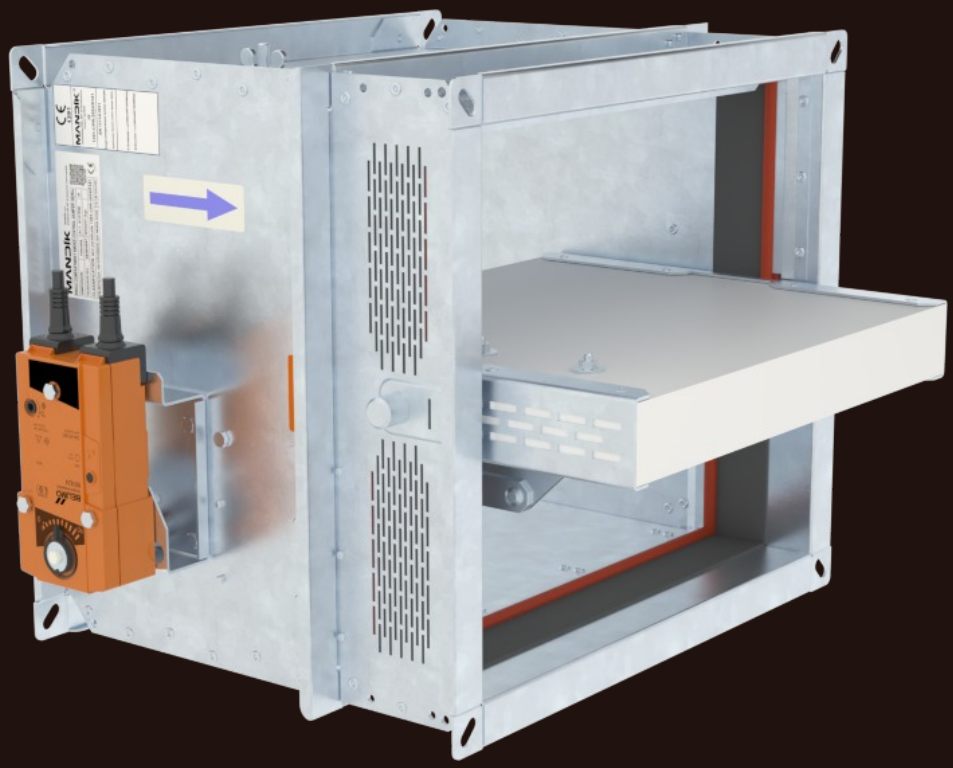
MANDÍK

TPM 159/22
Version 2026-05-22

MSD

Multi compartment smoke control damper

Technical Documentation
Installation, Commissioning, Operation, Maintenance and Service Manual



UK CA 2822

CE 1391

CCPI ASSESSED PRODUCT INFORMATION 015800192/1227 Smoke Control Dampers

MANDÍK®

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These technical specifications state a row of manufactured sizes and models of Multi compartment smoke control damper MSD. It is valid for production, designing, ordering, delivery, maintenance and operation.

CONTENT

I. GENERAL

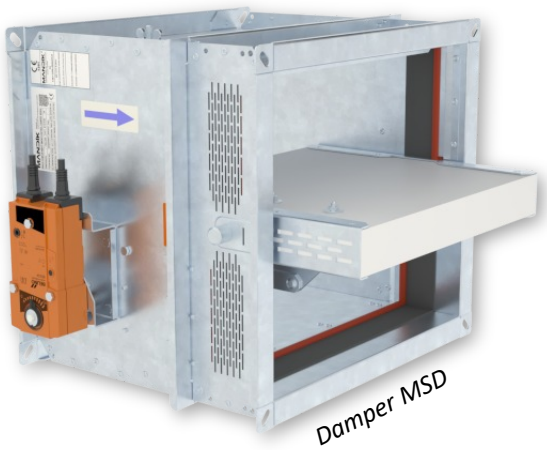
Description

Dampers - MSD are designed into an inlet or extract smoke ventilation system. The dampers are designed either to close to provide compartmentalization or to open (for fresh air inlet) or to allow removal of the heat and combustible products from a fire in the affected fire zone/compartment.

The damper blade is controlled by electrical actuating mechanism.

Dampers are fire resistant and are intended for systems with automatic activation.

Dampers are designed for using in fire compartments that can be connected to the smoke exhaust ducts (tested according to BS EN 1366-8) or they can be installed in or on the construction of the fire compartment.



Damper MSD

Damper characteristics

- CE certified acc. to BS EN 12101-8
- Tested in accordance with BS EN 1366-10
- Classified acc. to BS EN 13501-4
- External Casing leakage class min. ATC 3 (old marking “C“) acc. to BS EN 1751
- Internal leakage min. class 2, for max. dimension 1500 x 800 mm min. class 3 acc. to BS EN 1751
- Cycling test in class C_{mod} acc. to BS EN 12101-8
- Certificate of constancy of performance UKCA No. 2822-UKCA-CPR-XXXX
- Certificate of constancy of performance CE No. 1391-CPR-XXXX/XXXX
- Declaration of Perfomance UKCA No. PM/MSD/02/XX/X
- Declaration of Perfomance CE No. PM/MSD/01/XX/X
- Hygienic assessment - Report No. 1.6/pos/19/19b

Classification of Dampers

Supporting construction	Installation type / system	Classification
Horizontal or vertical duct system	Damper installed Into or onto a duct	EI 120 (v_{ed}-h_{od} i↔o) S1500C_{mod}HOT400/30AAmulti
Solid wall construction - 125 mm min. wall thickness	Mortar or gypsum	EI 120 (v_{ew} i↔o) S1500C_{mod}HOT400/30AAmulti
Solid wall construction - 100 mm min. wall thickness	Ablative Coated Batt	EI 90 (v_{ew} i↔o) S1500C_{mod}HOT400/30AAmulti
Gypsum plasterboard wall - 125 mm min. wall thickness	Mortar or gypsum	EI 120 (v_{ew} i↔o) S1500C_{mod}HOT400/30AAmulti
Gypsum plasterboard wall - 100 mm min. wall thickness	Ablative Coated Batt	EI 90 (v_{ew} i↔o) S1500C_{mod}HOT400/30AAmulti
Solid ceiling construction - 150 mm min. ceiling thickness	Mortar or gypsum	EI 120 (h_{ow} i↔o) S1500C_{mod}HOT400/30AAmulti
	Ablative Coated Batt	EI 90 (h_{ow} i↔o) S1500C_{mod}HOT400/30AAmulti

Working conditions

- Exact damper function is provided under the following conditions
  - maximum air velocity 15 m/s
  - underpressure max. -1500 Pa or overpressure max. 500 Pa
- Dampers can be installed with a horizontal blade axis.
- Dampers are designed for macroclimatic areas with mild climate according to BS EN IEC 60 721-3-3 ed.2., class 3K22.
- Temperature in the place of installation is permitted to range from -30°C to +50°C.

II. DESIGN

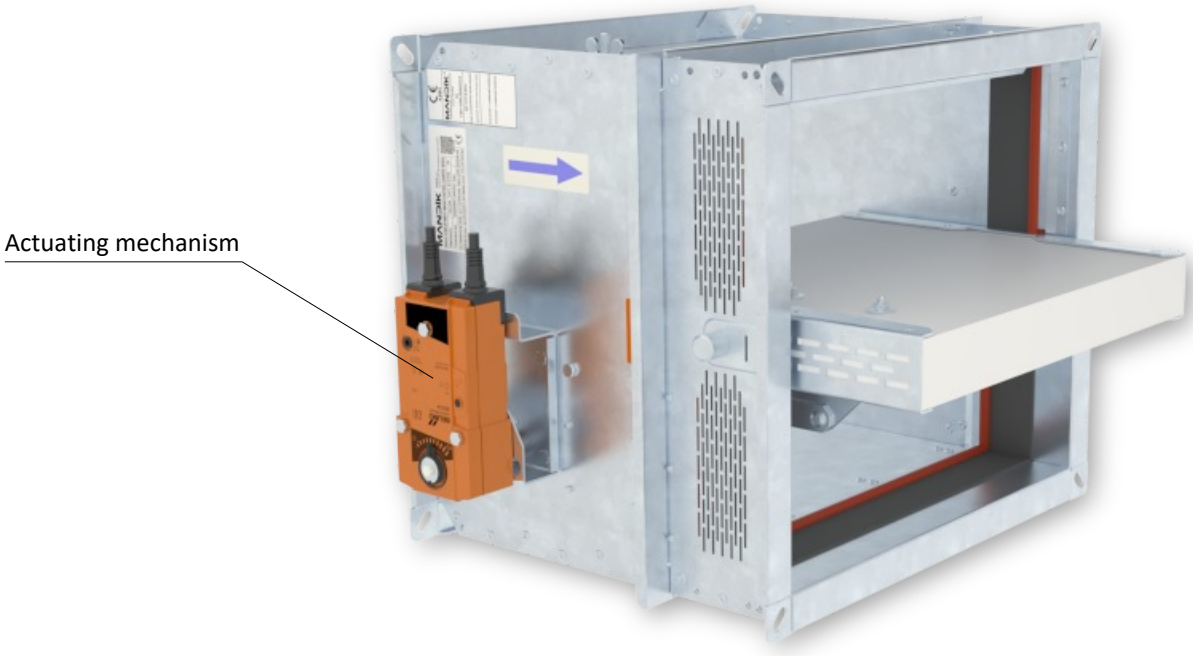
Design with actuating mechanism

Design .44 and .54

- Belimo actuators are used for dampers, series BEN, BEE, BE for 230V AC resp. 24 V AC/DC, Schischek InMax 50.75-S actuators (universal 24V or 230V supply) are used for large size of dampers.
- 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 power and control cable must be CAT 3 as BS EN8519.

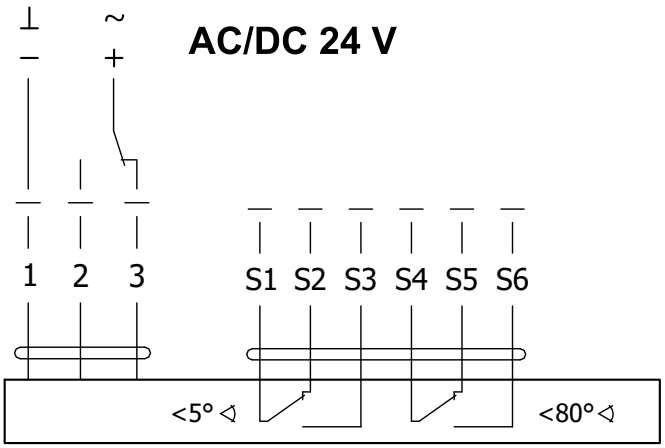
Design .65

- 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 power and control cable must be CAT 3 as BS EN8519.

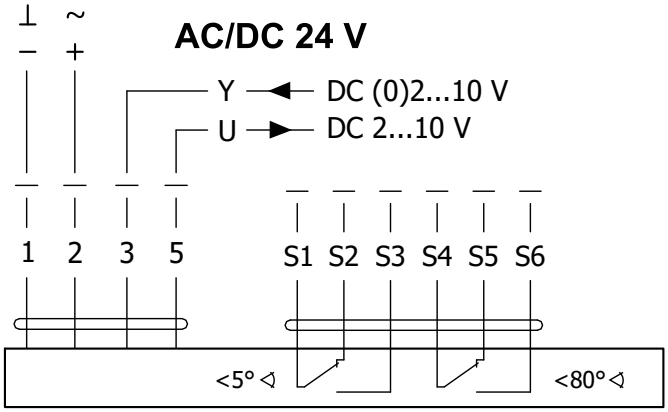


Design .44, .54 and .65

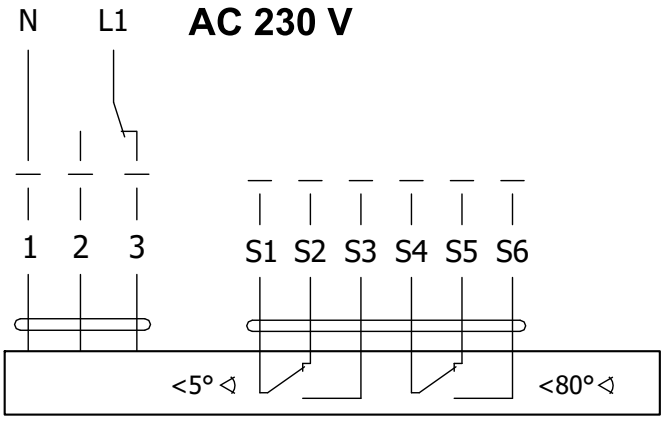
Actuator BELIMO BEN 24(-ST)



Actuator BELIMO BEN 24-SR



Actuator BELIMO BEN 230

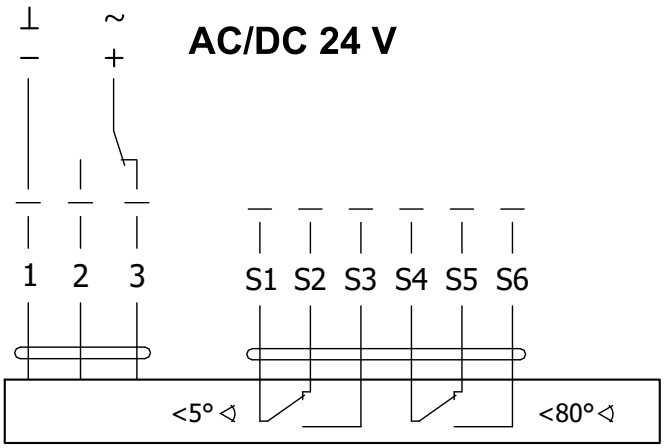


Extended leads are not possible with smoke control dampers as the belimo cabls are not fire rated to a high Field wiring must be brought into and terminated within the damper housing. For more detail → see pages 43 to 44, paragraph Assembly.

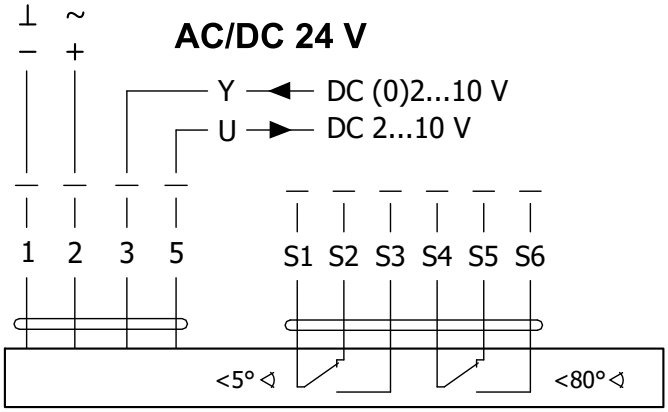
Actuator BELIMO BEN 24(-ST), BEN 24-SR, BEN 230			
Actuator BELIMO - 15 Nm	**BEN 24(-ST)**	**BEN 24-SR***	**BEN 230**
Power voltage	AC/DC 24 V 50/60Hz	AC/DC 24 V 50/60Hz	AC 230 V 50/60Hz
Power consumption - in operation - in the end position	3 W 0,1 W	3 W 0,3 W	4 W 0,4 W
Dimensioning	6 VA (Imax 8,2 A @ 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

* Only available for 24V and selected damper sizes

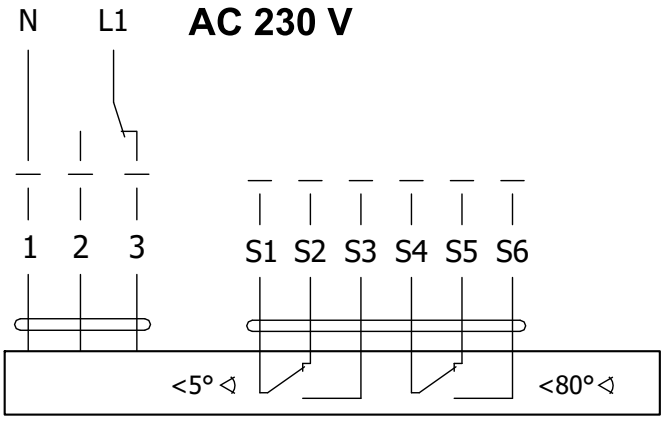
Actuator BELIMO BEE 24(-ST)



Actuator BELIMO BEE 24-SR



Actuator BELIMO BEE 230

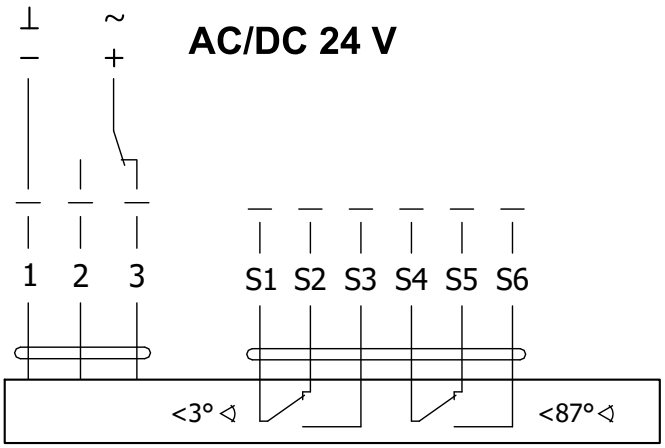


Extended leads are not possible with smoke control dampers as the belimo cabls are not fire rated to a high Field wiring must be brought into and terminated within the damper housing. For more detail → see pages 43 to 44, paragraph Assembly.

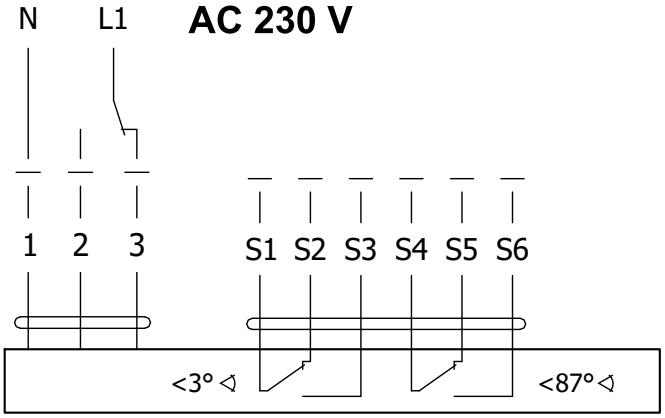
Actuator BELIMO BEE 24(-ST), BEE 24-SR, BEE 230			
Actuator BELIMO - 25 Nm	**BEE 24(-ST)**	**BEE 24-SR***	**BEE 230**
Power voltage	AC/DC 24 V 50/60Hz	AC/DC 24 V 50/60Hz	AC 230 V 50/60Hz
Power consumption - in operation - in the end position	2,5 W 0,1 W	3 W 0,3 W	3,5 W 0,4 W
Dimensioning	5 VA (Imax 8,2 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

* Only available for 24V and selected damper sizes

Actuator BELIMO BE 24-12(-ST)



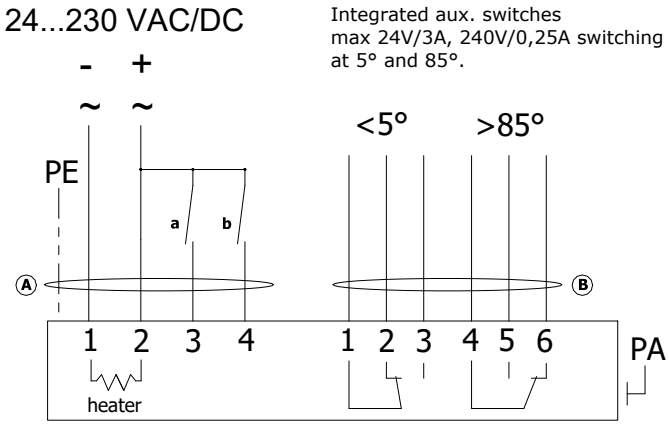
Actuator BELIMO BE 230-12



Extended leads are not possible with smoke control dampers as the belimo cabls are not fire rated to a high Field wiring must be brought into and terminated within the damper housing. For more detail → see pages 43 to 44, paragraph Assembly.

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 … +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 (BE 24-ST) with plug connectors	

Actuator SCHISCHEK InMax 50.75-S



Integrated aux. switches
max 24V/3A, 240V/0,25A switching
at 5° and 85°.

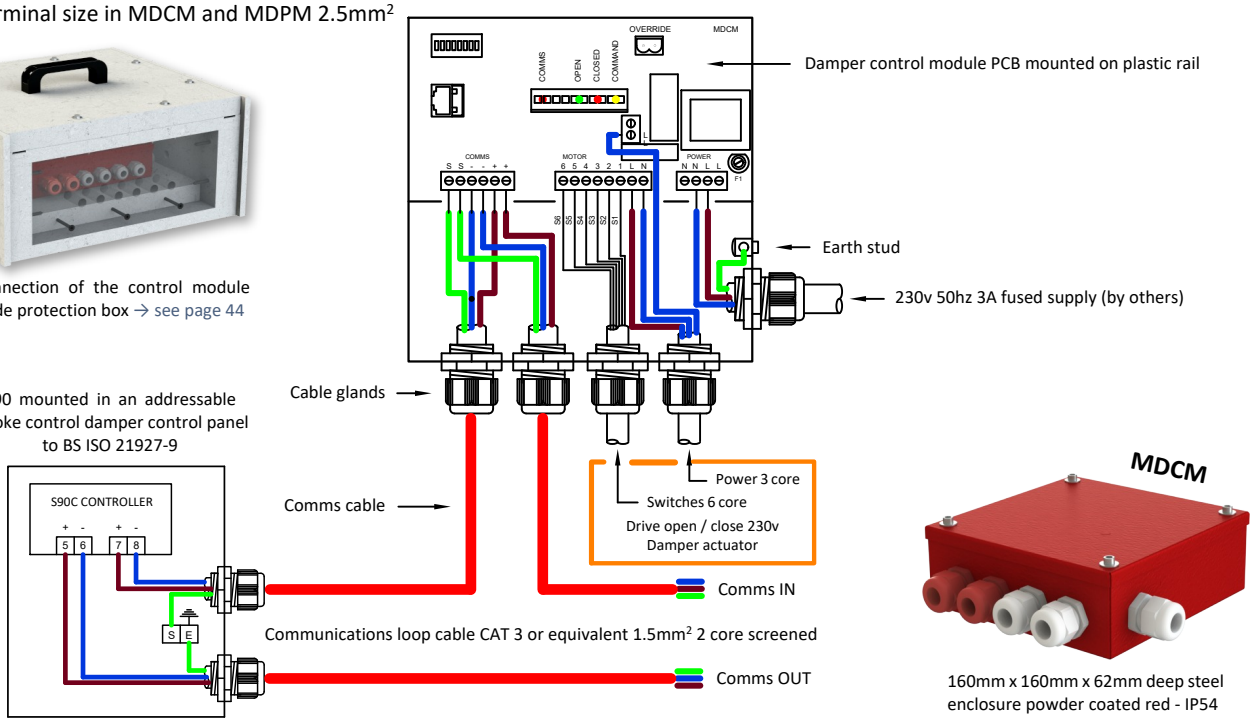
Extended leads are not possible with smoke control dampers as the belimo cabls are not fire rated to a high Field wiring must be brought into and terminated within the damper housing. For more detail → see pages 43 to 44, paragraph Assembly.

Actuator SCHISCHEK InMax 50.75-S	
Actuator SCHISCHEK	**InMax 50.75-S**
Power voltage	24-240 VAC/DC 50/60Hz
Power consumption - motoring - heating	10 W 16 W (start at -20°C)
Protection class	I
Degree of protection	IP 66
Adjustment time for 95°	< 60 s
Ambient temperature Storage temperature	-40°C … +50°C -40°C … +70°C
Connection	Cable 1 m, 0,5 mm^2

Communication and control module MDCM

- The MDCM damper control module is connected on a bi directional communication loop back to a control panel, typically located at the FCC.
- Each MDCM has a 230v local spur to power the damper actuator.
- Max terminal size in MDCM and MDPM 2.5mm²
- Up to 96x MDCM's can be connected on one loop and multiple loops can be incorporated.
- With an MA or AA system the MDCM's are mounted in a fire rated and tested Ca-Si housing to BS EN1366-10.

