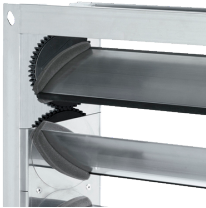




Opposed blades



Closed cell side seals



Encased gears

Multileaf dampers

JZ-LL-AL



Multileaf dampers made of aluminium 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 1200 × 1000 mm
- Closed multileaf damper air leakage to EN 1751, class 4
- Casing air leakage to EN 1751, class C
- Aerofoil opposed action blades
- Closed cell side seals meet increased hygiene requirements
- 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

General information	2	Dimensions	8
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Technical data	4	Product details	13
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Order code	7		

General information

Application

- Multileaf dampers as a control element in volume flow rate and differential pressure control in ventilation and air conditioning systems
- For extremely low-leakage shut-off of ducts and openings in walls and ceiling slabs

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

Classification

Air leakage with closed multileaf damper according to EN 1751: test pressure up to 2000 Pa

- Class 4

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

Parts and characteristics

- Ready-to-install shut-off damper
- Blades with gears
- Drive arm
- Quadrant stay with blade position indicator
- Operating temperature 0 to 60 °C

Attachments

- Quadrant stays and limit switches for the infinite adjustment of the multileaf dampers and for capturing the end positions
- Open/close actuators for opening and closing multileaf dampers
- Modulating actuators for variable damper blade positions
- Pneumatic actuators for opening and closing multileaf dampers

Accessories

- Installation subframes 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
- Encased gears on both blade ends
- 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 position at the first blade from the top (with up to 3 blades) or at the third blade from the top (with 4 or more blades)
- From H = 600 mm with 2 spindles, with linkage
- Blade tip seals and side seals

Materials and surfaces

- Casing and blades made of extruded aluminium sections
- 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, DB colour
- S3: Anodised, colour according to EURAS standard, E6-C-0

Standards and guidelines

- Casing air leakage to EN 1751, class C
- Closed multileaf damper air leakage to EN 1751, class 4
- Meets the increased requirements of DIN 1946, Part 4, with regard to the acceptable closed multileaf damper air leakage

Maintenance

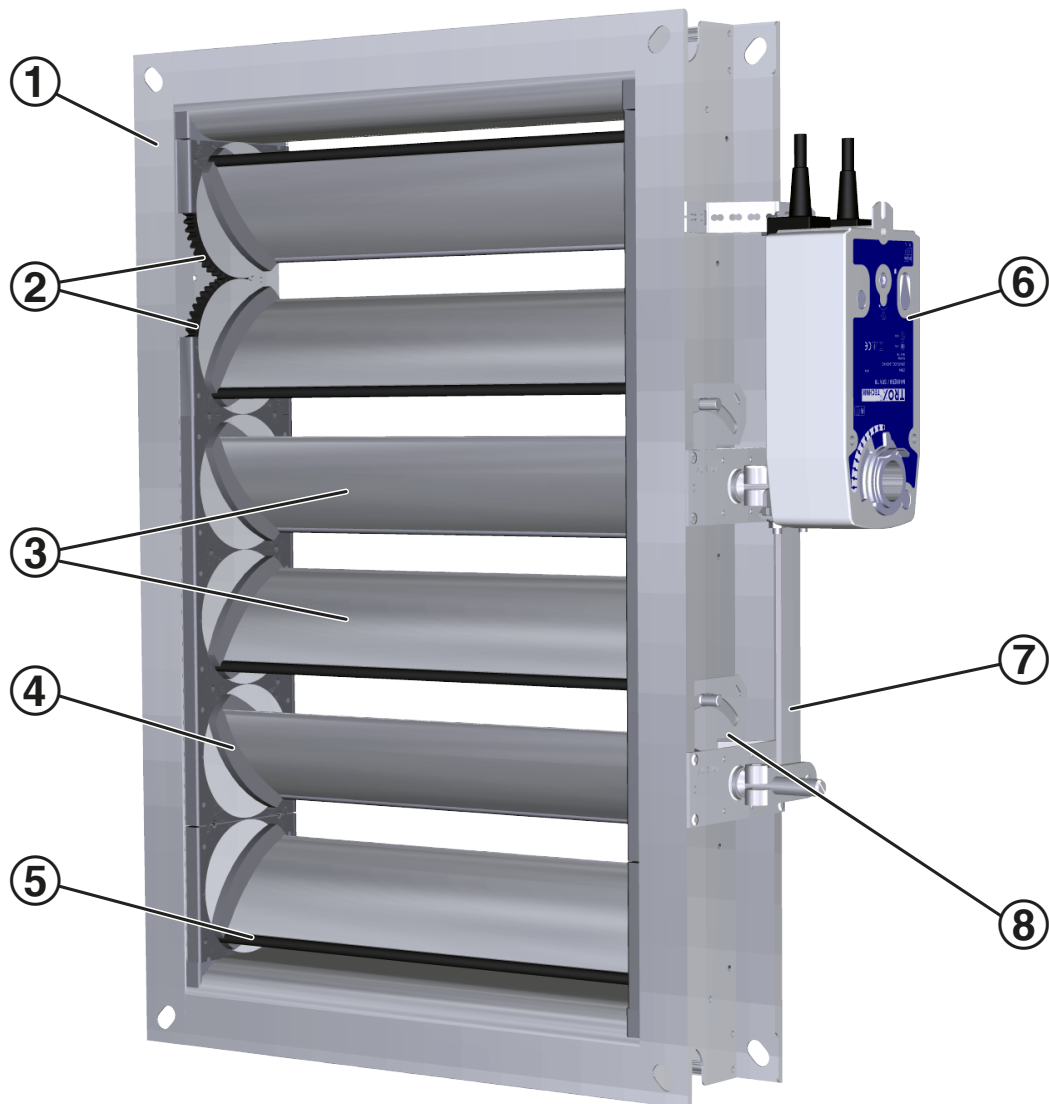
- Maintenance-free, as construction and materials are not subject to wear
- Contamination should be removed as it may lead to corrosion and to increased closed multileaf damper air leakage

