MULTILEAF DAMPER,
VARIANT JZ-LL-A2

Multileaf damper with actuator

OPPOSED BLADES

Opposed blades

JZ-LL

FOR EXTREMELY LOW-LEAKAGE SHUT-OFF IN VENTILATION AND AIR CONDITIONING SYSTEMS

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

- Maximum dimensions 2000 × 1995 mm
- Closed multileaf damper air leakage to EN 1751, classes 3 – 4, depending on size
- Casing air leakage to EN 1751, class C
- Aerofoil opposed action blades
- Closed cell side seals meet increased hygiene requirements
- Blades interconnected by external linkage
- 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
- Powder-coated construction

General information

Application

- Stainless steel and 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

- 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

Nominal sizes

- B: 200 – 2000 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 – 1995 in increments of 1 mm, except for standard size H - 1 mm, H + 1 mm, H + 2 mm)
- Height subdivided (HM): 1999 – 4066 mm, in increments of 1 mm
- Any combination of B × H

Variants

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

Constructions

- Duct connection
- Corner holes on both sides
- G: Flange holes on both sides

Bearings

- Plastic bearings, operating temperature 0 – 100 °C
- M: Brass bearings, operating temperature 0 – 100 °C
- E: Stainless steel bearings, operating temperature 0 – 100 °C

Blades

- Only for steel multileaf dampers with brass or stainless steel bearings (JZ-...-M, JZ-...-E)
- V: Reinforced blades available as from width 800 mm

Parts and characteristics

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

Attachments

- Quadrant stays and limit switches: Quadrant stays to adjust the damper blades (infinite adjustment) and for capturing the end positions
- Open/close actuators: Actuators for opening and closing multileaf dampers
- Modulating actuators: Actuators for infinite blade 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

Construction features

- Rectangular casing, welded (P1: casing with screws), material thickness galvanised steel 1.25 mm, stainless steel A2 = 1.2 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
- Damper blade shafts, Ø12 mm, with notch to indicate the damper 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 always attached to the second blade from the top
- Travel stop (angle section) ensures tight closure of the top and bottom blades
- Blade tip seals and side seals
- The construction and selection of materials comply with the criteria stipulated in European directives, referred to as ATEX (for use in potentially explosive atmospheres) for variants with brass or stainless steel bearings (-M, -E)

Material and surfaces

- Casing and blades made of galvanised sheet steel or stainless steel
- Blade shafts, drive arm and external linkage made of galvanised steel or stainless steel
- Plastic, brass or stainless steel bearings
- 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, DB colour

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 multileaf damper air leakage
- Multileaf damper sizes from B = 600 mm meet the increased requirements of DIN 1946, Part 4, with regard to the maximum closed multileaf damper air leakage

Maintenance

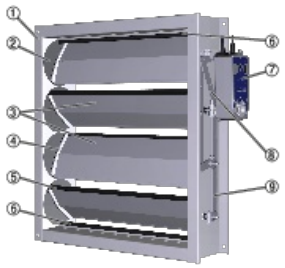
- Maintenance-free as construction and materials are not subject to wear
- Contamination should be removed as it may lead to corrosion and to increased closed multileaf damper air leakage

TECHNICAL INFORMATION

Function, Technical data, Quick sizing, Specification text, Order code

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 various speeds as the linkage includes a transverse link. This facilitates the closing process and reduces the closed multileaf damper air leakage.

Schematic illustration of JZ-LL, 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

The torque for actuating multileaf dampers must be dimensioned so 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 the impact of aerodynamic forces.
When air flows through the damper, the aerodynamic forces of the airflow create a closing force (torque) on the blades; this happens independently of the direction of the airflow. This closing force must be countered, or overcome. The blade angle α with the largest torque depends, among other things, on the fan characteristics.

Nominal sizes	200 × 180 – 2000 × 1995 mm
Operating temperature	0 – 100 °C

JZ-LL, JZ-LL-A2, minimum torques [Nm]

H	B									
	200	400	600	800	1000	1200	1400	1600	1800	2000
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	10	10	10	10
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

Steel and stainless steel multileaf dampers, free cross-sectional area [m^2]

H	B									
	200	400	600	800	1000	1200	1400	1600	1800	2000
180 – 344	0.03	0.06	0.09	0.12	0.15	0.18	0.21	0.24	0.27	0.3
345 – 509	0.06	0.11	0.17	0.23	0.28	0.34	0.4	0.45	0.51	0.57
510 – 674	0.08	0.17	0.25	0.33	0.42	0.5	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	1.1
840 – 1004	0.14	0.27	0.41	0.55	0.69	0.82	0.96	1.1	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	1.3	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	2.2	2.44
1665 – 1829	0.27	0.54	0.81	1.08	1.36	1.63	1.9	2.17	2.44	2.71
1830 – 1994	0.3	0.6	0.89	1.19	1.49	1.79	2.08	2.38	2.68	2.98
1995	0.32	0.65	0.97	1.3	1.62	1.95	2.27	2.6	2.92	3.25

Intermediate sizes: Interpolate values between widths.

