Multileaf dampers
Type JZ-HL-AL

Multileaf dampers made of aluminium 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 1200 × 1000 mm
- Closed blade air leakage to EN 1751, class 2
- Casing air leakage to EN 1751, class C
- Aerofoil opposed action blades
- Blades interconnected by gears
- Available in standard sizes and many intermediate sizes

Optional equipment and accessories

- Actuators: Open/Close actuators, modulating actuators
- Powder-coated construction
- Anodised construction

Opposed blades

Type		Page
JZ-HL-AL	General information	HLAL – 2
	Function	HLAL – 4
	Technical data	HLAL – 5
	Quick sizing	HLAL – 6
	Specification text	HLAL – 7
	Order code	HLAL – 8
	Attachments	HLAL – 9
	Dimensions and weight	HLAL – 11
	Product details	HLAL – 13
	Installation details	HLAL – 15
	Basic information and nomenclature	HLAL – 16

Application

Application
- Multileaf dampers of Type JZ-HL-AL 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
- Powder-coated construction

Special characteristics
- 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

Classification
Closed blade air leakage to EN 1751
Test pressure up to 2000 Pa
- Class 2

Nominal sizes
- B: 200 – 1200 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 mm
- Any combination of B × H

Description

Parts and characteristics
- Ready-to-install shut-off damper
- Blades with gears
- Drive arm
- Quadrant stay with blade position indicator

- Operating temperature 0 – 60 °C

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

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

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 (not for attachment ZS99)
- With drive shaft as an attachment: For the position of the drive shaft see 'Dimensions and weight'
- With actuator as an attachment: The actuator is attached to either the first blade from the top (with up to 3 blades) or to the third blade from the top (with 4 or more blades)
- Blade tip seals

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

Standards and guidelines
- Casing air leakage to EN 1751, class C
- Meets the general requirements of DIN 1946, part 4, with regard to the acceptable 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

Functional description

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-HL-AL

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

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.

Nominal sizes	200 × 100 mm – 1200 × 1000 mm
Maximum static differential pressure for a closed multileaf damper	2000 Pa
Operating temperature	0 – 60 °C

JZ-HL-AL, minimum torque

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 – 1000	10	10	10	10	10	10	10	10	10	10

Aluminium multileaf dampers, free area

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	0.190
300, 350	0.043	0.067	0.091	0.115	0.140	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	0.610	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	0.200	0.273	0.346	0.419	0.492	0.565	0.638	0.711	0.784	0.857
1000	0.142	0.223	0.304	0.385	0.466	0.547	0.628	0.709	0.790	0.871	0.952

Intermediate sizes: Intermediate widths can be interpolated

JZ-HL-AL, sound power level for a closed multileaf damper

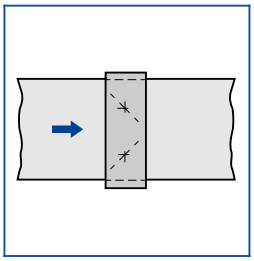
Δp_{st}	Area [m^2]								
	0.04	0.09	0.16	0.25	0.36	0.64	0.81	1	1.2
	L_{WA}								
Pa	dB(A)								
100	28	32	34	36	38	40	41	42	43
200	37	41	44	46	47	50	51	51	52
500	49	53	56	58	59	>60	>60	>60	>60
1000	59	>60	>60	>60	>60	>60	>60	>60	>60
1500	>60	>60	>60	>60	>60	>60	>60	>60	>60
2000	>60	>60	>60	>60	>60	>60	>60	>60	>60

Quick sizing 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).

JZ-HL-AL, quick sizing – differential pressure and sound power level

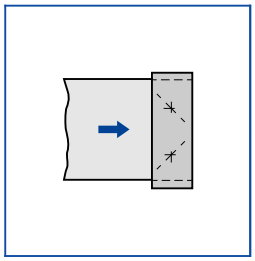
v	Damper blade position α									
	OPEN		20°		40°		60°		80°	
	Δp_{st}	L_{WA}	Δp_{st}	L_{WA}	Δp_{st}	L_{WA}	Δp_{st}	L_{WA}	Δp_{st}	L_{WA}
m/s	Pa	dB(A)	Pa	dB(A)	Pa	dB(A)	Pa	dB(A)	Pa	dB(A)
0.5	<5	<30	<5	<30	<5	<30	22	42	245	67
1	<5	<30	<5	<30	8	35	90	58	985	83
2	<5	<30	<5	32	32	51	350	74	>2000	>90
4	<5	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