Function

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-AL



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

Technical data

The torque for closing a multileaf damper 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 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 × 100 mm – 1200 × 1000 mm
Maximum permitted static differential pressure for a closed multileaf damper	2000 Pa
Operating temperature	0 to 60 °C

Minimum torques [Nm]

H	B										
	200	400	500	600	700	800	900	1000	1100	1200	
100 – 650	10	10	10	10	10	10	10	10	10	10	10
700 – 1000	20	20	20	20	20	20	20	20	20	20	20

Free cross-sectional area [m²]

H	B										
	200	300	400	500	600	700	800	900	1000	1100	1200
100, 150	0.014	0.022	0.03	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	0.2	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	0.79	0.871	0.952

Intermediate sizes: Interpolate values between widths.

Sound power level for a closed multileaf damper L_{WA} [dB(A)]

Δp_i [Pa]	Area B × H [m ²]									
	0.04	0.09	0.16	0.25	0.36	0.64	0.81	1	1.2	
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	

Quick sizing

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 program.

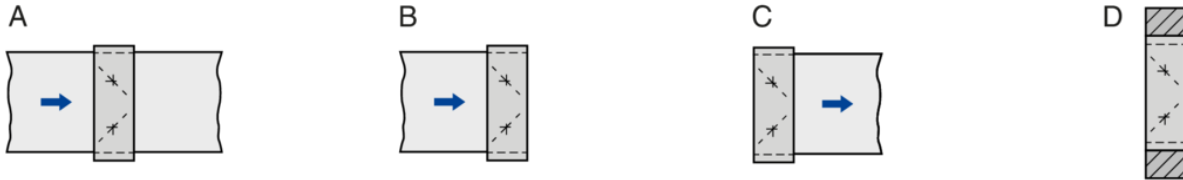
The sound power levels L_{WA} apply to multileaf dampers with a cross-sectional area (B × H) of 1 m².

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

Differential pressure and sound power level

v [m/s]	Damper blade position α									
	OPEN		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	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

Installation type



- A = Ducts on both sides
- B = Air discharge
- C = Air intake
- D = Air transfer

Specification text

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

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 according to EN 1751, Class 4. Casing leakage according 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

Materials and surfaces

- Casing and blades made of extruded aluminium sections
- 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, DB colour
- S3: Anodised, colour according to EURAS standard, E6-C-0

Technical data

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

Sizing data

- q_v (m³/h)
- Δp_t [Pa]

Air-regenerated noise

- L_{PA} [dB(A)]

Order code

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

1 Type

JZ-LL-AL Low-leakage multileaf damper made of aluminium, closed multileaf damper air leakage to EN 1751, class 4