Details of connection of the control module interfaces inside protection box → see page 44

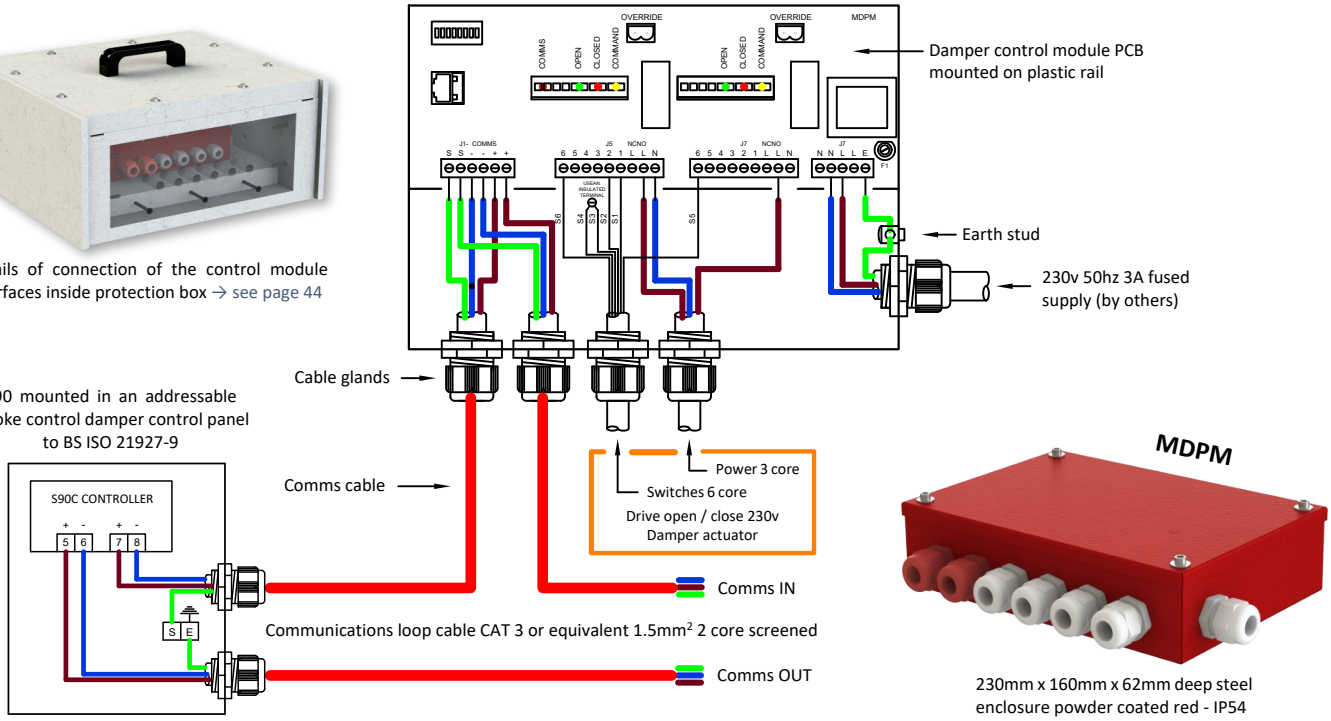


160mm x 160mm x 62mm deep steel enclosure powder coated red - IP54

Communication and control module MDPM

- The MDPM damper control module is a combined control module and damper positioning module to provide a balanced/3R position.
- It is connected on a bi directional communication loop back to a control panel.
- Max terminal size in MDCM and MDPM 2.5mm²
- Each MDPM has a 230v local spur for powering the damper actuator, located at the FCC.
- Up to 96x MDPM's can be connected on one loop and multiple loops can be incorporated.
- With an MA or AA system the MDPM's are mounted in a fire rated and tested Ca-Si housing to BS EN1366-10.

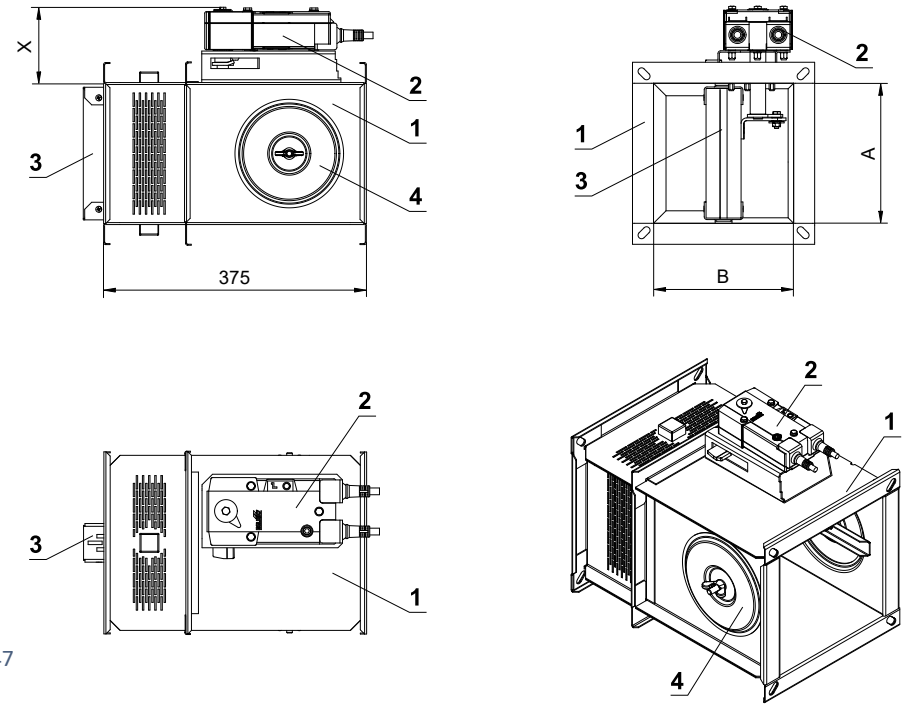
Details of connection of the control module interfaces inside protection box → see page 44



230mm x 160mm x 62mm deep steel enclosure powder coated red - IP54

III. DIMENSIONS

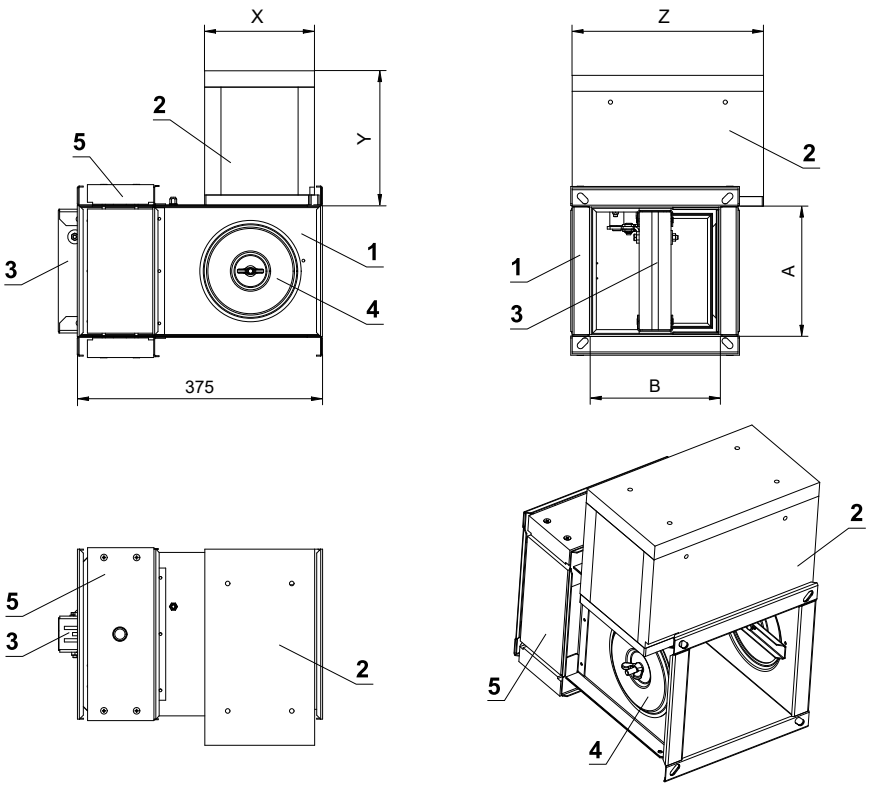
MSD with actuating mechanism



X = 94mm - BEN
98mm - BEE
115,2mm - BE
151mm - SCHISCHEK

1 MSD - design „A" → see pages 46 to 47
2 Actuating mechanism
3 Damper blade
4 Access door/ inspection cover

MSD with actuating mechanism, protective cladding boards and insulation box



X = 168mm - BEN (BEE)
171mm - BE
220mm - SCHISCHEK

Y = 250mm - BEN (BEE)
260mm - BE
260mm - SCHISCHEK

Z = 300mm - BEN (BEE)
370mm - BE
430mm - SCHISCHEK

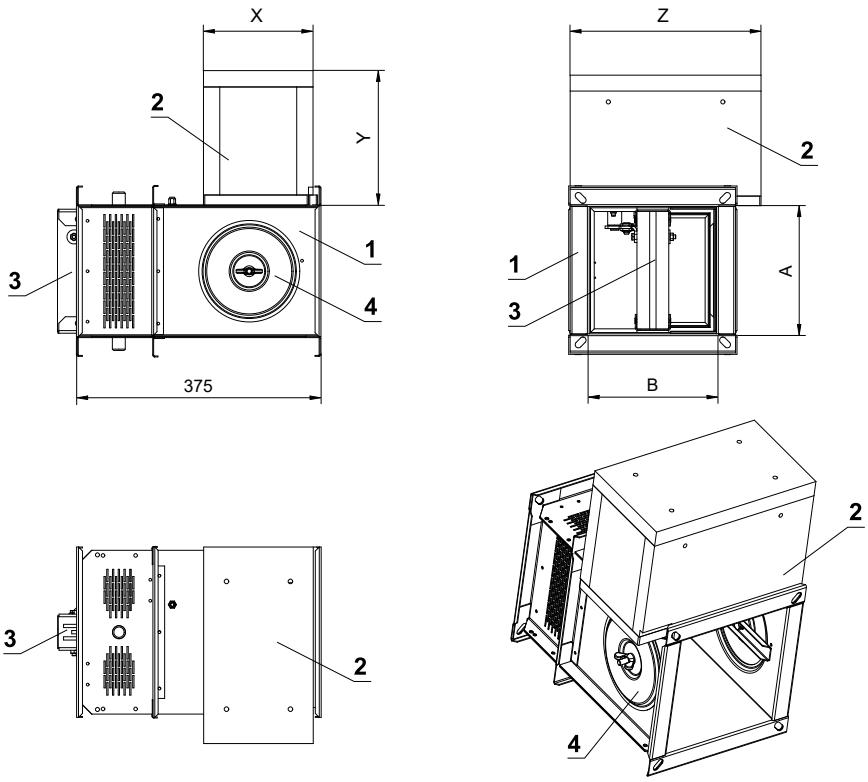
1 MSD - design „IB1" → see pages 46 to 47
2 Insulation box
3 Damper blade
4 Access door/ inspection cover
5 Protective cladding boards

MSD with actuating mechanism and insulation box

X = 168mm - BEN (BEE)
171mm - BE
220mm - SCHISCHEK

Y = 250mm - BEN (BEE)
260mm - BE
260mm - SCHISCHEK

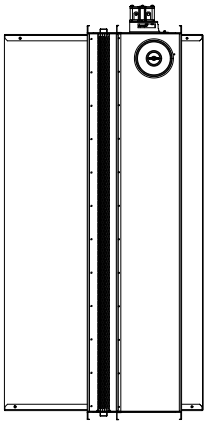
Z = 300mm - BEN (BEE)
370mm - BE
430mm - SCHISCHEK

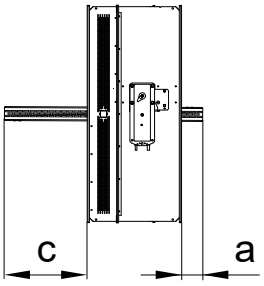


1 MSD - design „IB" → see pages 46 to 47
2 Insulation box
3 Damper blade
4 Access door/ inspection cover

Damper blade overlaps

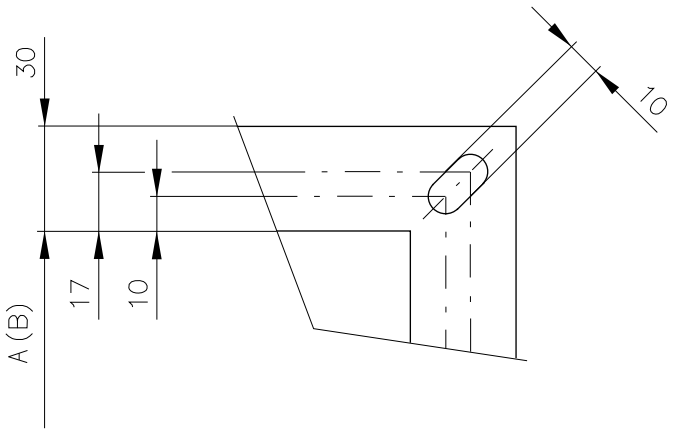
- Open damper blade overlaps the damper body by the value “c” or “a” and “c”. These values are specified in chapter Technical parameters → see pages 12 to 16.





Values "a" and "c" has to be respected when projecting related smoke exhaust ducts.

Flange with corner hole



Flanges of dampers are 30 mm wide with oval hole.

Technical parameters

A x B [mm]		Damper blade overlaps a [mm]	Damper blade overlaps c [mm]	Free area S_f [m²]	Weight [kg]	Actuating mechanism type
160 x	180	–	19	0,0162	17,4	BELIMO BEN (15 N.m)
	200	–	29	0,0191	17,7	
	225	–	41,5	0,0228	18,1	
	250	–	54	0,0264	18,5	
	280	–	69	0,0307	19	
	300	–	79	0,0336	19,3	
	315	–	86,5	0,0358	19,5	
	355	–	106,5	0,0416	20,1	
	400	–	129	0,0481	20,8	
	450	–	154	0,0554	21,6	
	500	–	179	0,0626	22,3	
	550	–	204	0,0699	23,1	
	560	–	209	0,0713	23,3	
	600	–	229	0,0771	23,9	
	630	–	244	0,0815	24,3	
	650	9	254	0,0844	24,6	
	700	34	279	0,0916	25,4	
	710	39	284	0,0931	25,5	
	750	59	304	0,0989	26,1	
	800	84	329	0,1061	26,9	
180 x	180	–	19	0,0185	17,8	
	200	–	29	0,0218	18,1	
	225	–	41,5	0,0259	18,5	
	250	–	54	0,0300	19	
	280	–	69	0,0350	19,5	
	300	–	79	0,0383	19,8	
	315	–	86,5	0,0408	20,1	
	355	–	106,5	0,0474	20,8	
	400	–	129	0,0548	21,6	
	450	–	154	0,0630	22,4	
	500	–	179	0,0713	23,3	
	550	–	204	0,0795	24,1	
	560	–	209	0,0812	24,3	
	600	–	229	0,0878	25	
	630	–	244	0,0927	25,5	
	650	9	254	0,0960	25,9	
	700	34	279	0,1043	26,7	
	710	39	284	0,1059	26,9	
	750	59	304	0,1125	27,5	
	800	84	329	0,1208	28,4	
200 x	180	–	19	0,0207	18,1	
	200	–	29	0,0244	18,5	
	225	–	41,5	0,0290	19	
	250	–	54	0,0337	19,5	
	280	–	69	0,0392	20	
	300	–	79	0,0429	20,4	
	315	–	86,5	0,0457	20,7	
	355	–	106,5	0,0531	21,5	
	400	–	129	0,0614	22,3	
	450	–	154	0,0707	23,3	
	500	–	179	0,0799	24,2	
	550	–	204	0,0892	25,2	
	560	–	209	0,0910	25,4	
200 x	600	–	229	0,0984	26,1	
	630	–	244	0,1040	26,7	
	650	9	254	0,1077	27,1	
	700	34	279	0,1169	28	
	710	39	284	0,1188	28,2	
	750	59	304	0,1262	29	
	800	84	329	0,1354	29,9	
225 x	180	–	19	0,0235	18,5	
	200	–	29	0,0277	19	
	225	–	41,5	0,0330	19,5	
	250	–	54	0,0382	20,1	
	280	–	69	0,0445	20,7	
	300	–	79	0,0487	21,1	
	315	–	87	0,0519	21,5	
	355	–	86,5	0,0603	22,3	
	400	–	106,5	0,0697	23,3	
	450	–	154	0,0802	24,4	
	500	–	179	0,0907	25,4	
	550	–	204	0,1012	26,5	
	560	–	209	0,1033	26,7	
	600	–	229	0,1117	27,5	
	630	–	244	0,1180	28,2	
	650	9	254	0,1222	28,6	
	700	34	279	0,1327	29,6	
	710	39	284	0,1348	29,9	
	750	59	304	0,1432	30,7	
	800	84	329	0,1537	31,7	
250 x	180	–	19	0,0263	19	
	200	–	29	0,0310	19,5	
	225	–	41,5	0,0369	20,1	
	250	–	54	0,0428	20,7	
	280	–	69	0,0498	21,4	
	300	–	79	0,0545	21,9	
	315	–	86,5	0,0580	22,2	
	355	–	106,5	0,0674	23,2	
	400	–	129	0,0780	24,2	
	450	–	154	0,0898	25,4	
	500	–	179	0,1015	26,6	
	550	–	204	0,1133	27,8	
	560	–	209	0,1156	28	
	600	–	229	0,1250	29	
	630	–	244	0,1321	29,6	
	650	9	254	0,1368	30,1	
	700	34	279	0,1485	31,3	
	710	39	284	0,1509	31,5	
	750	59	304	0,1603	32,4	
	800	84	329	0,1720	33,6	
280 x	180	–	19	0,0297	19,5	
	200	–	29	0,0350	20	
	225	–	41,5	0,0416	20,7	
	250	–	54	0,0482	21,4	
	280	–	69	0,0562	22,2	
	300	–	79	0,0615	22,7	

Sizes listed within the maximum/minimum sizes can be manufactured on request.

A x B [mm]		Damper blade overlaps a [mm]	Damper blade overlaps c [mm]	Free area S_f [m²]	Weight [kg]	Actuating mechanism type
280 x	315	–	86,5	0,0655	23,1	BELIMO BEN (15 N.m)
	355	–	106,5	0,0761	24,2	
	400	–	129	0,0880	25,4	
	450	–	154	0,1012	26,7	
	500	–	179	0,1145	28	
	550	–	204	0,1277	29,3	
	560	–	209	0,1304	29,6	
	600	–	229	0,1410	30,6	
	630	–	244	0,1489	31,4	
	650	9	254	0,1542	31,9	
	700	34	279	0,1675	33,2	
	710	39	284	0,1701	33,5	
	750	59	304	0,1807	34,5	
	800	84	329	0,1940	35,8	
300 x	180	–	19	0,0319	19,8	
	200	–	29	0,0376	20,4	
	225	–	41,5	0,0447	21,1	
	250	–	54	0,0519	21,9	
	280	–	69	0,0604	22,7	
	300	–	79	0,0661	23,3	
	315	–	86,5	0,0704	23,7	
	355	–	106,5	0,0818	24,9	
	400	–	129	0,0946	26,1	
	450	–	154	0,1089	27,5	
	500	–	179	0,1231	29	
	550	–	204	0,1374	30,3	
	560	–	209	0,1402	30,6	
	600	–	229	0,1516	31,7	
	630	–	244	0,1602	32,6	
	650	9	254	0,1659	33,1	
	700	34	279	0,1801	34,5	
	710	39	284	0,1830	34,8	
	750	59	304	0,1944	35,9	
	800	84	329	0,2086	37,2	
315 x	180	–	19	0,0336	20,1	
	200	–	29	0,0396	20,7	
	225	–	41,5	0,0471	21,5	
	250	–	54	0,0546	22,2	
	280	–	69	0,0636	23,1	
	300	–	79	0,0696	23,7	
	315	–	86,5	0,0741	24,2	
	355	–	106,5	0,0861	25,4	
	400	–	129	0,0996	26,7	
	450	–	154	0,1146	28,2	
	500	–	179	0,1296	29,6	
	550	–	204	0,1446	31,1	
	560	–	209	0,1476	31,4	
	600	–	229	0,1596	32,6	
	630	–	244	0,1686	33,4	
	650	9	254	0,1746	34	
	700	34	279	0,1896	35,5	
	710	39	284	0,1926	35,7	
	750	59	304	0,2046	36,9	
	800	84	329	0,2196	38,3	
355 x	180	–	19	0,0381	20,8	
	200	–	29	0,0449	21,5	
	225	–	41,5	0,0534	22,3	
	250	–	54	0,0619	23,2	
	280	–	69	0,0721	24,2	
	300	–	79	0,0789	24,9	
	315	–	86,5	0,0840	25,4	
	355	–	106,5	0,0976	26,7	
	400	–	129	0,1129	28,2	
	450	–	154	0,1299	29,9	BELIMO BEN (15 N.m)
	500	–	179	0,1469	31,5	
	550	–	204	0,1639	33,1	
	560	–	209	0,1673	33,5	
	600	–	229	0,1809	34,8	
	630	–	244	0,1911	35,7	
	650	9	254	0,1979	36,4	
	700	34	279	0,2149	38	
	710	39	284	0,2183	38,3	
	750	59	304	0,2319	39,6	
	800	84	329	0,2489	41,2	BELIMO BEE (25 N.m)
400 x	180	–	19	0,0431	21,6	BELIMO BEN (15 N.m)
	200	–	29	0,0508	22,3	
	225	–	41,5	0,0604	23,3	
	250	–	54	0,0701	24,2	
	280	–	69	0,0816	25,4	
	300	–	79	0,0893	26,1	
	315	–	86,5	0,0951	26,7	
	355	–	106,5	0,1105	28,2	
	400	–	129	0,1278	29,9	
	450	–	154	0,1471	31,7	
	500	–	179	0,1663	33,6	
	550	–	204	0,1856	35,4	
	560	–	209	0,1894	35,8	
	600	–	229	0,2048	37,2	
	630	–	244	0,2164	38,3	
	650	9	254	0,2241	39	
	700	34	279	0,2433	40,8	
	710	39	284	0,2472	41,2	
	750	59	304	0,2626	42,6	
	800	84	329	0,2818	44,4	BELIMO BEE (25 N.m)
450 x	180	–	19	0,0487	22,4	BELIMO BEN (15 N.m)
	200	–	29	0,0574	23,3	
	225	–	41,5	0,0683	24,4	
	250	–	54	0,0792	25,4	
	280	–	69	0,0922	26,7	
	300	–	79	0,1009	27,5	
	315	–	86,5	0,1074	28,2	
	355	–	106,5	0,1248	29,9	
	400	–	129	0,1444	31,7	
	450	–	154	0,1662	33,8	
	500	–	179	0,1879	35,9	
	550	–	204	0,2097	37,9	
	560	–	209	0,2140	38,3	
	600	–	229	0,2314	39,9	
	630	–	244	0,2445	41,1	
	650	9	254	0,2532	41,9	

Sizes listed within the maximum/minimum sizes can be manufactured on request.

A x B [mm]		Damper blade overlaps a [mm]	Damper blade overlaps c [mm]	Free area S_f [m²]	Weight [kg]	Actuating mechanism type
450 x	700	34	279	0,2749	43,9	BELIMO BEN (15 N.m)
	710	39	284	0,2793	44,3	
	750	59	304	0,2967	45,9	
	800	84	329	0,3184	47,9	BELIMO BEE (25 N.m)
500 x	180	–	19	0,0543	23,3	BELIMO BEN (15 N.m)
	200	–	29	0,0640	24,2	
	225	–	41,5	0,0761	25,4	
	250	–	54	0,0883	26,6	
	280	–	69	0,1028	28	
	300	–	79	0,1125	29	
	315	–	86,5	0,1198	29,6	
	355	–	106,5	0,1392	31,5	
	400	–	129	0,1610	33,6	
	450	–	154	0,1853	35,9	
	500	–	179	0,2095	38,1	
	550	–	204	0,2338	40,4	
	560	–	209	0,2386	40,8	
	600	–	229	0,2580	42,6	
	630	–	244	0,2726	43,9	
	650	9	254	0,2823	44,8	
	700	34	279	0,3065	47	
	710	39	284	0,3114	47,4	
	750	59	304	0,3308	49,2	
	800	84	329	0,3550	51,3	BELIMO BEE (25 N.m)
550 x	180	–	19	0,0599	24,1	BELIMO BEN (15 N.m)
	200	–	29	0,0706	25,2	
	225	–	41,5	0,0840	26,5	
	250	–	54	0,0974	27,8	
	280	–	69	0,1134	29,3	
	300	–	79	0,1241	30,3	
	315	–	86,5	0,1321	31,1	
	355	–	106,5	0,1535	33,1	
	400	–	129	0,1776	35,4	
	450	–	154	0,2044	37,9	
	500	–	179	0,2311	40,4	
	550	–	204	0,2579	42,8	
	560	–	209	0,2632	43,3	
	600	–	229	0,2846	45,3	
	630	–	244	0,3007	46,7	
	650	9	254	0,3114	47,7	
	700	34	279	0,3381	50	
	710	39	284	0,3435	50,5	
	750	59	304	0,3649	52,4	BELIMO BEE (25 N.m)
	800	84	329	0,3916	54,7	
560 x	180	–	19	0,0610	24,3	BELIMO BEN (15 N.m)
	200	–	29	0,0719	25,4	
	225	–	41,5	0,0856	26,7	
	250	–	54	0,0992	28	
	280	–	69	0,1155	29,6	
	300	–	79	0,1264	30,6	
	315	–	86,5	0,1346	31,4	
	355	–	106,5	0,1564	33,5	
	400	–	129	0,1809	35,8	
	450	–	154	0,2082	38,3	
	500	–	179	0,2354	40,8	
560 x	550	–	204	0,2627	43,3	BELIMO BEN (15 N.m)
	560	–	209	0,2681	43,8	
	600	–	229	0,2899	45,8	
	630	–	244	0,3063	47,2	
	650	9	254	0,3172	48,2	
	700	34	279	0,3444	50,6	
	710	39	284	0,3499	51,1	
	750	59	304	0,3717	53	BELIMO BEE (25 N.m)
	800	84	329	0,3989	55,4	
600 x	180	–	19	0,0655	25	BELIMO BEN (15 N.m)
	200	–	29	0,0772	26,1	
	225	–	41,5	0,0918	27,5	
	250	–	54	0,1065	29	
	280	–	69	0,1240	30,6	
	300	–	79	0,1357	31,7	
	315	–	86,5	0,1445	32,6	
	355	–	106,5	0,1679	34,8	
	400	–	129	0,1942	37,2	
	450	–	154	0,2235	39,9	
	500	–	179	0,2527	42,6	
	550	–	204	0,2820	45,3	
	560	–	209	0,2878	45,8	
	600	–	229	0,3112	47,9	
	630	–	244	0,3288	49,4	
	650	9	254	0,3405	50,5	
	700	34	279	0,3697	53	
	710	39	284	0,3756	53,5	BELIMO BEE (25 N.m)
	750	59	304	0,3990	55,6	
	800	84	329	0,4282	58,1	
630 x	180	–	19	0,0689	25,5	BELIMO BEN (15 N.m)
	200	–	29	0,0812	26,7	
	225	–	41,5	0,0966	28,2	
	250	–	54	0,1119	29,6	
	280	–	69	0,1304	31,4	
	300	–	79	0,1427	32,6	
	315	–	86,5	0,1519	33,4	
	355	–	106,5	0,1765	35,7	
	400	–	129	0,2042	38,3	
	450	–	154	0,2349	41,1	
	500	–	179	0,2657	43,9	
	550	–	204	0,2964	46,7	
	560	–	209	0,3026	47,2	
	600	–	229	0,3272	49,4	
	630	–	244	0,3456	51,1	
	650	9	254	0,3579	52,1	
	700	34	279	0,3887	54,8	
	710	39	284	0,3948	55,3	BELIMO BEE (25 N.m)
	750	59	304	0,4194	57,4	
	800	84	329	0,4502	60,1	BELIMO BE (40 N.m)
650 x	180	–	19	0,0711	25,9	BELIMO BEN (15 N.m)
	200	–	29	0,0838	27,1	
	225	–	41,5	0,0997	28,6	
	250	–	54	0,1156	30,1	
	280	–	69	0,1346	31,9	
	300	–	79	0,1473	33,1	

Sizes listed within the maximum/minimum sizes can be manufactured on request.

