CE

TPM 121/16

Version 2024-05-20

EN 12101-8

MANDÍK®

SINGLE COMPARTMENT SMOKE CONTROL DAMPER

SEDS-L

These technical specifications state a row of manufactured sizes and models of Single compartment smoke control damper (further only dampers) SEDS-L. It is valid for production, designing, ordering, delivery, maintenance and operation.

I. CONTENT

II. GENERAL INFORMATION

1. Description

1.1. Single compartment smoke control damper are shutters in smoke exhaust duct systems. Dampers are designed to remove heat and combustion products (e.g. smoke) from single fire compartment. In the event of fire the Smoke and Fire ventilation system opens the damper in the affected section which removes combustion products and heat from this section.

The damper blade is operated by an actuating mechanism.

The dampers can be installed in various duct sizes with respect to the field of direct applications according with EN 1366-9.

The field of direct applications based on tests results is acceptable according to EN 1363-1, part A.1 and A.2, EN 1366-2, part 13 and EN 1366-10, part 9.

Single compartment smoke control damper are classified as

E_{600} 120 (v_{ed}-h_{od}-i↔o) S1500C_{mod}MAsingle

The duct can be ended by KMM (TPM 002/96) grilles.

Fig. 1 Damper SEDS-L

1.2. Damper characteristics

- CE certified acc. to EN 12101-8
- Tested in accordance with EN 1366-10
- Classified acc. to EN 13501-4
- External Casing leakage min. class B, Internal leakage min. class 3 acc. to EN 1751
- Cycling test in class C_{mod} acc. to EN 12101-8
- ES Certificate No. 1391-CPR-XXXX/XXXX
- Declaration of Perfomance No. PM/SEDS-L/01/XX/X
- Hygienic assessment of smoke control dampers - Report No. 1.6/pos/19/19c

1.3. Working conditions

Dampers are designed for smoke exhaust duct systems with underpressure max. 1500 Pa or overpressure max. 500 Pa.

Dampers are designed for maximum air velocity 15 m/s.

Dampers are installed with the horizontal or vertical axis of the blades.

Dampers are intended for installation on air ducts and in/onto the walls where in the case of wall installation, this wall with damper does not have fire resistance and therefore does not separate two fire compartments.

Dampers are suitable for systems without abrasive, chemical and adhesive particles.

Dampers are designed for macroclimatic areas with mild climate according to EN IEC 60 721-3-3 ed.2., class 3K22. (Environment 3K22 is typically protected place with regulated temperature)

Temperature in the place of installation is permitted to range from -30°C to +50°C.

2. Design

2.1. Design with actuating mechanism

Design .44 and .54

Belimo actuators are used for dampers, series BEN, BEE, BE for 230V AC resp. 24 V AC/DC.

After connection to the power supply voltage, the actuator moves the damper blade to the "OPEN" position or "CLOSED" (according to the corresponding connection, see wiring diagram). If the power supply is interrupted, the actuator stops at the current position. The signalling of the "OPEN" and "CLOSED" damper blade positions is ensured by two built-in fixed “potential-free” end- limit switches.

The actuator for operating the damper blade is mounted in an insulated cover/box. It is accessible after removing the cover lid. The electrical connection of the actuator is made with a non-flammable cable (or a cable located in the adjoining cable duct), which passes through an opening made in the wall of the insulated cover/box when installing the damper or when connecting the actuator power cable. The cable entry must meet a minimum fire resistance of 30 minutes.

Design .65

Belimo modulating actuators, BEN (BEE)-SR series for 24V AC/DC are specially designed for remote control of smoke control dampers. The position of the damper blade is adjustable by means of control voltage 0 (2)...10V DC.

The signalling of the "OPEN" and "CLOSED" damper blade positions is ensured by two built-in fixed “potential-free” limit switches.

The actuator for operating the damper blade is mounted in an insulated cover/box. It is accessible after removing the cover lid. The electrical connection of the actuator is made with non-flammable cables (or cables located in the adjoining cable duct), which pass through an opening made in the wall of the insulated cover when installing the damper or when connecting the power cables of the actuator. The cable entry must meet a minimum fire resistance of 30 minutes.

Fig. 2 Damper SEDS-L - act. mechanism in the cover

Tab. 2.1.1. **Actuator BELIMO BEN 24(-ST), BEN 24-SR, BEN 230**

Actuator BELIMO - 15 Nm	BEN 24(-ST)	BEN 24-SR	BEN 230
Power voltage	AC/DC 24 V 50/60Hz	AC/DC 24 V 50/60Hz	AC 230 V 50/60Hz
Power consumption - in operation - in the end position	3 W 0,1 W	3 W 0,3 W	4 W 0,4 W
Dimensioning	6 VA (Imax 8,2 A @ 5 ms)	6,5 VA (Imax 8.2 A @ 5 ms)	7 VA (Imax 4 A @ 5 ms)
Protection class	III	III	II
Degree of protection	IP 54		
Adjustment time for 95°	< 30 s		
Ambient temperature Storage temperature	-30°C … +55°C -40°C … +80°C		
Connection - drive - auxiliary switch	Cable 1 m, 3 x 0,75 mm² Cable 1 m, 6 x 0,75 mm² (BEN 24-ST) with plug connectors	Cable 1 m, 4 x 0,75 mm² Cable 1 m, 6 x 0,75 mm²	Cable 1 m, 3 x 0,75 mm² Cable 1 m, 6 x 0,75 mm²

Fig. 3 **Actuator BELIMO BEN 24(-ST)**

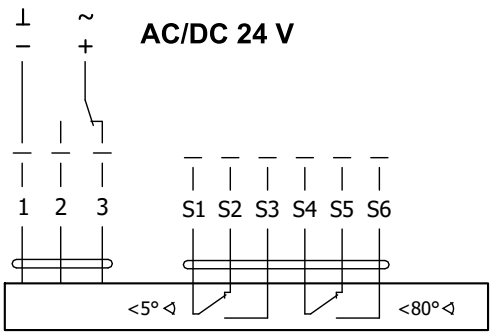


Fig. 4 **Actuator BELIMO BEN 24-SR**

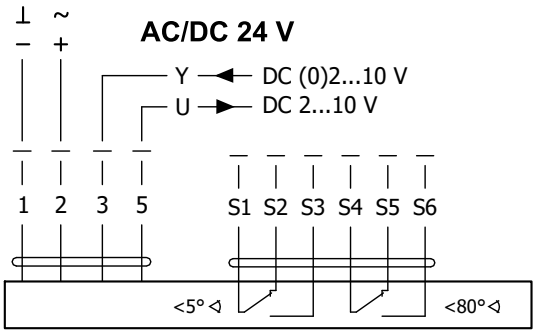
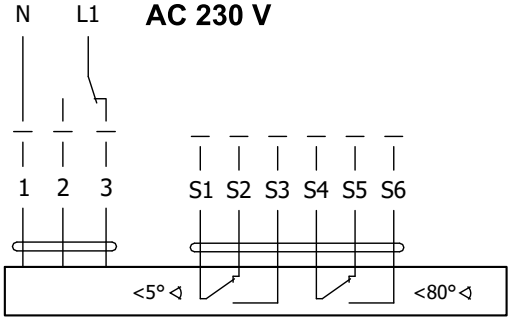