2 Nominal size [mm]

B × H

3 Installation subframe

No entry required: None

ER With installation subframe

4 Attachments

Z04 Hold open device

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 CLOSED

6 Surface

No entry required: Standard construction

P1 Powder-coated, specify RAL CLASSIC colour

S3 Anodised, E6-C-0, colour according to EURAS standard

Gloss level

RAL 9010 50 %

RAL 9006 30 %

All other RAL colours 70 %

Order example: JZ-LL-AL/800×500/Z04/S3

Nominal size

800 × 500 mm

Installation subframe

None

Attachments

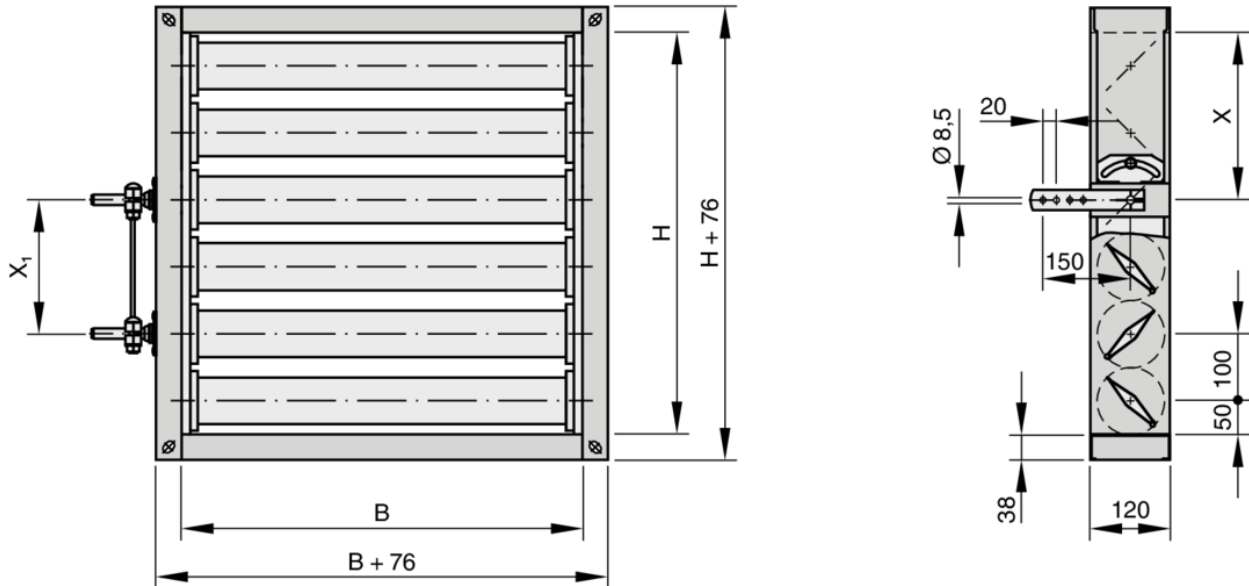
Hold open device

User interface

Anodised, EURAS E6-C-0, natural colour

Dimensions

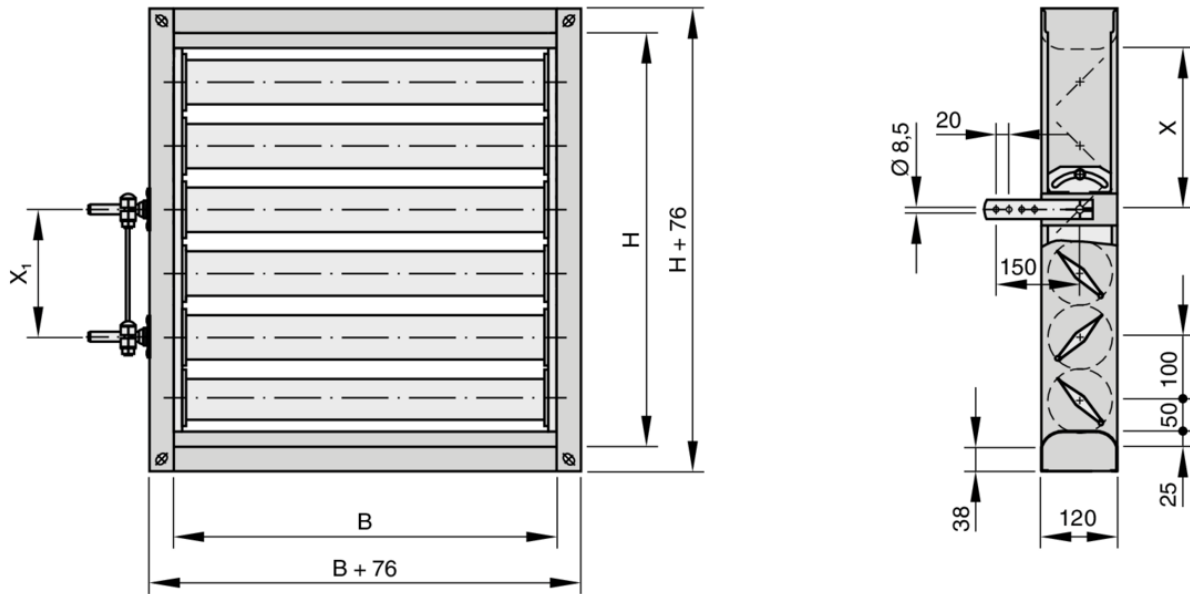
JZ-LL-AL, standard sizes



Standard sizes

H	No. of blades	Spindle position		Spindle position 2	
		X	Damper blade	X ₁	Damper blade
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

JZ-LL-AL, intermediate sizes



Intermediate sizes

H	No. of blades	Spindle position		Spindle position 2	
		X	Damper blade	X ₁	Damper blade
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

Weight [kg]

H	B											
	200	300	400	500	600	700	800	900	1000	1100	1200	
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	

Attachments

Quadrant stays and limit switches

Order code detail	Description	Limit switch	Function
Z04	Hold open device	–	
Z05	Hold open device	1	Damper blade position CLOSED
Z06	Hold open device	1	Damper blade position OPEN
Z07	Hold open device	2	Damper blade positions CLOSED and OPEN

Open/close actuators

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