A x B [mm]		Damper blade overlaps a [mm]	Damper blade overlaps c [mm]	Free area S_f [m²]	Weight [kg]	Actuating mechanism type
650 x	315	–	86,5	0,1568	34	BELIMO BEN (15 N.m)
	355	–	106,5	0,1822	36,4	
	400	–	129	0,2108	39	
	450	–	154	0,2426	41,9	
	500	–	179	0,2743	44,8	
	550	–	204	0,3061	47,7	
	560	–	209	0,3124	48,2	
	600	–	229	0,3378	50,5	
	630	–	244	0,3569	52,1	
	650	9	254	0,3696	53,2	
	700	34	279	0,4013	56	BELIMO BEE (25 N.m)
	710	39	284	0,4077	56,5	
	750	59	304	0,4331	58,7	
	800	84	329	0,4648	61,4	BELIMO BE (40 N.m)
700 x	180	–	19	0,0767	26,7	BELIMO BEN (15 N.m)
	200	–	29	0,0904	28	
	225	–	41,5	0,1075	29,6	
	250	–	54	0,1247	31,3	
	280	–	69	0,1452	33,2	
	300	–	79	0,1589	34,5	
	315	–	86,5	0,1692	35,5	
	355	–	106,5	0,1966	38	
	400	–	129	0,2274	40,8	
	450	–	154	0,2617	43,9	
	500	–	179	0,2959	47	
	550	–	204	0,3302	50	
	560	–	209	0,3370	50,6	
	600	–	229	0,3644	53	
	630	–	244	0,3850	54,8	
	650	9	254	0,3987	56	BELIMO BEE (25 N.m)
	700	34	279	0,4329	58,9	
	710	39	284	0,4398	59,5	
	750	59	304	0,4672	61,8	
	800	84	329	0,5014	64,6	BELIMO BE (40 N.m)
710 x	180	–	19	0,0778	26,9	BELIMO BEN (15 N.m)
	200	–	29	0,0917	28,2	
	225	–	42	0,1091	29,9	
	250	–	54	0,1265	31,5	
	280	–	69	0,1473	33,5	
	300	–	79	0,1612	34,8	
	315	–	86,5	0,1717	35,7	
	355	–	106,5	0,1995	38,3	
	400	–	129	0,2307	41,2	
	450	–	154	0,2655	44,3	
	500	–	179	0,3002	47,4	
	550	–	204	0,3350	50,5	
	560	–	209	0,3419	51,1	
	600	–	229	0,3697	53,5	
	630	–	244	0,3906	55,3	
	650	9	254	0,4045	56,5	BELIMO BEE (25 N.m)
	700	34	279	0,4392	59,5	
	710	39	284	0,4462	60,1	
	750	59	304	0,4740	62,4	BELIMO BE (40 N.m)
	800	84	329	0,5087	65,3	
750 x	180	–	19	0,0823	27,5	BELIMO BEN (15 N.m)
	200	–	29	0,0970	29	
	225	–	41,5	0,1154	30,7	
	250	–	54	0,1338	32,4	
	280	–	69	0,1558	34,5	
	300	–	79	0,1705	35,9	
	315	–	86,5	0,1815	36,9	
	355	–	106,5	0,2109	39,6	
	400	–	129	0,2440	42,6	
	450	–	154	0,2808	45,9	
	500	–	179	0,3175	49,2	
	550	–	204	0,3543	52,4	
	560	–	209	0,3616	53	
	600	–	229	0,3910	55,6	
	630	–	244	0,4131	57,4	
	650	9	254	0,4278	58,7	BELIMO BEE (25 N.m)
	700	34	279	0,4645	61,8	
	710	39	284	0,4719	62,4	
	750	59	304	0,5013	64,8	BELIMO BE (40 N.m)
	800	84	329	0,5380	67,8	
800 x	180	–	19	0,0879	28,4	BELIMO BEN (15 N.m)
	200	–	29	0,1036	29,9	
	225	–	41,5	0,1232	31,7	
	250	–	54	0,1429	33,6	
	280	–	69	0,1664	35,8	
	300	–	79	0,1821	37,2	
	315	–	86,5	0,1939	38,3	
	355	–	106,5	0,2253	41,2	
	400	–	129	0,2606	44,4	
	450	–	154	0,2999	47,9	
	500	–	179	0,3391	51,3	
	550	–	204	0,3784	54,7	
	560	–	209	0,3862	55,4	
	600	–	229	0,4176	58,1	
	630	–	244	0,4412	60,1	BELIMO BEE (25 N.m)
	650	9	254	0,4569	61,4	
	700	34	279	0,4961	64,6	
	710	39	284	0,5040	65,3	BELIMO BE (40 N.m)
	750	59	304	0,5354	67,8	
	800	84	329	0,5746	71	
900 x	180	–	19	0,0991	30,1	BELIMO BEN (15 N.m)
	200	–	29	0,1168	31,7	
	225	–	41,5	0,1389	33,8	
	250	–	54	0,1611	35,9	
	280	–	69	0,1876	38,3	
	300	–	79	0,2053	39,9	
	315	–	86,5	0,2186	41,1	
	355	–	106,5	0,2540	44,3	
	400	–	129	0,2938	47,9	
	450	–	154	0,3381	51,7	
	500	–	179	0,3823	55,6	
	550	–	204	0,4266	59,3	
	560	–	209	0,4354	60,1	BELIMO BEE (25 N.m)
	600	–	229	0,4708	63	
	630	–	244	0,4974	65,2	
	650	9	254	0,5151	66,6	

Sizes listed within the maximum/minimum sizes can be manufactured on request.

A x B [mm]		Damper blade overlaps a [mm]	Damper blade overlaps c [mm]	Free area S_f [m²]	Weight [kg]	Actuating mechanism type
900 x	700	34	279	0,5593	70,2	BELIMO BE (40 N.m)
	710	39	284	0,5682	70,9	
	750	59	304	0,6036	73,7	
	800	84	329	0,6478	77,1	
1000 x	180	–	19	0,1103	31,7	BELIMO BEN (15 N.m)
	200	–	29	0,1300	33,6	
	225	–	41,5	0,1546	35,9	
	250	–	54	0,1793	38,1	
	280	–	69	0,2088	40,8	
	300	–	79	0,2285	42,6	
	315	–	86,5	0,2433	43,9	
	355	–	106,5	0,2827	47,4	
	400	–	129	0,3270	51,3	
	450	–	154	0,3763	55,6	
	500	–	179	0,4255	59,7	
	550	–	204	0,4748	63,8	BELIMO BEE (25 N.m)
	560	–	209	0,4846	64,6	
	600	–	229	0,5240	67,8	
	630	–	244	0,5536	70,2	
	650	9	254	0,5733	71,7	BELIMO BE (40 N.m)
	700	34	279	0,6225	75,6	
	710	39	284	0,6324	76,4	
	750	59	304	0,6718	79,4	
	800	84	329	0,7210	83,1	
1100 x	180	–	19	0,1215	33,4	BELIMO BEN (15 N.m)
	200	–	29	0,1432	35,4	
	225	–	41,5	0,1703	37,9	
	250	–	54	0,1975	40,4	
	280	–	69	0,2300	43,3	
	300	–	79	0,2517	45,3	
	315	–	86,5	0,2680	46,7	
	355	–	106,5	0,3114	50,5	
	400	–	129	0,3602	54,7	
	450	–	154	0,4145	59,3	
	500	–	179	0,4687	63,8	BELIMO BEE (25 N.m)
	550	–	204	0,5230	68,2	
	560	–	209	0,5338	69,1	
	600	–	229	0,5772	72,5	
	630	–	244	0,6098	75,1	BELIMO BE (40 N.m)
	650	9	254	0,6315	76,7	
	700	34	279	0,6857	80,9	
	710	39	284	0,6966	81,7	
	750	59	304	0,7400	84,9	
	800	84	329	0,7942	88,8	
1250 x	180	–	19	0,1383	35,9	BELIMO BEN (15 N.m)
	200	–	29	0,1630	38,1	
	225	–	41,5	0,1939	40,9	
	250	–	54	0,2248	43,7	
	280	–	69	0,2618	47	
	300	–	79	0,2865	49,2	
	315	–	86,5	0,3050	50,8	
	355	–	106,5	0,3544	55	
1250 x	400	–	129	0,4100	59,7	BELIMO BEN (15 N.m)
	450	–	154	0,4718	64,8	
	500	–	179	0,5335	69,8	BELIMO BEE (25 N.m)
	550	–	204	0,5953	74,6	
	560	–	209	0,6076	75,6	
	600	–	229	0,6570	79,4	BELIMO BE (40 N.m)
	630	–	244	0,6941	82,1	
	650	9	254	0,7188	84	
	700	34	279	0,7805	88,5	
	710	39	284	0,7929	89,3	
	750	59	304	0,8423	92,8	
	800	84	329	0,9040	97,1	
1400 x	180	–	19	0,1551	38,3	BELIMO BEN (15 N.m)
	200	–	29	0,1828	40,8	
	225	–	41,5	0,2174	43,9	
	250	–	54	0,2521	47	
	280	–	69	0,2936	50,6	
	300	–	79	0,3213	53	
	315	–	86,5	0,3421	54,8	
	355	–	106,5	0,3975	59,5	
	400	–	129	0,4598	64,6	
	450	–	154	0,5291	70,2	BELIMO BEE (25 N.m)
	500	–	179	0,5983	75,6	
	550	–	204	0,6676	80,9	BELIMO BE (40 N.m)
	560	–	209	0,6814	81,9	
	600	–	229	0,7368	86	
	630	–	244	0,7784	88,9	
	650	9	254	0,8061	90,9	
	700	34	279	0,8753	95,7	
	710	39	284	0,8892	96,7	
	750	59	304	0,9446	100,4	
	800	84	329	1,0138	104,9	SCHISCHEK InMax 50.75
1500 x	180	–	19	0,1663	39,9	BELIMO BEN (15 N.m)
	200	–	29	0,1960	42,6	
	225	–	41,5	0,2331	45,9	
	250	–	54	0,2703	49,2	
	280	–	69	0,3148	53	
	300	–	79	0,3445	55,6	
	315	–	86,5	0,3668	57,4	
	355	–	106,5	0,4262	62,4	
	400	–	129	0,4930	67,8	
	450	–	154	0,5673	73,7	BELIMO BEE (25 N.m)
	500	–	179	0,6415	79,4	
	550	–	204	0,7158	84,9	BELIMO BE (40 N.m)
	560	–	209	0,7306	86	
	600	–	229	0,7900	90,2	
	630	–	244	0,8346	93,3	
	650	9	254	0,8643	95,4	
	700	34	279	0,9385	100,4	
	710	39	284	0,9534	101,3	
	750	59	304	1,0128	105,2	
	800	84	329	1,0870	109,8	SCHISCHEK InMax 50.75

Sizes listed within the maximum/minimum sizes can be manufactured on request.

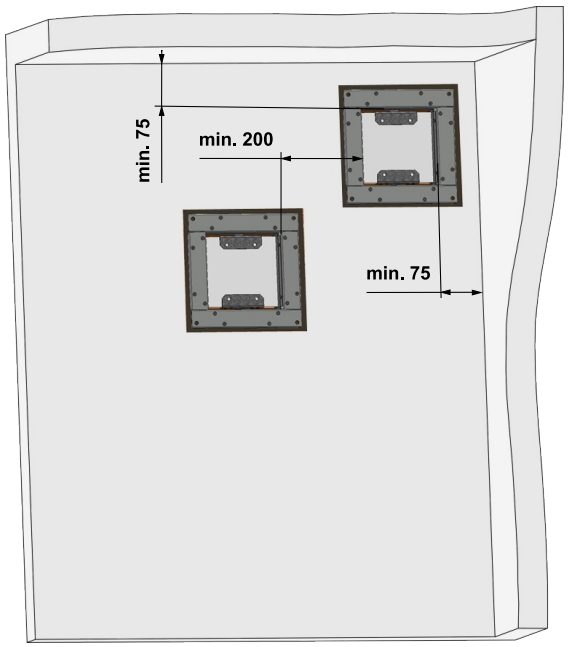
IV. INSTALLATION

Placement and installation

- Smoke dampers are intended for use in spaces with multiple fire compartments, which can be connected by a smoke extraction duct tested according to BS EN 1366-8 or BS EN 1366-9 or can be installed in the construction of the fire compartment.
- 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.

The distance between the smoke damper and the construction

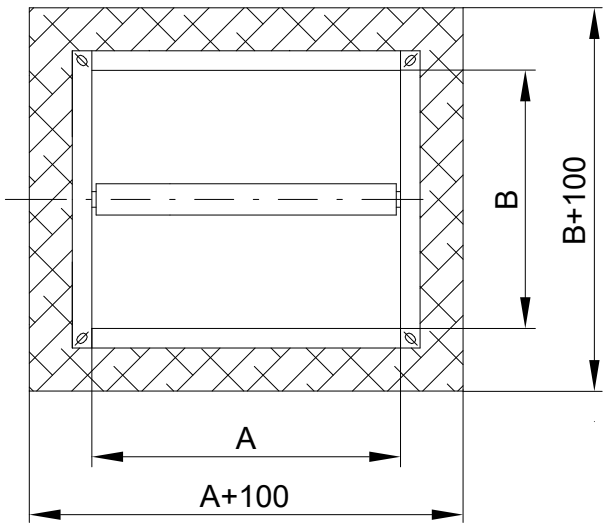
- minimum distance 200 mm between dampers installed in the duct;
- minimum distance 75 mm between damper and construction (wall/ceiling).



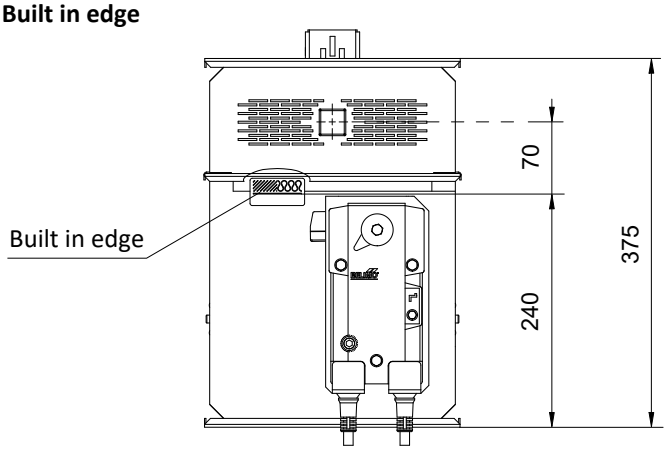
- This is the BS EN 1366-10 test standard distances. They are considered as minimum. Actual location should be based on wall manufacturers requirements.
- Always consult the wall manufacturers specific guidelines for deflection heads, penetration size, location to other services, fire stopping and load bearing capacity.
- With smoke control ducting then refer to duct manufacturers tested parameters for spacing & pattress requirements.
- No other services should pass through the dampers building work opening.
- For lightweight walls always consult the wall manufacturer specific guidelines for penetrations sizes and distances.

- 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 is built in, its blade should move freely and not rub against the body of the damper or duct during operation.

Dimensions of installation opening



Built in edge



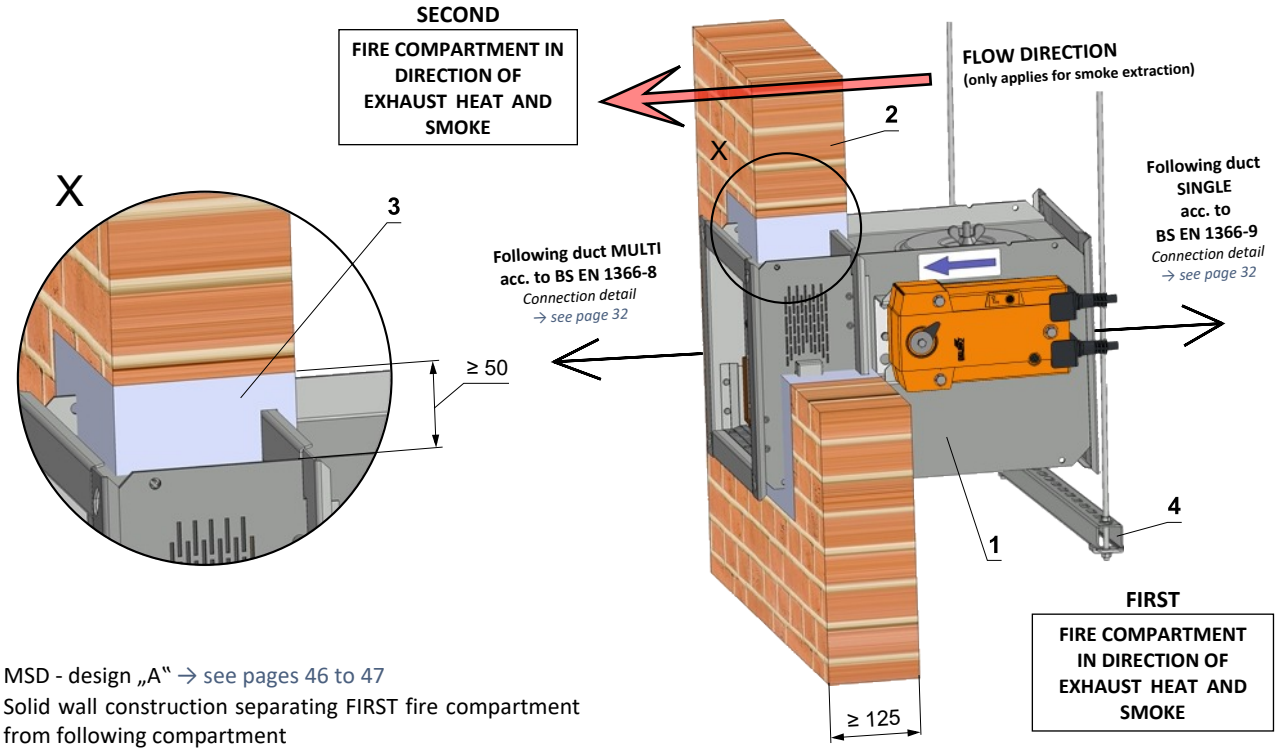
Statement of installations

Placement	wall/ceiling min. thickness [mm]	Filling of space between damper and wall	Fire resistance	Page
In solid wallconstruction SINGLE / MULTI	125	Mortar or gypsum	EI 120 (v_{ew} i↔o) S1500C_{mod}HOT400/30AAmulti	19
	100	Ablative Coated Batt	EI 90 (v_{ew} i↔o) S1500C_{mod}HOT400/30AAmulti	19
	125	Insulation with ROCKWOOL FIREPRO Mortar or gypsum	EI 120 (v_{ew} i↔o) S1500C_{mod}HOT400/30AAmulti	20
	100	Insulation with ROCKWOOL FIREPRO Ablative Coated Batt	EI 90 (v_{ew} i↔o) S1500C_{mod}HOT400/30AAmulti	21
In gypsum wall construction SINGLE / MULTI	125	Mortar or gypsum	EI 120 (v_{ew} i↔o) S1500C_{mod}HOT400/30AAmulti	22
	100	Ablative Coated Batt	EI 90 (v_{ew} i↔o) S1500C_{mod}HOT400/30AAmulti	22
	125	Insulation with ROCKWOOL FIREPRO Mortar or gypsum	EI 120 (v_{ew} i↔o) S1500C_{mod}HOT400/30AAmulti	23
	100	Insulation with ROCKWOOL FIREPRO Ablative Coated Batt	EI 90 (v_{ew} i↔o) S1500C_{mod}HOT400/30AAmulti	24
In solid ceiling construction SINGLE / MULTI	150	Mortar or gypsum	EI 120 (h_{ow} i↔o) S1500C_{mod}HOT400/30AAmulti	25
		Ablative Coated Batt	EI 90 (h_{ow} i↔o) S1500C_{mod}HOT400/30AAmulti	25
In solid ceiling construction MULTI / MULTI		Insulation with stone wool Mortar or gypsum	EI 120 (h_{ow} i↔o) S1500C_{mod}HOT400/30AAmulti	26
		Insulation with stone wool Ablative Coated Batt	EI 90 (h_{ow} i↔o) S1500C_{mod}HOT400/30AAmulti	26
Horizontal or vertical smoke extraction ducts tested according to BS EN 1366-8 or BS EN 1366-9	–	Damper installed Into or onto a duct	EI 120 (v_{ed}) S1500[H]C_{mod}HOT400/30AAmulti EI 120 (h_{od}) S1500[H]C_{mod}HOT400/30AAmulti	27-28

Installation in solid wall construction SINGLE / MULTI

Dividing construction between SINGLE / MULTI duct - mortar or gypsum

EIS 120

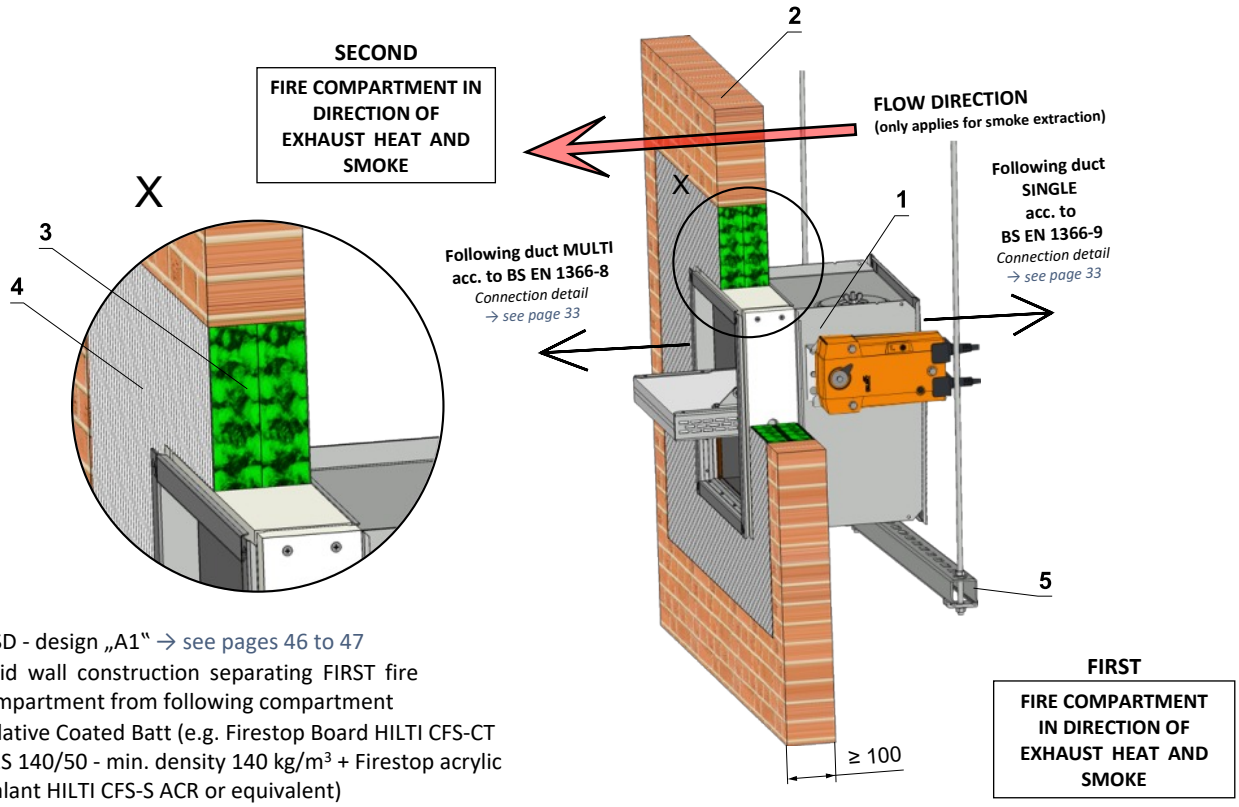


1 MSD - design „A" → see pages 46 to 47
2 Solid wall construction separating FIRST fire compartment from following compartment
3 British gypsum thistle bond 60 (or equivalent can by used) minimum density 670 kg/m³
4 Fixing profile with threaded rod → see pages 27 to 30*

* This installation was tested without supports. Supports can be used on wall manufacturers guidance, or after national standards.

