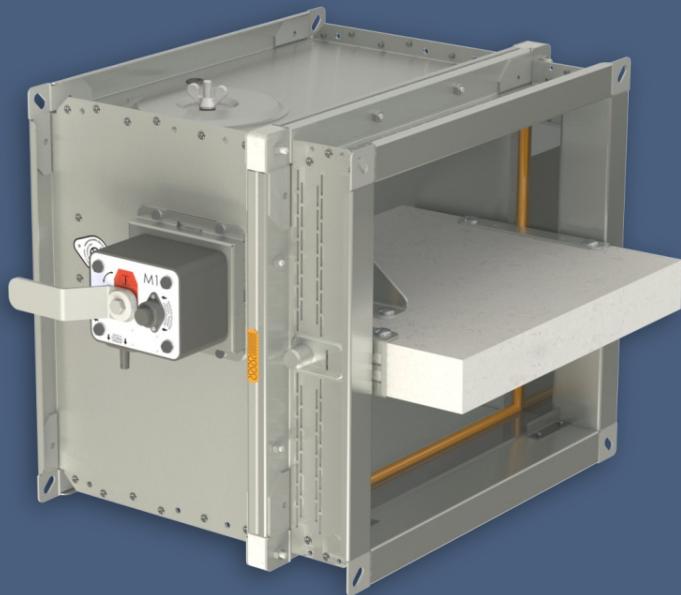
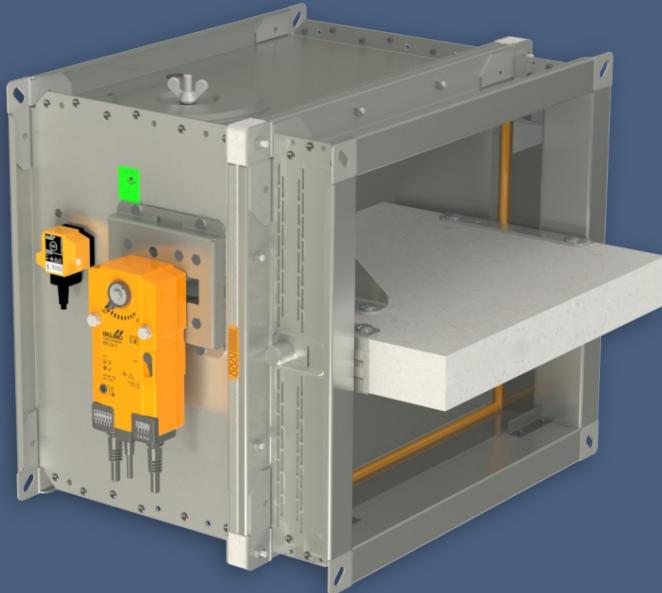


# FDMQ 120

## Fire damper

Technical Documentation

Installation, Commissioning, Operation, Maintenance and Service Manual



CE  
1391

These technical specifications state a row of manufactured sizes and models of fire dampers FDMQ 120.  
It is valid for production, designing, ordering, delivery, maintenance and operation.

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# I. GENERAL

## Description

Fire dampers are shutters in ducts of air-conditioning devices that prevent the spread of fire and combustion products from one fire segment to the other one by means of closing the duct in the points of fire separating constructions.

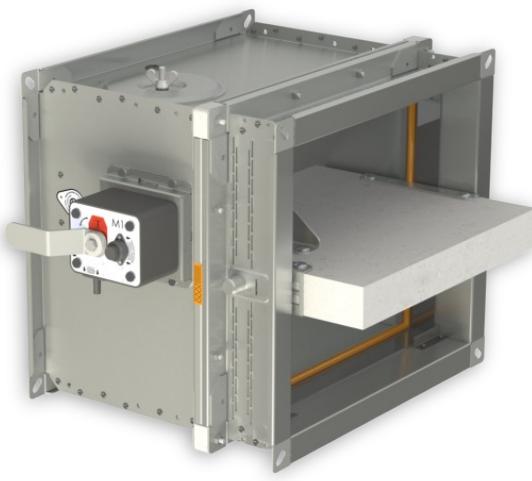
Damper blade automatically closes air duct using a closing spring or a spring return actuator. The closing spring is actuated by pressing a button on the manual control or by melting a thermal fuse.

The return spring of the actuator is actuated when a thermoelectric activation device BAT is activated, when a test button on BAT is pressed or when power supply of the actuator is interrupted.

After closing the blade, the damper is sealed with silicon against smoke penetration. On request by customer, the damper can be supplied silicon-free. In the closed position, the damper is also sealed with material which increases its volume due to increasing temperature and air proofs the air duct.



*FDMQ 120 with spring return actuator*



*FDMQ 120 with manual control*

### Damper characteristics

- CE certified acc. to EN 15650
- Tested in accordance with EN 1366-2
- Classified acc. to EN 13501-3+A1
- External Casing leakage class min. C acc. to EN 1751, Internal leakage min. class 2 acc. to EN 1751
- Cycling test in class C<sub>10000</sub> acc. to EN 15650
- Corrosion resistant acc. to EN 15650
- Certificate of constancy of performance No. [1391-CPR-XXXX/XXXX](#)
- Declaration of Performance No. [PM/FDMQ 120/01/XX/X](#)
- Hygienic assessment of fire dampers - Report No. [1.6/pos/19/19b](#)

### Working conditions

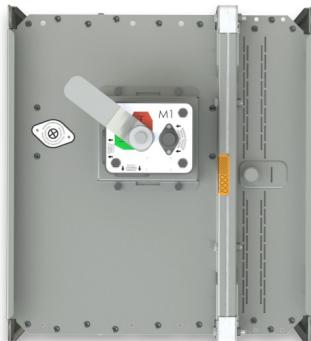
- Exact damper function is provided under the following conditions:
  - maximum air velocity 12 m/s
  - maximum pressure difference 1200 Pa
  - the air circulation in the whole damper section must be secured steady over the entire surface.
- Dampers can be installed in arbitrary position.
- Dampers are 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.

## II. DESIGN

### Design with manual control

#### Design .01

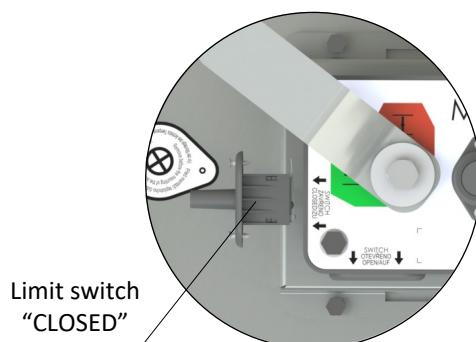
- Design with manual control with a thermal fuse which actuates the shutting device, after the nominal activation temperature 72°C has been reached.
- Automatic initiation of the manual control is not activated if the temperature does not exceed 70°C.



*Design .01*

#### Design .11

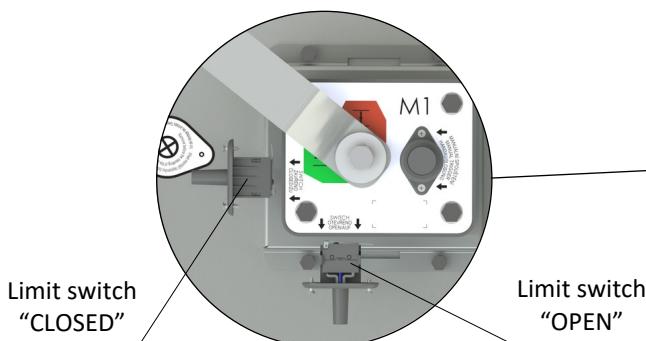
- Design .01 with manual control can be complemented with a limit switch signaling of the damper blade position "CLOSED".
- Cable is connected directly to limit switch.
- Limit switch detail → see page 5



*Design .11*

#### Design .80

- Design .01 with manual control can be complemented with two limit switches signaling of the damper blade position "CLOSED" and "OPEN".
- Cables are connected directly to limit switches.
- Limit switch detail → see page 5

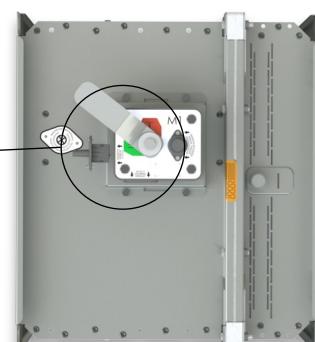


*Design .80*

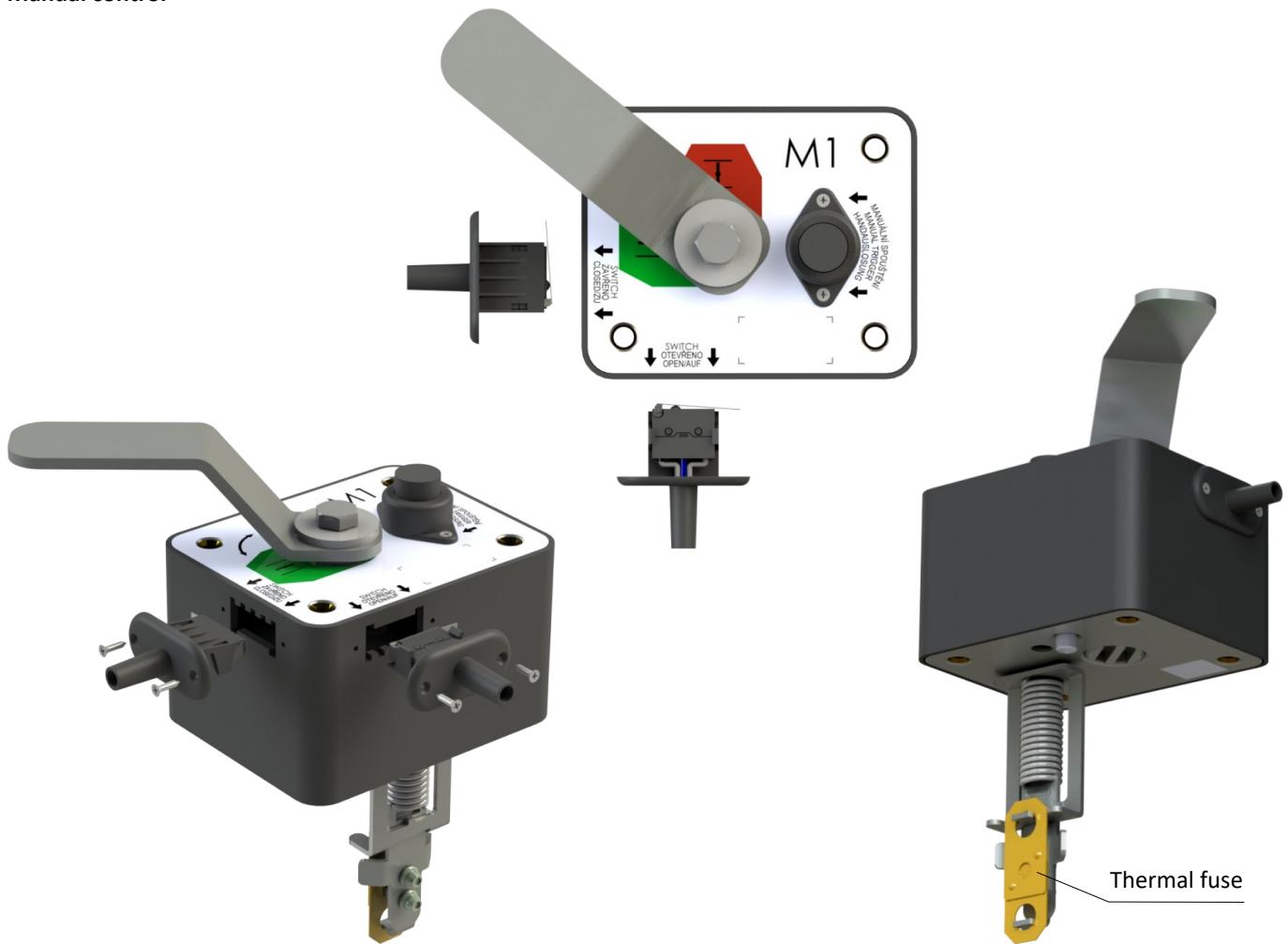
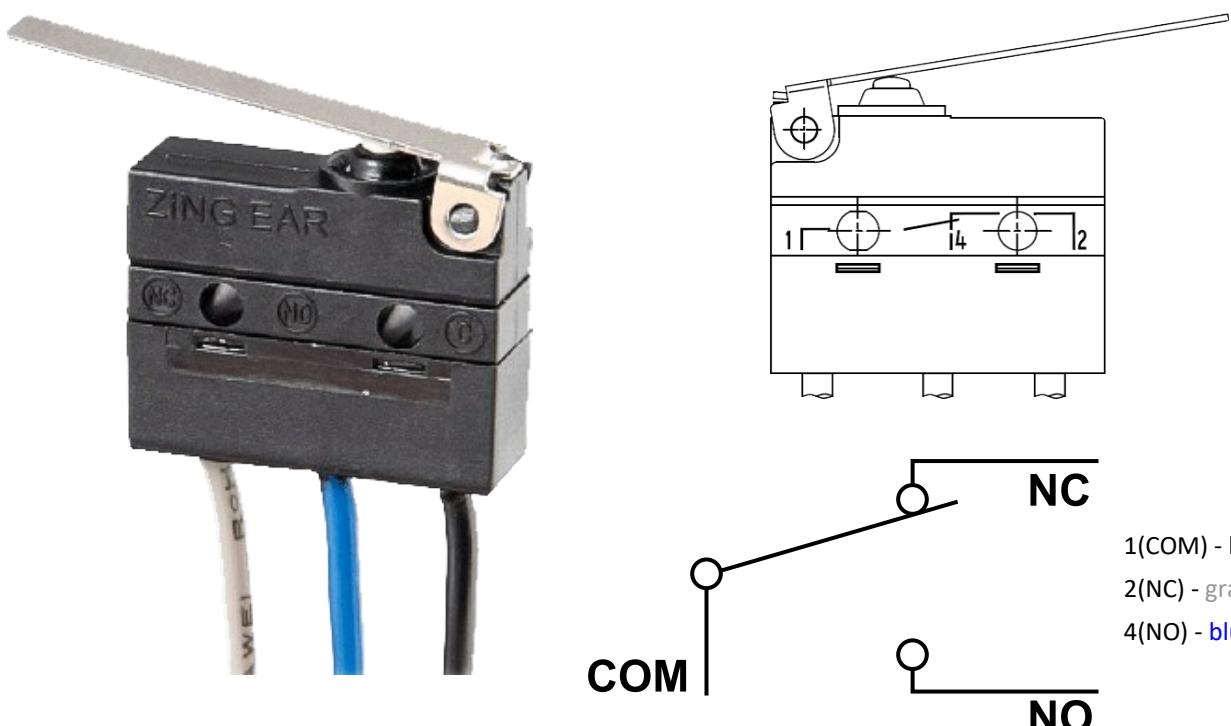
- In case that other activation temperatures are required, thermal fuses with nominal activation temperature +104°C or +147°C can be supplied (this requirement must be specified in the order).

#### ATTENTION:

- Manual controls are produced in five sizes M1 to M5, difference is only in size of a closing spring, which closes the fire damper.
- For the size of fire dampers is always assigned the size of the manual control → see pages 14 to 19
- It is not recommended to use different size of the manual control than given by the manufacturer, otherwise there is a risk of damaging the fire damper.



*Design .01*

**Manual control****Limit switch G905-300E03W1**

1(COM) - black wire  
2(NC) - gray wire  
4(NO) - blue wire

Nominal voltage and maximal current	AC 230V / 5A
Class of protection	IP 67
Working temperature	-25°C ... +120°C

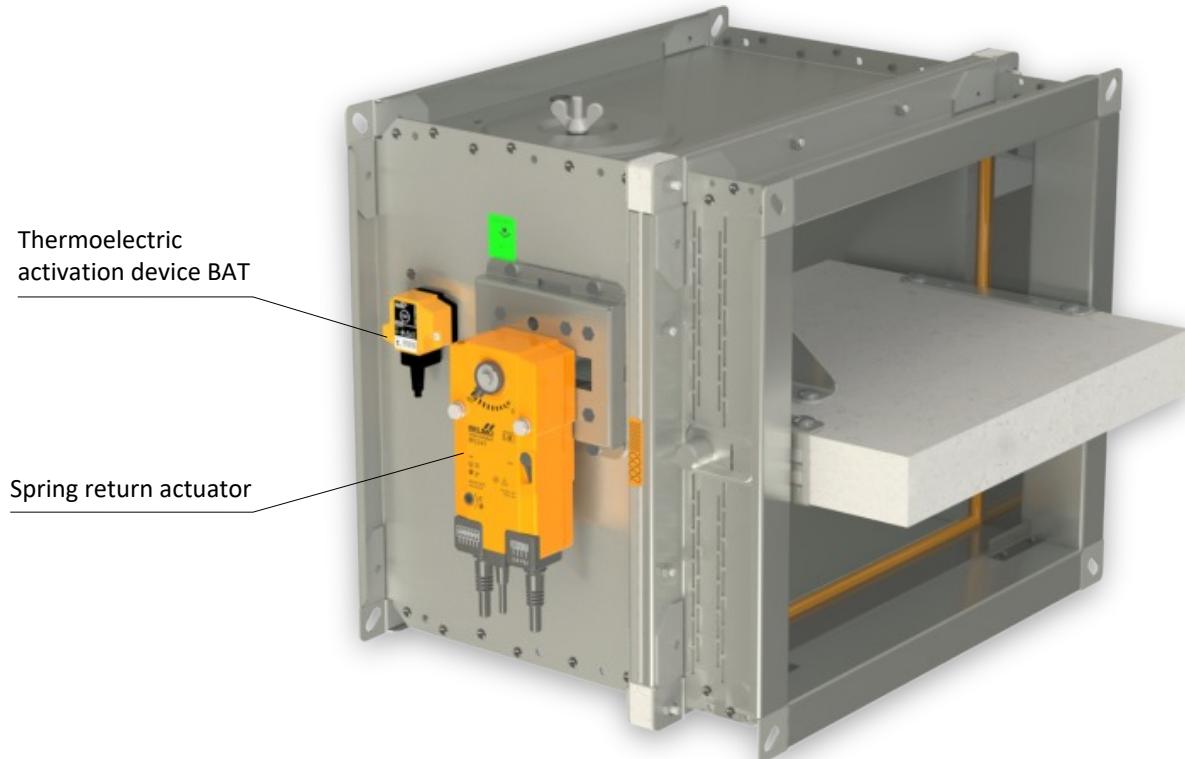
This limit switch is possible to connect in two following ways

- CUT-OFF if the arm is moving ... connect wire 1+2
- SWITCH-ON if the arm is moving ... connect wire 1+4

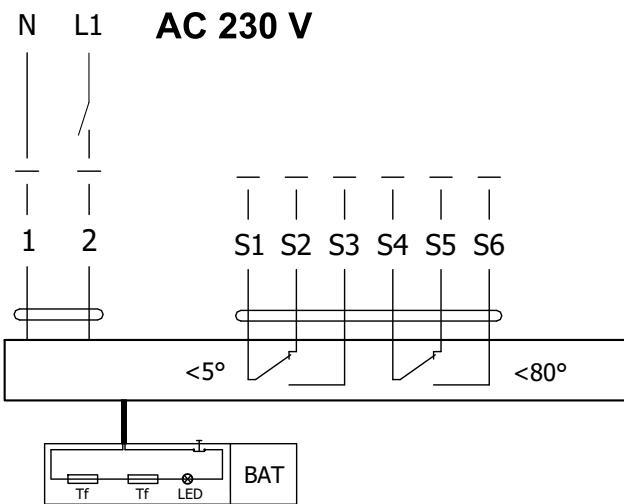
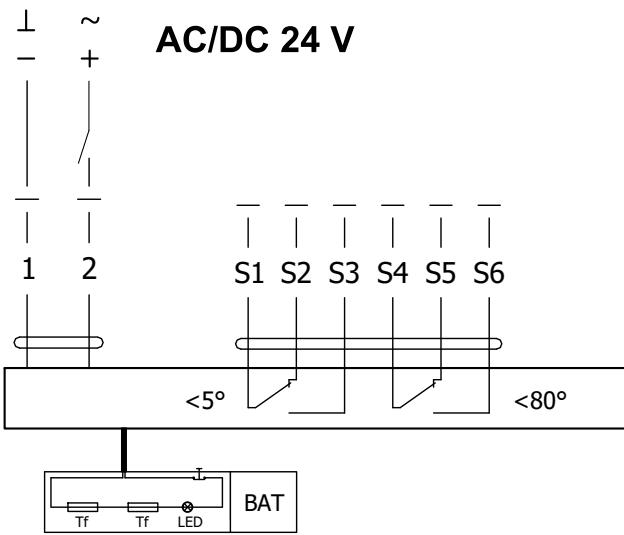
## Design with spring return actuator

### Design .40 and .50

- The fire dampers are equipped with Belimo spring return actuators with thermoelectric activation device BAT. The spring return actuator types are BFL, BFN or BF depending on the damper size. (Further mentioned as „actuator“).
- After being connected to power supply 230V or AC/DC 24V, the actuator rotates the damper blade to the operating position "OPEN" and at the same time pre-stretches its return spring.
- When the actuator is power supplied, the damper blade is in the position "OPEN" and the return spring is pre-stretched.
- Time needed for full opening of the damper blade from the position "CLOSED" to the position "OPEN" is maximum 120 sec. If the actuator power supply is interrupted (due to loss of supply voltage, or pressing a test button on the thermoelectric activation device BAT), the actuator rotates the damper blade to the breakdown position "CLOSED".
- The time of closing the damper blade from the position "OPEN" to the position "CLOSED" takes maximum 20 sec.
- In case that the power supply is restored again (the blade can be in any position), the actuator starts to rotate the damper blade back to the position "OPEN".
- A thermoelectric activation device BAT, which contains two thermal fuses Tf1 and Tf2, is an integral part of the actuator.
- These fuses are activated when temperature +72°C has been reached (the fuse Tf1 due to temperature outside the duct and the fuse Tf2 due to temperature inside the duct).
- After the thermal fuse Tf1 or Tf2 has been activated, the power supply is permanently and irreversibly interrupted and the actuator, by means of the pre-stretched spring, rotates the damper blade into the breakdown position "CLOSED".
- Signalisation of damper blade position "OPEN" and "CLOSE" is provided by two microswitches.

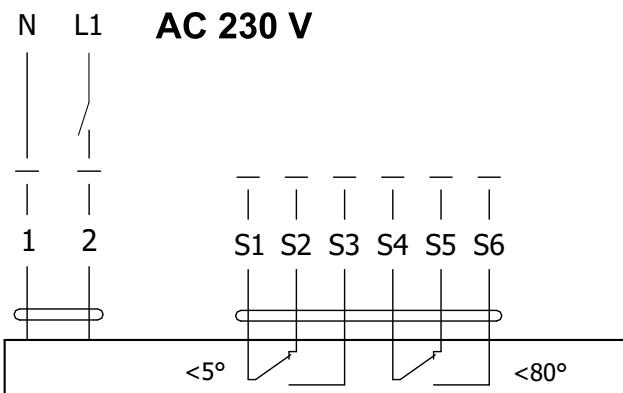


Design .40 and .50

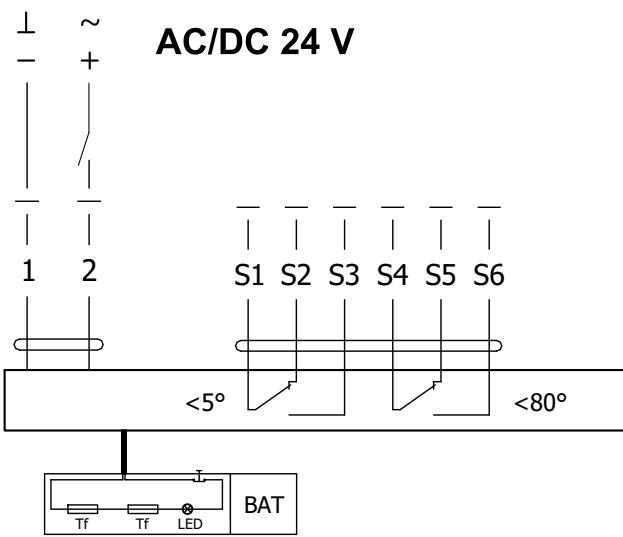
**Actuator BELIMO BFL 230-T****Actuator BELIMO BFL 24-T(-ST)****Actuator BELIMO BFL 230-T(-ST), BFL 24-T(-ST)**

<b>Actuator BELIMO - 4 Nm/ 3 Nm Spring</b>	<b>BFL 230-T(-ST)</b>	<b>BFL 24-T(-ST)</b>
Power voltage	AC 230 V 50/60Hz	AC/DC 24 V 50/60Hz
Power consumption - in operation - in rest position	3,5 W 1,1 W	2,5 W 0,8 W
Dimensioning	6,5 VA (Imax 4 A @ 5 ms)	4 VA (Imax 8,3 A @ 5 ms)
Protection class	II	III
Degree of protection	IP 54	
Running time - motor - spring return	< 60 s ~ 20 s	
Ambient temperature - normal duty - safety duty - non-operating temperature	-30°C ... +55°C The safe position will be attained up to max. +75°C -40°C ... +55°C	
Connection - supply/control - auxiliary switch	cable 1 m, 2 x 0,75 mm <sup>2</sup> (BFL 2xx-T-ST) with 3-pin plug-in connectors cable 1 m, 6 x 0,75 mm <sup>2</sup> (BFL 2xx-T-ST) with 6-pin plug-in connectors	
Response temperature thermal fuse	duct outside temperature +72°C duct inside temperature +72°C	

## Actuator BELIMO BFN 230-T

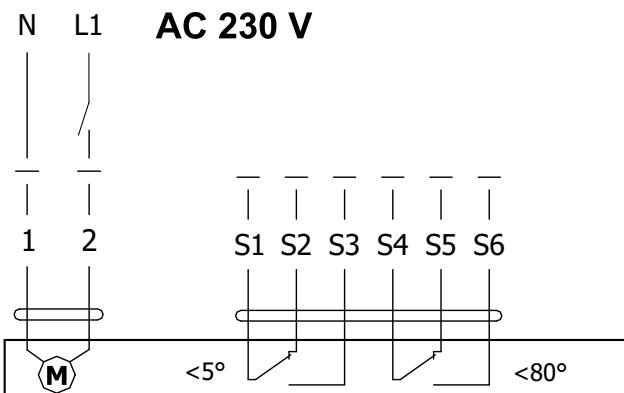
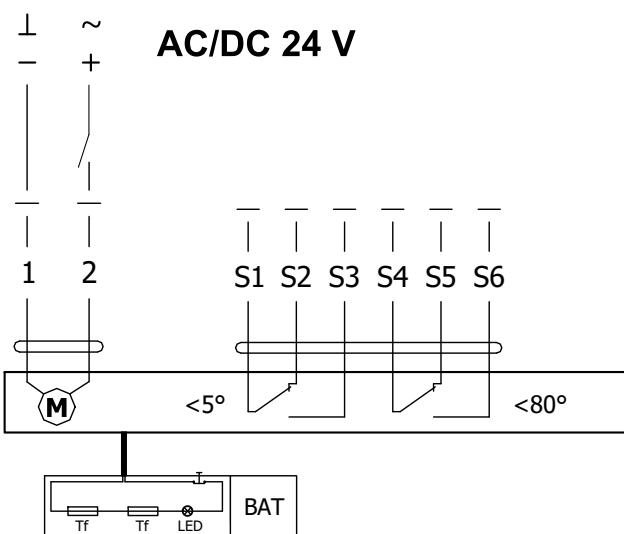


## Actuator BELIMO BFN 24-T(-ST)



## Actuator BELIMO BFN 230-T(-ST), BFN 24-T(-ST)

Actuator BELIMO - 9 Nm/ 7 Nm Spring	BFN 230-T(-ST)	BFN 24-T(-ST)
Power voltage	AC 230 V 50/60Hz	AC/DC 24 V 50/60Hz
Power consumption - in operation - in rest position	5 W 2,1 W	4 W 1,4 W
Dimensioning	10 VA (Imax 4 A @ 5 ms)	6 VA (Imax 8,3 A @ 5 ms)
Protection class	II	III
Degree of protection	IP 54	
Running time - motor - spring return	< 60 s ~ 20 s	
Ambient temperature - normal duty - safety duty - non-operating temperature	-30°C ... +55°C The safe position will be attained up to max. +75°C -40°C ... +55°C	
Connection - supply/control - auxiliary switch	cable 1 m, 2 x 0,75 mm² (BFN 2xx-T-ST) with 3-pin plug-in connectors cable 1 m, 6 x 0,75 mm² (BFN 2xx-T-ST) with 6-pin plug-in connectors	
Response temperature thermal fuse	duct outside temperature +72°C duct inside temperature +72°C	

**Actuator BELIMO BF 230-TN****Actuator BELIMO BF 24-TN (-ST)****Actuator BELIMO BF 230-TN(-ST), BF 24-TN(-ST)**

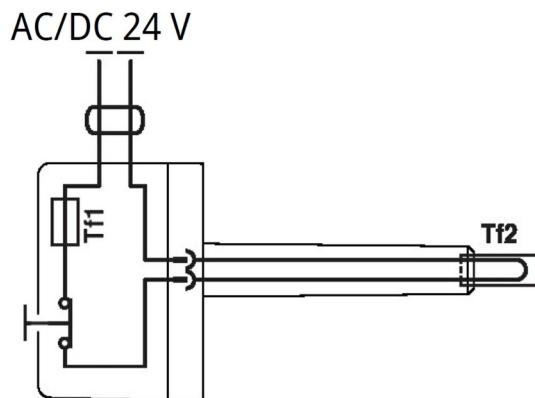
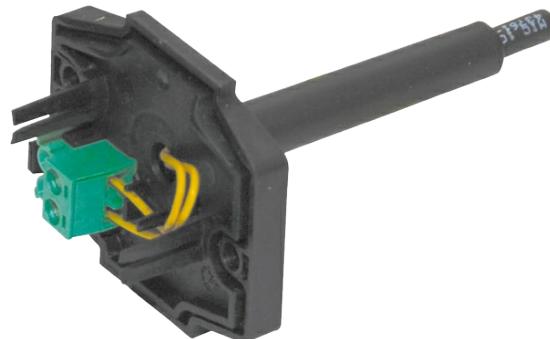
<b>Actuator BELIMO - 18 Nm/ 12 Nm Spring</b>	<b>BF 230-TN(-ST)</b>	<b>BF 24-TN(-ST)</b>
Power voltage	AC 230 V 50/60Hz	AC/DC 24 V 50/60Hz
Power consumption - in operation - in rest position	8,5 W 3 W	7 W 2 W
Dimensioning	11 VA (Imax 8,3 A @ 5 ms)	10 VA (Imax 8,3 A @ 5 ms)
Protection class	II	III
Degree of protection	IP 54	
Running time - motor - spring return	120 s ~ 16 s	
Ambient temperature - normal duty - safety duty - non-operating temperature	-30°C ... +50°C The safe position will be attained up to max. +75°C -40°C ... +50°C	
Connection - supply/control - auxiliary switch	cable 1 m, 2 x 0,75 mm² (BF 2xx-TN-ST) with 3-pin plug-in connectors cable 1 m, 6 x 0,75 mm² (BF 2xx-TN-ST) with 6-pin plug-in connectors	
Response temperature thermal fuse	duct outside temperature +72°C duct inside temperature +72°C	

## Thermoelectric activation device BAT

- If the thermal fuse Tf1 is interrupted (due to temperature outside the duct), it is necessary to replace the spring return actuator. Thermoelectric activation device BAT is integral part of the actuator.
- If the thermal fuse Tf2 is interrupted (due to temperature inside the duct), only the spare part ZBAT 72 needs to be replaced.
- When one of the thermal fuses responds, the supply voltage is interrupted permanently and irreversibly.
- The function (interruption of the supply voltage) can be checked by pressing the test button.
- Installation is carried out with the pre-assembled, self-tapping screws.



