							
60	24	36	50	50	50	50	32	32
115	14	28	50	50	50	36	24	23
230	4	19	35	29	18	13	15	13
460	0	11	16	6	0	0	7	3

Quick sizing – sound power level

The sound power levels L_{WA} apply to sound attenuation dampers with a cross-sectional area (B × H) of 1 m².

Air-regenerated noise MSA, MKA, XSA, XKA, RKA

v_s	m/s	4	6	8	10	12	14	16	18	20
L_{WA}	dB(A)	21	31	38	43	47	51	54	57	60

Quick sizing – differential pressure Splitter thickness 100 mm

Quick sizing tables provide a good overview of the differential pressures for different airway widths and airflow velocities. Intermediate values can be calculated with our Easy Product Finder design programme.

MKA100 / XKA100 – L = 500 mm

v_s	Airway width [mm]			
	40	60	100	200
	Δp_{st}			
m/s	Pa			
4	6	4	2	2
10	35	18	10	6
20	135	70	35	18

MKA100 / XKA100 – L = 1000 mm

v_s	Airway width [mm]			
	40	60	100	200
	Δp_{st}			
m/s	Pa			
4	8	4	2	2
10	45	24	12	6
20	180	90	45	22

MKA100 / XKA100 – L = 1500 mm

v_s	Airway width [mm]			
	40	60	100	200
	Δp_{st}			
m/s	Pa			
4	10	4	2	2
10	55	28	14	8
20	225	110	55	26

MKA100 / XKA100 – L = 2000 mm

v_s	Airway width [mm]			
	40	60	100	200
	Δp_{st}			
m/s	Pa			
4	12	5	4	2
10	70	35	16	8
20	270	135	65	30

MKA100 / XKA100 – L = 2500 mm

v_s	Airway width [mm]			
	40	60	100	200
	Δp_{st}			
m/s	Pa			
4	14	6	4	2
10	80	40	18	10
20	320	155	70	35

MKA100 / XKA100 – L = 3000 mm

v_s	Airway width [mm]			
	40	60	100	200
	Δp_{st}			
m/s	Pa			
4	16	8	4	2
10	90	45	20	10
20	365	175	80	40

Splitter thickness 200 mm

MKA200 / XKA200 – L = 500 mm

v_s	Airway width [mm]			
	50	100	200	400
	Δp_{st}			
m/s	Pa			
4	10	2	2	0
10	60	14	4	2
20	235	50	16	8

MKA200 / XKA200 – L = 1000 mm

v_s	Airway width [mm]			
	50	100	200	400
	Δp_{st}			
m/s	Pa			
4	12	2	2	0
10	65	16	6	2
20	265	60	22	10

MKA200 / XKA200 – L = 1500 mm

v_s	Airway width [mm]			
	50	100	200	400
	Δp_{st}			
m/s	Pa			
4	12	4	2	2
10	75	18	6	4
20	300	75	26	14

MKA200 / XKA200 – L = 2000 mm

v_s	Airway width [mm]			
	50	100	200	400
	Δp_{st}			
m/s	Pa			
4	14	4	2	2
10	85	22	8	4
20	335	85	30	16

MKA200 / XKA200 – L = 2500 mm

v_s	Airway width [mm]			
	50	100	200	400
	Δp_{st}			
m/s	Pa			
4	16	4	2	2
10	90	24	10	6
20	365	95	35	18

MKA200 / XKA200 – L = 3000 mm

v_s	Airway width [mm]			
	50	100	200	400
	Δp_{st}			
m/s	Pa			
4	16	4	2	2
10	100	28	10	6
20	400	110	40	22

Splitter thickness 230 mm

MKA230 / XKA230 – L = 500 mm

v_s	Airway width [mm]			
	60	115	230	460
	Δp_{st}			
m/s	Pa			
4	10	2	2	0
10	55	14	4	2
20	225	55	16	8

MKA230 / XKA230 – L = 1000 mm

v_s	Airway width [mm]			
	60	115	230	460
	Δp_{st}			
m/s	Pa			
4	10	4	2	0
10	65	16	6	2
20	260	65	22	10

MKA230 / XKA230 – L = 1500 mm

v_s	Airway width [mm]			
	60	115	230	460
	Δp_{st}			
m/s	Pa			
4	12	4	2	0
10	75	20	6	4
20	295	75	26	12

MKA230 / XKA230 – L = 2000 mm

v_s	Airway width [mm]			
	60	115	230	460
	Δp_{st}			
m/s	Pa			
4	14	4	2	2
10	80	22	8	4
20	330	90	30	16

MKA230 / XKA230 – L = 2500 mm

v_s	Airway width [mm]			
	60	115	230	460
	Δp_{st}			
m/s	Pa			
4	14	4	2	2
10	90	26	10	4
20	360	100	35	18

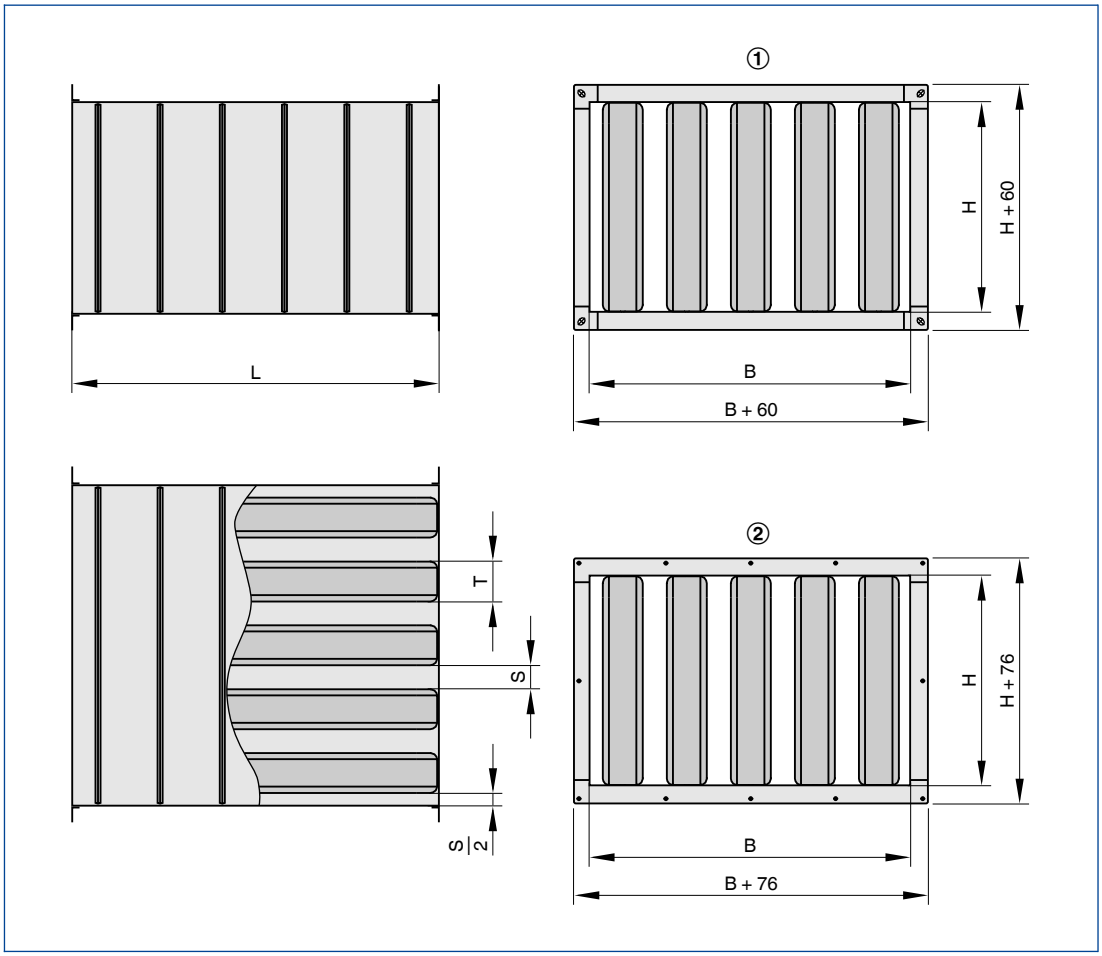
MKA230 / XKA230 – L = 3000 mm

v_s	Airway width [mm]			
	60	115	230	460
	Δp_{st}			
m/s	Pa			
4	16	6	2	2
10	100	28	10	6
20	395	115	40	20

Dimensions

For detailed information on corner holes and flange holes see Dimensions – Duct connection

Dimensional drawing of MSA



Nominal length	500	750	1000	1250	1500

Nominal height	300	600	900	1200	1500	1800

Nominal width	MSA100			MSA200			MSA230		
	T	n	S	T	n	S	T	n	S
	mm	–	mm	mm	–	mm	mm	–	mm
200	100	1	100	–	–	–	–	–	–
400	100	2	100	200	1	200	230	1	85
600	100	2 – 4	50 – 200	200	2	100	230	2	70
800	100	3 – 5	60 – 167	200	2 – 3	67 – 200	230	2	170
1000	100	4 – 7	43 – 150	200	3 – 4	50 – 133	230	3	103
1200	100	4 – 8	50 – 200	200	3 – 5	40 – 200	230	3 – 4	70 – 170
1400	100	5 – 10	40 – 180	200	4 – 5	80 – 150	230	3 – 5	50 – 237
1600	100	6 – 11	46 – 200	200	4 – 7	57 – 200	230	4 – 5	90 – 170
1800	100	6 – 12	50 – 200	200	5 – 8	50 – 160	230	4 – 6	70 – 220
2000	100	7 – 14	43 – 186	200	5 – 8	50 – 200	230	5 – 7	56 – 170
2200	100	7 – 15	47 – 200	200	6 – 9	44 – 167	230	5 – 7	84 – 186
2400	100	8 – 16	50 – 200	200	6 – 10	40 – 200	230	6 – 8	70 – 170

Sound attenuator casing with standard flange

The total weight of a splitter sound attenuator is the combined weight of the casing (with standard flange or angle section frame) and all splitters.

The total weight for intermediate sizes can be generated with our Easy Product Finder design programme.

Weight – sound attenuator casing with standard flange, L = 500

H	B									
	200	400	600	800	1000	1200	1400	1600	2000	2400
mm	kg									
300	6	8	10	12	14	16	18	20	24	28
600	9	11	13	15	17	19	21	23	27	31
900	12	14	16	18	20	22	24	26	30	34
1200	15	17	19	21	23	25	27	29	33	37
1500	18	20	22	24	26	28	30	32	36	39

Weight – sound attenuator casing with standard flange, L = 750

H	B									
	200	400	600	800	1000	1200	1400	1600	2000	2400
mm	kg									
300	8	10	13	16	19	22	25	27	33	38
600	13	15	18	21	24	26	29	31	36	42
900	17	19	22	25	28	30	33	35	40	46
1200	21	23	26	29	32	34	37	39	44	50
1500	25	27	30	33	36	38	41	43	47	54

Weight – sound attenuator casing with standard flange, L = 1000

H	B									
	200	400	600	800	1000	1200	1400	1600	2000	2400
mm	kg									
300	10	14	17	20	24	27	30	34	41	48
600	15	19	22	25	29	32	35	39	46	53
900	20	24	27	30	34	37	40	44	51	58
1200	25	29	32	35	39	43	46	50	57	63
1500	30	34	37	40	44	48	51	55	62	68

Weight – sound attenuator casing with standard flange, L = 1250

H	B									
	200	400	600	800	1000	1200	1400	1600	2000	2400
mm	kg									
300	13	17	21	25	29	33	37	41	49	58
600	19	23	27	31	35	39	43	47	54	64
900	25	29	33	37	41	45	49	53	60	70
1200	31	35	39	43	47	51	55	57	64	76
1500	37	41	45	49	53	58	62	66	73	82

Weight – sound attenuator casing with standard flange, L = 1500

H	B									
	200	400	600	800	1000	1200	1400	1600	2000	2400
mm	kg									
300	15	19	24	29	33	39	44	48	58	68
600	22	26	31	36	40	46	51	55	65	75
900	30	34	39	44	48	53	58	62	72	82
1200	37	41	46	51	55	60	65	69	79	89
1500	44	48	53	58	62	68	73	77	87	97

Sound attenuator casing with angle section frame

Weight – sound attenuator casing with angle section frame, L = 500

H	B									
	200	400	600	800	1000	1200	1400	1600	2000	2400
mm	kg									
300	9	13	16	19	23	25	28	32	39	45
600	14	18	21	24	28	30	33	37	44	50
900	18	22	25	28	32	35	38	42	49	55
1200	23	27	30	33	37	40	43	47	54	59
1500	28	32	35	38	42	45	48	52	59	64

Weight – sound attenuator casing with angle section frame, L = 750

H	B									
	200	400	600	800	1000	1200	1400	1600	2000	2400
mm	kg									
300	8	12	16	20	24	25	29	33	41	45
600	13	17	21	25	29	30	34	38	46	50
900	17	21	25	29	33	35	39	43	51	55
1200	22	26	30	34	38	40	44	48	56	59
1500	27	31	35	39	43	45	49	53	61	64

Weight – sound attenuator casing with angle section frame, L = 1000

H	B									
	200	400	600	800	1000	1200	1400	1600	2000	2400
mm	kg									
300	14	18	23	28	32	37	42	46	56	65
600	21	25	30	35	39	44	49	53	63	72
900	28	32	37	42	46	51	56	60	70	79
1200	35	39	44	49	53	58	63	67	77	86
1500	42	46	51	56	60	65	70	74	84	93

Weight – sound attenuator casing with angle section frame, L = 1250

H	B									
	200	400	600	800	1000	1200	1400	1600	2000	2400
mm	kg									
300	15	21	26	31	37	42	47	53	63	75
600	23	29	34	39	45	51	56	62	72	83
900	31	37	42	47	53	59	64	70	80	91
1200	40	46	51	56	62	67	73	79	89	99
1500	48	54	59	64	70	75	80	86	96	107

Weight – sound attenuator casing with angle section frame, L = 1500

H	B									
	200	400	600	800	1000	1200	1400	1600	2000	2400
mm	kg									
300	18	24	30	36	42	48	54	60	72	85
600	27	33	39	45	51	57	63	69	81	94
900	36	42	48	54	60	66	72	78	90	103
1200	45	51	57	63	69	76	82	88	100	112
1500	54	60	66	72	78	85	91	97	109	122

Splitters

Weight – MKA-100

Height	Glass fibre fabric (-F)					Glass fibre fabric and perforated sheet metal (-L)				
	Length [mm]									
	500	750	1000	1250	1500	500	750	1000	1250	1500
mm	kg									
300	2	3	4	5	6	3	4	5	6	8
600	4	5	7	8	10	5	7	9	11	13
900	5	7	9	11	13	7	10	13	16	18
1200	7	10	12	15	17	9	13	16	20	24
1500	8	12	15	18	21	11	16	20	25	29

Weight – MKA-200

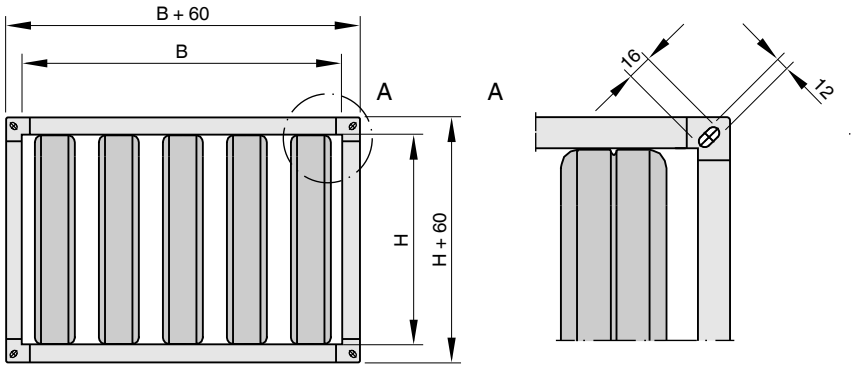
Height	Glass fibre fabric (-F)					Glass fibre fabric and perforated sheet metal (-L)				
	Length [mm]									
	500	750	1000	1250	1500	500	750	1000	1250	1500
mm	kg									
300	4	5	6	7.5	9	4	6	7	9	11
600	6	8	10	12	15	7	10	12	15	18
900	8	11	14	17	20	10	14	17	21	25
1200	10	14	18	22	26	13	18	22	27	32
1500	13	17	22	27	31	15	21	27	33	40

Weight – MKA-230

Height	Glass fibre fabric (-F)					Glass fibre fabric and perforated sheet metal (-L)				
	Length [mm]									
	500	750	1000	1250	1500	500	750	1000	1250	1500
mm	kg									
300	4	5	7	8	10	5	6	8	10	12
600	6	9	11	14	16	8	11	13	16	19
900	9	12	16	19	22	11	15	19	23	27
1200	11	16	20	24	28	14	19	24	30	35
1500	14	19	24	29	34	17	23	30	36	43

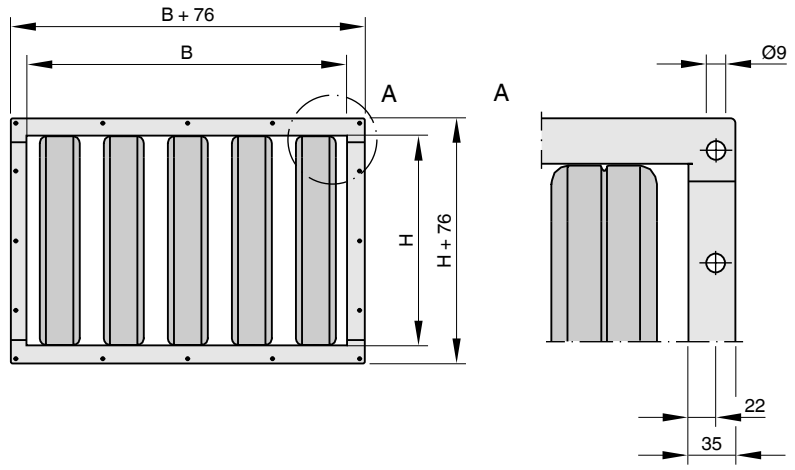
Corner holes

Splitter sound attenuator with standard flange



Flange holes

Splitter sound attenuator with angle section frame



Screw hole pitch = 150 mm

No. of holes per side

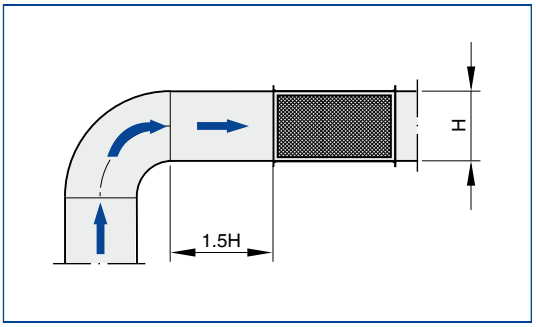
Width	No. of holes
B	n
mm	–
200 – 259	3
260 – 409	4
410 – 559	5
560 – 709	6
710 – 859	7
860 – 1009	8
1010 – 1159	9
1160 – 1309	10
1310 – 1459	11
1460 – 1609	12
1610 – 1759	13
1760 – 1909	14
1910 – 2059	15
2060 – 2209	16
2210 – 2359	17
2360 – 2400	18

No. of holes per side

Height	No. of holes
H	n
mm	–
150 – 299	1
300 – 449	2
450 – 599	3
600 – 749	4
750 – 899	5
900 – 1049	6
1050 – 1199	7
1200 – 1349	8
1350 – 1499	9
1500 – 1649	10
1650 – 1799	11
1800	12

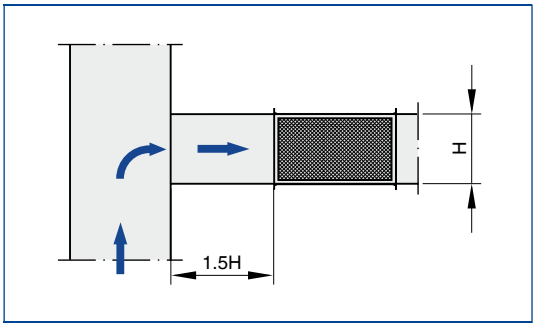
Upstream conditions

Upstream conditions – Bend



Vertical duct section before the bend:
Splitters vertical; H of duct = H of splitters
Horizontal duct section before the bend:
Splitters horizontal; B of duct = H of splitters

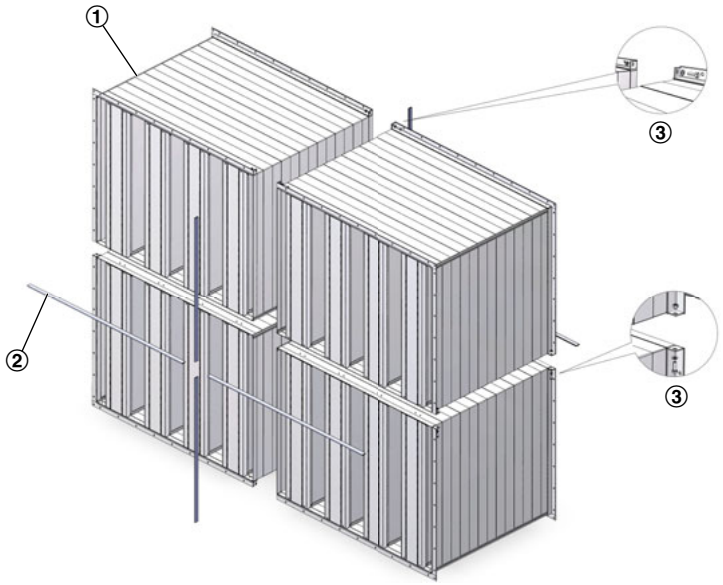
Upstream conditions – Junction



Vertical duct section before the junction:
Splitters vertical; H of duct = H of splitters
Horizontal duct section before the junction:
Splitters horizontal; B of duct = H of splitters

Width subdivided
Height subdivided

Schematic illustration of subdivided sound attenuators



① Sound attenuator, with width or height subdivided
② Seal
③ Screw fix connection

6

Standard text

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

Splitter sound attenuators used for the reduction of fan noise and air-regenerated noise in air conditioning systems. Attenuation effect due to absorption and resonance. Energy-saving as well as hygiene tested and certified.
Sound attenuators which consist of a casing with duct connections and splitters.
Splitters consists of an aerodynamically profiled frame (radius > 15 mm), absorption material, and resonating panels.
Frame edges are folded to protect the sound absorbing infill.
Insertion loss and sound power level of the air-regenerated noise tested to ISO 7235.
Meets the hygiene requirements of VDI 6022, DIN 1946, parts 2 and 4, as well as of VDI 3803.

Special features

- Resonating panels ensure increased insertion loss in the frequency range of critical fan noise
- Up to 30 % lower differential pressure
- Energy efficient and/or space saving due to aerodynamically profiled frame
- Hygiene tested and certified
- Multi-section construction available for large dimensions

Materials and surfaces

- Casing, splitter frames, partitioning panels and resonating panels made of galvanised sheet steel
- Standard flange and angle sections made of galvanised steel
- Absorption material is mineral wool

Mineral wool
- To EN 13501, fire rating class A1, non-combustible
- RAL quality mark RAL-GZ 388
- Biosoluble and hence hygienically safe according to the German TRGS 905 (Technical Rules for Hazardous Substances) and EU directive 97/69/EG
- Faced with glass fibre fabric as protection against erosion through airflow velocities of up to 20 m/s
- Inert to fungal and bacterial growth

Construction

Surface of splitter area not covered by a resonating panel
- F: Glass fibre fabric
- L: Glass fibre fabric and perforated sheet metal

Duct connection
- P: Standard flange 30 mm
- W: Angle section frame 35 × 35 × 3 mm

Technical data

- Splitter thickness: 100, 200, 230 mm
- Nominal sizes: 140 × 150 × 500 mm – 2400 × 1800 × 1500 mm
- Width subdivided: up to 4800 mm
- Height subdivided: up to 3600 mm
- Length subdivided: up to 3000 mm
- Operating temperature: – 100 °C

Sizing data

- B _____ [mm]
- H _____ [mm]
- L (in airflow direction) _____ [mm]
- $\dot{V}$ _____ [m³/h]
- D_e at 250 Hz _____ [dB]
- Δp_{st} _____ [Pa]

6

Order options

1 Type
MSA Splitter sound attenuator with casing

2 Splitter thickness [mm]
☐ **100**
☐ **200**
☐ **230**

3 Airway width (distance between splitters) [mm]

4 Number of splitters

5 Duct connection
☐ **P** Standard flange 30 mm
☐ **W** Angle section frame 35 × 35 × 3 mm (required for sound attenuators with width and/or height subdivided)

6 Splitter surface
☐ **F** Glass fibre fabric
☐ **L** Glass fibre fabric and perforated sheet metal

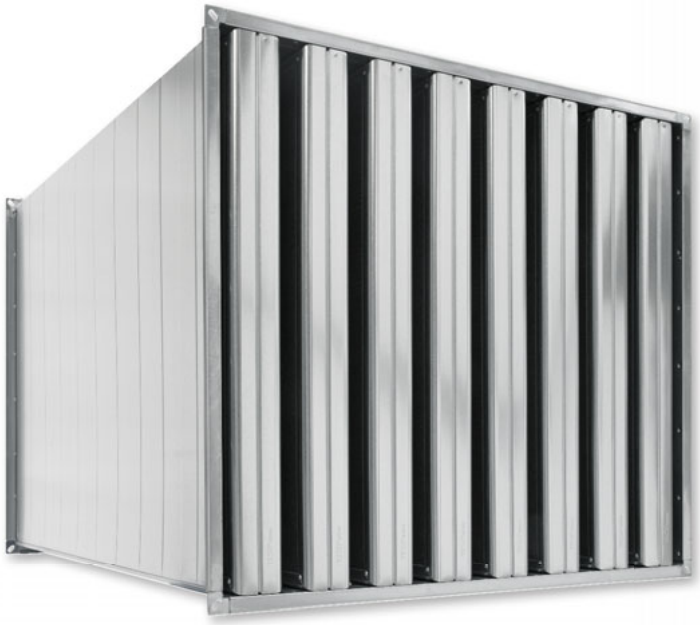
7 Nominal width B [mm]

8 Nominal height H [mm]

9 Nominal length in airflow direction L [mm]

Notes

Splitter sound attenuators
Type XSA



For high insertion loss with broadband damping, even in the high-frequency range

Splitter sound attenuators with splitters, suitable for air conditioning systems

- Attenuation effect due to absorption
- Energy efficient due to aerodynamically profiled frame (radius > 15 mm)
- Acoustic data measured to ISO 7235
- Absorption material is biosoluble and hence hygienically safe
- Absorption material faced with glass fibre fabric as a protection against erosion due to airflow velocities up to 20 m/s
- Absorption material non-combustible, to EN 13501, fire rating class A1
- Available in standard sizes and many intermediate sizes
- For use in zones 1 and 2 as well as in zones 21 and 22 according to EU Directive 94/9/EG (ATEX)
- Operating temperature up to 100 °C

Optional equipment and accessories

- Additional perforated sheet metal to protect the absorption material
- Powder-coated
- Stainless steel
- Brine and salt-water resistant aluminium construction (AlMg3)

Splitter frames with folded edges

HYGIENISCH GETESTET TROX® TECHNIK VDI 6022

Tested to VDI 6022

6

Variants

Product examples

Splitter sound attenuator, variant XSA-100

Splitter thickness 100 mm

Splitter sound attenuator, variant XSA-200

Splitter thickness 200 mm

Description

Application

- Splitter sound attenuators of Type XSA used for the reduction of fan noise and air-regenerated noise in air conditioning systems
- Attenuation effect due to absorption
- Broadband attenuation even in the high frequency range
- Hygiene tested and certified to VDI 6022
- For use in potentially explosive atmospheres (ATEX), zones 1, 2, 21 and 22 (outside)

Variants

- XSA-100: splitter thickness of 100 mm
- XSA-200: splitter thickness of 200 mm
- XSA-230: splitter thickness of 230 mm
- XSA-300: splitter thickness of 300 mm

Construction

Splitter surface
- F: Glass fibre fabric
- L: Glass fibre fabric and perforated sheet metal

Duct connection
- P: Standard flange 30 mm
- W: Angle section frame 35 × 35 × 3 mm

Nominal sizes

- B: 200, 400, 600, 800, 1000, 1200, 1400, 1600, 1800, 2000, 2200, 2400 mm (intermediate sizes 140 – 2399 mm in increments of 1 mm)
- Width subdivided: 2401 – 4800 mm, in increments of 1 mm
- H: 300, 600, 900, 1200, 1500, 1800 mm (intermediate sizes 150 – 1799 mm in increments of 1 mm)
- Height subdivided: 1801 – 4800 mm, in increments of 1 mm
- L: 500, 750, 1000, 1250, 1500 mm (intermediate sizes 501 – 1499 mm in increments of 1 mm)
- Length subdivided: 1750, 2000, 2250, 2500, 2750, 3000 mm (intermediate sizes 1501 – 2999 mm in increments of 1 mm)

Special features

- Increased insertion loss even in the high-frequency range
- Up to 30 % lower differential pressure
- Energy efficient and/or space saving due to aerodynamically profiled frame
- Hygiene tested and certified
- Multi-section construction available for large dimensions

Parts and characteristics
- Casing
- Aerodynamically profiled frame
- Absorption material to reduce air-regenerated noise by absorption

Construction features
- Casing with grooves for increased rigidity; larger sizes are extra reinforced
- Aerodynamically profiled splitter frame (radius > 15 mm) that enables a reduction of turbulence both upstream and downstream; frame with grooves for increased rigidity
- Frame edges are folded to protect the infill
- Subdivided construction with angle section frame
- Operating temperature up to 100 °C

Materials and surfaces
- Casing and splitter frames made of galvanised sheet steel
- Standard flange and angle sections made of galvanised steel
- Absorption material is mineral wool

Mineral wool
- To EN 13501, fire rating class A1, non-combustible
- RAL quality mark RAL-GZ 388
- Biosoluble and hence hygienically safe according to the German TRGS 905 (Technical Rules for Hazardous Substances) and EU directive 97/69/EG
- Faced with glass fibre fabric as protection against erosion through airflow velocities of up to 20 m/s
- Inert to fungal and bacterial growth

Installation and commissioning
- Observe installation information and the general codes of good practice in order to achieve the given performance data
- Vertical installation should be preferred
- The length (L) of sound attenuator splitters and splitter attenuators refers always to the airflow direction. Remember this with regard to vertical ducting.
- Installation in ducts outside of closed rooms requires sufficient protection against the effects of weather

Standards and guidelines
- Insertion loss and sound power level of air-regenerated noise tested to ISO 7235
- Meets the hygiene requirements of VDI 6022, DIN 1946, parts 1 and 2 as well as of VDI 3803
- Directive 94/9/EC: Equipment and protective systems intended for use in potentially explosive atmospheres

Maintenance
- Maintenance-free as construction and materials are not subject to wear

6

Technical data

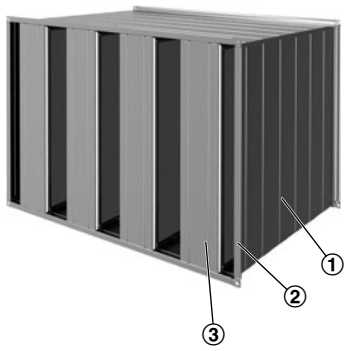
Splitter thickness	100, 200, 230, 300 mm
Nominal sizes	140 × 150 × 500 mm – 2400 × 1800 × 1500 mm
Width subdivided	up to 4800 mm
Height subdivided	up to 3600 mm
Length subdivided	up to 3000 mm
Operating temperature	– 100 °C

Function

Functional description

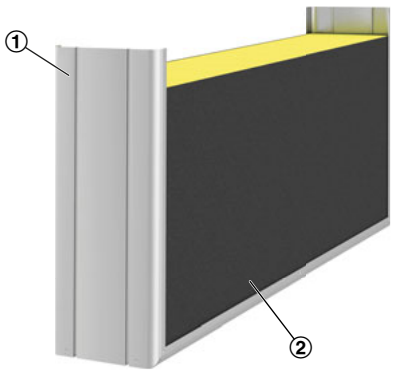
Splitter sound attenuators of Type XSA contain splitters of Type XKA.
The attenuation effect of the XKA splitters is due to absorption.
The splitters have a mineral wool infill as absorption material.