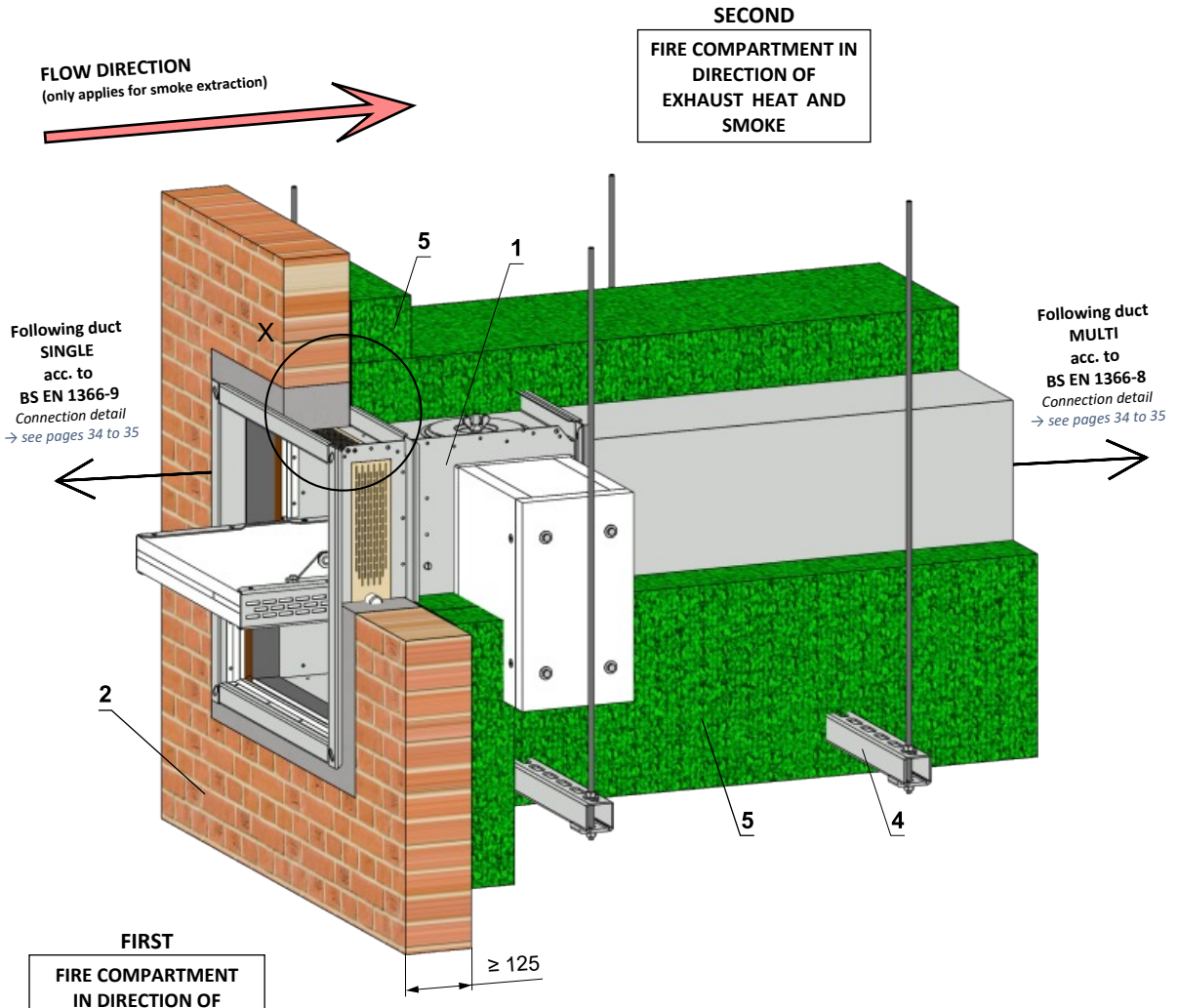
Dividing construction between SINGLE / MULTI duct - Ablative Coated Batt

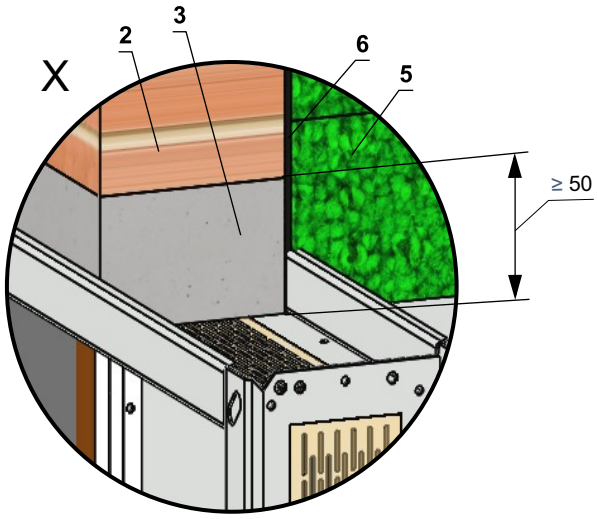
EIS 90



1 MSD - design „A1" → see pages 46 to 47
2 Solid wall construction separating FIRST fire compartment from following compartment
3 Ablative Coated Batt (e.g. Firestop Board HILTI CFS-CT B 1S 140/50 - min. density 140 kg/m³ + Firestop acrylic sealant HILTI CFS-S ACR or equivalent)
4 Fire stop coating thickness 1 mm (e.g. HILTI CFS-CT, PROMASTOP-CC or equivalent)
5 Fixing profile with threaded rod → see pages 27 to 30

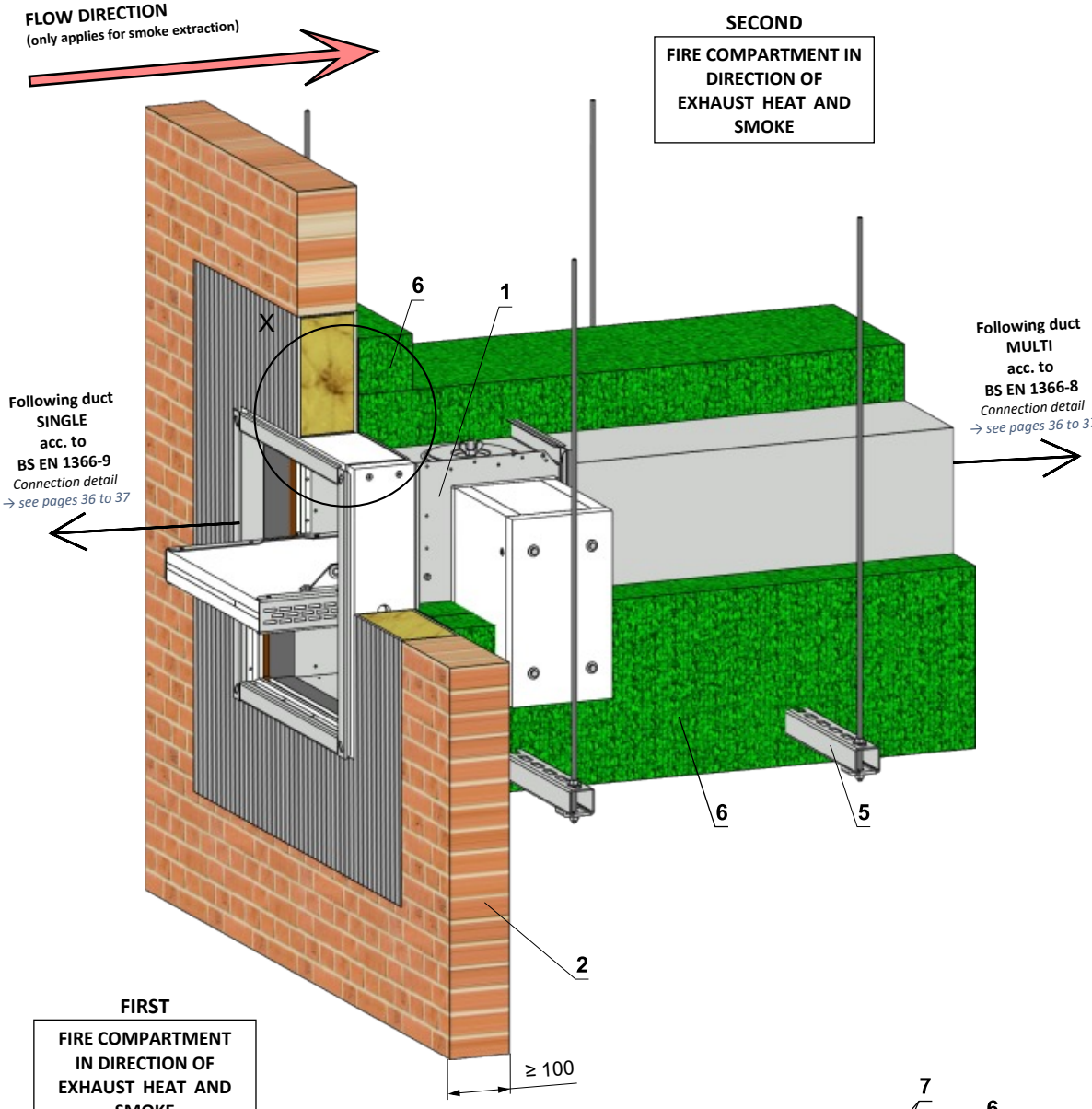
Dividing construction between SINGLE / MULTI duct - insulation with ROCKWOOL FIREPRO - mortar or gypsum **EIS 120**

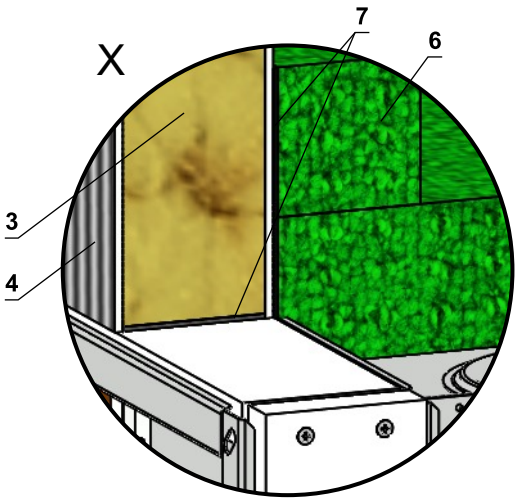




1 MSD - design „IB“ → see pages 46 to 47
2 Solid wall construction separating FIRST fire compartment from following compartment
3 British gypsum thistle bond 60 (or equivalent can by used) minimum density 670 kg/m³)
4 Fixing profile with threaded rod → see pages 27 to 30
5 ROCKWOOL FIREPRO DuctRock Slab th. 90 mm acc. to BS EN 1366-8
6 ROCKWOOL FIREPRO Glue

Dividing construction between SINGLE / MULTI duct - insulation with ROCKWOOL FIREPRO - Ablative Coated Batt **EIS 90**



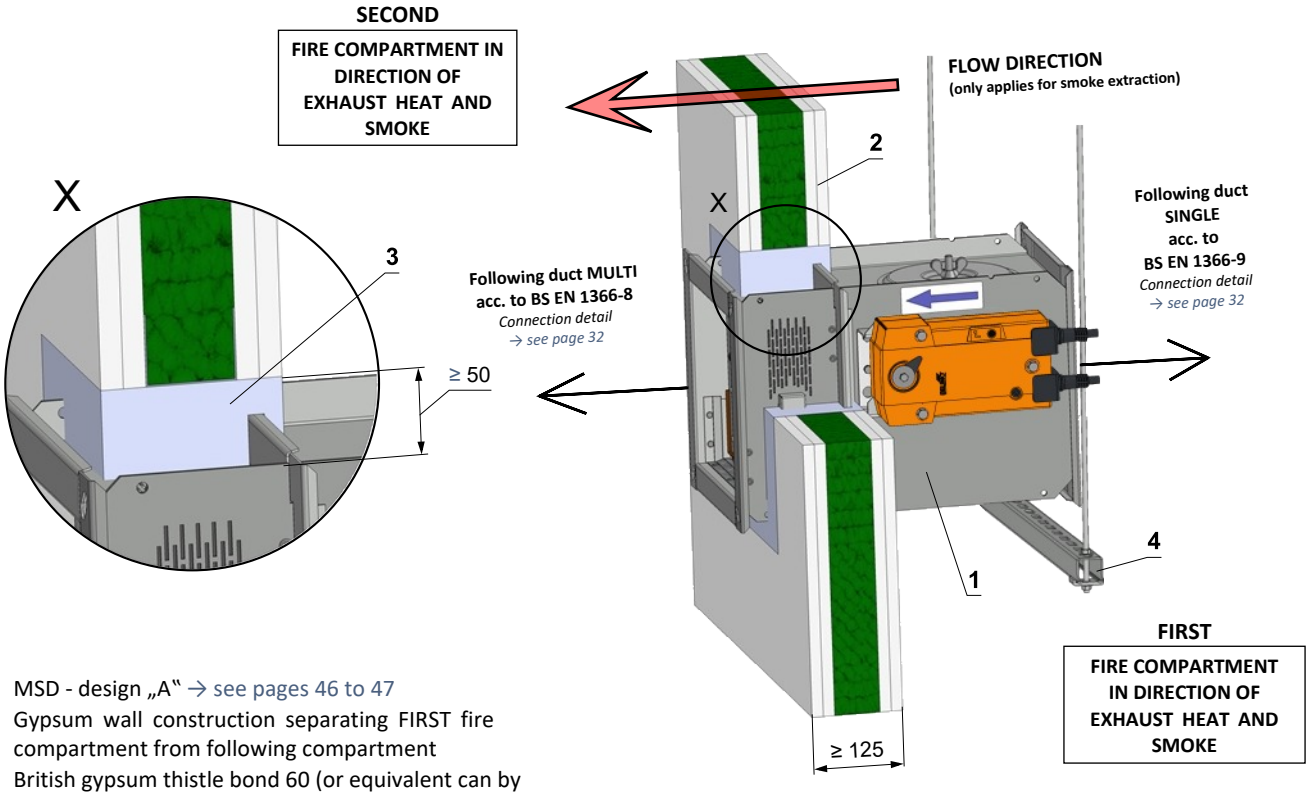


1 MSD - design „IB1" → see pages 46 to 47
2 Solid wall construction separating FIRST fire compartment from following compartment
3 Ablative Coated Batt (e.g. Firestop Board HILTI CFS-CT B 1S 140/50 - min. density 140 kg/m³ + Firestop acrylic sealant HILTI CFS-S ACR or equivalent)
4 Fire stop coating thickness 1 mm (e.g. HILTI CFS-CT, PROMASTOP-CC or equivalent)
5 Fixing profile with threaded rod → see pages 27 to 30
6 ROCKWOOL FIREPRO DuctRock Slab th. 90 mm acc. to BS EN 1366-8
7 ROCKWOOL FIREPRO Glue

Installation in gypsum wall SINGLE / MULTI

Dividing construction between SINGLE / MULTI duct - mortar or gypsum

EIS 120

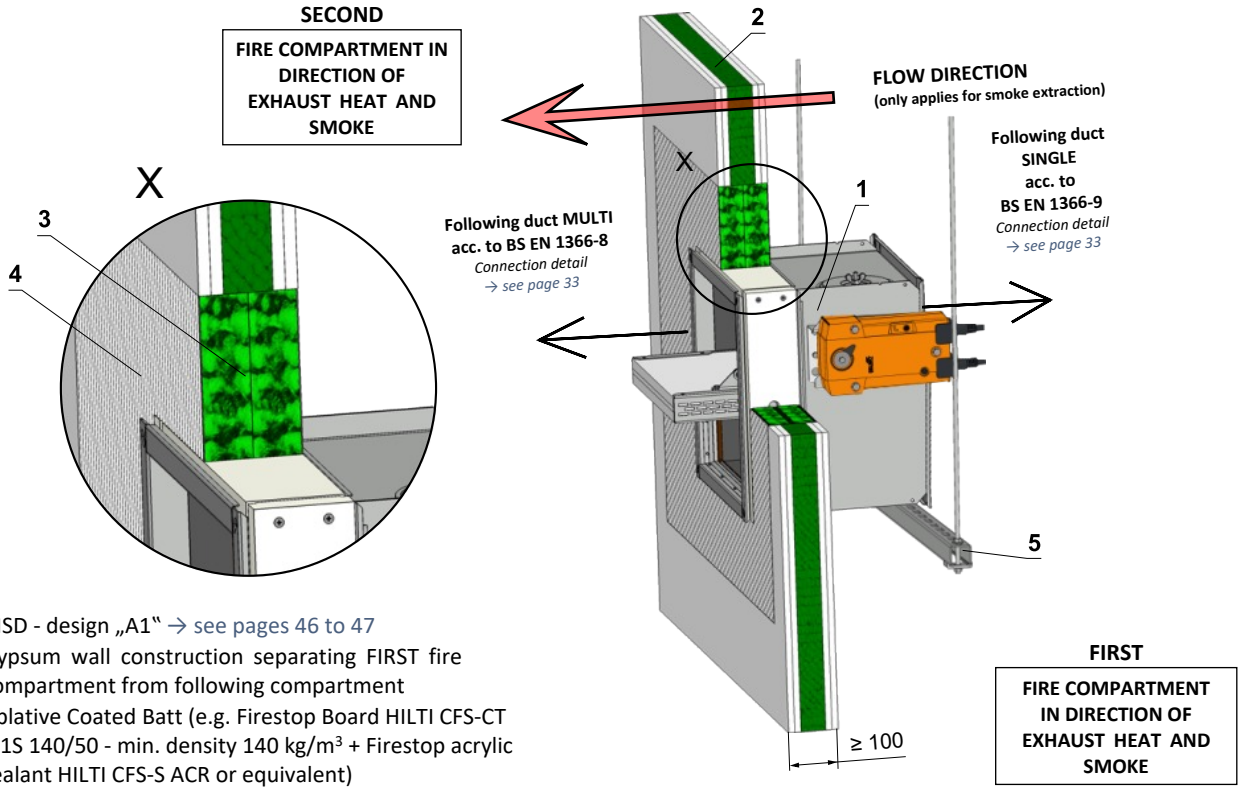


1 MSD - design „A" → see pages 46 to 47
2 Gypsum wall construction separating FIRST fire compartment from following compartment
3 British gypsum thistle bond 60 (or equivalent can by used) minimum density 670 kg/m³
4 Fixing profile with threaded rod → see pages 27 to 30*

* This installation was tested without supports. Supports can be used on wall manufacturers guidance, or after national standards.

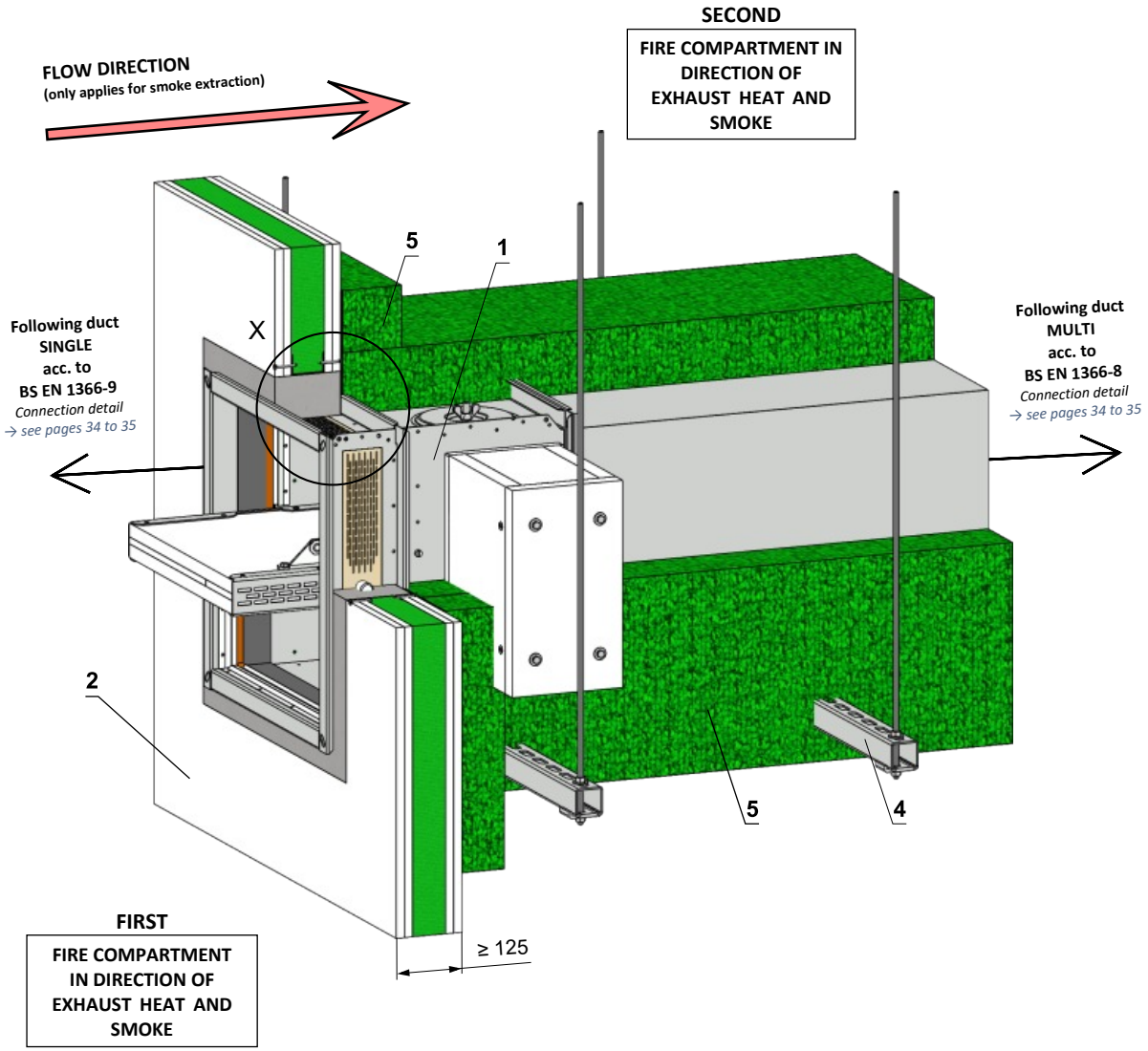
Dividing construction between SINGLE / MULTI duct - Ablative Coated Batt

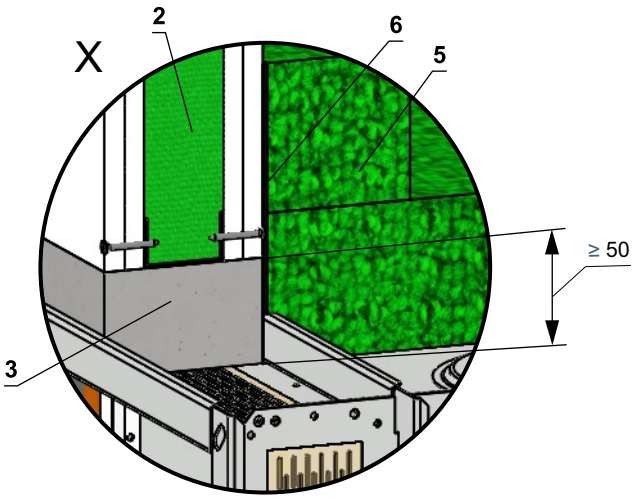
EIS 90



1 MSD - design „A1" → see pages 46 to 47
2 Gypsum wall construction separating FIRST fire compartment from following compartment
3 Ablative Coated Batt (e.g. Firestop Board HILTI CFS-CT B 1S 140/50 - min. density 140 kg/m³ + Firestop acrylic sealant HILTI CFS-S ACR or equivalent)
4 Fire stop coating thickness 1 mm (e.g. HILTI CFS-CT, PROMASTOP-CC or equivalent)
5 Fixing profile with threaded rod → see pages 27 to 30

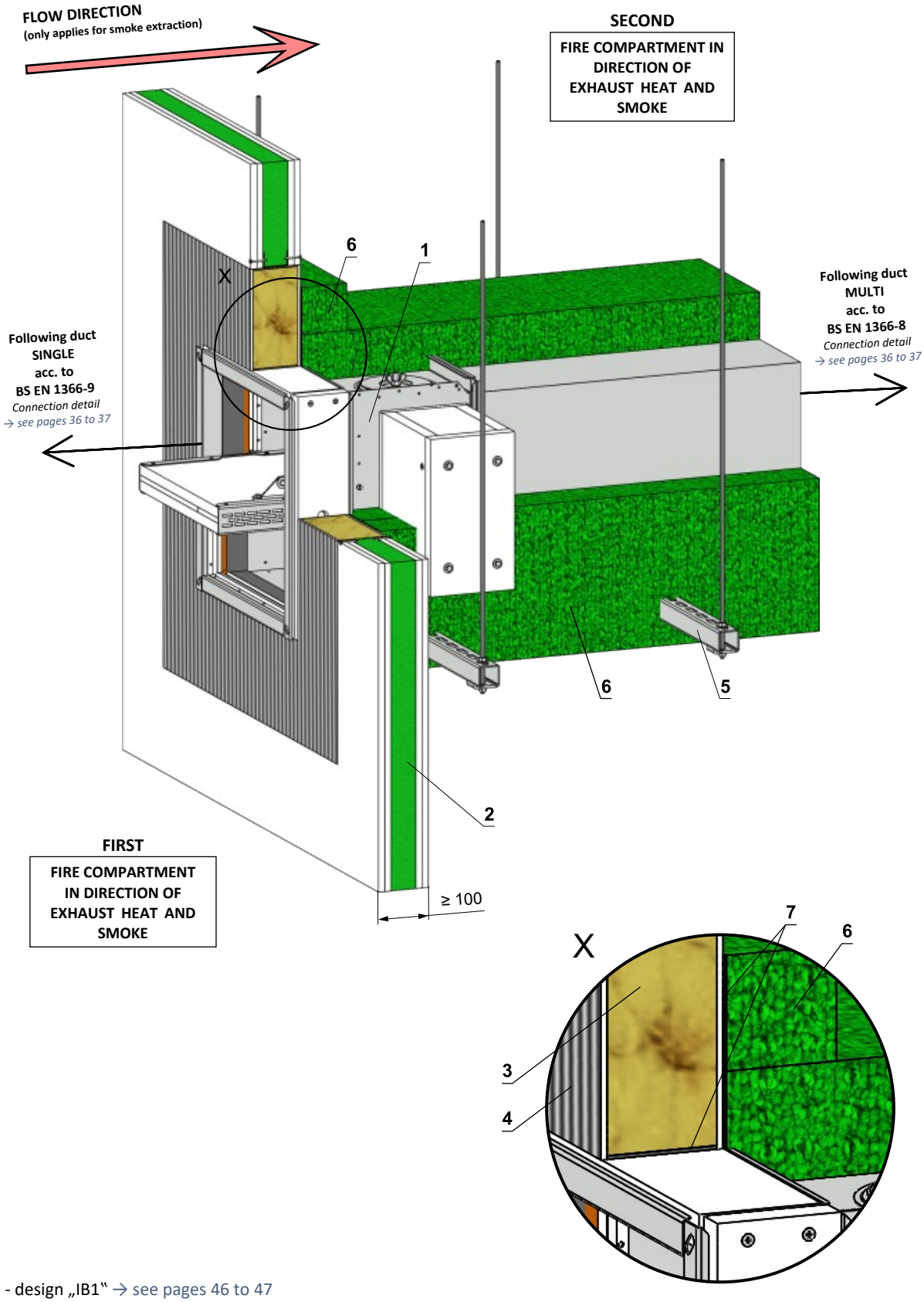
Dividing construction between SINGLE / MULTI duct - insulation with ROCKWOOL FIREPRO - mortar or gypsum **EIS 120**