**BELIMO ZBAT 72**  
Black (BK) = 72°C (standard)

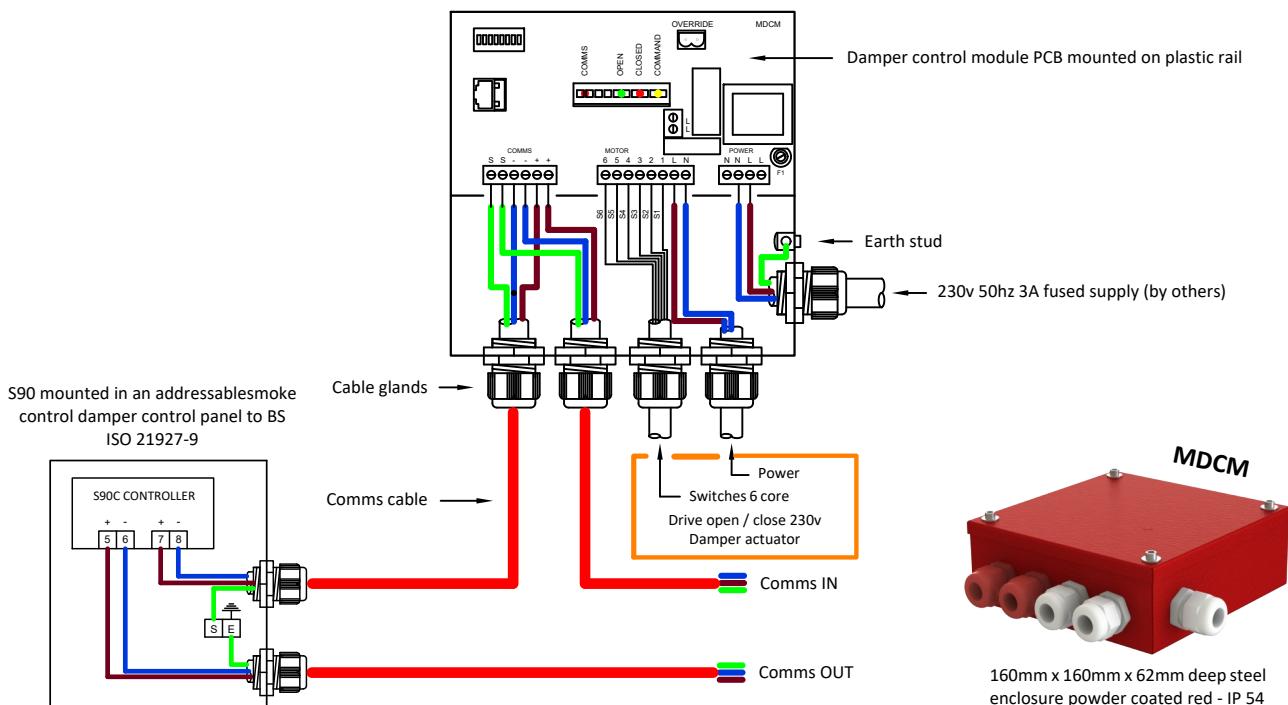


### Thermoelectrical starting mechanism BAT 72

Power voltage	AC/DC 24 V 50/60Hz
Rated current	1 A
AC/DC throughput resistance	<1 Ω
Protection class	III
Degree of protection	IP 54
Probe length	65 mm
Ambient temperature	-30°C ... +50°C
Storage temperature	-40°C ... +50°C
Ambient humidity	Max. 95% RH, non-condensing
Connection supply	Cable 1 m, 2 x 0.5 mm², Betaflam cable heatresistant up to 145°C
Response temperature thermal fuse	Duct inside temperature 72°C Duct outside temperature 72°C

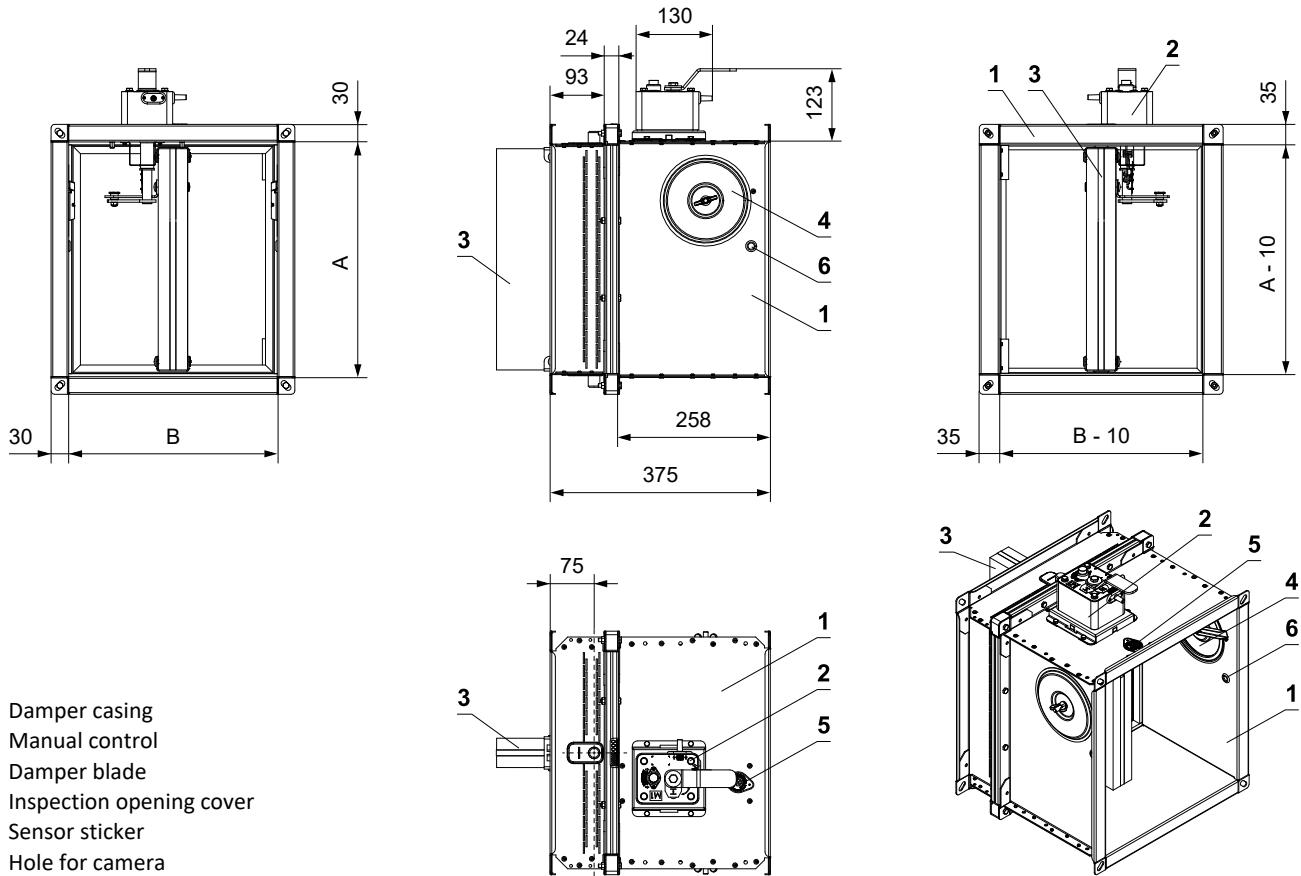
## Communication and control module MDCM

- 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.
- Up to 96x MDCM's can be connected on one loop and multiple loops can be incorporated.
- This accessory is only required with MANDIK control systems.
- Max terminal size in MDCM 2.5 mm<sup>2</sup>

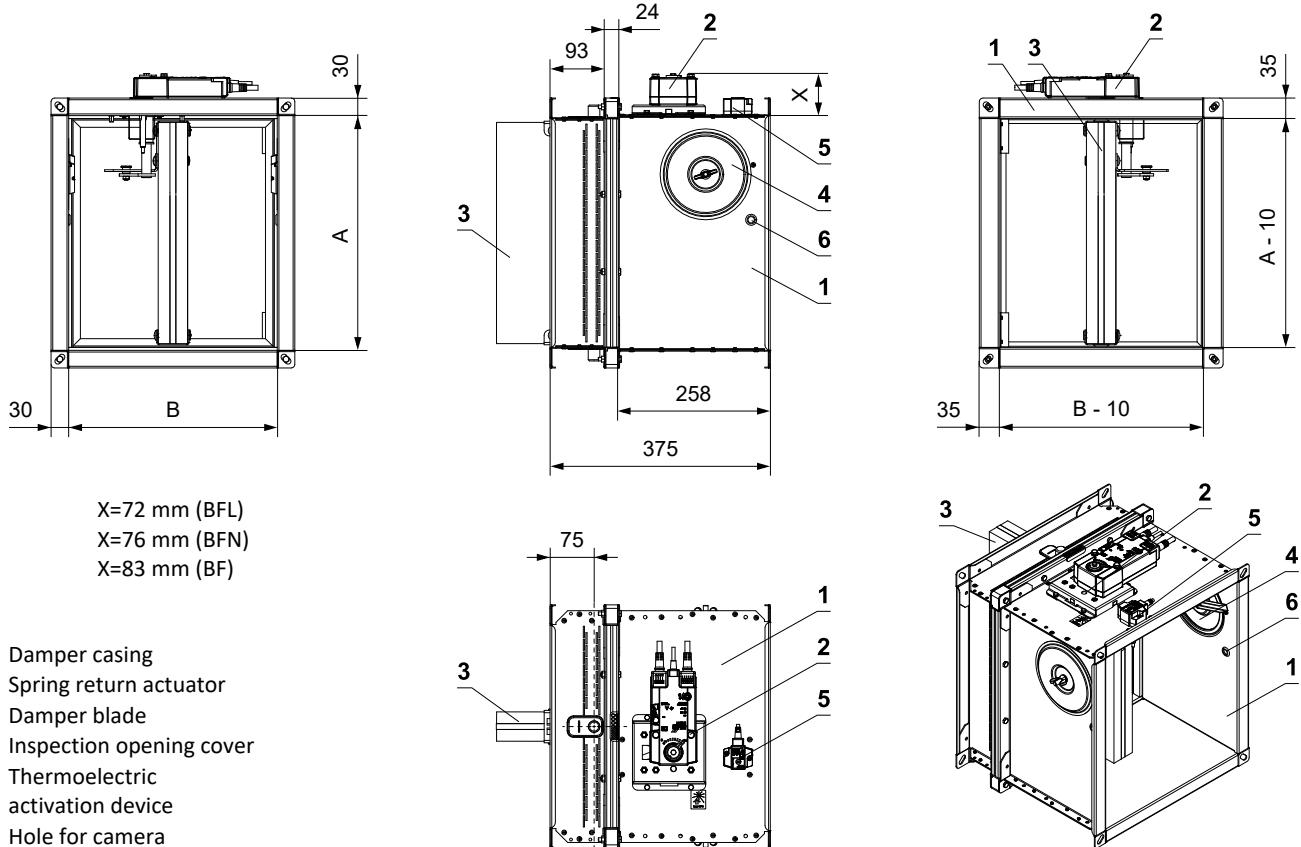


### III. DIMENSIONS

FDMQ 120 with manual control

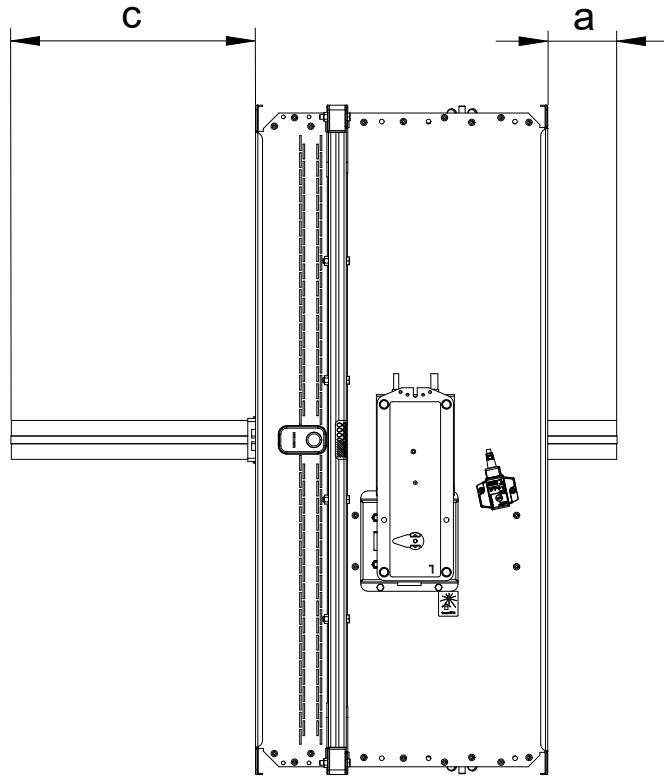


FDMQ 120 with spring return actuator

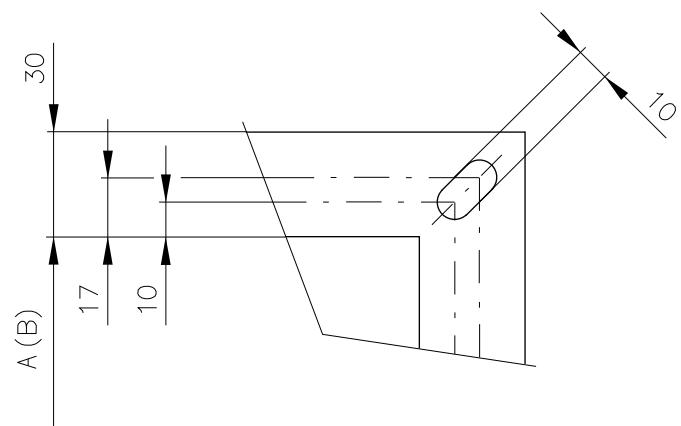
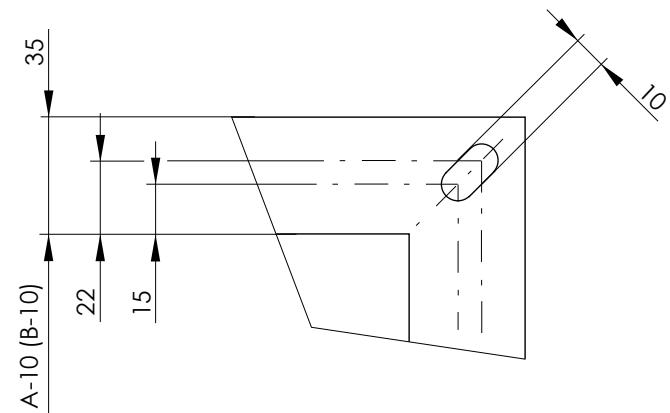


**Damper blade overlaps**

- Open damper blade overlaps the damper body by the value "c" or "a". These values are specified in chapter Technical parameters → see pages 14 to 19



Values "a" and "c" has to be respected when projecting following air-conditioning duct.

**Flange of a damper - CONTROL SIDE****Flange of a damper - INSTALLATION SIDE**

*30 mm wide flanges are fitted with oval holes in the corners*

## Technical parameters

A x B [mm]	Damper blade overlaps		Weight		Effective area Sef [m <sup>2</sup> ]	Spring return actuator	Manual control	A x B [mm]	Damper blade overlaps		Weight		Effective area Sef [m <sup>2</sup> ]	Spring return actuator	Manual control		
	a [mm]	c [mm]	Man. [kg]	Actu. [kg]*					a [mm]	c [mm]	Man. [kg]	Actu. [kg]*					
150 x	150	-	-	8	8,1	0,0094	BFL	200 x	650	3	248	19,5	22,5	0,1006	BFL	M2	
	180	-	13	8,5	8,6	0,0131			700	28	273	20,5	25	0,1094	BFN		
	200	-	23	8,9	9	0,0156			710	33	278	21	24	0,1111			
	225	-	35,5	9,4	9,5	0,0188			750	53	298	21,5	24,5	0,1181			
	250	-	48	9,9	10	0,0219			800	78	323	23	26	0,1269			
	280	-	63	10,5	10,6	0,0256	M1	225 x	150	-	-	9,5	9,7	0,0150	M1	M1	
	300	-	73	11,1	11,2	0,0281			180	-	13	10	11,5	0,0210			
	315	-	80,5	11,4	11,5	0,0300			200	-	23	10,5	12	0,0250			
	355	-	100,5	12,4	12,6	0,0350			225	-	36	11	12,5	0,0300			
	400	-	123	13,5	13,6	0,0406			250	-	48	11,5	13	0,0350			
150 x	450	-	148	14,5	14,6	0,0469	BFL	450 x	280	-	63	12	13,5	0,0410	BFN	M2	
	500	-	173	15,5	15,6	0,0531			300	-	73	12,5	14	0,0450			
	550	-	198	16,4	16,6	0,0594			315	-	80,5	13	14,5	0,0480			
	560	-	203	16,6	16,8	0,0606			355	-	100,5	14	15,5	0,0560			
	600	-	223	17,4	17,5	0,0656			400	-	123	15	16,5	0,0650			
	630	-	238	18	18,1	0,0694			450	-	148	16	17,5	0,0750			
	150	-	-	8,8	8,9	0,0116	M1	450 x	500	-	173	17	18,5	0,0850	M2	M2	
	180	-	13	9	10,5	0,0163			550	-	198	18	19,5	0,0950			
	200	-	23	9,5	11	0,0194			560	-	203	18	19,5	0,0970			
	225	-	36	10,0	11,5	0,0233			600	-	223	19	20,5	0,1050			
	250	-	48	10,5	12	0,0271			630	-	238	19,5	21	0,1110			
	280	-	63	11	12,5	0,0318			650	3	248	20	21,5	0,1150	BFN	M1	
	300	-	73	11,5	13	0,0349			700	28	273	21	22,5	0,1250			
	315	-	80,5	12	13,5	0,0372			710	33	278	21	22,5	0,1270			
	355	-	100,5	13	14,5	0,0434			750	53	298	22	23,5	0,1350			
	400	-	123	14	15,5	0,0504			800	78	323	23	24,5	0,1450			
180 x	450	-	148	15	16,5	0,0581	BFL	450 x	150	-	-	10	10,1	0,0169	M2	M2	
	500	-	173	16	17,5	0,0659			180	-	13	10,5	12	0,0236			
	550	-	198	17	18,5	0,0736			200	-	23	10,5	12,5	0,0281			
	560	-	203	17	18,5	0,0752			225	-	36	11	13	0,0338			
	600	-	223	18	19,5	0,0814			250	-	48	12	13,5	0,0394			
	630	-	238	18,5	20	0,0860			280	-	63	13	14,5	0,0461	BFN	M1	
	650	3	248	19	20,5	0,0891			300	-	73	13	15	0,0506			
	700	28	273	20	21,5	0,0969			315	-	80,5	13,5	15	0,0540			
	710	33	278	20	21,5	0,0984			355	-	100,5	14,5	16	0,0630			
	750	53	298	21	22,5	0,1046			400	-	123	15,5	17	0,0731			
180 x	800	78	323	22	23,5	0,1124		450 x	250	-	148	16,5	19,5	0,0844	M2	M2	
	150	-	-	9,1	9,2	0,0131			500	-	173	18	21	0,0956			
	180	-	13	9,5	11	0,0184			550	-	198	19	22	0,1069			
	200	-	23	10	11,5	0,0219			560	-	203	19	22	0,1091			
	225	-	36	10,5	13,5	0,0263			600	-	223	20	23	0,1181			
	250	-	48	11	12,5	0,0306	BFL	450 x	630	-	238	21	24	0,1249	BFN	M1	
	280	-	63	11,5	14,5	0,0359			650	3	248	21,5	24,5	0,1294			
	300	-	73	12	13,5	0,0394			700	28	273	22,5	25,5	0,1406			
	315	-	80,5	12,5	14	0,0420			710	33	278	23	26	0,1429			
	355	-	100,5	13	15	0,0490			750	53	298	23,5	26,5	0,1519			
200 x	400	-	123	14	16	0,0569			800	78	323	25	28	0,1631	M3	M3	
	450	-	148	15	18	0,0656		280 x	150	-	-	10,5	10,6	0,0191			
	500	-	173	16,5	18	0,0744			180	-	13	11	12,5	0,0268			
	550	-	198	17,5	20,5	0,0831			200	-	23	11,5	13,5	0,0319			
	560	-	203	17,5	20,5	0,0849			225	-	36	12	14	0,0383			
	600	-	223	18,5	23	0,0919			250	-	48	13	14,5	0,0446	BFL	M1	
	630	-	238	19	22	0,0971			280	-	63	14	15,5	0,0523			

Sizes in increments of 5 mm can be manufactured on request.

A x B [mm]	Damper blade overlaps		Weight		Effective area Sef [m <sup>2</sup> ]	Spring return actuator	Manual control	A x B [mm]	Damper blade overlaps		Weight		Effective area Sef [m <sup>2</sup> ]	Spring return actuator	Manual control
	a [mm]	c [mm]	Man. [kg]	Actu. [kg]*					a [mm]	c [mm]	Man. [kg]	Actu. [kg]*			
300	-	73	14	16	0,0574	BFL	M1	710	33	278	25	28	0,1842	BFN	M2
315	-	80,5	14,5	16,5	0,0612			315 x 750	53	298	26	29	0,1958		
355	-	100,5	15,5	17,5	0,0714			800	78	323	27,5	30,5	0,2103		
400	-	123	17	18,5	0,0829			150	-	-	11,8	11,9	0,0248		
450	-	148	18	21	0,0956			180	-	13	13	14,5	0,0347		
500	-	173	19,5	22,5	0,1084			200	-	23	13	14,5	0,0413		
550	-	198	20,5	23,5	0,1211			225	-	36	13,5	15	0,0495		
280 x 560	-	203	21	24	0,1237			250	-	48	14	16	0,0578		
600	-	223	22	25	0,1339	BFN	M2	280	-	63	15	17	0,0677	BFL	M1
630	-	238	22,5	25,5	0,1415			300	-	73	15,5	17	0,0743		
650	3	248	23	26	0,1466			315	-	80,5	16	17,5	0,0792		
700	28	273	24,5	27,5	0,1594			355	-	100,5	17	18,5	0,0924		
710	33	278	24,5	27,5	0,1619			400	-	123	18	20	0,1073		
750	53	298	25,5	28,5	0,1721			355 x 450	-	148	19,5	22,5	0,1238		
800	78	323	27	30	0,1849			500	-	173	21	24	0,1403		
150	-	-	10,8	11	0,0206			550	-	198	22,5	25,5	0,1568		
180	-	13	11,5	13	0,0289			560	-	203	22,5	25,5	0,1601		
200	-	23	11,5	13,5	0,0344			600	-	223	23,5	26,5	0,1733		
225	-	36	12	14	0,0413	BFL	M1	630	-	238	24,5	27,5	0,1832	BFN	M2
250	-	48	13	14,5	0,0481			650	3	248	25	28	0,1898		
280	-	63	14	15,5	0,0564			700	28	273	26,5	29,5	0,2063		
300	-	73	14	16	0,0619			710	33	278	26,5	29	0,2096		
315	-	80,5	14,5	16,5	0,0660			750	53	298	27,5	30,5	0,2228		
355	-	100,5	15,5	17,5	0,0770			800	78	323	29	32	0,2393		
400	-	123	17	18,5	0,0894			150	-	-	12,6	12,7	0,0281		
300 x 450	-	148	18	21	0,1031			180	-	13	13,5	15,5	0,0394		
500	-	173	19,5	22,5	0,1169	BFN	M2	200	-	23	14	15,5	0,0469	BFL	M1
550	-	198	20,5	23,5	0,1306			225	-	36	14,5	16,5	0,0563		
560	-	203	21	24	0,1334			250	-	48	15	17	0,0656		
600	-	223	22	25	0,1444			280	-	63	16	18	0,0769		
630	-	238	22,5	25,5	0,1526			300	-	73	16,5	18	0,0844		
650	3	248	23	26	0,1581			315	-	80,5	17	18,5	0,0900		
700	28	273	24,5	27,5	0,1719			355	-	100,5	18	20	0,1050		
710	33	278	24,5	27,5	0,1746			400	-	123	19,5	21	0,1219		
750	53	298	25,5	28,5	0,1856	BFL	M1	400 x 450	-	148	21	24	0,1406	BFN	M2
800	78	323	27	30	0,1994			500	-	173	22,5	25,5	0,1594		
150	-	-	11,8	11,9	0,0218			550	-	198	23,5	26,5	0,1781		
180	-	13	12	13,5	0,0305			560	-	203	24	27	0,1819		
200	-	23	12	13,5	0,0363			600	-	223	25,5	28,5	0,1969		
225	-	36	12,5	14	0,0435			630	-	238	26	29	0,2081		
250	-	48	13,5	15	0,0508			650	3	248	26,5	29,5	0,2156		
280	-	63	14,5	16	0,0595			700	28	273	28	31,5	0,2344		
300	-	73	14,5	16,5	0,0653			710	33	278	28,5	31,5	0,2381		
315	-	80,5	15	16,5	0,0696			750	53	298	29,5	32,5	0,2531		
355	-	100,5	16	17,5	0,0812	BFN	M2	800	78	323	31	34	0,2719	BF	M3
400	-	123	17	19	0,0943			150	-	-	13,5	13,6	0,0319		
450	-	148	18,5	21,5	0,1088			180	-	13	14,5	16,5	0,0446		
500	-	173	19,5	22,5	0,1233			200	-	23	15	16,5	0,0531		
550	-	198	21	24	0,1378			225	-	36	15,5	17,5	0,0638		
560	-	203	21,5	24,5	0,1407			450 x 250	-	48	16	18	0,0744		
600	-	223	22,5	25,5	0,1680	BFN	M2	280	-	63	17	19	0,0871	BFL	M1
630	-	238	23	26	0,1610			300	-	73	17,5	19,5	0,0956		
650	3	248	23,5	26,5	0,1668			315	-	80,5	18	20	0,1020		
700	28	273	25	28	0,1813			355	-	100,5	19,5	21	0,1190		

Sizes in increments of 5 mm can be manufactured on request.