Schematic illustration of MSA, XSA



① Casing
② Duct connection
③ Splitter

Schematic illustration of XKA-200



① Splitter frame, 200 mm wide
② Absorption material faced on both sides with glass fibre fabric

6

Order code

The length (L) of sound attenuator splitters and splitter attenuators refers always to the airflow direction. Remember this with regard to vertical ducting.

XSA

XSA 200 – 100 – 3 – P F / 900×600×1500

1 2 3 4 5 6 7 8 9

1 Type
XSA Splitter sound attenuator with casing

2 Splitter thickness [mm]
100
200
230
300

3 Airway width (distance between splitters) [mm]

4 Number of splitters

5 Duct connection
P Standard flange 30 mm
W Angle section frame 35 × 35 × 3 mm (required for sound attenuators with width and/or height subdivided)

6 Splitter surface
F Glass fibre fabric
L Glass fibre fabric and perforated sheet metal

7 Nominal width B [mm]

8 Nominal height H [mm]

9 Nominal length in airflow direction L [mm]

Order example

XSA–100–100–2–W–L/400×1500×1500

Splitter thickness	100 mm
Airway width	100 mm
No. of splitters	2
Connecting frame	Angle section frame
Splitter surface	Glass fibre fabric and perforated sheet metal
Width	400 mm
Height	1500 mm
Length (in airflow direction)	1500 mm

Splitter thickness 100 mm

Insertion loss values for other lengths (intermediate sizes) and airway widths can be determined with the Easy Product Finder design programme.

XKA100 / XSA100 – Length L = 500 mm

Airway width	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e dB							
40	3	5	10	18	37	45	31	23
60	3	5	8	16	33	38	25	19
100	3	3	5	11	25	23	13	9
200	0	1	3	8	14	9	5	6

XKA100 / XSA100 – Length L = 1000 mm

Airway width	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e dB							
40	4	8	19	29	46	50	39	32
60	4	7	16	26	42	47	34	26
100	4	4	9	19	35	35	22	15
200	1	2	5	13	22	14	8	7

XKA100 / XSA100 – Length L = 1500 mm

Airway width	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e dB							
40	6	11	27	39	50	50	47	40
60	6	9	23	35	50	50	42	34
100	5	5	14	27	44	46	31	20
200	2	3	8	18	30	19	11	9

XKA100 / XSA100 – Length L = 2000 mm

Airway width	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e dB							
40	7	14	36	50	50	50	50	49
60	7	12	30	45	50	50	50	41
100	6	7	19	34	50	50	39	26
200	3	4	11	24	38	24	14	10

XKA100 / XSA100 – Length L = 2500 mm

Airway width	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e dB							
40	9	18	44	50	50	50	50	50
60	8	14	37	50	50	50	50	49
100	7	8	23	42	50	50	48	32
200	4	5	13	29	46	30	17	12

XKA100 / XSA100 – Length L = 3000 mm

Airway width	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e dB							
40	10	21	50	50	50	50	50	50
60	10	17	44	50	50	50	50	50
100	8	9	28	49	50	50	50	37
200	5	6	16	34	50	35	20	13

Splitter thickness 200 mm

XKA200 / XSA200 – Length L = 500 mm

Airway width	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e dB							
50	2	12	18	31	44	42	29	23
100	3	4	9	20	26	22	16	11
200	2	2	6	13	14	11	7	5
400	1	1	4	8	7	5	4	3

XKA200 / XSA200 – Length L = 1000 mm

Airway width	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e dB							
50	6	14	22	44	50	50	36	27
100	3	8	15	32	46	38	23	16
200	2	5	11	22	25	18	11	7
400	1	3	7	13	11	8	5	4

XKA200 / XSA200 – Length L = 1500 mm

Airway width	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e dB							
50	8	20	31	50	50	50	48	33
100	5	12	22	47	50	50	31	20
200	3	7	15	31	35	24	14	8
400	2	4	11	18	15	9	6	5

XKA200 / XSA200 – Length L = 2000 mm

Airway width	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e dB							
50	10	27	40	50	50	50	50	39
100	6	16	28	50	50	50	39	24
200	4	9	20	41	45	30	17	10
400	2	5	14	24	19	11	7	6

XKA200 / XSA200 – Length L = 2500 mm

Airway width	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e							
	dB							
50	13	34	47	50	50	50	50	45
100	7	21	34	50	50	50	45	27
200	4	11	23	50	50	36	19	11
400	3	7	16	29	21	13	8	6

XKA200 / XSA200 – Length L = 3000 mm

Airway width	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e							
	dB							
50	16	42	50	50	50	50	50	50
100	8	26	39	50	50	50	50	31
200	5	13	27	50	50	41	21	12
400	3	8	18	34	24	14	9	7

Splitter thickness 230 mm

XKA230 / XSA230 – Length L = 500 mm

Airway width	Centre frequency f_m [Hz]							
	62.5	125	250	500	1000	2000	4000	8000
	D_e							
	dB							
60	4	7	12	25	34	25	19	18
115	3	5	9	18	24	17	13	13
230	2	3	7	11	13	9	7	7
460	1	0	4	4	2	1	1	2

XKA230 / XSA230 – Length L = 1000 mm

Airway width	Centre frequency f_m [Hz]							
	62.5	125	250	500	1000	2000	4000	8000
	D_e							
	dB							
60	5	12	20	35	48	40	27	21
115	4	8	16	27	35	27	18	15
230	3	5	12	18	20	14	10	9
460	2	1	7	9	6	1	1	3

XKA230 / XSA230 – Length L = 1500 mm

Airway width	Centre frequency f_m [Hz]							
	62.5	125	250	500	1000	2000	4000	8000
	D_e							
	dB							
60	6	16	27	46	50	50	35	25
115	5	12	22	36	46	37	24	18
230	3	7	16	25	28	19	12	11
460	2	2	11	15	10	1	0	3

XKA230 / XSA230 – Length L = 2000 mm

Airway width	Centre frequency f_m [Hz]							
	62.5	125	250	500	1000	2000	4000	8000
	D_e							
	dB							
60	7	21	35	50	50	50	43	29
115	5	15	28	45	50	47	29	21
230	4	9	21	32	36	24	14	13
460	3	4	14	20	15	1	0	4

XKA230 / XSA230 – Length L = 2500 mm

Airway width	Centre frequency f_m [Hz]							
	62.5	125	250	500	1000	2000	4000	8000
	D_e							
	dB							
60	8	25	43	50	50	50	50	33
115	6	19	35	50	50	50	34	24
230	5	12	26	40	43	28	17	14
460	4	5	18	25	19	0	0	5

XKA230 / XSA230 – Length L = 3000 mm

Airway width	Centre frequency f_m [Hz]							
	62.5	125	250	500	1000	2000	4000	8000
	D_e							
	dB							
60	9	30	50	50	50	50	50	37
115	7	22	41	50	50	50	40	27
230	6	14	31	47	50	33	19	16
460	5	6	21	31	23	0	0	5

Splitter thickness 300 mm

XKA300 / XSA300 – Length L = 500 mm

Airway width	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e dB							
75	4	7	17	25	34	32	22	18
150	2	5	11	16	19	17	12	9
300	1	3	6	9	10	9	6	5
600	0	2	4	5	5	5	3	4

XKA300 / XSA300 – Length L = 1000 mm

Airway width	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e dB							
75	6	15	24	42	48	50	33	26
150	3	9	18	27	34	28	17	11
300	1	6	11	15	16	13	8	7
600	1	4	7	8	7	5	4	5

XKA300 / XSA300 – Length L = 1500 mm

Airway width	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e dB							
75	8	20	33	50	50	50	44	30
150	3	14	26	38	46	39	21	13
300	2	8	16	21	21	17	10	8
600	1	6	11	12	9	6	4	5

XKA300 / XSA300 – Length L = 2000 mm

Airway width	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e dB							
75	10	25	42	50	50	50	50	34
150	4	18	33	48	50	50	26	16
300	2	11	20	26	26	21	12	9
600	1	7	14	16	11	7	5	5

XKA300 / XSA300 – Length L = 2500 mm

Airway width	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e dB							
75	13	30	50	50	50	50	50	38
150	5	23	40	50	50	50	30	18
300	3	14	25	32	32	25	13	10
600	1	9	17	19	13	7	5	6

XKA300 / XSA300 – Length L = 3000 mm

Airway width	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e dB							
75	15	35	50	50	50	50	50	42
150	6	28	48	50	50	50	35	20
300	3	17	30	38	37	29	15	11
600	2	11	21	23	14	8	5	6

Quick sizing – sound power level

The sound power levels L_{WA} apply to sound attenuation dampers with a cross-sectional area (B × H) of 1 m^2.

Air-regenerated noise MSA, MKA, XSA, XKA, RKA

v_s	m/s	4	6	8	10	12	14	16	18	20
L_{WA}	dB(A)	21	31	38	43	47	51	54	57	60

Quick sizing – differential pressure

Splitter thickness 100 mm

MKA100 / XKA100 – L = 500 mm

v_s	Airway width [mm]			
	40	60	100	200
	Δp_{st}			
m/s	Pa			
4	6	4	2	2
10	35	18	10	6
20	135	70	35	18

MKA100 / XKA100 – L = 1000 mm

v_s	Airway width [mm]			
	40	60	100	200
	Δp_{st}			
m/s	Pa			
4	8	4	2	2
10	45	24	12	6
20	180	90	45	22

MKA100 / XKA100 – L = 1500 mm

v_s	Airway width [mm]			
	40	60	100	200
	Δp_{st}			
m/s	Pa			
4	10	4	2	2
10	55	28	14	8
20	225	110	55	26

MKA100 / XKA100 – L = 2000 mm

v_s	Airway width [mm]			
	40	60	100	200
	Δp_{st}			
m/s	Pa			
4	12	5	4	2
10	70	35	16	8
20	270	135	65	30

MKA100 / XKA100 – L = 2500 mm

v_s	Airway width [mm]			
	40	60	100	200
	Δp_{st}			
m/s	Pa			
4	14	6	4	2
10	80	40	18	10
20	320	155	70	35

MKA100 / XKA100 – L = 3000 mm

v_s	Airway width [mm]			
	40	60	100	200
	Δp_{st}			
m/s	Pa			
4	16	8	4	2
10	90	45	20	10
20	365	175	80	40

Splitter thickness 200 mm

MKA200 / XKA200 – L = 500 mm

v_s	Airway width [mm]			
	50	100	200	400
	Δp_{st}			
m/s	Pa			
4	10	2	2	0
10	60	14	4	2
20	235	50	16	8

MKA200 / XKA200 – L = 1000 mm

v_s	Airway width [mm]			
	50	100	200	400
	Δp_{st}			
m/s	Pa			
4	12	2	2	0
10	65	16	6	2
20	265	60	22	10

MKA200 / XKA200 – L = 1500 mm

v_s	Airway width [mm]			
	50	100	200	400
	Δp_{st}			
m/s	Pa			
4	12	4	2	2
10	75	18	6	4
20	300	75	26	14

MKA200 / XKA200 – L = 2000 mm

v_s	Airway width [mm]			
	50	100	200	400
	Δp_{st}			
m/s	Pa			
4	14	4	2	2
10	85	22	8	4
20	335	85	30	16

MKA200 / XKA200 – L = 2500 mm

v_s	Airway width [mm]			
	50	100	200	400
	Δp_{st}			
m/s	Pa			
4	16	4	2	2
10	90	24	10	6
20	365	95	35	18

MKA200 / XKA200 – L = 3000 mm

v_s	Airway width [mm]			
	50	100	200	400
	Δp_{st}			
m/s	Pa			
4	16	4	2	2
10	100	28	10	6
20	400	110	40	22

Splitter thickness 230 mm

MKA230 / XKA230 – L = 500 mm

v_s	Airway width [mm]			
	60	115	230	460
	Δp_{st}			
m/s	Pa			
4	10	2	2	0
10	55	14	4	2
20	225	55	16	8

MKA230 / XKA230 – L = 1000 mm

v_s	Airway width [mm]			
	60	115	230	460
	Δp_{st}			
m/s	Pa			
4	10	4	2	0
10	65	16	6	2
20	260	65	22	10

MKA230 / XKA230 – L = 1500 mm

v_s	Airway width [mm]			
	60	115	230	460
	Δp_{st}			
m/s	Pa			
4	12	4	2	0
10	75	20	6	4
20	295	75	26	12

MKA230 / XKA230 – L = 2000 mm

v_s	Airway width [mm]			
	60	115	230	460
	Δp_{st}			
m/s	Pa			
4	14	4	2	2
10	80	22	8	4
20	330	90	30	16

MKA230 / XKA230 – L = 2500 mm

v_s	Airway width [mm]			
	60	115	230	460
	Δp_{st}			
m/s	Pa			
4	14	4	2	2
10	90	26	10	4
20	360	100	35	18

MKA230 / XKA230 – L = 3000 mm

v_s	Airway width [mm]			
	60	115	230	460
	Δp_{st}			
m/s	Pa			
4	16	6	2	2
10	100	28	10	6
20	395	115	40	20

Splitter thickness 300 mm

XKA300 – L = 500 mm

v_s	Airway width [mm]			
	75	150	300	600
	Δp_{st}			
m/s	Pa			
4	10	2	1	0
10	62	12	3	1
20	247	50	14	6

XKA300 – L = 1000 mm

v_s	Airway width [mm]			
	75	150	300	600
	Δp_{st}			
m/s	Pa			
4	11	2	1	0
10	69	14	4	2
20	278	58	17	7

XKA300 – L = 1500 mm

v_s	Airway width [mm]			
	75	150	300	600
	Δp_{st}			
m/s	Pa			
4	12	3	1	0
10	77	16	5	2
20	308	65	19	8

XKA300 – L = 2000 mm

v_s	Airway width [mm]			
	75	150	300	600
	Δp_{st}			
m/s	Pa			
4	14	3	1	0
10	85	18	6	2
20	339	73	22	10

XKA300 – L = 2500 mm

v_s	Airway width [mm]			
	75	150	300	600
	Δp_{st}			
m/s	Pa			
4	15	3	1	0
10	92	20	6	3
20	369	81	25	11

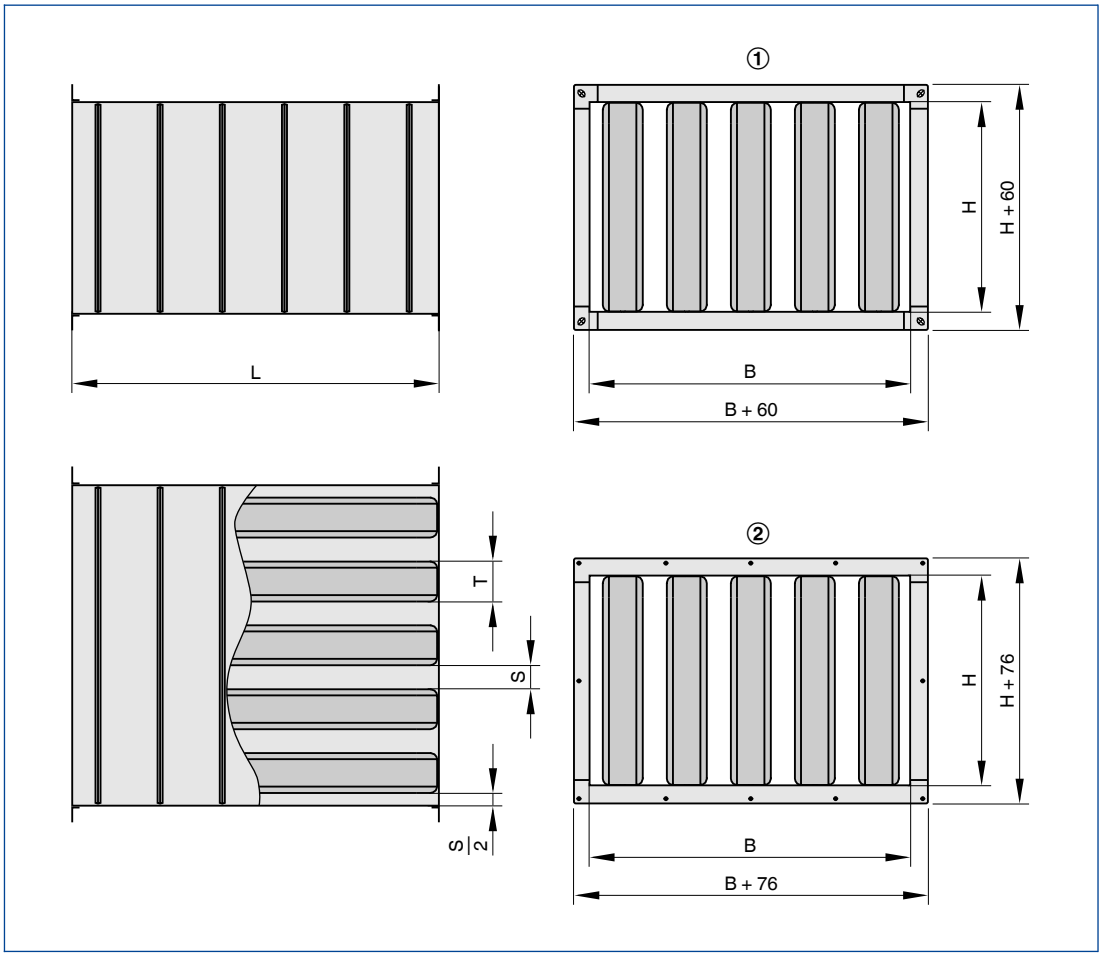
XKA300 – L = 3000 mm

v_s	Airway width [mm]			
	75	150	300	600
	Δp_{st}			
m/s	Pa			
4	16	4	1	0
10	100	22	7	3
20	400	89	28	12

Dimensions

For detailed information on corner holes and flange holes see Dimensions – Duct connection

Dimensional drawing of XSA



Nominal length	500	750	1000	1250	1500

Nominal height	300	600	900	1200	1500	1800

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Nominal width	XSA100			XSA200			XSA230			XSA300		
	T	n	S	T	n	S	T	n	S	T	n	S
	mm	–	mm	mm	–	mm	mm	–	mm	mm	–	mm
200	100	1	100	–	–	–	–	–	–	–	–	–
400	100	2	100	200	1	200	230	1	85	300	1	100
600	100	2 – 4	50 – 200	200	2	100	230	2	70	300	1	300
800	100	3 – 5	60 – 167	200	2 – 3	67 – 200	230	2	170	300	1 – 2	100 – 250
1000	100	4 – 7	43 – 150	200	3 – 4	50 – 133	230	3	103	300	2	200
1200	100	4 – 8	50 – 200	200	3 – 5	40 – 200	230	3 – 4	70 – 170	300	2 – 3	100 – 300
1400	100	5 – 10	40 – 180	200	4 – 5	80 – 150	230	3 – 5	50 – 237	300	3 – 4	50 – 167
1600	100	6 – 11	46 – 200	200	4 – 7	57 – 200	230	4 – 5	90 – 170	300	3 – 4	100 – 233
1800	100	6 – 12	50 – 200	200	5 – 8	50 – 160	230	4 – 6	70 – 220	300	3 – 5	60 – 300
2000	100	7 – 14	43 – 186	200	5 – 8	50 – 200	230	5 – 7	56 – 170	300	4 – 5	100 – 200
2200	100	7 – 15	47 – 200	200	6 – 9	44 – 167	230	5 – 7	84 – 186	300	4 – 6	67 – 250
2400	100	8 – 16	50 – 200	200	6 – 10	40 – 200	230	6 – 8	70 – 170	300	4 – 7	43 – 300

Sound attenuator casing with standard flange

The total weight of a splitter sound attenuator is the combined weight of the casing (with standard flange or angle section frame) and all splitters.

The total weight for intermediate sizes can be generated with our Easy Product Finder design programme.

Weight – sound attenuator casing with standard flange, L = 500

H	B									
	200	400	600	800	1000	1200	1400	1600	2000	2400
mm	kg									
300	6	8	10	12	14	16	18	20	24	28
600	9	11	13	15	17	19	21	23	27	31
900	12	14	16	18	20	22	24	26	30	34
1200	15	17	19	21	23	25	27	29	33	37
1500	18	20	22	24	26	28	30	32	36	39

Weight – sound attenuator casing with standard flange, L = 750

H	B									
	200	400	600	800	1000	1200	1400	1600	2000	2400
mm	kg									
300	8	10	13	16	19	22	25	27	33	38
600	13	15	18	21	24	26	29	31	36	42
900	17	19	22	25	28	30	33	35	40	46
1200	21	23	26	29	32	34	37	39	44	50
1500	25	27	30	33	36	38	41	43	47	54

Weight – sound attenuator casing with standard flange, L = 1000

H	B									
	200	400	600	800	1000	1200	1400	1600	2000	2400
mm	kg									
300	10	14	17	20	24	27	30	34	41	48
600	15	19	22	25	29	32	35	39	46	53
900	20	24	27	30	34	37	40	44	51	58
1200	25	29	32	35	39	43	46	50	57	63
1500	30	34	37	40	44	48	51	55	62	68

Weight – sound attenuator casing with standard flange, L = 1250

H	B									
	200	400	600	800	1000	1200	1400	1600	2000	2400
mm	kg									
300	13	17	21	25	29	33	37	41	49	58
600	19	23	27	31	35	39	43	47	54	64
900	25	29	33	37	41	45	49	53	60	70
1200	31	35	39	43	47	51	55	57	64	76
1500	37	41	45	49	53	58	62	66	73	82

Weight – sound attenuator casing with standard flange, L = 1500

H	B									
	200	400	600	800	1000	1200	1400	1600	2000	2400
mm	kg									
300	15	19	24	29	33	39	44	48	58	68
600	22	26	31	36	40	46	51	55	65	75
900	30	34	39	44	48	53	58	62	72	82
1200	37	41	46	51	55	60	65	69	79	89
1500	44	48	53	58	62	68	73	77	87	97

Sound attenuator casing with angle section frame

Weight – sound attenuator casing with angle section frame, L = 500

H	B									
	200	400	600	800	1000	1200	1400	1600	2000	2400
mm	kg									
300	9	13	16	19	23	25	28	32	39	45
600	14	18	21	24	28	30	33	37	44	50
900	18	22	25	28	32	35	38	42	49	55
1200	23	27	30	33	37	40	43	47	54	59
1500	28	32	35	38	42	45	48	52	59	64

Weight – sound attenuator casing with angle section frame, L = 750

H	B									
	200	400	600	800	1000	1200	1400	1600	2000	2400
mm	kg									
300	8	12	16	20	24	25	29	33	41	45
600	13	17	21	25	29	30	34	38	46	50
900	17	21	25	29	33	35	39	43	51	55
1200	22	26	30	34	38	40	44	48	56	59
1500	27	31	35	39	43	45	49	53	61	64

Weight – sound attenuator casing with angle section frame, L = 1000

H	B									
	200	400	600	800	1000	1200	1400	1600	2000	2400
mm	kg									
300	14	18	23	28	32	37	42	46	56	65
600	21	25	30	35	39	44	49	53	63	72
900	28	32	37	42	46	51	56	60	70	79
1200	35	39	44	49	53	58	63	67	77	86
1500	42	46	51	56	60	65	70	74	84	93

Weight – sound attenuator casing with angle section frame, L = 1250

H	B									
	200	400	600	800	1000	1200	1400	1600	2000	2400
mm	kg									
300	15	21	26	31	37	42	47	53	63	75
600	23	29	34	39	45	51	56	62	72	83
900	31	37	42	47	53	59	64	70	80	91
1200	40	46	51	56	62	67	73	79	89	99
1500	48	54	59	64	70	75	80	86	96	107

Weight – sound attenuator casing with angle section frame, L = 1500

H	B									
	200	400	600	800	1000	1200	1400	1600	2000	2400
mm	kg									
300	18	24	30	36	42	48	54	60	72	85
600	27	33	39	45	51	57	63	69	81	94
900	36	42	48	54	60	66	72	78	90	103
1200	45	51	57	63	69	76	82	88	100	112
1500	54	60	66	72	78	85	91	97	109	122

Splitters

Weight – XKA-100

Height	Glass fibre fabric (-F)					Glass fibre fabric and perforated sheet metal (-L)				
	Length [mm]									
	500	750	1000	1250	1500	500	750	1000	1250	1500
mm	kg									
300	2	2	3	4	4	3	4	5	6	7
600	3	4	4	5	6	5	7	9	11	13
900	4	5	6	7	8	7	10	12	15	18
1200	5	6	7	9	10	9	12	16	20	23
1500	5	7	9	10	12	11	15	20	24	28

Weight – XKA-200

Height	Glass fibre fabric (-F)					Glass fibre fabric and perforated sheet metal (-L)				
	Length [mm]									
	500	750	1000	1250	1500	500	750	1000	1250	1500
mm	kg									
300	3	4	5	6	7	4	6	7	9	10
600	5	6	8	9	11	7	10	12	15	18
900	6	8	11	13	15	10	13	17	21	25
1200	8	11	13	16	19	12	17	22	27	32
1500	10	13	16	19	22	15	21	27	33	39

