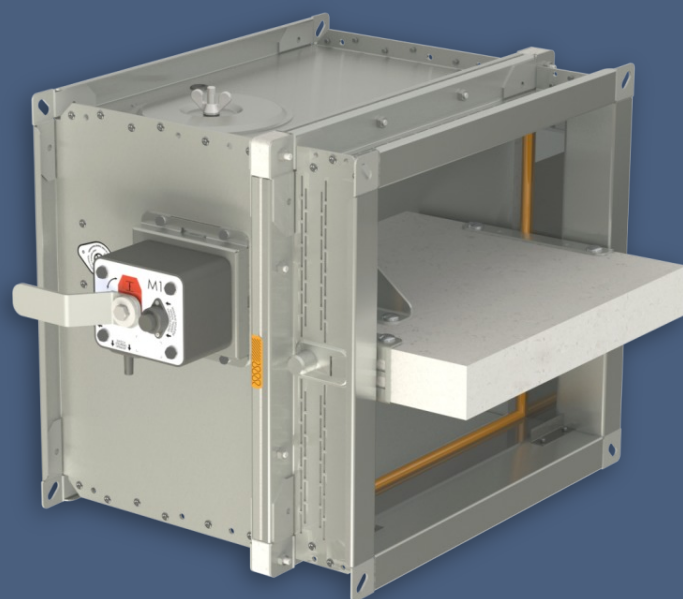
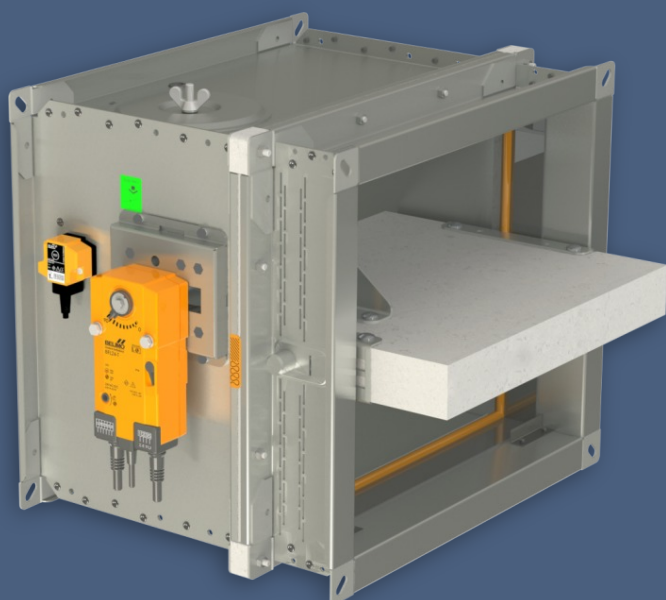


FDMQ 120

Fire damper

Technical Documentation

Installation, Commissioning, Operation, Maintenance and Service Manual



UK
CA
2822

CE
1391

MANDÍK®

www.mandik.co.uk

Manufacturer

MANDÍK, a. s. • Dobříšská 550 • 267 24 Hostomice • Czech Republic • Tel.: +420 311 706 742 • E-Mail: mandik@mandik.cz

Authorized representative

MANDIK UK Ltd • 130 Aztec West • Bristol BS32 4UB • United Kingdom • Tel.: +44 117 4526376 • E-Mail: help@mandik.co.uk

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.

CONTENT

I. GENERAL.....	3
Description.....	3
II. DESIGN.....	4
Design with manual control.....	4
Design with spring return actuator.....	6
Communication and control module MDCM.....	1
III. DIMENSIONS.....	12
Technical parameters.....	14
IV. INSTALLATION.....	20
Placement and installation.....	20
Statement of installations.....	22
Installation in solid wall construction.....	23
Installation outside solid wall construction.....	27
Installation in gypsum wall construction.....	29
Installation outside gypsum wall construction.....	33
Installation in shaft wall.....	37
Installation in solid ceiling construction.....	38
V. SUSPENSION SYSTEMS.....	41
Example of duct connection.....	43
VI. TECHNICAL DATA.....	44
Pressure loss.....	44
Noise data.....	46
VII. MATERIAL, FINISHING.....	47
VIII. TRANSPORTATION AND STORAGE.....	48
Logistic terms.....	48
IX. ASSEMBLY, ATTENDANCE AND MAINTENANCE.....	48
Entry into service and revisions.....	53
X. ORDERING INFORMATIONS.....	55
Ordering key.....	55
Accessories.....	55
Data label.....	56

I. GENERAL

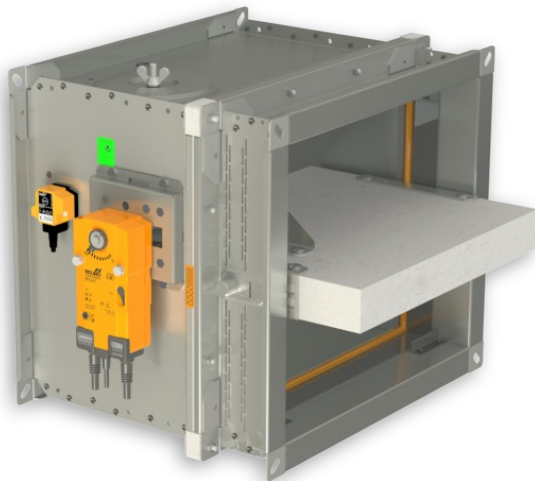
Description

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.