Fig. 5 **Actuator BELIMO BEN 230**



Tab. 2.1.2. Actuator BELIMO BEE 24(-ST), BEE 24-SR, BEE 230

Actuator BELIMO - 25 Nm	BEE 24(-ST)	BEE 24-SR	BEE 230
Power voltage	AC/DC 24 V 50/60Hz	AC/DC 24 V 50/60Hz	AC 230 V 50/60Hz
Power consumption - in operation - in the end position	2,5 W 0,1 W	3 W 0,3 W	3,5 W 0,4 W
Dimensioning	5 VA (Imax 8,2 A @ 5 ms)	5,5 VA (Imax 8.2 A @ 5 ms)	6 VA (Imax 4 A @ 5 ms)
Protection class	III	III	II
Degree of protection	IP 54		
Adjustment time for 95°	< 60 s		
Ambient temperature Storage temperature	-30°C … +55°C -40°C … +80°C		
Connection - drive - auxiliary switch	Cable 1 m, 3 x 0,75 mm² Cable 1 m, 6 x 0,75 mm² (BEE 24-ST) with plug connectors	Cable 1 m, 4 x 0,75 mm² Cable 1 m, 6 x 0,75 mm²	Cable 1 m, 3 x 0,75 mm² Cable 1 m, 6 x 0,75 mm²

Fig. 6 Actuator BELIMO BEE 24(-ST)

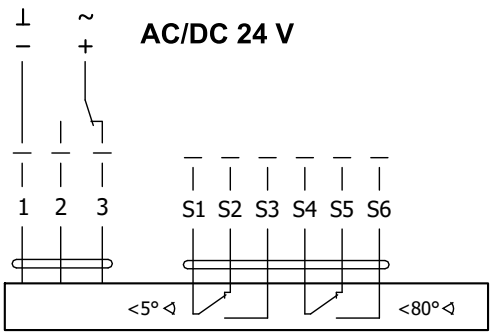


Fig. 7 Actuator BELIMO BEE 24-SR

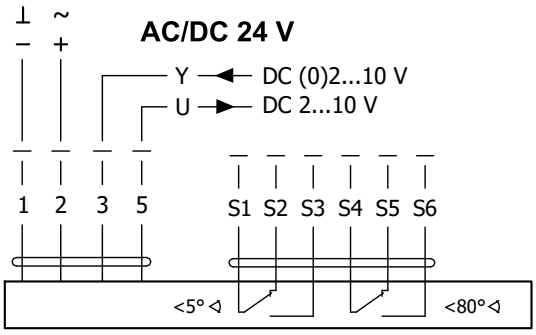
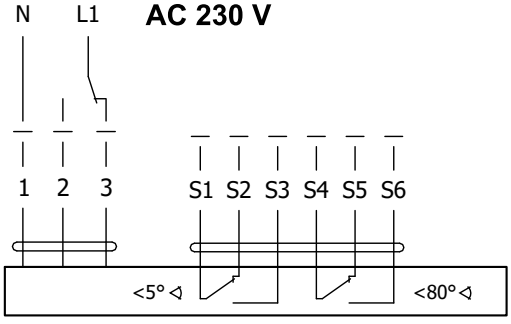


Fig. 8 Actuator BELIMO BEE 230

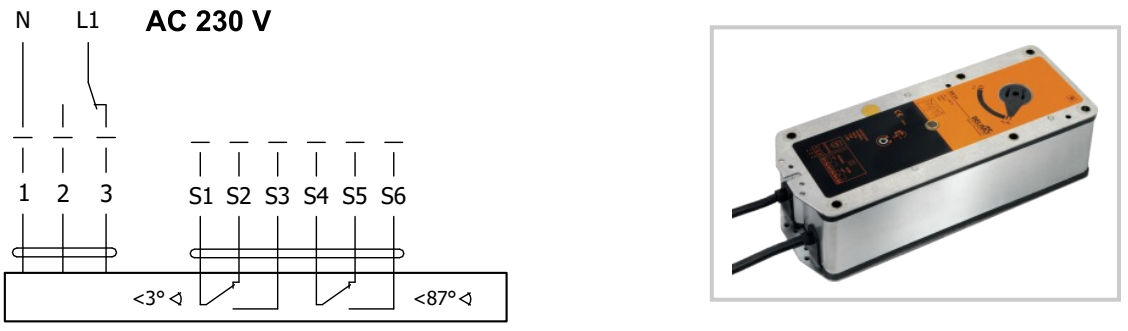


Tab. 2.1.3. Actuator BELIMO BE 24-12(-ST), BE 230-12

Actuator BELIMO - 40 Nm	BE 24-12(-ST)	BE 230-12
Power voltage	AC/DC 24 V 50/60Hz	AC 230 V 50/60Hz
Power consumption - in operation - in the end position	12 W 0,5 W	8 W 0,5 W
Dimensioning	18 VA (Imax 8,2 A @ 5 ms)	15 VA (Imax 7,9 A @ 5 ms)
Protection class	III	II
Degree of protection	IP 54	
Adjustment time for 95°	< 60 s	
Ambient temperature Storage temperature	-30°C … +50°C -40°C … +80°C	
Connection - drive - auxiliary switch	Cable 1 m, 3 x 0,75 mm² Cable 1 m, 6 x 0,75 mm² (BE 24-ST) with plug connectors	

Fig. 9 Actuator BELIMO BE 24-12(-ST)

Fig. 10 Actuator BELIMO BE 230-12



2.2. Design with the communication and power supply unit

Design .66

Design with communication and power supply device BKNE 230-24 and with actuator BEN (BEE, BE)-ST pro 24V.

The BKNE 230-24 serves on the one hand as a decentralized network device for powering the actuator and on the other hand transmits the signal of the communication and control device BKSE 24-6.

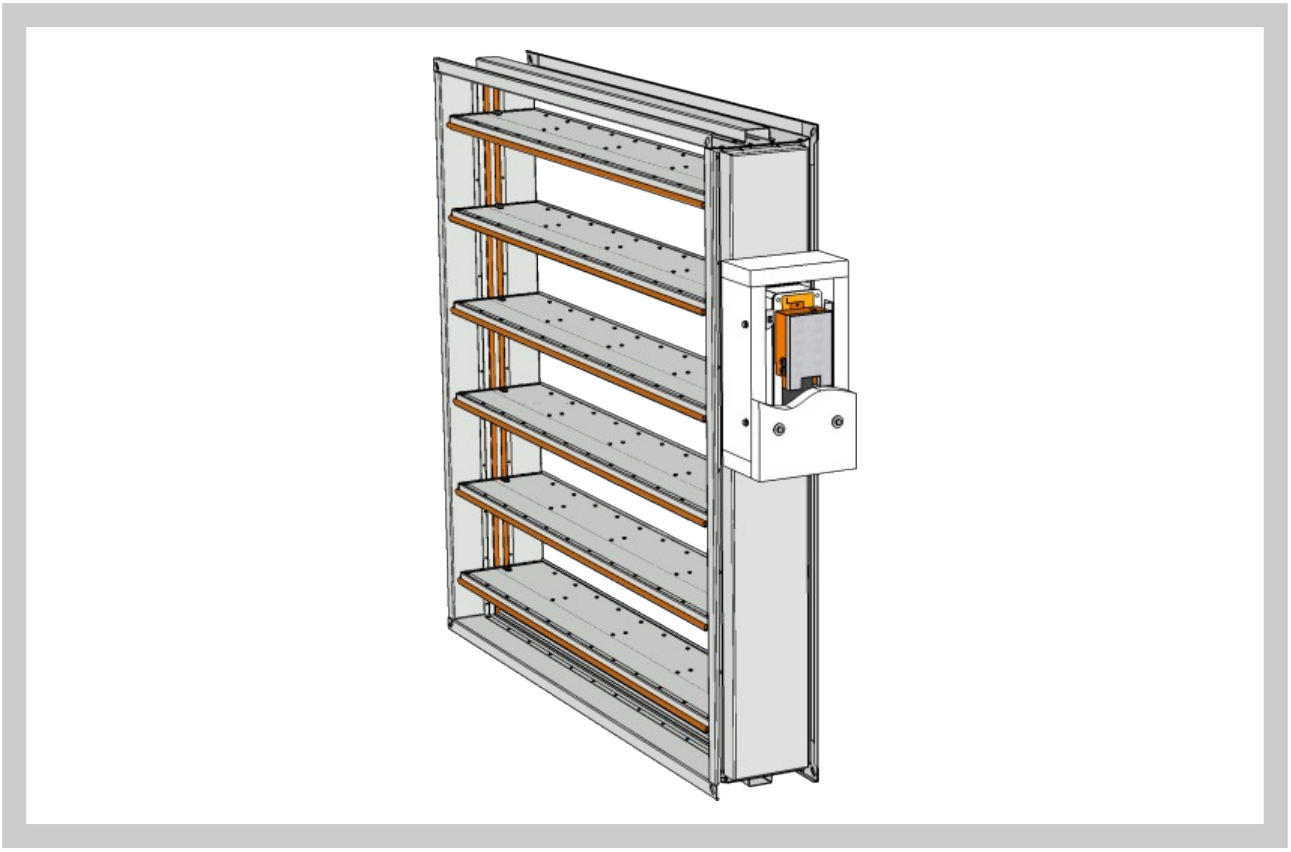
It simplifies electrical installation and connection of dampers. In the meantime, it facilitates “on-site inspection” and allows central control and inspection of dampers using a simple 2-wire line.
The BKNE 230-24 transmits the "OPEN" / "CLOSED" damper position (switches in the actuator) and fault messages to the BKSE 24-6. It also receives commands from the control device and controls the adjustment of the actuator to the desired position. The last control command will be retained even after a temporary network failure..