Weight – XKA-230

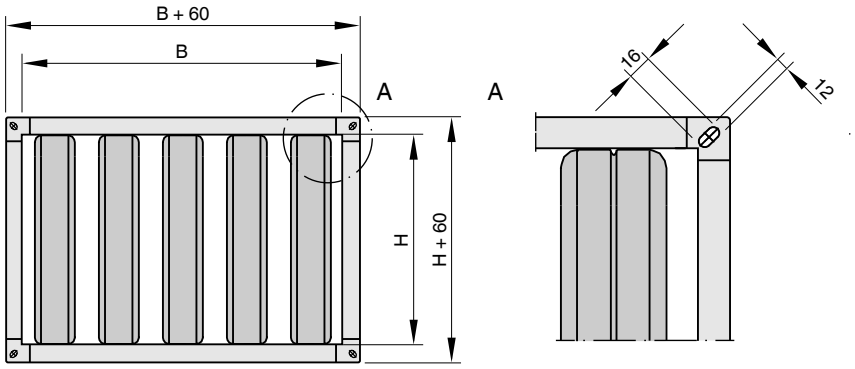
Height	Glass fibre fabric (-F)					Glass fibre fabric and perforated sheet metal (-L)				
	Length [mm]									
	500	750	1000	1250	1500	500	750	1000	1250	1500
mm	kg									
300	3	5	6	7	8	4	6	8	10	11
600	5	7	9	11	12	7	10	13	16	19
900	7	10	12	14	17	10	14	19	23	27
1200	9	12	15	18	21	13	19	24	29	34
1500	11	15	18	22	25	16	23	29	35	42

Weight – XKA-300

Height	Glass fibre fabric (-F)					Glass fibre fabric and perforated sheet metal (-L)				
	Length [mm]									
	500	750	1000	1250	1500	500	750	1000	1250	1500
mm	kg									
300	4	6	7	9	10	5	7	9	11	14
600	7	9	11	14	16	9	12	16	19	22
900	9	12	15	18	21	12	17	22	27	31
1200	12	15	19	23	27	16	22	28	34	40
1500	14	19	23	28	33	19	27	34	42	49

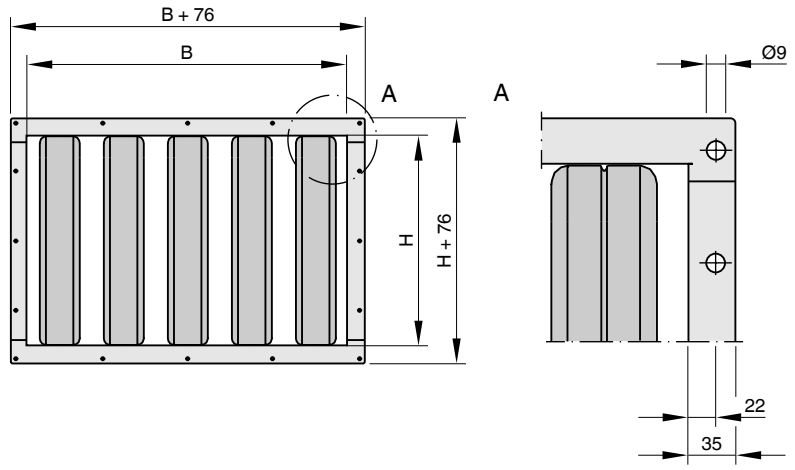
Corner holes

Splitter sound attenuator with standard flange



Flange holes

Splitter sound attenuator with angle section frame



Screw hole pitch = 150 mm

No. of holes per side

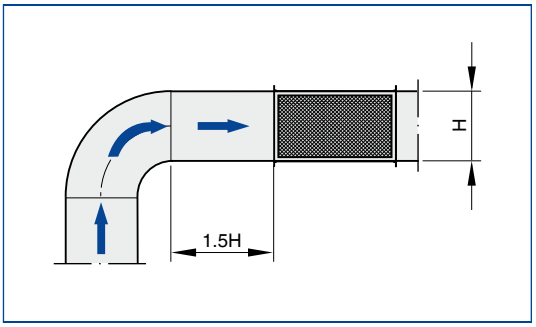
Width	No. of holes
B	n
mm	–
200 – 259	3
260 – 409	4
410 – 559	5
560 – 709	6
710 – 859	7
860 – 1009	8
1010 – 1159	9
1160 – 1309	10
1310 – 1459	11
1460 – 1609	12
1610 – 1759	13
1760 – 1909	14
1910 – 2059	15
2060 – 2209	16
2210 – 2359	17
2360 – 2400	18

No. of holes per side

Height	No. of holes
H	n
mm	–
150 – 299	1
300 – 449	2
450 – 599	3
600 – 749	4
750 – 899	5
900 – 1049	6
1050 – 1199	7
1200 – 1349	8
1350 – 1499	9
1500 – 1649	10
1650 – 1799	11
1800	12

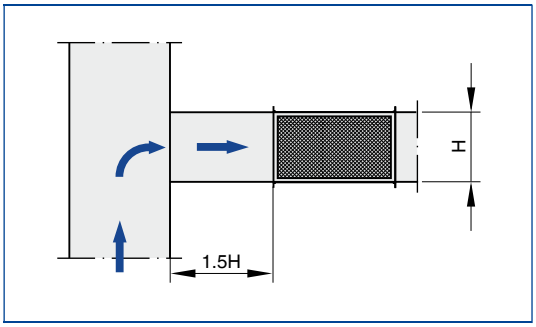
Upstream conditions

Upstream conditions – Bend



Vertical duct section before the bend:
Splitters vertical; H of duct = H of splitters
Horizontal duct section before the bend:
Splitters horizontal; B of duct = H of splitters

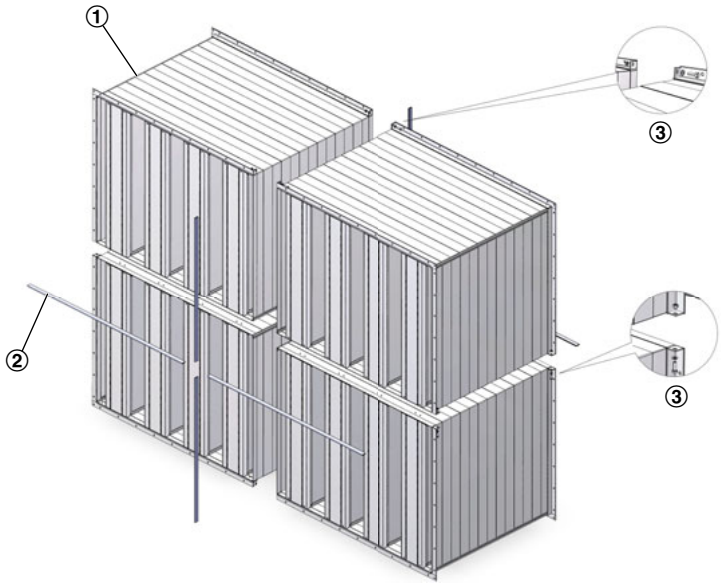
Upstream conditions – Junction



Vertical duct section before the junction:
Splitters vertical; H of duct = H of splitters
Horizontal duct section before the junction:
Splitters horizontal; B of duct = H of splitters

Width subdivided
Height subdivided

Schematic illustration of subdivided sound attenuators



① Sound attenuator, with width or height subdivided
② Seal
③ Screw fix connection

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Standard text

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

Splitter sound attenuators used for the reduction of fan noise and air-regenerated noise in air conditioning systems. Attenuation effect due to absorption. Energy-saving as well as hygiene tested and certified.
Sound attenuators which consist of a casing with duct connections and splitters.
Splitters consists of an aerodynamically profiled frame (radius > 15 mm) and absorption material. Frame edges are folded to protect the sound absorbing infill.
Insertion loss and sound power level of the air-regenerated noise tested to ISO 7235.
Meets the hygiene requirements of VDI 6022, DIN 1946, parts 2 and 4, as well as of VDI 3803.

Special features

- Increased insertion loss even in the high-frequency range
- Up to 30 % lower differential pressure
- Energy efficient and/or space saving due to aerodynamically profiled frame
- Hygiene tested and certified
- Multi-section construction available for large dimensions

Materials and surfaces

- Casing and splitter frames made of galvanised sheet steel
- Standard flange and angle sections made of galvanised steel
- Absorption material is mineral wool

Mineral wool
- To EN 13501, fire rating class A1, non-combustible
- RAL quality mark RAL-GZ 388
- Biosoluble and hence hygienically safe according to the German TRGS 905 (Technical Rules for Hazardous Substances) and EU directive 97/69/EG
- Faced with glass fibre fabric as protection against erosion through airflow velocities of up to 20 m/s
- Inert to fungal and bacterial growth

Construction

Splitter surface
- F: Glass fibre fabric
- L: Glass fibre fabric and perforated sheet metal

Duct connection
- P: Standard flange 30 mm
- W: Angle section frame 35 × 35 × 3 mm

Technical data

- Splitter thickness: 100, 200, 230, 300 mm
- Nominal sizes: 140 × 150 × 500 mm – 2400 × 1800 × 1500 mm
- Width subdivided: up to 4800 mm
- Height subdivided: up to 3600 mm
- Length subdivided: up to 3000 mm
- Operating temperature: – 100 °C

Sizing data

- B _____ [mm]
- H _____ [mm]
- L (in airflow direction) _____ [mm]
- $\dot{V}$ _____ [m³/h]
- D_e at 250 Hz _____ [dB]
- Δp_{st} _____ [Pa]

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Order options

1 Type
XSA Splitter sound attenuator with casing

2 Splitter thickness [mm]
☐ **100**
☐ **200**
☐ **230**
☐ **300**

3 Airway width (distance between splitters) [mm]

4 Number of splitters

5 Duct connection
☐ **P** Standard flange 30 mm
☐ **W** Angle section frame 35 × 35 × 3 mm (required for sound attenuators with width and/or height subdivided)

6 Splitter surface
☐ **F** Glass fibre fabric
☐ **L** Glass fibre fabric and perforated sheet metal

7 Nominal width B [mm]

8 Nominal height H [mm]

9 Nominal length in airflow direction L [mm]

Notes

Splitters
Type MKA

For increased insertion loss and broadband attenuation even in the low frequency range

Energy-saving splitters with resonating panels, ready to be used in air conditioning systems

- Attenuation effect due to resonance and absorption
- Energy efficient due to aerodynamically profiled frame (radius > 15 mm)
- Acoustic data measured to ISO 7235
- Absorption material is biosoluble and hence hygienically safe
- Absorption material faced with glass fibre fabric as a protection against erosion due to airflow velocities up to 20 m/s
- Absorption material non-combustible, to EN 13501, fire rating class A1
- Available in standard sizes and many intermediate sizes
- Operating temperature up to 100 °C

Optional equipment and accessories

- Additional perforated sheet metal to protect the absorption material
- Powder-coated
- Stainless steel
- Brine and salt-water resistant aluminium construction (AlMg3)

Splitter frames with folded edges

Tested to VDI 6022

Description

Sound attenuator splitter, variant MKA-200

Application
- Sound attenuator splitters with resonating panels, Type MKA, used for the reduction of fan noise and air-regenerated noise in air conditioning systems
- Attenuation effect due to absorption and resonance
- Broadband attenuation even in the low frequency range of critical fan noise
- Hygiene tested and certified to VDI 6022
- For use in potentially explosive atmospheres (ATEX), zones 1, 2, 21 and 22 (outside)

Variants
- MKA-100: Splitter thickness 100 mm
- MKA-200: Splitter thickness 200 mm
- MKA-230: Splitter thickness 230 mm

Construction
Surface of splitter area not covered by a resonating panel
- F: Glass fibre fabric
- L: Glass fibre fabric and perforated sheet metal

Nominal sizes
- H: 300, 600, 900, 1200, 1500, 1800 mm (intermediate sizes 400 – 1700 mm in increments of 100 mm)
- Height subdivided: 1900 – 5000 mm, in increments of 100 mm
- L: 500, 750, 1000, 1250, 1500 mm
- Length subdivided: 1750, 2000, 2250, 2500, 2750, 3000 mm (intermediate sizes 1501 – 2999 mm in increments of 1 mm)

Useful additions
- Fitting accessories for sound attenuator splitters

Special features
- Resonating panels ensure increased insertion loss in the frequency range of critical fan noise
- Up to 30 % lower differential pressure
- Energy efficient and/or space saving due to aerodynamically profiled frame
- Hygiene tested and certified
- Multi-section construction available for large dimensions

Parts and characteristics
- Aerodynamically profiled frame
- Absorption material and resonating panels fitted to reduce air-regenerated noise by absorption and resonance

Construction features
- Aerodynamically profiled splitter frame (radius > 15 mm) that enables a reduction of turbulence both upstream and downstream; frame with grooves for increased rigidity
- Frame edges are folded to protect the infill
- Operating temperature up to 100 °C (construction with perforated sheet metal up to 300 °C for 3h max.)

Materials and surfaces
- Splitter frames, partitioning panels and resonating panels made of galvanised sheet steel
- Absorption material is mineral wool

Mineral wool
- To EN 13501, fire rating class A1, non-combustible
- RAL quality mark RAL-GZ 388
- Biosoluble and hence hygienically safe according to the German TRGS 905 (Technical Rules for Hazardous Substances) and EU directive 97/69/EG
- Faced with glass fibre fabric as protection against erosion through airflow velocities of up to 20 m/s
- Inert to fungal and bacterial growth

Installation and commissioning
- Splitters are supplied as ready-to-install kits
- Observe installation information and the general codes of good practice in order to achieve the given performance data
- Vertical installation should be preferred, horizontal installation is possible up to H = 1200 mm
- The length (L) of sound attenuator splitters and splitter attenuators refers always to the airflow direction. Remember this with regard to vertical ducting.
- Installation in ducts outside of closed rooms requires sufficient protection against the effects of weather

Standards and guidelines

- Insertion loss and sound power level of air-regenerated noise tested to ISO 7235
- Meets the hygiene requirements of VDI 6022, DIN 1946, parts 1 and 2 as well as of VDI 3803
- Directive 94/9/EC: Equipment and protective systems intended for use in potentially explosive atmospheres

Maintenance

- Maintenance-free as construction and materials are not subject to wear

Technical data

Splitter thickness	100, 200, 230 mm
Nominal sizes	140 × 500 mm – 1800 × 1500 mm
Operating temperature	– 100 °C

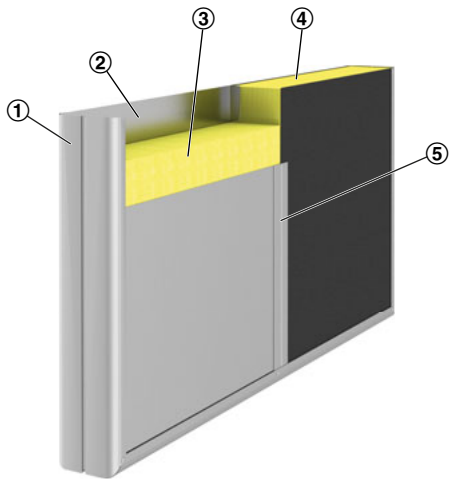
Function

Functional description

The attenuation effect of the splitters is due to absorption and resonance.
The splitters have a mineral wool infill as absorption material. Part of the splitter surface that runs parallel to the airflow is covered with resonating panels. These panels start oscillating due to the sound (resonance) and hence absorb sound energy.

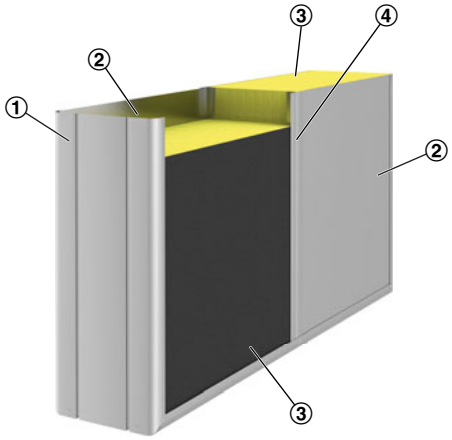
Resonance works best in the frequency range of critical fan noise.
There is a higher attenuation across a wider frequency range when compared to mere absorption splitters.

Schematic illustration of MKA-100



① Splitter frame, 100 mm wide
② Opposing resonating panels
③ Absorption material
④ Absorption material faced on both sides with glass fibre fabric
⑤ Partitioning panel

Schematic illustration of MKA-200



① Splitter frame, 200 mm wide
② Offset resonating panels
③ Absorption material faced on one side with glass fibre fabric
④ Partitioning panel

Order code

The length (L) of sound attenuator splitters and splitter attenuators refers always to the airflow direction. Remember this with regard to vertical ducting.

MKA

MKA 200 – F / 600×1500
1 2 3 4 5

1 Type
MKA Sound attenuator splitter with resonating panels

2 Splitter thickness [mm]
100
200
230

3 Splitter surface
F Glass fibre fabric
L Glass fibre fabric and perforated sheet metal

4 Height H [mm]

5 Length in airflow direction L [mm]

Fitting accessories for sound attenuator splitters

SD – KBLECH
1

1 Part

SD-KBLECH	Clamp sheet for MKA, XKA, RKA200
SD-KAP100	U-sheet for MKA-100, XKA-100
SD-KAP200	U-sheet for MKA-200, XKA-200, RKA200
SD-KAP230	U-sheet for MKA-230, XKA-230
SD-KAP300	U-sheet for XKA-300

Order example

MKA100–L/1500×1500

Splitter thickness	100 mm
Splitter surface	Glass fibre fabric and perforated sheet metal
Height	1500 mm
Length	1500 mm

Splitter thickness 100 mm

Insertion loss values for other lengths (intermediate sizes) and airway widths can be determined with the Easy Product Finder design programme.

MKA100 / MSA100 – Length L = 500 mm

Airway width	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e							
	dB							
40	4	10	11	13	21	27	24	18
60	3	9	9	11	18	23	20	15
100	3	4	5	8	13	15	11	8
200	0	2	2	4	7	4	3	3

MKA100 / MSA100 – Length L = 1000 mm

Airway width	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e							
	dB							
40	5	13	20	23	31	38	32	26
60	5	11	17	19	28	32	27	21
100	3	8	9	13	21	22	15	11
200	0	5	5	9	15	9	6	6

MKA100 / MSA100 – Length L = 1500 mm

Airway width	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e							
	dB							
40	6	16	30	32	42	48	40	34
60	6	14	25	28	38	41	33	27
100	4	10	14	19	29	28	19	14
200	2	7	7	13	20	12	7	7

MKA100 / MSA100 – Length L = 2000 mm

Airway width	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e							
	dB							
40	8	19	39	42	50	50	49	42
60	7	16	32	36	47	50	40	34
100	5	12	19	25	37	35	23	16
200	3	9	10	17	25	15	9	8

MKA100 / MSA100 – Length L = 2500 mm

Airway width	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e							
	dB							
40	9	22	48	50	50	50	50	50
60	8	19	40	45	50	50	47	40
100	6	14	24	30	45	41	27	19
200	3	12	12	21	33	19	12	11

MKA100 / MSA100 – Length L = 3000 mm

Airway width	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e							
	dB							
40	10	25	50	50	50	50	50	50
60	9	22	48	50	50	50	50	46
100	7	16	28	36	50	47	31	22
200	2	14	15	26	41	24	16	14

Splitter thickness 200 mm

MKA200 / MSA200 – Length L = 500 mm

Airway width	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e							
	dB							
50	5	7	19	21	26	22	17	14
100	2	4	12	12	15	11	9	8
200	1	3	7	6	7	6	5	4
400	0	2	4	4	4	3	2	2

MKA200 / MSA200 – Length L = 1000 mm

Airway width	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e							
	dB							
50	6	16	33	39	41	39	26	20
100	4	10	22	23	26	19	13	11
200	2	7	13	12	12	10	8	6
400	1	4	7	5	6	4	3	3

MKA200 / MSA200 – Length L = 1500 mm

Airway width	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e							
	dB							
50	9	22	44	50	50	50	34	25
100	5	15	32	33	37	25	16	14
200	3	9	19	18	15	12	10	7
400	1	6	10	8	8	6	4	4

MKA200 / MSA200 – Length L = 2000 mm

Airway width	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e							
	dB							
50	12	29	50	50	50	50	43	29
100	6	19	42	44	47	31	19	17
200	4	12	25	23	18	15	12	9
400	1	8	13	10	10	8	5	5

MKA200 / MSA200 – Length L = 2500 mm

Airway width	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e							
	dB							
50	14	38	50	50	50	50	49	35
100	8	25	50	50	50	38	23	18
200	5	16	30	29	23	16	13	10
400	2	10	16	13	12	9	6	5

MKA200 / MSA200 – Length L = 2000 mm

Airway width	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e							
	dB							
50	12	29	50	50	50	50	43	29
100	6	19	42	44	47	31	19	17
200	4	12	25	23	18	15	12	9
400	1	8	13	10	10	8	5	5

Splitter thickness 230 mm

MKA230 / MSA230 – Length L = 500 mm

Airway width	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e							
	dB							
60	3	7	16	19	21	17	14	14
115	2	5	11	12	13	10	9	10
230	1	3	6	5	5	2	4	6
460	0	2	1	0	0	0	0	2

MKA230 / MSA230 – Length L = 1000 mm

Airway width	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e							
	dB							
60	7	13	27	30	35	25	18	18
115	4	10	20	20	22	15	12	13
230	1	7	12	10	8	4	6	8
460	0	3	4	0	0	0	0	2

MKA230 / MSA230 – Length L = 1500 mm

Airway width	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e							
	dB							
60	11	19	38	41	49	33	21	21
115	7	14	28	28	30	20	15	15
230	2	10	18	15	10	6	9	9
460	0	5	7	1	0	0	2	3

MKA230 / MSA230 – Length L = 2000 mm

Airway width	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e							
	dB							
60	15	24	50	50	50	42	25	25
115	9	19	37	36	39	26	18	18
230	3	13	24	19	13	8	11	10
460	0	7	10	3	0	0	3	3

MKA230 / MSA230 – Length L = 2500 mm

Airway width	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e							
	dB							
60	19	30	50	50	50	50	29	28
115	12	24	46	44	47	31	21	20
230	4	16	29	24	16	11	13	12
460	0	9	13	4	0	0	5	3

MKA230 / MSA230 – Length L = 3000 mm

Airway width	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e							
	dB							
60	24	36	50	50	50	50	32	32
115	14	28	50	50	50	36	24	23
230	4	19	35	29	18	13	15	13
460	0	11	16	6	0	0	7	3

Quick sizing – sound power level

The sound power levels L_{WA} apply to sound attenuation dampers with a cross-sectional area (B × H) of 1 m^2.

Air-regenerated noise MSA, MKA, XSA, XKA, RKA

v_s	m/s	4	6	8	10	12	14	16	18	20
L_{WA}	dB(A)	21	31	38	43	47	51	54	57	60

Quick sizing – differential pressure

Splitter thickness 100 mm

Quick sizing tables provide a good overview of the differential pressures for different airway widths and airflow velocities. Intermediate values can be calculated with our Easy Product Finder design programme.

MKA100 / XKA100 – L = 500 mm

v_s	Airway width [mm]			
	40	60	100	200
	Δp_{st}			
m/s	Pa			
4	6	4	2	2
10	35	18	10	6
20	135	70	35	18

MKA100 / XKA100 – L = 1000 mm

v_s	Airway width [mm]			
	40	60	100	200
	Δp_{st}			
m/s	Pa			
4	8	4	2	2
10	45	24	12	6
20	180	90	45	22

MKA100 / XKA100 – L = 1500 mm

v_s	Airway width [mm]			
	40	60	100	200
	Δp_{st}			
m/s	Pa			
4	10	4	2	2
10	55	28	14	8
20	225	110	55	26

MKA100 / XKA100 – L = 2000 mm

v_s	Airway width [mm]			
	40	60	100	200
	Δp_{st}			
m/s	Pa			
4	12	5	4	2
10	70	35	16	8
20	270	135	65	30

MKA100 / XKA100 – L = 2500 mm

v_s	Airway width [mm]			
	40	60	100	200
	Δp_{st}			
m/s	Pa			
4	14	6	4	2
10	80	40	18	10
20	320	155	70	35

MKA100 / XKA100 – L = 3000 mm

v_s	Airway width [mm]			
	40	60	100	200
	Δp_{st}			
m/s	Pa			
4	16	8	4	2
10	90	45	20	10
20	365	175	80	40

Splitter thickness 200 mm

MKA200 / XKA200 – L = 500 mm

v_s	Airway width [mm]			
	50	100	200	400
	Δp_{st}			
m/s	Pa			
4	10	2	2	0
10	60	14	4	2
20	235	50	16	8

MKA200 / XKA200 – L = 1000 mm

v_s	Airway width [mm]			
	50	100	200	400
	Δp_{st}			
m/s	Pa			
4	12	2	2	0
10	65	16	6	2
20	265	60	22	10

MKA200 / XKA200 – L = 1500 mm

v_s	Airway width [mm]			
	50	100	200	400
	Δp_{st}			
m/s	Pa			
4	12	4	2	2
10	75	18	6	4
20	300	75	26	14

MKA200 / XKA200 – L = 2000 mm

v_s	Airway width [mm]			
	50	100	200	400
	Δp_{st}			
m/s	Pa			
4	14	4	2	2
10	85	22	8	4
20	335	85	30	16

MKA200 / XKA200 – L = 2500 mm

v_s	Airway width [mm]			
	50	100	200	400
	Δp_{st}			
m/s	Pa			
4	16	4	2	2
10	90	24	10	6
20	365	95	35	18

MKA200 / XKA200 – L = 3000 mm

v_s	Airway width [mm]			
	50	100	200	400
	Δp_{st}			
m/s	Pa			
4	16	4	2	2
10	100	28	10	6
20	400	110	40	22

Splitter thickness 230 mm

MKA230 / XKA230 – L = 500 mm

v_s	Airway width [mm]			
	60	115	230	460
	Δp_{st}			
m/s	Pa			
4	10	2	2	0
10	55	14	4	2
20	225	55	16	8

MKA230 / XKA230 – L = 1000 mm

v_s	Airway width [mm]			
	60	115	230	460
	Δp_{st}			
m/s	Pa			
4	10	4	2	0
10	65	16	6	2
20	260	65	22	10

MKA230 / XKA230 – L = 1500 mm

v_s	Airway width [mm]			
	60	115	230	460
	Δp_{st}			
m/s	Pa			
4	12	4	2	0
10	75	20	6	4
20	295	75	26	12

MKA230 / XKA230 – L = 2000 mm

v_s	Airway width [mm]			
	60	115	230	460
	Δp_{st}			
m/s	Pa			
4	14	4	2	2
10	80	22	8	4
20	330	90	30	16

MKA230 / XKA230 – L = 2500 mm

v_s	Airway width [mm]			
	60	115	230	460
	Δp_{st}			
m/s	Pa			
4	14	4	2	2
10	90	26	10	4
20	360	100	35	18

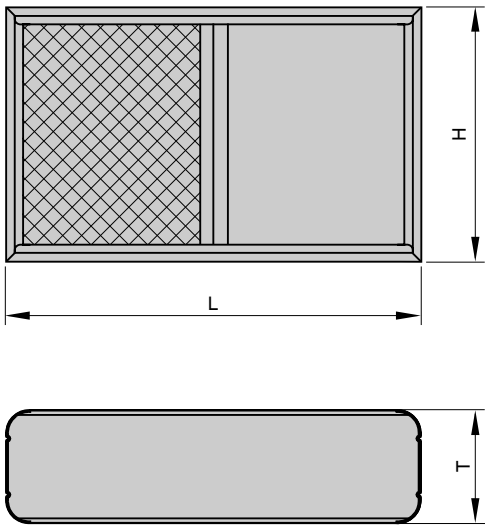
MKA230 / XKA230 – L = 3000 mm

v_s	Airway width [mm]			
	60	115	230	460
	Δp_{st}			
m/s	Pa			
4	16	6	2	2
10	100	28	10	6
20	395	115	40	20

Dimensions

The length (L) of sound attenuator splitters and splitter attenuators refers always to the airflow direction. Remember this with regard to vertical ducting.