1 MSD - design „IB" → see pages 46 to 47
2 Gypsum wall construction separating FIRST fire compartment from following compartment
3 British gypsum thistle bond 60 (or equivalent can by used) minimum density 670 kg/m³)
4 Fixing profile with threaded rod → see pages 27 to 30
5 ROCKWOOL FIREPRO DuctRock Slab th. 90 mm acc. to BS EN 1366-8
6 ROCKWOOL FIREPRO Glue

Dividing construction between SINGLE / MULTI duct - insulation with ROCKWOOL FIREPRO - Ablative Coated Batt **EIS 90**



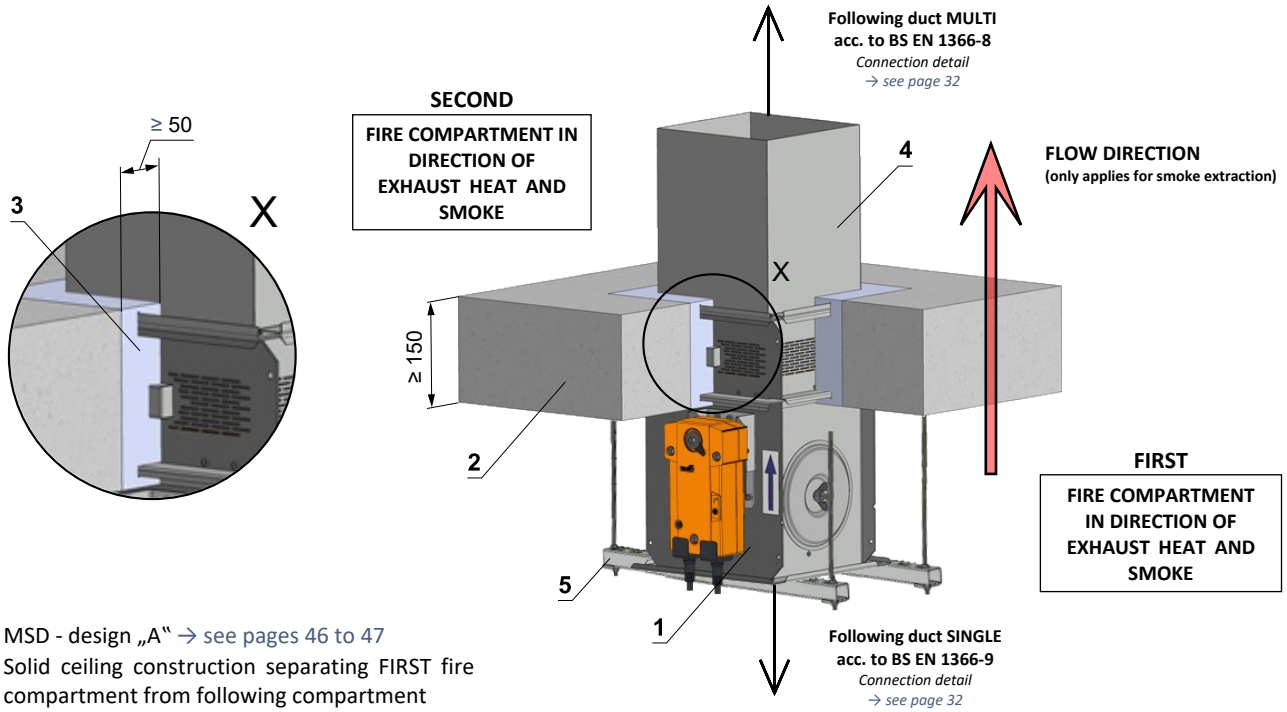
1 MSD - design „IB1" → see pages 46 to 47
2 Gypsum wall construction separating FIRST fire compartment from following compartment
3 Ablative Coated Batt (e.g. Firestop Board HILTI CFS-CT B 1S 140/50 - min. density 140 kg/m³ + Firestop acrylic sealant HILTI CFS-S ACR or equivalent)
4 Fire stop coating thickness 1 mm (e.g. HILTI CFS-CT, PROMASTOP-CC or equivalent)
5 Fixing profile with threaded rod → see pages 27 to 30
6 ROCKWOOL FIREPRO DuctRock Slab th. 90 mm acc. to BS EN 1366-8
7 ROCKWOOL FIREPRO Glue

Installation in solid ceiling construction SINGLE / MULTI

Dividing construction between SINGLE / MULTI duct - mortar or gypsum

EIS 120

- The damper can be installed from both sides of the construction, i.e. From the top or the bottom side of the ceiling.



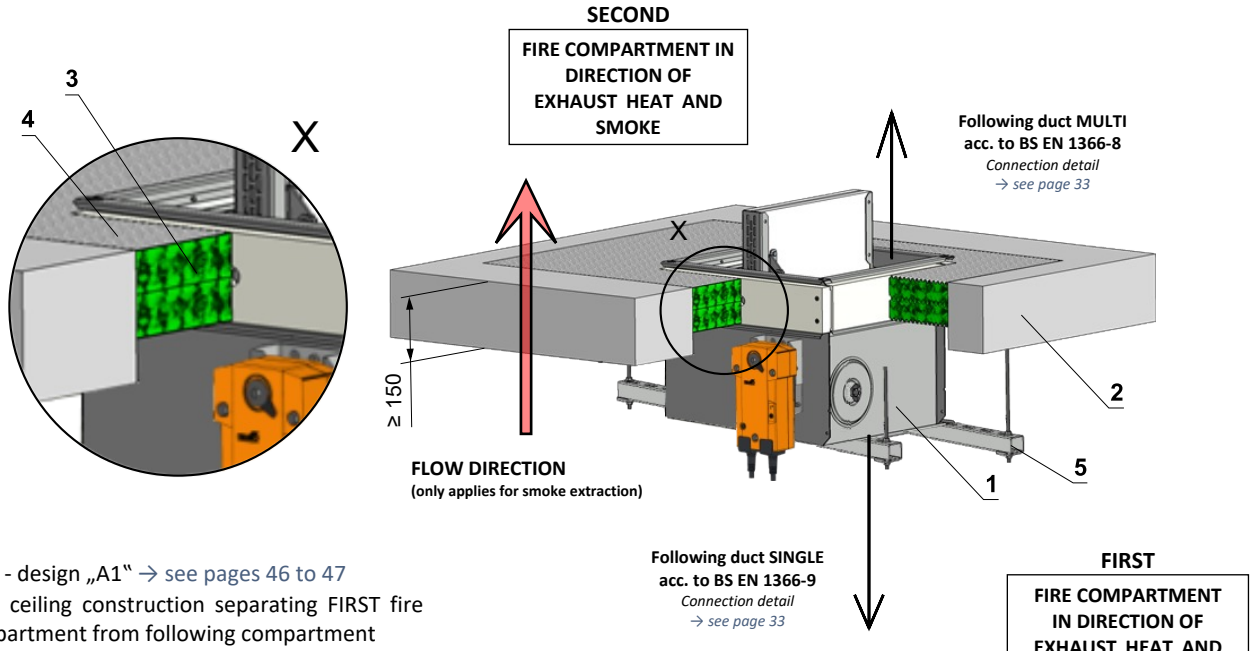
1 MSD - design „A" → see pages 46 to 47
2 Solid ceiling construction separating FIRST fire compartment from following compartment
3 British gypsum thistle bond 60 (or equivalent can by used) minimum density 670 kg/m³
4 Duct
5 Fixing profile with threaded rod → see pages 27 to 30*

* This installation was tested without supports. Supports can be used on wall manufacturers guidance, or after national standards.

Dividing construction between SINGLE / MULTI duct - Ablative Coated Batt

EIS 90

- The damper can be installed from both sides of the construction, i.e. From the top or the bottom side of the ceiling.



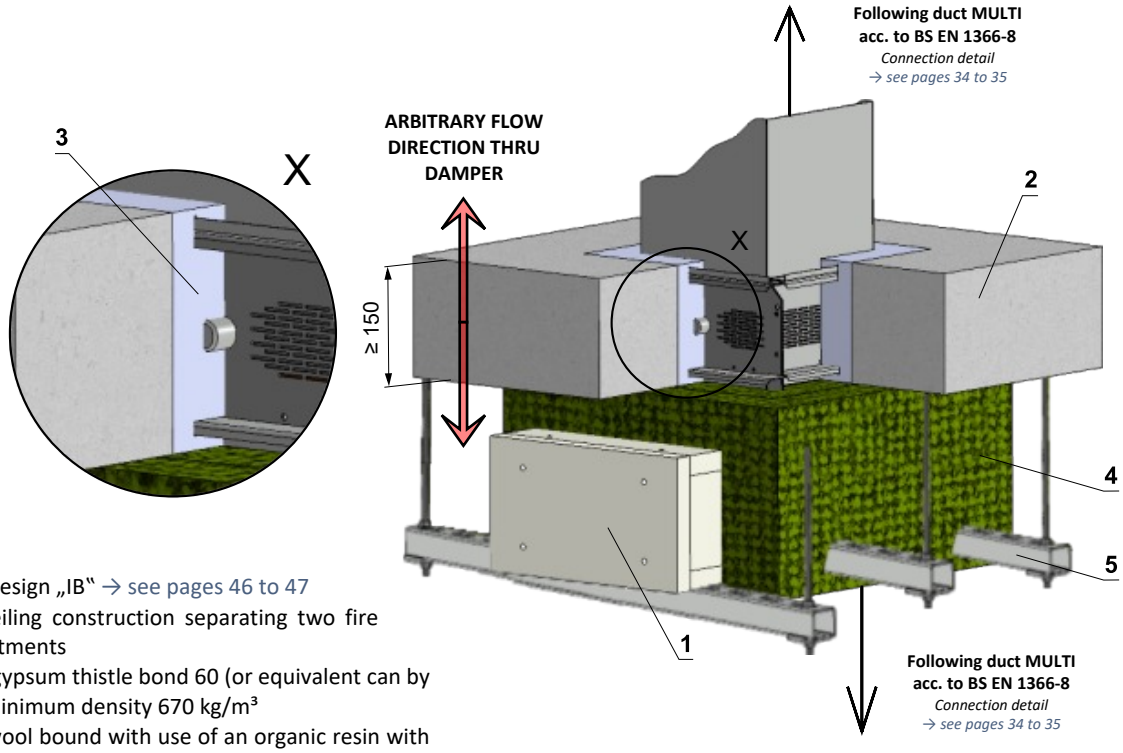
1 MSD - design „A1" → see pages 46 to 47
2 Solid ceiling construction separating FIRST fire compartment from following compartment
3 Ablative Coated Batt (e.g. Firestop Board HILTI CFS-CT B 1S 140/50 - min. density 140 kg/m³ + Firestop acrylic sealant HILTI CFS-S ACR or equivalent)
4 Fire stop coating thickness 1 mm (e.g. HILTI CFS-CT, PROMASTOP-CC or equivalent)
5 Fixing profile with threaded rod → see pages 27 to 30

Installation in solid ceiling construction MULTI / MULTI

Dividing construction between MULTI / MULTI duct - insulation with stone wool - mortar or gypsum

EIS 120

- The damper can be installed from both sides of the construction, i.e. From the top or the bottom side of the ceiling.



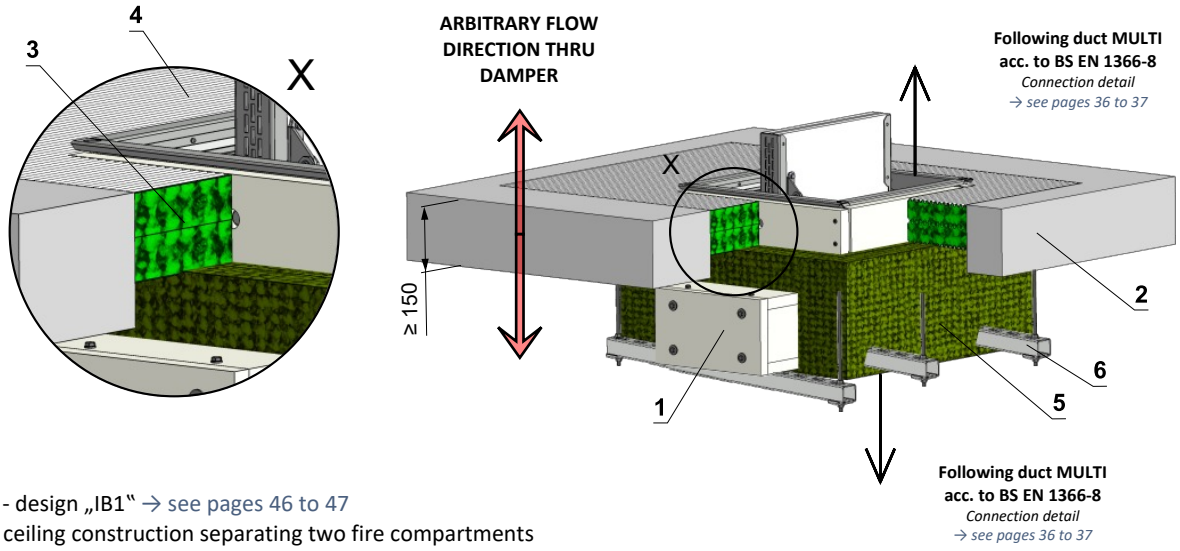
1 MSD - design „IB" → see pages 46 to 47
2 Solid ceiling construction separating two fire compartments
3 British gypsum thistle bond 60 (or equivalent can by used) minimum density 670 kg/m³
4 Stone wool bound with use of an organic resin with crushed stone as a refrigerant, min. density 300 kg/m³ composed of two layers 2x60 mm
5 Fixing profile with threaded rod → see pages 27 to 30*

* This installation was tested without supports. Supports can be used on wall manufacturers guidance, or after national standards.

Dividing construction between MULTI / MULTI duct - insulation with stone wool - Ablative Coated Batt

EIS 90

- The damper can be installed from both sides of the construction, i.e. From the top or the bottom side of the ceiling.



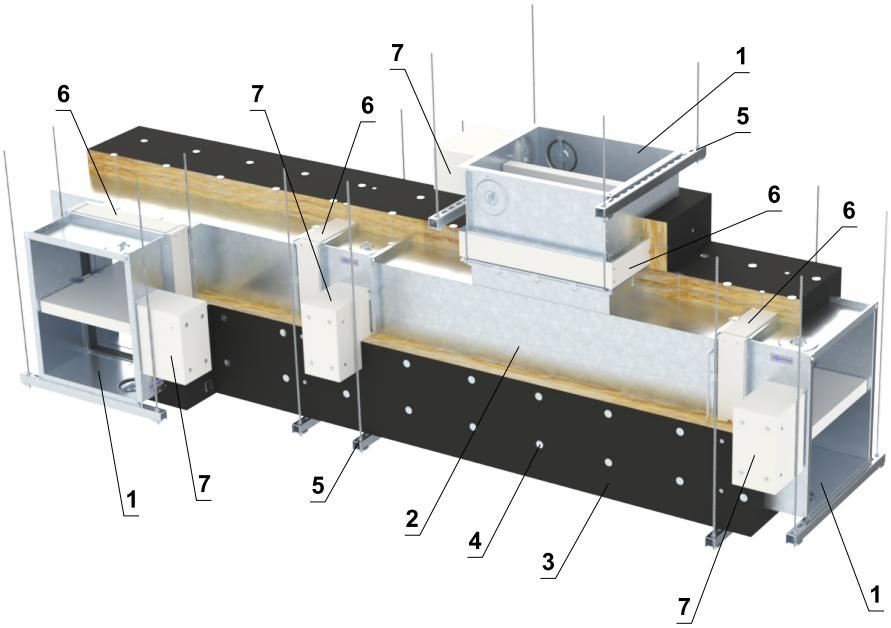
1 MSD - design „IB1" → see pages 46 to 47
2 Solid ceiling construction separating two fire compartments
3 Ablative Coated Batt (e.g. Firestop Board HILTI CFS-CT B 1S 140/50 - min. density 140 kg/m³ + Firestop acrylic sealant HILTI CFS-S ACR or equivalent)
4 Fire stop coating thickness 1 mm (e.g. HILTI CFS-CT, PROMASTOP-CC or equivalent)
5 Stone wool bound with use of an organic resin with crushed stone as a refrigerant, min. density 300 kg/m³ composed of two layers 2x60 mm
6 Fixing profile with threaded rod → see pages 27 to 30

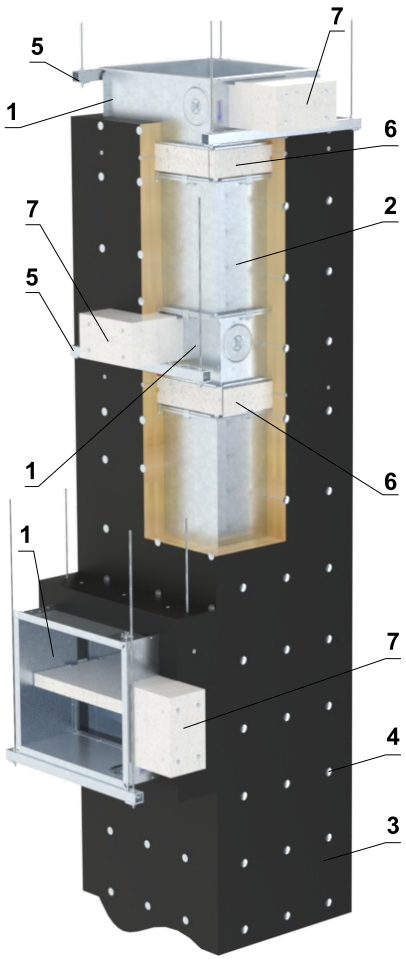
Installation damper into/onto smoke extraction ducts

Installation of the damper into/onto horizontal or vertical steel smoke extraction duct insulated with mineral wool
- damper placement in a multi section

EI 120 (h_{od}) S1500[H]C_{mod}HOT400/30AAmulti
EI 120 (v_{ed}) S1500[H]C_{mod}HOT400/30AAmulti

- <u>The dampers may be installed onto or into smoke extraction ducts listed below:</u>
  - **Flameshield Fireduct (manufacturer Kent Ductwork Ltd.)**
    The duct is made of 1.2 mm thick galvanized steel sheet and insulated with 1 layer of 90 mm thick stone wool Rockwool FirePro DuctRock Slab (manufacturer ROCKWOOL Ltd.). The stone wool is finished with a black aluminium foil on the outer side.
- <u>The dampers may be installed onto or into other smoke extraction ducts than that specified above with the following limitations:</u>
  - The duct shall be tested according to BS EN 1366-9 or BS EN 1366-8 depending on the intended use.
  - The duct shall be made of material of the same or greater density and of the same or greater thickness as the ducts listed above.
  - Changing surface protection materials is not permitted.
  - Changing the paint surface finish is not permitted.
- Support, drop rods, anchors etc. must be used in accordance with a duct manufacturer instructions.
- The connected duct shall be suspended in such a way that the transfer of all loads from the duct to the damper is completely excluded.
- The damper may be installed in position according picture below





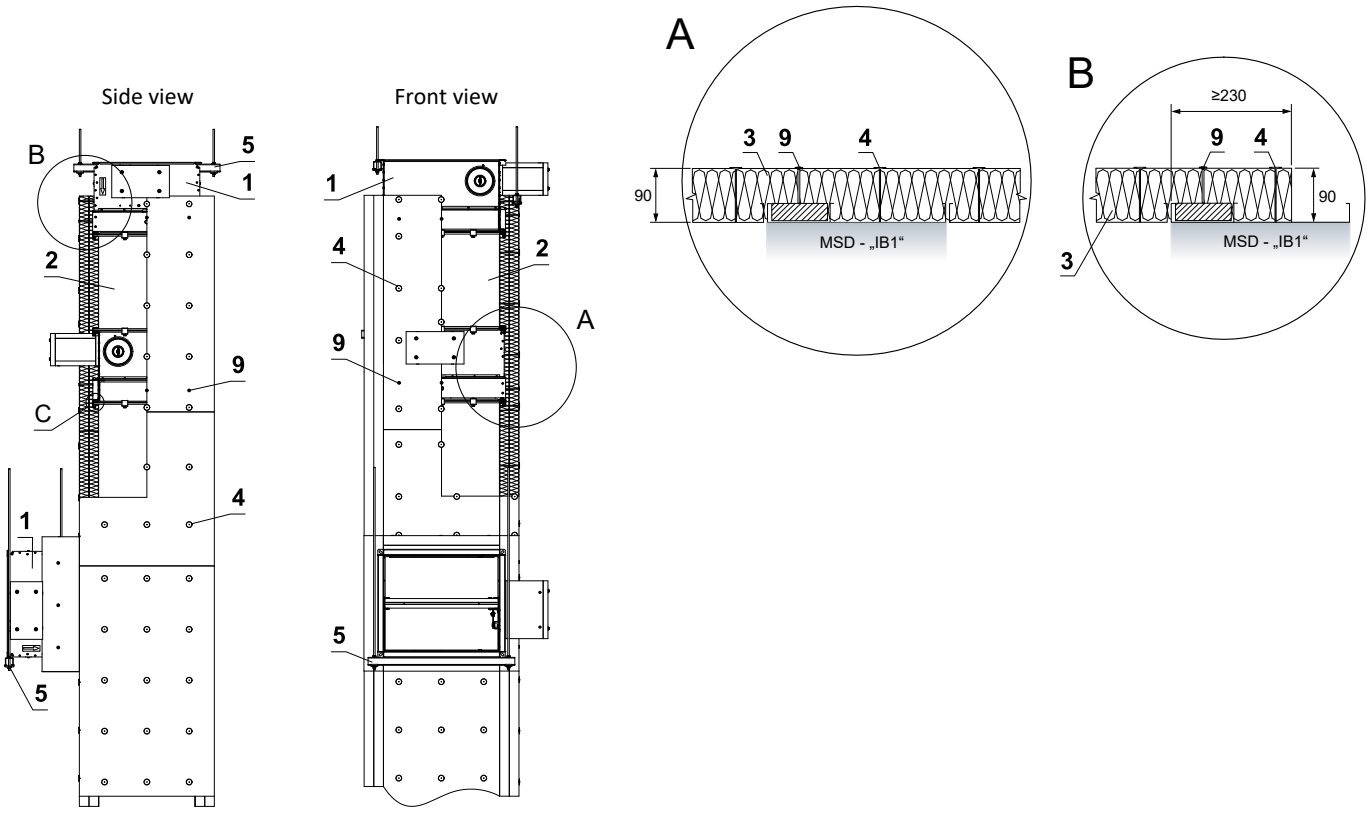
1 MSD - design „IB1“
2 Steel smoke extraction duct (type according to duct manufacturer instructions)
3 Surface protection material (type according to duct manufacturer instructions)
4 Steel insulation pin (type according to duct manufacturer instructions)
5 Fixing profile with threaded rod → see page 30
6 Protective cladding board - min. th. 10 mm, min. density 870 kg/m³ e.g. PROMATECT-H)
7 Protection box of actuator - part of the IB, IB1 damper design Note: There is no protection box in designs A and A1.