The BKNE 230-24 controls the switching position of the actuator, its adjustment time and the data exchange with the BKSE 24-6. In addition, it controls the actuator current (actuator connection) and the power supply.
To simplify the connection, the actuator is equipped with plug connectors that plug directly into the BKNE 230-24.

The actuator, communication and power supply device BKNE 230-24 are mounted in an insulated cover, they are accessible after removing the cover. The electrical connection of the actuator and the BKNE 230-24 communication and power supply device is made with a non-flammable cable (or a cable located in an adjoining cable duct), the two-wire BKNE 230-24 cable should be connected to terminals 6 and 7. It is also recommended to use cable, which is used for fire signalling network. The cables pass through an opening made in the wall of the insulated cover when installing the damper or when connecting the actuator power cable. The cable entry must meet a minimum fire resistance of 30 minutes.

For more information on actuators and devices, see the Belimo catalogue.

Fig. 11 Damper SEDS-L - actuating machanism and BKNE in the cover

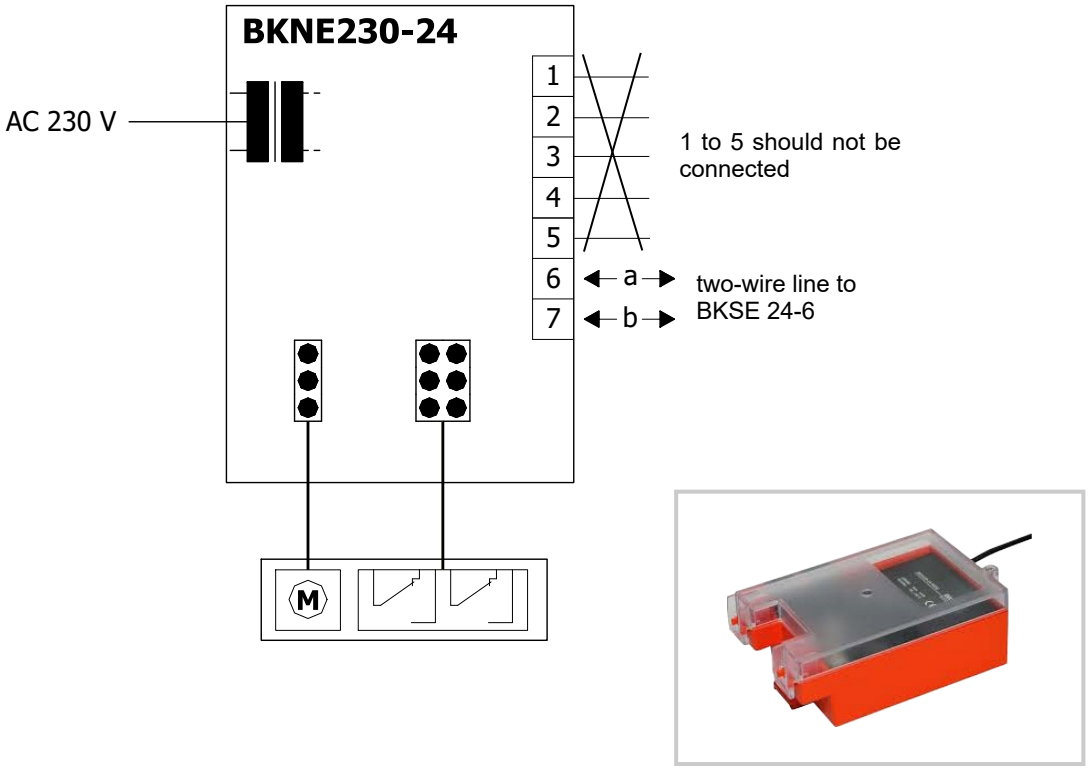


2.3. Communication and supply device

Tab. 2.3.1. Communication and power supply device BKNE 230-24

Communication and power supply device	BKNE 230-24
Power voltage	AC 230V 50/60Hz
Power consumption	10 W (including actuator)
Dimensioning	19 VA (including actuator)
Protection class	II
Ambient operation temperature Storage temperature	-30°C … +50°C -40°C … +80°C
Connection - network - drive - terminal blocks	cable 1 m without plug 6-pin plug, 3-pin plug screw terminals for 2x1.5 mm^2 conductor

Fig. 12 Communication and power supply device BKNE 230-24



Signalling

LED	State	Function
yellow	flashing	damper rotates to the open position
yellow	lit-up	damper is open
green	flashing	damper rotates to the closed position
green	lit-up	damper is closed
yellow or green	flashes twice as often	fault
yellow + green	dark	network outage

2.4. Communication and control devices

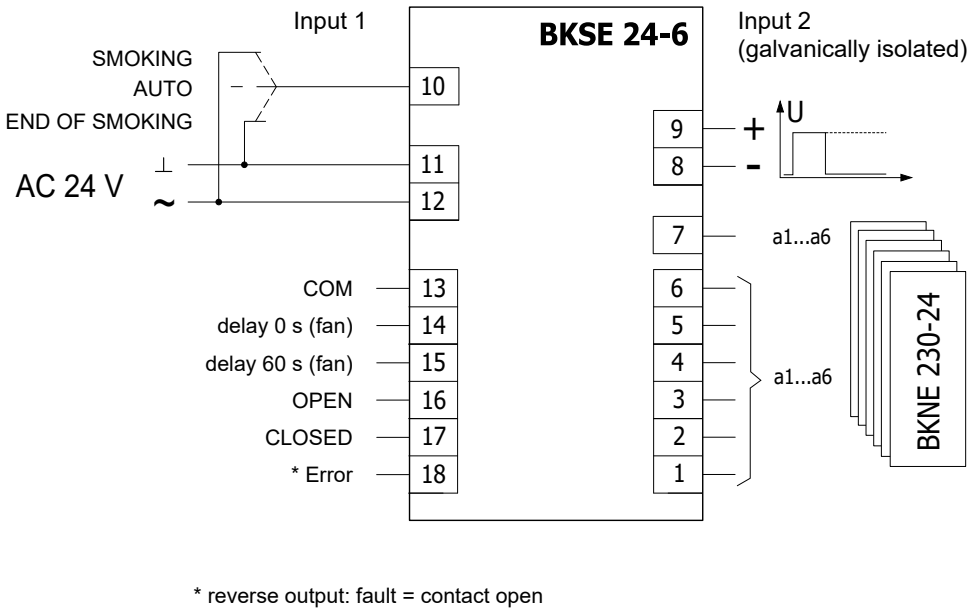
BKSE 24-6 indicates operating condition and faults of flue dampers. These conditions can be signalled or transmitted to the higher-level control system via the auxiliary built-in contacts. Signals from individual BKNE 230-24 are evaluated separately. All BKNE 230-24 are controlled simultaneously. A maximum of 6 BKNE 230-24 can be connected to the BKSE 24-6.