A x B [mm]	Damper blade overlaps		Weight		Effective area Sef [m <sup>2</sup> ]	Spring return actuator	Manual control	A x B [mm]	Damper blade overlaps		Weight		Effective area Sef [m <sup>2</sup> ]	Spring return actuator	Manual control		
	a [mm]	c [mm]	Man. [kg]	Actu. [kg]*					a [mm]	c [mm]	Man. [kg]	Actu. [kg]*					
450 x	400	-	123	20,5	22,5	0,1381	BFL	M1	150	-	-	15,4	15,5	0,0401	BFL	M1	
	450	-	148	22	25	0,1594	BFN		180	-	13	16,5	18,5	0,0562			
	500	-	173	24	27	0,1806			200	-	23	17	18,5	0,0669			
	550	-	198	25,5	28,5	0,2019			225	-	36	17,5	19,5	0,0803			
	560	-	203	25,5	28,5	0,2061			250	-	48	18,5	20	0,0936			
	600	-	223	27	30	0,2231	M2		280	-	63	19,5	21	0,1097			
	630	-	238	27,5	30,5	0,2359			300	-	73	20	22	0,1204			
	650	3	248	28,5	31,5	0,2444			315	-	80,5	20,5	22,5	0,1284			
	700	28	273	30	33	0,2656	BF		355	-	100,5	22	23,5	0,1498			
	710	33	278	30	33	0,2699			400	-	123	23,5	25,5	0,1739			
500 x	750	53	298	31,5	34,5	0,2869	M3	560 x 450	-	148	25,5	28,5	0,2006	BFN	M2		
	800	78	323	33	36	0,3081		500	-	173	27	30	0,2274				
	150	-	-	14,3	14,5	0,0356		550	-	198	29	32	0,2541				
	180	-	13	15,5	17	0,0499		560	-	203	29,5	32,5	0,2595				
	200	-	23	16	17,5	0,0594		600	-	223	31	34	0,2809				
	225	-	36	16,5	18	0,0713		BFL		630	-	238	31,5			34,5	0,2969
	250	-	48	17	19	0,0831				650	3	248	32			35	0,3076
	280	-	63	18	20	0,0974				700	28	273	34			37	0,3344
	300	-	73	19	20,5	0,1069				710	33	278	34,5			37,5	0,3397
	315	-	80,5	19,5	21	0,1140				750	53	298	35,5			38,5	0,3611
550 x	355	-	100,5	20,5	22,5	0,1330	M3	800	78	323	37,5	40,5	0,3879				
	400	-	123	22	23,5	0,1544		150	-	-	16,1	16,2	0,0431				
	450 x 450	-	148	23,5	26,5	0,1781		180	-	13	17,5	19,5	0,0604				
	500	-	173	25,5	28,5	0,2019		200	-	23	18	20,5	0,0719				
	550	-	198	27	30	0,2256		225	-	36	18,5	21,5	0,0863				
	560	-	203	27	30	0,2304		BFN		250	-	48	19			22	0,1006
	600	-	223	28,5	31,5	0,2494				280	-	63	20			23	0,1179
	630	-	238	29,5	32,5	0,2636				300	-	73	21			24	0,1294
	650	3	248	30	33	0,2731				315	-	80,5	21,5			24,5	0,1380
	700	28	273	32	35	0,2969				355	-	100,5	23			26	0,1610
500 x	710	33	278	32	35	0,3016	BF	M3	400	-	123	24,5	27,5	0,1869	BFN	M1	
	750	53	298	33,5	36,5	0,3206			600 x 450	-	148	26,5	29,5	0,2156			
	800	78	323	35	38	0,3444			500	-	173	28,5	31,5	0,2444			
	150	-	-	15,2	15,3	0,0394			550	-	198	30	33	0,2731			
	180	-	13	16,5	18	0,0551			560	-	203	30,5	33,5	0,2789			
	200	-	23	17	18,5	0,0656	BFL		600	-	223	32	35	0,3019			
	225	-	36	17,5	19	0,0788			630	-	238	33	36	0,3191			
	250	-	48	18	20	0,0919			650	3	248	33,5	36,5	0,3306			
	280	-	63	19	21	0,1076			700	28	273	35,5	38,5	0,3594			
	300	-	73	20	21,5	0,1181			710	33	278	36	39	0,3651			
550 x	315	-	80,5	20,5	22	0,1260	M3		750	53	298	37,5	40,5	0,3881			
	355	-	100,5	22	23,5	0,1470			800	78	323	39	42	0,4169			
	400	-	123	23,5	25	0,1706			150	-	-	16,6	16,7	0,0454			
	450 x 450	-	148	25	28	0,1969			180	-	13	18	20	0,0635			
	500	-	173	27	30	0,2231	BFN		200	-	23	18,5	21	0,0756			
	550	-	198	28,5	31,5	0,2494			225	-	36	19	22	0,0908			
	560	-	203	29	32	0,2546			250	-	48	20	23	0,1059			
	600	-	223	30,5	33,5	0,2756			280	-	63	21	24	0,1240			
	630	-	238	31	34	0,2914			300	-	73	21,5	24,5	0,1361			
500 x	650	3	248	32	35	0,3019	BF	M3	315	-	80,5	22,5	25,5	0,1452	BFN	M1	
	700	28	273	34	37	0,3281			355	-	100,5	24	27	0,1694			
	710	33	278	34	37	0,3334			400	-	123	25,5	28,5	0,1966			
	750	53	298	35,5	38,5	0,3544			450	-	148	27,5	30,5	0,2269			
	800	78	323	37	40	0,3806			500	-	173	29	32	0,2571			

Sizes in increments of 5 mm can be manufactured on request.

A x B [mm]	Damper blade overlaps		Weight		Effective area Sef [m <sup>2</sup> ]	Spring return actuator	Manual control	A x B [mm]	Damper blade overlaps		Weight		Effective area Sef [m <sup>2</sup> ]	Spring return actuator	Manual control	
	a [mm]	c [mm]	Man. [kg]	Actu. [kg]*					a [mm]	c [mm]	Man. [kg]	Actu. [kg]*				
550	-	198	31	34	0,2874	BFN	M2	225	-	36	21,5	23,5	0,1028	BFL	M1	
560	-	203	31,5	34,5	0,2934			250	-	48	22	24,5	0,1199			
600	-	223	33	36	0,3176			280	-	63	23	26	0,1404			
630	-	238	34	37	0,3358			300	-	73	23,5	26,5	0,1541			
630 x 650	3	248	34,5	37,5	0,3479			315	-	80,5	24	27	0,1644			
700	28	273	36,5	39,5	0,3781	BF		355	-	100,5	25,5	28,5	0,1918	BFN	M3	
710	33	278	37	40	0,3842			400	-	123	27,5	30,5	0,2226			
750	53	298	38,5	41,5	0,4084			450	-	148	29,5	32,5	0,2569			
800	78	323	40,5	43,5	0,4386			500	-	173	31,5	34,5	0,2911			
150	-	-	17	17,1	0,0469	BFL	M1	550	-	198	33,5	36,5	0,3254	BF	M2	
180	-	13	19	20,5	0,0656			560	-	203	34	37	0,3322			
200	-	23	20	21,5	0,0781			600	-	223	35,5	38,5	0,3596			
225	-	36	21	22,5	0,0938			630	-	238	36,5	39,5	0,3802			
250	-	48	22	23,5	0,1094			650	3	248	37,5	40,5	0,3939			
280	-	63	23	24,5	0,1281			700	28	273	39,5	42,5	0,4281			
300	-	73	24	25,5	0,1406			710	33	278	40	43	0,4350			
315	-	80,5	24,5	26	0,1500			750	53	298	41,5	44,5	0,4624			
355	-	100,5	26	27,5	0,1750			800	78	323	43,5	46,5	0,4966			
400	-	123	28	29,5	0,2031			150	-	-	18,7	18,8	0,0544			
650 x 450	-	148	30	31,5	0,2344	BFN	M2	180	-	13	21	22,5	0,0761	BFL	M1	
500	-	173	32	33,5	0,2656			200	-	23	22	23,5	0,0906			
550	-	198	34	35,5	0,2969			225	-	36	22,5	24,5	0,1088			
560	-	203	34,5	37,5	0,3031			250	-	48	23	25,5	0,1269			
600	-	223	36	39	0,3281			280	-	63	24	27	0,1486			
630	-	238	37	40	0,3469			300	-	73	24,5	27,5	0,1631			
650	3	248	38	41	0,3594			315	-	80,5	25	28	0,1740			
700	28	273	40	43	0,3906			355	-	100,5	26,5	29,5	0,2030			
710	33	278	40,5	43,5	0,3969			400	-	123	28,5	31,5	0,2356			
750	53	298	42	45	0,4219			750 x 450	-	148	30,5	33,5	0,2719			
800	78	323	44	47	0,4531			500	-	173	32,5	35,5	0,3081			
150	-	-	17,8	18	0,0506	BFL	M1	550	-	198	35	38	0,3444	BF	M2	
180	-	13	20	21,5	0,0709			560	-	203	35	38,5	0,3516			
200	-	23	21	22,5	0,0844			600	-	223	37	40,5	0,3806			
225	-	36	22	23,5	0,1013			630	-	238	38	41	0,4024			
250	-	48	23	24,5	0,1181			650	3	248	39	42	0,4169			
280	-	63	24,5	26	0,1384			700	28	273	41,5	44,5	0,4531			
300	-	73	25,5	27	0,1519			710	33	278	41,5	44,5	0,4604			
315	-	80,5	26	27,5	0,1620			750	53	298	43	46	0,4894			
355	-	100,5	27,5	29	0,1890			800	78	323	45	48	0,5256			
400	-	123	29,5	31	0,2194			150	-	-	19,6	19,7	0,0581			
700 x 450	-	148	31,5	33	0,2531	BFN	M2	180	-	13	22	23,5	0,0814	BFL	M1	
500	-	173	33,5	35	0,2869			200	-	23	23	24,5	0,0969			
550	-	198	35,5	38,5	0,3206			225	-	36	23,5	25,5	0,1163			
560	-	203	36	39	0,3274			250	-	48	24	26,5	0,1356			
600	-	223	37,5	40,5	0,3544			280	-	63	25	28	0,1589			
630	-	238	39	42	0,3746			300	-	73	25,5	28,5	0,1744			
650	3	248	40	43	0,3881			800 x 315	-	80,5	26,5	29,5	0,1860			
700	28	273	42	45	0,4219			355	-	100,5	28	31	0,2170			
710	33	278	42,5	45,5	0,4286			400	-	123	30	33	0,2519			
750	53	298	44	47	0,4556			450	-	148	32	35	0,2906			
800	78	323	46	49	0,4894			500	-	173	34	37	0,3294			
150	-	-	18	18,1	0,0514	BFL	M1	550	-	198	36,5	39,5	0,3681	BFN	M2	
710 x 180	-	13	20	21,5	0,0719			560	-	203	37	40	0,3759			
200	-	23	21	22,5	0,0856			600	-	223	39	42	0,4069			

Sizes in increments of 5 mm can be manufactured on request.

A x B [mm]	Damper blade overlaps		Weight		Effective area Sef [m <sup>2</sup> ]	Spring return actuator	Manual control	A x B [mm]	Damper blade overlaps		Weight		Effective area Sef [m <sup>2</sup> ]	Spring return actuator	Manual control	
	a [mm]	c [mm]	Man. [kg]	Actu. [kg]*					a [mm]	c [mm]	Man. [kg]	Actu. [kg]*				
800 x 630	-	238	40	43	0,4301	BF	M3	1100 x 315	-	80,5	36	37,5	0,2580	BFN	M2	
	3	248	40,5	43,5	0,4456				-	100,5	38	40	0,3010			
	28	273	43	46	0,4844				-	123	38,5	41	0,3494			
	33	278	43,5	46,5	0,4921				-	148	40,5	43,5	0,4031			
	53	298	45	48	0,5231				-	173	43	46	0,4569			
	78	323	47	50	0,5619	BFL	M4		-	198	46	49	0,5106	BF	M3	
	-	-	21,3	21,5	0,0656				-	203	46,5	49,5	0,5214			
	-	13	24	25,5	0,0919				-	223	49	52	0,5644			
	-	23	25	26,5	0,1094				-	238	50	53	0,5966			
	-	36	26,5	28	0,1313				-	248	51,5	54,5	0,6181			
900 x 450	-	250	28	29,5	0,1531	BF	M1		-	273	54,5	57,5	0,6719	BFN	M2	
	-	63	29,5	31	0,1794				-	278	54,5	57,5	0,6826			
	-	73	30	31,5	0,1969				-	298	56,5	59,5	0,7256			
	-	80,5	30,5	32	0,2100				-	323	59,5	62,5	0,7794			
	-	100,5	31	33,5	0,2450				-	31	32,5	34	0,1286			
	-	123	32,5	35,5	0,2844	BFN	M2		-	32,5	34	36	0,1531	BFL	M3	
	-	148	35	38	0,3281				-	34	35,5	37	0,1838			
	-	173	37	40	0,3719				-	48	35,5	37	0,2144			
	-	198	39,5	42,5	0,4156				-	63	37,5	39	0,2511			
	-	203	40	43	0,4244				-	73	39	40,5	0,2756			
1000 x 600	-	223	42	45	0,4594	BF	M3		-	80,5	40	41,5	0,2940	BFN	M2	
	-	238	43,5	46,5	0,4856				-	100,5	42,5	45,5	0,3430			
	-	248	44,5	47,5	0,5031				-	123	45,5	48,5	0,3981			
	-	273	47	50	0,5469				-	148	49	52	0,4594			
	-	278	47	50	0,5556				-	173	47,5	50,5	0,5206			
	-	298	49	52	0,5906	BFL	M4		-	198	50,5	53,5	0,5819	BF	M3	
	-	323	51,5	54,5	0,6344				-	203	51,5	54,5	0,5941			
	-	23,1	23,2	23,2	0,0731				-	223	54	57	0,6431			
	-	13	26	27,5	0,1024				-	238	55,5	58,5	0,6799			
	-	23	27	28,5	0,1219				-	248	56,5	59,5	0,7044			
1100 x 500	-	28,5	30	30	0,1463	BF	M1		-	273	60	63	0,7656	BFL	M4	
	-	48	30	31,5	0,1706				-	278	60	63	0,7779			
	-	63	31,5	33	0,1999				-	298	62,5	65,5	0,8269			
	-	73	32,5	34	0,2194				-	323	65,5	68,5	0,8881			
	-	80,5	33,5	35	0,2340				-	34	35,5	37	0,1444			
	-	100,5	35,5	37	0,2730	BFN	M2		-	35,5	37	39	0,1719	BFL	M5	
	-	123	35	38	0,3169				-	37,5	39	41	0,2063			
	-	148	37,5	40,5	0,3656				-	48	39,5	41	0,2406			
	-	173	40	43	0,4144				-	63	41,5	43	0,2819			
	-	198	42,5	45,5	0,4631				-	73	43	44,5	0,3094			
1100 x 450	-	203	43	46	0,4729	BF	M3		-	80,5	44	47	0,3300	BFN	M2	
	-	223	45	48	0,5119				-	100,5	47	50	0,3850			
	-	238	47	50	0,5411				-	123	50	53	0,4469			
	-	248	48	51	0,5606				-	148	53,5	56,5	0,5156			
	-	273	51	54	0,6094				-	173	52	55	0,5844			
	-	278	51	54	0,6191	BFL	M4		-	198	55,5	58,5	0,6531	BF	M3	
	-	298	53	56	0,6581				-	203	56	59	0,6669			
	-	323	55,5	58,5	0,7069				-	223	59	62	0,7219			
	-	28	29,5	29,5	0,1129				-	238	60,5	63,5	0,7631			
	-	23	29	30,5	0,1344				-	248	62	65	0,7906			
1100 x 300	-	36	30,5	32	0,1613	BFL	M2		-	273	65,5	68,5	0,8594	BF	M5	
	-	48	32	33,5	0,1881				-	278	66	69	0,8731			
	-	63	34	35,5	0,2204				-	298	68,5	71,5	0,9281			
	-	73	35	36,5	0,2419				-	323	71,5	74,5	0,9969			
	-	-	-	-	-				-	-	-	-	-			
	-	-	-	-	-				-	-	-	-	-			

Sizes in increments of 5 mm can be manufactured on request.

A x B [mm]	Damper blade overlaps		Weight		Effective area Sef [m <sup>2</sup> ]	Spring return actuator	Manual control	A x B [mm]	Damper blade overlaps		Weight		Effective area Sef [m <sup>2</sup> ]	Spring return actuator	Manual control
	a [mm]	c [mm]	Man. [kg]	Actu. [kg]*					a [mm]	c [mm]	Man. [kg]	Actu. [kg]*			
1500 x	180	-	13	36	37,5	0,1549	BFL	M2	500	-	173	57	60	0,6269	M3
	200	-	23	37,5	39	0,1844			550	-	198	58,5	61,5	0,7006	
	225	-	36	39,5	41	0,2213			560	-	203	59,5	62,5	0,7154	
	250	-	48	41,5	43	0,2581			600	-	223	62,5	65,5	0,7744	
	280	-	63	44	45,5	0,3024			630	-	238	64	67	0,8186	
	300	-	73	45,5	48,5	0,3319	BFN	M3	650	3	248	65,5	68,5	0,8481	M4
	315	-	80,5	46,5	49,5	0,3540			700	28	273	69,5	72,5	0,9219	
	355	-	100,5	49,5	52,5	0,4130			710	33	278	69,5	79,5	0,9366	
	400	-	123	53	56	0,4794			750	53	298	72,5	75,5	0,9956	
	450	-	148	55	58	0,5531			800	78	323	75,5	78,5	1,0694	

Sizes in increments of 5 mm can be manufactured on request.

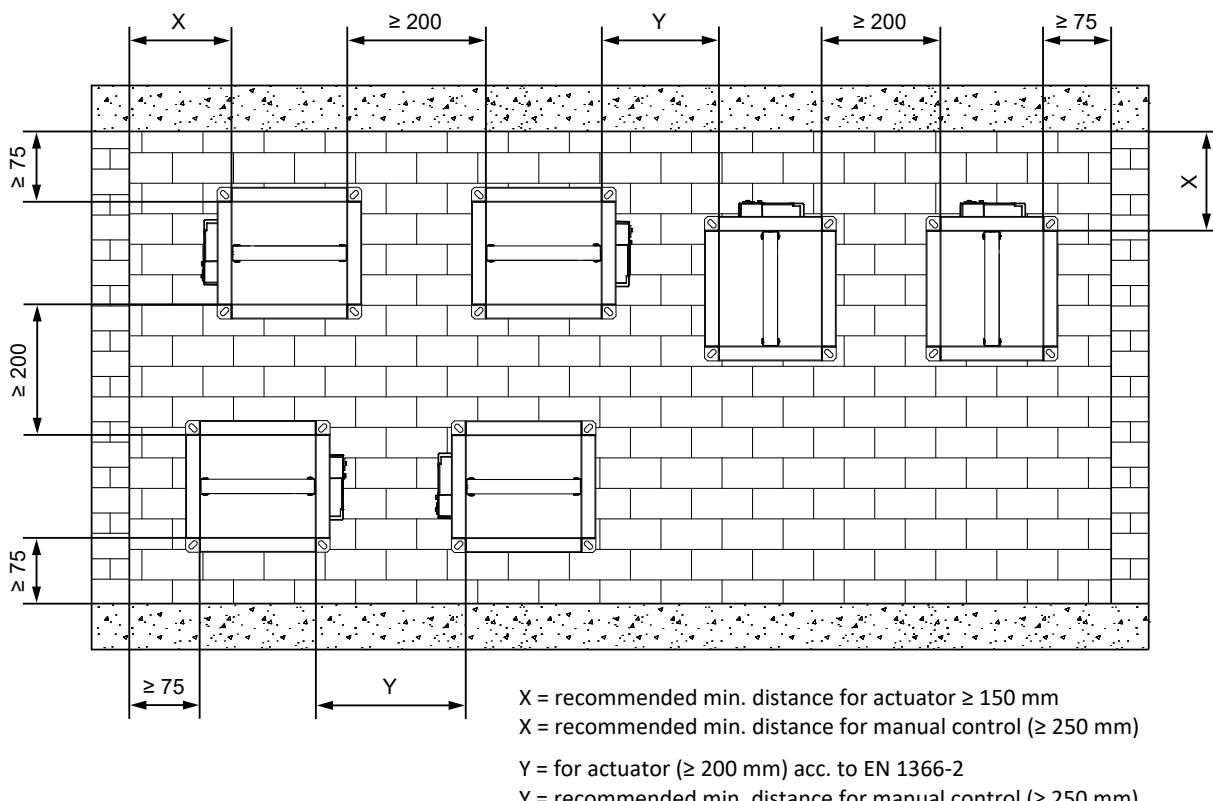
## IV. INSTALLATION

### Placement and installation

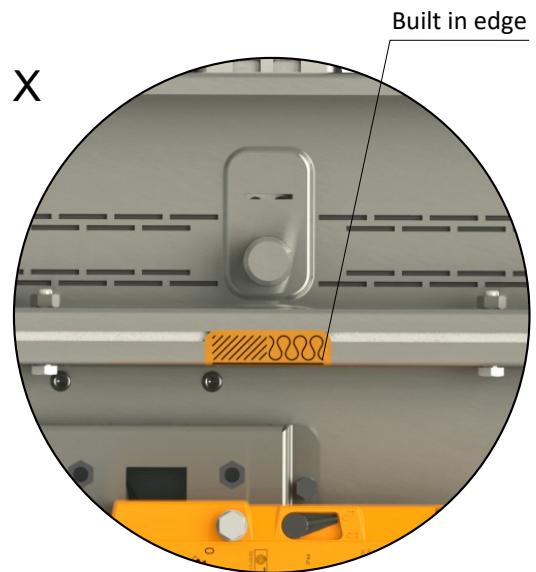
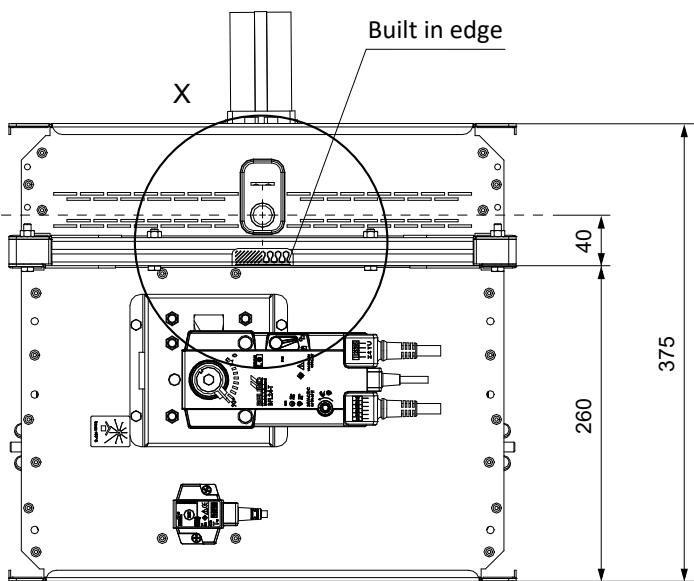
- The fire dampers are suitable for installation in arbitrary position in vertical and horizontal passages of fire separating constructions. The damper installation procedures must be done so that all load transfer from the fire separating constructions to the damper is absolutely excluded. Following air-conditioning duct must be suspended or supported so that all load transfer from the following duct to the fire damper is absolutely excluded. The gap between the installed damper and the fire separating construction must be perfectly filled with approved material.
  - The damper must be installed so that the damper blade (in closed position) is situated in the fire separating construction - marked by the label BUILT-IN EDGE on the damper casing. If such solution is not possible, the duct between the fire separating
- construction and the damper blade must be protected according to the certified installation method → see pages 23 to 40
- During the installation and plastering process, the actuating mechanism must be protected (covered) against damage and pollution. The damper casing should not be deformed during bricklaying. Once the damper is built in, the damper blade should not grind against the damper casing during opening or closing.
  - The distance between the fire damper and the construction (wall, ceiling) must be 75 mm at the minimum, according to EN 1366-2. If two or more dampers are to be installed in one fire separating construction, the distance between adjacent dampers must be 200 mm at the minimum, according to EN 1366-2.

#### Minimum distance between the fire dampers and the construction

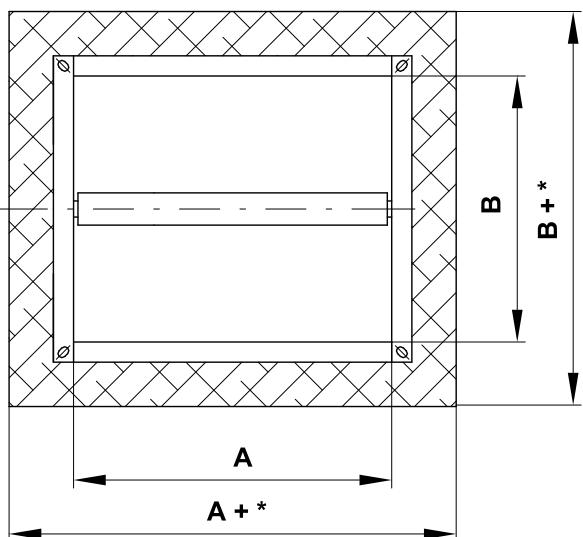
- minimum distance 200 mm between dampers, according to EN 1366-2
- minimum distance 75 mm between damper and construction (wall/ceiling), according to EN 1366-2
- recommended minimum distance 150 mm necessary for access to the actuator
- recommended minimum distance 250 mm necessary for access to the manual control



- Always consult the wall manufacturers specific guidelines for penetration size, location to other services, fire stopping and load bearing capacity.
- 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.