Installation type A



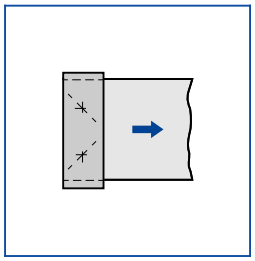
Ducts on both sides

Installation type B



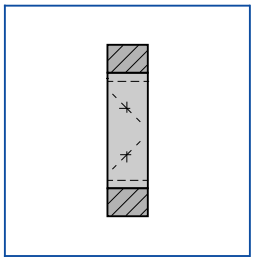
Air discharge

Installation type C



Air intake

Installation type D



Air transfer

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.
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 2.
Casing air leakage to EN 1751, class C.

Special characteristics

– 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

Materials and surfaces

– Casing and blades made of extruded aluminium sections
– Shafts, bearing plate and position indicator made of galvanised steel
– Blade tip seals made of PE/PTV plastic
– P1: Powder-coated, RAL CLASSIC colour
– PS: Powder-coated, DB colour

– S3: Anodised to EURAS standard, E6-C-0

Technical data

– Nominal sizes:
200 × 100 mm – 1200 × 1000 mm
– Maximum static differential pressure for a closed multileaf damper: 2000 Pa

– Operating temperature: 0 to 60 °C

Sizing data

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

JZ–HL–AL

JZ – HL – AL / 1200×800 / ER / Z64 / NO / P1 – RAL ...
1 2 3 4 5 6

1 Type
JZ-HL-AL Low-leakage multileaf damper made of aluminium, closed blade air leakage to EN 1751, class 2

2 Nominal size [mm]
B × H

3 Installation subframe
No entry: none
ER With installation subframe

4 Attachments
Z04 Quadrant stay
Z05 – Z07 Quadrant stay and limit switches
Z12 – Z51 Actuators
ZF01 – ZF15 Spring return actuators
Z60 – Z77 Pneumatic actuators

5 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

6 Surface
No entry: standard construction
P1 Powder-coated, specify RAL CLASSIC colour
PS Powder-coated, specify 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-HL-AL/800×500/Z04/S3

Nominal size	800 × 500 mm
Installation subframe	Without
Attachments	Quadrant stay
Surface	Anodised to EURAS standard, E6-C-0, natural colour

Quadrant stays and limit switches

Order code detail	Meaning	Limit switch	Function
Z04	Quadrant stay	–	
Z05	Quadrant stay	1	Damper blade position CLOSED
Z06	Quadrant stay	1	Damper blade position OPEN
Z07	Quadrant stay	2	Damper blade positions CLOSED nad OPEN

Open/Close actuators

Order code detail	Meaning	Function	Supply voltage	Torque	Auxiliary switch
Z12	SM230A	–1-wire-control –2-wire-control (3-point)	100 – 240 V AC	20 Nm	–
Z14	SM24A	–1-wire-control –2-wire-control (3-point)	24 V AC/DC	20 Nm	–
Z16	SM230A	–1-wire-control –2-wire-control (3-point)	100 – 240 V AC	20 Nm	S2A
Z18	SM24A	–1-wire-control –2-wire-control (3-point)	24 V AC/DC	20 Nm	S2A
Z42	LM230A	–1-wire-control –2-wire-control (3-point)	100 – 240 V AC	5 Nm	–
Z43	NM230A	–1-wire-control –2-wire-control (3-point)	100 – 240 V AC	10 Nm	–
Z44	LM24A	–1-wire-control –2-wire-control (3-point)	24 V AC/DC	5 Nm	–
Z45	NM24A	–1-wire-control –2-wire-control (3-point)	24 V AC/DC	10 Nm	–
Z46	LM230A	–1-wire-control –2-wire-control (3-point)	100 – 240 V AC	5 Nm	S2A
Z47	NM230A	–1-wire-control –2-wire-control (3-point)	100 – 240 V AC	10 Nm	S2A
Z48	LM24A	–1-wire-control –2-wire-control (3-point)	24 V AC/DC	5 Nm	S2A
Z49	NM24A	–1-wire-control –2-wire-control (3-point)	24 V AC/DC	10 Nm	S2A

Minimum torque of multileaf damper has to be considered when selecting the actuator.