Damper control is ensured with a simple 2-wire line. The damper's correct function is indicated by two LEDs. The operating status of the entire control system and any errors are indicated by these LEDs and the corresponding error LED.
Mounting and connection of BKSE 24-6 can be done on a 35mm DIN rail. It's connected using two 9-pin terminal blocks (plug connectors).

Tab. 2.4.1. Communication and control devices BKSE 24-6

Communication and control devices	BKSE 24-6
Power voltage	AC 24 V 50/60Hz
Power consumption	3,5 W (operating position)
Dimensioning	5,5 VA 18 VA (Imax 6.4 A @ 2.5 ms)
Protection class	III (low voltage)
Degree of protection	IP 20
Ambient operation temperature	0 … +50°C
Connection	screw terminals for 2x1.5 mm^2 conductor

Fig. 13 Communication and control devices BKSE 24-6

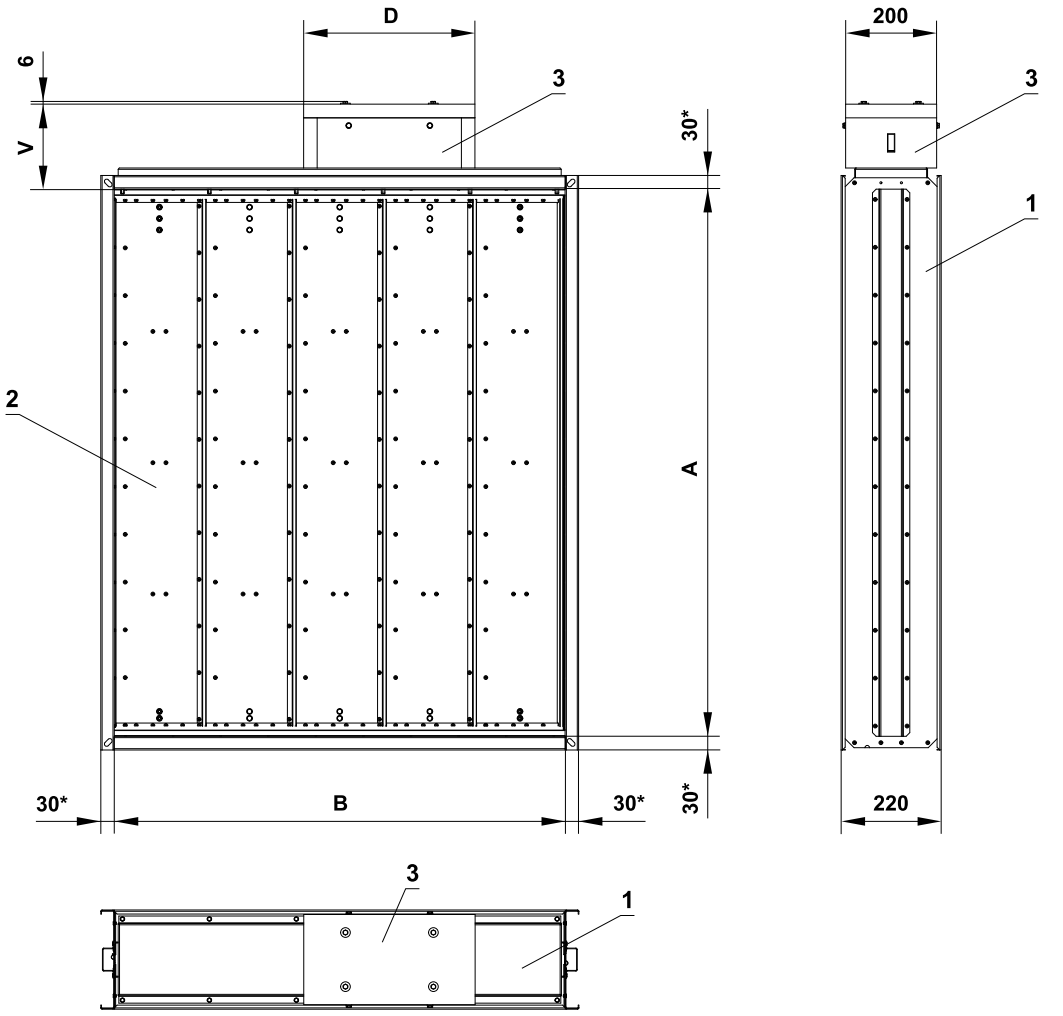


* reverse output: fault = contact open

3. Dimensions, weights

3.1. Dimensions

Fig. 14 Damper SEDS-L



* standard height of the flange

Position:

1 Damper body
2 Damper blade
3 Actuating mechanism cover

Actuating mechanism	**V** [mm]	**D** [mm]
BEN / BEE	176,5	315
BE	186,5	380
BEN / BEE + BKNE	236,5	315
BE + BKNE	251,5	380