**Built in edge**

*"BUILT IN EDGE label" indicates the recommended edge of installation of a fire damper in the fire separating construction (wall/ceiling). The damper must be installed so that the entire damper blade (in the closed position) is located in the fire separating construction (wall/ceiling) and at the same time the actuating mechanism and inspection openings are freely accessible.*

**Dimensions of an installation opening****\* Mortar or gypsum**

- min.  $A(B)+100 - 140$ , by the type of installation  
→ see pages 23 to 40
- max.  $A(B)+300$

**Ablative Coated Batt**

- min.  $A(B)+100$
- max.  $A(B)+360$

**Examples of constructions for fire damper installation**

- The fire damper can be installed into:
  - Solid wall construction made e.g. of normal concrete/masonry or porous concrete with min. thickness 100 mm.
  - Gypsum wall construction with min. thickness 100 mm.
  - Solid ceiling construction made e.g. of normal concrete or porous concrete, with minimum thickness according to EN 1366-2.
- Outside the wall/ceiling construction. The duct and damper must be protected by fire insulation.  
If damper is installed outside a construction it is necessary to use reinforcing frame VRM-Q 120 → see page 51

## Statement of installations

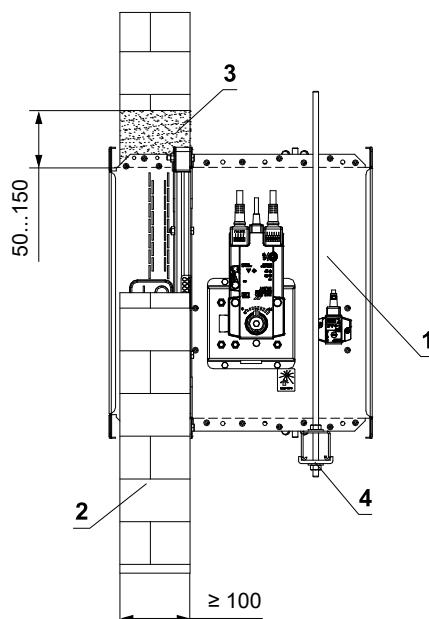
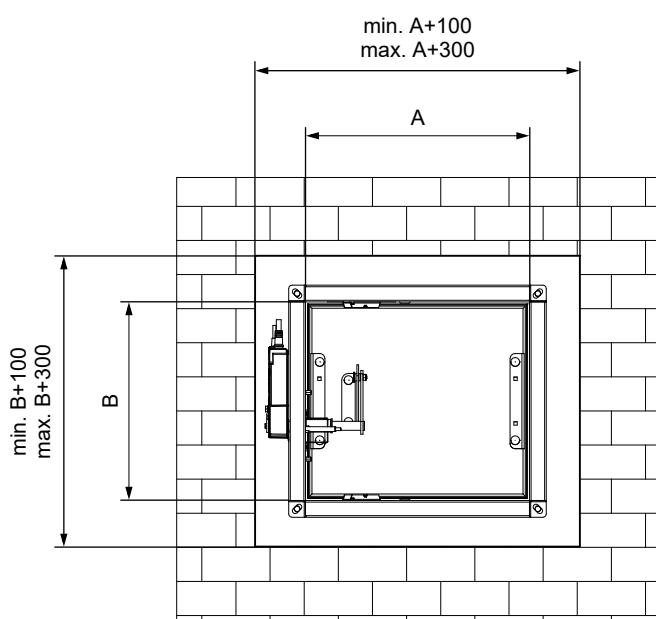
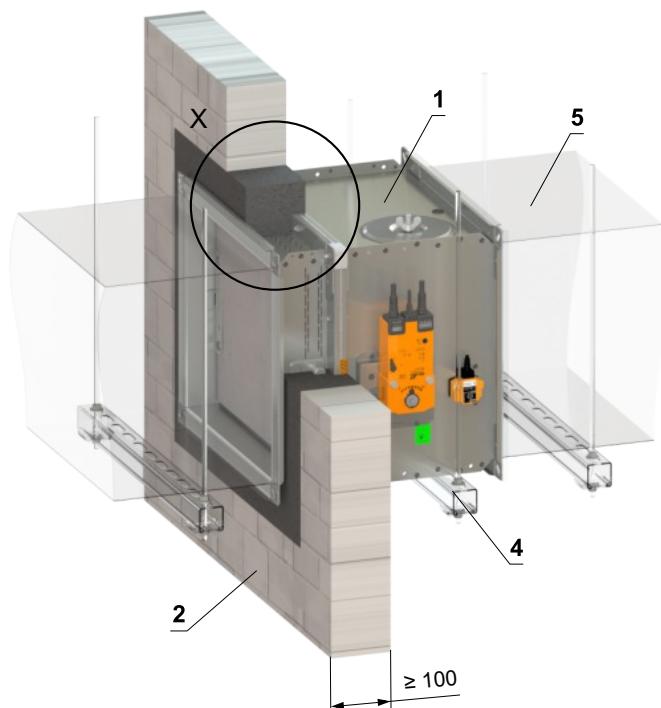
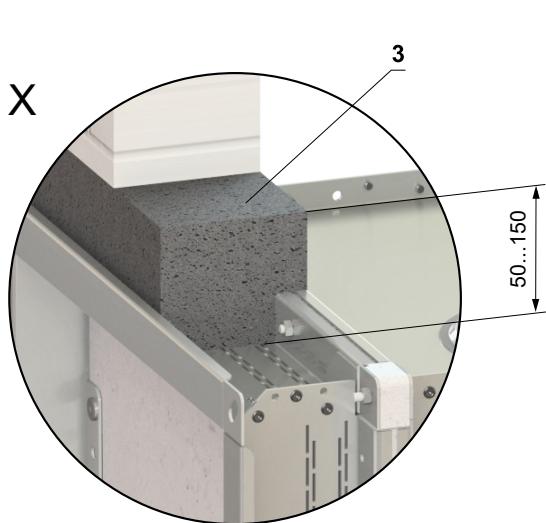
Placement	wall/ceiling min. thickness [mm]	Method of installation	Fire resistance	Page
In solid wall construction	100	Mortar or gypsum	EI 120 ( $v_e \leftrightarrow o$ ) S - 500 Pa	23
		2 dampers in battery - mortar or gypsum		24
		4 dampers in battery - mortar or gypsum	EI 120 ( $v_e \leftrightarrow o$ ) S	25
		Ablative Coated Batt		26
Outside solid wall construction	100	ISOVER Ultimate Protect - Ablative Coated Batt	EI 120 ( $v_e \leftrightarrow o$ ) S	27-28
In gypsum wall construction	100	Mortar or gypsum	EI 120 ( $v_e \leftrightarrow o$ ) S - 500 Pa	29
		2 dampers in battery - mortar or gypsum		30
		4 dampers in battery - mortar or gypsum	EI 120 ( $v_e \leftrightarrow o$ ) S	31
		Ablative Coated Batt		32
Outside gypsum wall construction	100	ISOVER Ultimate Protect - Ablative Coated Batt		33-34
		Flamebar EN Fire Duct - FPL 110 insulation		35-36
In shaft wall construction	107	Mortar or gypsum	EI 120 ( $v_e \leftrightarrow o$ ) S	37
In solid ceiling construction	150	Mortar or gypsum	EI 120 ( $h_o \leftrightarrow o$ ) S - 500 Pa	38
		2 dampers in battery - mortar or gypsum		39
		4 dampers in battery - mortar or gypsum	EI 120 ( $h_o \leftrightarrow o$ ) S	40

## Installation in solid wall construction

### In solid wall construction - mortar or gypsum

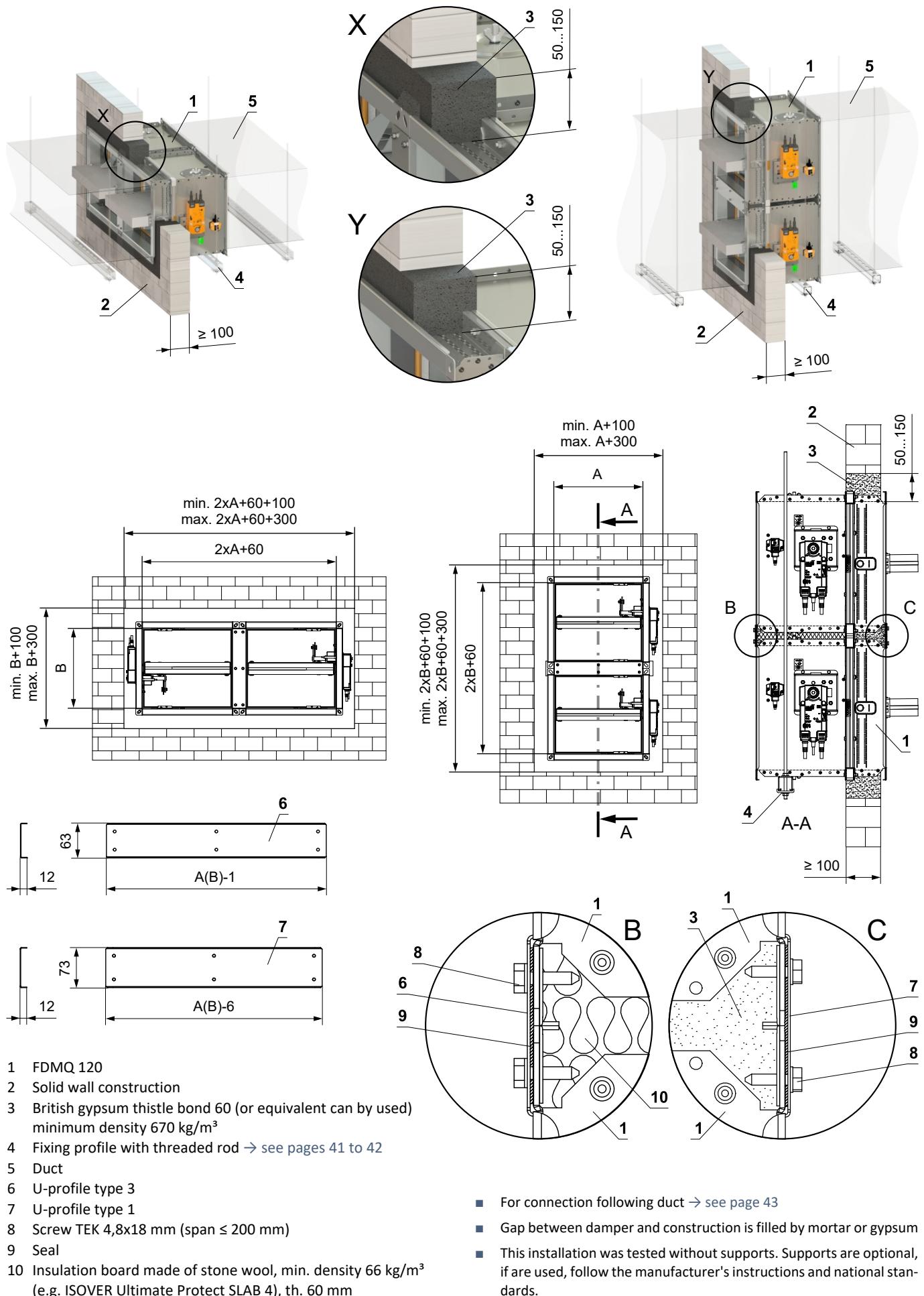
**EI 120 ( $v_e \leftrightarrow o$ ) S - 500 Pa**

- For connection following duct → see page 43
- This installation was tested without supports. Supports are optional, if are used, follow the manufacturer's instructions and national standards.

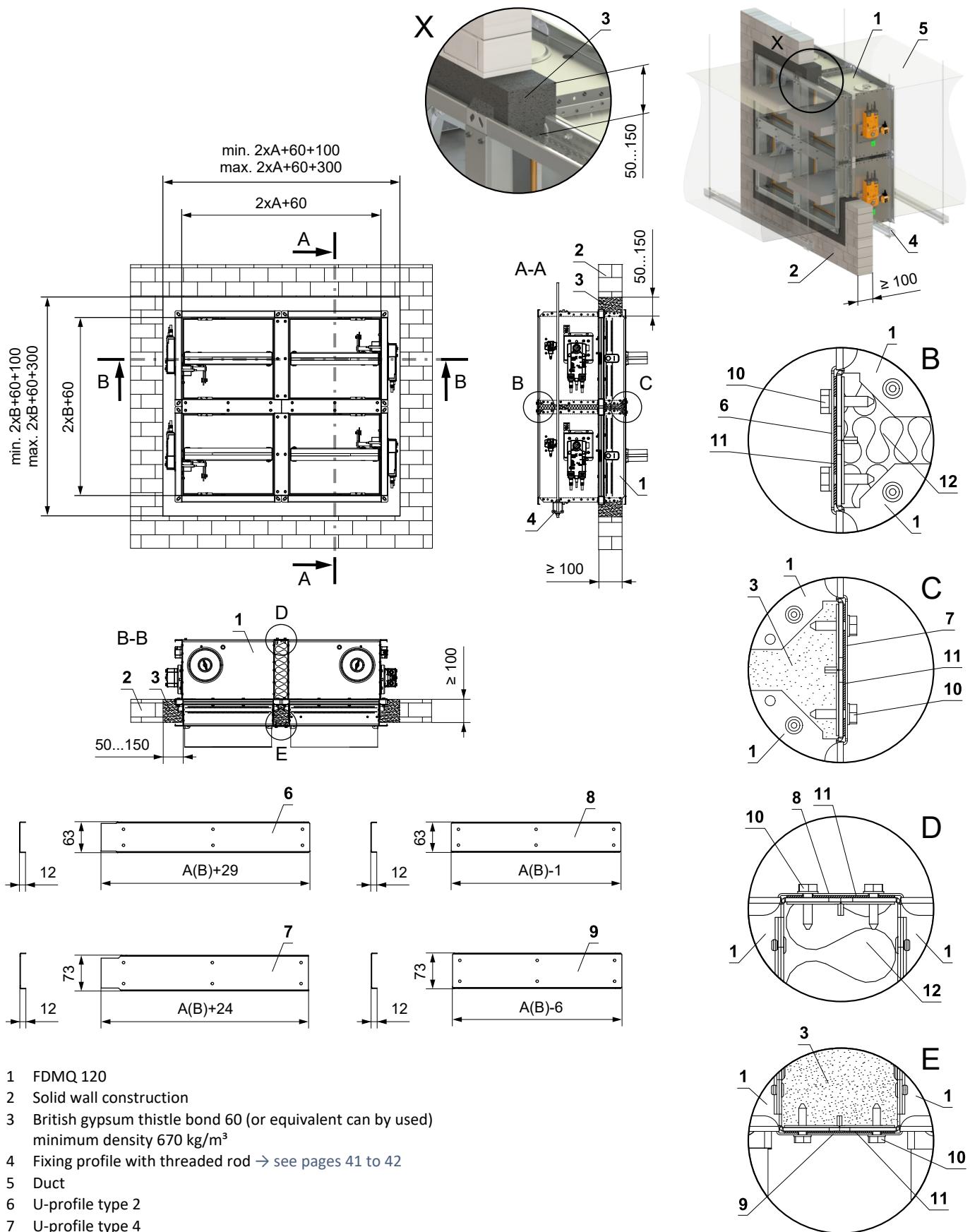


- 1 FDMQ 120
- 2 Solid wall construction
- 3 British gypsum thistle bond 60 (or equivalent can be used)  
minimum density 670 kg/m<sup>3</sup>
- 4 Fixing profile with threaded rod → see pages 41 to 42
- 5 Duct

## In solid wall construction - 2 dampers in battery - mortar or gypsum

EI 120 ( $v_e i \leftrightarrow o$ ) S

## In solid wall construction - 4 dampers in battery - mortar or gypsum

EI 120 ( $v_e i \leftrightarrow o$ ) S

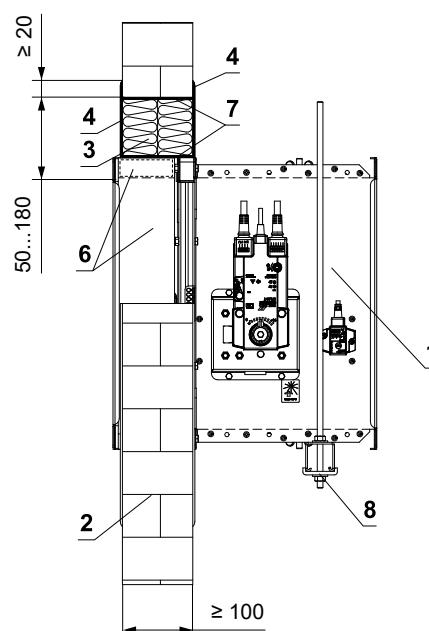
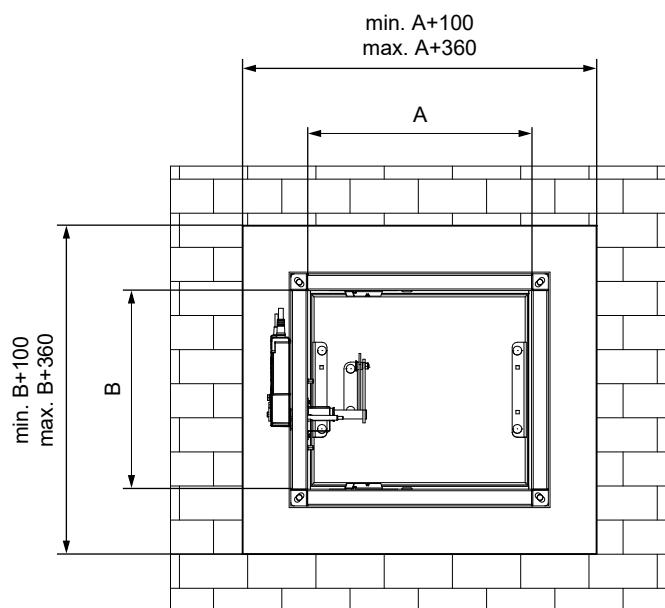
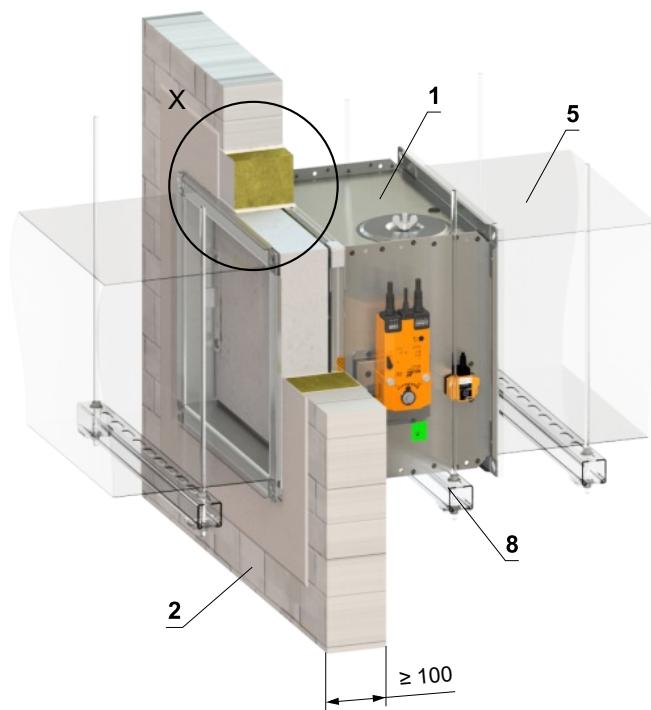
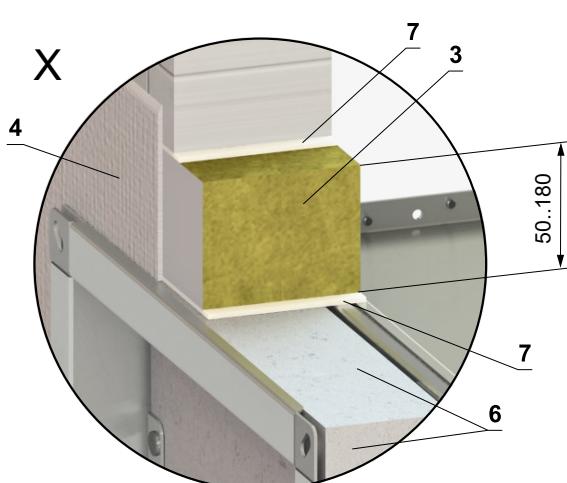
- 1 FDMQ 120
- 2 Solid wall construction
- 3 British gypsum thistle bond 60 (or equivalent can be used)  
minimum density 670 kg/m<sup>3</sup>
- 4 Fixing profile with threaded rod → see pages 41 to 42
- 5 Duct
- 6 U-profile type 2
- 7 U-profile type 4
- 8 U-profile type 1
- 9 U-profile type 3
- 10 Screw TEK 4,8x18 mm (span ≤ 200 mm)
- 11 Seal
- 12 Insulation board made of stone wool, min. density 66 kg/m<sup>3</sup>  
(e.g. ISOVER Ultimate Protect SLAB 4), th. 60 mm

- For connection following duct → see page 43
- Gap between damper and construction is filled by mortar or gypsum
- This installation was tested without supports. Supports are optional, if are used, follow the manufacturer's instructions and national standards.

## In solid wall construction - Ablative Coated Batt

EI 120 ( $v_e$   $i \leftrightarrow o$ ) S

- For connection following duct → see page 43



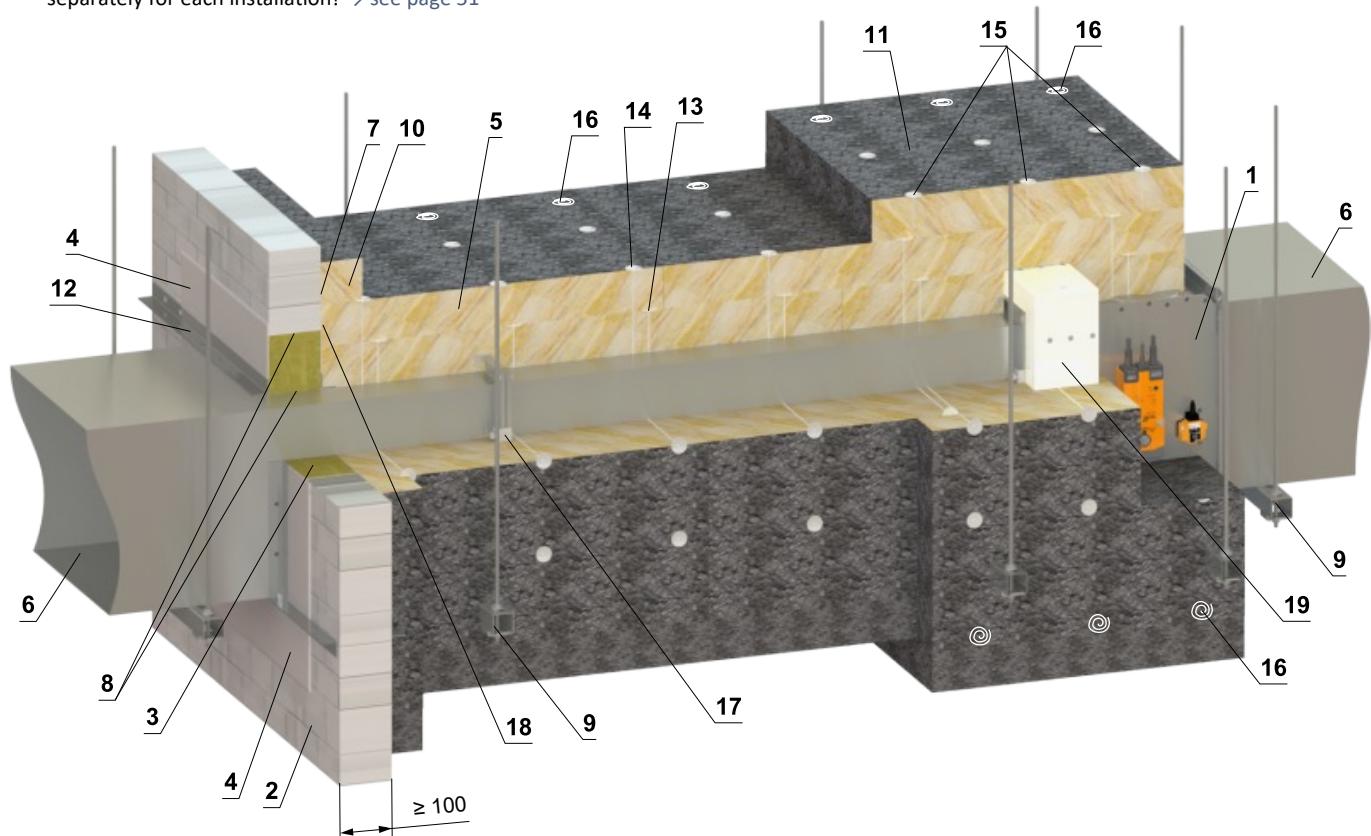
- 1 FDMQ 120
- 2 Solid wall construction
- 3 Ablative Coated Batt (e.g. Firestop Board HILTI CFS-CT B 1S 140/50 - min. density 140 kg/m<sup>3</sup> + Firestop acrylic sealant HILTI CFS-S ACR or equivalent)
- 4 Fire stop coating thickness 1 mm (e.g. HILTI CFS-CT, PROMASTOP-CC or equivalent)
- 5 Duct
- 6 Protective cladding boards - (not part of the damper) but must be used as part of the penetration filling → see page 52
- 7 Fire resistant mastic - fill the gap on both sides of the fire separation construction and around the perimeter of penetration and damper body. (e.g. HILTI CFS-S ACR)
- 8 Fixing profile with threaded rod → see pages 41 to 42

## Installation outside solid wall construction

### Outside solid wall construction - ISOVER Ultimate Protect - Ablative Coated Batt

**EI 120 (v<sub>e</sub> i↔o) S**

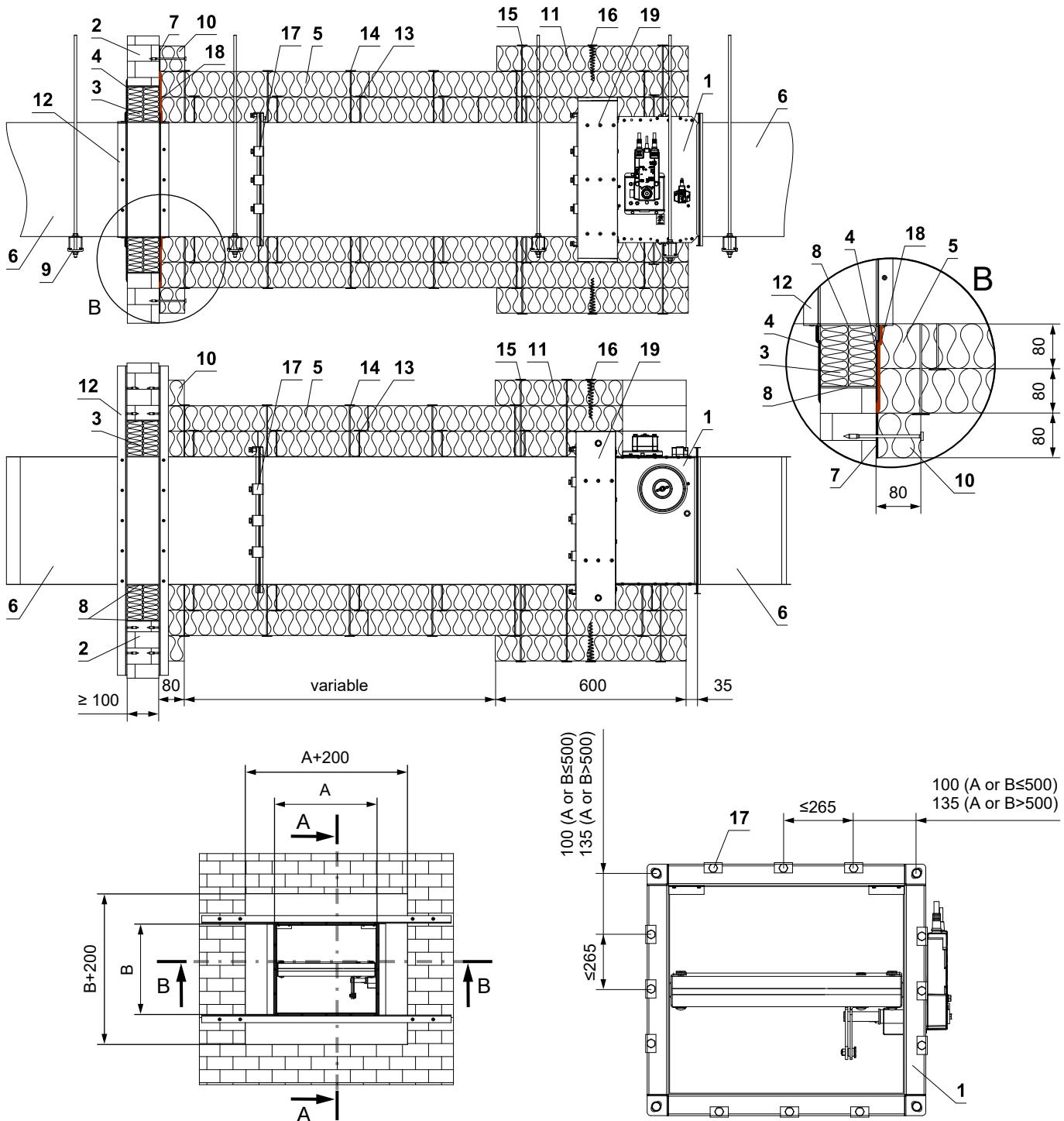
- For connection following duct → see page 43
- Minimum and maximum distance between the wall and the fire damper is unlimited.
- When installing the insulation, follow the ISOVER manufacturer's instructions.
- The fire damper and duct must be suspended separately.
- The duct must be suspended on both sides of the fire damper in accordance with national standards.
- The duct between the fire damper and the fire separating construction must be suspended using threaded rods and mounting profiles or another suspension system in accordance with national standards.
- Fire damper inspection holes are covered with insulation, therefore it's necessary to make an inspection hole in the connecting duct.
- Load on suspension system depends on weight of the fire damper and duct system → see page 41
- Max. length between two suspension systems is 1500 mm.
- Installation must be done in such a way that all load transfer from the fire separating construction to the damper is completely eliminated.
- If the threaded rod is located inside the duct insulation, the distance between the threaded rod and the duct must be max. 30 mm.
- If the threaded rod is located outside the duct insulation, the distance between the threaded rod and the insulation must be max. 40 mm.
- The insulation boards are fastened to the duct.
- Reinforcing frame VRM-Q 120 must always be used for this type of installation. VRM-Q 120 is not part of the fire damper and must be ordered separately for each installation! → see page 51



- |   |  |    |   |
|---|--|----|---|
| 1 | FDMQ 120   | 10 | Duct penetration insulation collar - ISOVER Ultimate Protect SLAB 4.0 Alu1, th. 80 mm - glued (pos. 7) and fixed with screws to the wall construction |
| 2 | Solid wall construction  | 11 | Insulating collar of the damper and duct connection - ISOVER Ultimate Protect SLAB 4.0 Alu1, th. 80 mm  |
| 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-SACR or equivalent)                   | 12 | L-profile 30x30x3 mm - dimensions and installation acc. to ISOVER manufacturer  |
| 4 | Fire stop coating thickness 1 mm (e.g. HILTI CFS-CT, PROMASTOP-CC or equivalent)   | 13 | Stud-welded pins 80 mm - quantity and placing acc. to ISOVER manufa.  |
| 5 | Insulation board made of stone wool, with a surface treatment of aluminum foil, min. density 66 kg/m³ (ISOVER Ultimate Protect SLAB 4.0 Alu1, th. 80 mm)               | 14 | Stud-welded pins 160 mm - quantity and placing acc. to ISOVER manufa.   |
| 6 | Standard air ducts, made of galvanized sheet thickness 0,8 mm, flanges 30 mm, acc. to EN 1507 and DIN 24190  | 15 | Stud-welded pins 240 mm - quantity and placing acc. to ISOVER manufa.   |
| 7 | ISOVER Protect BSK glue - apply on the insulation and stick it to the fire separation construction   | 16 | Fire spiral shaped screws - quantity and placing acc. to ISOVER manufa.   |
| 8 | Fire resistant mastic - fill the gap on both sides of the fire separation construction and around the perimeter of penetration and damper body. (e.g. HILTI CFS-S ACR) | 17 | Steel clamp min. M8 bolts   |
| 9 | Fixing profile with threaded rod → see pages 41 to 42  | 18 | ISOVER Protect BSF  |
|   |  | 19 | VRM-Q 120 → see page 51   |

(continued on next page)

(continuation of installation Outside solid wall construction - ISOVER Ultimate Protect - Ablative Coated Batt)