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

Open/close actuators, fast-running

Order code detail	Description	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

Only up to height $H \leq 650$ mm

Open/close actuators, spring return

Order code detail	Description	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
ZF06	SF24A	Supply voltage on/off	24 V AC/DC	20 Nm	–
ZF07	SFA	Supply voltage on/off	24 – 240 V AC 24 – 125 V DC	20 Nm	–
ZF08	SF24A-S2	Supply voltage on/off	24 V AC/DC	20 Nm	integrated
ZF09	SFA-S2	Supply voltage on/off	24 – 240 V AC 24 – 125 V DC	20 Nm	integrated
ZF11	EF24A	Supply voltage on/off	24 V AC/DC	30 Nm	–
ZF12	EF230A	Supply voltage on/off	100 – 240 V AC	30 Nm	–
ZF13	EF24A-S2	Supply voltage on/off	24 V AC/DC	30 Nm	integrated
ZF14	EF230A-S2	Supply voltage on/off	100 – 240 V AC	30 Nm	integrated

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

Modulating actuators

Order code detail	Description	Function	Supply voltage	Torque	Auxiliary switch
Z20	SM24A-SR	2 – 10 V DC	24 V AC/DC	20 Nm	–
Z21	GM24A-SR	2 – 10 V DC	24 V AC/DC	40 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	Description	Function	Supply voltage	Torque	Auxiliary switch
ZF05	NF24A-SR	2 – 10 V DC	24 V AC/DC	10 Nm	–
ZF10	SF24A-SR	2 – 10 V DC	24 V AC/DC	20 Nm	–
ZF15	EF24A-SR	2 – 10 V DC	24 V AC/DC	30 Nm	–

ZF05: Only up to height $H \leq 650$

Double acting pneumatic actuators

Order code detail	Description	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

Minimum torque, which depends on the nominal size of multileaf damper, and the operating pressure have to be considered when selecting the actuator.