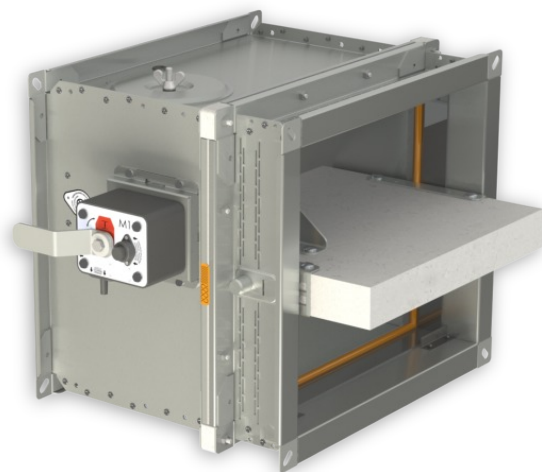
Damper blade automatically closes air duct using a closing spring or a spring return actuator. The closing spring is actuated by pressing a button on the manual control or by melting a thermal fuse.

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 BS EN 15650
- Tested in accordance with BS EN 1366-2
- Classified acc. to BS EN 13501-3+A1
- External Casing leakage class min. ATC 3 (old marking "C") acc. to BS EN 1751, Internal leakage min. class 2 acc. to BS EN 1751
- Cycling test in class C₁₀₀₀₀ acc. to BS EN 15650
- Corrosion resistant acc. to BS EN 15650
- Certificate of constancy of performance UKCA No. [2822-UKCA-CPR-XXXX](#)
- Certificate of constancy of performance CE No. [1391-CPR-XXXX/XXXX](#)
- Declaration of Performance UKCA No. [PM/FDMQ 120/02/XX/X](#)
- Declaration of Performance CE 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 with horizontal blade axis.
- Dampers are suitable for systems without abrasive, chemical and adhesive particles.
- Dampers are designed for macroclimatic areas with mild climate according to BS 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.
- 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).



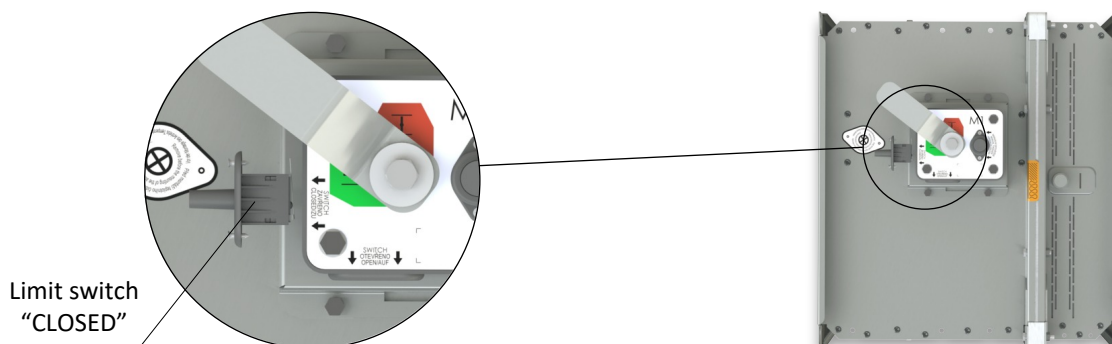
Design .01

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 .11

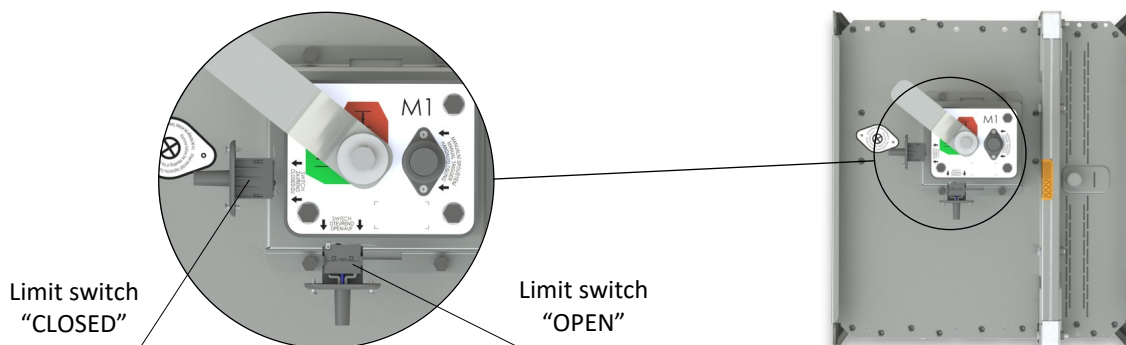
- Design .01 with manual control can be complemented with a limit switch signaling of the damper blade position "CLOSED".
- Cable is connected directly to limit switch.
- Limit switch detail → see page 5