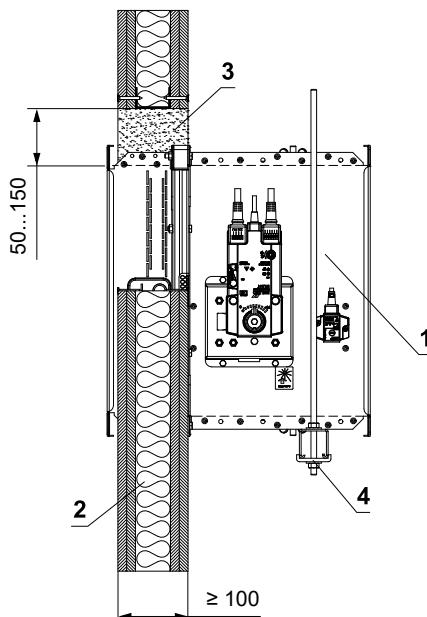
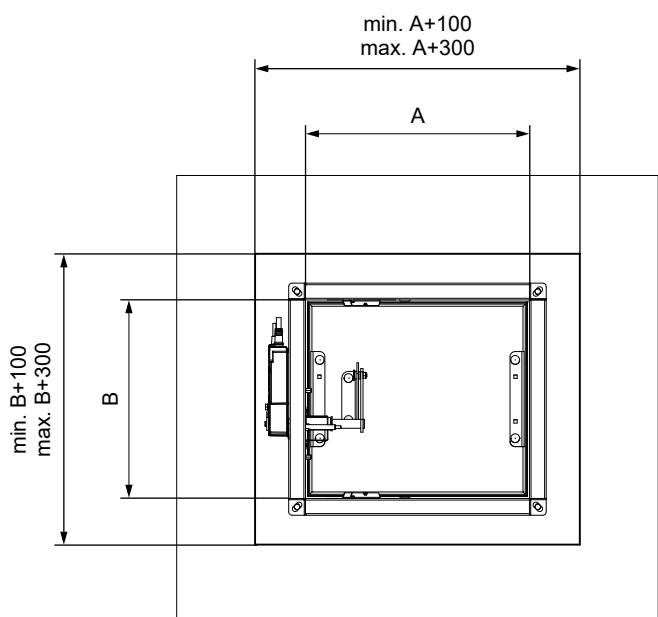
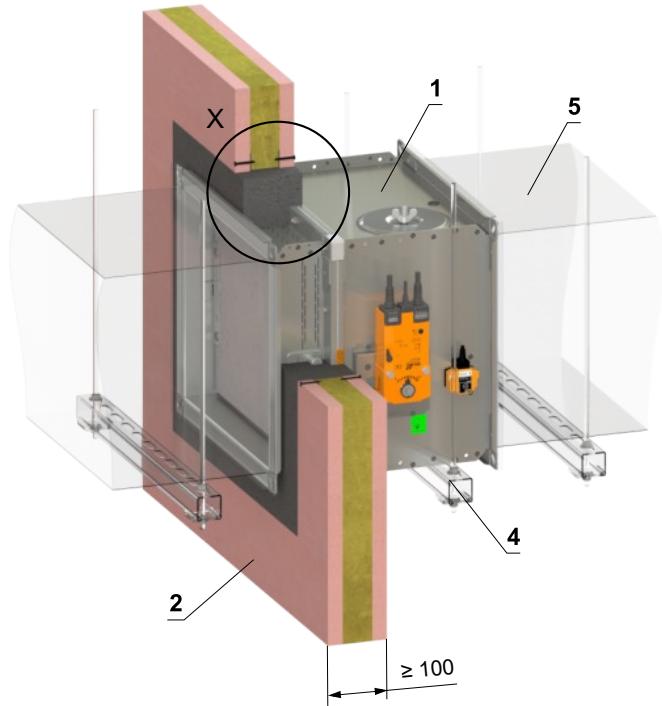
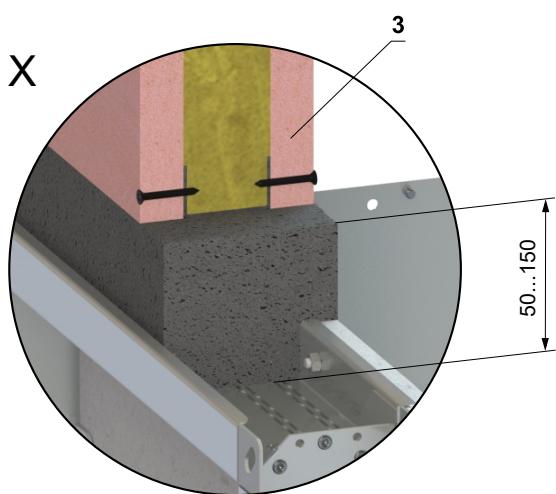
- 1 FDMQ 120
- 2 Solid wall construction
- 3 Ablative Coated Batt (e.g. Firestop Board HILTI CFS-CT B 1S 140/50 - min. density 140 kg/m³ + Firestop acrylic sealant HILTI CFS-SACR or equivalent)
- 4 Fire stop coating thickness 1 mm (e.g. HILTI CFS-CT, PROMASTOP-CC or equivalent)
- 5 Insulation board made of stone wool, with a surface treatment of aluminum foil, min. density 66 kg/m³ (ISOVER Ultimate Protect SLAB 4.0 Alu1, th. 80 mm)
- 6 Standard air ducts, made of galvanized sheet thickness 0,8 mm, flanges 30 mm, acc. to EN 1507 and DIN 24190
- 7 ISOVER Protect BSK glue - apply on the insulation and stick it to the fire separation construction
- 8 Fire resistant mastic - fill the gap on both sides of the fire separation construction and around the perimeter of penetration and damper body. (e.g. HILTI CFS-S ACR)
- 9 Fixing profile with threaded rod → see pages 41 to 42
- 10 Duct penetration insulation collar - ISOVER Ultimate Protect SLAB 4.0 Alu1, th. 80 mm - glued (pos. 7) and fixed with screws to the wall construction
- 11 Insulating collar of the damper and duct connection - ISOVER Ultimate Protect SLAB 4.0 Alu1, th. 80 mm
- 12 L-profile 30x30x3 mm - dimensions and installation acc. to ISOVER manufacturer
- 13 Stud-welded pins 80 mm - quantity and placing acc. to ISOVER manufa.
- 14 Stud-welded pins 160 mm - quantity and placing acc. to ISOVER manufa.
- 15 Stud-welded pins 240 mm - quantity and placing acc. to ISOVER manufa.
- 16 Fire spiral shaped screws - quantity and placing acc. to ISOVER manufa.
- 17 Steel clamp min. M8 bolts
- 18 ISOVER Protect BSF
- 19 VRM-Q 120 → see page 51

## Installation in gypsum wall construction

### In gypsum wall construction - mortar or gypsum

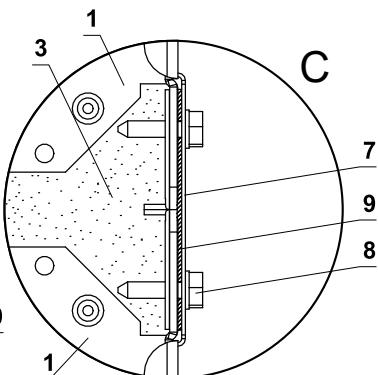
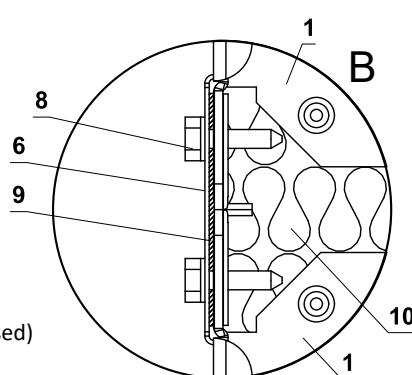
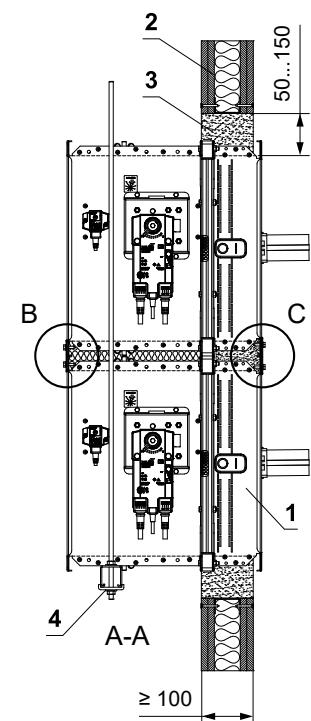
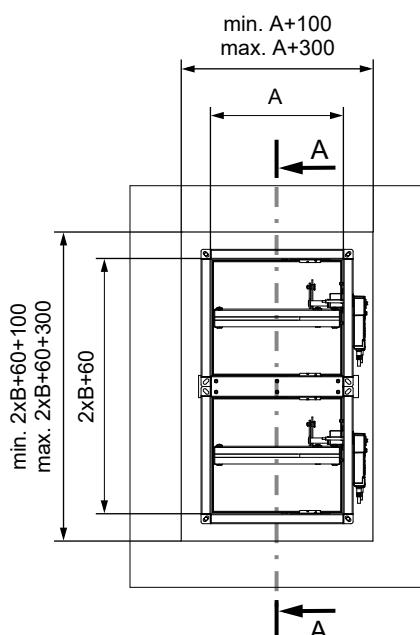
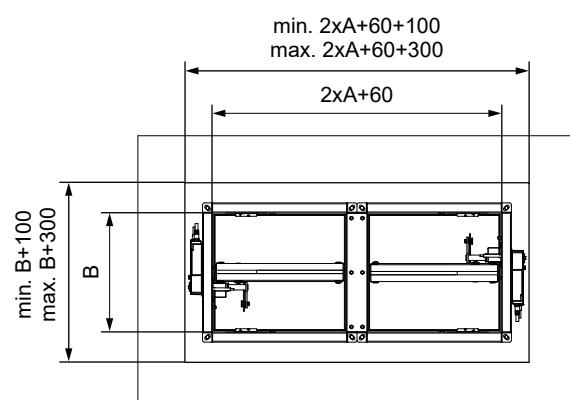
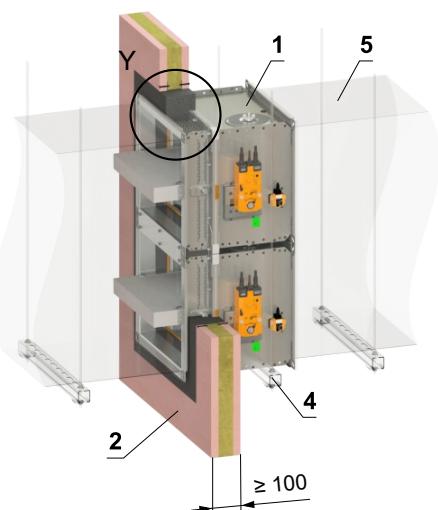
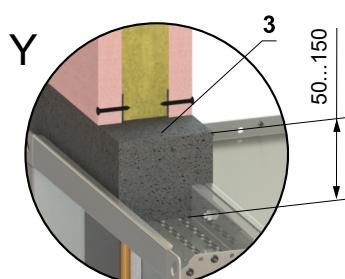
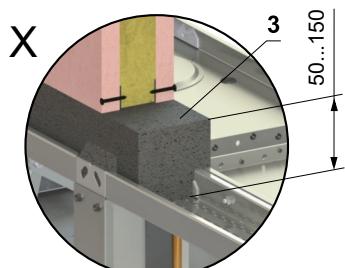
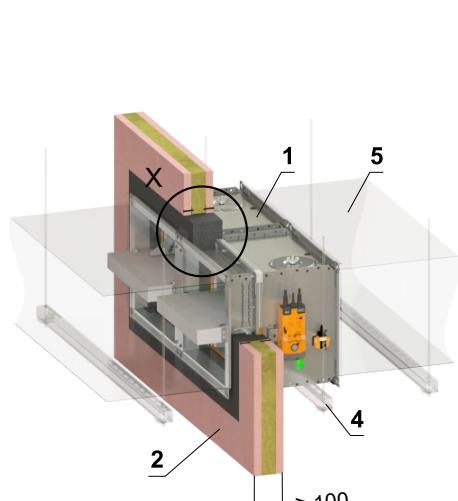
**EI 120 ( $v_e \leftrightarrow o$ ) S - 500 Pa**

- For connection following duct → see page 43
- This installation was tested without supports. Supports are optional, if are used, follow the manufacturer's instructions and national standards.



- 1 FDMQ 120
- 2 Gypsum wall construction
- 3 British gypsum thistle bond 60 (or equivalent can be used)  
minimum density 670 kg/m<sup>3</sup>
- 4 Fixing profile with threaded rod → see pages 41 to 42
- 5 Duct

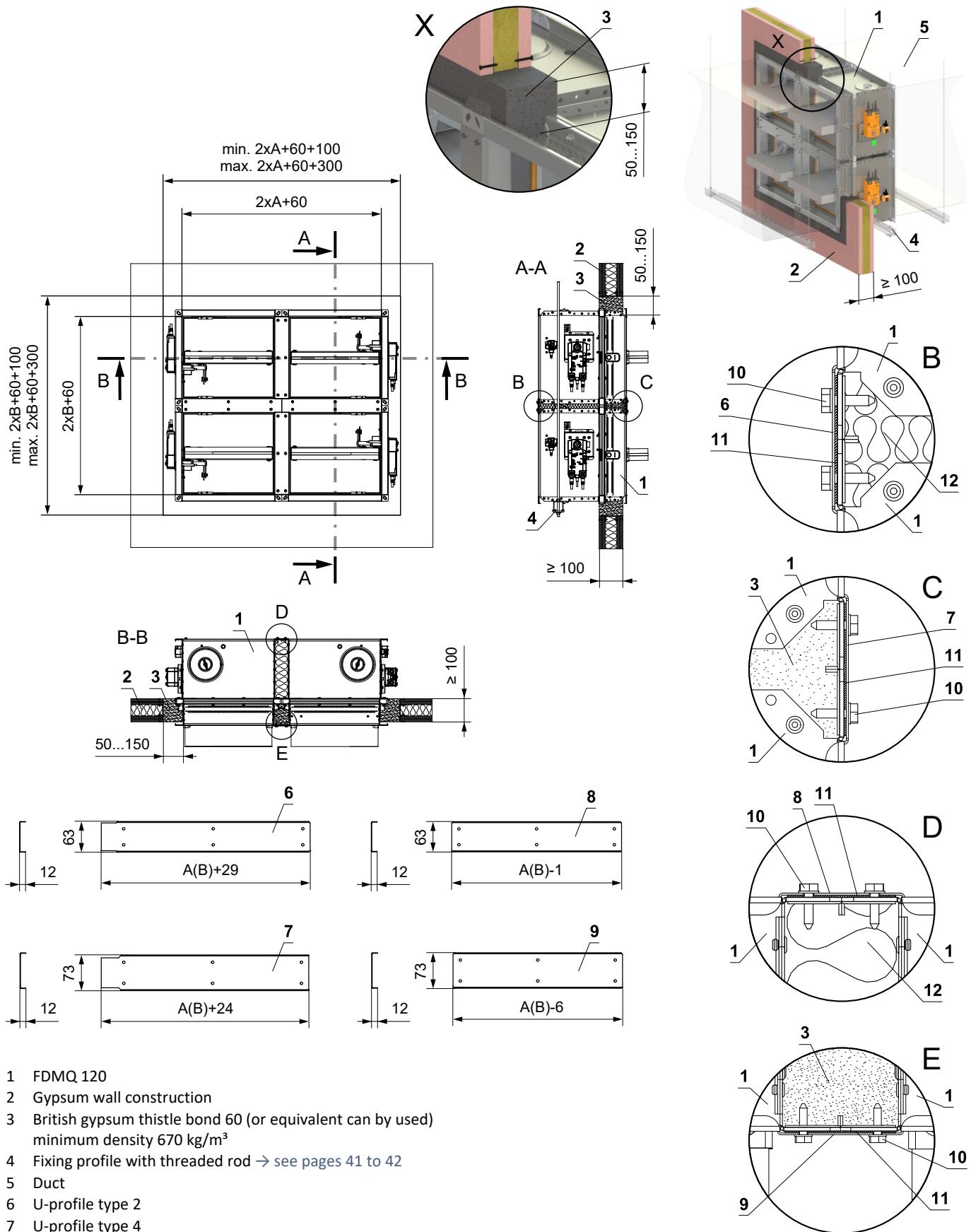
## In gypsum wall construction - 2 dampers in battery - mortar or gypsum

EI 120 ( $v_e i \leftrightarrow o$ ) S

- 1 FDMQ 120
- 2 Gypsum wall construction
- 3 British gypsum thistle bond 60 (or equivalent can be used)  
minimum density 670 kg/m<sup>3</sup>
- 4 Fixing profile with threaded rod → see pages 41 to 42
- 5 Duct
- 6 U-profile type 3
- 7 U-profile type 1
- 8 Screw TEK 4,8x18 mm (span ≤ 200 mm)
- 9 Seal
- 10 Insulation board made of stone wool, min. density 66 kg/m<sup>3</sup>  
(e.g. ISOVER Ultimate Protect SLAB 4), th. 60 mm

- For connection following duct → see page 43
- Gap between damper and construction is filled by mortar or gypsum
- This installation was tested without supports. Supports are optional, if are used, follow the manufacturer's instructions and national standards.

## In gypsum wall construction - 4 dampers in battery - mortar or gypsum

EI 120 ( $v_e i \leftrightarrow o$ ) S

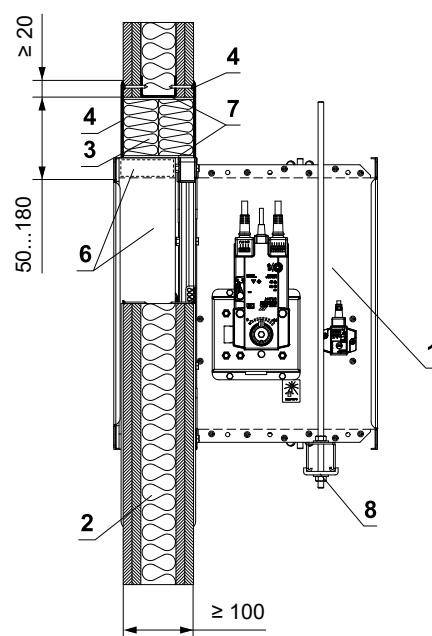
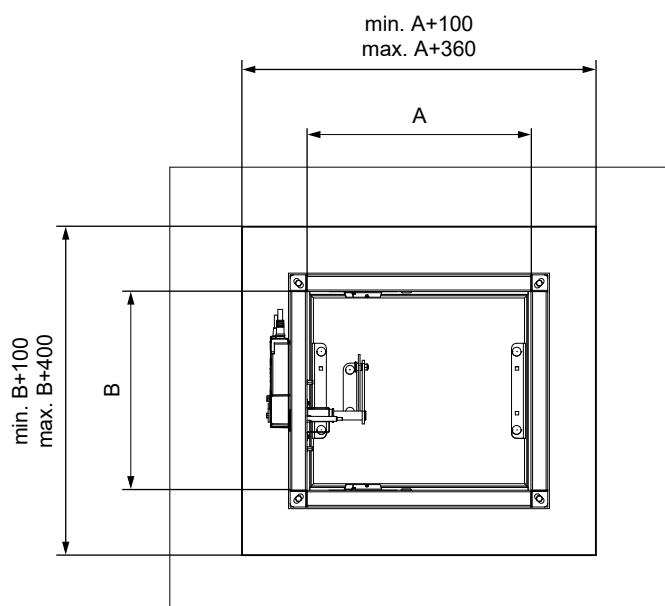
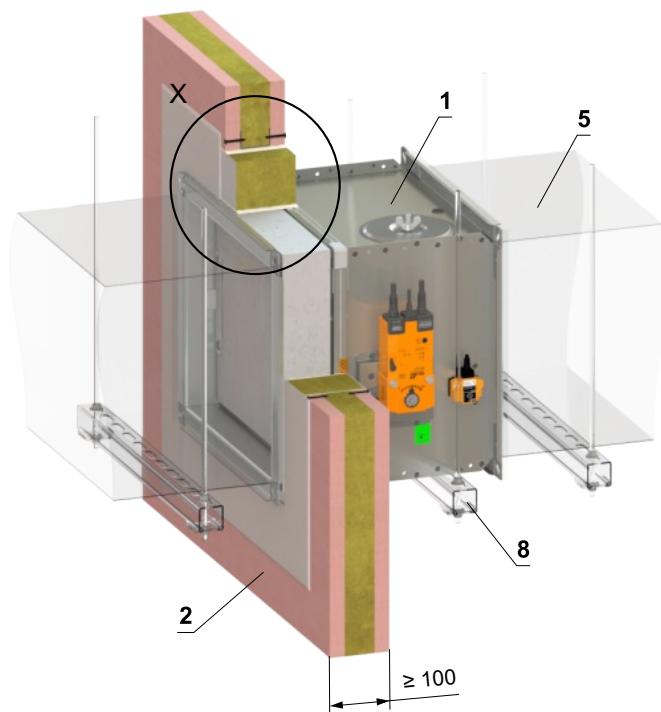
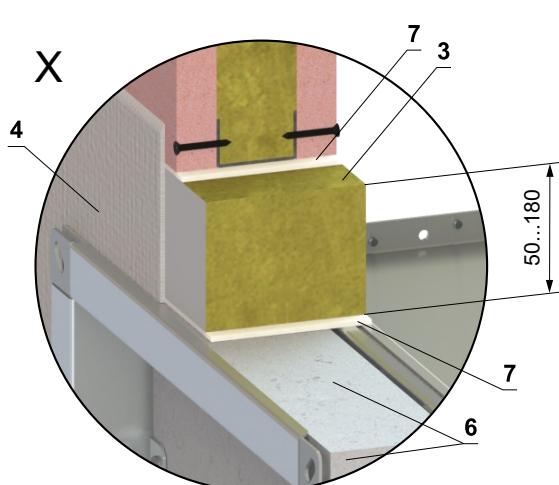
- 1 FDMQ 120
- 2 Gypsum wall construction
- 3 British gypsum thistle bond 60 (or equivalent can be used)  
minimum density 670 kg/m<sup>3</sup>
- 4 Fixing profile with threaded rod → see pages 41 to 42
- 5 Duct
- 6 U-profile type 2
- 7 U-profile type 4
- 8 U-profile type 1
- 9 U-profile type 3
- 10 Screw TEK 4,8x18 mm (span ≤ 200 mm)
- 11 Seal
- 12 Insulation board made of stone wool, min. density 66 kg/m<sup>3</sup>  
(e.g. ISOVER Ultimate Protect SLAB 4), th. 60 mm

- For connection following duct → see page 43
- Gap between damper and construction is filled by mortar or gypsum
- This installation was tested without supports. Supports are optional, if are used, follow the manufacturer's instructions and national standards.

## In gypsum wall construction - Ablative Coated Batt

EI 120 ( $v_e$  i↔o) S

- For connection following duct → see page 43



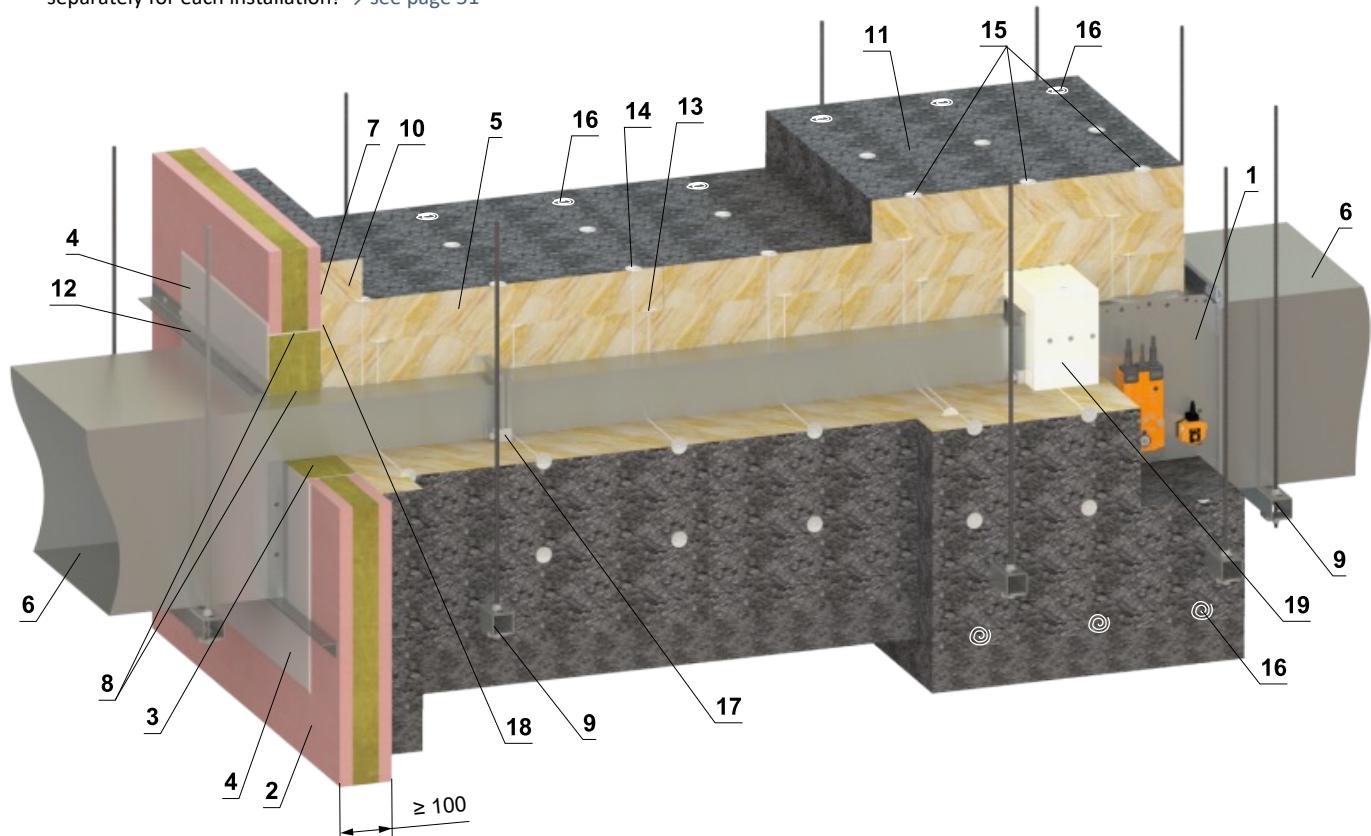
- 1 FDMQ 120
- 2 Gypsum wall construction
- 3 Ablative Coated Batt (e.g. Firestop Board HILTI CFS-CT B 1S 140/50 - min. density 140 kg/m³ + Firestop acrylic sealant HILTI CFS-S ACR or equivalent)
- 4 Fire stop coating thickness 1 mm (e.g. HILTI CFS-CT, PROMASTOP-CC or equivalent)
- 5 Duct
- 6 Protective cladding boards - (not part of the damper) but must be used as part of the penetration filling → see page 52
- 7 Fire resistant mastic - fill the gap on both sides of the fire separation construction and around the perimeter of penetration and damper body. (e.g. HILTI CFS-S ACR)
- 8 Fixing profile with threaded rod → see pages 41 to 42