3.2. Weights and effective area cross section

Tab. 3.2.1. Weights and effective area cross section

Size AxB	Number of blades	Weight [kg]	Sef [m²]	Actuating mechanism BELIMO	Size AxB	Number of blades	Weight [kg]	Sef [m²]	Actuating mechanism BELIMO
200 x 200	1	14.3	0.0227	BEN	**400 x 200**	1	17.6	0.0511	BEN
x 250	2	16.4	0.0270	BEN	**x 250**	2	20.3	0.0608	BEN
x 300	2	17.3	0.0350	BEN	**x 300**	2	21.5	0.0788	BEN
x 350	2	18.3	0.0430	BEN	**x 350**	2	22.6	0.0968	BEN
x 400	2	19.2	0.0510	BEN	**x 400**	2	23.8	0.1148	BEN
x 450	3	21.2	0.0554	BEN	**x 450**	3	26.4	0.1246	BEN
x 500	3	22.2	0.0634	BEN	**x 500**	3	27.6	0.1426	BEN
x 600	3	24.1	0.0794	BEN	**x 600**	3	30.0	0.1786	BEN
x 700	4	27.0	0.0917	BEN	**x 700**	4	33.7	0.2063	BEN
x 800	4	28.9	0.1077	BEN	**x 800**	4	36.1	0.2423	BEN
x 900	5	34.5	0.1200	BEE	**x 900**	5	42.5	0.2700	BEE
x 1000	5	36.4	0.1360	BEE	**x 1000**	5	44.8	0.3060	BEE
x 1100	6	39.3	0.1483	BEE	**x 1100**	6	48.6	0.3337	BEE
x 1200	6	41.2	0.1643	BEE	**x 1200**	6	51.0	0.3697	BEE
250 x 200	1	15.1	0.0298	BEN	**450 x 200**	1	18.4	0.0582	BEN
x 250	2	17.4	0.0355	BEN	**x 250**	2	21.3	0.0693	BEN
x 300	2	18.4	0.0460	BEN	**x 300**	2	22.5	0.0898	BEN
x 350	2	19.4	0.0565	BEN	**x 350**	2	23.7	0.1103	BEN
x 400	2	20.4	0.0670	BEN	**x 400**	2	25.0	0.1308	BEN
x 450	3	22.5	0.0727	BEN	**x 450**	3	27.7	0.1419	BEN
x 500	3	23.5	0.0832	BEN	**x 500**	3	28.9	0.1624	BEN
x 600	3	25.5	0.1042	BEN	**x 600**	3	31.4	0.2034	BEN
x 700	4	28.7	0.1203	BEN	**x 700**	4	38.0	0.2349	BEE
x 800	4	30.7	0.1413	BEN	**x 800**	4	40.5	0.2759	BEE
x 900	5	36.5	0.1575	BEE	**x 900**	5	44.5	0.3075	BEE
x 1000	5	38.5	0.1785	BEE	**x 1000**	5	47.0	0.3485	BEE
x 1100	6	41.6	0.1947	BEE	**x 1100**	6	50.9	0.3801	BEE
x 1200	6	43.6	0.2157	BEE	**x 1200**	6	53.4	0.4211	BEE
300 x 200	1	15.9	0.0369	BEN	**500 x 200**	1	19.2	0.0653	BEN
x 250	2	18.3	0.0439	BEN	**x 250**	2	22.2	0.0777	BEN
x 300	2	19.4	0.0569	BEN	**x 300**	2	23.5	0.1007	BEN
x 350	2	20.5	0.0699	BEN	**x 350**	2	24.8	0.1237	BEN
x 400	2	21.5	0.0829	BEN	**x 400**	2	26.1	0.1467	BEN
x 450	3	23.8	0.0900	BEN	**x 450**	3	29.0	0.1592	BEN
x 500	3	24.9	0.1030	BEN	**x 500**	3	30.3	0.1822	BEN
x 600	3	27.0	0.1290	BEN	**x 600**	3	32.9	0.2282	BEN
x 700	4	30.3	0.1490	BEN	**x 700**	4	39.7	0.2636	BEE
x 800	4	32.5	0.1750	BEN	**x 800**	4	42.3	0.3096	BEE
x 900	5	38.5	0.1950	BEE	**x 900**	5	46.5	0.3450	BEE
x 1000	5	40.6	0.2210	BEE	**x 1000**	5	49.1	0.3910	BEE
x 1100	6	43.9	0.2410	BEE	**x 1100**	6	53.2	0.4264	BEE
x 1200	6	46.1	0.2670	BEE	**x 1200**	6	55.8	0.4724	BE
350 x 200	1	16.8	0.0440	BEN	**600 x 200**	1	20.9	0.0795	BEN
x 250	2	19.3	0.0524	BEN	**x 250**	2	24.2	0.0946	BEN
x 300	2	20.4	0.0679	BEN	**x 300**	2	25.6	0.1226	BEN
x 350	2	21.6	0.0834	BEN	**x 350**	2	27.0	0.1506	BEN
x 400	2	22.7	0.0989	BEN	**x 400**	2	28.4	0.1786	BEN
x 450	3	25.1	0.1073	BEN	**x 450**	3	31.6	0.1938	BEN
x 500	3	26.2	0.1228	BEN	**x 500**	3	33.0	0.2218	BEN
x 600	3	28.5	0.1538	BEN	**x 600**	3	35.8	0.2778	BEN
x 700	4	32.0	0.1776	BEN	**x 700**	4	43.1	0.3209	BEE
x 800	4	34.3	0.2086	BEN	**x 800**	4	45.9	0.3769	BEE
x 900	5	40.5	0.2325	BEE	**x 900**	5	50.5	0.4200	BEE
x 1000	5	42.7	0.2635	BEE	**x 1000**	5	53.3	0.4760	BEE
x 1100	6	46.3	0.2874	BEE	**x 1100**	6	57.9	0.5191	BE
x 1200	6	48.5	0.3184	BEE	**x 1200**	6	60.7	0.5751	BE

Size AxB	Number of blades	Weight [kg]	Sef [m²]	Actuating mechanism BELIMO	Size AxB	Number of blades	Weight [kg]	Sef [m²]	Actuating mechanism BELIMO
700 x 200	1	22.5	0.0937	BEN	**1000 x 200**	1	27.5	0.1363	BEN
x 250	2	26.1	0.1115	BEN	**x 250**	2	32.0	0.1622	BEN
x 300	2	27.7	0.1445	BEN	**x 300**	2	33.9	0.2102	BEN
x 350	2	29.2	0.1775	BEN	**x 350**	2	35.7	0.2582	BEN
x 400	2	30.7	0.2105	BEN	**x 400**	2	37.6	0.3062	BEN
x 450	3	34.2	0.2284	BEN	**x 450**	3	42.0	0.3322	BEN
x 500	3	35.7	0.2614	BEN	**x 500**	3	43.9	0.3802	BEN
x 600	3	38.8	0.3274	BEN	**x 600**	3	50.3	0.4762	BEE
x 700	4	46.4	0.3782	BEE	**x 700**	4	56.5	0.5501	BE
x 800	4	49.5	0.4442	BEE	**x 800**	4	60.3	0.6461	BE
x 900	5	54.5	0.4950	BEE	**x 900**	5	66.5	0.7200	BE
x 1000	5	57.5	0.5610	BE	**x 1000**	5	70.2	0.8160	BE
x 1100	6	62.5	0.6118	BE	**x 1100**	6	76.5	0.8899	BE
x 1200	6	65.6	0.6778	BE	**x 1200**	6	80.2	0.9859	BE
800 x 200	1	24.2	0.1079	BEN	**1100 x 200**	1	29.1	0.1505	BEN
x 250	2	28.1	0.1284	BEN	**x 250**	2	34.0	0.1791	BEN
x 300	2	29.7	0.1664	BEN	**x 300**	2	35.9	0.2321	BEN
x 350	2	31.4	0.2044	BEN	**x 350**	2	37.9	0.2851	BEN
x 400	2	33.0	0.2424	BEN	**x 400**	2	39.9	0.3381	BEN
x 450	3	36.8	0.2630	BEN	**x 450**	3	47.2	0.3668	BEE
x 500	3	38.4	0.3010	BEN	**x 500**	3	49.2	0.4198	BEE
x 600	3	41.7	0.3770	BEN	**x 600**	3	53.2	0.5258	BEE
x 700	4	49.8	0.4355	BEE	**x 700**	4	59.9	0.6074	BE
x 800	4	53.1	0.5115	BEE	**x 800**	4	63.8	0.7134	BE
x 900	5	58.5	0.5700	BE	**x 900**	5	70.5	0.7950	BE
x 1000	5	61.8	0.6460	BE	**x 1000**	5	74.5	0.9010	BE
x 1100	6	67.2	0.7045	BE	**x 1100**	6	81.1	0.9826	BE
x 1200	6	70.5	0.7805	BE	**x 1200**	6	85.1	1.0886	BE
900 x 200	1	25.8	0.1221	BEN	**1200 x 200**	1	30.8	0.1647	BEN
x 250	2	30.0	0.1453	BEN	**x 250**	2	35.9	0.1960	BEN
x 300	2	31.8	0.1883	BEN	**x 300**	2	38.0	0.2540	BEN
x 350	2	33.5	0.2313	BEN	**x 350**	2	40.1	0.3120	BEN
x 400	2	35.3	0.2743	BEN	**x 400**	2	42.2	0.3700	BEN
x 450	3	39.4	0.2976	BEN	**x 450**	3	49.8	0.4014	BEE
x 500	3	41.1	0.3406	BEN	**x 500**	3	51.9	0.4594	BEE
x 600	3	47.3	0.4266	BEE	**x 600**	3	56.1	0.5754	BE
x 700	4	53.1	0.4928	BEE	**x 700**	4	63.2	0.6647	BE
x 800	4	56.7	0.5788	BE	**x 800**	4	67.4	0.7807	BE
x 900	5	62.5	0.6450	BE	**x 900**	5	74.5	0.8700	BE
x 1000	5	66.0	0.7310	BE	**x 1000**	5	78.7	0.9860	BE
x 1100	6	71.8	0.7972	BE	**x 1100**	6	85.8	1.0753	BE
x 1200	6	75.4	0.8832	BE	**x 1200**	6	90.0	1.1913	BE

If is used the communication and supply device BKNE230-24, the weight is higher by 0,68 kg.