Design .11

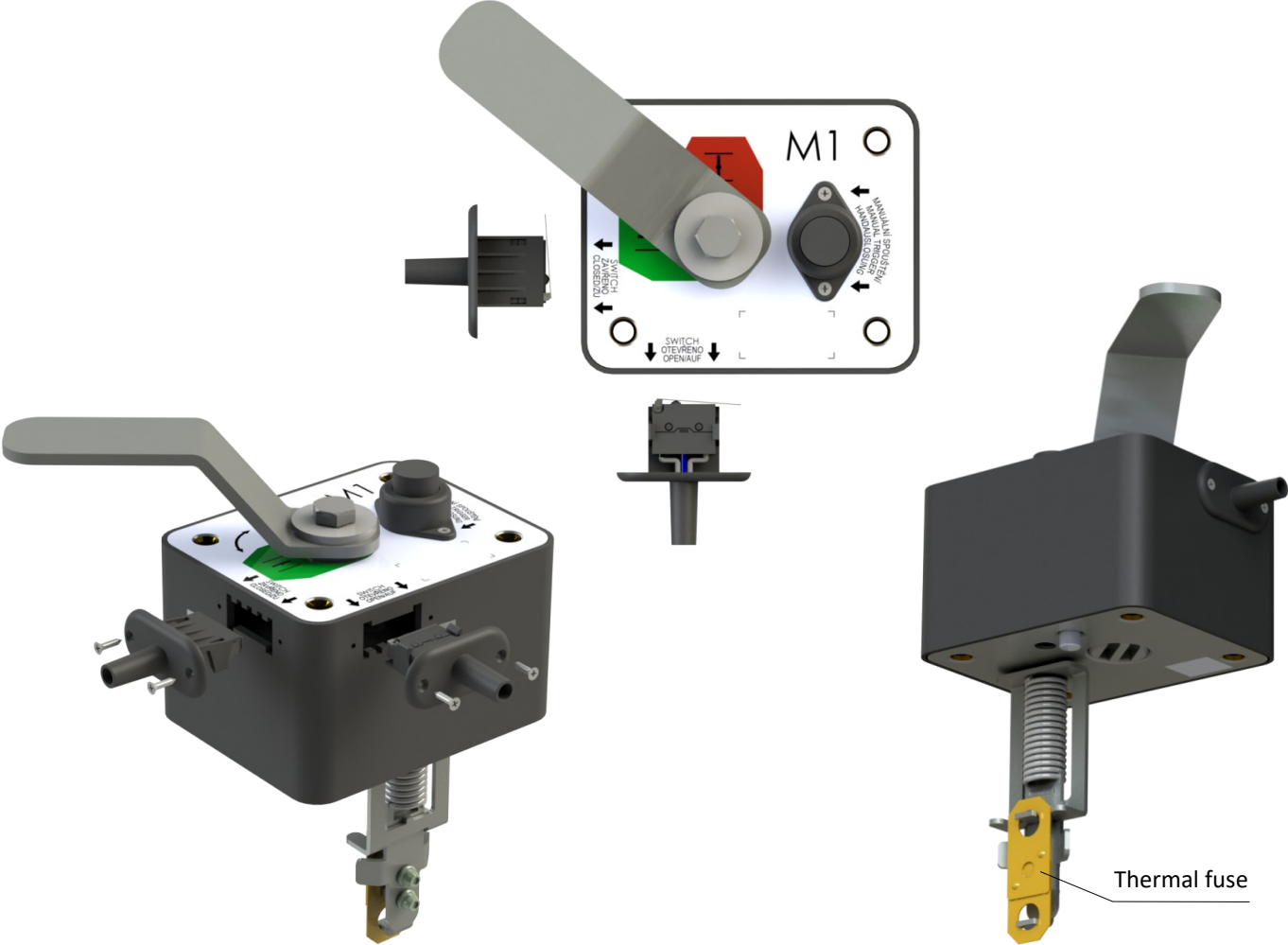
Design .80

- 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

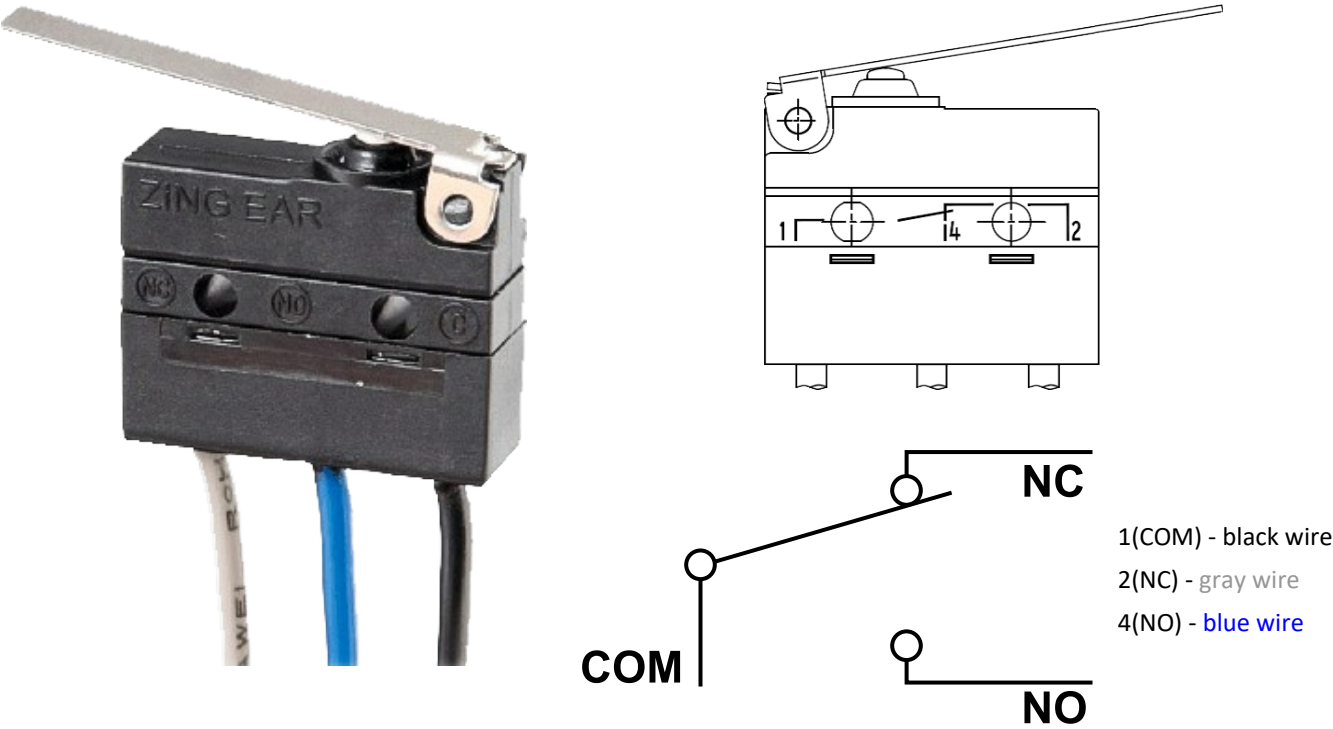


Design .80

Manual control