## Installation outside gypsum wall construction

### Outside gypsum wall construction - ISOVER Ultimate Protect - Ablative Coated Batt

**EI 120 (v<sub>e</sub> i↔o) S**

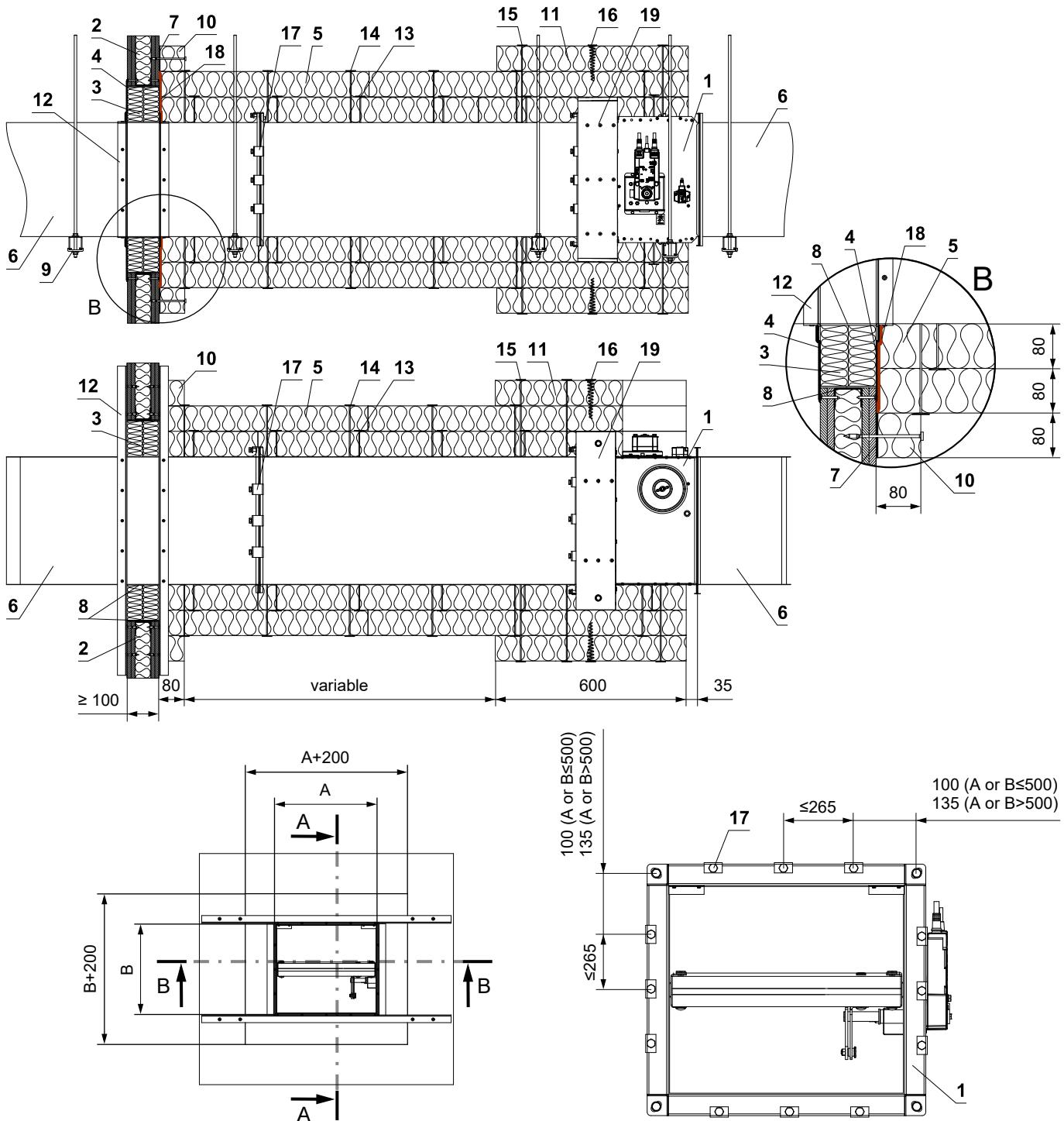
- For connection following duct → see page 43
- Minimum and maximum distance between the wall and the fire damper is unlimited.
- When installing the insulation, follow the ISOVER manufacturer's instructions.
- The fire damper and duct must be suspended separately.
- The duct must be suspended on both sides of the fire damper in accordance with national standards.
- The duct between the fire damper and the fire separating construction must be suspended using threaded rods and mounting profiles or another suspension system in accordance with national standards.
- Fire damper inspection holes are covered with insulation, therefore it's necessary to make an inspection hole in the connecting duct.
- Load on suspension system depends on weight of the fire damper and duct system → see page 41
- Max. length between two suspension systems is 1500 mm.
- Installation must be done in such a way that all load transfer from the fire separating construction to the damper is completely eliminated.
- If the threaded rod is located inside the duct insulation, the distance between the threaded rod and the duct must be max. 30 mm.
- If the threaded rod is located outside the duct insulation, the distance between the threaded rod and the insulation must be max. 40 mm.
- The insulation boards are fastened to the duct.
- Reinforcing frame VRM-Q 120 must always be used for this type of installation. VRM-Q 120 is not part of the fire damper and must be ordered separately for each installation! → see page 51



- |   |  |    |   |
|---|--|----|---|
| 1 | FDMQ 120   | 10 | Duct penetration insulation collar - ISOVER Ultimate Protect SLAB 4.0 Alu1, th. 80 mm - glued (pos. 7) and fixed with screws to the wall construction |
| 2 | Gypsum wall construction   | 11 | Insulating collar of the damper and duct connection - ISOVER Ultimate Protect SLAB 4.0 Alu1, th. 80 mm  |
| 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-SACR or equivalent)                   | 12 | L-profile 30x30x3 mm - dimensions and installation acc. to ISOVER manufacturer  |
| 4 | Fire stop coating thickness 1 mm (e.g. HILTI CFS-CT, PROMASTOP-CC or equivalent)   | 13 | Stud-welded pins 80 mm - quantity and placing acc. to ISOVER manufa.  |
| 5 | Insulation board made of stone wool, with a surface treatment of aluminum foil, min. density 66 kg/m³ (ISOVER Ultimate Protect SLAB 4.0 Alu1, th. 80 mm)               | 14 | Stud-welded pins 160 mm - quantity and placing acc. to ISOVER manufa.   |
| 6 | Standard air ducts, made of galvanized sheet thickness 0,8 mm, flanges 30 mm, acc. to EN 1507 and DIN 24190  | 15 | Stud-welded pins 240 mm - quantity and placing acc. to ISOVER manufa.   |
| 7 | ISOVER Protect BSK glue - apply on the insulation and stick it to the fire separation construction   | 16 | Fire spiral shaped screws - quantity and placing acc. to ISOVER manufa.   |
| 8 | Fire resistant mastic - fill the gap on both sides of the fire separation construction and around the perimeter of penetration and damper body. (e.g. HILTI CFS-S ACR) | 17 | Steel clamp min. M8 bolts   |
| 9 | Fixing profile with threaded rod → see pages 41 to 42  | 18 | ISOVER Protect BSF  |
|   |  | 19 | VRM-Q 120 → see page 51   |

(continued on next page)

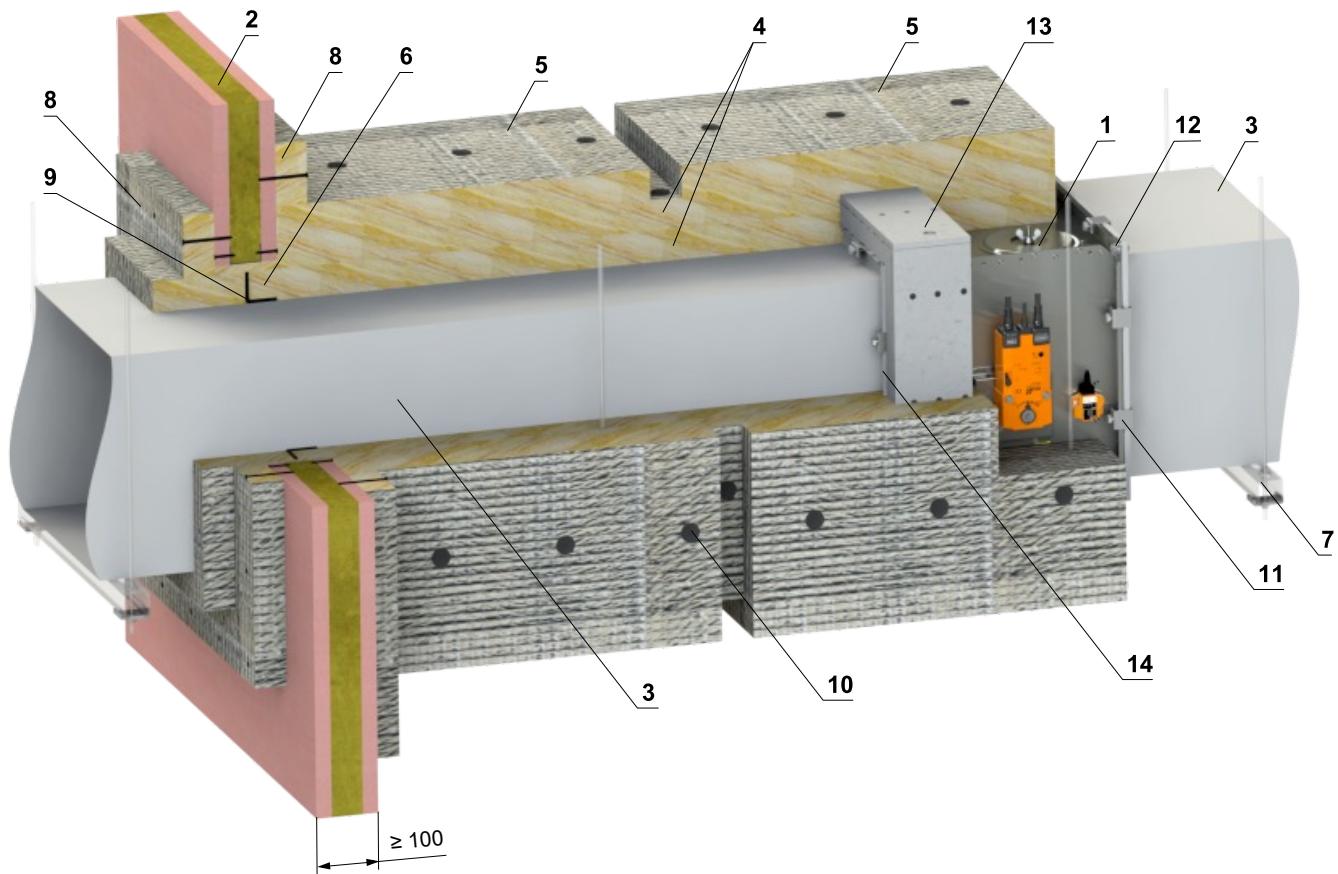
(continuation of installation Outside gypsum wall construction - ISOVER Ultimate Protect - Ablative Coated Batt)



- 1 FDMQ 120
- 2 Gypsum wall construction
- 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-SACR or equivalent)
- 4 Fire stop coating thickness 1 mm (e.g. HILTI CFS-CT, PROMASTOP-CC or equivalent)
- 5 Insulation board made of stone wool, with a surface treatment of aluminum foil, min. density 66 kg/m³ (ISOVER Ultimate Protect SLAB 4.0 Alu1, th. 80 mm)
- 6 Standard air ducts, made of galvanized sheet thickness 0,8 mm, flanges 30 mm, acc. to EN 1507 and DIN 24190
- 7 ISOVER Protect BSK glue - apply on the insulation and stick it to the fire separation construction
- 8 Fire resistant mastic - fill the gap on both sides of the fire separation construction and around the perimeter of penetration and damper body. (e.g. HILTI CFS-S ACR)
- 9 Fixing profile with threaded rod → see pages 41 to 42
- 10 Duct penetration insulation collar - ISOVER Ultimate Protect SLAB 4.0 Alu1, th. 80 mm - glued (pos. 7) and fixed with screws to the wall construction
- 11 Insulating collar of the damper and duct connection - ISOVER Ultimate Protect SLAB 4.0 Alu1, th. 80 mm
- 12 L-profile 30x30x3 mm - dimensions and installation acc. to ISOVER manufacturer
- 13 Stud-welded pins 80 mm - quantity and placing acc. to ISOVER manufa.
- 14 Stud-welded pins 160 mm - quantity and placing acc. to ISOVER manufa.
- 15 Stud-welded pins 240 mm - quantity and placing acc. to ISOVER manufa.
- 16 Fire spiral shaped screws - quantity and placing acc. to ISOVER manufa.
- 17 Steel clamp min. M8 bolts
- 18 ISOVER Protect BSF
- 19 VRM-Q 120 → see page 51

**Outside gypsum wall construction - Flamebar EN Fire Duct - FPL 110 insulation****EI 120 (v<sub>e</sub> i↔o) S**

- Minimum and maximum distance between the wall and the fire damper is unlimited.
- The fire damper and duct must be suspended separately.
- The duct must be suspended on both sides of the fire damper in accordance with national standards.
- The duct between the fire damper and the fire separating construction must be suspended using threaded rods and mounting profiles or another suspension system in accordance with national standards.
- Fire damper inspection holes are covered with insulation, therefore it's necessary to install an access door in the connecting duct. (This must be a Flamebar access door if installed in the fire duct.)
- Load on suspension system depends on weight of the fire damper and duct system → see page 41
- Max. length between two suspension systems is 1500 mm.
- Installation must be done in such a way that all load transfer from the fire separating construction to the damper is completely eliminated.
- Reinforcing frame VRM-Q 120 must always be used for this type of installation. VRM-Q 120 is not part of the fire damper and must be ordered separately for each installation! → see page 51

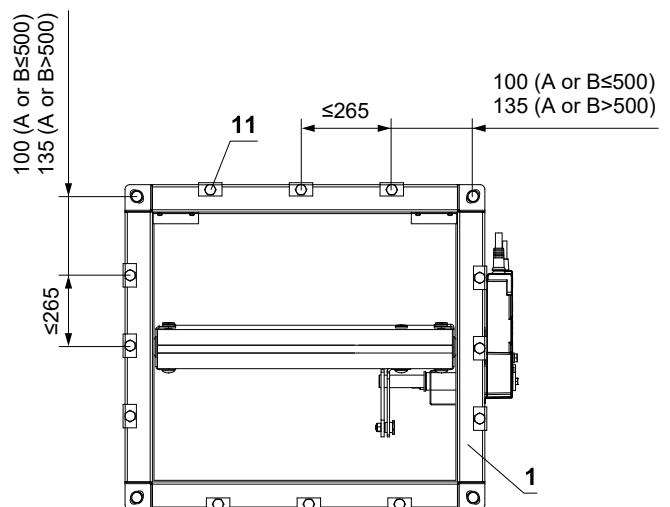
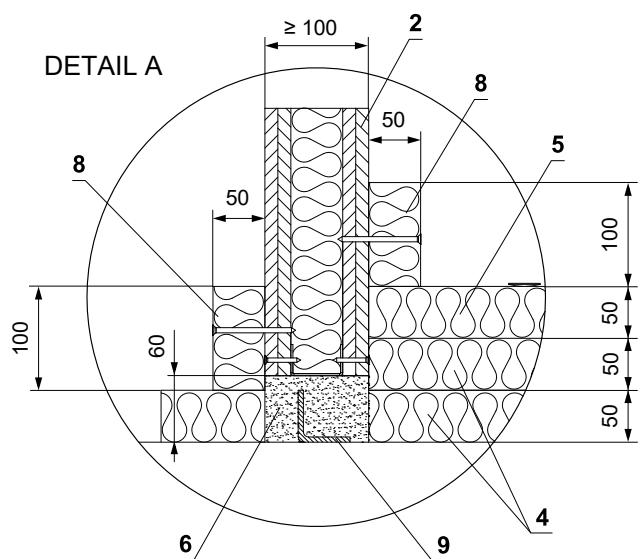
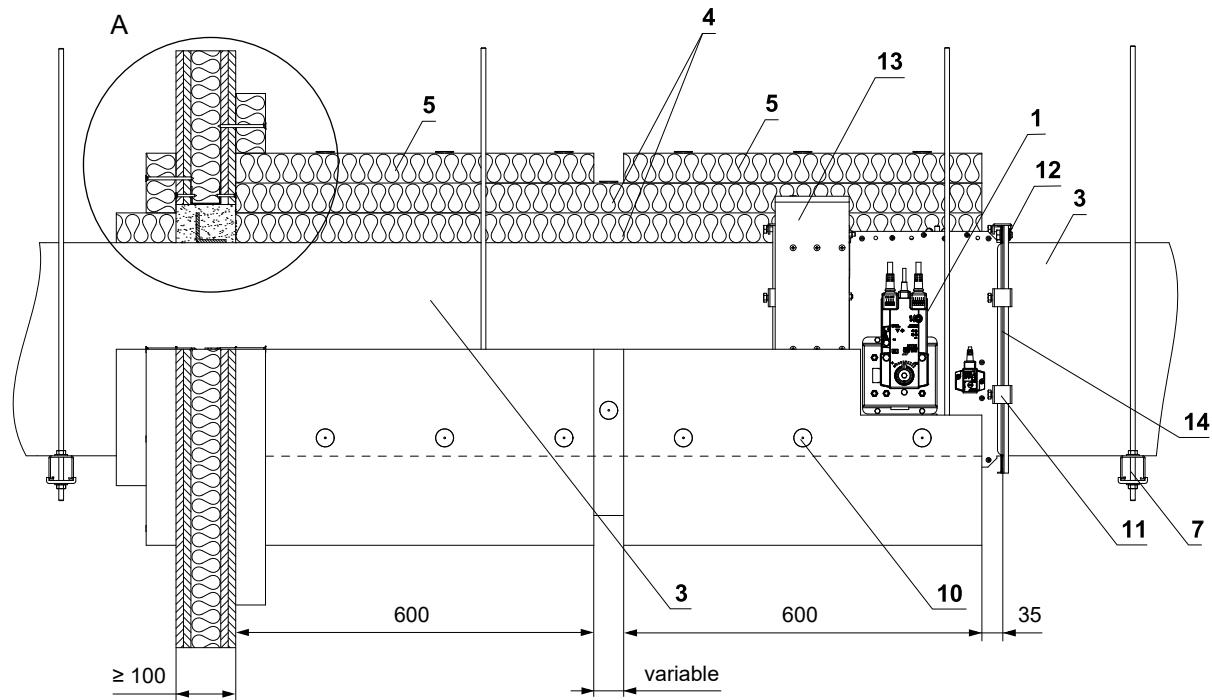


- 1 FDMQ 120
- 2 Gypsum wall construction
- 3 Flamebar EN fire Duct - made of galvanised sheet metal, thickness is dependant on duct size, type BW18 fire sprayed with Flamebar BW18 (insulated duct), type BW11 fire sprayed with Flamebar BW11 (not insulated duct)
- 4 Insulation - two layers of stone wool FPL 110 SLAB, thickness 2x 50 mm, density 105 kg/m<sup>3</sup>, the second layer of insulation is provided with aluminium foil on the outside (FPL 110 FOIL FACED SLAB) - visible edges of mineral wool are covered with self-adhesive aluminium tape
- 5 Insulation collar - additional insulation of the fire damper and gypsum wall construction - third layer of insulation FPL 110 FOIL FACED SLAB, thickness 50 mm and width 600 mm
- 6 Filling - FPL 110 mineral wool - fill the gap between the duct and the wall
- 7 Fixing profile with threaded rod → see pages 41 to 42

- 8 Penetration insulation pattyress - FPL 110 FOIL FACED SLAB, thickness 50 mm - glued with Idenden 10-450 and fixed with screws to the wall construction
- 9 Reinforcement of the duct - steel L-profile 50x50x5 mm or flange to Flamebar spec. on all sides of the duct within 100 mm of the wall
- 10 Insulation pins - riveted to the duct - after the insulation boards are pushed over the insulation pins, secure the ends with disc plates in each insulation layer
- 11 Steel clamp - flange connection with Flamebar G-Clamps with M8 bolts, max. spacing 200 mm
- 12 Bolt assembly - flange connection at corners - M10 bolt and nut
- 13 VRM-Q 120 → see page 51
- 14 Sealing - all joints between duct segments are insulated with Flamebar Fibre Gasket self-adhesive tape and Flamebar Intumescient Sealant

(continued on next page)

(continuation of installation Outside gypsum wall construction - FPL duct - Rockwool insulation



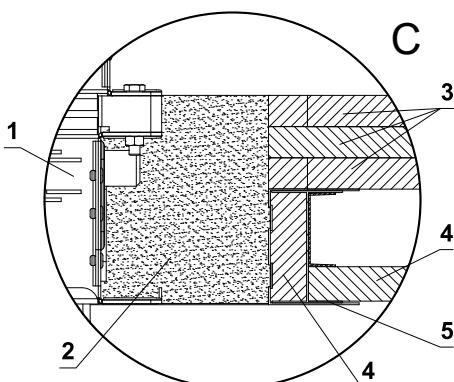
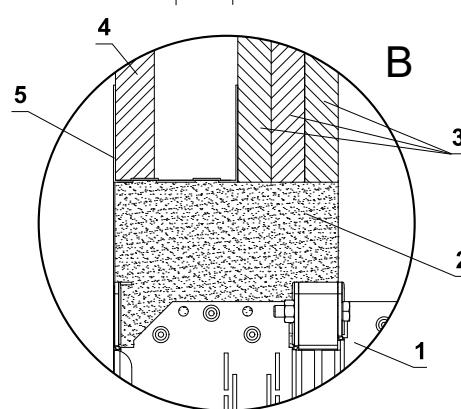
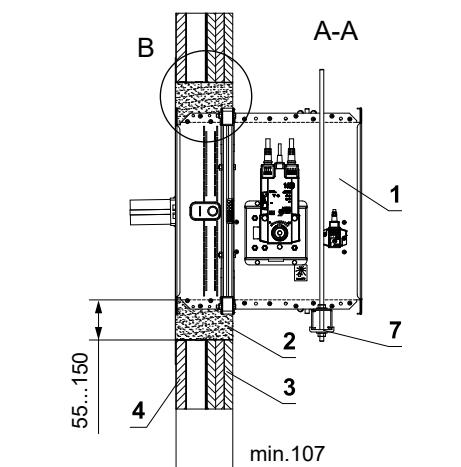
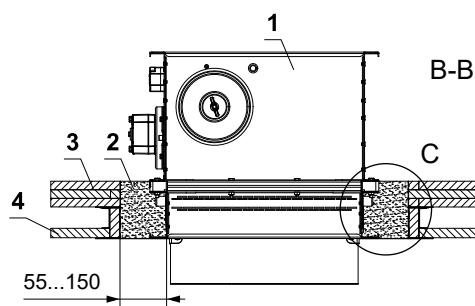
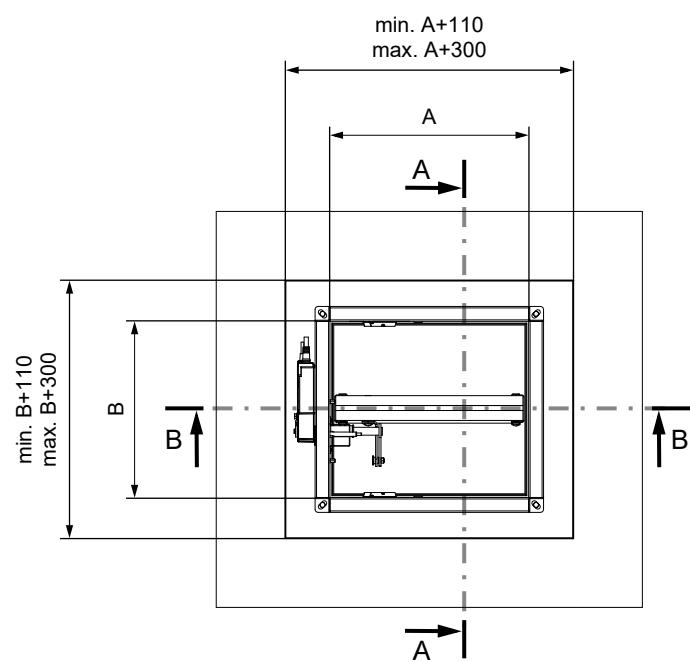
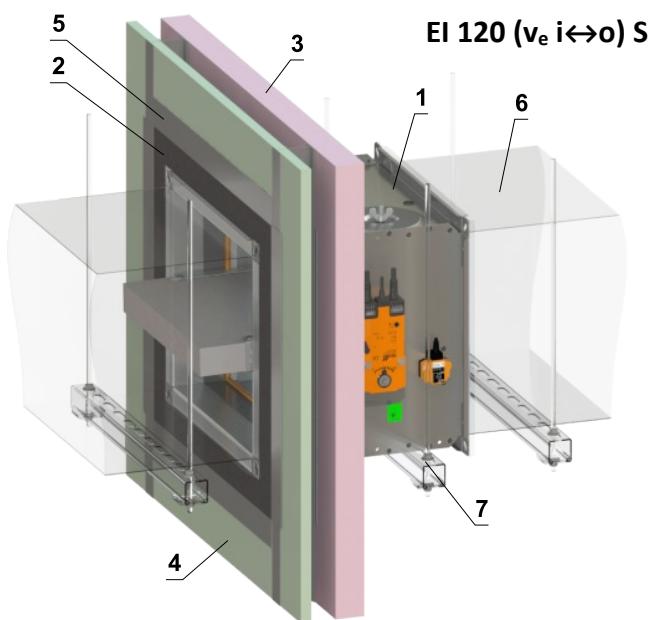
- 1 FDMQ 120
- 2 Gypsum wall construction
- 3 Flamebar EN fire Duct - made of galvanised sheet metal, thickness is dependant on duct size, type BW18 fire sprayed with Flamebar BW18 (insulated duct), type BW11 fire sprayed with Flamebar BW11 (not insulated duct)
- 4 Insulation - two layers of stone wool FPL 110 SLAB, thickness 2x 50 mm, density 105 kg/m<sup>3</sup>, the second layer of insulation is provided with aluminium foil on the outside (FPL 110 FOIL FACED SLAB) - visible edges of mineral wool are covered with self-adhesive aluminium tape
- 5 Insulation collar - additional insulation of the fire damper and gypsum wall construction - third layer of insulation FPL 110 FOIL FACED SLAB, thickness 50 mm and width 600 mm
- 6 Filling - FPL 110 mineral wool - fill the gap between the duct and the wall
- 7 Fixing profile with threaded rod → see pages 41 to 42

- 8 Penetration insulation patters - FPL 110 FOIL FACED SLAB, thickness 50 mm - glued with Idenden 10-450 and fixed with screws to the wall construction
- 9 Reinforcement of the duct - steel L-profile 50x50x5 mm or flange to Flamebar spec. on all sides of the duct within 100 mm of the wall
- 10 Insulation pins - riveted to the duct - after the insulation boards are pushed over the insulation pins, secure the ends with disc plates in each insulation layer
- 11 Steel clamp - flange connection with Flamebar G-Clamps with M8 bolts, max. spacing 200 mm
- 12 Bolt assembly - flange connection at corners - M10 bolt and nut
- 13 VRM-Q 120 → see page 51
- 14 Sealing - all joints between duct segments are insulated with Flamebar Fibre Gasket self-adhesive tape and Flamebar Intumescent Sealant

## Installation in shaft wall

### In shaft wall - mortar or gypsum

- For connection following duct → see page 43
- Maximum size for FDMQ 120 in shaftwall is 1500mm x 650mm
- Damper can be installed on either side of the wall.
- It is possible to use e.g. wall type A306030, A306035... from [www.british-gypsum.com](http://www.british-gypsum.com)
- It is possible to use walls that have the same or greater thickness and density of boards than the walls listed below (more layers of boards can also be used)
- Follow the instructions of the shaft wall manufacturer.