Dimensional drawing of MKA



T: Splitter thickness
L: Length (in airflow direction)

Weight – MKA-100

Height	Glass fibre fabric (-F)					Glass fibre fabric and perforated sheet metal (-L)				
	Length [mm]									
	500	750	1000	1250	1500	500	750	1000	1250	1500
mm	kg									
300	2	3	4	5	6	3	4	5	6	8
600	4	5	7	8	10	5	7	9	11	13
900	5	7	9	11	13	7	10	13	16	18
1200	7	10	12	15	17	9	13	16	20	24
1500	8	12	15	18	21	11	16	20	25	29

Weight – MKA-200

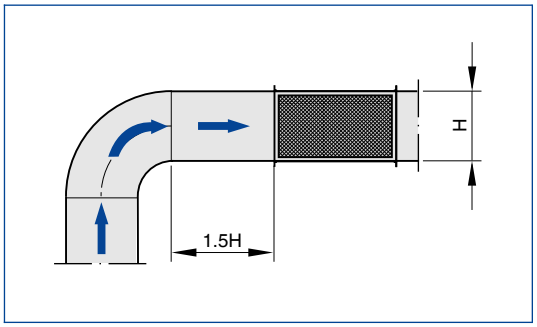
Height	Glass fibre fabric (-F)					Glass fibre fabric and perforated sheet metal (-L)				
	Length [mm]									
	500	750	1000	1250	1500	500	750	1000	1250	1500
mm	kg									
300	4	5	6	7.5	9	4	6	7	9	11
600	6	8	10	12	15	7	10	12	15	18
900	8	11	14	17	20	10	14	17	21	25
1200	10	14	18	22	26	13	18	22	27	32
1500	13	17	22	27	31	15	21	27	33	40

Weight – MKA-230

Height	Glass fibre fabric (-F)					Glass fibre fabric and perforated sheet metal (-L)				
	Length [mm]									
	500	750	1000	1250	1500	500	750	1000	1250	1500
mm	kg									
300	4	5	7	8	10	5	6	8	10	12
600	6	9	11	14	16	8	11	13	16	19
900	9	12	16	19	22	11	15	19	23	27
1200	11	16	20	24	28	14	19	24	30	35
1500	14	19	24	29	34	17	23	30	36	43

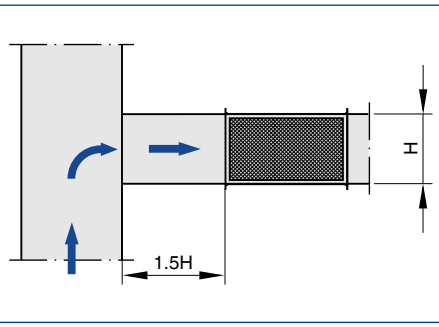
Upstream conditions

Upstream conditions – Bend



Vertical duct section before the bend:
Splitters vertical; H of duct = H of splitters
Horizontal duct section before the bend:
Splitters horizontal; B of duct = H of splitters

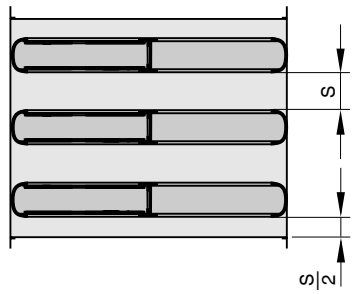
Upstream conditions – Junction



Vertical duct section before the junction:
Splitters vertical; H of duct = H of splitters
Horizontal duct section before the junction:
Splitters horizontal; B of duct = H of splitters

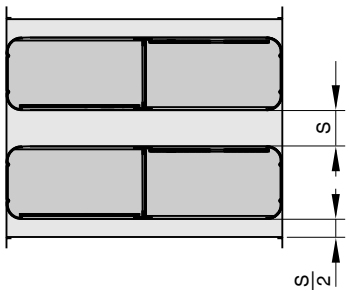
Correct installation

Correct installation of MKA-100 splitters



Opposing resonating panels

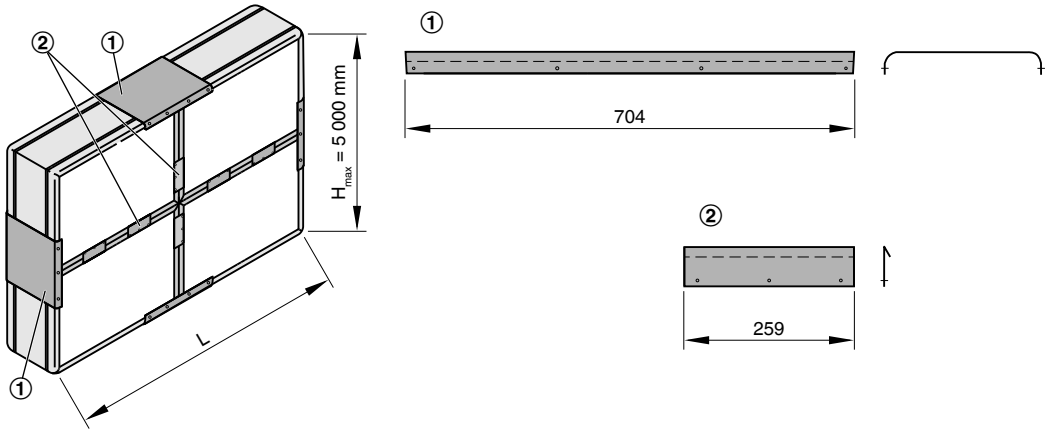
Correct installation of MKA-200 and MKA-230 splitters



Offset resonating panels

Assembly of subdivided splitters

Assembly of subdivided splitters



① U-sheet
② Clamp sheet

H or L ≤ 750 mm: without clamp sheet
H or L 751 – 1000 mm: 1 clamp sheet on each side
H or L > 1000 mm:
2 clamp sheets on each side recommended

Standard text

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

Sound attenuator splitters used for the reduction of fan noise and air-regenerated noise in air conditioning systems. Attenuation effect due to absorption and resonance. Energy-saving as well as hygiene tested and certified.
Installation kit consists of an aerodynamically profiled frame (radius > 15 mm), absorption material and resonating panels.
Frame edges are folded to protect the sound absorbing infill.
Insertion loss and sound power level of the air-regenerated noise tested to ISO 7235.
Meets the hygiene requirements of VDI 6022, DIN 1946, parts 2 and 4, as well as of VDI 3803.

Special features

- Resonating panels ensure increased insertion loss in the frequency range of critical fan noise
- Up to 30 % lower differential pressure
- Energy efficient and/or space saving due to aerodynamically profiled frame
- Hygiene tested and certified
- Multi-section construction available for large dimensions

Materials and surfaces

- Splitter frames, partitioning panels and resonating panels made of galvanised sheet steel
- Absorption material is mineral wool

Mineral wool
- To EN 13501, fire rating class A1, non-combustible
- RAL quality mark RAL-GZ 388
- Biosoluble and hence hygienically safe according to the German TRGS 905 (Technical Rules for Hazardous Substances) and EU directive 97/69/EG
- Faced with glass fibre fabric as protection against erosion through airflow velocities of up to 20 m/s
- Inert to fungal and bacterial growth

Construction

Surface of splitter area not covered by a resonating panel
- F: Glass fibre fabric
- L: Glass fibre fabric and perforated sheet metal

Technical data

- Splitter thickness: 100, 200, 230 mm
- Nominal sizes: 140 × 500 mm – 1800 × 1500 mm
- Operating temperature: – 100 °C

Sizing data

- B _____ [mm]
- H _____ [mm]
- L (in airflow direction) _____ [mm]
- $\dot{V}$ _____ [m^3/h]
- D_e at 250 Hz _____ [dB]
- Δp_{st} _____ [Pa]

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Order options

1 Type

MKA Sound attenuator splitter with resonating panels

2 Splitter thickness [mm]

☐ **100**
☐ **200**
☐ **230**

3 Splitter surface

☐ **F** Glass fibre fabric
☐ **L** Glass fibre fabric and perforated sheet metal

4 Height H [mm]

5 Length in airflow direction L [mm]

Notes

Splitters
Type XKA

For high insertion loss with broadband damping, even in the high-frequency range

Energy-saving splitters, ready to be used in air conditioning systems

- Attenuation effect due to absorption
- Energy efficient due to aerodynamically profiled frame (radius > 15 mm)
- Acoustic data measured to ISO 7235
- Absorption material is biosoluble and hence hygienically safe
- Absorption material faced with glass fibre fabric as a protection against erosion due to airflow velocities up to 20 m/s
- Absorption material non-combustible, to EN 13501, fire rating class A1
- Available in standard sizes and many intermediate sizes
- Operating temperature up to 100 °C

Optional equipment and accessories

- Additional perforated sheet metal to protect the absorption material
- Powder-coated
- Stainless steel
- Brine and salt-water resistant aluminium construction (AlMg3)

Splitter frames
with folded edges

HYGIENISCH GETESTET
TROX® TECHNIK
VDI 6022

Tested to VDI 6022

6

Description

Sound attenuator splitter, variant XKA-200

Application
- Sound attenuator splitters of Type XKA, used for the reduction of fan noise and air-regenerated noise in air conditioning systems
- Attenuation effect due to absorption
- Broadband attenuation even in the high frequency range
- Hygiene tested and certified to VDI 6022
- For use in potentially explosive atmospheres (ATEX), zones 1, 2, 21 and 22 (outside)

Variants
- XKA-100: Splitter thickness 100 mm
- XKA-200: Splitter thickness 200 mm
- XKA-230: Splitter thickness 230 mm
- XKA-300: Splitter thickness 300 mm

Construction
Splitter surface
- F: Glass fibre fabric
- L: Glass fibre fabric and perforated sheet metal

Nominal sizes
- H: 300, 600, 900, 1200, 1500, 1800 mm (intermediate sizes 400 – 1700 mm in increments of 100 mm)
- Height subdivided: 1900 – 5000 mm, in increments of 100 mm
- L: 500, 750, 1000, 1250, 1500 mm
- Length subdivided: 1750, 2000, 2250, 2500, 2750, 3000 mm (intermediate sizes 1501 – 2999 mm in increments of 1 mm)

Useful additions
- Fitting accessories for sound attenuator splitters

Special features
- Increased insertion loss even in the high-frequency range
- Up to 30 % lower differential pressure
- Energy efficient and/or space saving due to aerodynamically profiled frame
- Hygiene tested and certified
- Multi-section construction available for large dimensions

Parts and characteristics
- Aerodynamically profiled frame
- Absorption material to reduce air-regenerated noise by absorption

Construction features
- Aerodynamically profiled splitter frame (radius > 15 mm) that enables a reduction of turbulence both upstream and downstream; frame with grooves for increased rigidity
- Frame edges are folded to protect the infill
- Operating temperature up to 100 °C (construction with perforated sheet metal up to 300 °C for 3h max.)

Materials and surfaces
- Splitter frames made of galvanised sheet steel
- Absorption material is mineral wool

Mineral wool
- To EN 13501, fire rating class A1, non-combustible
- RAL quality mark RAL-GZ 388
- Biosoluble and hence hygienically safe according to the German TRGS 905 (Technical Rules for Hazardous Substances) and EU directive 97/69/EG
- Faced with glass fibre fabric as protection against erosion through airflow velocities of up to 20 m/s
- Inert to fungal and bacterial growth

Installation and commissioning
- Splitters are supplied as ready-to-install kits
- Observe installation information and the general codes of good practice in order to achieve the given performance data
- Vertical installation should be preferred, horizontal installation is possible up to H = 1200 mm
- The length (L) of sound attenuator splitters and splitter attenuators refers always to the airflow direction. Remember this with regard to vertical ducting.
- Installation in ducts outside of closed rooms requires sufficient protection against the effects of weather

Standards and guidelines

- Insertion loss and sound power level of air-regenerated noise tested to ISO 7235
- Meets the hygiene requirements of VDI 6022, DIN 1946, parts 1 and 2 as well as of VDI 3803
- Directive 94/9/EC: Equipment and protective systems intended for use in potentially explosive atmospheres

Maintenance

- Maintenance-free as construction and materials are not subject to wear

Technical data

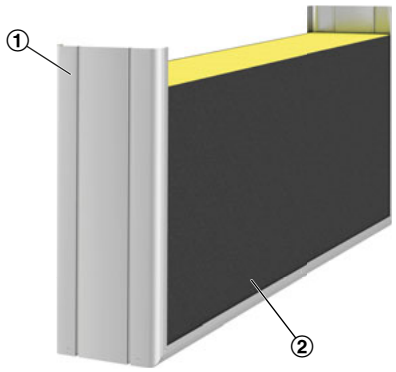
Splitter thickness	100, 200, 230, 300 mm
Nominal sizes	140 × 500 mm – 1800 × 1500 mm
Operating temperature	– 100 °C

Function

Functional description

The attenuation effect of the XKA splitters is due to absorption.
The splitters have a mineral wool infill as absorption material.

Schematic illustration of XKA-200



① Splitter frame, 200 mm wide
② Absorption material faced on both sides with glass fibre fabric

Order code

The length (L) of sound attenuator splitters and splitter attenuators refers always to the airflow direction. Remember this with regard to vertical ducting.

XKA

XKA 200 – F / 600×1500
1 2 3 4 5

1 Type
XKA Sound attenuator splitter

2 Splitter thickness [mm]
100
200
230
300

3 Splitter surface
F Glass fibre fabric
L Glass fibre fabric under perforated sheet metal

4 Height H [mm]

5 Length in airflow direction L [mm]

Fitting accessories for sound attenuator splitters

SD – KBLECH
1

1 Part

SD-KBLECH	Clamp sheet for MKA, XKA, RKA200
SD-KAP100	U-sheet for MKA-100, XKA-100
SD-KAP200	U-sheet for MKA-200, XKA-200, RKA200
SD-KAP230	U-sheet for MKA-230, XKA-230
SD-KAP300	U-sheet for XKA-300

Order example

XKA100–L/1500×1500

Splitter thickness	100 mm
Splitter surface	Glass fibre fabric and perforated sheet metal
Height	1500 mm
Length	1500 mm

Splitter thickness 100 mm

Insertion loss values for other lengths (intermediate sizes) and airway widths can be determined with the Easy Product Finder design programme.

XKA100 / XSA100 – Length L = 500 mm

Airway width	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e dB							
40	3	5	10	18	37	45	31	23
60	3	5	8	16	33	38	25	19
100	3	3	5	11	25	23	13	9
200	0	1	3	8	14	9	5	6

XKA100 / XSA100 – Length L = 1000 mm

Airway width	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e dB							
40	4	8	19	29	46	50	39	32
60	4	7	16	26	42	47	34	26
100	4	4	9	19	35	35	22	15
200	1	2	5	13	22	14	8	7

XKA100 / XSA100 – Length L = 1500 mm

Airway width	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e dB							
40	6	11	27	39	50	50	47	40
60	6	9	23	35	50	50	42	34
100	5	5	14	27	44	46	31	20
200	2	3	8	18	30	19	11	9

XKA100 / XSA100 – Length L = 2000 mm

Airway width	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e dB							
40	7	14	36	50	50	50	50	49
60	7	12	30	45	50	50	50	41
100	6	7	19	34	50	50	39	26
200	3	4	11	24	38	24	14	10

XKA100 / XSA100 – Length L = 2500 mm

Airway width	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e dB							
40	9	18	44	50	50	50	50	50
60	8	14	37	50	50	50	50	49
100	7	8	23	42	50	50	48	32
200	4	5	13	29	46	30	17	12

XKA100 / XSA100 – Length L = 3000 mm

Airway width	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e dB							
40	10	21	50	50	50	50	50	50
60	10	17	44	50	50	50	50	50
100	8	9	28	49	50	50	50	37
200	5	6	16	34	50	35	20	13

Splitter thickness 200 mm

XKA200 / XSA200 – Length L = 500 mm

Airway width	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e dB							
50	2	12	18	31	44	42	29	23
100	3	4	9	20	26	22	16	11
200	2	2	6	13	14	11	7	5
400	1	1	4	8	7	5	4	3

XKA200 / XSA200 – Length L = 1000 mm

Airway width	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e dB							
50	6	14	22	44	50	50	36	27
100	3	8	15	32	46	38	23	16
200	2	5	11	22	25	18	11	7
400	1	3	7	13	11	8	5	4

XKA200 / XSA200 – Length L = 1500 mm

Airway width	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e dB							
50	8	20	31	50	50	50	48	33
100	5	12	22	47	50	50	31	20
200	3	7	15	31	35	24	14	8
400	2	4	11	18	15	9	6	5

XKA200 / XSA200 – Length L = 2000 mm

Airway width	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e dB							
50	10	27	40	50	50	50	50	39
100	6	16	28	50	50	50	39	24
200	4	9	20	41	45	30	17	10
400	2	5	14	24	19	11	7	6

XKA200 / XSA200 – Length L = 2500 mm

Airway width	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e dB							
50	13	34	47	50	50	50	50	45
100	7	21	34	50	50	50	45	27
200	4	11	23	50	50	36	19	11
400	3	7	16	29	21	13	8	6

XKA200 / XSA200 – Length L = 3000 mm

Airway width	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e dB							
50	16	42	50	50	50	50	50	50
100	8	26	39	50	50	50	50	31
200	5	13	27	50	50	41	21	12
400	3	8	18	34	24	14	9	7

Splitter thickness 230 mm

XKA230 / XSA230 – Length L = 500 mm

Airway width	Centre frequency f_m [Hz]							
	62.5	125	250	500	1000	2000	4000	8000
	D_e dB							
60	4	7	12	25	34	25	19	18
115	3	5	9	18	24	17	13	13
230	2	3	7	11	13	9	7	7
460	1	0	4	4	2	1	1	2

XKA230 / XSA230 – Length L = 1000 mm

Airway width	Centre frequency f_m [Hz]							
	62.5	125	250	500	1000	2000	4000	8000
	D_e dB							
60	5	12	20	35	48	40	27	21
115	4	8	16	27	35	27	18	15
230	3	5	12	18	20	14	10	9
460	2	1	7	9	6	1	1	3

XKA230 / XSA230 – Length L = 1500 mm

Airway width	Centre frequency f_m [Hz]							
	62.5	125	250	500	1000	2000	4000	8000
	D_e dB							
60	6	16	27	46	50	50	35	25
115	5	12	22	36	46	37	24	18
230	3	7	16	25	28	19	12	11
460	2	2	11	15	10	1	0	3

XKA230 / XSA230 – Length L = 2000 mm

Airway width	Centre frequency f_m [Hz]							
	62.5	125	250	500	1000	2000	4000	8000
	D_e dB							
60	7	21	35	50	50	50	43	29
115	5	15	28	45	50	47	29	21
230	4	9	21	32	36	24	14	13
460	3	4	14	20	15	1	0	4

XKA230 / XSA230 – Length L = 2500 mm

Airway width	Centre frequency f_m [Hz]							
	62.5	125	250	500	1000	2000	4000	8000
	D_e dB							
60	8	25	43	50	50	50	50	33
115	6	19	35	50	50	50	34	24
230	5	12	26	40	43	28	17	14
460	4	5	18	25	19	0	0	5

XKA230 / XSA230 – Length L = 3000 mm

Airway width	Centre frequency f_m [Hz]							
	62.5	125	250	500	1000	2000	4000	8000
	D_e dB							
60	9	30	50	50	50	50	50	37
115	7	22	41	50	50	50	40	27
230	6	14	31	47	50	33	19	16
460	5	6	21	31	23	0	0	5

Splitter thickness 300 mm

XKA300 / XSA300 – Length L = 500 mm

Airway width	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e							
	dB							
75	4	7	17	25	34	32	22	18
150	2	5	11	16	19	17	12	9
300	1	3	6	9	10	9	6	5
600	0	2	4	5	5	5	3	4

XKA300 / XSA300 – Length L = 1000 mm

Airway width	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e							
	dB							
75	6	15	24	42	48	50	33	26
150	3	9	18	27	34	28	17	11
300	1	6	11	15	16	13	8	7
600	1	4	7	8	7	5	4	5

XKA300 / XSA300 – Length L = 1500 mm

Airway width	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e							
	dB							
75	8	20	33	50	50	50	44	30
150	3	14	26	38	46	39	21	13
300	2	8	16	21	21	17	10	8
600	1	6	11	12	9	6	4	5

XKA300 / XSA300 – Length L = 2000 mm

Airway width	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e							
	dB							
75	10	25	42	50	50	50	50	34
150	4	18	33	48	50	50	26	16
300	2	11	20	26	26	21	12	9
600	1	7	14	16	11	7	5	5

XKA300 / XSA300 – Length L = 2500 mm

Airway width	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e							
	dB							
75	13	30	50	50	50	50	50	38
150	5	23	40	50	50	50	30	18
300	3	14	25	32	32	25	13	10
600	1	9	17	19	13	7	5	6

XKA300 / XSA300 – Length L = 3000 mm

Airway width	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e							
	dB							
75	15	35	50	50	50	50	50	42
150	6	28	48	50	50	50	35	20
300	3	17	30	38	37	29	15	11
600	2	11	21	23	14	8	5	6

Quick sizing – sound power level

The sound power levels L_{WA} apply to sound attenuation dampers with a cross-sectional area (B × H) of 1 m^2.

Air-regenerated noise MSA, MKA, XSA, XKA, RKA

v_s	m/s	4	6	8	10	12	14	16	18	20
L_{WA}	dB(A)	21	31	38	43	47	51	54	57	60

Quick sizing – differential pressure

Splitter thickness 100 mm

MKA100 / XKA100 – L = 500 mm

v_s	Airway width [mm]			
	40	60	100	200
	Δp_{st}			
m/s	Pa			
4	6	4	2	2
10	35	18	10	6
20	135	70	35	18

MKA100 / XKA100 – L = 1000 mm

v_s	Airway width [mm]			
	40	60	100	200
	Δp_{st}			
m/s	Pa			
4	8	4	2	2
10	45	24	12	6
20	180	90	45	22

MKA100 / XKA100 – L = 1500 mm

v_s	Airway width [mm]			
	40	60	100	200
	Δp_{st}			
m/s	Pa			
4	10	4	2	2
10	55	28	14	8
20	225	110	55	26

MKA100 / XKA100 – L = 2000 mm

v_s	Airway width [mm]			
	40	60	100	200
	Δp_{st}			
m/s	Pa			
4	12	5	4	2
10	70	35	16	8
20	270	135	65	30

MKA100 / XKA100 – L = 2500 mm

v_s	Airway width [mm]			
	40	60	100	200
	Δp_{st}			
m/s	Pa			
4	14	6	4	2
10	80	40	18	10
20	320	155	70	35

MKA100 / XKA100 – L = 3000 mm

v_s	Airway width [mm]			
	40	60	100	200
	Δp_{st}			
m/s	Pa			
4	16	8	4	2
10	90	45	20	10
20	365	175	80	40

Splitter thickness 200 mm

MKA200 / XKA200 – L = 500 mm

v_s	Airway width [mm]			
	50	100	200	400
	Δp_{st}			
m/s	Pa			
4	10	2	2	0
10	60	14	4	2
20	235	50	16	8

MKA200 / XKA200 – L = 1000 mm

v_s	Airway width [mm]			
	50	100	200	400
	Δp_{st}			
m/s	Pa			
4	12	2	2	0
10	65	16	6	2
20	265	60	22	10

MKA200 / XKA200 – L = 1500 mm

v_s	Airway width [mm]			
	50	100	200	400
	Δp_{st}			
m/s	Pa			
4	12	4	2	2
10	75	18	6	4
20	300	75	26	14

MKA200 / XKA200 – L = 2000 mm

v_s	Airway width [mm]			
	50	100	200	400
	Δp_{st}			
m/s	Pa			
4	14	4	2	2
10	85	22	8	4
20	335	85	30	16

MKA200 / XKA200 – L = 2500 mm

v_s	Airway width [mm]			
	50	100	200	400
	Δp_{st}			
m/s	Pa			
4	16	4	2	2
10	90	24	10	6
20	365	95	35	18

MKA200 / XKA200 – L = 3000 mm

v_s	Airway width [mm]			
	50	100	200	400
	Δp_{st}			
m/s	Pa			
4	16	4	2	2
10	100	28	10	6
20	400	110	40	22

Splitter thickness 230 mm

MKA230 / XKA230 – L = 500 mm

v_s	Airway width [mm]			
	60	115	230	460
	Δp_{st}			
m/s	Pa			
4	10	2	2	0
10	55	14	4	2
20	225	55	16	8

MKA230 / XKA230 – L = 1000 mm

v_s	Airway width [mm]			
	60	115	230	460
	Δp_{st}			
m/s	Pa			
4	10	4	2	0
10	65	16	6	2
20	260	65	22	10

MKA230 / XKA230 – L = 1500 mm

v_s	Airway width [mm]			
	60	115	230	460
	Δp_{st}			
m/s	Pa			
4	12	4	2	0
10	75	20	6	4
20	295	75	26	12

MKA230 / XKA230 – L = 2000 mm

v_s	Airway width [mm]			
	60	115	230	460
	Δp_{st}			
m/s	Pa			
4	14	4	2	2
10	80	22	8	4
20	330	90	30	16

MKA230 / XKA230 – L = 2500 mm

v_s	Airway width [mm]			
	60	115	230	460
	Δp_{st}			
m/s	Pa			
4	14	4	2	2
10	90	26	10	4
20	360	100	35	18

MKA230 / XKA230 – L = 3000 mm

v_s	Airway width [mm]			
	60	115	230	460
	Δp_{st}			
m/s	Pa			
4	16	6	2	2
10	100	28	10	6
20	395	115	40	20

Splitter thickness 300 mm

XKA300 – L = 500 mm

v_s	Airway width [mm]			
	75	150	300	600
	Δp_{st}			
m/s	Pa			
4	10	2	1	0
10	62	12	3	1
20	247	50	14	6

XKA300 – L = 1000 mm

v_s	Airway width [mm]			
	75	150	300	600
	Δp_{st}			
m/s	Pa			
4	11	2	1	0
10	69	14	4	2
20	278	58	17	7

XKA300 – L = 1500 mm

v_s	Airway width [mm]			
	75	150	300	600
	Δp_{st}			
m/s	Pa			
4	12	3	1	0
10	77	16	5	2
20	308	65	19	8

XKA300 – L = 2000 mm

v_s	Airway width [mm]			
	75	150	300	600
	Δp_{st}			
m/s	Pa			
4	14	3	1	0
10	85	18	6	2
20	339	73	22	10

XKA300 – L = 2500 mm

v_s	Airway width [mm]			
	75	150	300	600
	Δp_{st}			
m/s	Pa			
4	15	3	1	0
10	92	20	6	3
20	369	81	25	11

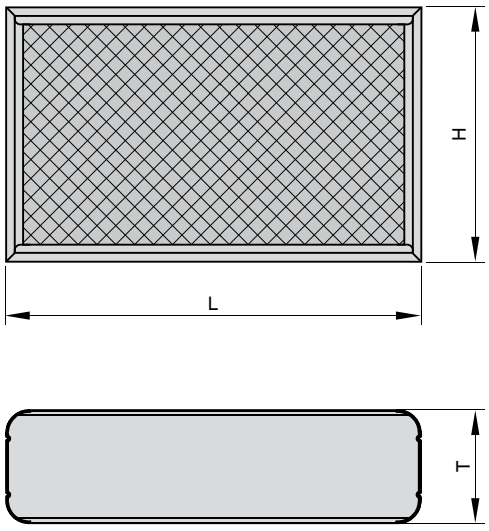
XKA300 – L = 3000 mm

v_s	Airway width [mm]			
	75	150	300	600
	Δp_{st}			
m/s	Pa			
4	16	4	1	0
10	100	22	7	3
20	400	89	28	12

Dimensions

The length (L) of sound attenuator splitters and splitter attenuators refers always to the airflow direction. Remember this with regard to vertical ducting.