Limit switch G905-300E03W1



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

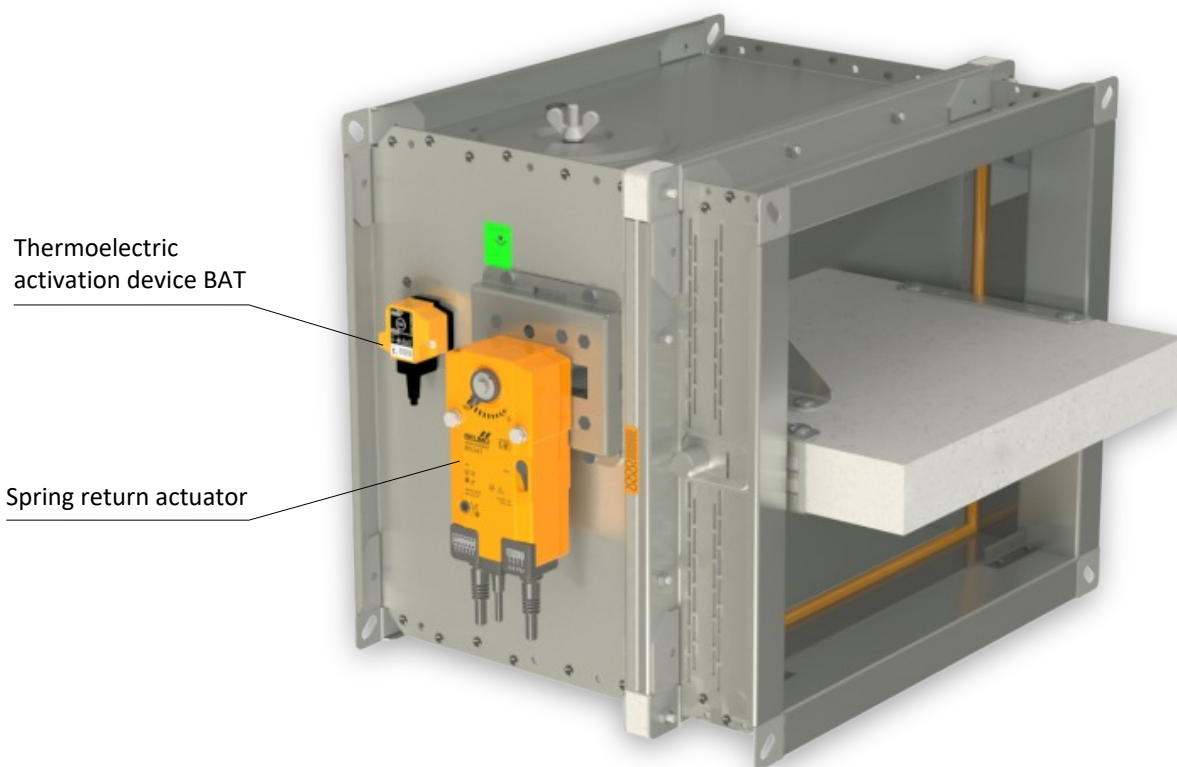
This limit switch is possible to connect in two following ways