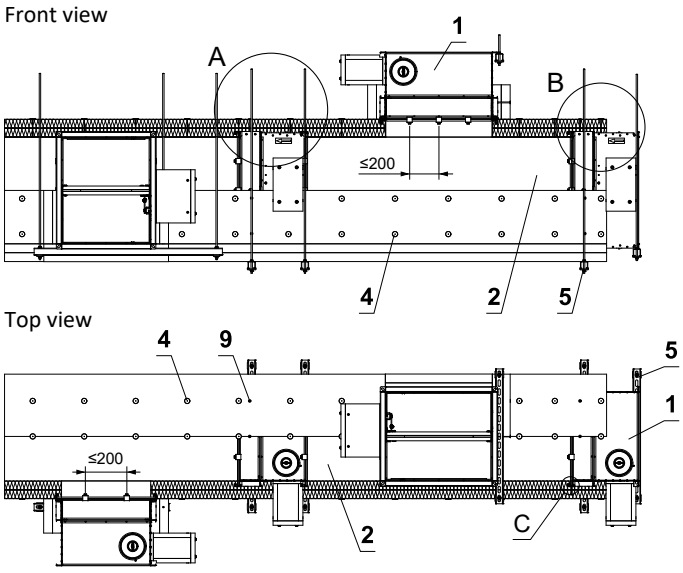
(Continued on next page)

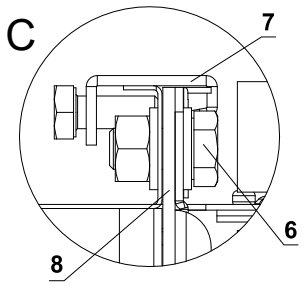
continuation of suspension MSD installed in horizontal duct MULTI / MULTI

- The damper is connected to the smoke extraction duct by the damper flange as follow:
  - M10 bolts, washers and nuts are used at the corners of the flange
  - C-clamps with M8 bolts with a maximum spacing of 200 mm are used around the circumference
  - Ceramic selfadhesive sealing tape is inserted between flanges

Flame Shield







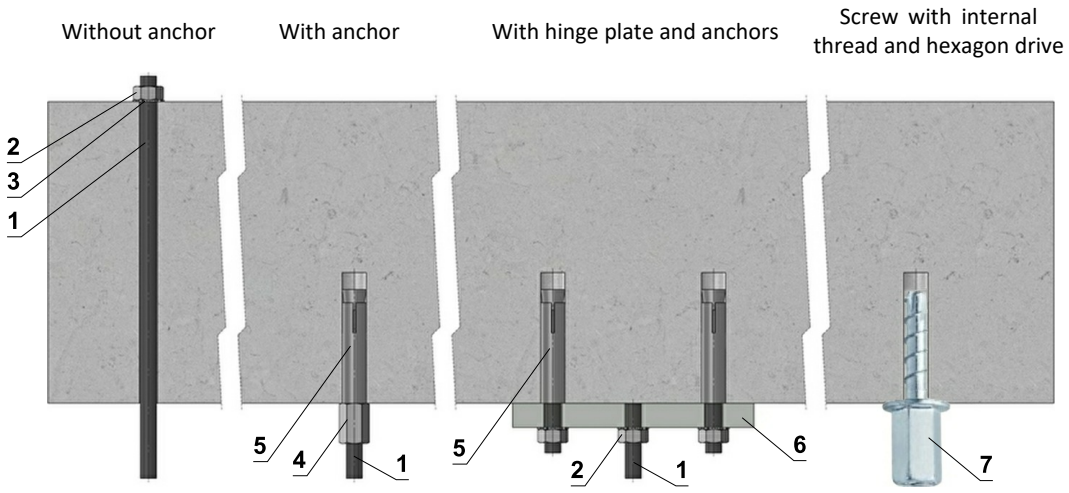
1 MSD - design „IB1“
2 Steel smoke extraction duct (type according to duct manufacturer instructions)
3 Surface protection material (type according to duct manufacturer instructions)
4 Steel insulation pin (type according to duct manufacturer instructions)
5 Suspension system (type according to duct manufacturer instructions)
6 Flange connection at corners - M10 bolt, washers and nut
7 M8 C-clamps - maximum spacing of C-clamps 200 mm (type according to duct manufacturer instructions)
8 Ceramic selfadhesive sealing tape - arround the duct circumference (type according to duct manufacturer instructions)
9 Insulation connection to Protective cladding boards - washer M5 (DIN 125A), screw 5xL mm (screw lenght = insullation thickness + 20 mm)

V. SUSPENSION SYSTEMS

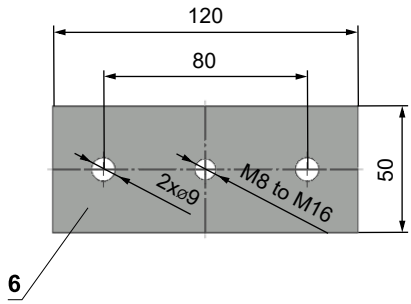
Mounting to the ceiling wall

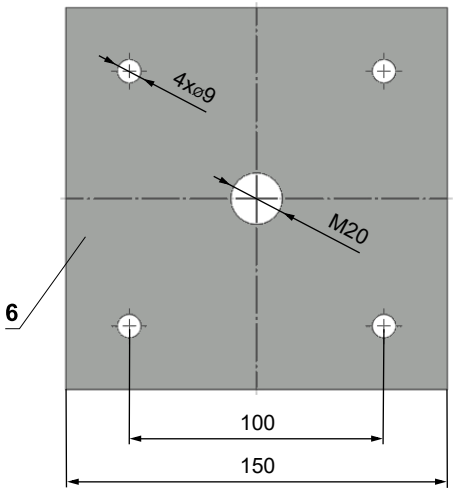
- The dampers must be suspended using threaded rods and mounting profiles. Their dimensioning depends on the damper's weight.
- The dampers and duct must be suspended separately.
- The connected duct must be suspended in such a way that the transfer of all loads from the adjoining ventilation duct to the damper body is completely excluded. Adjacent duct must be suspended or supported, as required by the duct suppliers.

Possible examples of anchoring to the ceiling construction
Follow the instructions of fixing specialist or installation company



Hinge plates





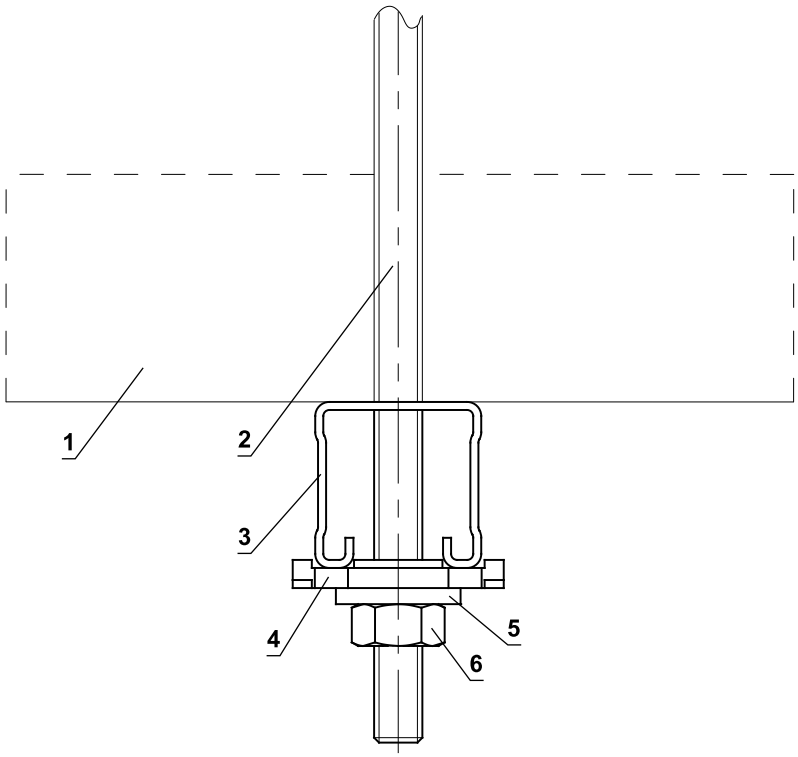
- If in doubt then always consult a specialist anchor engineer such as Halfen or Hilti.

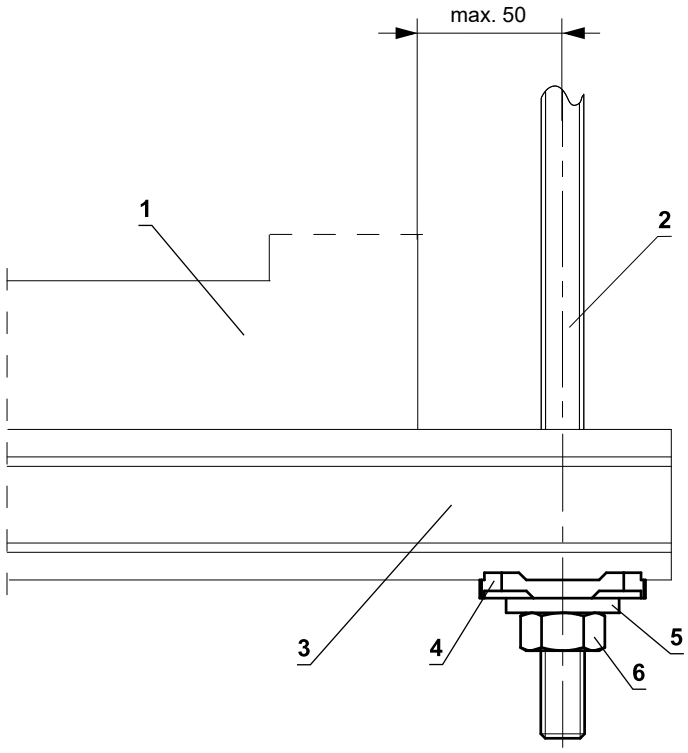
1 Threaded rod M8 - M20
2 Nut M8 - M20
3 Washer for M8 - M20
4 Coupling Nut M8 - M20
5 Anchor
6 Hinge plate - min. thickness 10 mm
7 Concrete screw tested for fire resistance R30-R90, max. Tension up to 0.75 KN (length 35 mm)

Load capacities of threaded rods at the required fire resistance 60 min. < t ≤ 120 min.

Size	As [mm²]	Weight [kg]	
		for 1 rod	for 2 rods
M8	36,6	22	44
M10	58	35	70
M12	84,3	52	104
M16	157	96	192
M18	192	117	234
M20	245	150	300

Example of placing of mounting profiles HILTI



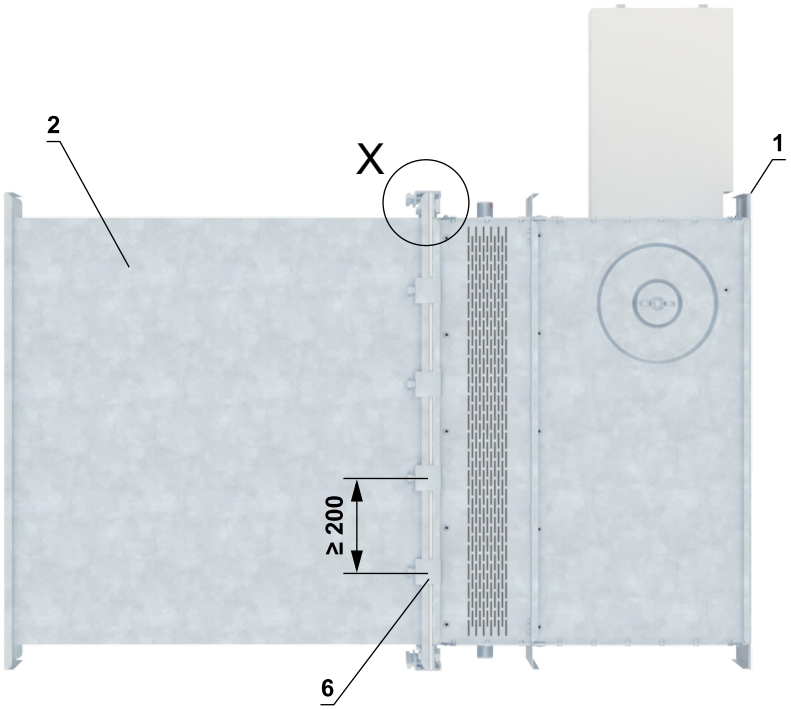


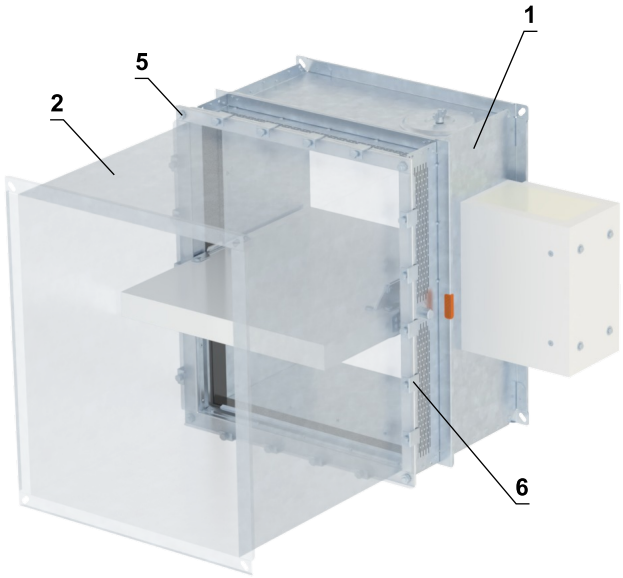
1 MSD
2 Threaded rod M8 - M12
3 Support HILTI MQ-41 or MQ-41/3
4 Bored plate HILTI MQZ-L
5 Washer for M8 - M12
6 Nut M8 - M12

Example of duct connection

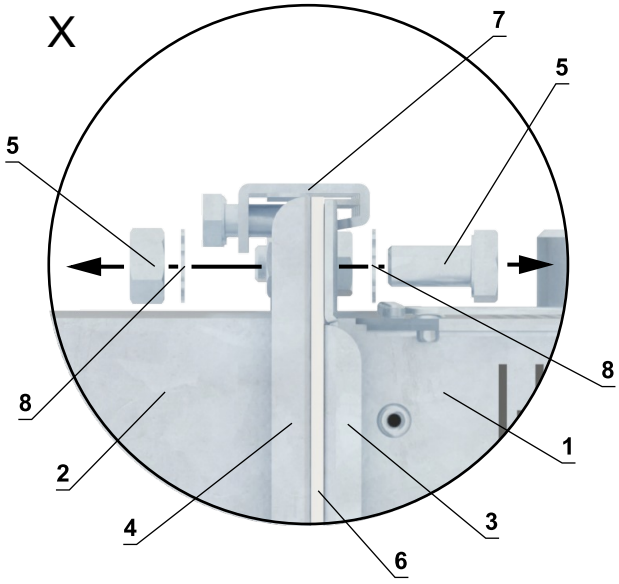
Flange connection

Connection to smoke extract duct acc. to BS EN 1366-8 (MULTI) / to BS EN 1366-9 (SINGLE)





Electrically conductive connection

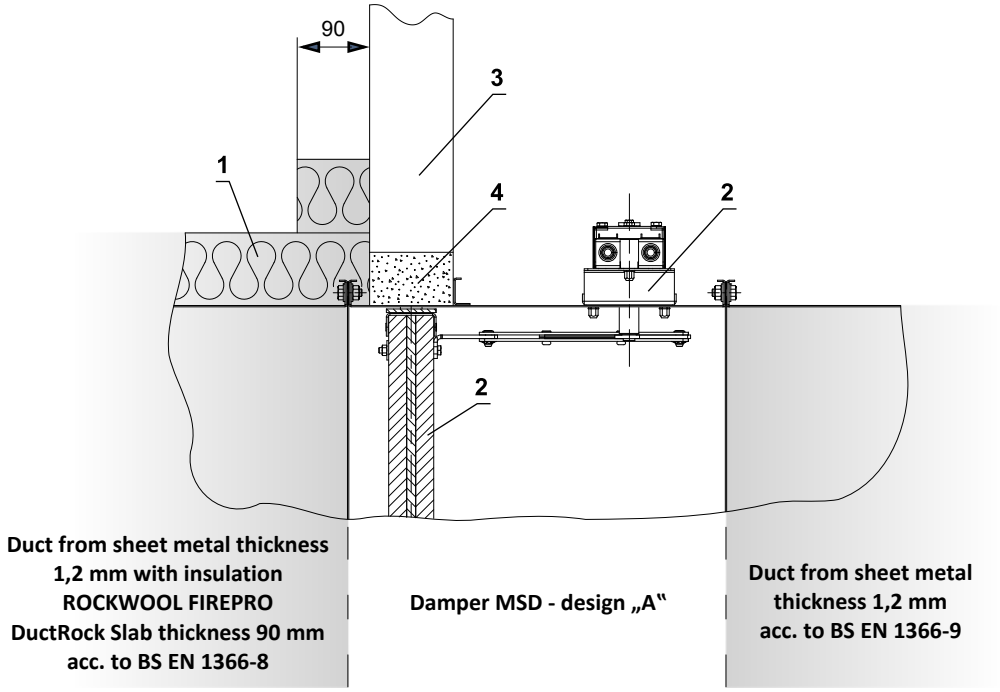


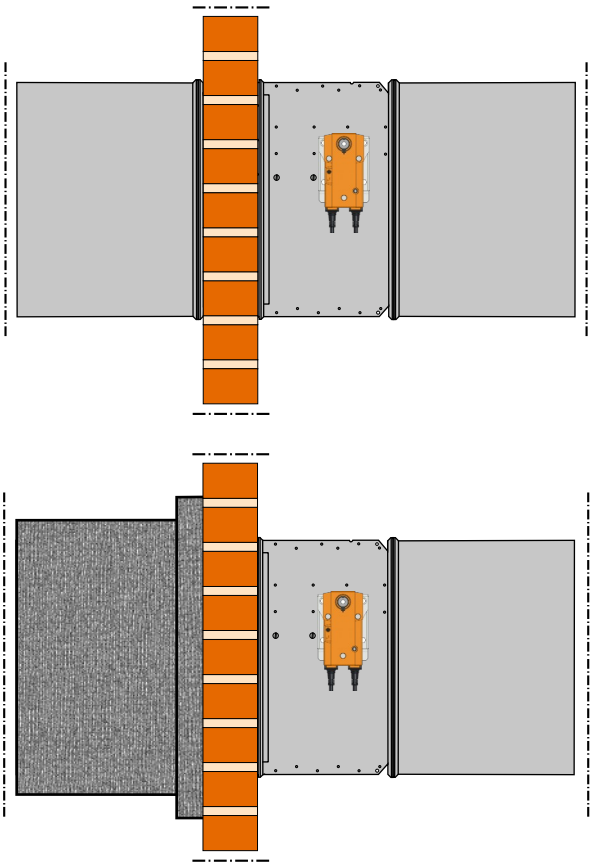
1 MSD
2 Connecting air duct MULTI
3 Flange of MSD
4 Flange of duct
5 M8 bolt assembly (min. one connection must be electrically conductive)
6 Ceramic self-adhesive tape (FJ 120 Pyrosil B 170-250 kg/m^3 - Tremco-illbruck) or equivalent
7 M8 C-clamps - maximum spacing of C-clamps 200 mm (type according to duct manufacturer instructions instructions)
8 Lock washers

MSD installed in fire separating construction and connection to steel duct

Connection MSD to steel duct, installed in construction with gypsum filling and insulation - design "A"

Connect the joints of stone wool plates with ROCKWOOL FIREPRO Glue, secure with nails and welding pins at max. spacings of 250 mm. Board joints must be covered using ROCKWOOL black aluminium foil tape. Follow duct supplier's instructions and insulation.

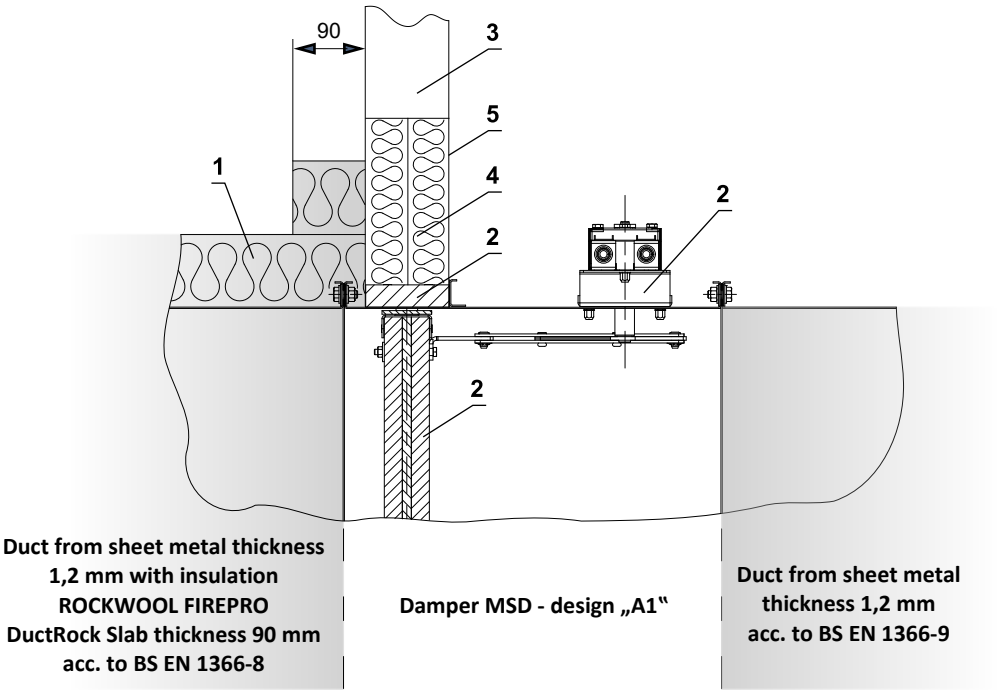


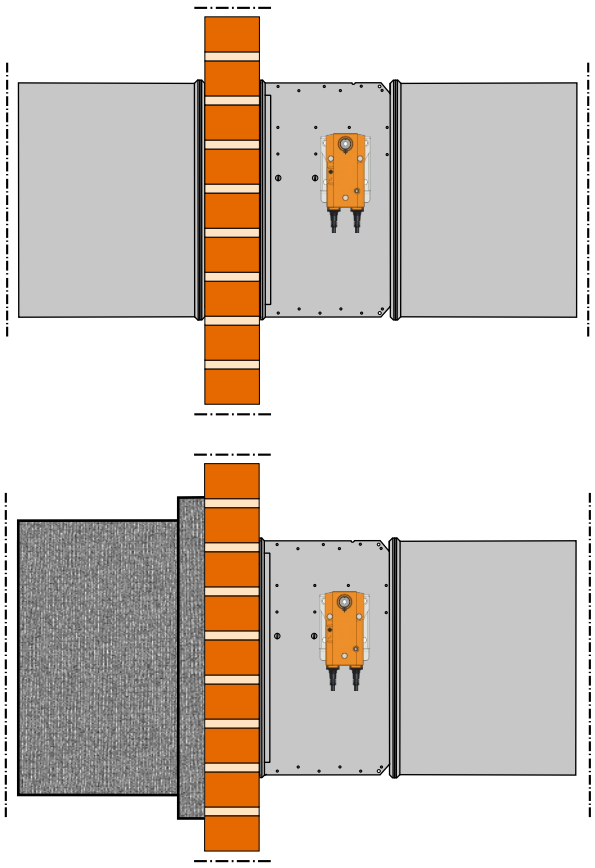


1 ROCKWOOL FIREPRO DuctRock Slab th. 90 mm acc. to BS EN 1366-8
2 Part of MSD - design „A"
3 Wall
4 British gypsum thistle bond 60 (or equivalent can by used) minimum density 670 kg/m³)

Connection MSD to steel duct, installed in construction with Ablative Coat. B. filling and insulation - design "A1"

Connect the joints of stone wool plates with ROCKWOOL FIREPRO Glue, secure with nails and welding pins at max. spacings of 250 mm. Board joints must be covered using ROCKWOOL black aluminium foil tape. Follow duct supplier's instructions and insulation.

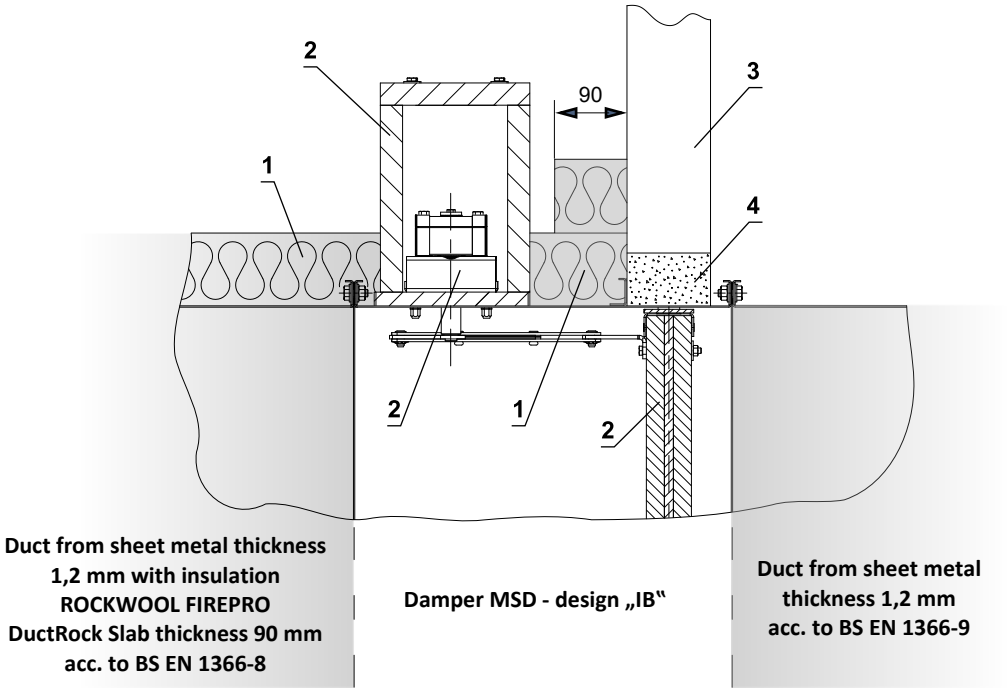


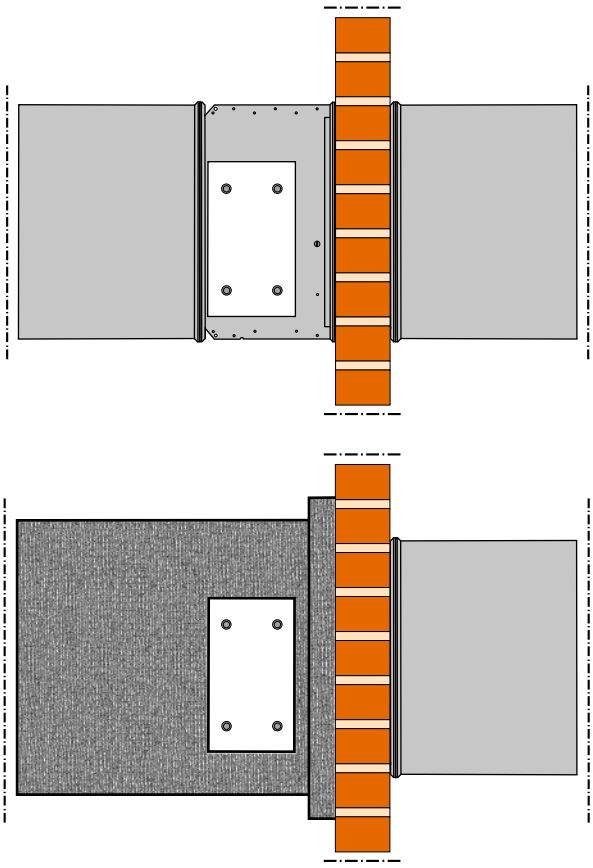


1 ROCKWOOL FIREPRO DuctRock Slab th. 90 mm acc. to BS EN 1366-8
2 Part of MSD - design „A1"
3 Wall
4 Ablative Coated Batt (e.g. Firestop Board HILTI CFS-CT B 1S 140/50 - min. density 140 kg/m3 + Firestop acrylic sealant HILTI CFS-S ACR or equivalent)
5 Fire stop coating thickness 1 mm (e.g. HILTI CFS-CT, PROMASTOP-CC or equivalent)

Connection MSD to steel duct, installed in construction with gypsum filling and insulation - design "IB"

Connect the joints of stone wool plates with ROCKWOOL FIREPRO Glue, secure with nails and welding pins at max. spacings of 250 mm. Board joints must be covered using ROCKWOOL black aluminium foil tape. Follow duct supplier's instructions and insulation.