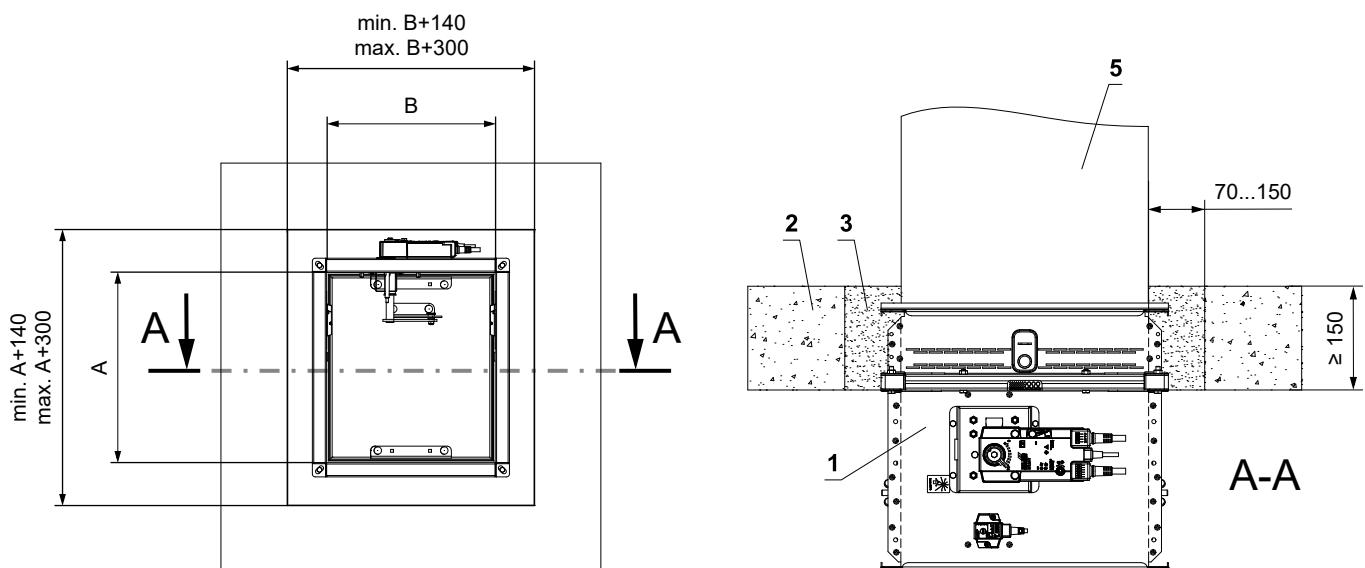
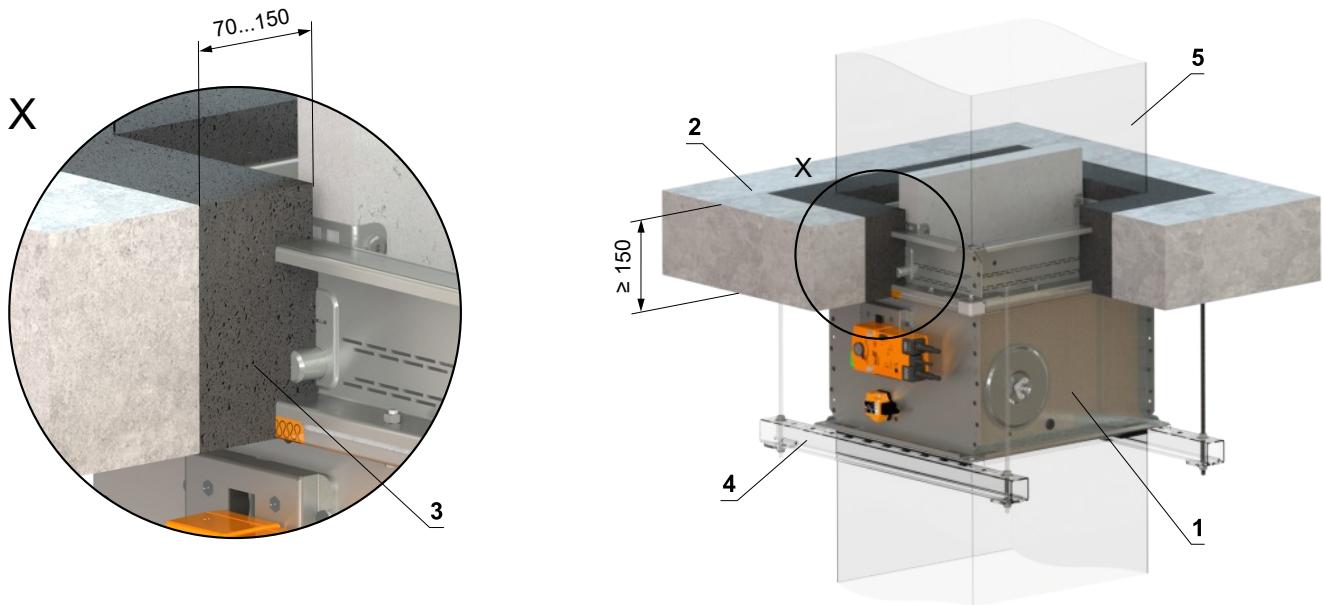
- 1 FDMQ 120
- 2 British gypsum thistle bond 60 (or equivalent can be used)  
minimum density 670 kg/m<sup>3</sup>
- 3 Plasterboard EN 520 - Type F - min. 3x15 mm
- 4 Plasterboard EN 520 - Type F - min. 1x19 mm
- 5 Plasteboard profile
- 6 Duct
- 7 Fixing profile with threaded rod → see pages 41 to 42

## Installation in solid ceiling construction

### In solid ceiling construction - mortar or gypsum

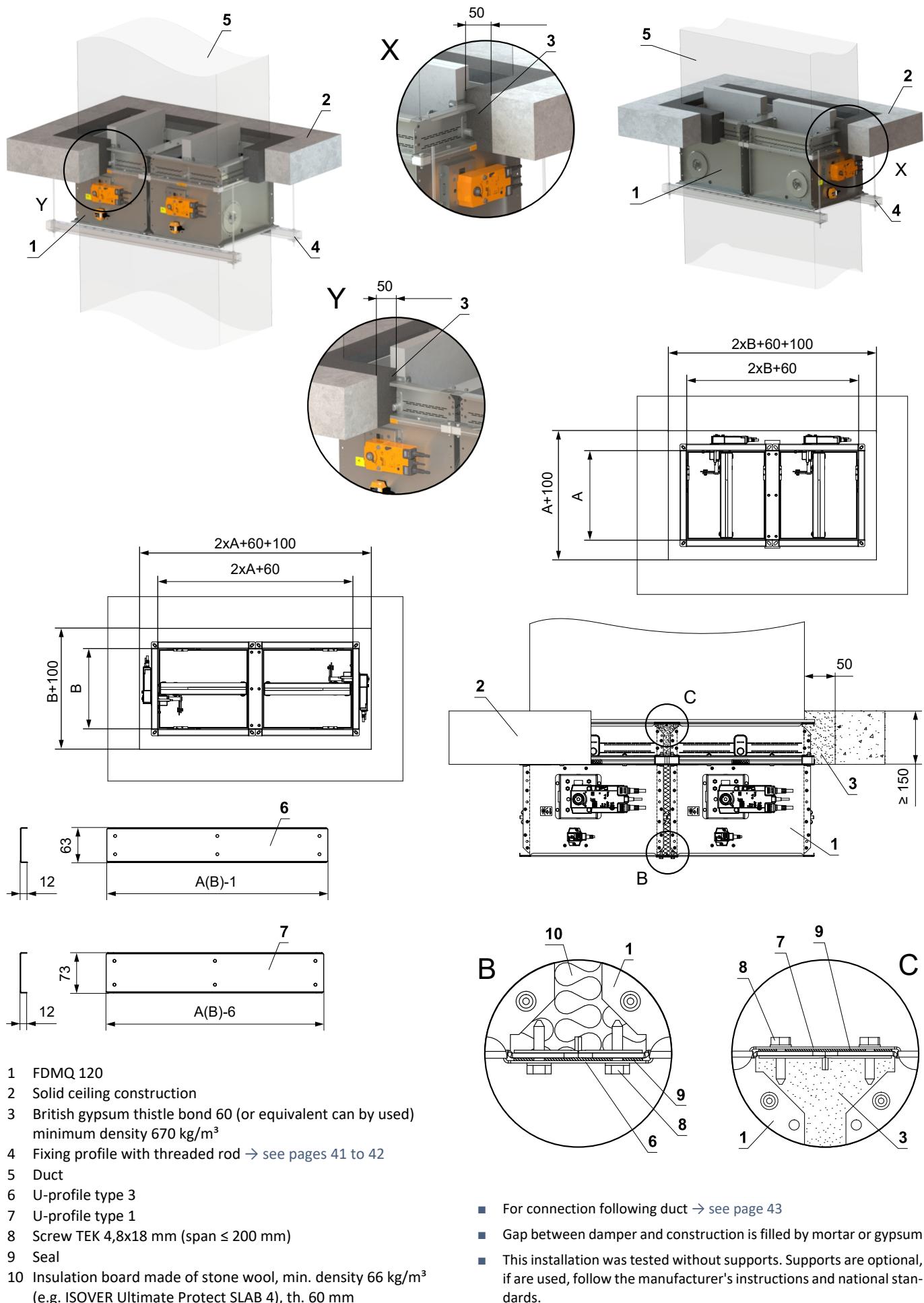
EI 120 ( $h_o$   $i \leftrightarrow o$ ) S - 500 Pa

- For connection following duct → see page 43
- This installation was tested without supports. Supports are optional, if are used, follow the manufacturer's instructions and national standards.

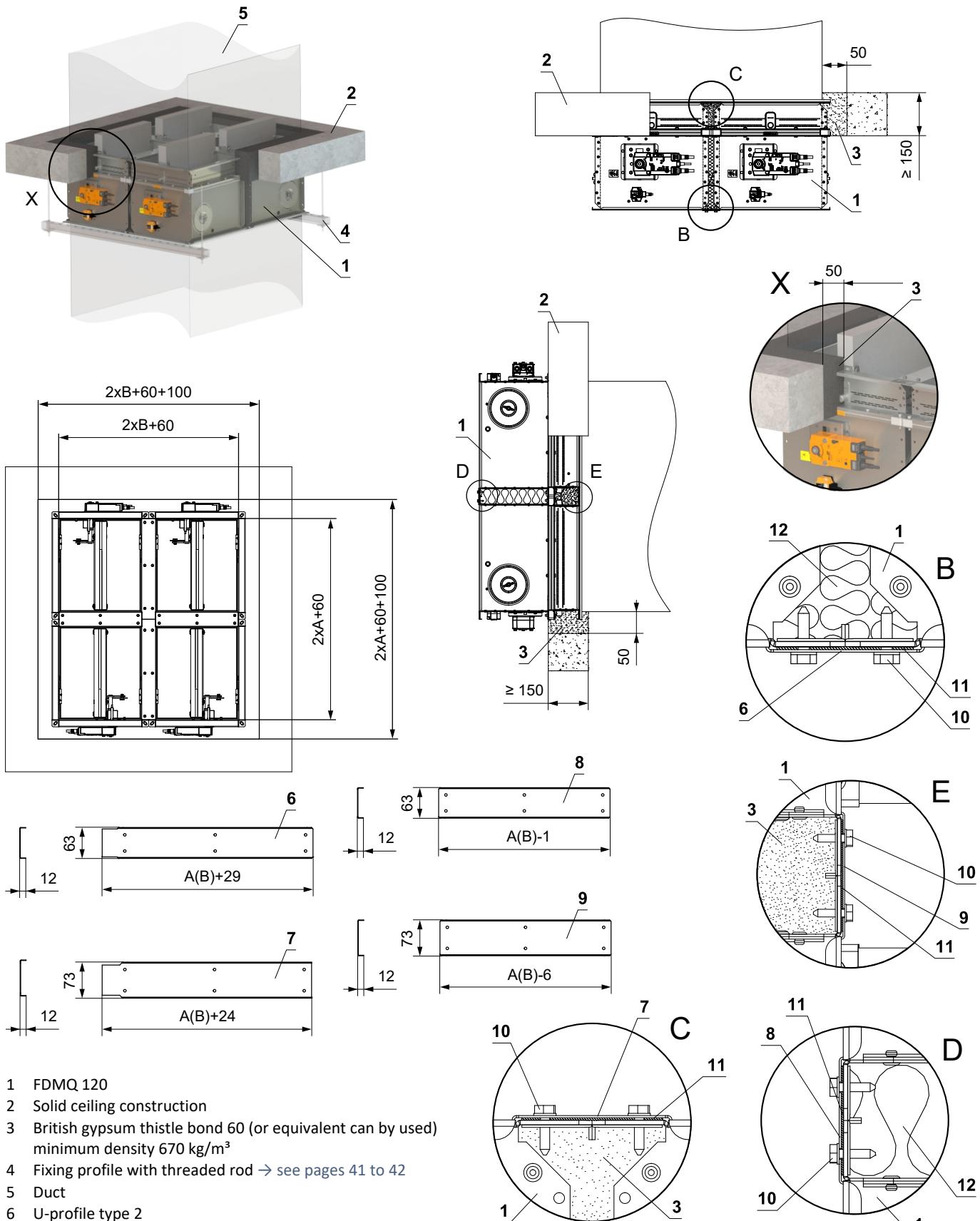


- 1 FDMQ 120
- 2 Solid ceiling construction
- 3 British gypsum thistle bond 60 (or equivalent can be used)  
minimum density 670 kg/m<sup>3</sup>
- 4 Fixing profile with threaded rod → see pages 41 to 42
- 5 Duct

## In solid ceiling construction - 2 dampers in battery - mortar or gypsum

EI 120 ( $h_0 \leftrightarrow o$ ) S

## In solid ceiling construction - 4 dampers in battery - mortar or gypsum

EI 120 ( $h_0$  i↔o) S

- 1 FDMQ 120
- 2 Solid ceiling construction
- 3 British gypsum thistle bond 60 (or equivalent can be used)  
minimum density 670 kg/m<sup>3</sup>
- 4 Fixing profile with threaded rod → see pages 41 to 42
- 5 Duct
- 6 U-profile type 2
- 7 U-profile type 4
- 8 U-profile type 1
- 9 U-profile type 3
- 10 Screw TEK 4,8x18 mm (span ≤ 200 mm)
- 11 Seal
- 12 Insulation board made of stone wool, min. density 66 kg/m<sup>3</sup>  
(e.g. ISOVER Ultimate Protect SLAB 4), th. 60 mm

- For connection following duct → see page 43
- Gap between damper and construction is filled by mortar or gypsum
- This installation was tested without supports. Supports are optional, if are used, follow the manufacturer's instructions and national standards.

## V. SUSPENSION SYSTEMS

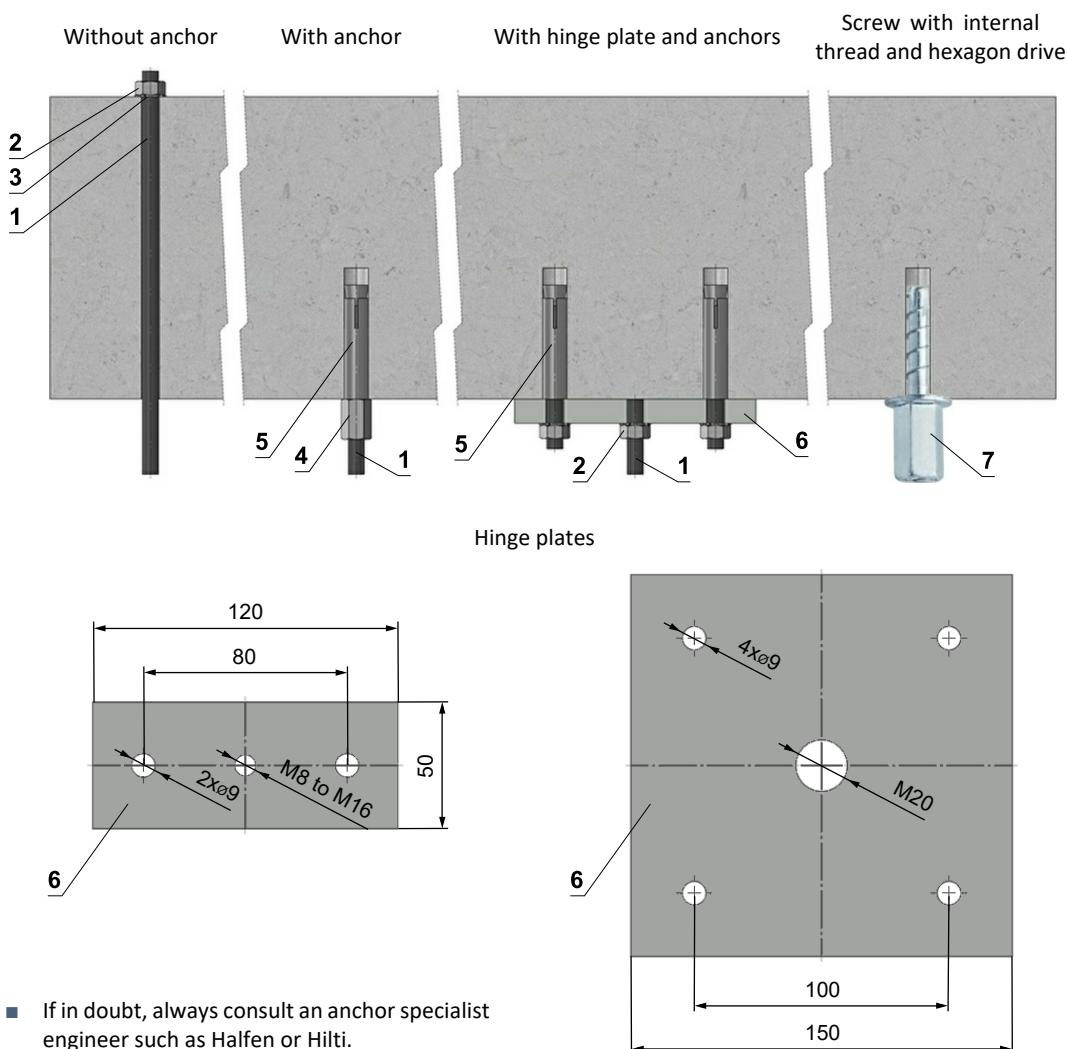
### Mounting to the ceiling wall

- The dampers must be suspended using threaded rods and mounting profiles. Their dimensioning depend on the weight of the damper.
- The dampers and the duct must be suspended separately.
- Following air-conditioning duct must be suspended or supported so that all load transfer from the following duct

to the damper flanges is absolutely excluded. Adjacent duct must be suspended or supported, as required by the duct suppliers.

- Threaded rods longer than 1,5 m must be protected by fire insulation.

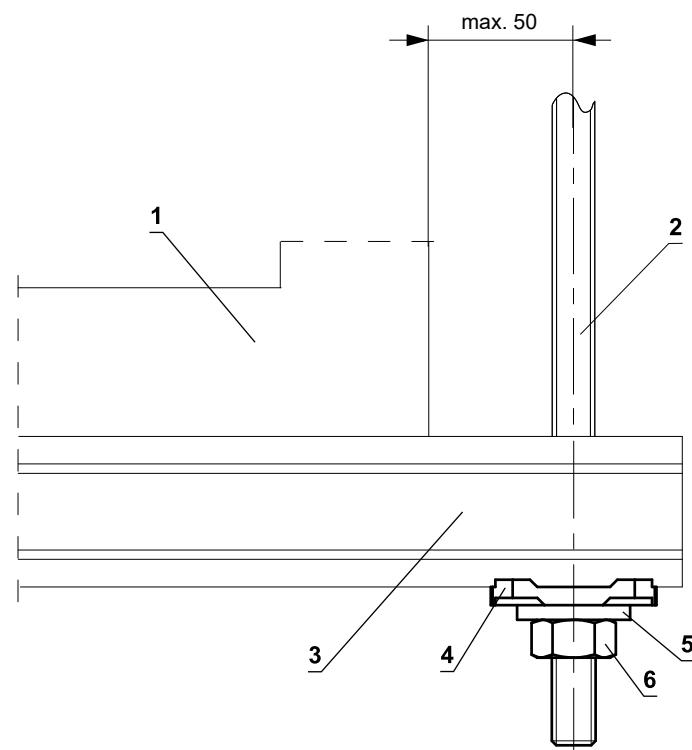
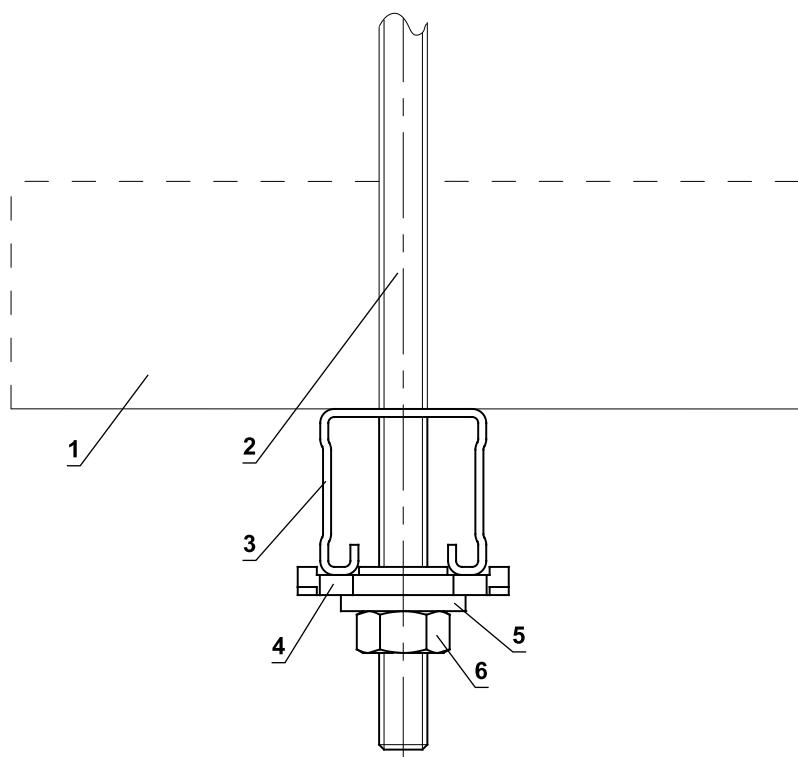
#### Examples of anchoring to the ceiling construction Follow the instructions of fixing specialist or installation company



- 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.

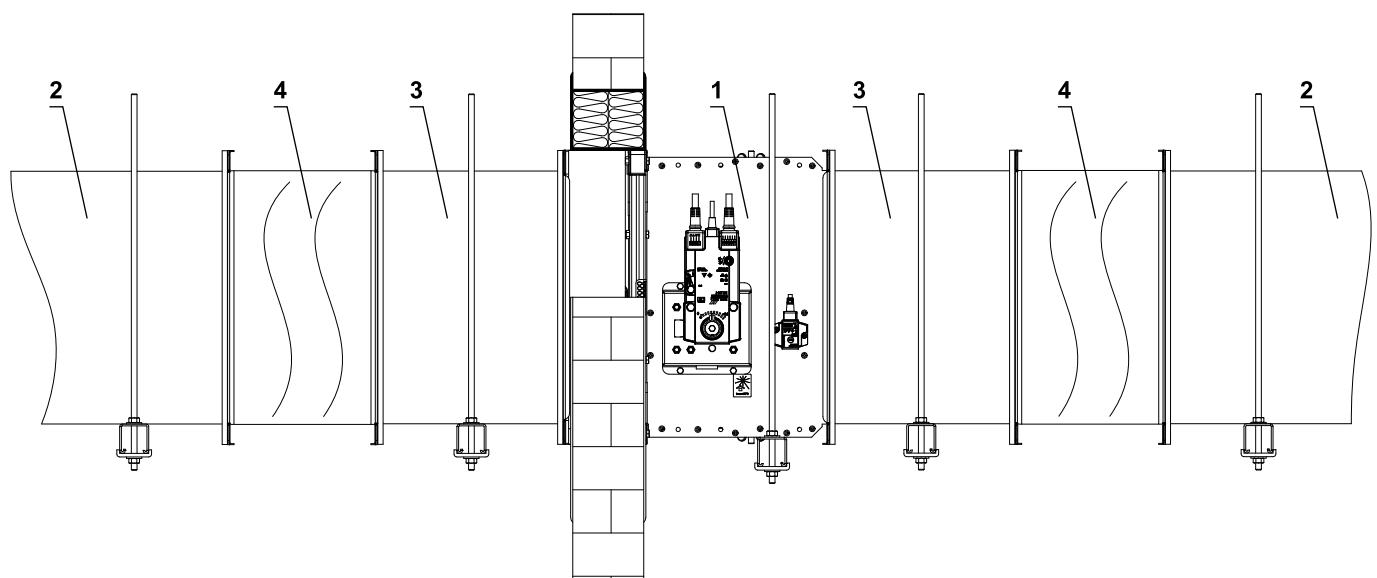
Size	As [mm <sup>2</sup> ]	Weight [kg]	
		for 1 rod	for 2 rods
M8	36,6	22	44
M10	58	35	70
M12	84,3	52	104
M16	157	96	192
M18	192	117	234
M20	245	150	300

**Example of placing of mounting profiles HILTI**

- 1 FDMQ 120
- 2 Threaded rod M8 - M20
- 3 Support HILTI MQ-41 (or MQ-41/3 or equivalent)
- 4 Bored plate HILTI MQZ-L or equivalent
- 5 Washer for M8 - M20
- 6 Nut M8 - M20

■ Dimension elements of the suspension system  
acc. to the weight of the damper, → see page 41

## Example of duct connection



- 1 FDMQ 120
- 2 Connecting air duct
- 3 Extension piece (if required)
- 4 Damping pad or breakaway connection as DW 144

## VI. TECHNICAL DATA

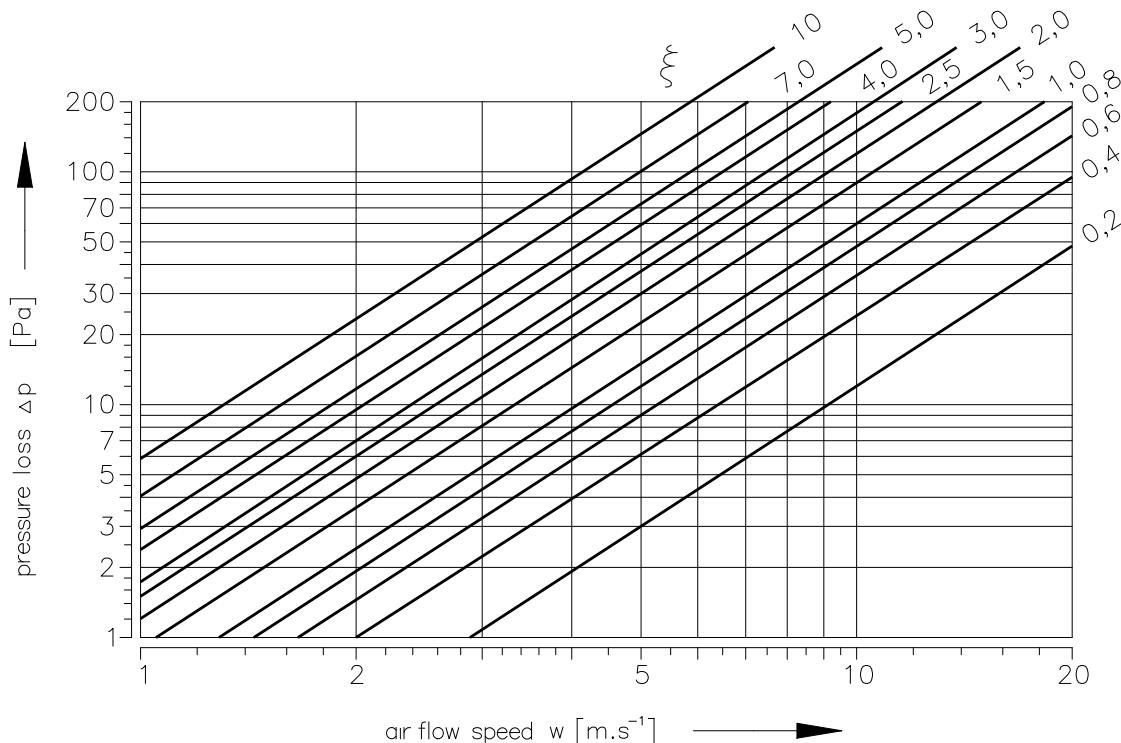
### Pressure loss

#### Pressure loss calculation

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

$\Delta p$	[Pa]	pressure loss
w	[m/s]	air flow speed in nominal damper section
$\rho$	[kg/m³]	air density
$\xi$	[-]	coefficient of local pressure loss for the nominal damper section → see page 45

#### Determination of pressure loss by using diagram $\rho = 1,2 \text{ kg/m}^3$



**Coefficient of local pressure loss**

B	A													
	150	180	200	225	250	280	300	315	355	400	450	500	550	560
150	3,522	3,307	3,081	2,980	2,850	2,704	2,629	2,510	2,421	2,326	2,252	2,187	2,166	2,139
180	2,557	2,389	2,236	2,153	2,064	1,962	1,889	1,802	1,727	1,664	1,610	1,569	1,547	1,529
200	1,972	1,843	1,723	1,653	1,590	1,502	1,451	1,383	1,325	1,276	1,235	1,201	1,186	1,172
225	1,522	1,465	1,321	1,197	1,173	1,141	1,106	1,067	1,015	0,964	0,948	0,917	0,891	0,881
250	1,249	1,164	1,083	1,044	1,008	0,952	0,902	0,867	0,828	0,799	0,772	0,752	0,739	0,732
280	1,133	1,032	1,002	0,960	0,926	0,881	0,827	0,781	0,728	0,705	0,685	0,673	0,665	0,650
300	1,041	0,947	0,896	0,861	0,823	0,775	0,729	0,677	0,648	0,635	0,601	0,592	0,587	0,584
315	0,865	0,803	0,749	0,724	0,693	0,658	0,618	0,595	0,569	0,546	0,527	0,513	0,503	0,499
355	0,735	0,684	0,638	0,609	0,585	0,556	0,528	0,506	0,483	0,464	0,448	0,436	0,428	0,424
400	0,640	0,596	0,555	0,529	0,509	0,481	0,463	0,439	0,420	0,402	0,389	0,377	0,371	0,367
450	0,567	0,527	0,490	0,470	0,452	0,430	0,405	0,387	0,370	0,355	0,343	0,332	0,330	0,324
500	0,514	0,478	0,443	0,426	0,413	0,387	0,369	0,350	0,334	0,321	0,310	0,301	0,298	0,293
550	0,490	0,455	0,421	0,405	0,390	0,367	0,344	0,326	0,317	0,300	0,289	0,287	0,278	0,275
560	0,469	0,434	0,404	0,390	0,371	0,349	0,334	0,318	0,303	0,291	0,281	0,273	0,270	0,266
600	0,439	0,409	0,384	0,368	0,355	0,333	0,316	0,301	0,289	0,281	0,270	0,259	0,253	0,244
630	0,429	0,398	0,370	0,357	0,343	0,322	0,306	0,291	0,278	0,267	0,257	0,250	0,237	0,243
650	—	0,379	0,356	0,342	0,329	0,309	0,297	0,284	0,266	0,257	0,250	0,240	0,229	0,233
700	—	0,375	0,348	0,333	0,321	0,306	0,289	0,275	0,262	0,250	0,244	0,234	0,222	0,221
710	—	0,368	0,343	0,329	0,316	0,300	0,285	0,268	0,257	0,247	0,237	0,230	0,219	0,219
750	—	0,354	0,330	0,321	0,309	0,286	0,271	0,260	0,246	0,238	0,230	0,222	0,219	0,215
800	—	0,344	0,320	0,309	0,297	0,282	0,264	0,251	0,239	0,229	0,221	0,215	0,211	0,209