- 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

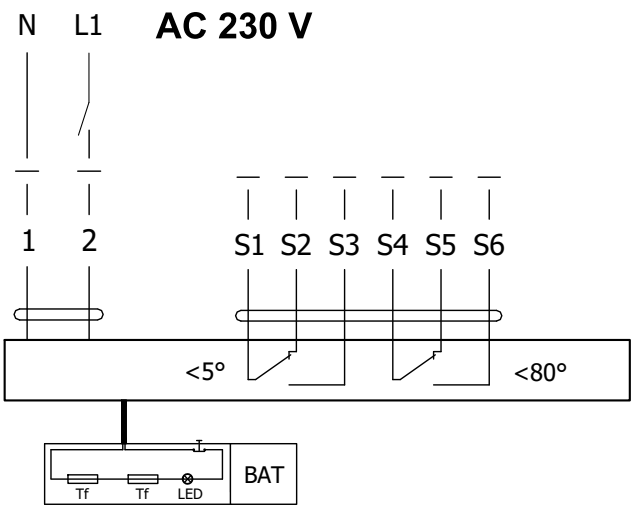
Design .40 and .50

- 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.

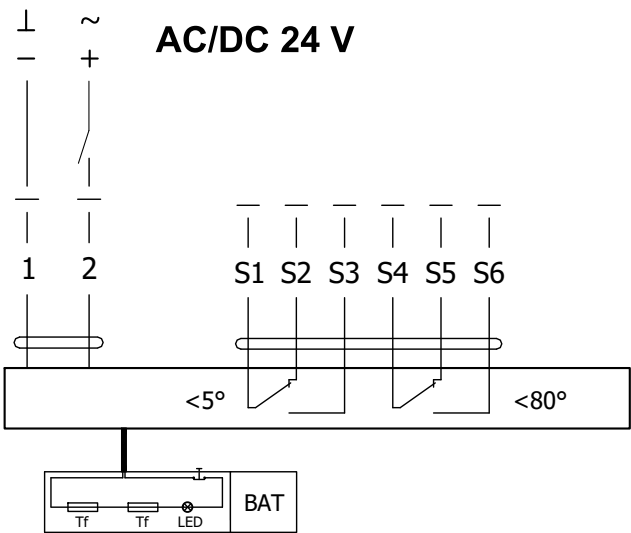


Design .40 and .50

Actuator BELIMO BFL 230-T



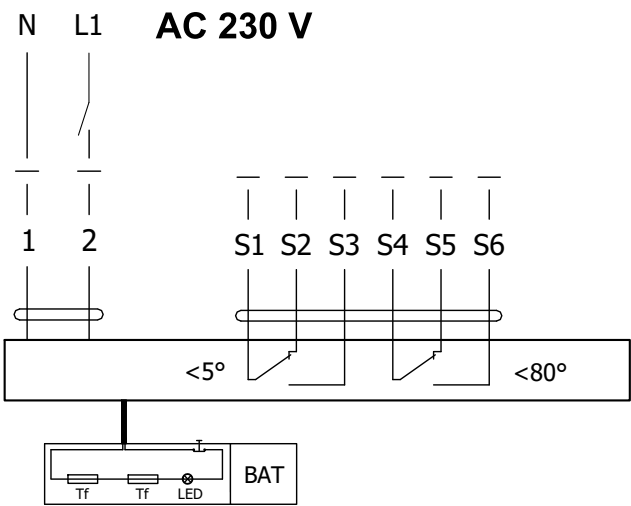
Actuator BELIMO BFL 24-T(-ST)



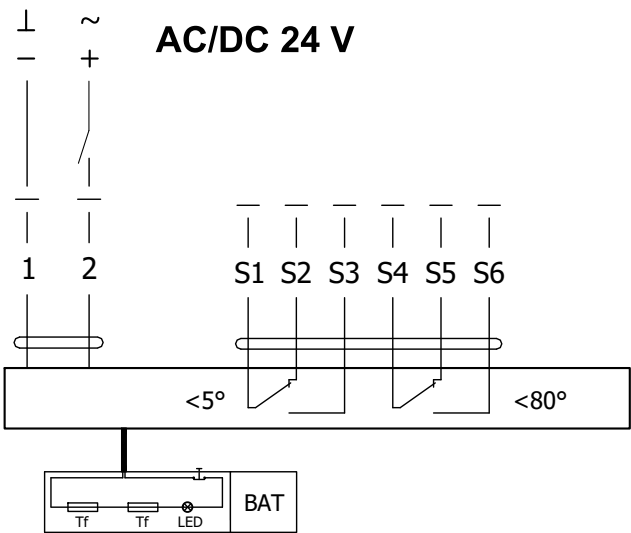
Actuator BELIMO BFL 230-T(-ST), BFL 24-T(-ST)

Actuator BELIMO - 4 Nm/ 3 Nm Spring	BFL 230-T(-ST)	BFL 24-T(-ST)
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 ² (BFL 2xx-T-ST) with 3-pin plug-in connectors cable 1 m, 6 x 0,75 mm ² (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