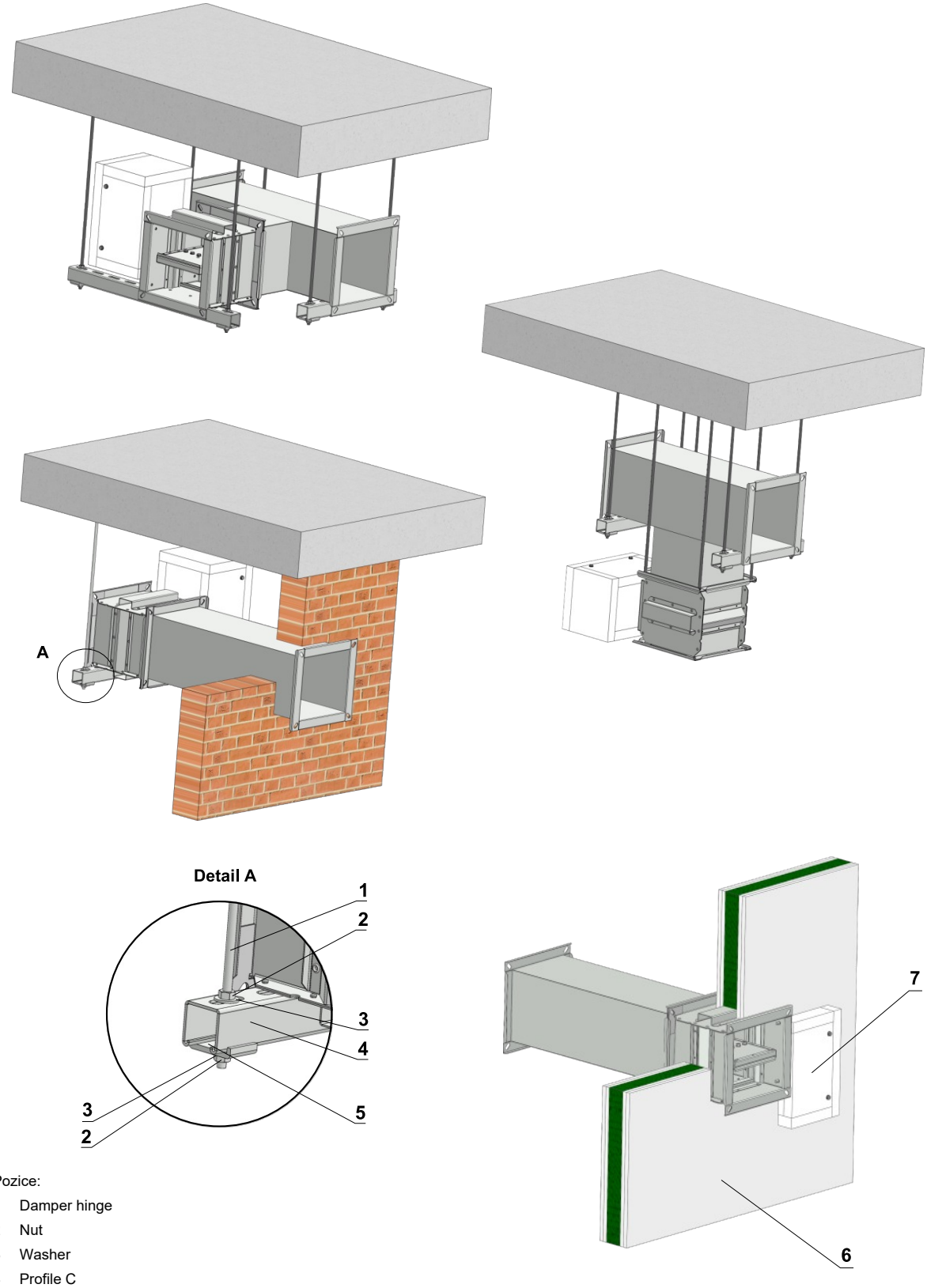
4. Placement and Assembly

4.1. Damper are designed to remove heat and combustion products (e.g. smoke) from single fire compartment according EN1366-9.
Damper are designed for installation with horizontal or vertical axis of the blades.
Backtoback smoke exhaust duct has to be hung or supported so as all load transfer from the backtoback smoke exhaust duct to the damper is absolutely excluded. To provide needed access space to the control device, all other objects must be situated at least 350 mm from the control parts of the damper.

4.2. During installation the damper blade must be in position CLOSED. The damper body should not be deformed in the course of installation. Once the damper built in, its blade should not grind on the damper body during opening or closing.

4.3. Installation examples

Fig. 15 Installation examples



Pozice:

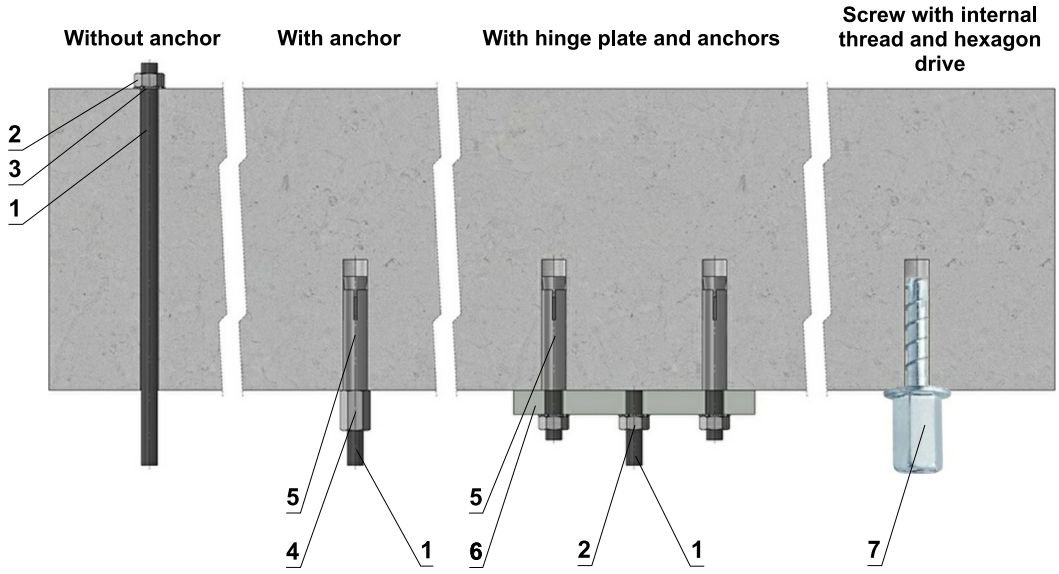
1 Damper hinge
2 Nut
3 Washer
4 Profile C
5 Washer C
6 Wall construction without fire resistance
7 Atypical protection box with access to actuator from side, not as standard from the top

5. Suspension systems

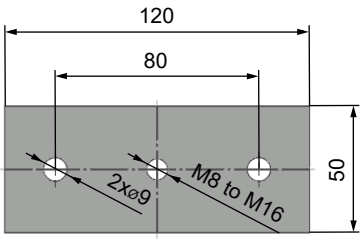
5.1. Mounting to the ceiling wall

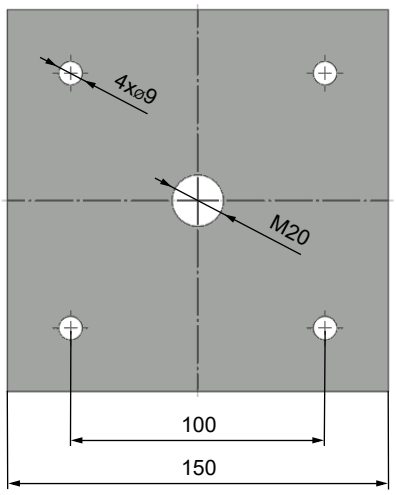
Fig. 16 Mounting to the ceiling wall

Anchoring possible after national standards

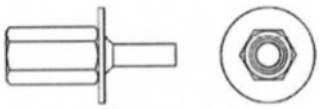


Hinge plates





Screw with internal thread and hexagon drive



Position:

1 Threaded rod M8 – M20
2 Nut
3 Washer
4 Coupling Nut
5 Anchor
6 Hinge plate - min. thickness 10 mm
7 Concrete screw tested for fire resistance R30-R90, max. Tension up to 0.75 KN (length 35 mm)

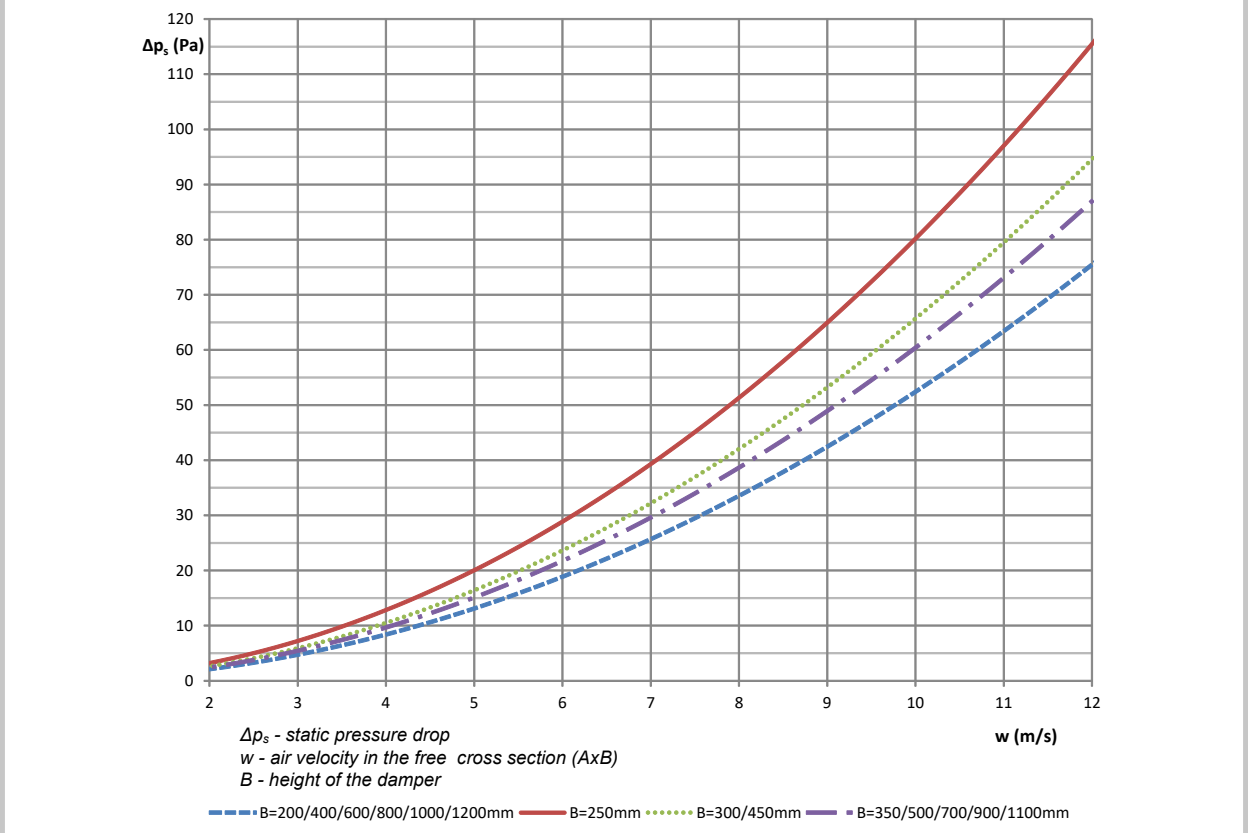
Load capacities of threaded hanger rods F [N] at the required fire resistance 90 minutes

Size	A_s [mm²]	Weight G [kg]	
		for 1 piece	for 1 pair
M8	36,6	22	44
M10	58	35	70
M12	84,3	52	104
M14	115	70	140
M16	157	96	192
M18	192	117	234
M20	245	150	300

III. TECHNICAL DATA

6. Pressure drops

Diagram 1 Pressure drops of the damper was determined for air density 1,2 kg/m^3



7. Noise data

7.1. Sound power level corrected with filter A

Tab. 7.1.1. Sound power level Lw in dB(A) for B=250/300/450mm, damper fully open

	f (Hz)	63	125	250	500	1000	2000	4000	8000	Total
w (m/s)	**2**	16	24	29	29	28	26	23	9	**35**
	3	25	33	38	38	37	35	32	18	**44**
	4	32	40	45	45	44	42	39	25	**51**
	5	38	46	51	51	50	48	45	31	**57**
	6	42	50	55	55	54	52	49	35	**61**
	7	46	54	59	59	58	56	53	39	**65**
	8	49	57	62	62	61	59	56	42	**68**
	9	50	58	63	63	62	60	57	43	**69**
	10	53	61	66	66	65	63	60	46	**72**
	11	55	63	68	68	67	65	62	48	**74**
	12	57	65	70	70	69	67	64	50	**76**

w - air velocity in the free cross section (AxB) - i.e. before blades
f - frequency of octave band

Tab. 7.1.2. Sound power level Lw in dB(A) for B=350/500/700/900/1100mm, damper fully open

	f (Hz)	63	125	250	500	1000	2000	4000	8000	Total
w (m/s)	**2**	15	23	28	28	27	25	22	8	**34**
	3	24	32	37	37	36	34	31	17	**43**
	4	31	39	44	44	43	41	38	24	**50**
	5	36	44	49	49	48	46	43	29	**55**
	6	41	49	54	54	53	51	48	34	**60**
	7	45	53	58	58	57	55	52	38	**64**
	8	48	56	61	61	60	58	55	41	**67**
	9	49	57	62	62	61	59	56	42	**68**
	10	51	59	64	64	63	61	58	44	**70**
	11	53	61	66	66	65	63	60	46	**72**
	12	55	63	68	68	67	65	62	48	**74**

w - air velocity in the free cross section (AxB) - i.e. before blades
f - frequency of octave band

Tab. 7.1.3. Sound power level Lw in dB(A) for B=200/400/600/800/1000/1200mm, damper fully open

	f (Hz)	63	125	250	500	1000	2000	4000	8000	Total
w (m/s)	**2**	13	21	26	26	25	23	20	6	**32**
	3	21	29	34	34	33	31	28	14	**40**
	4	28	36	41	41	40	38	35	21	**47**
	5	34	42	47	47	46	44	41	27	**53**
	6	38	46	51	51	50	48	45	31	**57**
	7	42	50	55	55	54	52	49	35	**61**
	8	45	53	58	58	57	55	52	38	**64**
	9	47	55	60	60	59	57	54	40	**66**
	10	48	56	61	61	60	58	55	41	**67**
	11	50	58	63	63	62	60	57	43	**69**
	12	52	60	65	65	64	62	59	45	**71**

w - air velocity in the free cross section (AxB) - i.e. before blades
f - frequency of octave band

IV. MATERIAL, FINISHING

8. Material

8.1. Damper casing and damper blade are made of galvanized plate without any other surface finish.

8.2. Fasteners are galvanized.

8.3. The actuator cover is made of fire-resistant material (fire protection board)

V. INSPECTION, TESTING

9. Inspection, testing

9.1. The appliance is constructed and preset by the manufacturer, its operation is dependent on proper installation and adjustment.

VI. TRANSPORTATION AND STORAGE

10. Logistic terms

10.1. Dampers are transported by box freight vehicles without direct weather impact, there must not occur any shocks and ambient temperature must not exceed +40°C. Dampers must be protected against mechanic damages when transported and manipulated. During transportation, the damper blade must be in the "CLOSED" position.

10.2. Dampers are stored indoor in environment without any aggressive vapours, gases or dust. Indoor temperature must be in the range from -5°C to +40°C and maximum relative humidity 80%. Dampers must be protected against mechanic damages when transported and manipulated.