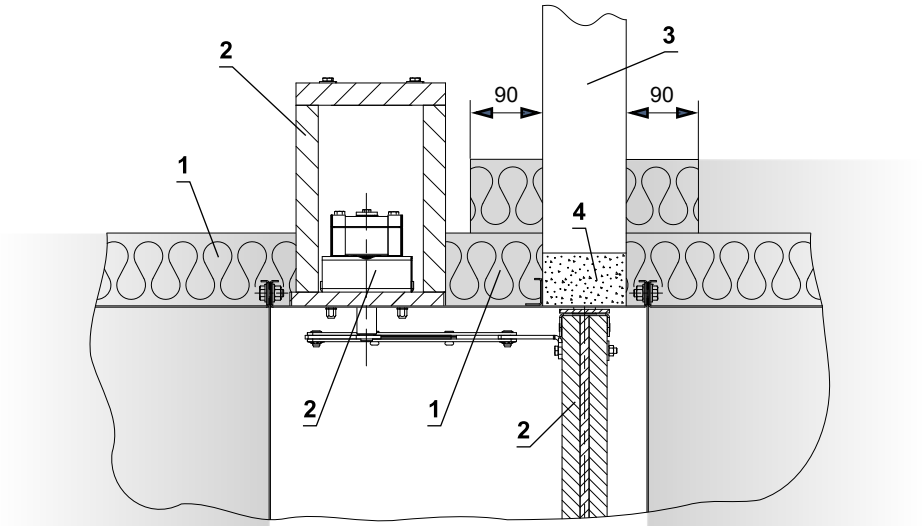




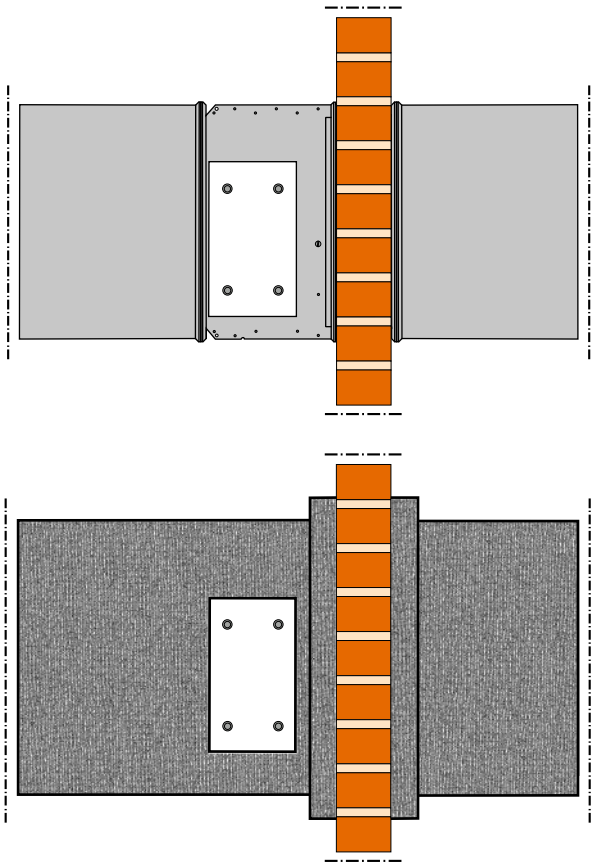
1 ROCKWOOL FIREPRO DuctRock Slab th. 90 mm acc. to BS EN 1366-8
2 Part of MSD - design „IB"
3 Wall
4 British gypsum thistle bond 60 (or equivalent can by used) minimum density 670 kg/m³)

Connection MSD to steel duct, installed in construction with gypsum filling and insulation - design "IB"

Connect the joints of stone wool plates with ROCKWOOL FIREPRO Glue, secure with nails and welding pins at max. spacings of 250 mm. Board joints must be covered using ROCKWOOL black aluminium foil tape. Follow duct supplier's instructions and insulation.



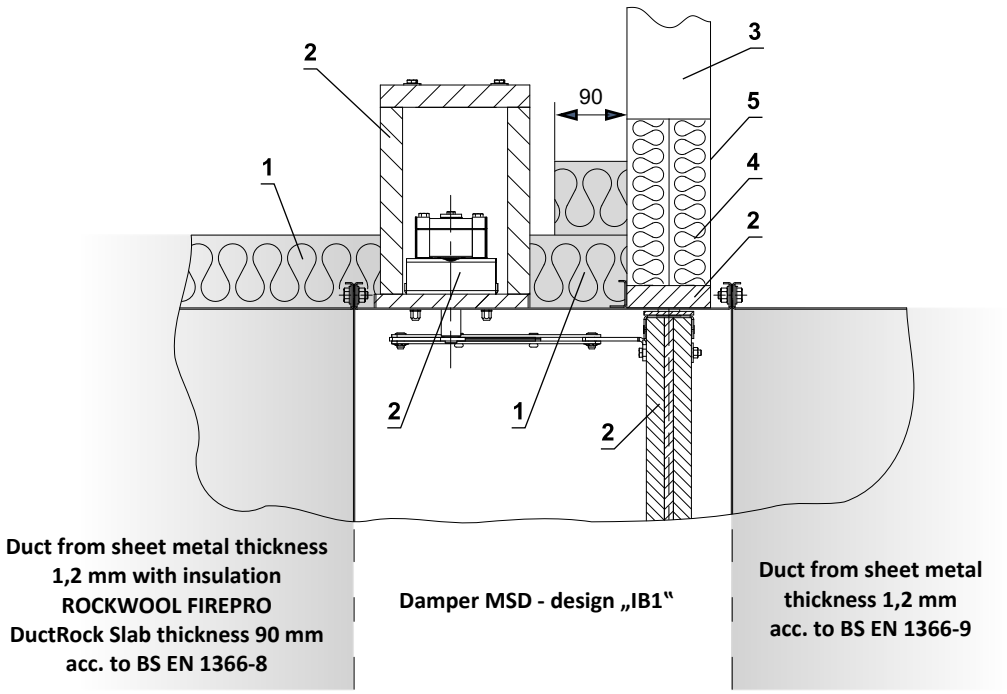
Duct from sheet metal thickness 1,2 mm with insulation ROCKWOOL FIREPRO DuctRock Slab thickness 90 mm acc. to BS EN 1366-8	**Damper MSD - design „IB"**	**Duct from sheet metal thickness 1,2 mm with insulation ROCKWOOL FIREPRO DuctRock Slab thickness 90 mm acc. to BS EN 1366-8**

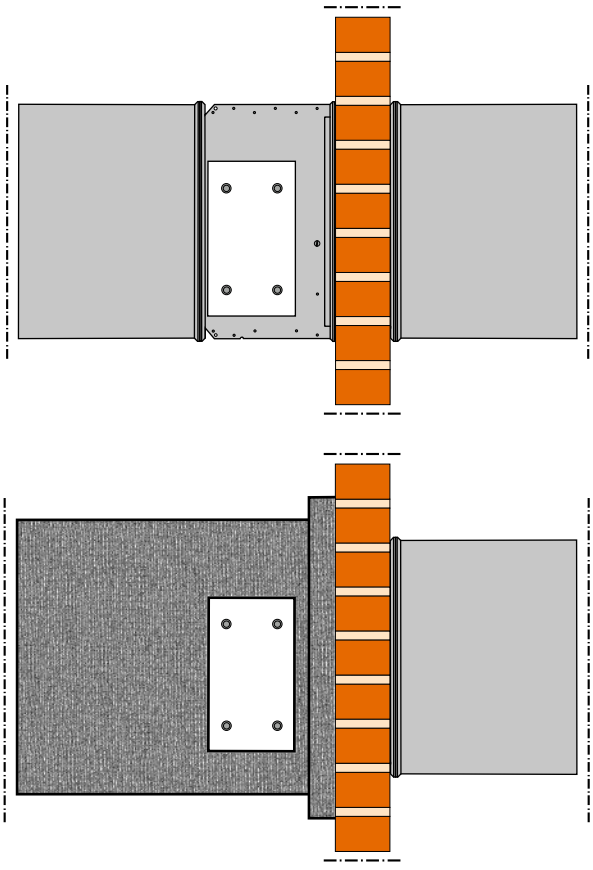


1 ROCKWOOL FIREPRO DuctRock Slab th. 90 mm acc. to BS EN 1366-8
2 Part of MSD - design „IB"
3 Wall
4 British gypsum thistle bond 60 (or equivalent can by used) minimum density 670 kg/m³)

Connection MSD to steel duct, installed in construction with Ablative Coat. B. filling and insulation - design "IB1"

Connect the joints of stone wool plates with ROCKWOOL FIREPRO Glue, secure with nails and welding pins at max. spacings of 250 mm. Board joints must be covered using ROCKWOOL black aluminium foil tape. Follow duct supplier's instructions and insulation.

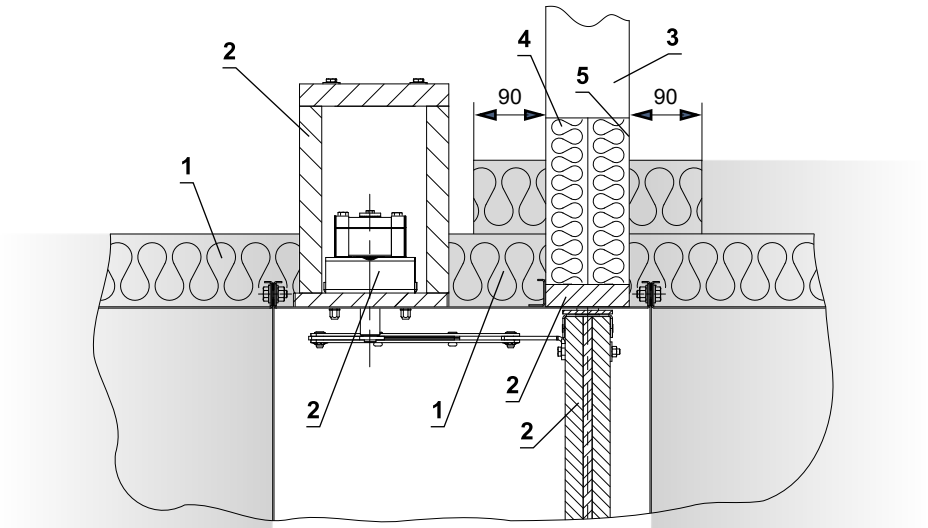




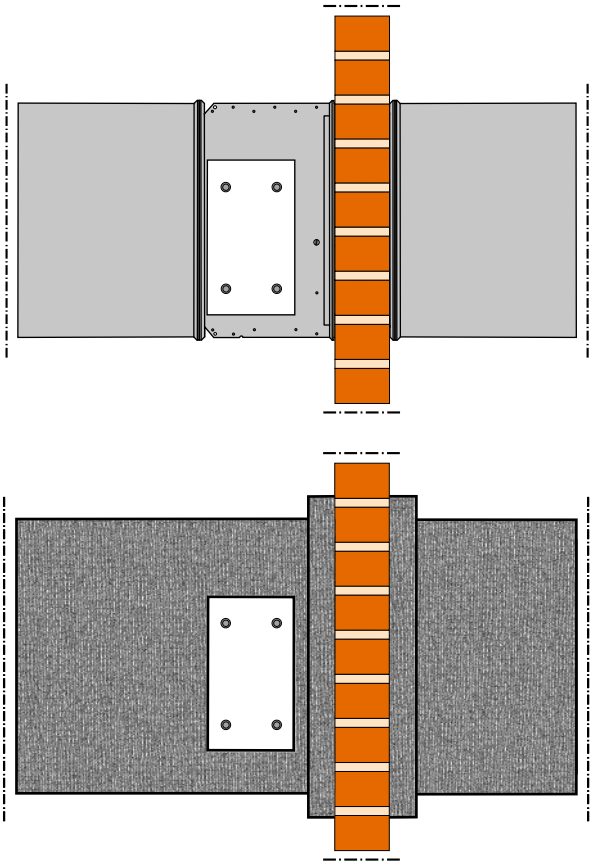
1 ROCKWOOL FIREPRO DuctRock Slab th. 90 mm acc. to BS EN 1366-8
2 Part of MSD - design „IB1"
3 Wall
4 Ablative Coated Batt (e.g. Firestop Board HILTI CFS-CT B 1S 140/50 - min. density 140 kg/m3 + Firestop acrylic sealant HILTI CFS-S ACR or equivalent)
5 Fire stop coating thickness 1 mm (e.g. HILTI CFS-CT, PROMASTOP-CC or equivalent)

Connection MSD to steel duct, installed in construction with Ablative Coat. B. filling and insulation - design "IB1"

Connect the joints of stone wool plates with ROCKWOOL FIREPRO Glue, secure with nails and welding pins at max. spacings of 250 mm. Board joints must be covered using ROCKWOOL black aluminium foil tape. Follow duct supplier's instructions and insulation.



Duct from sheet metal thickness 1,2 mm with insulation ROCKWOOL FIREPRO DuctRock Slab thickness 90 mm acc. to BS EN 1366-8	**Damper MSD - design „IB1"**	**Duct from sheet metal thickness 1,2 mm with insulation ROCKWOOL FIREPRO DuctRock Slab thickness 90 mm acc. to BS EN 1366-8**

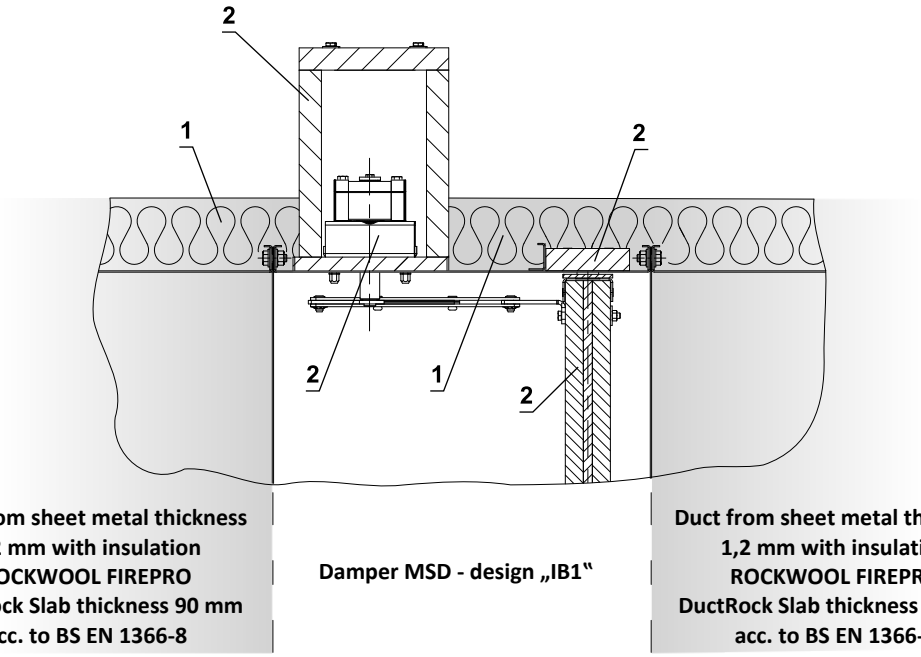


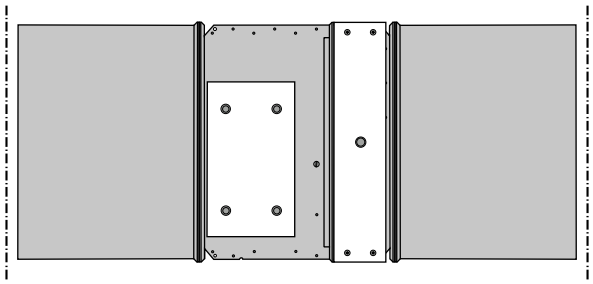
1 ROCKWOOL FIREPRO DuctRock Slab th. 90 mm acc. to BS EN 1366-8
2 Part of MSD - design „IB1"
3 Wall
4 Ablative Coated Batt (e.g. Firestop Board HILTI CFS-CT B 1S 140/50 - min. density 140 kg/m3 + Firestop acrylic sealant HILTI CFS-S ACR or equivalent)
5 Fire stop coating thickness 1 mm (e.g. HILTI CFS-CT, PROMASTOP-CC or equivalent)

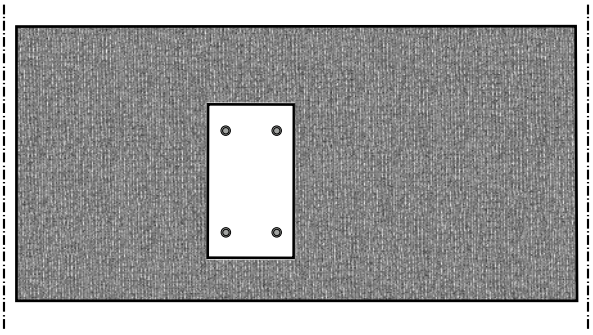
MSD installed in steel duct with insulation

Connection MSD in steel duct with insulation - design "IB1"

Connect the joints of stone wool plates with ROCKWOOL FIREPRO Glue, secure with nails and welding pins at max. spacings of 250 mm. Board joints must be covered using ROCKWOOL black aluminium foil tape. Follow duct supplier's instructions and insulation.







1 ROCKWOOL FIREPRO DuctRock Slab th. 90 mm acc. to BS EN 1366-8
2 Part of MSD - design „IB1"

VI. TECHNICAL DATA

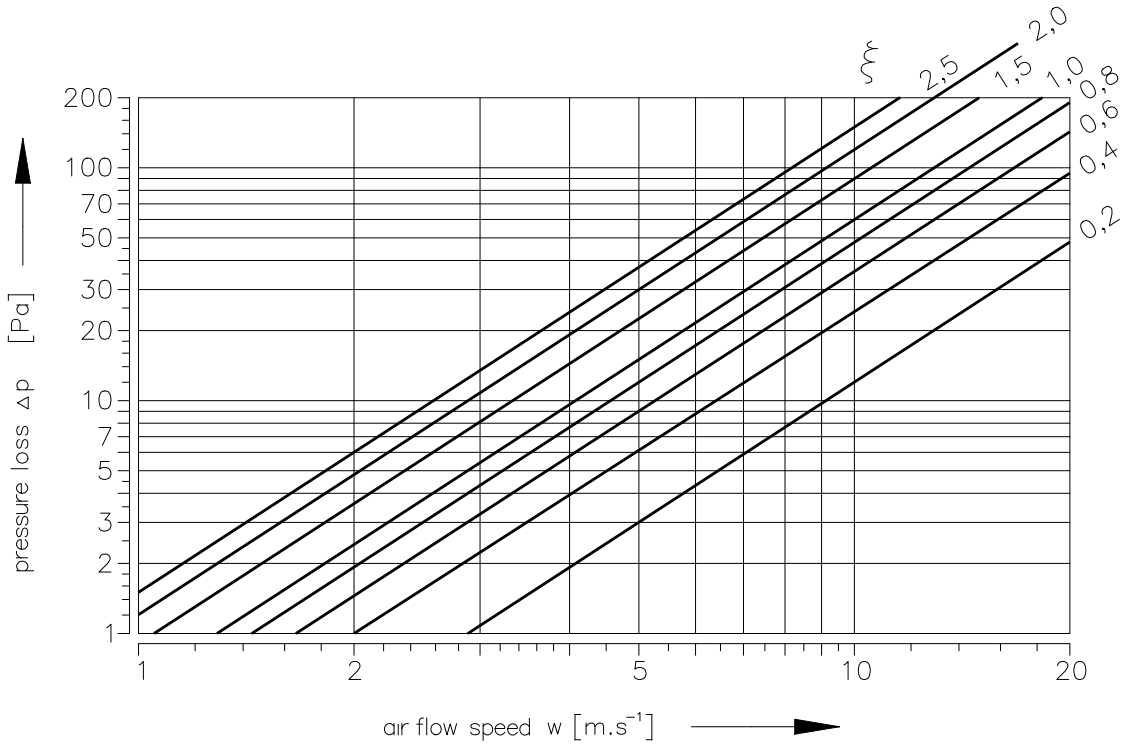
Pressure loss

Pressure loss calculation

$$\Delta p = \xi \cdot \rho \cdot \frac{w^2}{2}$$

Δp	[Pa]	presure loss
w	[m/s]	air flow speed in nominal damper section
ρ	[kg/m³]	air density
ξ	[-]	coefficient of local pressure loss for the nominal damper section → see page 40

Determination of pressure loss by using diagram ρ = 1,2 kg/m³



Coefficient of local pressure loss

	B									
A	**180**	**200**	**225**	**250**	**280**	**300**	**315**	**355**	**400**	**450**
180	2,1314	1,6906	1,3782	1,1149	1,0037	0,9288	0,7918	0,6827	0,6003	0,5350
200	1,9945	1,5804	1,2423	1,0368	0,9748	0,8785	0,7383	0,6367	0,5585	0,4976
225	1,9207	1,5162	1,1256	0,9994	0,9341	0,8442	0,7137	0,6078	0,5329	0,4772
250	1,8415	1,4584	1,1032	0,9651	0,9009	0,8068	0,6837	0,5832	0,5125	0,4590
280	1,7505	1,3782	1,0732	0,9116	0,8571	0,7597	0,6484	0,5543	0,4847	0,4366
300	1,6853	1,3311	1,0400	0,8635	0,8046	0,7148	0,6099	0,5264	0,4665	0,4109
315	1,6071	1,2690	1,0037	0,8303	0,7597	0,6645	0,5864	0,5050	0,4419	0,3927
355	1,5408	1,2155	0,9544	0,7929	0,7083	0,6356	0,5607	0,4815	0,4227	0,3756
400	1,4841	1,1706	0,9063	0,7651	0,6859	0,6227	0,5382	0,4633	0,4045	0,3606
450	1,4359	1,1331	0,8913	0,7394	0,6666	0,5896	0,5200	0,4473	0,3916	0,3478
500	1,3996	1,1021	0,8624	0,7201	0,6548	0,5810	0,5061	0,4344	0,3799	0,3371
550	1,3803	1,0882	0,8378	0,7073	0,6474	0,5757	0,4965	0,4269	0,3734	0,3349
560	1,3643	1,0754	0,8282	0,7009	0,6324	0,5725	0,4922	0,4227	0,3692	0,3285
600	1,3493	1,0582	0,8218	0,6944	0,6270	0,5585	0,4858	0,4184	0,3659	0,3242
630	1,3332	1,0497	0,8100	0,6837	0,6238	0,5436	0,4804	0,4130	0,3606	0,3199
650	1,3204	1,0379	0,7907	0,6752	0,6003	0,5393	0,4740	0,4066	0,3542	0,3157
700	1,3108	1,0304	0,7832	0,6741	0,5949	0,5382	0,4719	0,4045	0,3531	0,3146
710	1,3043	1,0272	0,7747	0,6688	0,5896	0,5371	0,4697	0,4034	0,3520	0,3135
750	1,2926	1,0176	0,7683	0,6634	0,5842	0,5307	0,4633	0,3980	0,3478	0,3103
800	1,2808	1,0079	0,7618	0,6559	0,5767	0,5222	0,4601	0,3959	0,3456	0,3060
900	1,2594	0,9908	0,7479	0,6441	0,5692	0,5136	0,4526	0,3884	0,3381	0,3007
1000	1,2433	0,9780	0,7383	0,6367	0,5607	0,4976	0,4462	0,3831	0,3338	0,2975
1100	1,2284	0,9662	0,7287	0,6281	0,5478	0,4869	0,4408	0,3777	0,3296	0,2932
1250	1,2155	0,9544	0,7126	0,6206	0,5339	0,4804	0,4355	0,3734	0,3264	0,2900
1400	1,2027	0,9459	0,6998	0,6142	0,5254	0,4783	0,4301	0,3692	0,3231	0,2857
1500	1,1952	0,9395	0,6955	0,6110	0,5157	0,4708	0,4280	0,3670	0,3199	0,2846