Open/Close actuators, fast-running

Order code detail	Meaning	Function	Supply voltage	Torque	Auxiliary switch
ZS21	SMQ24A	–1-wire-control	24 V AC/DC	16 Nm	–
ZS22	SMQ24A	–1-wire-control	24 V AC/DC	16 Nm	S2A

Open/Close actuators, spring return

Order code detail	Meaning	Function	Supply voltage	Torque	Auxiliary switch
ZF01	NF24A	Supply voltage on/off	24 V AC/DC	10 Nm	–
ZF02	NFA	Supply voltage on/off	24 – 240 V AC 24 – 125 V DC	10 Nm	–
ZF03	NF24A-S2	Supply voltage on/off	24 V AC/DC	10 Nm	integrated
ZF04	NFA-S2	Supply voltage on/off	24 – 240 V AC 24 – 125 V DC	10 Nm	integrated

Modulating actuators

Order code detail	Meaning	Function	Supply voltage	Torque	Auxiliary switch
Z20	SM24A-SR	2 – 10 V DC	24 V AC/DC	20 Nm	–
Z50	LM24A-SR-F	2 – 10 V DC	24 V AC/DC	5 Nm	–
Z51	NM24A-SR	2 – 10 V DC	24 V AC/DC	10 Nm	–

Minimum torque of multileaf damper has to be considered when selecting the actuator.

Modulating actuators, spring return

Order code detail	Meaning	Function	Supply voltage	Torque	Auxiliary switch
ZF05	NF24A-SR	2 – 10 V DC	24 V AC/DC	10 Nm	–

Double acting pneumatic actuators

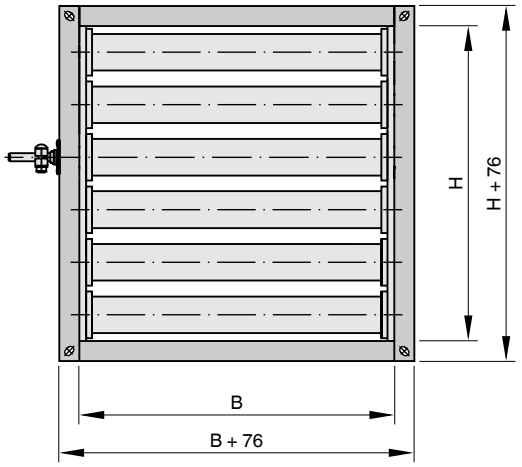
Order code detail	Meaning	Damper blade safety function	Operating pressure	Torque at 6 bar	Limit switch	Solenoid valve
Z60	DR030	–	1.2 – 6 bar	35 Nm	–	–
Z61	DR030	Power off to close/open	1.2 – 6 bar	35 Nm	–	24 V DC
Z62	DR030	Power off to close/open	1.2 – 6 bar	35 Nm	–	230 V AC
Z63	DR030	–	1.2 – 6 bar	35 Nm	2	
Z64	DR030	Power off to close/open	1.2 – 6 bar	35 Nm	2	24 V DC
Z65	DR030	Power off to close/open	1.2 – 6 bar	35 Nm	2	230 V AC
Z66	DR060	–	1.2 – 6 bar	70 Nm	–	
Z67	DR060	Power off to close/open	1.2 – 6 bar	70 Nm	–	24 V DC
Z68	DR060	Power off to close/open	1.2 – 6 bar	70 Nm	–	230 V AC
Z69	DR060	–	1.2 – 6 bar	70 Nm	2	
Z70	DR060	Power off to close/open	1.2 – 6 bar	70 Nm	2	24 V DC
Z71	DR060	Power off to close/open	1.2 – 6 bar	70 Nm	2	230 V AC

Z60 – Z65: At 1.2 bar operating pressure only up to height H ≤ 650 mm

Single acting pneumatic actuators

Order code detail	Meaning	Damper blade safety function	Operating pressure	Torque at 6 bar	Limit switch	Solenoid valve
Z72	SC060 SO060	Pressure off to close/open	6 bar	30 Nm		
Z73	SC060 SO060	Power off and pressure off to close/open	6 bar	30 Nm		24 V DC
Z74	SC060 SO060	Power off and pressure off to close/open	6 bar	30 Nm		230 V AC
Z75	SC060 SO060	Pressure off to close/open	6 bar	30 Nm	2	
Z76	SC060 SO060	Power off and pressure off to close/open	6 bar	30 Nm	2	24 V DC
Z77	SC060 SO060	Power off and pressure off to close/open	6 bar	30 Nm	2	230 V AC