Dimensional drawing of XKA



T:Splitter thickness
L:Length (in airflow direction)

Weight – XKA-100

Height	Glass fibre fabric (-F)					Glass fibre fabric and perforated sheet metal (-L)				
	Length [mm]									
	500	750	1000	1250	1500	500	750	1000	1250	1500
mm	kg									
300	2	2	3	4	4	3	4	5	6	7
600	3	4	4	5	6	5	7	9	11	13
900	4	5	6	7	8	7	10	12	15	18
1200	5	6	7	9	10	9	12	16	20	23
1500	5	7	9	10	12	11	15	20	24	28

Weight – XKA-200

Height	Glass fibre fabric (-F)					Glass fibre fabric and perforated sheet metal (-L)				
	Length [mm]									
	500	750	1000	1250	1500	500	750	1000	1250	1500
mm	kg									
300	3	4	5	6	7	4	6	7	9	10
600	5	6	8	9	11	7	10	12	15	18
900	6	8	11	13	15	10	13	17	21	25
1200	8	11	13	16	19	12	17	22	27	32
1500	10	13	16	19	22	15	21	27	33	39

Weight – XKA-230

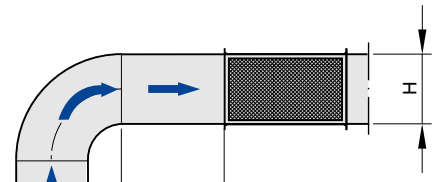
Height	Glass fibre fabric (-F)					Glass fibre fabric and perforated sheet metal (-L)				
	Length [mm]									
	500	750	1000	1250	1500	500	750	1000	1250	1500
mm	kg									
300	3	5	6	7	8	4	6	8	10	11
600	5	7	9	11	12	7	10	13	16	19
900	7	10	12	14	17	10	14	19	23	27
1200	9	12	15	18	21	13	19	24	29	34
1500	11	15	18	22	25	16	23	29	35	42

Weight – XKA-300

Height	Glass fibre fabric (-F)					Glass fibre fabric and perforated sheet metal (-L)				
	Length [mm]									
	500	750	1000	1250	1500	500	750	1000	1250	1500
mm	kg									
300	4	6	7	9	10	5	7	9	11	14
600	7	9	11	14	16	9	12	16	19	22
900	9	12	15	18	21	12	17	22	27	31
1200	12	15	19	23	27	16	22	28	34	40
1500	14	19	23	28	33	19	27	34	42	49

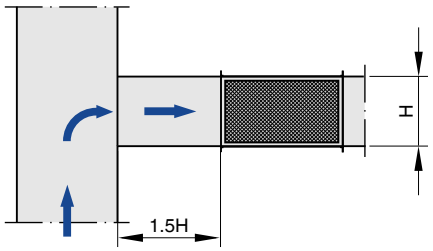
Upstream conditions

Upstream conditions – Bend



Vertical duct section before the bend:
Splitters vertical; H of duct = H of splitters
Horizontal duct section before the bend:
Splitters horizontal; B of duct = H of splitters

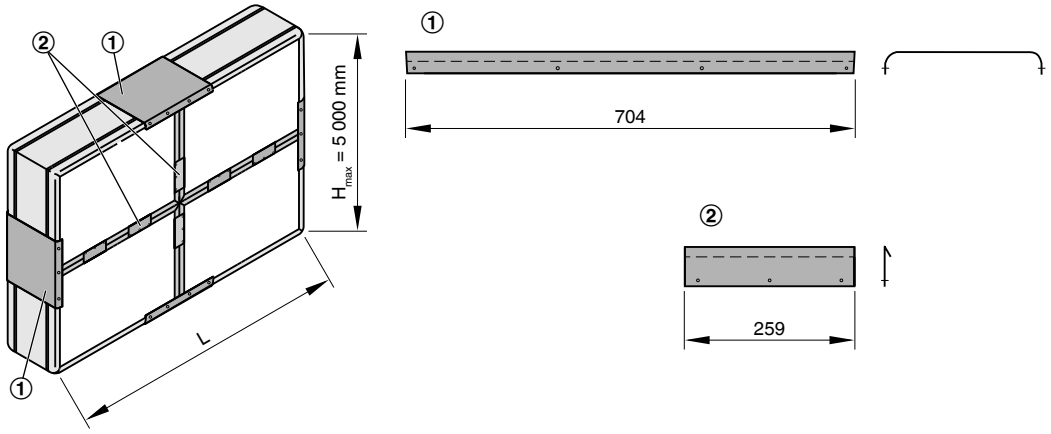
Upstream conditions – Junction



Vertical duct section before the junction:
Splitters vertical; H of duct = H of splitters
Horizontal duct section before the junction:
Splitters horizontal; B of duct = H of splitters

Assembly of subdivided splitters

Assembly of subdivided splitters



① U-sheet
② Clamp sheet

H or L ≤ 750 mm: without clamp sheet
H or L 751 – 1000 mm: 1 clamp sheet on each side
H or L > 1000 mm:
2 clamp sheets on each side recommended

6

Standard text

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

Sound attenuator splitters used for the reduction of fan noise and air-regenerated noise in air conditioning systems. Attenuation effect due to absorption. Energy-saving as well as hygiene tested and certified.
Installation kit consists of an aerodynamically profiled frame (radius > 15 mm) and absorption material.
Frame edges are folded to protect the sound absorbing infill.
Insertion loss and sound power level of the air-regenerated noise tested to ISO 7235.
Meets the hygiene requirements of VDI 6022, DIN 1946, parts 2 and 4, as well as of VDI 3803.

Special features

–Increased insertion loss even in the high-frequency range
–Up to 30 % lower differential pressure
–Energy efficient and/or space saving due to aerodynamically profiled frame
–Hygiene tested and certified
–Multi-section construction available for large dimensions

Materials and surfaces

–Splitter frames made of galvanised sheet steel
–Absorption material is mineral wool

Mineral wool
–To EN 13501, fire rating class A1, non-combustible
–RAL quality mark RAL-GZ 388
–Biosoluble and hence hygienically safe according to the German TRGS 905 (Technical Rules for Hazardous Substances) and EU directive 97/69/EG
–Faced with glass fibre fabric as protection against erosion through airflow velocities of up to 20 m/s
–Inert to fungal and bacterial growth

Construction

Splitter surface
–F: Glass fibre fabric
–L: Glass fibre fabric and perforated sheet metal

Technical data

–Splitter thickness: 100, 200, 230, 300 mm
–Nominal sizes: 140 × 500 mm – 1800 × 1500 mm
–Operating temperature: – 100 °C

Sizing data

–B[mm]
–H[mm]
–L (in airflow direction)[mm]
–$\dot{V}$[m³/h]
–D_e at 250 Hz[dB]
–Δp_{st}[Pa]

Order options

6

1 Type
XKASound attenuator splitter

2 Splitter thickness [mm]
☐ **100**
☐ **200**
☐ **230**
☐ **300**

3 Splitter surface
☐ **F**Glass fibre fabric
☐ **L**Glass fibre fabric under perforated sheet metal

4 Height H [mm]

5 Length in airflow direction L [mm]

Splitters
Type RKA

Parts kit for high insertion loss in the low-frequency range

Energy-saving splitters with resonating panels, ready to be used in air conditioning systems

- Installation in combination with other attenuator splitters
- Energy efficient due to aerodynamically profiled frame (radius > 15 mm)
- Acoustic data measured to ISO 7235
- Absorption material is biosoluble and hence hygienically safe
- Absorption material faced with glass fibre fabric as a protection against erosion due to airflow velocities up to 20 m/s
- Absorption material non-combustible, to EN 13501, fire rating class A1
- Available in standard sizes and many intermediate sizes
- Operating temperature up to 100 °C

Optional equipment and accessories

- Powder-coated
- Stainless steel

Splitter frames with folded edges

Tested to VDI 6022

Type		Page
RKA	General information	6.2 – 28
	Order code	6.2 – 30
	Insertion loss	6.2 – 31
	Quick sizing	6.2 – 33
	Dimensions and weight	6.2 – 34
	Installation details	6.2 – 35
	Specification text	6.2 – 36
	Basic information and nomenclature	6.4 – 1

Description

Sound attenuator splitter, variant RKA-200

Application

–Sound attenuator splitters with resonating panels, Type RKA, used for the reduction of fan noise and air-regenerated noise in air conditioning systems
–Installation in combination with other Type MKA or XKA splitters
–Attenuation effect due to resonance
–Broadband attenuation particularly in the low frequency range of critical fan noise
–Hygiene tested and certified to VDI 6022
–For use in potentially explosive atmospheres (ATEX), zones 1, 2, 21 and 22 (outside)

Variants

Maximum attenuation
–A: 250 – 125 Hz
–B: 125 – 250 Hz
–C: 125 – 63 Hz
–D: 63 – 125 Hz

Nominal sizes

–H: 300, 600, 900, 1200, 1500, 1800 mm (intermediate sizes 400 – 1700 mm in increments of 100 mm)
–Height subdivided: 1900 – 5000 mm, in increments of 100 mm
–L: 500, 750, 1000, 1250, 1500 mm

Useful additions

–Fitting accessories for sound attenuator splitters

Special features

–Resonating panels ensure increased insertion loss in the frequency range of critical fan noise
–Up to 30 % lower differential pressure
–Energy efficient and/or space saving due to aerodynamically profiled frame
–Hygiene tested and certified
–Multi-section construction available for large dimensions

Parts and characteristics

–Aerodynamically profiled frame
–Absorption material and resonating panels fitted to reduce air-regenerated noise by resonance

Construction features

–Aerodynamically profiled splitter frame (radius > 15 mm) that enables a reduction of turbulence both upstream and downstream; frame with grooves for increased rigidity
–Frame edges are folded to protect the infill
–Operating temperature up to 100 °C (construction with perforated sheet metal up to 300 °C for 3h max.)

Materials and surfaces

–Splitter frames and resonating panels made of galvanised sheet steel
–Absorption material is mineral wool

Mineral wool
–To EN 13501, fire rating class A1, non-combustible
–RAL quality mark RAL-GZ 388
–Biosoluble and hence hygienically safe according to the German TRGS 905 (Technical Rules for Hazardous Substances) and EU directive 97/69/EG
–Faced with glass fibre fabric as protection against erosion through airflow velocities of up to 20 m/s
–Inert to fungal and bacterial growth

Installation and commissioning

–Splitters are supplied as ready-to-install kits
–Observe installation information and the general codes of good practice in order to achieve the given performance data
–Vertical installation should be preferred, horizontal installation is possible up to H = 1200 mm
–The length (L) of sound attenuator splitters and splitter attenuators refers always to the airflow direction.
Remember this with regard to vertical ducting.
–Installation in ducts outside of closed rooms requires sufficient protection against the effects of weather

Standards and guidelines

–Insertion loss and sound power level of air-regenerated noise tested to ISO 7235
–Meets the hygiene requirements of VDI 6022, DIN 1946, parts 1 and 2 as well as of VDI 3803
–Directive 94/9/EC: Equipment and protective systems intended for use in potentially explosive atmospheres

Maintenance

–Maintenance-free as construction and materials are not subject to wear

Technical data

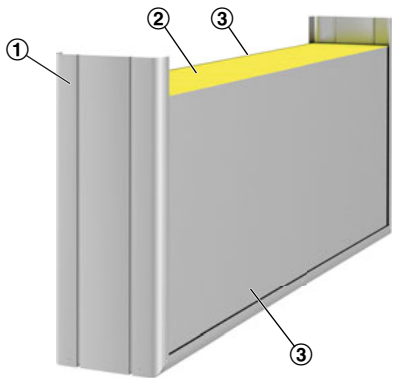
Splitter thickness	200 mm
Nominal sizes	140 × 500 mm – 1800 × 1500 mm
Operating temperature	– 100 °C

Function

Functional description

The attenuation effect of the RKA splitters is due to resonance.
The splitter surface that runs parallel to the airflow is covered with resonating panels. These panels start oscillating due to the sound (resonance) and hence absorb sound energy.
Resonance works best in the frequency range of critical fan noise. The splitters have a mineral wool infill that prevents an amplification of the sound.

Schematic illustration of RKA200



① Splitter frame, 200 mm wide
② Absorption material
③ Resonating panels on both sides

Order code

The length (L) of sound attenuator splitters and splitter attenuators refers always to the airflow direction. Remember this with regard to vertical ducting.

RKA

RKA 200 – D / 600×1500
1 2 3 4 5

1 Type
RKASound attenuator splitter

2 Splitter thickness [mm]
200

3 Resonator construction
Optimised for the following frequencies
A250/125 Hz
B125/250 Hz
C125/63 Hz
D63/125 Hz

4 Height H [mm]

5 Length in airflow direction L [mm]

Fitting accessories for sound attenuator splitters

SD – KBLECH
1

1 Part
SD-KBLECH Clamp sheet for MKA, XKA, RKA200
SD-KAP100U-sheet for MKA-100, XKA-100
SD-KAP200U-sheet for MKA-200, XKA-200, RKA200
SD-KAP230U-sheet for MKA-230, XKA-230
SD-KAP300U-sheet for XKA-300

Order example

RKA200–B/1500×1000

Resonator construction	125/250 Hz
Height	1500 mm
Length	1000 mm

Insertion loss values for other lengths (intermediate sizes) and airway widths can be determined with the Easy Product Finder design programme.

RKA200 – Length L = 500 mm

Airway width	RKA200-A			RKA200-B			RKA200-C	
	Centre frequency f_m [Hz]							
	63	125	250	63	125	250	63	125
S	$D_{e, add}$							
mm	dB							
50	5	12	4	6	8	2	7	7
80	3	8	3	3	6	1	4	4
100	2	6	2	3	4	1	3	3
120	2	5	2	2	4	1	3	3
150	1	4	1	2	3	1	2	2

RKA200 – Length L = 750 mm

Airway width	RKA200-A			RKA200-B			RKA200-C	
	Centre frequency f_m [Hz]							
	63	125	250	63	125	250	63	125
S	$D_{e, add}$							
mm	dB							
50	7	19	7	9	14	4	10	11
80	4	12	4	5	9	2	6	7
100	3	9	3	4	7	2	5	5
120	3	8	2	3	6	1	4	4

RKA200 – Length L = 1000 mm

Airway width	RKA200-A			RKA200-B			RKA200-C	
	Centre frequency f_m [Hz]							
	63	125	250	63	125	250	63	125
S	$D_{e, add}$							
mm	dB							
50	10	25	9	12	19	5	14	15
80	6	16	6	7	12	3	9	9
100	5	13	5	6	9	3	7	7
120	4	10	4	5	8	2	6	6
150	3	8	3	4	6	2	5	5

RKA200 – Length L = 1250 mm

Airway width	RKA200-A			RKA200-B			RKA200-C	
	Centre frequency f_m [Hz]							
	63	125	250	63	125	250	63	125
S	$D_{e, add}$							
mm	dB							
50	12	31	11	15	23	6	17	18
80	7	20	7	9	15	4	11	11
100	6	16	5	7	11	3	8	9
120	5	13	4	6	10	2	7	7

RKA200 – Length L = 1500 mm

Airway width	RKA200-A			RKA200-B			RKA200-C	
	Centre frequency f_m [Hz]							
	63	125	250	63	125	250	63	125
S	$D_{e, add}$							
mm	dB							
50	14	38	14	18	28	8	21	22
80	9	24	8	11	18	5	13	14
100	7	19	6	9	14	4	10	11
120	6	16	5	7	12	3	9	9

Quick sizing – sound power level

The sound power levels L_{WA} apply to sound attenuation dampers with a cross-sectional area (B × H) of 1 m^2.

Air-regenerated noise MSA, MKA, XSA, XKA, RKA

v_s	m/s	4	6	8	10	12	14	16	18	20
L_{WA}	dB(A)	21	31	38	43	47	51	54	57	60

Quick sizing – differential pressure

MKA-200 / XKA-200 + RKA200 L_{tot} = 1000 mm

v_s	Airway width [mm]			
	40	60	100	200
	Δp_{st}			
m/s	Pa			
4	12	2	1	0
10	65	15	5	2
20	265	62	21	10

MKA200 / XKA200 + RKA200 L_{tot} = 1500 mm

v_s	Airway width [mm]			
	50	100	200	400
	Δp_{st}			
m/s	Pa			
4	12	3	1	1
10	75	18	6	3
20	300	74	26	13

MKA200 / XKA200 + RKA200 L_{tot} = 2000 mm

v_s	Airway width [mm]			
	50	100	200	400
	Δp_{st}			
m/s	Pa			
4	14	4	2	2
10	85	22	8	4
20	335	85	30	16

MKA200 / XKA200 + RKA200 L_{tot} = 2500 mm

v_s	Airway width [mm]			
	50	100	200	400
	Δp_{st}			
m/s	Pa			
4	16	4	2	2
10	90	24	10	6
20	365	95	35	18

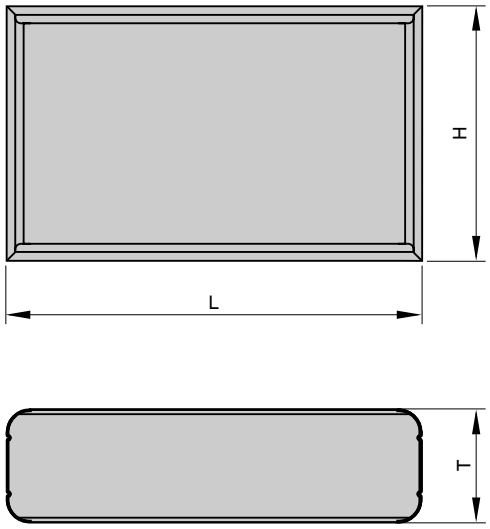
MKA200 / XKA200 + RKA200 L_{tot} = 3000 mm

v_s	Airway width [mm]			
	50	100	200	400
	Δp_{st}			
m/s	Pa			
4	16	4	2	2
10	100	28	10	6
20	400	110	40	22

Dimensions

The length (L) of sound attenuator splitters and splitter attenuators refers always to the airflow direction. Remember this with regard to vertical ducting.

Dimensional drawing of RKA...



T:Splitter thickness
L:Length (in airflow direction)

Weight – RKA-200

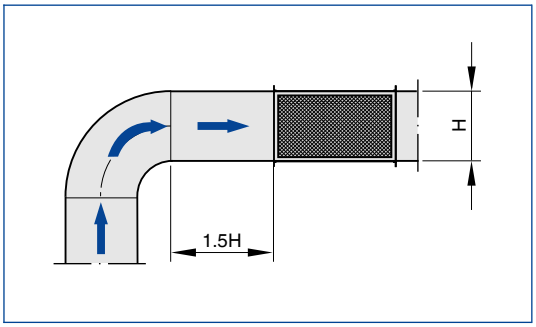
Height	RKA200-A					RKA200-B				
	Length [mm]									
	500	750	1000	1250	1500	500	750	1000	1250	1500
mm	kg									
300	4	6	7	9	10	5	7	9	12	14
600	7	9	12	14	16	9	13	16	20	23
900	9	13	16	19	23	13	18	23	28	33
1200	12	16	20	24	29	16	23	29	36	43
1500	14	20	25	30	35	20	28	36	44	52

Weight – RKA-200

Height	RKA200-C					RKA200-D				
	Length [mm]									
	500	750	1000	1250	1500	500	750	1000	1250	1500
mm	kg									
300	6	9	12	14	17	7	11	14	17	21
600	11	16	21	26	30	14	19	25	31	37
900	16	23	30	37	43	20	28	37	45	54
1200	21	30	39	48	56	26	37	48	59	-
1500	26	37	48	59	69	32	45	59	-	-

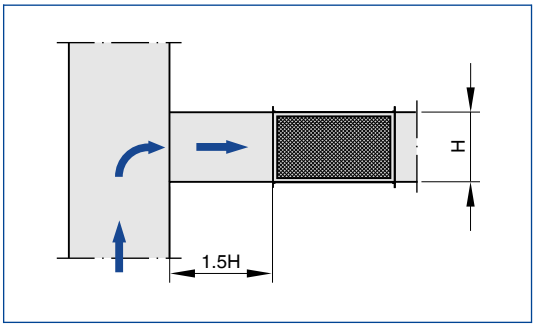
Upstream conditions

Upstream conditions – Bend



Vertical duct section before the bend:
Splitters vertical; H of duct = H of splitters
Horizontal duct section before the bend:
Splitters horizontal; B of duct = H of splitters

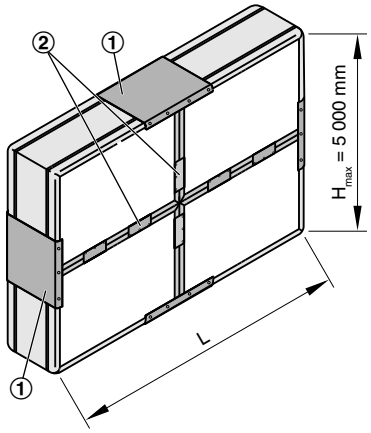
Upstream conditions – Junction

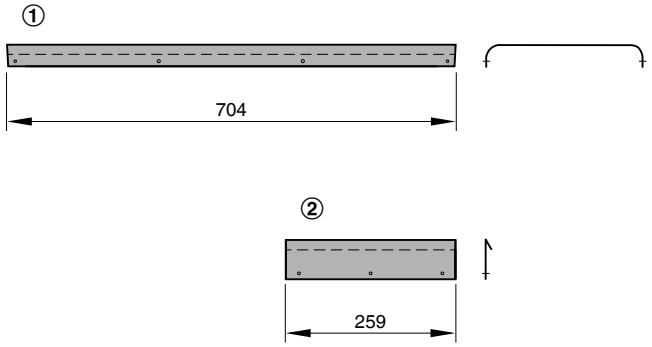


Vertical duct section before the junction:
Splitters vertical; H of duct = H of splitters
Horizontal duct section before the junction:
Splitters horizontal; B of duct = H of splitters

Assembly of subdivided splitters

Assembly of subdivided splitters





① U-sheet
② Clamp sheet

H or L ≤ 750 mm: without clamp sheet
H or L 751 – 1000 mm: 1 clamp sheet on each side
H or L > 1000 mm:
2 clamp sheets on each side recommended

6

Standard text

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

Sound attenuator splitters used for the reduction of fan noise and air-regenerated noise in air conditioning systems. Attenuation effect due to resonance. To be used in combination with sound absorbing splitters. Energy-saving as well as hygiene tested and certified.
Installation kit consists of an aerodynamically profiled frame (radius > 15 mm), absorption material and resonating panels.
Frame edges are folded to protect the sound absorbing infill.
Insertion loss and sound power level of the air-regenerated noise tested to ISO 7235.
Meets the hygiene requirements of VDI 6022, DIN 1946, parts 2 and 4, as well as of VDI 3803.

Special features

–Resonating panels ensure increased insertion loss in the frequency range of critical fan noise
–Up to 30 % lower differential pressure
–Energy efficient and/or space saving due to aerodynamically profiled frame
–Hygiene tested and certified
–Multi-section construction available for large dimensions

Materials and surfaces

–Splitter frames and resonating panels made of galvanised sheet steel
–Absorption material is mineral wool

Mineral wool
–To EN 13501, fire rating class A1, non-combustible
–RAL quality mark RAL-GZ 388
–Biosoluble and hence hygienically safe according to the German TRGS 905 (Technical Rules for Hazardous Substances) and EU directive 97/69/EG
–Faced with glass fibre fabric as protection against erosion through airflow velocities of up to 20 m/s
–Inert to fungal and bacterial growth

Technical data

–Splitter thickness: 200 mm
–Nominal sizes:
140 × 500 mm – 1800 × 1500 mm
–Operating temperature: – 100 °C

Sizing data

–B[mm]
–H[mm]
–L (in airflow direction)[mm]
–$\dot{V}$[m³/h]
–D_e at 250 Hz[dB]
–Δp_{st}[Pa]

Order options

1 Type
RKASound attenuator splitter

2 Splitter thickness [mm]
☐ **200**

3 Resonator construction
Optimised for the following frequencies
☐ **A**250/125 Hz
☐ **B**125/250 Hz
☐ **C**125/63 Hz
☐ **D**63/125 Hz

4 Height H [mm]

5 Length in airflow direction L [mm]

Circular silencers
Type CA

For the reduction of noise in circular ducts, galvanised sheet steel construction

Circular silencers Type CA for the reduction of noise in the circular ducts of air conditioning systems

- Absorption material is non-combustible mineral wool with RAL quality mark, biosoluble and hence hygienically safe according to the German TRGS 905 (Technical Rules for Hazardous Substances) and EU directive 97/69/EG
- Mineral wool faced with glass fibre as protection against erosion due to airflow velocities up to 20 m/s
- Casing and perforated inner duct are galvanised sheet steel
- Variant with spigot has a groove for a lip seal, suitable for connecting circular ducts to EN 1506 or EN 13180
- Insertion loss measured according to ISO 7235
- Casing air leakage to EN 15727, class B

Optional equipment and accessories

- With flanges on both ends
- With lip seals on both ends

HYGIENISCH GETESTET TROX® TECHNIK VDI 6022

Tested to VDI 6022

6

Description

Circular silencer Type CA

For air terminal units and mechanical self-powered controllers see the Control Units catalogue

Application

–Circular silencers Type CA for the reduction of noise in the circular ducts of air conditioning systems
–For the reduction of air-regenerated noise of air terminal units such as LVC and TVR, and of mechanical self-powered controllers such as RN and VFC
–For the reduction of fan noise
–Can be used as cross talk silencer to reduce the transfer of noise through ducts between neighbouring rooms

Variants

–050: Circular silencer with 50 mm insulation
–100: Circular silencer with 100 mm insulation
–VF1: Circular silencer with flange on one end
–VF2: Circular silencer with flanges on both ends
–Special versions upon request

Nominal sizes

–100, 125, 160, 200, 250, 315, 400, 450, 500, 560, 630, 710, 800 mm
For VAV terminal units and CAV controllers
–100, 125, 160, 200, 250, 315, 400 mm

Accessories

–GE: Matching flange for one end
–GZ: Matching flanges for both ends
–VD2: Lip seals on both ends (factory fitted)

Special features

–Insertion loss measured according to ISO 7235
–Absorption material is non-combustible
–Insulation thickness 50 mm or 100 mm

Parts and characteristics

–Casing
–Perforated inner tube
–Absorption material

Construction features

–Circular casing
–Spigot suitable for circular ducts to EN 1506 or EN 13180
–Spigot with groove for lip seal
–Operating pressure up to 1000 Pa
–Operating temperature up to 100 °C

Materials and surfaces

–Casing and perforated inner duct are galvanised sheet steel
–Lining is mineral wool

Mineral wool
–To EN 13501, fire rating class A2, non-combustible
–RAL quality mark RAL-GZ 388
–Biosoluble and hence hygienically safe according to the German TRGS 905 (Technical Rules for Hazardous Substances) and EU directive 97/69/EG
–Faced with glass fibre as protection against erosion through airflow velocities up to 20 m/s
–Inert to fungal and bacterial growth

Installation and commissioning

–Any installation orientation
–Installation in ducts outside of closed rooms requires sufficient protection against the effects of weather

Standards and guidelines

–Insertion loss measured according to ISO 7235
–Casing air leakage to EN 15727, class B

Maintenance

–Maintenance-free as construction and materials are not subject to wear

Technical data

Nominal sizes	100 – 800 mm
Operating pressure	– 1000 Pa
Operating temperature	– 100 °C

Order code

CA

For available combinations of insulation thickness, nominal size and nominal length see the Weight table.

CA – 050 / 315×1000 / GZ / VF2
1 2 3 4 5 6

1 Type
CA Circular silencer

2 Insulation thickness [mm]
05050
100100

3 Nominal size [mm]
100
125
160
200
250
315
400
450
500
560
630
710
800

4 Nominal length [mm]
500
1000
1500

5 Matching flange
No entry: none
GEon one end (only VF1)
GZon both ends (only VF2)

6 Type of connection
No entry: spigot
VD2 Spigot with lip seal on both ends
VF1 Flange on one end
VF2 Flanges on both ends

Order example

CA 100/315×1500/GZ/VF2

Insulation thickness	100 mm
Nominal size	315 mm
Length	1500 mm
Matching flange	Both sides
Type of connection	Flanges on both ends

6

CA050 – length L = 500 mm (insulation thickness 50 mm)

Nominal size	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e							
	dB							
100	3	5	8	14	23	30	18	13
125	3	4	7	12	21	23	12	10
160	2	3	6	10	18	17	8	8
200	1	2	5	9	16	13	5	6
250	1	2	4	8	14	10	3	4
315	1	1	3	7	12	7	2	3
400	1	1	3	6	11	6	1	2

CA100 – length L = 500 mm (insulation thickness 100 mm)

Nominal size	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e							
	dB							
100	4	9	12	18	35	33	26	14
125	4	7	10	17	31	26	19	11
160	3	6	9	15	28	20	13	8
200	3	5	8	15	25	16	9	7
250	2	4	7	14	21	13	6	5
315	2	3	6	13	18	10	4	4
400	1	3	6	12	17	8	3	3

CA050 – length L = 1000 mm (insulation thickness 50 mm)

Nominal size	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e							
	dB							
100	4	9	15	27	42	50	43	25
125	4	7	12	23	38	42	29	20
160	3	5	9	19	34	30	18	15
200	2	4	8	16	31	22	12	11
250	2	3	6	14	28	17	8	9
315	1	2	5	12	25	13	5	6
400	1	2	4	10	22	10	3	5

CA100 – length L = 1000 mm (insulation thickness 100 mm)

Nominal size	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e							
	dB							
100	5	17	24	35	50	50	47	25
125	5	14	21	32	48	44	33	20
160	5	11	18	30	42	33	22	15
200	4	9	16	28	38	26	16	12
250	3	8	14	26	33	21	11	9
315	3	6	12	24	29	16	8	7
400	2	5	11	23	25	12	5	5
450	2	5	10	22	23	11	4	5
500	2	4	10	21	22	10	4	4

CA050 – length L = 1500 mm (insulation thickness 50 mm)

Nominal size	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e							
	dB							
250	2	4	8	19	39	23	13	12
315	2	3	7	17	35	17	9	9
400	1	2	6	14	31	13	6	7

CA100 – length L = 1500 mm (insulation thickness 100 mm)

Nominal size	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e							
	dB							
250	4	11	21	37	41	27	15	12
315	3	9	18	34	35	21	10	9
400	3	7	16	32	31	16	7	7
450	2	6	15	31	29	14	6	6
500	2	6	14	30	27	13	5	6
560	2	5	13	29	25	11	4	5
630	2	5	12	28	23	10	4	4
710	2	5	11	27	22	9	3	4
800	2	4	11	26	20	8	2	3

The stated differential pressures for circular silencers correspond to the values for smooth pipes. Deviations, if any, are of no practical relevance. For ductwork calculation, if the length of a circular silencer is included in the total length of the ductwork, no extra length must be added.