B	A													
	600	630	650	700	710	750	800	900	1000	1100	1250	1400	1500	
150	2,112	2,091	2,083	2,067	2,062	2,044	2,029	1,992	1,972	—	—	—	—	—
180	1,513	1,495	1,480	1,469	1,462	1,449	1,436	1,412	1,394	1,377	1,363	1,348	1,340	
200	1,154	1,144	1,131	1,123	1,120	1,109	1,099	1,080	1,066	1,053	1,040	1,031	1,024	
225	0,874	0,861	0,841	0,833	0,824	0,817	0,810	0,795	0,785	0,775	0,758	0,744	0,740	
250	0,725	0,714	0,705	0,704	0,698	0,693	0,685	0,673	0,665	0,656	0,648	0,641	0,638	
280	0,645	0,641	0,617	0,612	0,606	0,601	0,593	0,585	0,576	0,563	0,549	0,540	0,530	
300	0,569	0,554	0,550	0,549	0,548	0,541	0,532	0,524	0,507	0,496	0,490	0,488	0,480	
315	0,493	0,487	0,481	0,479	0,476	0,470	0,467	0,459	0,452	0,447	0,442	0,436	0,434	
355	0,419	0,414	0,408	0,405	0,404	0,399	0,397	0,389	0,384	0,379	0,374	0,370	0,368	
400	0,363	0,358	0,352	0,351	0,350	0,345	0,343	0,336	0,331	0,327	0,324	0,321	0,318	
450	0,319	0,315	0,311	0,310	0,309	0,306	0,301	0,296	0,293	0,289	0,286	0,281	0,280	
500	0,288	0,285	0,284	0,281	0,279	0,276	0,273	0,268	0,264	0,261	0,258	0,256	0,254	
550	0,272	0,269	0,264	0,259	0,256	0,254	0,253	0,248	0,245	0,242	0,237	0,234	0,232	
560	0,264	0,259	0,256	0,255	0,253	0,250	0,248	0,244	0,240	0,236	0,233	0,231	0,230	
600	0,242	0,241	0,239	0,238	0,237	0,233	0,228	0,226	0,222	0,219	0,216	0,214	0,212	
630	0,240	0,237	0,234	0,233	0,232	0,229	0,226	0,223	0,220	0,217	0,213	0,211	0,209	
650	0,230	0,227	0,225	0,223	0,222	0,219	0,216	0,210	0,208	0,206	0,201	0,198	0,196	
700	0,219	0,219	0,218	0,217	0,215	0,213	0,211	0,207	0,204	0,202	0,199	0,196	0,194	
710	0,217	0,217	0,216	0,215	0,214	0,212	0,209	0,205	0,201	0,199	0,197	0,195	0,193	
750	0,211	0,208	0,206	0,205	0,204	0,203	0,201	0,197	0,193	0,189	0,187	0,185	0,183	
800	0,206	0,203	0,201	0,200	0,199	0,197	0,194	0,191	0,188	0,186	0,183	0,182	0,181	

## 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 <sup>2</sup> ]	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 <sup>2</sup> ]	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

w [m/s]	$\xi [-]$																
	0,2	0,3	0,4	0,5	0,6	0,7	0,8	0,9	1	1,5	2	2,5	3	4	5	8	10
2	15,5	18,7	20,9	22,6	24	25,2	26,3	27,2	28	31,2	33,4	35,1	36,5	38,8	40,5	44,2	45,9
3	26,1	29,2	31,5	33,2	34,6	35,8	36,9	37,8	38,6	41,7	44	45,7	47,1	49,4	51,1	54,7	56,5
4	33,6	36,7	39	40,7	42,1	43,3	44,3	45,3	46,1	49,2	51,5	53,2	54,6	56,9	58,6	62,2	64
5	39,4	42,5	44,8	46,5	47,9	49,1	50,2	51,1	51,9	55	57,3	59	60,4	62,7	64,4	68	69,8
6	44,1	47,3	49,5	51,3	52,7	53,9	54,9	55,8	56,6	59,8	62	63,8	65,2	67,4	69,2	72,8	74,5
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	69,2	71,4	73,2	76,8	78,6
8	51,6	54,8	57	58,8	60,2	61,4	62,4	63,3	64,1	67,3	69,5	71,3	72,7	74,9	76,7	80,3	82
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	75,7	78	79,7	83,4	85,1
10	57,4	60,6	62,8	64,6	66	67,2	68,2	69,1	70	73,1	75,3	77,1	78,5	80,7	82,5	86,1	87,9
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	81	83,2	85	88,6	90,3
12	62,2	65,4	67,6	69,3	70,7	71,9	73	73,9	74,7	77,9	80,1	81,8	83,2	85,5	87,2	90,9	92,6

#### 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 $L_{rel}$

w [m/s]	f [Hz]							
	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 casings are made from galvanized sheet metal without further surface treatment.
- Damper blades are made from fire resistant asbestos free boards made of mineral fibres.
- Manual control have cover made of mechanically resistant and durable plastic and the other parts are galvanized without further surface treatment.
- Thermal fuses are made of sheet brass, thickness 0,5 mm.
- Fasteners and springs are galvanized.
- According to the customer's requirements, dampers can be made of stainless steel material.

Specifications for stainless-steel design:

- Class A2 – Food-grade stainless steel (AISI 304 – EN 1.4301)
- Class A4 – Chemistry-grade stainless steel (AISI 316, 316L – EN 1.4401, EN 1.4404)

The respective stainless steel is the material for all components that are located or entering the damper inner space; components outside the damper casing are typically from galvanised sheet metal (fasteners for mounting the actuator or manual control, mechanical components except Item 4), frame components.

The following components, including the fasteners, are made from stainless steel at all times:

- 1) Damper casing and all components permanently attached
- 2) Blade holders including pins, metal parts of blades
- 3) Control components inside the damper (L-profile, pin with lever, rod, fasteners)
- 4) Parts of a manual control entering the inner space of a damper casing (lower sheet of a manual control, lock holder "1", lock lever "2", closing spring, 8 dia. stopper pin, manual control pin)
- 5) Inspection opening cover including the stirrup and fasteners (if they are parts of the cover)
- 6) Bearing for torque transfer from the lever with pin on the blade L-profile (made from AISI 440C)

The damper blade is made from boards of homogeneous material Promatect-H, connected with galvanized "U" clips on the outside, sealed with Promat K84 glue.

Thermal fuse is identical for all material variants of the dampers. Upon specification by customer, the thermal fuse can be made from A4 from stainless steel sheet metal.

Thermoelectric activation device BAT is modified for stainless-steel variant of the dampers; standard galvanised screws are replaced with stainless-steel M4 screws of corresponding class. Damper casing has stainless-steel riveting M4 nuts.

Plastic, rubber and silicon components, sealants, foaming tapes, glass-ceramic seals, housings, brass bearings of the blade, actuators, and end switches are identical for all material variants of the dampers.

Some fasteners and components are only available in one class of stainless steel; the type will be used in all stainless-steel variants.

The damper blade in the variant for chemical environments (Class A4) is always treated with a coating of chemically resistant Promat SR.

Any other requirements for the design will be considered atypical and will be addressed on an individual basis.

## VIII. TRANSPORTATION AND STORAGE

### Logistic terms

- Dampers are delivered on pallets. As standard, the dampers are wrapped in plastic foil for protection during transport and must not be used for long-term storage. Temperature changes during transport can cause condensation of water inside the packaging and thereby cause corrosion of materials used in the dampers (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 dampers must be stored in clean, dry, well ventilated and dust-free environment out of direct sunlight. Ensure protection against moisture and extreme temperatures (minimum temperature +5°C). The dampers 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.
- 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 must be 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 fire dampers must be done according international and local norms and laws.
- All effective safety standards and directives must be observed during damper assembly.
- To ensure reliable damper function it is necessary to avoid blocking the actuating 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 lock washers that are placed under the head of one screw and a fastened nut are used for conductive connection.

### Manual operation - actuator control without electric voltage

- A special wrench (part of the actuator) can be used to manually turn the damper blade to any position. When the wrench is turned in the direction of the arrow, the damper blade rotates to its open position. As the blade rotation is stopped, in every position, the actuator will be locked. Unlocking is possible even manually as per instructions on the actuator, or by the activation of the supply voltage.
- If the actuator is manually locked, the damper blade will not close in the event of a fire after the activation of the thermoelectric activation device BAT. To restore correct damper operation, the actuator must be unlocked (manually or by applying power supply).

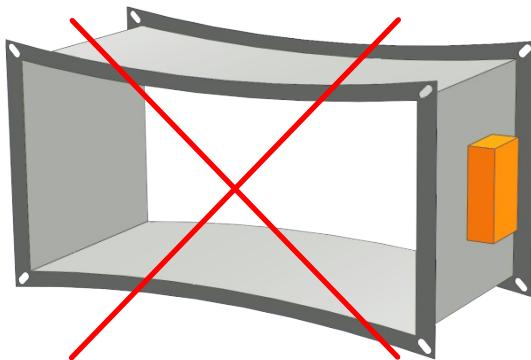
### Limit switches

- If the damper is equipped with limit switches and these switches are not used during operation (e.g. because of a project change), they can be left on the damper and not connected (they need not be dismounted).
- On the other hand, if the limit switch is to be added to the damper design, the change can be implemented by change kit.
- These facts must be recorded in the respective operation documentation of the damper (record books of the damper, fire logs, etc.) and subsequently, adequate function checks must be carried out.

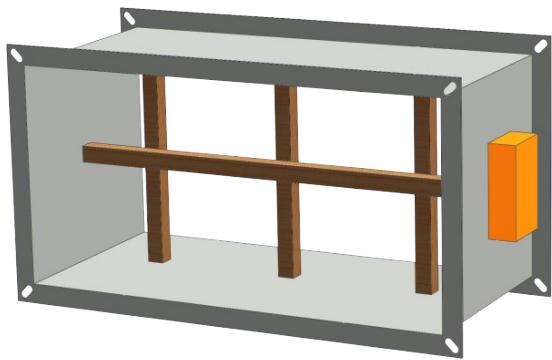
### Installation / fixing the damper

- The damper casing shall not be deformed in the course of bricklaying.
- Once the damper is built in, the damper blade shall not grind on the damper casing during opening or closing.

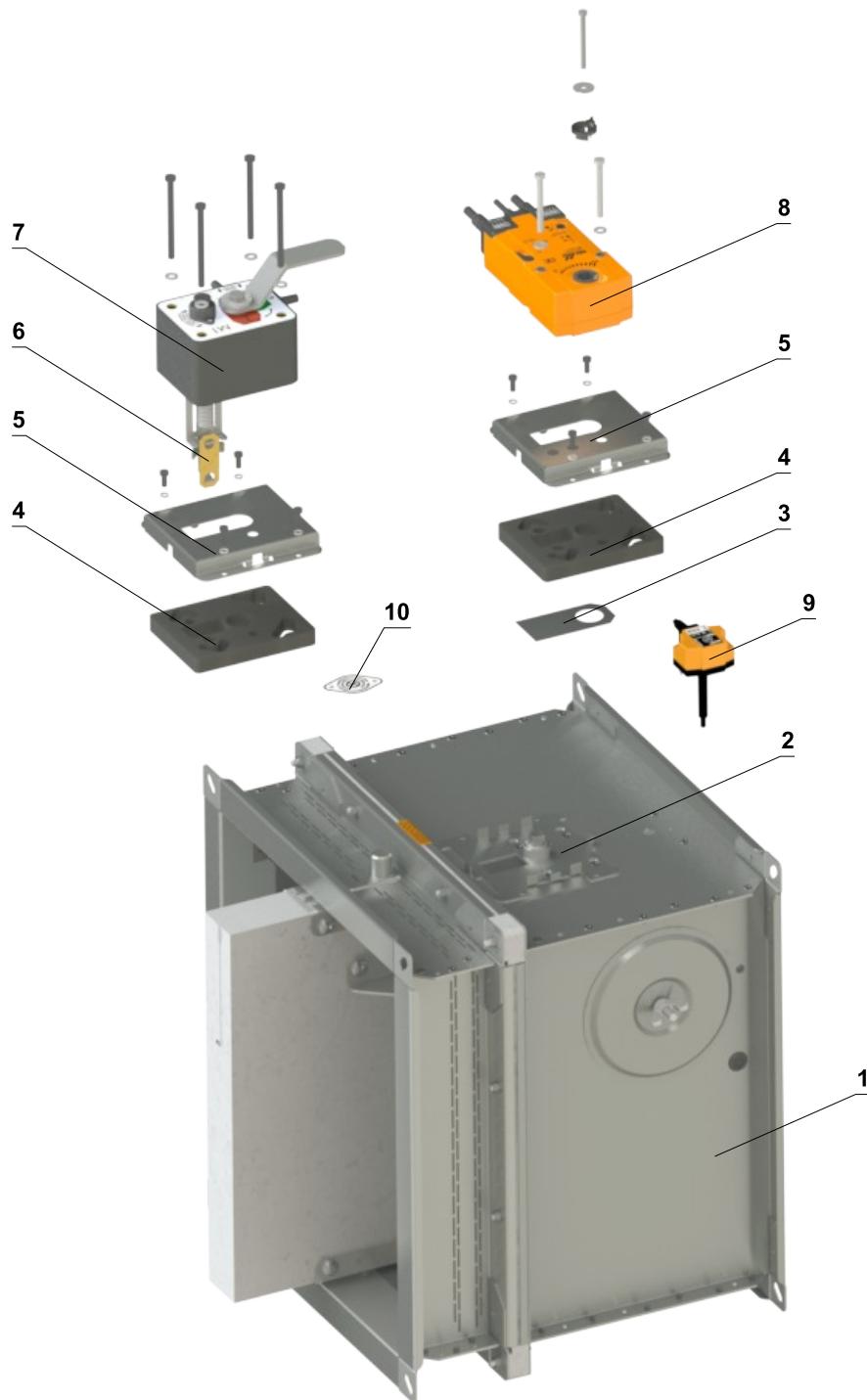
**Protection of the damper casing against buckling during installation, especially for large sizes!**



**WRONG!**



**Reinforcement of the casing with wooden beams**

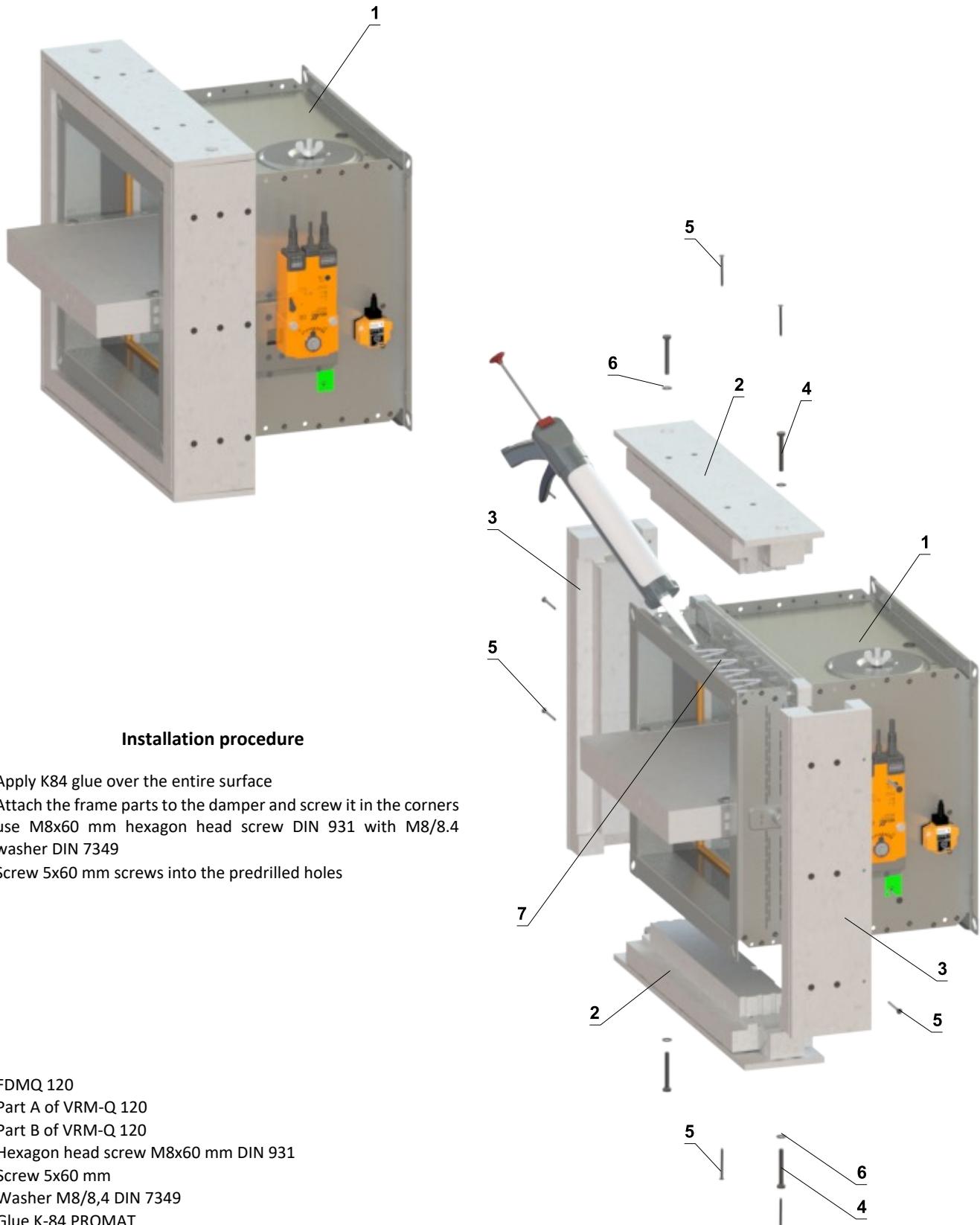
**Change of manual control for the actuator or vice versa**

- |                              |  |
|------------------------------|--|
| 1 Damper                     | 6 Thermal fuse                         |
| 2 Mouting plate              | 7 Manual control                       |
| 3 Sealing cover              | 8 Spring return actuator               |
| 4 Sealing of a mouting plate | 9 Thermoelectric activation device BAT |
| 5 Cover of a mouting plate   | 10 Sensor sticker                      |

### Reinforcing frame VRM-Q 120

- For damper placement outside wall construction is necessary to use reinforcing frame VRM-Q 120
- Fastening material is included in the package except glue K84
- Install reinforcing frame only after connecting duct.

### Fixing reinforcing frame VRM-Q 120 to the damper casing

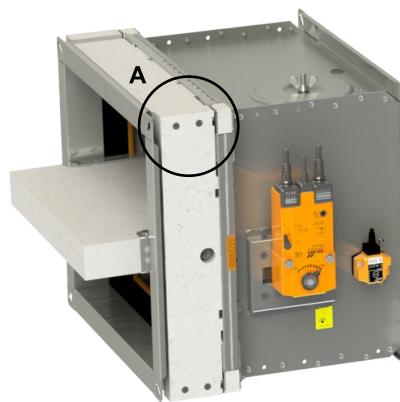


## Protective cladding boards

- Protective cladding boards must be used as part of the penetration filling of installation with ablative coated batt
- Can be ordered from MANDIK (installed on the damper or as an accessory) or can be sourced from local supplier
- If protective cladding boards are required, this must be specified in the ordering key
- Boards are made of PROMATECT-MST, thickness 30 mm (PROMATECT 250, thickness 30 mm can be used as an alternative)
- Glue K84 is not included in the package

### Installation procedure

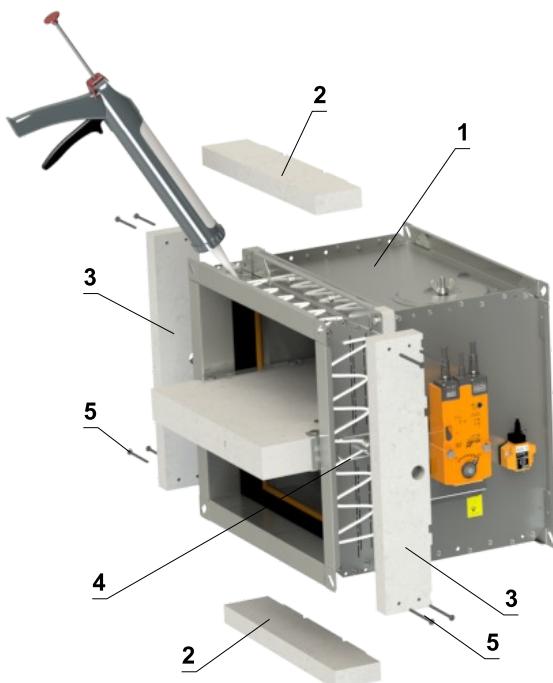
- 1) Apply K84 glue over the entire surface
- 2) Attach protective cladding boards to the damper and glue them to the casing
- 3) Screw parts A and B together using 4x screw 5x70 mm
- 4) Completely fill the gaps with glue



DETAIL A

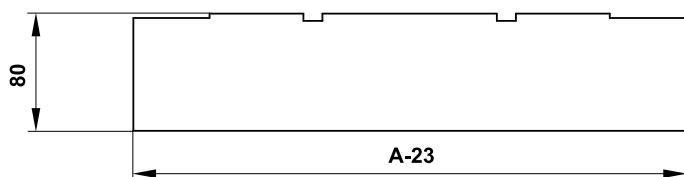


Completely fill the  
gaps between boards!



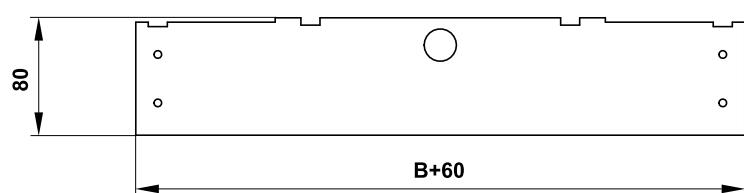
- 1 FDMQ 120
- 2 Part A of protective cladding boards
- 3 Part B of protective cladding boards
- 4 Glue PROMAT K-84
- 5 Screw 5x70 mm

Part A



- Detailed dimensions of protective cladding boards on request

Part B



## 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. Check of thermal fuse and actuating mechanism. Check the closing function of the damper blade. This can be done by removing the thermal fuse from the damper casing. 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.
- 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 with actuator into operation after their assembly and by sequential checks. Check of blade rotation into the breakdown position "CLOSED" can be done after disconnecting the actuator supply (e.g. by pressing the test button at the thermoelectric activation device BAT or disconnecting the supply from ELECTRICAL FIRE SIGNALISATION). Check of blade rotation back into the "OPEN" position can be done after restoration of power supply (e.g. by releasing the test button or restoration of supply from ELECTRICAL FIRE SIGNALISATION). Without power supply, the damper can be operated manually and fixed in any required position. Release of the locking mechanism can be achieved manually or automatically by applying the supply voltage. It is recommended to provide periodical checks, maintenance and service actions on fire equipment by authorized persons. The authorized persons can be trained by producer, or by authorized distributor. All effective safety standards and directives must be observed during fire damper assembly.
- Visual inspection of proper damper installation, inner area of a damper, damper blade, contact surfaces and silicon seal.
- For regular or exceptional inspection of interior of fire damper, micro-camera device can be used. On each fire damper is an inspection opening. In the case of inspection by camera, take out the black rubber cap, insert the camera inside the damper, check interior and at the end of inspection, put the rubber cap back tightly to cover the empty hole.

### For dampers with manual control, following checks must be carried out

#### Check of a manual control and thermal fuse

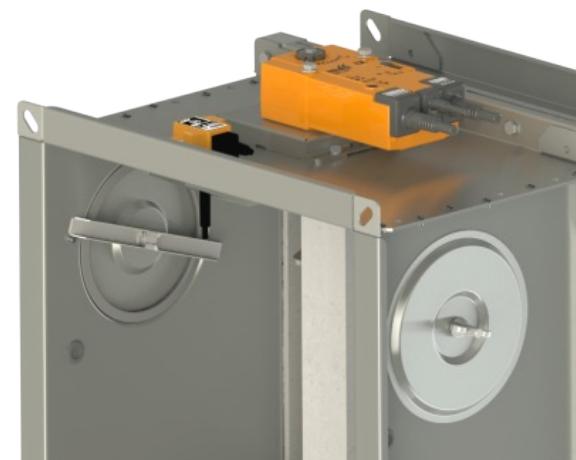
- **To check the function of the manual control proceed as follows:**
- Turn the damper blade to "CLOSED" position as follows:
  - The damper blade is in "OPEN" position.
  - Press the control button of the manual control to turn the damper blade to "CLOSED" position.
  - Check the damper blade rotation to "CLOSED" position.
  - Damper blade closing shall be smooth and fast, the control lever shall be in „CLOSED“ position.
- Turn the damper blade to "OPEN" position as follows:
  - Turn the control lever by 90°.
  - Check the damper blade rotation to "OPEN" position.
  - The lever will automatically lock in "OPEN" position.
- **Check of function and condition of the thermal fuse:**
  - To check the function and the status of the fuse it's possible to remove the manual control from the casing of the fire damper which is attached to the damper casing with four screws M6.
  - Removing the thermal fuse from the fuse holder of a manual control, checks its correct functionality.
  - The manual control is identified as M1 to M5, depending on the closing spring strength.

**For the designs with actuators, following checks must be carried out**

- Check the rotation of the blade to "CLOSED" failure position after disconnection the power supply of the actuator (e.g. by pressing the test button on the thermoelectric activation device BAT or by disconnection the power supply from electrical fire signalization). Check the rotation of the blade back to "OPEN" position by restoring the power supply to the actuator (e.g. by releasing the test button or by restoring the power supply from electrical fire signalization).

**The check of function of the damper with actuator can be carried out as follows**

- By disconnecting and restoring the power supply, e.g. by a signal from electrical fire signalization.
- By pressing the test button on the thermoelectric activation device BAT (simulating fuse tripping).

**■ Inspection opening disassembly***Inspection opening detail***How to proceed after Tf1 or Tf2 fuses have been activated**

- If the thermal fuse **Tf1** is interrupted (due to temperature outside the duct), it is necessary to replace the spring return actuator. → see page 10
- If the thermal fuse **Tf2** is interrupted (due to temperature inside the duct), only the spare part ZBAT 72 needs to be replaced. → see page 10

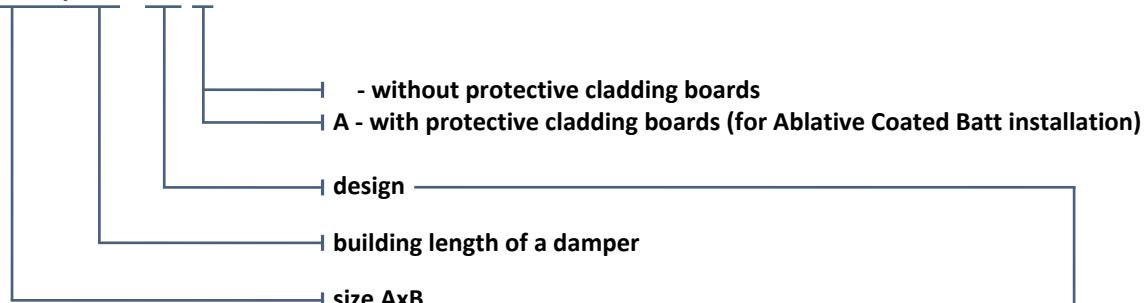
- Ensure each damper is fully checked for operational capability, control should be initiated from the control system or by manual control. Damper blades should open and close correctly and operation should be visually inspected and documented prior to handover.

## X. ORDERING INFORMATIONS

### Ordering key

#### Fire damper

FDMQ 120 800x400/375 - .40 A



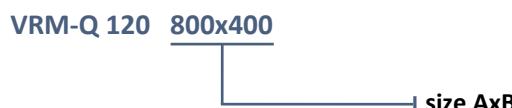
#### EXAMPLE:

**FDMQ 120 800x400/375 - .40 A** - 800x400-damper size, /375-building lenght of a damper, .40-damper design, A-with protective cladding boards

Damper design	Additional digit
Manual control and thermal	.01
Manual control and thermal with a terminal switch („CLOSED“)	.11
Manual control and thermal with two terminal switches („OPEN“, „CLOSED“)	.80
With actuator BF 230-TN (BFL, BFN 230-T) - voltage AC 230 V	.40
With actuator BF 24-TN (BFL, BFN 24-T) - voltage AC/DC 24 V	.50

### Accessories

#### Reinforcing frame VRM-Q 120

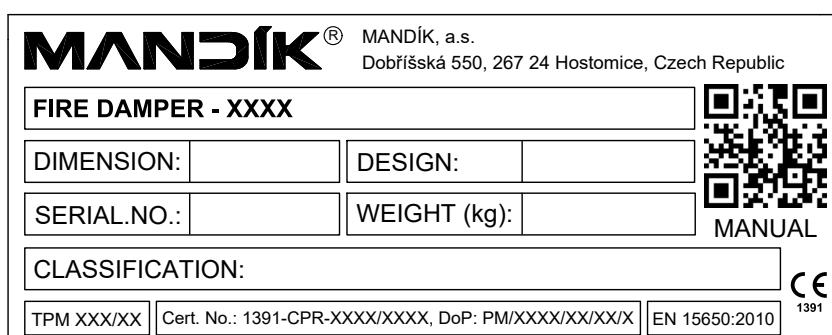


#### Protective cladding boards



### 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](http://www.mandik.co.uk)

**MANDÍK®**

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