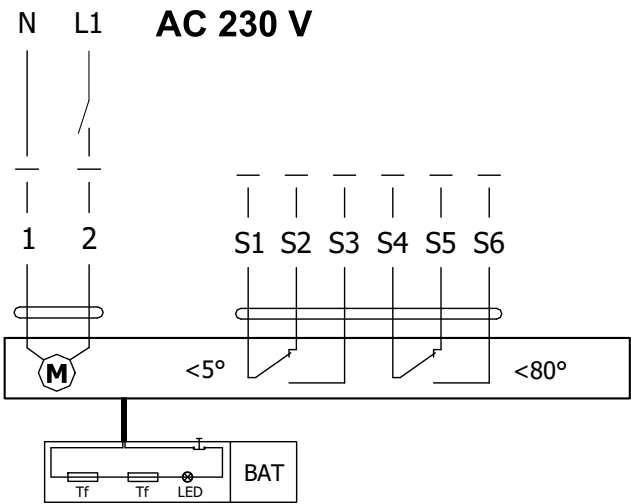


Actuator BELIMO BFN 24-T(-ST)

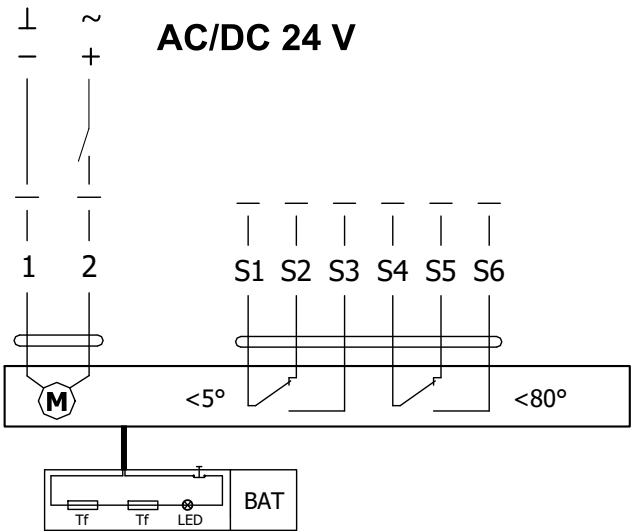


Actuator BELIMO BFN 230-T(-ST), BFN 24-T(-ST)		
Actuator BELIMO - 9 Nm/ 7 Nm Spring	BFN 230-T(-ST)	BFN 24-T(-ST)
Power voltage	AC 230 V 50/60Hz	AC/DC 24 V 50/60Hz
Power consumption - in operation - in rest position	5 W 2,1 W	4 W 1,4 W
Dimensioning	10 VA (Imax 4 A @ 5 ms)	6 VA (Imax 8,3 A @ 5 ms)
Protection 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 mm ² (BFN 2xx-T-ST) with 3-pin plug-in connectors cable 1 m, 6 x 0,75 mm ² (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)

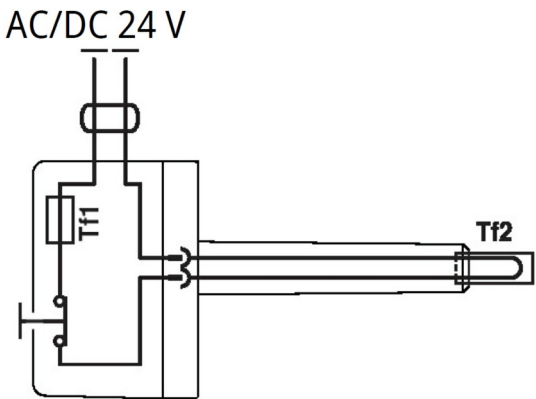
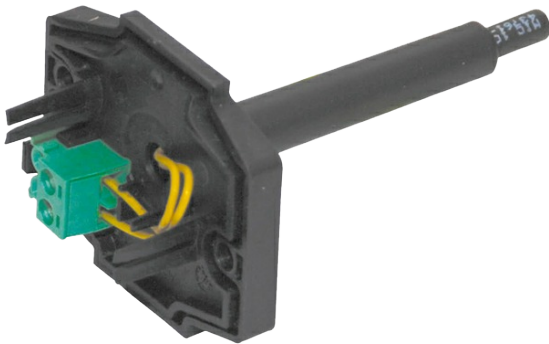
Actuator BELIMO - 18 Nm/ 12 Nm Spring	BF 230-TN(-ST)	BF 24-TN(-ST)
Power voltage	AC 230 V 50/60Hz	AC/DC 24 V 50/60Hz
Power consumption - in operation - in rest position	8,5 W 3 W	7 W 2 W
Dimensioning	11 VA (Imax 8,3 A @ 5 ms)	10 VA (Imax 8,3 A @ 5 ms)
Protection class	II	III
Degree of protection	IP 54	
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 mm ² (BF 2xx-TN-ST) with 3-pin plug-in connectors cable 1 m, 6 x 0,75 mm ² (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.