Quick sizing – differential pressure

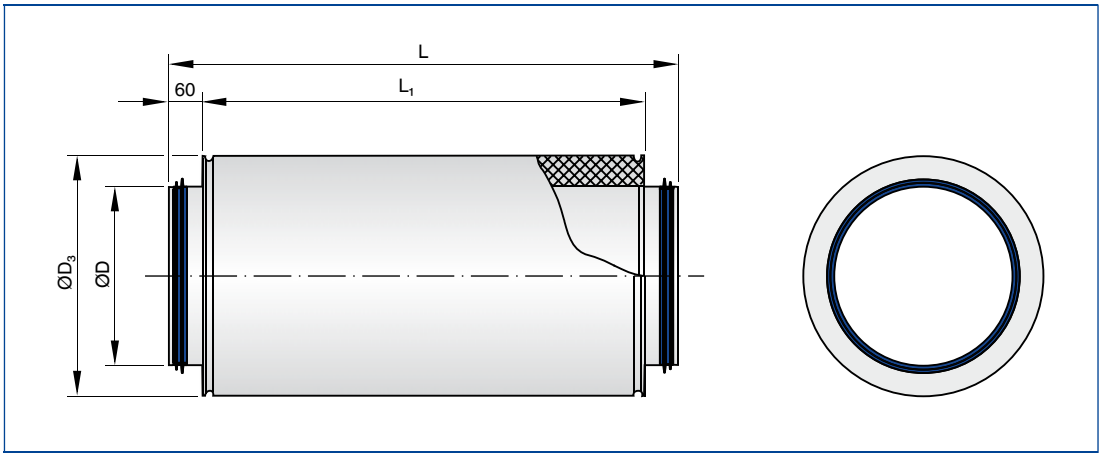
Nominal size	$\dot{V}$		L = 500 mm	L = 1000 mm	L = 1500 mm
			Δp_{st}		
	l/s	m^3/h	Pa		
100	30	108	2	2	
	60	216	4	8	
	75	270	6	12	
	90	324	8	18	
125	50	180	2	2	
	95	342	4	6	
	120	432	6	10	
	145	522	6	14	
160	80	288	2	2	
	155	558	2	6	
	195	702	4	8	
	235	846	6	10	
200	125	450	2	2	
	245	882	2	4	
	310	1116	4	6	
	370	1332	4	8	
250	195	702	<2	<2	<2
	385	1386	<2	4	4
	485	1746	2	4	6
	580	2088	4	6	8
315	310	1116	<2	<2	<2
	615	2214	<2	2	4
	770	2772	<2	4	4
	925	3330	2	4	6
400	500	1800	<2	<2	<2
	995	3582	<2	<2	2
	1245	4482	<2	2	4
	1495	5382	<2	4	4
450	630	2268		<2	<2
	1260	4536		<2	<2
	1575	5670		<2	4
	1890	6804		2	4
500	780	2808		<2	<2
	1560	5616		<2	2
	1950	7020		2	2
	2335	8406		2	4
560	980	3528			<2
	1955	7038			<2
	2445	8802			2
	2935	10566			4
630	1240	4464			<2
	2480	8928			<2
	3095	11142			<2
	3715	13374			<2
710	1575	5670			<2
	3150	11340			<2
	3935	14166			<2
	4725	17010			<2
800	2000	7200			<2
	4000	14400			<2
	5000	18000			<2
	6000	21600			<2

Application

–Circular silencer for the reduction of noise
–Spigot

Dimensions

Dimensional drawing of CA



Dimensions

Nominal size	CA-050 $ØD_3$	CA-100 $ØD_3$	ØD
	mm	mm	mm
100	199	299	99
125	224	324	124
160	259	359	159
200	299	399	199
250	349	449	249
315	414	514	314
400	499	599	399
450		648	448
500		698	498
560		758	558
630		828	628
710		908	708
800		998	798

Dimensions

Nominal length	L	L_1
	mm	mm
500	500	380
1000	1000	880
1500	1500	1380

The table shows the available nominal sizes.

Weight

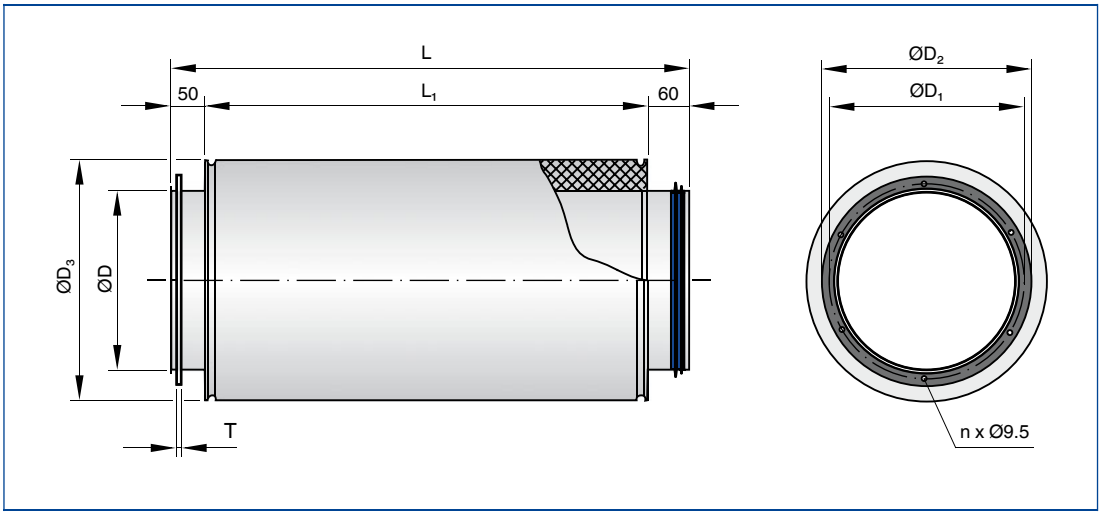
Nominal size	CA-050			CA-100		
	500	1000	1500	500	1000	1500
	m					
	kg	kg	kg	kg	kg	kg
100	4	7		6	11	
125	5	9		7	13	
160	7	12		9	16	
200	7	13		9	17	
250	9	16	22	11	20	29
315	12	20	28	14	25	35
400	15	25	34	18	30	42
450					33	46
500					36	52
560						55
630						62
710						68
800						76

Application

–Circular silencer for the reduction of noise
–Spigot on one end to make connections to the ducting
–With flange on one end to make a detachable connection to the ducting

Dimensions

Dimensional drawing of CA/.../VF1



Dimensions

Nominal size	CA-050 $ØD_3$	CA-100 $ØD_3$	ØD	$ØD_1$	$ØD_2$	n	T
	mm	mm	mm	mm	mm		mm
100	199	299	99	132	152	4	4
125	224	324	124	157	177	4	4
160	259	359	159	192	212	6	4
200	299	399	199	233	253	6	4
250	349	449	249	283	303	6	4
315	414	514	314	352	378	8	4
400	499	599	399	438	464	8	4
450		648	448	488	514	8	4
500		698	498	538	564	8	4
560		758	558	600	634	12	4
630		828	628	670	704	12	4
710		908	708	750	784	12	4
800		998	798	840	874	16	4

Dimensions

Nominal length	L	L_1
	mm	mm
500	490	380
1000	990	880
1500	1490	1380

The table shows the available nominal sizes.

Weight

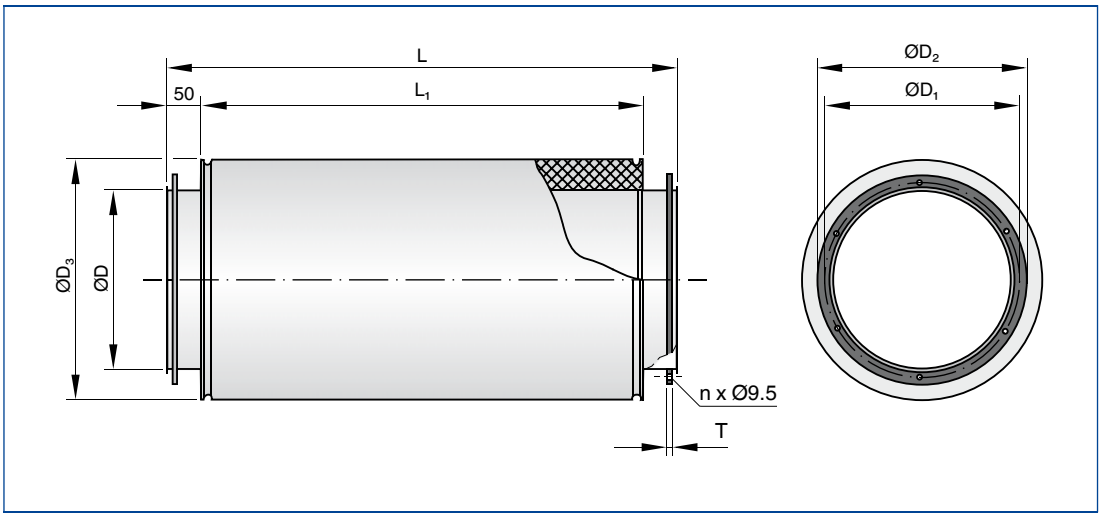
Nominal size	CA-050			CA-100		
	500	1000	1500	500	1000	1500
	m					
	kg	kg	kg	kg	kg	kg
100	4	7		6	11	
125	5	9		7	13	
160	8	13		10	17	
200	8	14		10	18	
250	10	17	23	12	21	30
315	13	21	29	15	26	36
400	16	26	35	19	31	43
450					34	47
500					38	54
560						57
630						64
710						71
800						79

Application

–Circular silencer for the reduction of noise
–With flanges on both ends to make detachable connections to the ducting

Dimensions

Dimensional drawing of CA/.../VF2



Dimensions

Nominal size	CA-050 $ØD_3$	CA-100 $ØD_3$	ØD	$ØD_1$	$ØD_2$	n	T
	mm	mm	mm	mm	mm		mm
100	199	299	99	132	152	4	4
125	224	324	124	157	177	4	4
160	259	359	159	192	212	6	4
200	299	399	199	233	253	6	4
250	349	449	249	283	303	6	4
315	414	514	314	352	378	8	4
400	499	599	399	438	464	8	4
450		648	448	488	514	8	4
500		698	498	538	564	8	4
560		758	558	600	634	12	4
630		828	628	670	704	12	4
710		908	708	750	784	12	4
800		998	798	840	874	16	4

Dimensions

Nominal length	L	L_1
	mm	mm
500	480	380
1000	980	880
1500	1480	1380

The table shows the available nominal sizes.

Weight

Nominal size	CA-050			CA-100		
	500	1000	1500	500	1000	1500
	m					
	kg	kg	kg	kg	kg	kg
100	4	7		6	11	
125	6	10		8	14	
160	8	13		10	17	
200	8	14		10	18	
250	10	17	23	12	21	30
315	14	22	30	16	27	37
400	18	28	37	21	33	45
450					36	49
500					39	55
560						59
630						67
710						73
800						82

Standard text

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

Circular silencers for air conditioning systems, rigid construction, available in 13 nominal sizes. Insertion loss measured according to ISO 7235. Casing with acoustic and thermal insulation. Various types of connection, suitable for circular ducts to EN 1506 or EN 13180. Casing air leakage to EN 15727, class B.

Special features

–Insertion loss measured according to ISO 7235
–Absorption material is non-combustible
–Insulation thickness 50 mm or 100 mm

Materials and surfaces

–Casing and perforated inner duct are galvanised sheet steel
–Lining is mineral wool

Mineral wool
–To EN 13501, fire rating class A2, non-combustible
–RAL quality mark RAL-GZ 388
–Biosoluble and hence hygienically safe according to the German TRGS 905 (Technical Rules for Hazardous Substances) and EU directive 97/69/EG
–Faced with glass fibre as protection against erosion through airflow velocities up to 20 m/s
–Inert to fungal and bacterial growth

Technical data

–Nominal sizes: 100 to 800 mm
–Operating pressure: 1000 Pa max.
–Operating temperature: 100 °C max.

Sizing data

–D[mm]
–L[mm]
–Insulation thickness[mm]
–$\dot{V}$[m³/h]
–D_e at 250 Hz[dB]
–Δp_{st}[Pa]

Order options

1 Type
CA Circular silencer

2 Insulation thickness [mm]
☐ **050**50
☐ **100**100

3 Nominal size [mm]
☐ **100**
☐ **125**
☐ **160**
☐ **200**
☐ **250**
☐ **315**
☐ **400**
☐ **450**
☐ **500**
☐ **560**
☐ **630**
☐ **710**
☐ **800**

4 Nominal length [mm]
☐ **500**
☐ **1000**
☐ **1500**

5 Matching flange
No entry: none
☐ **GE**on one end (only VF1)
☐ **GZ**on both ends (only VF2)

6 Type of connection
No entry: spigot
☐ **VD2**Spigot with lip seal on both ends
☐ **VF1**Flange on one end
☐ **VF2**Flanges on both ends

Notes

Circular silencers
Type CB

For the increased reduction of noise in circular ducts, galvanised sheet steel construction

Circular silencers made of galvanised sheet steel for the reduction of noise in circular ducts of air conditioning systems, with increased insertion loss due to sound absorbing pod

- Absorption material is non-combustible mineral wool with RAL quality mark, biosoluble and hence hygienically safe according to the German TRGS 905 (Technical Rules for Hazardous Substances) and EU directive 97/69/EG
- Mineral wool faced with glass fibre fabric as protection against erosion due to airflow velocities up to 20 m/s
- Casing, perforated inner duct and pod are galvanised sheet steel
- Pod with domed end upstream to reduce the differential pressure
- Variant with spigot has a groove for a lip seal, suitable for connecting circular ducts to EN 1506 or EN 13180
- Insertion loss measured according to ISO 7235
- Casing air leakage to EN 15727, class B

Optional equipment and accessories

- With flanges on both ends
- Lip seal

HYGIENISCH GETESTET TROX® TECHNIK VDI 6022

Tested to VDI 6022

Description

Circular silencer Type CB

Application
–Circular silencers Type CB for the reduction of air-regenerated noise in the circular ducts of air conditioning systems
–For the reduction of air-regenerated noise
–For the reduction of fan noise

Variants
–050: Circular silencer with 50 mm insulation
–100: Circular silencer with 100 mm insulation
–CB ../VF1: Circular silencer with flange on one end (end with domed cap)
–CB ../VF2: Circular silencer with flanges on both ends
–Special versions upon request

Nominal sizes
–250, 315, 400, 450, 500, 560, 630, 710, 800, 900, 1000 mm

Accessories
–Matching flange for one end
–Matching flanges for both ends
–Lip seals on both ends (factory fitted)

Special features
–Insertion loss measured according to ISO 7235
–Increased insertion loss due to sound absorbing pod
–Pod with domed end upstream to reduce the differential pressure
–Absorption material is non-combustible
–Insulation thickness 50 mm or 100 mm

Parts and characteristics
–Casing
–Perforated inner duct
–Sound absorbing pod

Construction features
–Circular casing
–Spigot suitable for circular ducts to EN 1506 or EN 13180
–Spigot with groove for lip seal
–Operating pressure up to 1000 Pa
–Operating temperature up to 100 °C

Materials and surfaces
–Casing, perforated inner duct and pod are galvanised sheet steel
–Lining is mineral wool

Mineral wool
–To EN 13501, fire rating class A2, non-combustible
–RAL quality mark RAL-GZ 388
–Biosoluble and hence hygienically safe according to the German TRGS 905 (Technical Rules for Hazardous Substances) and EU directive 97/69/EG
–Faced with glass fibre fabric as protection against erosion through airflow velocities of up to 20 m/s
–Inert to fungal and bacterial growth

Installation and commissioning
–Any installation orientation
–Installation in ducts outside of closed rooms requires sufficient protection against the effects of weather

Standards and guidelines
–Insertion loss measured according to ISO 7235
–Casing air leakage to EN 15727, at least class B

Maintenance
–Maintenance-free as construction and materials are not subject to wear

Technical data

Nominal sizes	250 – 1000 mm
Operating pressure	– 1000 Pa
Operating temperature	– 100 °C

Order code

CB

For available combinations of insulation thickness, nominal size and nominal length see the Weight table.

CB – 050 / 315×1000 / GZ / VF2
1 2 3 4 5 6

1 Type
CB Circular silencer with pod

2 Insulation thickness [mm]
05050
100100

3 Nominal size [mm]
250
315
400
450
500
560
630
710
800
900
1000

4 Length [mm]
500
1000
1500

5 Matching flange
No entry: none
GEon one end (only VF1)
GZon both ends (only VF2)

6 Type of connection
No entry: spigot
VD2 Spigot with lip seal on both ends (up to nominal size 800)
VF1 Flange on one end
VF2 Flanges on both ends

Order example

CB 100/315×1500/GZ/VF2

Insulation thickness	100 mm
Nominal size	315 mm
Length	1500 mm
Matching flange	Both sides
Type of connection	Flanges on both ends

CB050 – length L = 500 mm (insulation thickness 50 mm)

Nominal size	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e							
	dB							
250	1	3	6	11	17	20	23	23
315	1	3	5	10	15	17	18	18
400	1	2	5	8	13	15	14	13

CB100 – length L = 500 mm (insulation thickness 100 mm)

Nominal size	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e							
	dB							
250	2	5	10	17	24	23	26	24
315	2	5	9	16	21	20	21	18
400	1	4	8	14	18	17	16	14
450	1	4	7	14	16	16	14	12
500	1	3	7	13	16	15	13	11
560	1	3	6	13	15	14	11	10
630	1	3	6	12	15	13	10	9
710	1	3	6	12	14	12	9	8
800	1	2	5	11	13	11	8	7
900	1	2	5	10	13	10	7	6
1000	1	2	5	10	12	10	6	5

CB050 – length L = 1000 mm (insulation thickness 50 mm)

Nominal size	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e							
	dB							
250	3	5	9	18	42	48	47	35
315	2	5	8	15	40	42	36	27
400	2	4	6	12	38	35	28	20

CB100 – length L = 1000 mm (insulation thickness 100 mm)

Nominal size	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e							
	dB							
250	5	10	17	30	47	50	50	36
315	4	9	15	27	44	45	39	27
400	3	7	13	25	40	38	29	21
450	3	7	12	24	39	35	26	18
500	2	6	12	23	38	33	24	17
560	2	6	11	22	36	31	21	15
630	2	5	11	21	34	29	19	13
710	2	5	10	20	33	27	17	12
800	2	5	9	19	31	25	14	10
900	2	4	9	18	30	23	13	9
1000	2	4	8	17	29	22	12	8

CB050 – length L = 1500 mm (insulation thickness 50 mm)

Nominal size	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e							
	dB							
250	5	7	10	23	50	50	50	44
315	5	6	8	19	50	50	50	34
400	5	5	7	15	50	50	39	25

CB100 – length L = 1500 mm (insulation thickness 100 mm)

Nominal size	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e							
	dB							
250	7	14	22	41	50	50	50	44
315	7	12	20	37	50	50	50	34
400	6	10	17	33	50	50	40	26
450	5	9	16	31	50	50	36	23
500	5	9	16	30	50	50	33	21
560	4	8	15	30	50	48	29	19
630	4	8	14	29	50	44	26	16
710	4	7	13	28	50	41	23	14
800	3	6	13	26	49	37	20	12
900	3	6	12	24	47	34	17	11
1000	3	6	11	23	45	33	16	10

Quick sizing – differential pressure and sound power level

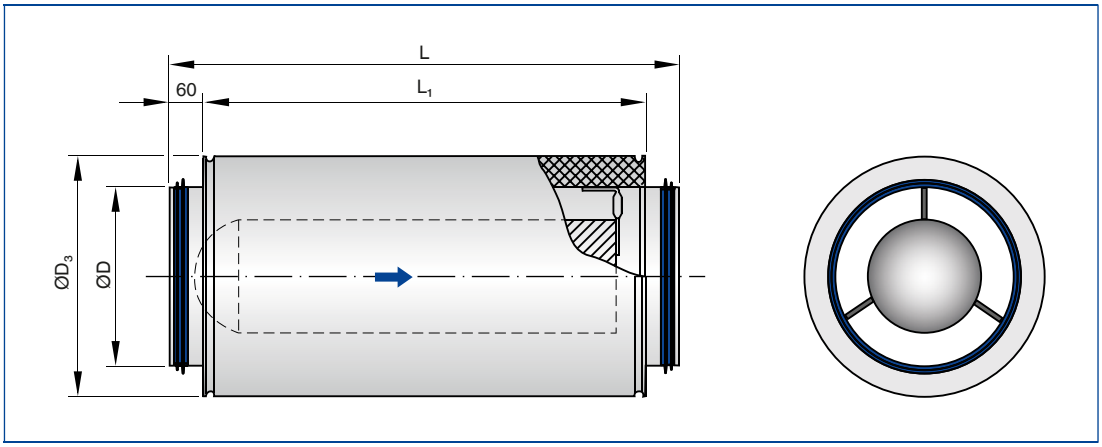
Nominal size	V̇		Air-regenerated noise	Differential pressure		
			L_{WA}	L = 500 mm	L = 1000 mm	L = 1500 mm
				Δp_{st}		
	l/s	m^3/h	dB(A)	Pa		
250	190	684	34	14	18	25
	385	1386	51	55	75	95
	480	1728	56	85	115	150
	575	2070	60	120	165	210
315	305	1098	35	14	18	25
	610	2196	52	50	95	120
	765	2754	57	80	105	130
	915	3294	61	115	145	180
400	495	1782	36	12	16	20
	990	3564	52	50	60	75
	1240	4464	58	75	95	115
	1485	5346	62	110	135	165
450	630	2268	36	12	16	20
	1255	4518	53	50	60	70
	1570	5652	58	75	90	110
	1885	6786	63	107	130	155
500	775	2790	36	12	14	18
	1550	5580	53	45	55	65
	1940	6984	59	70	85	100
	2330	8388	63	100	125	150
560	975	3510	37	12	14	18
	1950	7020	53	45	55	65
	2435	8766	59	70	85	100
	2925	10530	63	100	120	140
630	1235	4446	37	12	14	16
	2470	8892	54	45	55	65
	3090	11124	59	70	80	95
	3705	13338	64	100	115	135
710	1570	5652	37	12	14	16
	3140	11304	54	45	50	60
	3925	14130	59	70	80	95
	4710	16956	64	95	115	135
800	1995	7182	37	12	12	14
	3990	14364	54	45	50	60
	4990	17964	60	70	75	85
	5985	21546	64	95	110	125
900	2530	9108	38	12	12	14
	5055	18198	54	45	50	55
	6320	22752	60	65	75	85
	7585	27306	64	95	105	120
1000	3125	11250	38	12	12	14
	6245	22482	55	45	50	55
	7805	28098	60	65	75	85
	9370	33732	64	95	105	120

Application

–Circular silencer for the reduction of noise
–Spigot

Dimensions

Dimensional drawing of CB



Dimensions

Nominal size	CB-050 $ØD_3$	CB-100 $ØD_3$	ØD
	mm	mm	mm
250	349	449	249
315	414	514	314
400	499	599	399
450		648	448
500		698	498
560		758	558
630		828	628
710		908	708
800		998	798
900		1098	898
1000		1198	998

Dimensions

Nominal length	L	L_1
	mm	mm
500	500	380
1000	1000	880
1500	1500	1380

The table shows the available nominal sizes.

Weight

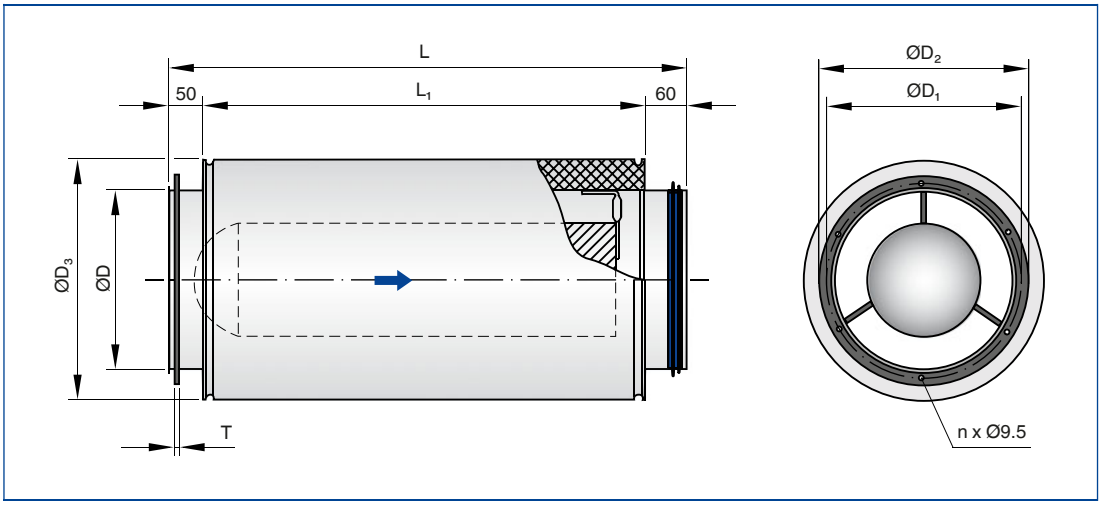
Nominal size	CB-050			CB-100		
	500	1000	1500	500	1000	1500
	m					
	kg	kg	kg	kg	kg	kg
250	10	17	24	12	21	31
315	12	21	30	15	26	37
400	16	27	38	19	32	46
450				21	35	50
500				22	38	56
560				26	44	62
630				30	49	69
710				33	55	77
800				37	61	86
900				40	68	95
1000				45	75	105

Application

–Circular silencer for the reduction of noise
–Spigot on one end to make connections to the ducting
–With flange on one end to make a detachable connection to the ducting

Dimensions

Dimensional drawing of CB/.../VF1



Dimensions

Nominal size	CB-050 $ØD_3$	CB-100 $ØD_3$	ØD	$ØD_1$	$ØD_2$	n	T
	mm	mm	mm	mm	mm		mm
250	349	449	249	283	303	6	4
315	414	514	314	352	378	8	4
400	499	599	399	438	464	8	4
450		648	448	488	514	8	4
500		698	498	538	564	8	4
560		758	558	600	634	12	4
630		828	628	670	704	12	4
710		908	708	750	784	12	4
800		998	798	840	874	16	4
900		1098	898	940	974	16	4
1000		1198	998	1041	1075	16	4

Dimensions

Nominal length	L	L_1
	mm	mm
500	490	380
1000	990	880
1500	1490	1380

The table shows the available nominal sizes.

Weight

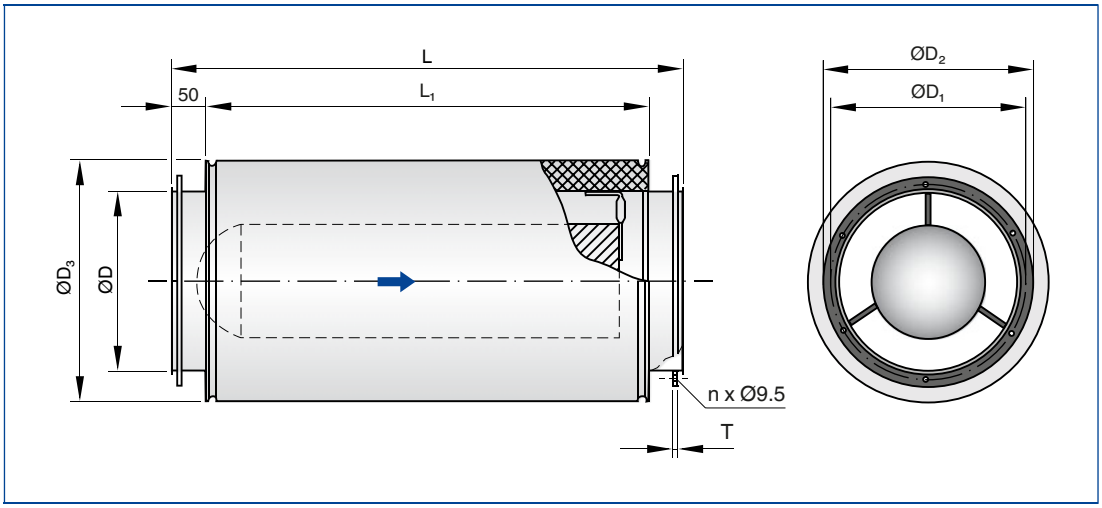
Nominal size	CB-050			CB-100		
	500	1000	1500	500	1000	1500
	m					
	kg	kg	kg	kg	kg	kg
250	11	18	25	13	22	32
315	14	22	31	16	27	38
400	17	28	39	20	33	47
450				22	36	51
500				24	40	58
560				28	46	64
630				32	51	71
710				36	58	80
800				40	64	89
900				43	71	98
1000				49	79	110

Application

–Circular silencer for the reduction of noise
–With flanges on both ends to make detachable connections to the ducting

Dimensions

Dimensional drawing of CB/.../VF2



[1] Construction with flanges: Length reduced by 10 mm (VF1) or 20 mm (VF2)

Dimensions

Nominal size	CB-050 ØD3	CB-100 ØD3	ØD	ØD1	ØD2	n	T
	mm	mm	mm	mm	mm		mm
250	349	449	249	283	303	6	4
315	414	514	314	352	378	8	4
400	499	599	399	438	464	8	4
450		648	448	488	514	8	4
500		698	498	538	564	8	4
560		758	558	600	634	12	4
630		828	628	670	704	12	4
710		908	708	750	784	12	4
800		998	798	840	874	16	4
900		1098	898	940	974	16	4
1000		1198	998	1041	1075	16	4

Dimensions

Nominal length	L	L1
	mm	mm
500	480	380
1000	980	880
1500	1480	1380

6

The table shows the available nominal sizes.