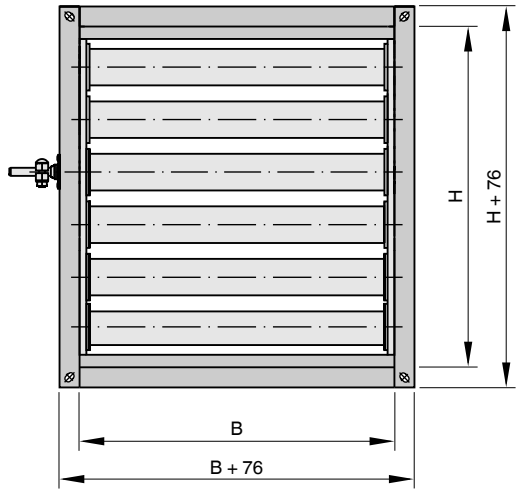
JZ-HL-AL, standard sizes



JZ-AL, JZ-HL-AL, standard sizes

H	No. of blades	Position of drive shaft	
		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

JZ-HL-AL, intermediate sizes



JZ-AL, JZ-HL-AL, intermediate sizes

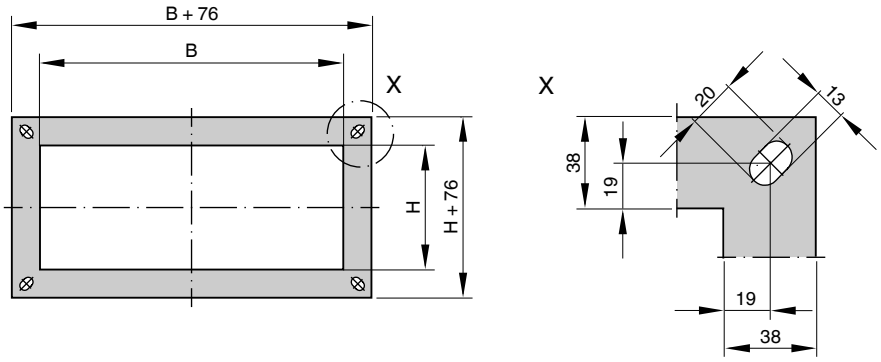
H	No. of blades	Position of drive shaft	
		X	Blade
mm	–	mm	–
150	1	50	1
250	2	50	1
350	3	50	1
450	4	250	3
550	5	250	3
650	6	250	3
750	7	250	3
850	8	250	3
950	9	250	3