	B									
A	**500**	**550**	**560**	**600**	**630**	**650**	**700**	**710**	**750**	**800**
180	0,4879	0,4665	0,4462	0,4216	0,4109	0,3916	0,3884	0,3820	0,3681	0,3585
200	0,4526	0,4323	0,4152	0,3959	0,3820	0,3681	0,3606	0,3552	0,3424	0,3328
225	0,4355	0,4152	0,4002	0,3788	0,3681	0,3531	0,3456	0,3413	0,3338	0,3221
250	0,4216	0,4002	0,3809	0,3659	0,3542	0,3403	0,3328	0,3274	0,3210	0,3092
280	0,3948	0,3766	0,3585	0,3435	0,3328	0,3199	0,3167	0,3114	0,2975	0,2932
300	0,3766	0,3531	0,3435	0,3253	0,3157	0,3071	0,2996	0,2953	0,2814	0,2750
315	0,3574	0,3349	0,3264	0,3103	0,3007	0,2932	0,2846	0,2782	0,2696	0,2611
355	0,3413	0,3253	0,3114	0,2975	0,2868	0,2750	0,2718	0,2664	0,2557	0,2493
400	0,3274	0,3082	0,2985	0,2900	0,2761	0,2654	0,2589	0,2557	0,2472	0,2386
450	0,3167	0,2964	0,2889	0,2782	0,2654	0,2589	0,2525	0,2461	0,2386	0,2301
500	0,3071	0,2943	0,2803	0,2664	0,2579	0,2482	0,2429	0,2386	0,2311	0,2236
550	0,3039	0,2857	0,2771	0,2611	0,2450	0,2365	0,2301	0,2268	0,2279	0,2194
560	0,2996	0,2825	0,2729	0,2515	0,2504	0,2408	0,2290	0,2268	0,2236	0,2172
600	0,2943	0,2793	0,2707	0,2493	0,2482	0,2375	0,2268	0,2247	0,2194	0,2140
630	0,2910	0,2761	0,2664	0,2482	0,2450	0,2343	0,2268	0,2247	0,2161	0,2119
650	0,2900	0,2707	0,2632	0,2461	0,2418	0,2322	0,2258	0,2236	0,2140	0,2097
700	0,2868	0,2654	0,2622	0,2450	0,2408	0,2301	0,2247	0,2226	0,2129	0,2087
710	0,2846	0,2632	0,2600	0,2440	0,2397	0,2290	0,2226	0,2215	0,2119	0,2076
750	0,2814	0,2611	0,2568	0,2397	0,2365	0,2268	0,2204	0,2194	0,2108	0,2054
800	0,2793	0,2600	0,2547	0,2354	0,2333	0,2236	0,2183	0,2172	0,2087	0,2022
900	0,2739	0,2547	0,2504	0,2333	0,2301	0,2172	0,2151	0,2129	0,2044	0,1990
1000	0,2696	0,2515	0,2461	0,2290	0,2268	0,2151	0,2119	0,2087	0,2001	0,1958
1100	0,2664	0,2482	0,2429	0,2258	0,2236	0,2129	0,2097	0,2065	0,1969	0,1937
1250	0,2632	0,2429	0,2397	0,2226	0,2204	0,2076	0,2065	0,2044	0,1947	0,1905
1400	0,2611	0,2397	0,2375	0,2204	0,2183	0,2044	0,2033	0,2022	0,1926	0,1894
1500	0,2589	0,2386	0,2365	0,2183	0,2161	0,2022	0,2012	0,2001	0,1905	0,1883

Noise data

Level of acoustic output corrected with filter A

$$L_{WA} = L_{W1} + 10 \log(S) + K_A$$

L_{WA}	[dB(A)]	level of acoustic output corrected with filter A
L_{W1}	[dB]	level of acoustic output L_{W1} related to the 1 m^2 section
S	[m^2]	duct cross section
K_A	[dB]	correction to the weight filter A

Level of acoustic output in octave ranges

$$L_{Woct} = L_{W1} + 10 \log(S) + L_{rel}$$

L_{Woct}	[dB]	spectrum of acoustic output in octave range
L_{W1}	[dB]	level of acoustic output L_{W1} related to the 1 m^2 section
S	[m^2]	duct cross section
L_{rel}	[dB]	relative level expressing the shape of the spectrum

Tables of acoustics values

Level of acoustic output L_{W1}[dB] related to the 1 m^2 section

	ξ [-]											
w [m/s]	**0,2**	**0,3**	**0,4**	**0,5**	**0,6**	**0,7**	**0,8**	**0,9**	**1**	**1,5**	**2**	**2,5**
2	15,5	18,7	20,9	22,6	24	25,2	26,3	27,2	28	31,2	33,4	35,1
3	26,1	29,2	31,5	33,2	34,6	35,8	36,9	37,8	38,6	41,7	44	45,7
4	33,6	36,7	39	40,7	42,1	43,3	44,3	45,3	46,1	49,2	51,5	53,2
5	39,4	42,5	44,8	46,5	47,9	49,1	50,2	51,1	51,9	55	57,3	59
6	44,1	47,3	49,5	51,3	52,7	53,9	54,9	55,8	56,6	59,8	62	63,8
7	48,2	51,3	53,5	55,3	56,7	57,9	58,9	59,8	60,7	63,8	66,1	67,8
8	51,6	54,8	57	58,8	60,2	61,4	62,4	63,3	64,1	67,3	69,5	71,3
9	54,7	57,9	60,1	61,8	63,2	64,4	65,5	66,4	67,2	70,4	72,6	74,3
10	57,4	60,6	62,8	64,6	66	67,2	68,2	69,1	70	73,1	75,3	77,1
11	59,9	63,1	65,3	67,1	68,5	69,7	70,7	71,6	72,4	75,6	77,8	79,6
12	62,2	65,4	67,6	69,3	70,7	71,9	73	73,9	74,7	77,9	80,1	81,8

Correction to the weight filter A

w [m/s]	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
K_A [dB]	-15	-11,8	-9,8	-8,4	-7,3	-6,4	-5,7	-5	-4,5	-4	-3,6

Relative level expressing the shape of the spectrum L_{rel}

	f [Hz]							
w [m/s]	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
2	-4,5	-6,9	-10,9	-16,7	-24,1	-33,2	-43,9	-56,4
3	-3,9	-5,3	-8,4	-13,1	-19,5	-27,6	-37,4	-48,9
4	-3,9	-4,5	-6,9	-10,9	-16,7	-24,1	-33,2	-43,9
5	-4	-4,1	-5,9	-9,4	-14,6	-21,5	-30,0	-40,3
6	-4,2	-3,9	-5,3	-8,4	-13,1	-19,5	-27,6	-37,4
7	-4,5	-3,9	-4,9	-7,5	-11,9	-17,9	-25,7	-35,1
8	-4,9	-3,9	-4,5	-6,9	-10,9	-16,7	-24,1	-33,2
9	-5,2	-3,9	-4,3	-6,4	-10,1	-15,6	-22,7	-31,5
10	-5,5	-4	-4,1	-5,9	-9,4	-14,6	-21,5	-30
11	-5,9	-4,1	-4	-5,6	-8,9	-13,8	-20,4	-28,8
12	-6,2	-4,3	-3,9	-5,3	-8,4	-13,1	-19,5	-27,6

VII. MATERIAL, FINISHING

- Damper casing is made of galvanized sheet metal without any other surface finish.
- The damper blade and the actuator cover are made of fire-resistant asbestos free boards made of mineral fibres connected with nailed “U” connectors.
- Fasteners are galvanized.

VIII. TRANSPORTATION AND STORAGE

Logistic terms

- Dampers are delivered on a pallets. As standard, the dampers are wrapped in plastic foil for protection during transport and must not be used for long-term storage of the equipment . Changes in temperature during transport may cause condensation of water vapour inside the packaging and thereby condisitions may arise inside the packaging that are suitable for corrosion of materials used in the equipment (e.g. white corrosion on zinc-coated items or mould on calcium silicate). Therefore, it is necessary to remove the transport packaging immediately after unloading to allow air to circulate around the product.
- The equipment must be stored in clean, dry, well ventilated and dust-free environment out of direct sunlight. ensuring protection against moisture and extremes of temperatures (minumum temperature +5°C) the equipment must be protected against mechanical and accidental damage prior to installation.
- Another required packaging system should be approved and agreed by manufacturer. Packaging material is not returnable in case that another packaging system (material) is required and used and it is not included into final price of damper.
- For unloading and further manipulation with the damper is necessary to use appropriate tooling (forklifts) due to damper weight. Dampers are fragile.
- Dampers are transported by box freight vehicles without direct weather impact, there must not occur any shocks and ambient temperature must not exceed +50°C. Dampers must be protected against impact when transported and manipulated. During transportation, the damper blade must be in the "CLOSED" position.
- Dampers are stored indoor in environment without any aggressive vapours, gases or dust. Indoor temperature must be in the range from -30°C to +50°C and maximum relative humidity 95% (avoid condensation on the damper body). Dampers must be protected against impact when transported and manipulated.

IX. ASSEMBLY, ATTENDANCE AND MAINTENANCE

- 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.
- All effective safety standards and directives must be obse-rved during damper assembly.
- To ensure reliable smoke control damper function it is necessary to avoid blocking the closing mechanism and contact surfaces with collected dust, fibre and sticky materials and solvents.
- Flange and screw joints must be conductively connected to protect against dangerous contact. 2 galvanized fan shape pads that are placed under the head of one screw and a fastened nut are used for conductive connection.

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

DANGER OF DAMAGE

Always:

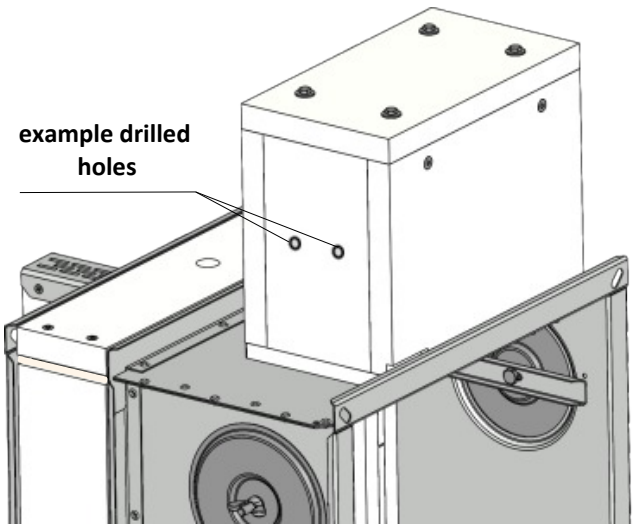
REMOVE POWER BEFORE USING ALLEN KEY!
NEVER USE A POWER TOOL!

Both incorrect operations will damage the clutch Mechanism
NO WARRANTY CLAIM!

Electrical connection of the actuator in protection box

Protection box without slot or predrilled holes

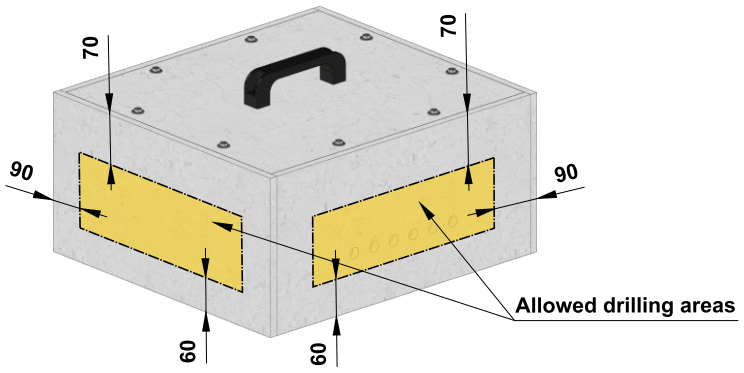
- Drill two holes into the protection box (from outside to inside) and pull through field wiring cables (CAT 3 fire resistant cables as BS 8519) to connect to the actuator trailing lead inside the housing, using a standard screwed cable connector block, the protection box is made of calcium silicate plates.
- Procedure
  - Use drill (drill size acc. To suit connecting cable Ø + 2 mm for seal up by mastic) and make two holes. 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.

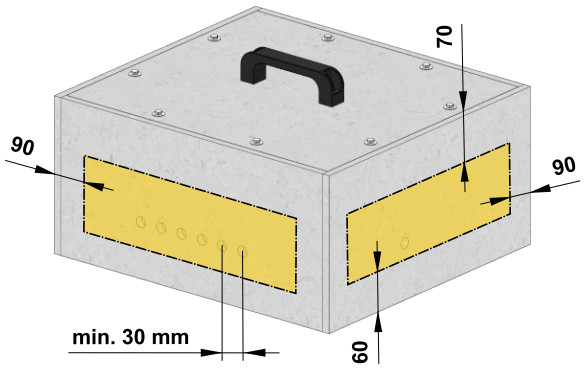


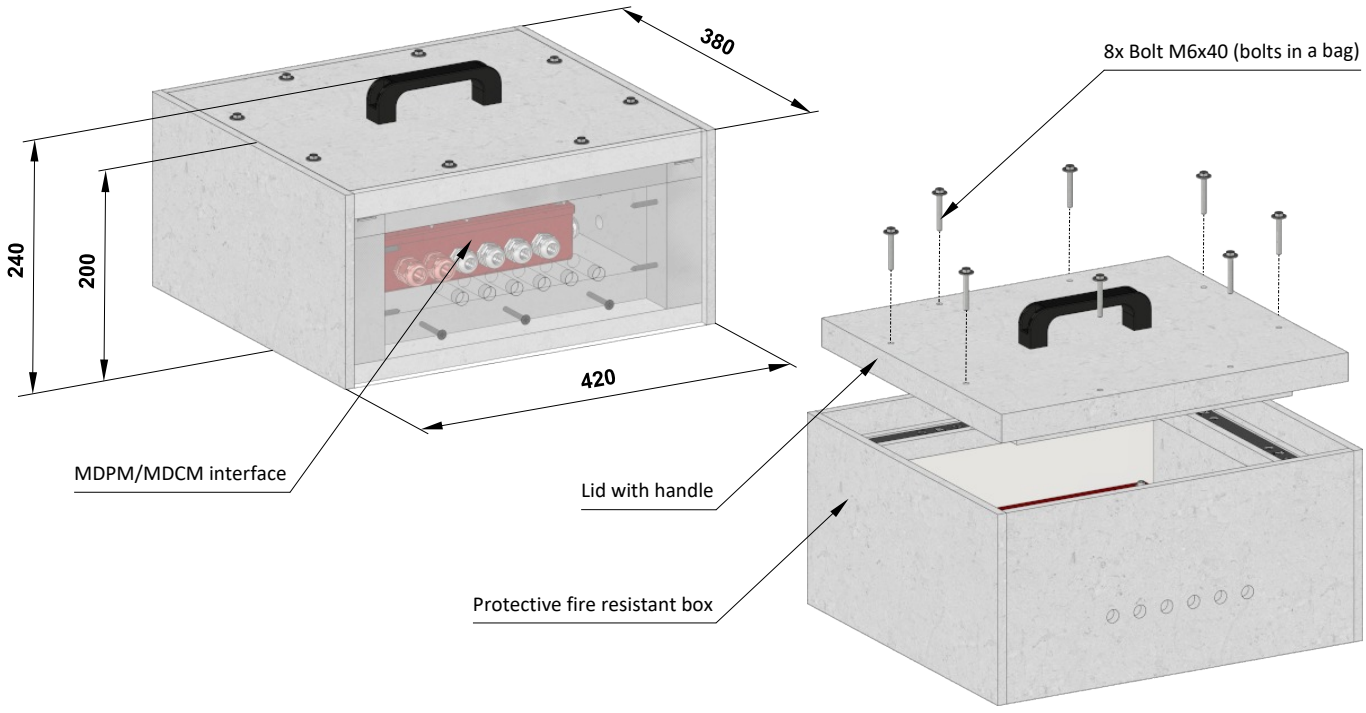
Example of position of holes in the wall of the box, without pre-manufactured slot

Connection of the control module MDPM & MDCM interfaces inside protection box

- Drill holes into the protection box (from outside to inside) and pull through field wiring cable (fire resistant cables) to connect control module. Protection box is made of calcium silicate insulating plates.
- Procedure:
  - Screw red box of MDPM/MDCM interface inside of the FIRE RATED housing to the back side, use pre drilled holes in red box and self-taping screws 4,8x25 mm. Minimum distance from walls 20 mm.
  - Use drill (drill size acc. to suit connecting cable Ø + 2 mm for seal up by mastic) and make holes (min. pitch of the holes must be 30 mm), number of holes depends on the type of control module. **It is possible to drill holes in any side of the protection box.**
  - Pull the heat resistant cable through the calcium silicate insulating plate (wall) and connect with cables from control module.
  - Seal up the space around cable with fire resistant mastic (HILTI CFS-S ACR, PROMASTOP) or equivalent.
  - Let the mastic harden.
- Placement:
  - The FIRE RATED housing can be installed onto a wall.
  - For installation, drill 4 holes in the rear of the housing (from inside to outside) with a maximum hole diameter of 8,5mm, use fixing appropriate for the application. Seal all holes and gap between FIRE RATED housing and wall with firestop (HILTI CFS-S ACR, PROMASTOP).



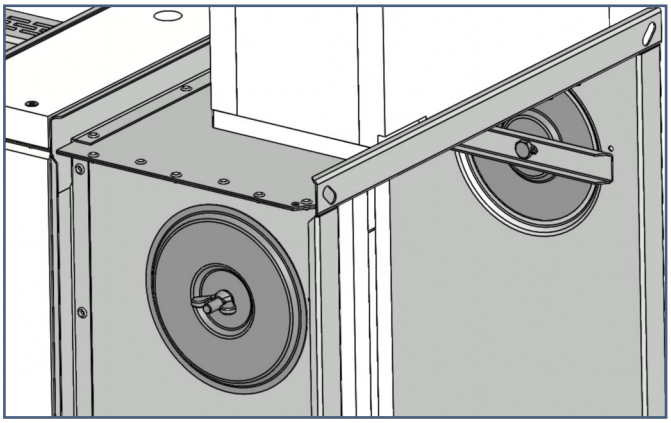




Entry into service and revisions

- 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.
- 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.

- Inspection hole disassembly
  - release the covering lid by turning the wing nut and while turning the lid right or left release it from the security belt. Then tilt the lid and remove it from its original position.



Inspection hole detail

- 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.
- Before entering the dampers into operation after their assembly and by sequential checks, the following checks must be carried out for all designs.
- Visual inspection of proper damper integration, inside damper area, damper blade, contact surfaces and silicon sealing.

- Ensure each damper is fully checked for operational capability, control should be initiated from the control system. Dampers blades should open and close correctly and operation should be visually inspected and documented prior to handover.

X. ORDERING INFORMATION

Ordering key MSD

Square damper MSD

1	2	3		4	5	6	7		8
MSD	UK	800x400	/	375	.44	IB1	Q30	-	ZN

EXAMPLE:

MSD UK 800x400/375 .44 IB1 Q30-ZN

Square smoke control damper MSD, dimension 800x400 mm, built length 375 mm, control design with spring return actuator 230 V, design includes protection box of the actuator and include the protective cladding boards in line with the blade, flange dimension 30 mm, galvanized material variant.

1| Type of smoke control damper - MSD

2| Country of destination

3| Damper dimensions A x B → see pages 12 to 16

"A" is the width of the damper

"B" is the height of the damper

4| Built length - 375 mm

5| Damper design

.44	With actuating mechanism BEN, BEE, BE, InMax 50.75-S for 230V
.54	With actuating mechanism BEN, BEE, BE, InMax 50.75-S for 24V
.65*	With actuating mechanism BEN (BEE)-SR for 24V

** Design .65 is not available by using actuating mechanism BE, InMax 50.75-S*

6| Accessories

	Without accessories
A	Design does not include protection box of the actuator and does not include protective cladding boards in line with the blade
A1	Design does not include protection box of the actuator and includes protective cladding boards in line with the blade
IB	Design includes protection box of the actuator and does not include the protective cladding boards in line with the blade
IB1	Design includes protection box of the actuator and include the protective cladding boards in line with the blade

7| Flange dimension

Q30	Flange width 30 mm

8| Material

ZN	Galvanized

Round damper MSD

1	2	3	4	5		6
MSD	UK	DN 500	.44	RS	-	ZN

EXAMPLE:

MSD UK DN 500 .44 RS-ZN

Round smoke control damper MSD, dimension DN 500 mm, control design with spring return actuator 230 V, straight connection to circular duct, galvanized material variant.

1| Type of smoke control damper - MSD

2| Country of destination

3| Damper dimensions ØD → see page 16

4| Damper design

.44	With actuating mechanism BEN 230V
.54	With actuating mechanism BEN 24V

5| Duct connection

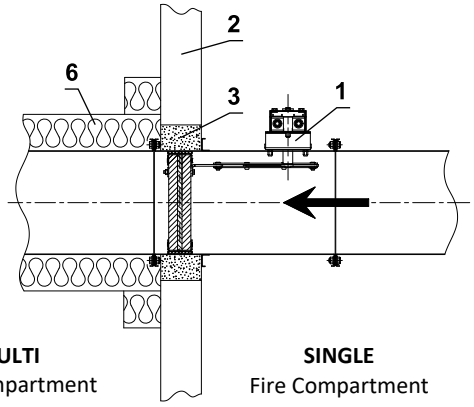
RS	Straight connection to circular duct

6| Material

ZN	Galvanized

Methods of damper installation, according to design

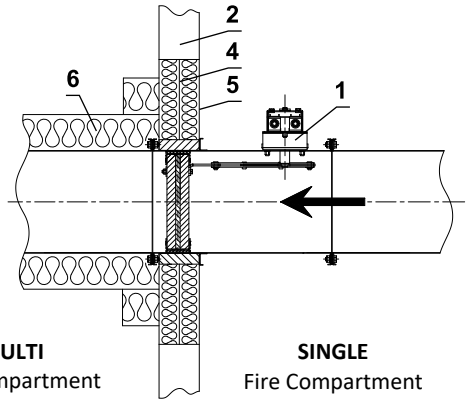
Design „A" **EIS 120**



MULTI
Fire Compartment

SINGLE
Fire Compartment

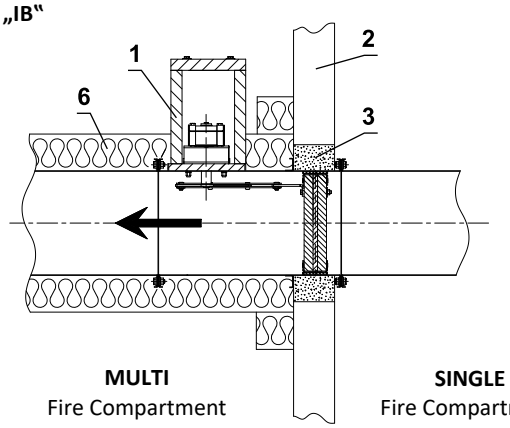
Design „A1" **EIS 90**



MULTI
Fire Compartment

SINGLE
Fire Compartment

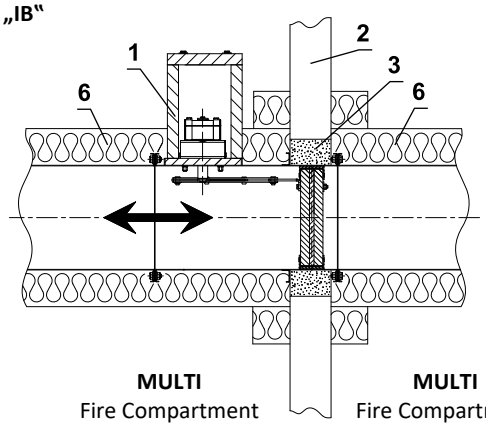
Design „IB" **EIS 120**



MULTI
Fire Compartment

SINGLE
Fire Compartment

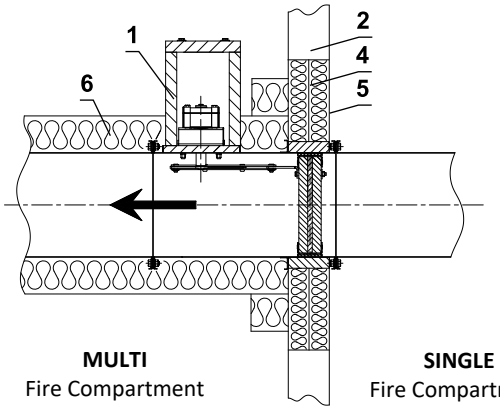
Design „IB" **EIS 120**



MULTI
Fire Compartment

MULTI
Fire Compartment

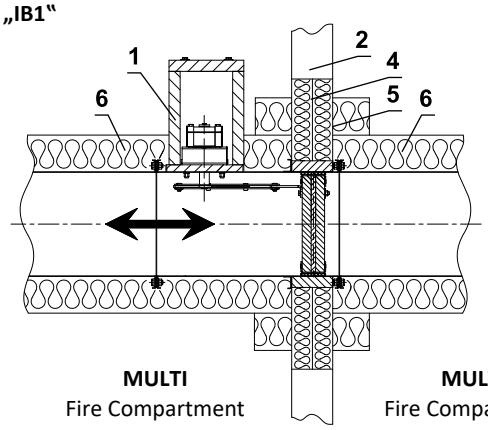
Design „IB1" **EIS 90**



MULTI
Fire Compartment

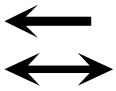
SINGLE
Fire Compartment

Design „IB1" **EIS 90**



MULTI
Fire Compartment

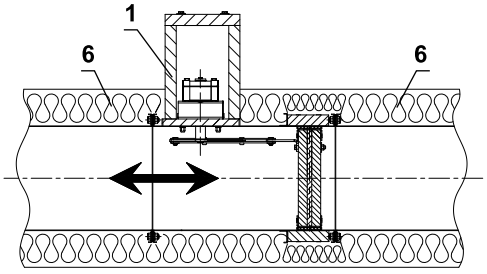
MULTI
Fire Compartment



For smoke and heat extraction function only!

1 MSD
2 Wall
3 British gypsum thistle bond 60 min. density 670 kg/m³
4 Ablative Coated Batt (e.g. Firestop Board HILTI CFS-CT B 1S 140/50 - min. density 140 kg/m³ + Firestop acrylic sealant HILTI CFS-S ACR or equivalent)
5 Fire stop coating thickness 1 mm (e.g. HILTI CFS-CT, PROMASTOP-CC or equivalent)
6 ROCKWOOL FIREPRO DuctRock Slab th. 90 mm

Design „IB1" **EIS 120**



MULTI
Fire Compartment

Data label

- Data label is placed on the damper casing (example)

The producer reserves the right for innovations of the product.
For actual product information see www.mandik.co.uk

MANDÍK®

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