VII. ASSEMBLY, ATTENDANCE, MAINTENANCE AND REVISIONS

11. Assembly

11.1. Assembly, maintenance and damper function check can be done only by qualified and trained person, i.e. “AUTHORIZED PERSON” according to the manufacturer documentation. All works done on the smoke control dampers must be done according international and local norms and laws.

11.2. All effective safety standards and directives must be observed during damper assembly.

11.3. To ensure reliable smoke exhaust damper function it is necessary to avoid blocking the closing mechanism and contact surfaces with collected dust, fibre and sticky materials and solvents.

11.4. **Manual operation**

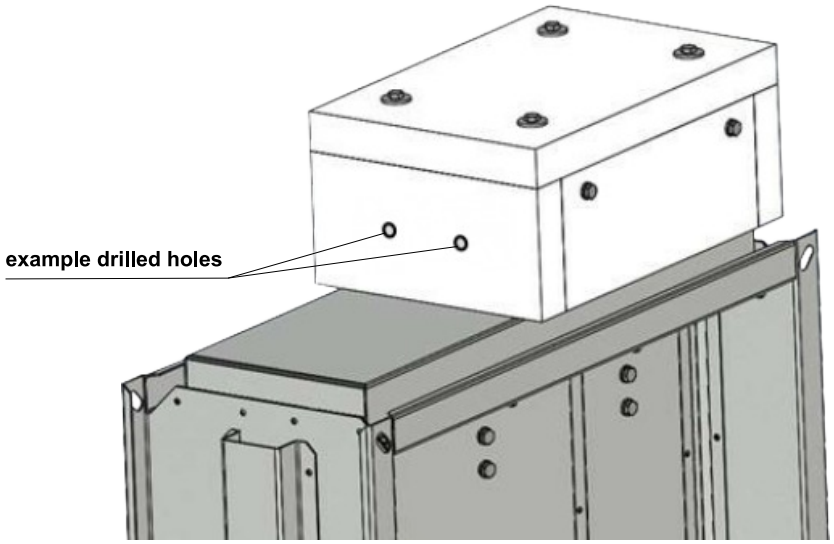
Without power supply, the damper can be operated manually and fixed in any required position.

11.5. Electrical connection of the actuator in protection box

Protection box without slot or predrilled holes

Drill two holes into the protection box (from outside to inside) and pull through field wiring cables (fire resistant cables) to connect actuator trailing lead. Protection box is made of calcium silicate plates.

Fig. 17 Example of position of holes in the wall of the box, without pre-manufactured slot

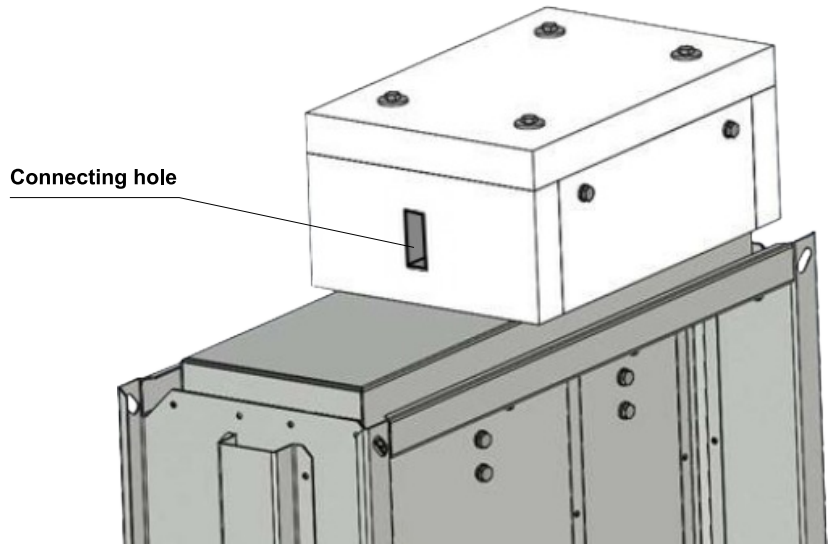


Procedure:

- Use drill (drill size acc. To suit connecting cable Ø + 2 mm for seal up by mastic) and make two holes (see fig. 17). **It is possible to drill holes in any side of the housing.**
- Pull the heat resistant cable through the calcium silicate plate (wall) and connect with cables from actuator acc. to above mentioned electrical diagram.
- Seal up the space around cable with fire resistant mastic (HILTI CFS-S ACR, PROMASTOP) or equivalent.
- Let the mastic harden.

Protection box with slot including intumescent tapes – not available for UK

Fig. 18 Example of pre-manufactured slot in the insulating box, with intumescent tape inside slot



To connect the actuator, use the prepared hole in the box, which is equipped with intumescent tape. If necessary, the hole can be additionally filled with fire-resistant sealant.

12. Entry into service and revisions

12.1. Before entering the dampers into operation after assembly and after sequential revisions, checks and functionality tests of all designs including operation of the electrical components must be successfully provided and finished. After entering into operation, these revisions must be done according to requirement set by national regulations.

12.1.1. In case that dampers are found unable to serve for their function for any cause, it must be clearly marked. The operator is obliged to ensure that the damper is put into condition in which it is ready for function and meanwhile he is obliged to provide the fire protection by another appropriate way.

12.1.2. Results of regular checks, imperfections found and all-important facts connected with the damper function must be recorded in the "FIRE BOOK" and immediately reported to the operator.

12.2. Before entering the dampers into operation after their assembly and by sequential checks, the following checks must be carried out for all designs.

12.2.1. Visual inspection of proper damper integration, inside damper area, damper blade, contact surfaces and silicon sealing.

12.2.2. Check of damper blade displacement can be realize after actuating mechanism supply connection or signal connection from higher level control systems. Blade displacement from position “OPEN” to position “CLOSED” and return displacement is checked.

13. Spare parts

13.1. Spare parts are supplied only on basis of an order.

VIII. PRODUCT DATA

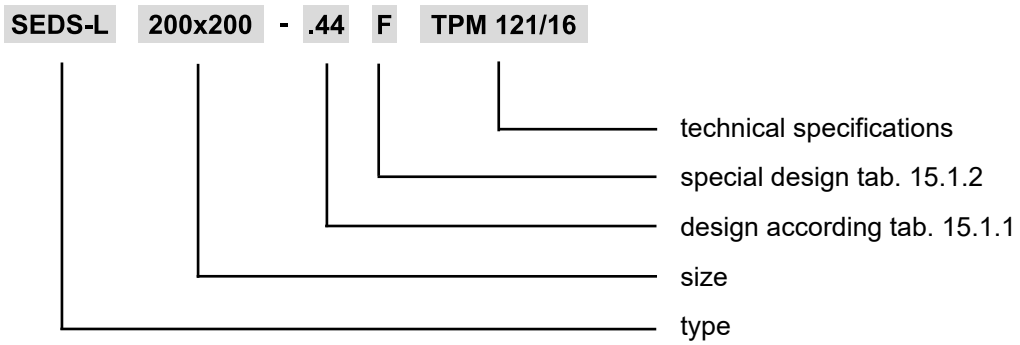
14. Product label

14.1. Product label is placed on the damper casing

Fig. 19 **Product label (Nameplate)**

IX. ORDERING INFORMATION

15. Ordering key



Tab. 15.1.1. Dampers design

Dampers design	Additional digit
with actuating mechanism BEN, BEE, BE for 230V	.44
with actuating mechanism BEN, BEE, BE for 24V	.54
with actuating mechanism BEN (BEE)-SR for 24V	.65*
with the communication and supply device BKNE 230-24 and actuating mechanism BEN (BEE, BE)-ST for 24V	.66

*** Design .65 is not available by using actuating mechanism BE**

Tab. 15.1.2. Special dampers design

Special dampers design	Additional digit
insulation inside of the blades	I
flanges with height 20 mm	F

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