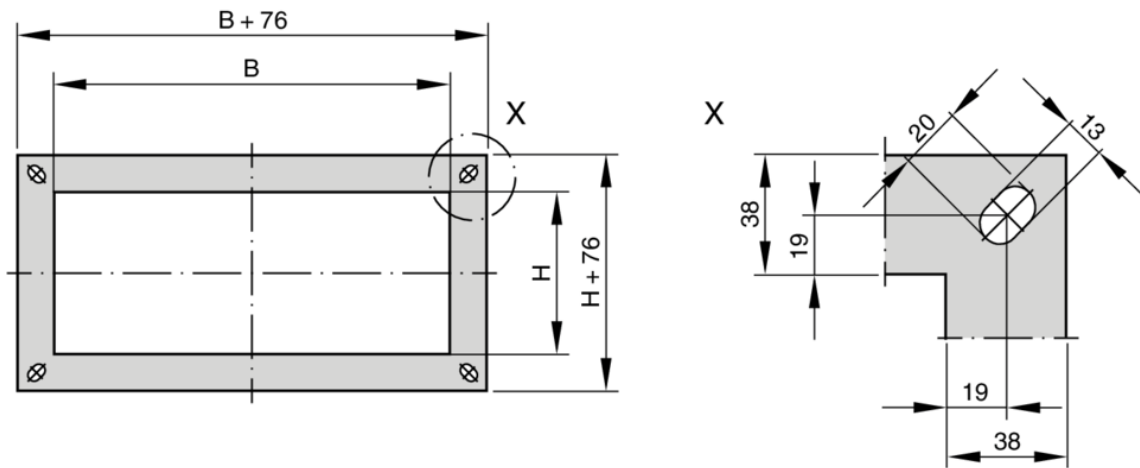
Single acting pneumatic actuators

Order code detail	Description	Damper blade safety function	Operating pressure	Limit switch	Torque at 6 bar	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

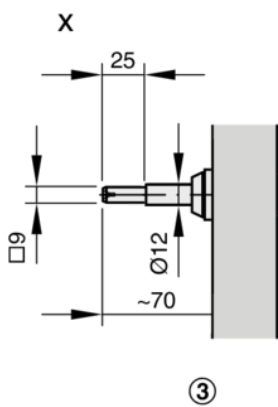
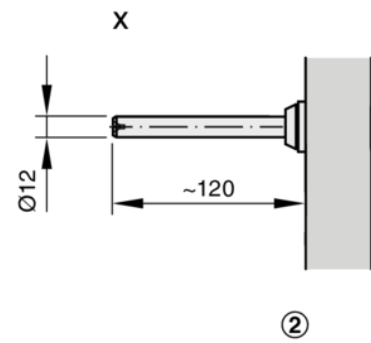
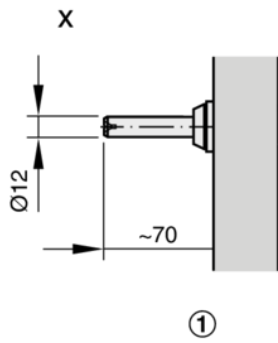
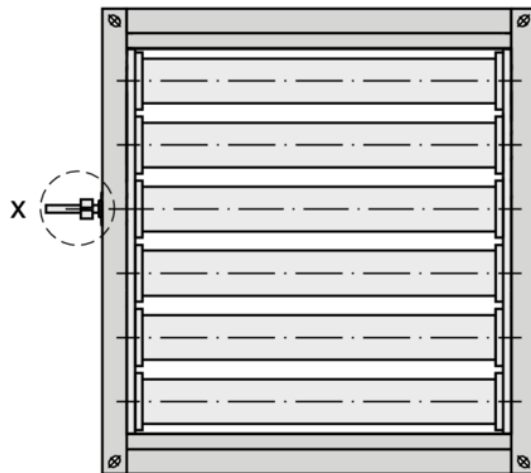
Product details

- Drive shafts (special accessory) upon request

Aluminium multileaf dampers, corner holes



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



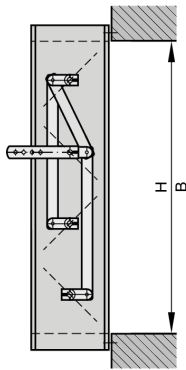
- ① Standard shaft
- ② ZS99 – extended shaft
- ③ ZS991 – square shaft 9 mm

Installation details

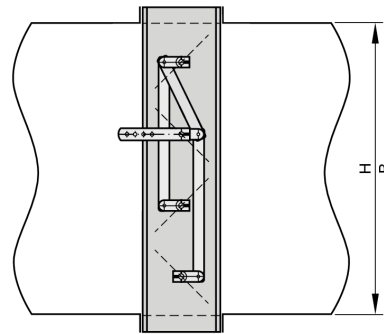
Installation and commissioning

- 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



Nomenclature

B [mm]

Duct width

H [mm]

Duct height

Lengths

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

n []

Number of flange screw holes

m [kg]

Weight

L_{WA} [dB(A)]

A-weighted sound power level of air-regenerated noise for the multileaf damper

α [kPa]

Damper blade position, 0°: OPEN, 90°: CLOSED

A [m²]

Upstream cross section

v [m/s]

Airflow velocity based on the upstream cross section (B × H)

q_v [m³/h]; [l/s]

Volume flow rate

Δp_t [Pa]

Differential pressure

Δp_{max t} [Pa]

Maximum differential pressure