Weight

Nominal size	CB-050			CB-100		
	500	1000	1500	500	1000	1500
	m					
	kg	kg	kg	kg	kg	kg
250	11	18	25	13	22	32
315	15	23	32	17	28	39
400	19	30	41	22	35	49
450				24	38	53
500				25	41	59
560				30	48	66
630				35	54	74
710				38	60	82
800				43	67	92
900				47	75	102
1000				52	82	113

Standard text

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

Circular silencers with sound absorbing pod for better acoustic performance, rigid construction, for air conditioning systems,
available in 11 nominal sizes.
Insertion loss measured according to ISO 7235.
Casing with acoustic and thermal insulation.
Optimised differential pressure due to the sound-absorbing pod with domed end upstream.
Various types of connection, suitable for circular ducts to EN 1506 or EN 13180.
Casing air leakage to EN 15727, class B.

Special features

–Insertion loss measured according to ISO 7235
–Increased insertion loss due to sound absorbing pod
–Pod with domed end upstream to reduce the differential pressure
–Absorption material is non-combustible
–Insulation thickness 50 mm or 100 mm

Materials and surfaces

–Casing, perforated inner duct and pod are galvanised sheet steel
–Lining is mineral wool

Mineral wool
–To EN 13501, fire rating class A2, non-combustible
–RAL quality mark RAL-GZ 388
–Biosoluble and hence hygienically safe according to the German TRGS 905 (Technical Rules for Hazardous Substances) and EU directive 97/69/EG
–Faced with glass fibre fabric as protection against erosion through airflow velocities of up to 20 m/s
–Inert to fungal and bacterial growth

Technical data

–Nominal sizes: 250 – 1000 mm
–Operating pressure: 1000 Pa max.
–Operating temperature: 100 °C max.

Sizing data

–D[mm]
–L[mm]
–Insulation thickness[mm]
–$\dot{V}$[m³/h]
–D_e at 250 Hz[dB]
–Δp_{st}[Pa]

Order options

1 Type
CB Circular silencer with pod

2 Insulation thickness [mm]
☐ **050**50
☐ **100**100

3 Nominal size [mm]
☐ **250**
☐ **315**
☐ **400**
☐ **450**
☐ **500**
☐ **560**
☐ **630**
☐ **710**
☐ **800**
☐ **900**
☐ **1000**

4 Length [mm]
☐ **500**
☐ **1000**
☐ **1500**

5 Matching flange
No entry: none
☐ **GE**on one end (only VF1)
☐ **GZ**on both ends (only VF2)

6 Type of connection
No entry: spigot
☐ **VD2**Spigot with lip seal on both ends
☐ (up to nominal size 800)
☐ **VF1**Flange on one end
☐ **VF2**Flanges on both ends

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Notes

Circular silencers
Type CS

For the reduction of noise in circular ducts, aluminium construction

Circular silencers, in rigid aluminium construction, for the reduction of noise in the circular ducts of air conditioning systems

- Absorption material is non-combustible mineral wool with RAL quality mark, biosoluble and hence hygienically safe according to the German TRGS 905 (Technical Rules for Hazardous Substances) and EU directive 97/69/EG
- Casing and perforated inner duct made of aluminium
- Variant with spigot has a groove for a lip seal, suitable for connecting circular ducts to EN 1506 or EN 13180
- Insertion loss measured according to ISO 7235
- Casing air leakage to EN 15727, class D

Optional equipment and accessories

- Socket-type spigots on both ends
- Raised edges at both ends
- With lip seals on both ends

HYGIENISCH GETESTET TROX® TECHNIK VDI 6022

Tested to VDI 6022

6

Description

Circular silencer Type CS

Application
–Circular silencers Type CS for the reduction of air-regenerated noise in the circular ducts of air conditioning systems
–For the reduction of air-regenerated noise of air terminal units LVC and TVR, and of mechanical self-powered controllers RN and VFC
–For the reduction of fan noise
–Can be used as cross talk silencer to reduce the transfer of noise through ducts between neighbouring rooms

Variants
–025: Circular silencer with 25 mm insulation
–050: Circular silencer with 50 mm insulation
–AS2: Circular silencer with socket-type spigots on both ends
–BK2: Circular silencer with raised edges at both ends
–Special versions upon request

Nominal sizes
–80, 100, 125, 160, 200, 250, 315, 400 mm

Accessories
–VD2: Lip seals on both ends (factory fitted)
–AS2: Socket-type spigots on both ends
–BK2: Raised edges at ends

Special features
–Insertion loss measured according to ISO 7235
–Absorption material is non-combustible
–Insulation thickness 25 mm or 50 mm

Parts and characteristics
–Casing
–Perforated inner tube
–Absorption material

Construction features
–Circular casing
–Spigot suitable for circular ducts to EN 1506 or EN 13180
–Spigot with groove for lip seal
–Operating pressure up to 1000 Pa
–Operating temperature up to 100 °C

Materials and surfaces
–Casing and perforated inner duct made of aluminium
–Lining is mineral wool
–End pieces made ABS plastic, flammability to UL 94, V-0 (nominal sizes 80 – 125)
–End pieces made of aluminium (nominal sizes 160 – 400)

Mineral wool
–To EN 13501, fire rating class A2, non-combustible
–RAL quality mark RAL-GZ 388
–Biosoluble and hence hygienically safe according to the German TRGS 905 (Technical Rules for Hazardous Substances) and EU directive 97/69/EG
–Inert to fungal and bacterial growth

Installation and commissioning
–Any installation orientation
–Installation in ducts outside of closed rooms requires sufficient protection against the effects of weather

Standards and guidelines
–Insertion loss measured according to ISO 7235
–Casing air leakage to EN 15727, class D

Maintenance
–Maintenance-free as construction and materials are not subject to wear

Technical data

Nominal sizes	100 – 800 mm
Operating pressure	– 1000 Pa
Operating temperature	– 100 °C

Order code

CS

CS – 025 / 160×1000 / VD2
1 2 3 4 5

1 Type
CS Circular silencer

2 Insulation thickness [mm]
02525
05050

3 Nominal size [mm]
80
100
125
160
200
250
315
400

4 Nominal length [mm]
500
1000
1500

5 Type of connection
No entry: spigot
VD2 Spigot with lip seal on both ends
AS2 Socket-type spigots on both ends
BK2 Raised edges at both ends

Order example

CS 50/250×1500/VD2

Insulation thickness	50 mm
Nominal size	250 mm
Length	1500 mm
Type of connection	Spigot with lip seal on both ends

CS025, CF025 – length L = 500 mm (insulation thickness 25 mm)

Nominal size	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e							
	dB							
80	1	2	4	9	20	16	15	10
100	1	1	4	8	17	14	12	9
125	1	1	3	8	15	11	9	7
160	1	1	2	5	14	10	8	6
200	1	1	2	5	14	9	6	5
250	0	1	2	5	13	8	5	4
315	0	1	1	4	9	7	4	3
400	0	0	1	3	6	5	3	3

CS050, CF050 – length L = 500 mm (insulation thickness 50 mm)

Nominal size	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e							
	dB							
80	4	5	11	20	30	27	16	12
100	3	4	9	17	24	21	12	10
125	2	3	7	14	20	16	11	9
160	2	2	6	12	17	14	8	6
200	1	2	5	12	16	11	6	5
250	1	2	4	12	15	8	5	4
315	1	1	3	9	12	6	4	3
400	1	1	3	7	9	6	4	3

CS025, CF025 – length L = 1000 mm (insulation thickness 25 mm)

Nominal size	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e							
	dB							
80	3	5	10	21	44	46	37	23
100	2	3	8	17	44	34	28	21
125	2	3	7	17	43	30	24	17
160	1	1	4	12	40	27	20	16
200	1	1	3	11	35	22	16	13
250	1	1	3	11	30	19	12	10
315	0	1	3	9	21	10	12	8
400	0	1	3	8	16	8	8	7

CS050, CF050 – length L = 1000 mm (insulation thickness 50 mm)

Nominal size	Centre frequency fm [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e							
	dB							
80	8	14	23	47	50	50	44	27
100	7	10	21	38	50	50	29	22
125	5	7	16	32	50	42	25	22
160	4	5	12	26	47	34	20	16
200	3	5	11	25	45	26	16	13
250	2	4	9	25	40	19	12	10
315	1	4	8	22	28	13	12	8
400	0	4	8	18	23	11	10	7

CS025, CF025 – length L = 1500 mm (insulation thickness 25 mm)

Nominal size	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e							
	dB							
80	3	5	13	28	47	48	44	31
100	2	4	12	24	47	41	34	26
125	2	3	10	22	45	34	28	20
160	2	2	6	16	42	30	25	19
200	2	2	5	15	41	27	19	15
250	1	2	5	15	38	25	14	11
315	1	2	4	12	27	19	13	10
400	1	1	4	10	23	17	11	8

CS050, CF050 – length L = 1500 mm (insulation thickness 50 mm)

Nominal size	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e							
	dB							
80	11	14	33	48	50	50	47	37
100	10	11	27	44	50	50	37	30
125	7	9	21	41	50	46	33	27
160	5	7	17	37	48	42	24	19
200	4	6	14	37	48	34	18	15
250	3	5	11	35	45	25	14	11
315	2	4	10	26	35	19	12	10
400	2	4	9	20	26	17	11	8

The stated differential pressures for circular silencers correspond to the values for smooth pipes. Deviations, if any, are of no practical relevance. For ductwork calculation, if the length of a circular silencer is included in the total length of the ductwork, no extra length must be added.

Quick sizing – differential pressure

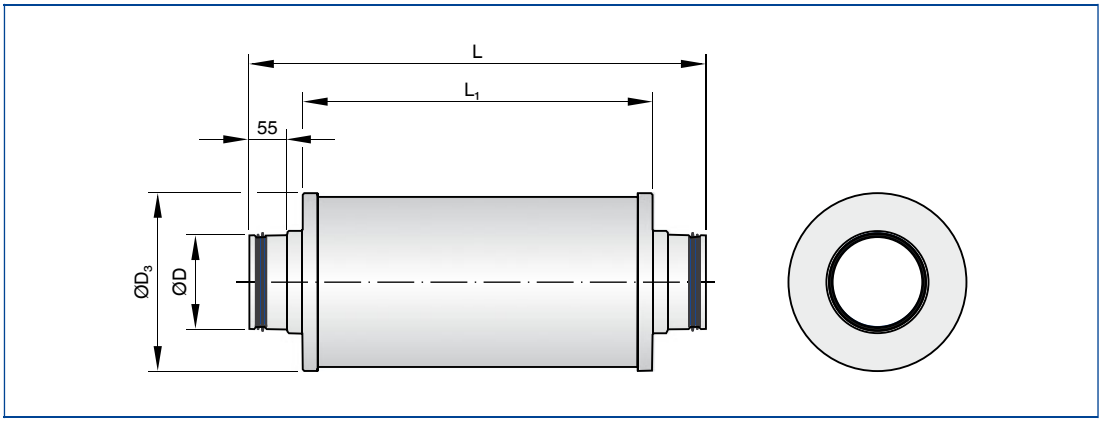
Nominal size	$\dot{V}$		L = 500 mm	L = 1000 mm	L = 1500 mm
			Δp_{st}		
	l/s	m^3/h	Pa		
80	20	72	2	4	6
	40	144	6	12	16
	50	180	8	16	25
	55	198	12	25	35
100	30	108	2	2	4
	60	216	4	8	12
	75	270	6	12	18
	90	324	8	18	25
125	50	180	2	2	4
	95	342	4	6	10
	120	432	6	10	14
	145	522	6	14	20
160	80	288	2	2	2
	155	558	2	6	8
	195	702	4	8	10
	235	846	6	10	14
200	125	450	2	2	2
	245	882	2	4	6
	310	1116	4	6	8
	370	1332	4	8	10
250	195	702	<2	<2	<2
	385	1386	<2	4	4
	485	1746	2	4	6
	580	2088	4	6	8
315	310	1116	<2	<2	<2
	615	2214	<2	2	4
	770	2772	<2	4	4
	925	3330	2	4	6
400	500	1800	<2	<2	<2
	995	3582	<2	<2	2
	1245	4482	<2	2	4
	1495	5382	<2	4	4

Application

–Circular silencer for the reduction of noise
–Spigot

Dimensions

Dimensional drawing of CS



Dimensions

Nominal size	CS-025 ØD3	CS-050 ØD3	ØD
	mm	mm	mm
80	135	192	79
100	160	212	99
125	191	236	124
160	221	271	159
200	261	311	199
250	311	366	249
315	376	426	314
400	461	511	399

Dimensions

Nominal length	L	L1
	mm	mm
500	650	500
1000	1150	1000
1500	1650	1500

Weight

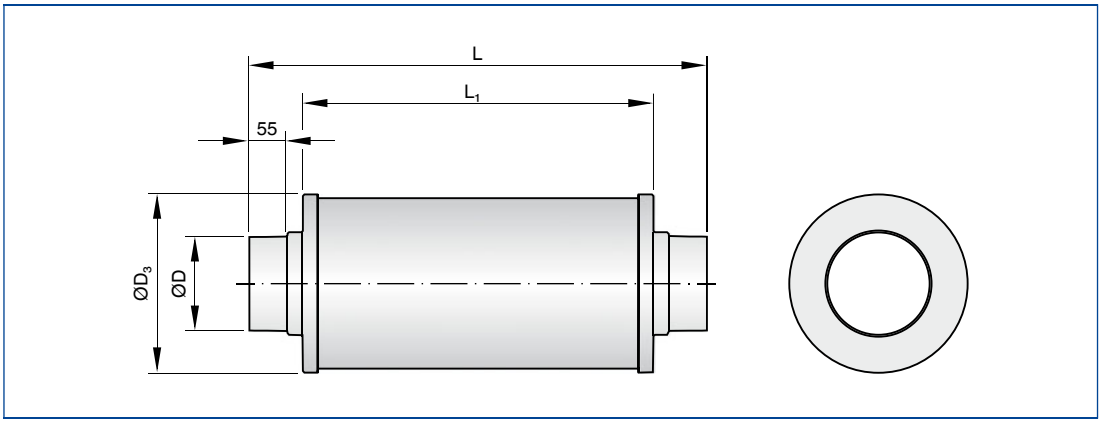
Nominal size	CS-025			CS-050		
	500	1000	1500	500	1000	1500
	m					
	kg	kg	kg	kg	kg	kg
80	1.0	1.8	2.6	1.4	2.6	3.7
100	1.2	2.1	3.1	1.6	2.9	4.2
125	1.4	2.5	3.7	1.9	3.3	4.7
160	1.6	2.9	4.2	2.1	3.8	5.4
200	2.0	3.6	5.2	2.6	4.6	6.5
250	2.5	4.4	6.2	3.1	5.5	7.8
315	2.9	5.2	7.5	3.5	6.2	8.9
400	3.7	6.6	9.4	4.5	7.9	11.3

Application

–Circular silencer for the reduction of noise
–Socket-type spigots to make connections to the ducting

Dimensions

Dimensional drawing of CS/.../AS2



Dimensions

Nominal size	CS-025 ØD3	CS-050 ØD3	ØD
	mm	mm	mm
80	135	192	80
100	160	212	100
125	191	236	125
160	221	271	160
200	261	311	200
250	311	366	250
315	376	426	315
400	461	511	400

Dimensions

Nominal length	L	L1
	mm	mm
500	650	500
1000	1150	1000
1500	1650	1500

Weight

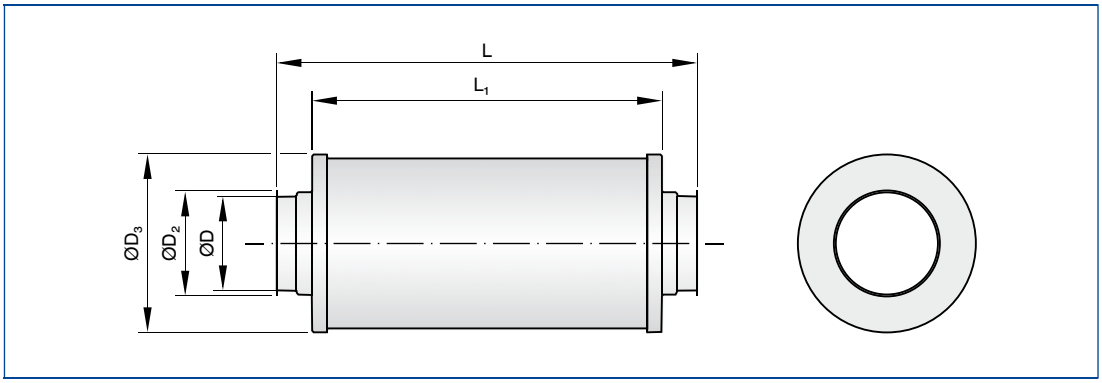
Nominal size	CS-025			CS-050		
	500	1000	1500	500	1000	1500
	m					
	kg	kg	kg	kg	kg	kg
80	1.0	1.8	2.6	1.4	2.6	3.7
100	1.2	2.1	3.1	1.6	2.9	4.2
125	1.4	2.5	3.7	1.9	3.3	4.7
160	1.6	2.9	4.2	2.1	3.8	5.4
200	2.0	3.6	5.2	2.6	4.6	6.5
250	2.5	4.4	6.2	3.1	5.5	7.8
315	2.9	5.2	7.5	3.5	6.2	8.9
400	3.7	6.6	9.4	4.5	7.9	11.3

Application

–Circular silencer for the reduction of noise
–With raised edges to make detachable connections to the ducting

Dimensions

Dimensional drawing of CS/.../BK2



Dimensions

Nominal size	CS-025 ØD3	CS-050 ØD3	ØD	ØD2
	mm	mm	mm	mm
80	135	192	79	93
100	160	212	99	113
125	191	236	124	138
160	221	271	159	173
200	261	311	199	213
250	311	366	249	263
315	376	426	314	328
400	461	511	399	413

Dimensions

Nominal length	L	L1
	mm	mm
500	638	500
1000	1138	1000
1500	1638	1500

Weight

Nominal size	CS-025			CS-050		
	500	1000	1500	500	1000	1500
	m					
	kg	kg	kg	kg	kg	kg
80	1.0	1.8	2.6	1.4	2.6	3.7
100	1.2	2.1	3.1	1.6	2.9	4.2
125	1.4	2.5	3.7	1.9	3.3	4.7
160	1.6	2.9	4.2	2.1	3.8	5.4
200	2.0	3.6	5.2	2.6	4.6	6.5
250	2.5	4.4	6.2	3.1	5.5	7.8
315	2.9	5.2	7.5	3.5	6.2	8.9
400	3.7	6.6	9.4	4.5	7.9	11.3

Standard text

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

Circular silencers for air conditioning systems, rigid construction, available in 8 nominal sizes. Insertion loss measured according to ISO 7235. Casing with acoustic and thermal insulation. Spigot with groove for lip seal, suitable for connecting circular ducts to EN 1506 or EN 13180. Casing air leakage to EN 15727, class D.

Special features

–Insertion loss measured according to ISO 7235
–Absorption material is non-combustible
–Insulation thickness 25 mm or 50 mm

Materials and surfaces

–Casing and perforated inner duct made of aluminium
–Lining is mineral wool
–End pieces made ABS plastic, flammability to UL 94, V-0 (nominal sizes 80 – 125)
–End pieces made of aluminium (nominal sizes 160 – 400)

Mineral wool
–To EN 13501, fire rating class A2, non-combustible
–RAL quality mark RAL-GZ 388
–Biosoluble and hence hygienically safe according to the German TRGS 905 (Technical Rules for Hazardous Substances) and EU directive 97/69/EG
–Inert to fungal and bacterial growth

Technical data

–Nominal sizes: 80 – 400 mm
–Operating pressure: 1000 Pa max.
–Operating temperature: 100 °C max.

Sizing data

–D[mm]
–L[mm]
–Insulation thickness[mm]
–$\dot{V}$[m³/h]
–D_e at 250 Hz[dB]
–Δp_{st}[Pa]

Order options

1 Type
CS Circular silencer

2 Insulation thickness [mm]
☐ **025**25
☐ **050**50

3 Nominal size [mm]
☐ **80**
☐ **100**
☐ **125**
☐ **160**
☐ **200**
☐ **250**
☐ **315**
☐ **400**

4 Nominal length [mm]
☐ **500**
☐ **1000**
☐ **1500**

5 Type of connection
No entry: spigot
☐ **VD2**Spigot with lip seal on both ends
☐ **AS2**Socket-type spigots on both ends
☐ **BK2**Raised edges at both ends

6

Notes

Circular silencers
Type CF

For the reduction of noise in circular ducts, flexible aluminium construction

Circular silencers, in flexible aluminium construction,
for the reduction of noise in the circular ducts of air conditioning systems

- Absorption material is non-combustible mineral wool with RAL quality mark, biosoluble and hence hygienically safe according to the German TRGS 905 (Technical Rules for Hazardous Substances) and EU directive 97/69/EG
- Casing and perforated inner duct made of aluminium
- Variant with spigot has a groove for a lip seal, suitable for connecting circular ducts to EN 1506 or EN 13180
- Insertion loss measured according to ISO 7235
- Casing air leakage to EN 15727, class D

Optional equipment and accessories

- Socket-type spigots on both ends
- Raised edges at both ends
- With lip seals on both ends

HYGIENISCH GETESTET TROX® TECHNIK VDI 6022

Tested to VDI 6022

Description

Flexible circular silencer Type CF

Application
–Flexible circular silencers Type CF for the reduction of noise in the circular ducts of air conditioning systems
–For the reduction of air-regenerated noise of air terminal units LVC and TVR, and of mechanical self-powered controllers RN and VFC
–For the reduction of fan noise
–Can be used as cross talk silencer to reduce the transfer of noise through ducts between neighbouring rooms

Variants
–025: Circular silencer with 25 mm insulation
–050: Circular silencer with 50 mm insulation
–AS2: Circular silencer with socket-type spigots on both ends
–BK2: Circular silencer with raised edges at both ends
–Special versions upon request

Nominal sizes
–80, 100, 125, 160, 200, 250, 315, 400 mm

Accessories
–VD2: Lip seals on both ends (factory fitted)
–AS2: Socket-type spigots on both ends
–BK2: Raised edges at ends

Special features
–Insertion loss measured according to ISO 7235
–Very flexible and consequently suitable for installation in complicated duct systems and restricted spaces
–Absorption material is non-combustible
–Insulation thickness 25 mm or 50 mm

Parts and characteristics
–Casing
–Perforated inner tube
–Absorption material

Construction features
–Circular casing
–Flexible construction
–Spigot suitable for circular ducts to EN 1506 or EN 13180
–Spigot with groove for lip seal
–Operating pressure up to 1000 Pa
–Operating temperature up to 100 °C

Materials and surfaces
–Casing and perforated inner duct made of aluminium
–Lining is mineral wool
–End pieces made ABS plastic, flammability to UL 94, V-0 (nominal sizes 80 – 125)
–End pieces made of aluminium (nominal sizes 160 – 400)

Mineral wool
–To EN 13501, fire rating class A2, non-combustible
–RAL quality mark RAL-GZ 388
–Biosoluble and hence hygienically safe according to the German TRGS 905 (Technical Rules for Hazardous Substances) and EU directive 97/69/EG
–Inert to fungal and bacterial growth

Installation and commissioning
–Any installation orientation
–Bend radius should be no less than 3x outer diameter D_3
–Installation in ducts outside of closed rooms requires sufficient protection against the effects of weather

Standards and guidelines
–Insertion loss measured according to ISO 7235
–Casing air leakage to EN 15727, class D

Maintenance
–Maintenance-free as construction and materials are not subject to wear

Technical data

Nominal sizes	100 – 800 mm
Operating pressure	– 1000 Pa
Operating temperature	– 100 °C

Order code

CF

CF – 025 / 160×1000 / VD2
1 2 3 4 5

1 Type
CF Flexible circular silencer

2 Insulation thickness [mm]
02525
05050

3 Nominal size [mm]
80
100
125
160
200
250
315
400

4 Nominal length [mm]
500
1000
1500
2000

5 Type of connection
No entry: spigot
VD2 Spigot with lip seal on both ends
AS2 Socket-type spigots on both ends
BK2 Raised edges at both ends

Order example

CF 50/160×1000/VD2

Insulation thickness	50 mm
Nominal size	160 mm
Length	1000 mm
Type of connection	Spigot with lip seal on both ends

CS025, CF025 – length L = 500 mm (insulation thickness 25 mm)

Nominal size	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e							
	dB							
80	1	2	4	9	20	16	15	10
100	1	1	4	8	17	14	12	9
125	1	1	3	8	15	11	9	7
160	1	1	2	5	14	10	8	6
200	1	1	2	5	14	9	6	5
250	0	1	2	5	13	8	5	4
315	0	1	1	4	9	7	4	3
400	0	0	1	3	6	5	3	3

CS050, CF050 – length L = 500 mm (insulation thickness 50 mm)

Nominal size	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e							
	dB							
80	4	5	11	20	30	27	16	12
100	3	4	9	17	24	21	12	10
125	2	3	7	14	20	16	11	9
160	2	2	6	12	17	14	8	6
200	1	2	5	12	16	11	6	5
250	1	2	4	12	15	8	5	4
315	1	1	3	9	12	6	4	3
400	1	1	3	7	9	6	4	3

CS025, CF025 – length L = 1000 mm (insulation thickness 25 mm)

Nominal size	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e							
	dB							
80	3	5	10	21	44	46	37	23
100	2	3	8	17	44	34	28	21
125	2	3	7	17	43	30	24	17
160	1	1	4	12	40	27	20	16
200	1	1	3	11	35	22	16	13
250	1	1	3	11	30	19	12	10
315	0	1	3	9	21	10	12	8
400	0	1	3	8	16	8	8	7

CS050, CF050 – length L = 1000 mm (insulation thickness 50 mm)

Nominal size	Centre frequency fm [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e							
	dB							
80	8	14	23	47	50	50	44	27
100	7	10	21	38	50	50	29	22
125	5	7	16	32	50	42	25	22
160	4	5	12	26	47	34	20	16
200	3	5	11	25	45	26	16	13
250	2	4	9	25	40	19	12	10
315	1	4	8	22	28	13	12	8
400	0	4	8	18	23	11	10	7

CS025, CF025 – length L = 1500 mm (insulation thickness 25 mm)

Nominal size	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e							
	dB							
80	3	5	13	28	47	48	44	31
100	2	4	12	24	47	41	34	26
125	2	3	10	22	45	34	28	20
160	2	2	6	16	42	30	25	19
200	2	2	5	15	41	27	19	15
250	1	2	5	15	38	25	14	11
315	1	2	4	12	27	19	13	10
400	1	1	4	10	23	17	11	8

CS050, CF050 – length L = 1500 mm (insulation thickness 50 mm)

Nominal size	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e							
	dB							
80	11	14	33	48	50	50	47	37
100	10	11	27	44	50	50	37	30
125	7	9	21	41	50	46	33	27
160	5	7	17	37	48	42	24	19
200	4	6	14	37	48	34	18	15
250	3	5	11	35	45	25	14	11
315	2	4	10	26	35	19	12	10
400	2	4	9	20	26	17	11	8

CF025 – length L = 2000 mm (insulation thickness 25 mm)

Nominal size	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e							
	dB							
80	3	6	15	35	50	50	50	39
100	2	5	15	30	50	49	41	31
125	2	4	12	28	48	37	32	23
160	2	3	8	20	47	34	28	21
200	1	3	7	19	47	32	20	16
250	1	3	6	17	43	30	15	13
315	1	2	6	14	32	27	13	11
400	1	2	4	10	23	22	11	9

CF050 – length L = 2000 mm (insulation thickness 50 mm)

Nominal size	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e							
	dB							
80	15	15	42	50	50	50	50	47
100	12	12	34	50	50	50	46	37
125	9	11	27	50	50	50	40	31
160	6	9	22	48	50	50	29	21
200	5	8	18	47	50	42	22	18
250	4	6	15	45	50	30	16	13
315	3	4	12	33	41	27	14	11
400	3	3	9	22	29	22	11	9

The stated differential pressures for circular silencers correspond to the values for smooth pipes. Deviations, if any, are of no practical relevance. For ductwork calculation, if the length of a circular silencer is included in the total length of the ductwork, no extra length must be added.