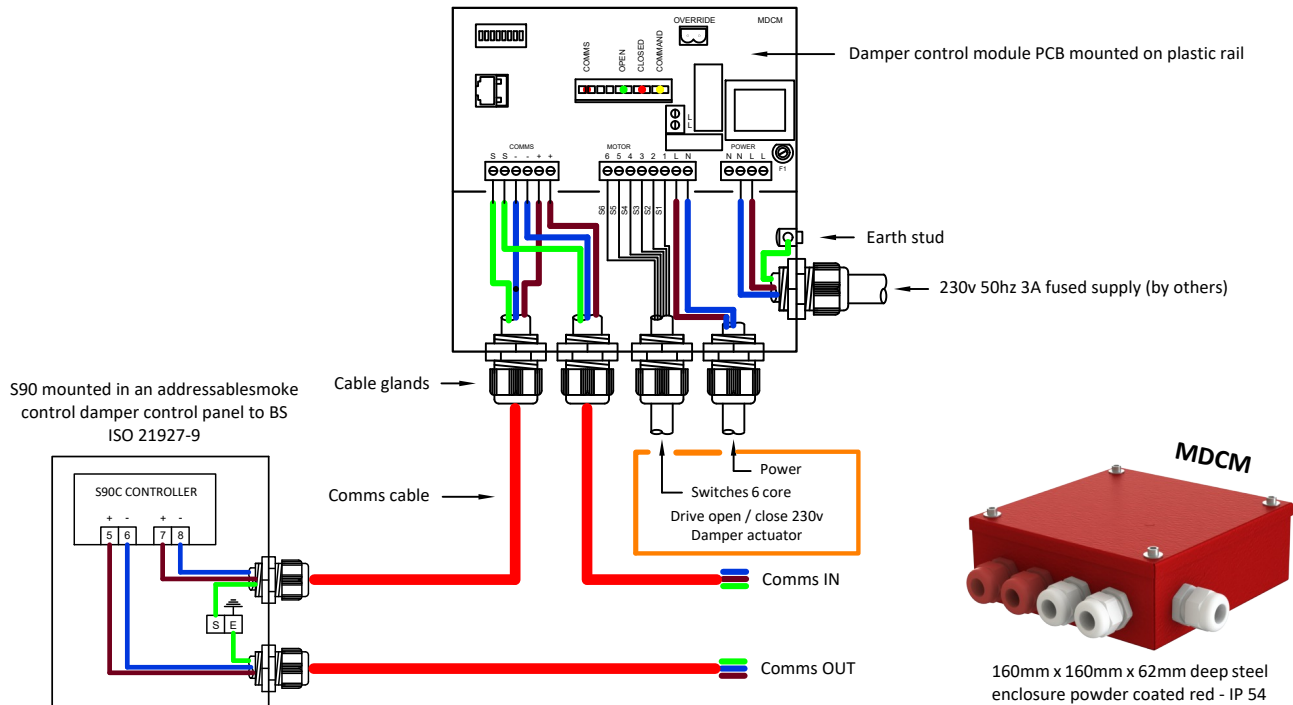
BELIMO ZBAT 72
Black (BK) = 72°C (standard)