Maximum static differential pressure for a closed multileaf damper $\Delta p_{t\ max}$ [Pa]

Construction	B						
	800	1000	1200	1400	1600	1800	2000
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) 3	3500	3000	2700	2500	2300	2100	2000

JZ-LL, JZ-LL-A2, sound power level for a closed multileaf damper L_{WA} [dB(a)]

Δp_t [Pa]	Area B × H [m²]							
	0.14	0.2	0.4	0.6	0.8	1.2	2	4
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

Die Schnellauslegung gibt einen guten Überblick über die zu erwartenden Schallleistungspegel und Druckdifferenzen. Ungefähre Zwischenwerte können interpoliert werden. Zu exakten Zwischenwerten und Spektraldaten führt die Auslegung mit unserem Auslegungsprogramm Easy Product Finder.

Die Schallleistungen L_{WA} gelten für Jalousieklappen mit einer Querschnittsfläche (B × H) von 1 m².

Die Druckdifferenzen gelten für Jalousieklappen, die in Luftleitungen eingebaut sind (Einbauart A).

JZ-LL, JZ-LL-A2, JZ-HL, Druckdifferenz und Schallleistungspegel

v [m/s]	Klappenstellung α									
	AUF		20°		40°		60°		80°	
	Δp_t [Pa]	L_{WA} [dB(A)]	Δp_t [Pa]	L_{WA} [dB(A)]	Δp_t [Pa]	L_{WA} [dB(A)]	Δp_t [Pa]	L_{WA} [dB(A)]	Δp_t [Pa]	L_{WA} [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

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 multileaf damper air leakage to EN 1751, class 4 (B ≤ 600 mm, class 3)

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

Material and surfaces

- Casing and blades made of galvanised sheet steel or stainless steel
- Blade shafts, drive arm and external linkage made of galvanised steel or stainless steel
- Plastic, brass or stainless steel bearings
- 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, DB colour

Constructions

- Duct connection
- Corner holes on both sides
- G: Flange holes on both sides

Bearings

- Plastic bearings, operating temperature 0 – 100 °C
- M: Brass bearings, operating temperature 0 – 100 °C
- E: Stainless steel bearings, operating temperature 0 – 100 °C

Blades

- Only for steel multileaf dampers with brass or stainless steel bearings (JZ-...-M, JZ-...-E)
- V: Reinforced blades available as from width 800 mm

Technical data

- Nominal sizes: 200 × 180 mm – 2000 × 1995 mm
- Operating temperature: 0 to 100 °C

Sizing data

- q_v (m^3/h)
- Δp_t [Pa]
- Air-regenerated noise
- L_{PA} [dB(A)]

Life cycle assessment
A life cycle assessment is available for the product series in form of an Environmental Product Declaration (EPD) that has been checked and published by a programme holder.

JZ-LL	–	A2	–	G	–	M	–		–	L	/	1000 × 1005	/	ER	/	Z64	/	NC	/	P1 - RAL 9010
1		2		3		4		5		6		7		8		9		10		11

1 Type
JZ-LL Low-leakage multileaf damper, closed blade air leakage to EN 1751, classes 3 – 4

2 Material
No entry: galvanised steel
A2 Stainless steel

3 Duct connection
No entry: corner holes on both sides,
G Flange holes on both sides (no corner holes)

4 Bearings
No entry: plastic bearings
M Brass bearings
E Stainless steel bearings

5 Construction of blades
Only for steel or stainless steel multileaf dampers with brass or stainless steel bearings
V Reinforced blades, available from width 800 mm

6 Operating side
No entry: right
L left

7 Nominal size [mm]
Specify width × height

Galvanised steel variants are available with the width or height subdivided
Width > 2000: width subdivided
Height > 1995: height subdivided

8 Installation subframe
No entry: without installation subframe
ER With installation subframe (duct connection G only)

9 Attachments
No entry: without attachments
Z04 – Z07 Hold open device
Z12 – Z51 Actuators
ZF01 – ZF15 Spring return actuators
Z60 – Z77 Pneumatic actuators

Explosion-proof actuators
Z1EX, Z3EX Electrical
Z60EX – Z77EX Pneumatic

10 Damper blade safety function
Only with spring return actuators or pneumatic actuators
NO pressure off/power off to OPEN (Normally Open)
NC pressure off/power off to CLOSE (Normally Closed)

11 Surface
No entry: standard construction
P1 powder-coated, specify RAL CLASSIC colour

Gloss level
RAL 9010 GU 50
RAL 9006 GU 30
All other RAL colours GU 70

Order example: JZ-LL–G–L/1200×675/ER/ZF06/NC

Material	Galvanised steel
Duct connection	Flange holes on both sides
Bearings	Plastic bearings
Construction of blades	Standard
Operating side	Left
Nominal size	1200 × 675 mm
Installation subframe	With
Attachments	Spring return actuator, 20 Nm, 24 V AC/DC
Damper blade position	Power off to CLOSE
User interface	Standard construction

Variants

Multileaf damper, variant JZ-LL

Multileaf damper with explosion-proof actuator

Multileaf damper, variant JZ-LL-A2

Multileaf damper with actuator