Quick sizing – differential pressure

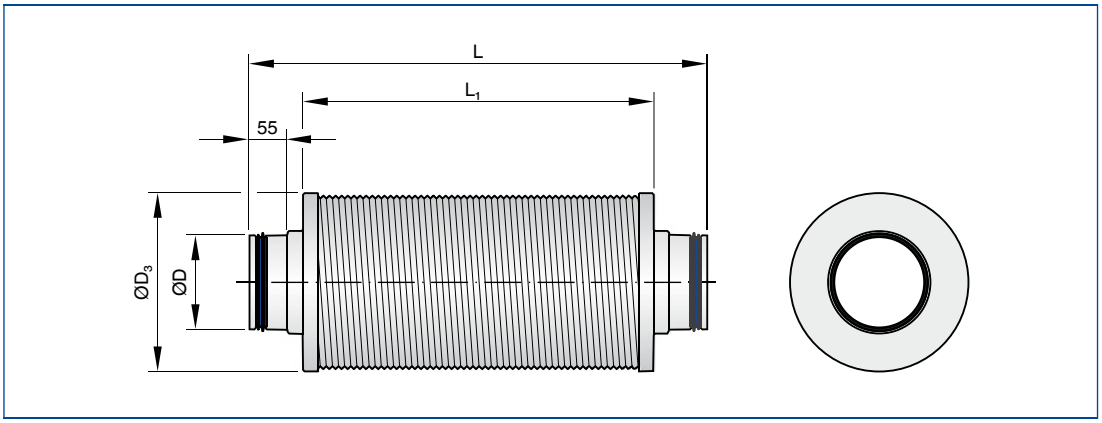
Nominal size	$\dot{V}$		L = 500 mm	L = 1000 mm	L = 1500 mm	L = 2000 mm
			Δp_{st}			
	l/s	m³/h	Pa			
80	20	72	2	4	6	6
	40	144	6	12	16	25
	50	180	8	16	25	35
	55	198	12	25	35	45
100	30	108	2	2	4	5
	60	216	4	8	12	16
	75	270	6	12	18	25
	90	324	8	18	25	35
125	50	180	2	2	4	4
	95	342	4	6	10	12
	120	432	6	10	14	18
	145	522	6	14	20	25
160	80	288	2	2	2	4
	155	558	2	6	8	10
	195	702	4	8	10	14
	235	846	6	10	14	18
200	125	450	2	2	2	2
	245	882	2	4	6	8
	310	1116	4	6	8	10
	370	1332	4	8	10	14
250	195	702	<2	<2	<2	2
	385	1386	<2	4	4	6
	485	1746	2	4	6	8
	580	2088	4	6	8	10
315	310	1116	<2	<2	<2	<2
	615	2214	<2	2	4	4
	770	2772	<2	4	4	6
	925	3330	2	4	6	8
400	500	1800	<2	<2	<2	<2
	995	3582	<2	<2	2	4
	1245	4482	<2	2	4	4
	1495	5382	<2	4	4	6

Application

–Circular silencer for the reduction of noise
–Spigot

Dimensions

Dimensional drawing of CF



Dimensions

Nominal size	CF-025	CF-050	ØD
	ØD3	ØD3	
	mm	mm	mm
80	135	192	79
100	160	212	99
125	191	236	124
160	221	271	159
200	261	311	199
250	311	366	249
315	376	426	314
400	461	511	399

Dimensions

Nominal length	L	L1
	mm	mm
500	650	500
1000	1150	1000
1500	1650	1500
2000	2150	2000

Weight

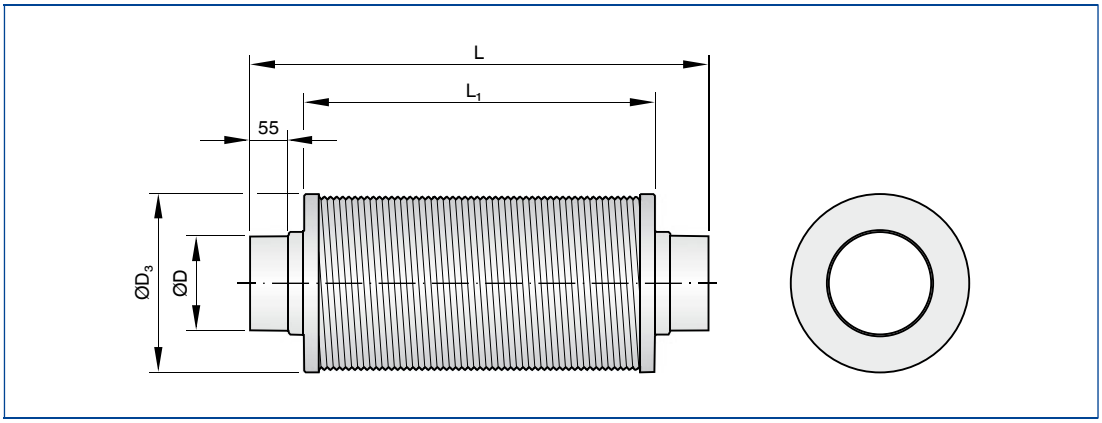
Nominal size	CF-025				CF-050			
	500	1000	1500	2000	500	1000	1500	2000
	m							
	kg	kg	kg	kg	kg	kg	kg	kg
80	0.6	1.0	1.5	1.9	0.9	1.5	2.2	2.8
100	0.8	1.3	1.7	2.2	1.1	1.8	2.5	3.2
125	0.9	1.5	2.1	2.7	1.2	2.0	2.9	3.7
160	1.1	1.8	2.5	3.2	1.4	2.4	3.3	4.3
200	1.3	2.2	3.0	3.9	1.7	2.9	4.0	5.1
250	1.6	2.7	3.7	4.7	2.1	3.5	4.8	6.2
315	1.9	3.2	4.5	5.7	2.4	4.0	5.6	7.2
400	2.5	4.1	5.6	7.2	3.1	5.1	7.1	9.1

Application

–Circular silencer for the reduction of noise
–Socket-type spigots to make connections to the ducting

Dimensions

Dimensional drawing of CF/.../AS2



Dimensions

Nominal size	CF-025	CF-050	ØD
	$ØD_3$	$ØD_3$	
	mm	mm	mm
80	135	192	80
100	160	212	100
125	191	236	125
160	221	271	160
200	261	311	200
250	311	366	250
315	376	426	315
400	461	511	400

Dimensions

Nominal length	L	L_1
	mm	mm
500	650	500
1000	1150	1000
1500	1650	1500
2000	2150	2000

Weight

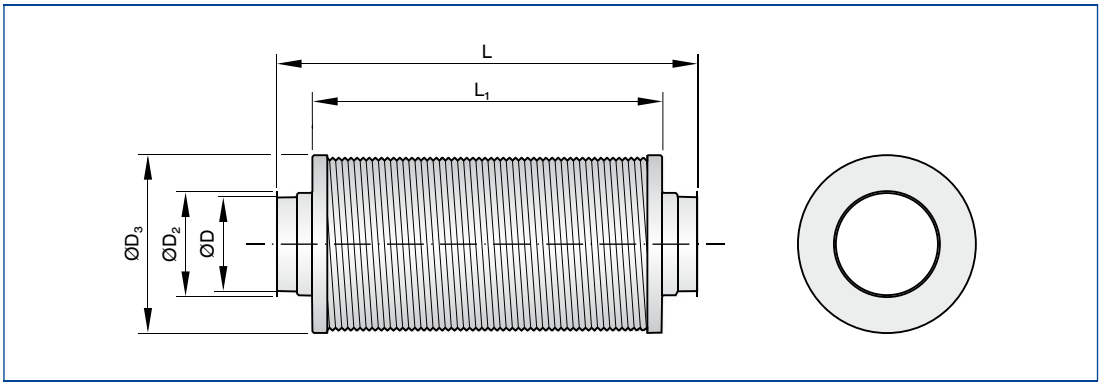
Nominal size	CF-025				CF-050			
	500	1000	1500	2000	500	1000	1500	2000
	m							
	kg	kg	kg	kg	kg	kg	kg	kg
80	0.6	1.0	1.5	1.9	0.9	1.5	2.2	2.8
100	0.8	1.3	1.7	2.2	1.1	1.8	2.5	3.2
125	0.9	1.5	2.1	2.7	1.2	2.0	2.9	3.7
160	1.1	1.8	2.5	3.2	1.4	2.4	3.3	4.3
200	1.3	2.2	3.0	3.9	1.7	2.9	4.0	5.1
250	1.6	2.7	3.7	4.7	2.1	3.5	4.8	6.2
315	1.9	3.2	4.5	5.7	2.4	4.0	5.6	7.2
400	2.5	4.1	5.6	7.2	3.1	5.1	7.1	9.1

Application

–Circular silencer for the reduction of noise
–With raised edges to make detachable connections to the ducting

Dimensions

Dimensional drawing of CF/.../BK2



Dimensions

Nominal size	CF-025 $ØD_3$	CF-050 $ØD_3$	ØD	$ØD_2$
	mm	mm	mm	mm
80	135	192	79	93
100	160	212	99	113
125	191	236	124	138
160	221	271	159	173
200	261	311	199	213
250	311	366	249	263
315	376	426	314	328
400	461	511	399	413

Dimensions

Nominal length	L	L_1
	mm	mm
500	638	500
1000	1138	1000
1500	1638	1500
2000	2138	2000

Weight

Nominal size	CF-025				CF-050			
	500	1000	1500	2000	500	1000	1500	2000
	m							
	kg	kg	kg	kg	kg	kg	kg	kg
80	0.6	1.0	1.5	1.9	0.9	1.5	2.2	2.8
100	0.8	1.3	1.7	2.2	1.1	1.8	2.5	3.2
125	0.9	1.5	2.1	2.7	1.2	2.0	2.9	3.7
160	1.1	1.8	2.5	3.2	1.4	2.4	3.3	4.3
200	1.3	2.2	3.0	3.9	1.7	2.9	4.0	5.1
250	1.6	2.7	3.7	4.7	2.1	3.5	4.8	6.2
315	1.9	3.2	4.5	5.7	2.4	4.0	5.6	7.2
400	2.5	4.1	5.6	7.2	3.1	5.1	7.1	9.1

Standard text

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

Circular silencers for air conditioning systems, flexible construction, available in 8 nominal sizes. Insertion loss measured according to ISO 7235. Casing with acoustic and thermal insulation. Spigot with groove for lip seal, suitable for connecting circular ducts to EN 1506 or EN 13180. Casing air leakage to EN 15727, class D.

Special features

–Insertion loss measured according to ISO 7235
–Very flexible and consequently suitable for installation in complicated duct systems and restricted spaces
–Absorption material is non-combustible
–Insulation thickness 25 mm or 50 mm

Materials and surfaces

–Casing and perforated inner duct made of aluminium
–Lining is mineral wool
–End pieces made ABS plastic, flammability to UL 94, V-0 (nominal sizes 80 – 125)
–End pieces made of aluminium (nominal sizes 160 – 400)

Mineral wool
–To EN 13501, fire rating class A2, non-combustible
–RAL quality mark RAL-GZ 388
–Biosoluble and hence hygienically safe according to the German TRGS 905 (Technical Rules for Hazardous Substances) and EU directive 97/69/EG
–Inert to fungal and bacterial growth

Technical data

–Nominal sizes: 80 – 400 mm
–Operating pressure: 1000 Pa max.
–Operating temperature: 100 °C max.

Sizing data

–D[mm]
–L[mm]
–Insulation thickness[mm]
–$\dot{V}$[m³/h]
–D_e at 250 Hz[dB]
–Δp_{st}[Pa]

6

Order options

1 Type
CF Flexible circular silencer

2 Insulation thickness [mm]
☐ **025**25
☐ **050**50

3 Nominal size [mm]
☐ **80**
☐ **100**
☐ **125**
☐ **160**
☐ **200**
☐ **250**
☐ **315**
☐ **400**

4 Nominal length [mm]
☐ **500**
☐ **1000**
☐ **1500**
☐ **2000**

5 Type of connection
No entry: spigot
☐ **VD2**Spigot with lip seal on both ends
☐ **AS2**Socket-type spigots on both ends
☐ **BK2**Raised edges at both ends

Circular silencers
Type CAK

For the reduction of noise in plastic circular ducts for contaminated air

Plastic circular silencers for the reduction of noise in the circular ducts of extract air systems for aggressive media

- Absorption material is non-combustible mineral wool with RAL quality mark, biosoluble and hence hygienically safe according to the German TRGS 905 (Technical Rules for Hazardous Substances) and EU directive 97/69/EG
- Mineral wool faced with glass fibre as protection against erosion due to airflow velocities up to 20 m/s
- Casing and perforated inner duct are flame-resistant polypropylene (PPs) to DIN 4102, building class B1
- Variant with spigot suitable for circular ducts according to DIN 8077 or DIN 8078
- Insertion loss measured according to ISO 7235
- Casing air leakage to EN 15727, class D

Optional equipment and accessories

- With flanges on both ends

HYGIENISCH GETESTET TROX® TECHNIK VDI 6022

Tested to VDI 6022

Description

Circular silencer
Type CAK

Application
–Plastic circular silencers Type CAK
for the reduction of noise in the circular ducts
of air conditioning systems
–Suitable for contaminated air
–For the reduction of air-regenerated noise
of air terminal units TVRK and TVLK
–For the reduction of fan noise

Variants
–CAK: Circular silencer
–VF2: Circular silencer with flanges
on both ends

Nominal sizes
–125, 160, 200, 250, 315, 400 mm

Accessories
–GZ: Matching flanges for both ends

Special features
–Insertion loss measured according to ISO 7235
–Absorption material is non-combustible

Parts and characteristics
–Casing
–Perforated inner tube
–Absorption material

Construction features
–Circular casing
–Spigot suitable for circular ducts according
to DIN 8077 or DIN 8078
–Maximum operating pressure 1000 Pa
–Operating temperature 10 to 100 °C

Materials and surfaces
–Casing and perforated inner duct
are flame-resistant polypropylene (PPs)
to DIN 4102, building class B1
–Lining is mineral wool

Mineral wool
–To EN 13501, fire rating class A2,
non-combustible
–RAL quality mark RAL-GZ 388
–Biosoluble and hence hygienically safe
according to the German TRGS 905
(Technical Rules for Hazardous Substances)
and EU directive 97/69/EG
–Faced with glass fibre as protection against
erosion through airflow velocities up to 20 m/s
–Inert to fungal and bacterial growth

Installation and commissioning
–Any installation orientation
–Installation in ducts outside of closed rooms
requires sufficient protection against
the effects of weather

Standards and guidelines
–Insertion loss measured according to ISO 7235
–Casing air leakage to EN 15727, class D

Maintenance
–Maintenance-free as construction
and materials are not subject to wear

Technical data

Nominal sizes	125 – 400 mm
Operating pressure	– 1000 Pa
Operating temperature	– 100 °C

Order code

CAK

CAK / 160×1000 / GZ / VF2
1 2 3 4 5

1 Type
CAK Circular silencer

2 Nominal size [mm]
125
160
200
250
315
400

3 Length [mm]
500
1000
1500

4 Matching flange
No entry: none
GZon both ends (only VF2)

5 Type of connection
No entry: spigot
VF2 Flanges on both ends

Order example

CAK/200×1000

Nominal size	200 mm
Length	1000 mm
Type of connection	Spigot

Length L = 500 mm

Nominal size	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e							
	dB							
125	1	6	7	14	25	23	14	12
160	0	3	5	11	22	21	12	10
200	0	2	4	10	21	17	10	8
250	0	2	4	9	19	13	9	8
315	0	2	3	8	18	12	7	6
400	0	2	3	6	14	8	6	4

Length L = 1000 mm

Nominal size	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e							
	dB							
125	2	9	13	22	34	35	24	16
160	1	4	9	18	30	31	19	13
200	1	4	9	15	29	25	16	11
250	0	4	8	14	26	22	15	11
315	0	4	6	14	26	17	11	8
400	0	3	6	11	25	13	10	7

Length L = 1500 mm

Nominal size	Centre frequency f_m [Hz]							
	63	125	250	500	1000	2000	4000	8000
	D_e							
	dB							
125	3	12	19	31	42	43	33	20
160	2	7	13	25	38	41	27	17
200	1	6	12	21	36	33	20	14
250	1	6	11	20	35	30	20	15
315	1	6	9	19	34	23	15	10
400	1	4	8	16	29	15	11	8

The stated differential pressures for circular silencers correspond to the values for smooth pipes. Deviations, if any, are of no practical relevance. For ductwork calculation, if the length of a circular silencer is included in the total length of the ductwork, no extra length must be added.

Quick sizing – differential pressure

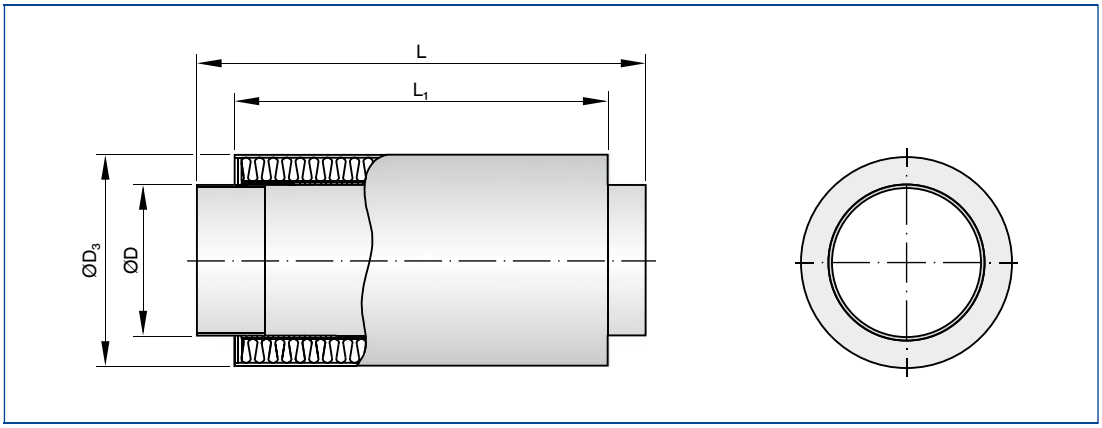
Nominal size	$\dot{V}$		L = 500 mm	L = 1000 mm	L = 1500 mm
			Δp_{st}		
	l/s	m³/h	Pa		
125	50	180	2	2	4
	95	342	4	6	10
	120	432	6	10	14
	145	522	6	14	20
160	80	288	2	2	2
	155	558	2	6	8
	195	702	4	8	10
	235	846	6	10	14
200	125	450	2	2	2
	245	882	2	4	6
	310	1116	4	6	8
	370	1332	4	8	10
250	195	702	<2	<2	<2
	385	1386	<2	4	4
	485	1746	2	4	6
	580	2088	4	6	8
315	310	1116	<2	<2	<2
	615	2214	<2	2	4
	770	2772	<2	4	4
	925	3330	2	4	6
400	500	1800	<2	<2	<2
	995	3582	<2	<2	2
	1245	4482	<2	2	4
	1495	5382	<2	4	4

Application

–Circular silencer for the reduction of noise
–Spigot

Dimensions

Dimensional drawing of CAK



Dimensions

Nominal size	ØD	ØD3
	mm	mm
125	125	225
160	160	250
200	200	280
250	250	355
315	315	415
400	400	500

Dimensions

Nominal length	L	L1
	mm	mm
500	595	495
1000	1095	995
1500	1595	1495

Weight

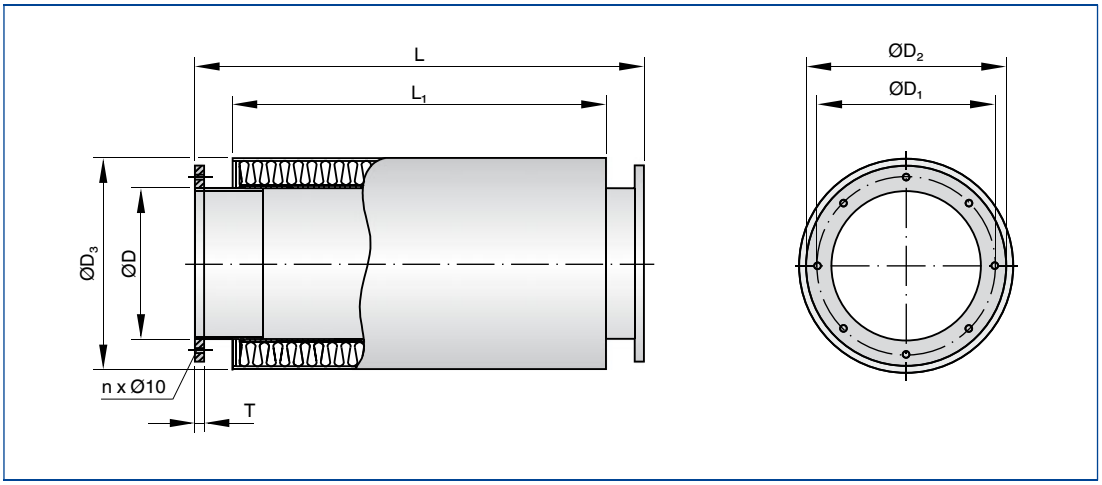
Nominal size	500	1000	1500
	m	m	m
	kg	kg	kg
125	2	4	6
160	3	5	7
200	3	6	9
250	4	8	11
315	5	9	13
400	5	9	13

Application

–Circular silencer for the reduction of noise
–With flanges to make detachable connections to the ductwork

Dimensions

Dimensional drawing of CAK/.../VF2



Dimensions

Nominal size	ØD	ØD3	ØD1	ØD2	n	T
	mm	mm	mm	mm		mm
125	125	225	165	185	8	8
160	160	250	200	230	8	8
200	200	280	240	270	8	8
250	250	355	290	320	12	8
315	315	415	350	395	12	10
400	400	500	445	475	16	10

Dimensions

Nominal length	L	L1
	mm	mm
500	595	495
1000	1095	995
1500	1595	1495

Weight

Nominal size	500	1000	1500
	m	m	m
	kg	kg	kg
125	3	4	6
160	3	5	7
200	4	6	9
250	5	8	12
315	5	9	14
400	7	11	15

Standard text

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

Plastic circular silencers for use in extract air systems subject to aggressive media; they reduce the air-regenerated noise in plastic ducts (absorption principle). Insertion loss measured according to ISO 7235. Absorption material is mineral wool with RAL quality mark RAL-GZ 388. Spigot, suitable for ducts according to DIN 8077. Casing air leakage to EN 15727, class D.

Special features
–Insertion loss measured according to ISO 7235
–Absorption material is non-combustible

Materials and surfaces
–Casing and perforated inner duct are flame-resistant polypropylene (PPs) to DIN 4102, building class B1
–Lining is mineral wool

Mineral wool
–To EN 13501, fire rating class A2, non-combustible
–RAL quality mark RAL-GZ 388
–Biosoluble and hence hygienically safe according to the German TRGS 905 (Technical Rules for Hazardous Substances) and EU directive 97/69/EG
–Faced with glass fibre as protection against erosion through airflow velocities up to 20 m/s
–Inert to fungal and bacterial growth

Technical data
–Nominal sizes: 125 – 400 mm
–Operating pressure: 1000 Pa max.
–Operating temperature: 100 °C max.

Sizing data
–D[mm]
–L[mm]
–Insulation thickness[mm]
–$\dot{V}$[m³/h]
–D_e at 250 Hz[dB]
–Δp_{st}[Pa]

Order options

1 Type
CAK Circular silencer

2 Nominal size [mm]
☐ **125**
☐ **160**
☐ **200**
☐ **250**
☐ **315**
☐ **400**

3 Length [mm]
☐ **500**
☐ **1000**
☐ **1500**

4 Matching flange
No entry: none
☐ **GZ**on both ends (only VF2)

5 Type of connection
No entry: spigot
☐ **VF2**Flanges on both ends

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Sound attenuators

Basic information and nomenclature

- Product selection
- Principal dimensions
- Nomenclature
- Sizing and sizing example

Product selection

	Type									
	Splitter sound attenuators		Splitters			Circular silencers				
	MSA	XSA	MKA	XKA	RKA	CA	CB	CS	CF	CAK
Sound attenuator casing										
Rectangular	●	●								
Circular						●	●	●	●	●
Galvanised sheet steel	●	●				●	●			
Aluminium								●	●	
Plastic										●
Splitters										
Absorption	●	●	●	●			●			
Resonance	●		●		●					
Duct connection										
Standard flange	●	●								
Angle section frame	●	●								
Spigot						●	●	●	●	●
Flange on one end						●	●			
Flanges on both ends						●	●			●
Socket-type spigots on both ends								●	●	
Raised edges at both ends								●	●	
Nominal sizes										
Diameter						100 – 800 mm	250 – 1000 mm	80 – 400 mm		110 – 400 mm
Width	140 – 2400 mm									
Increment	1 mm									
Width subdivided	– 4800 mm									
Height	300 – 1800 mm									
Increment	1 mm									
Height subdivided	– 4800 mm									
Length	500 – 1500 mm									
Increment	1 mm									
Length subdivided	– 3000 mm									
Splitter surface										
Glass fibre fabric	●	●	●	●						
Glass fibre fabric and perforated metal facing	●	●	●	●						
●	Possible									
	Not possible									

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Principal dimensions

ØD [mm]
Outside diameter of the connecting spigot

$ØD_3$ [mm]
Outer diameter of circular silencers

L [mm]
Length of attenuator/silencer including spigot (in airflow direction)

L_1[mm]
Length of acoustic cladding

B [mm]
Duct width

H [mm]
Duct height

n [ ]
Number of flange screw holes

m [kg]
Weight

Nomenclature

f_m [Hz]
Octave band centre frequency

L_{WA} [dB(A)]
A-weighted sound pressure level of air-regenerated noise

D_e [dB(A)]
Insertion loss

$\dot{V}$ [m³/h] and [l/s]
Volume flow rate

Δp_{st} [Pa]
Static differential pressure

All sound power levels are based on 1 pW.

Sizing with the help of this catalogue

This catalogue provides convenient quick sizing tables for sound attenuators. The insertion loss values are provided for splitters of any thickness. Sound power levels of the air-regenerated noise and differential pressures are given for various airflow velocities. Sizing data for other dimensions, insertion loss values, volume flow rates and differential pressures can be determined quickly and precisely using the Easy Product Finder design programme.

Sizing example

Given data

Duct B = 800 mm, H = 900 mm
$\dot{V}$ = 2900 l/s (10440 m^3/h)
D_e = 30 dB at 250 Hz

Quick sizing

MSA-200 L = 1000 mm, S = 50 mm

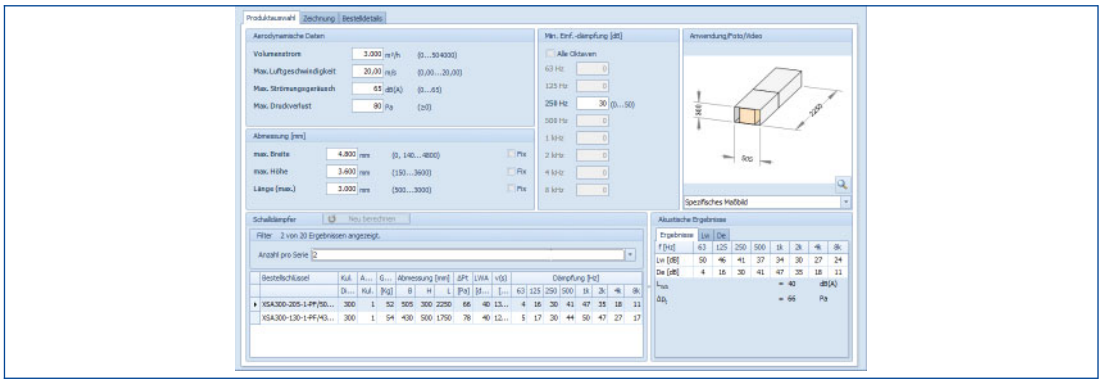
Calculation procedure

A = 0.800 × 0.9 = 0.72 m^2
v = $\dot{V}$/A = 2900/0.72 (/1000) = 4.0 m/s
Δp_{st} = 12 Pa
L_{WA} = 21 dB(A)

Easy Product Finder

The Easy Product Finder allows you to size products using your project-specific data.

You will find the Easy Product Finder on our website.



Disclaimer

Disclaimer
The information provided in this product catalogue is without obligation and does in particular not constitute a guarantee of the properties of a product. The described applications are not binding but are rather meant for general information as they may vary from case to case. The products and systems shown are examples. Some products and systems shown may have been designed for individual customers and hence represent customised solutions. Some of these products and systems come with special parts or equipment that is only available at a surcharge. Technical data is subject to change due to the results of ongoing research and development. The information regarding the scope of delivery, appearance, performance, dimensions, and weights was correct at the time of going to press. For up-to-date information please refer to our website www.troxtechnik.com. Feature requests are binding only if they are included in the sales contract. Terms of delivery and technical details are subject to change. All business relationships with TROX GmbH are subject to our General Terms and Conditions valid at that time. These Terms and Conditions are available on our website http://www.trox.de/de/site_services/dpt/index.html. Alternatively, we will send them to you upon request. This edition replaces all previous editions.

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Multileaf dampers
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2014

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