JZ-HL-AL, weight

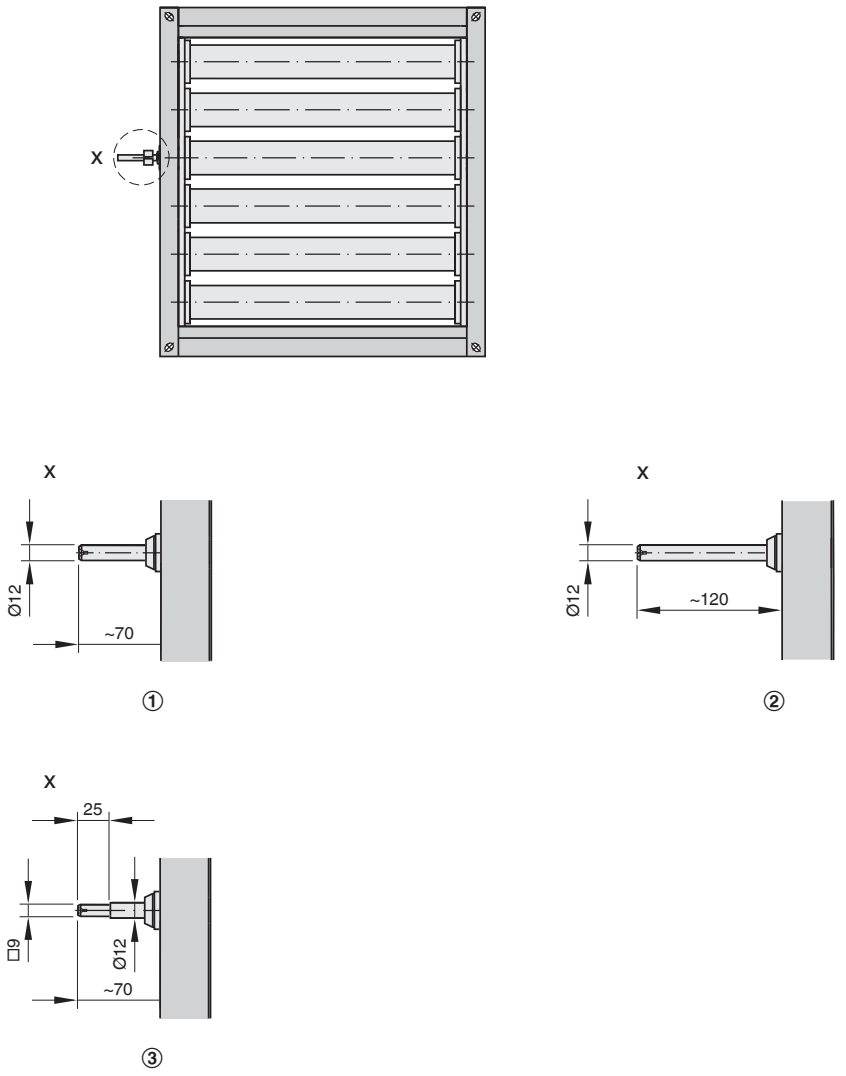
H	B [mm]	B [mm]			B [mm]						
	200	300	400	500	600	700	800	900	1000	1100	1200
mm	kg										
100	2	2	2	3	3	3	3	3	3	4	4
200	3	3	3	4	4	4	4	4	5	5	5
300	3	4	4	4	5	5	5	6	6	6	7
400	4	4	5	5	6	6	6	7	7	8	8
500	4	5	5	6	6	7	8	8	9	9	10
600	5	5	6	7	7	8	9	9	10	11	11
700	5	6	7	7	8	9	10	11	11	12	13
800	6	6	7	8	9	10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

– Drive shafts (special accessory) upon request

Aluminium multileaf dampers, corner holes



JZ-LL-AL, JZ-HL-AL, drive shafts

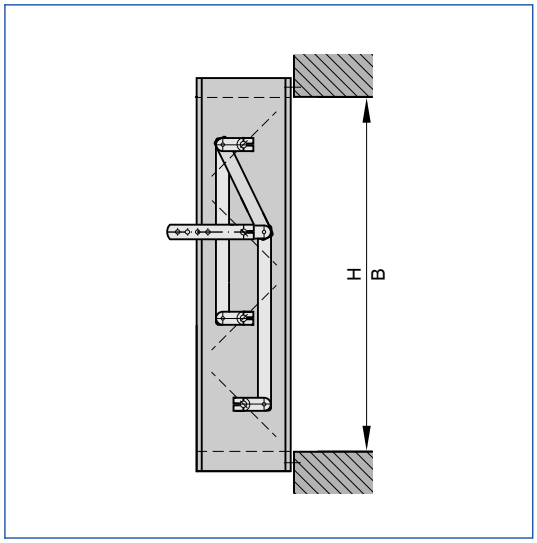


① Standard shaft
② ZS99 – extended drive shaft
③ ZS991 – square shaft 9 mm

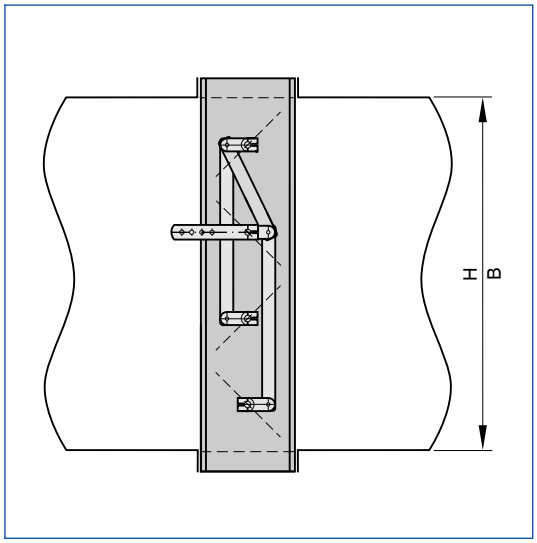
Installation and commissioning

- With horizontal or vertical blades
- With or without installation subframe
- Torsion-free installation
- Only for installation in internal spaces

Wall installation without installation subframe



Duct installation



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 power 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.