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

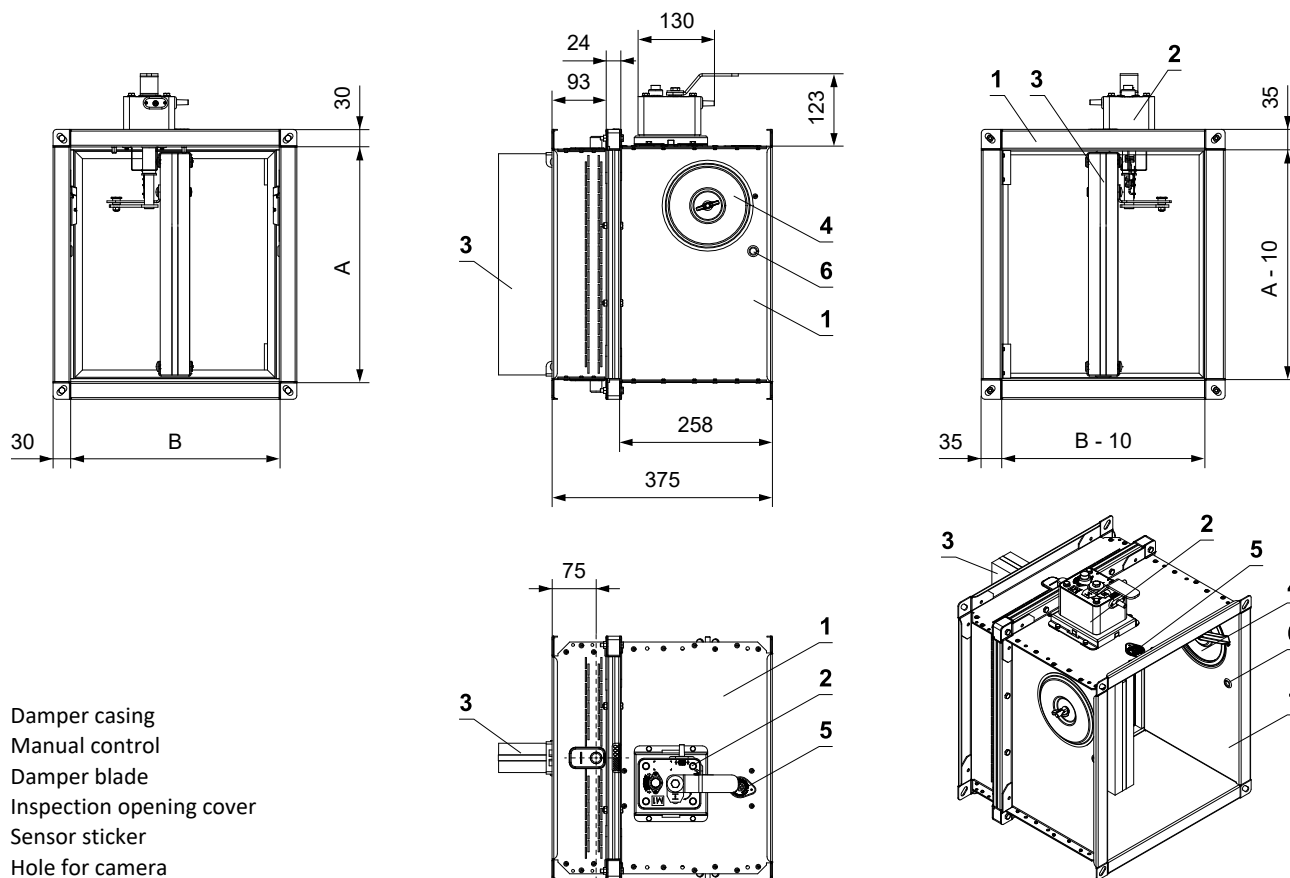
Communication and control module MDCM

- 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 mm²

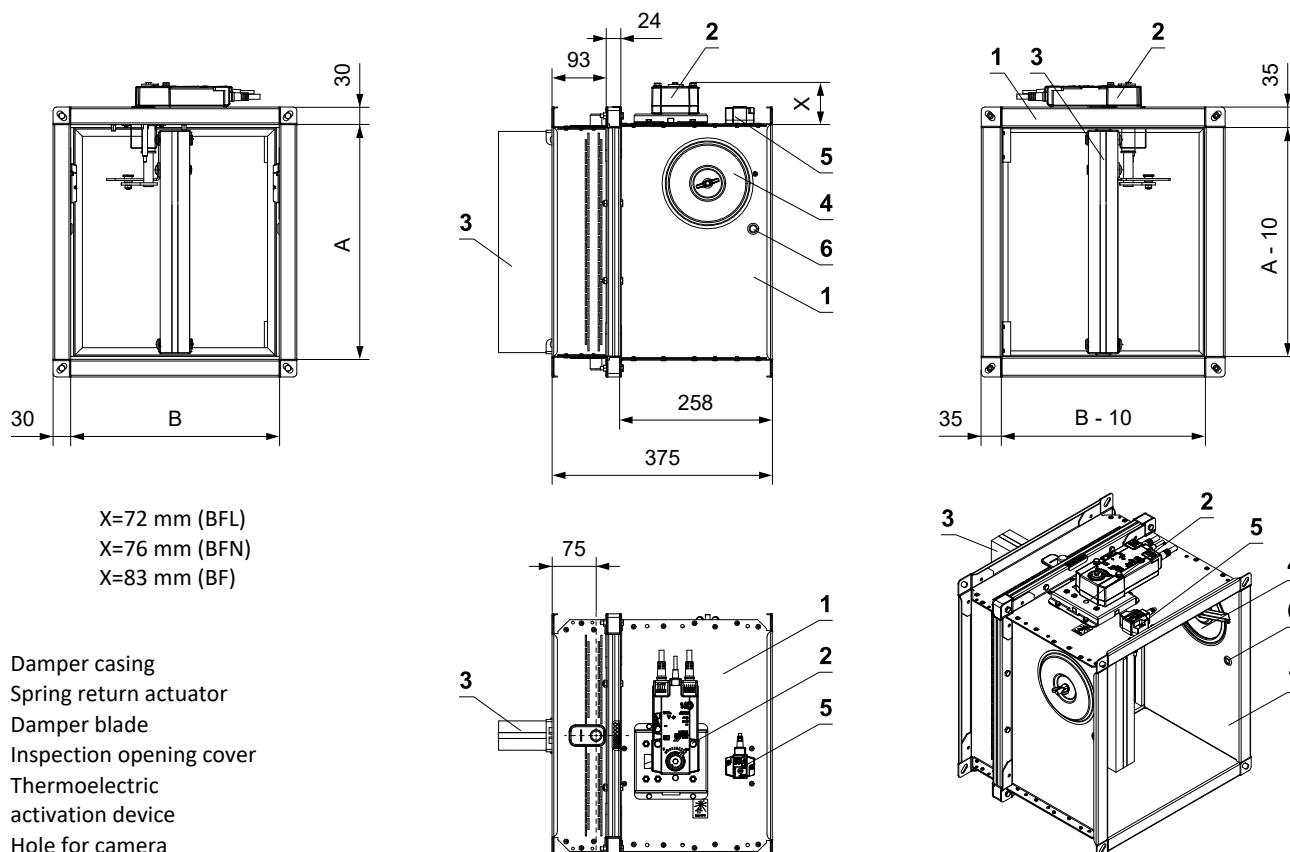


III. DIMENSIONS

FDMQ 120 with manual control

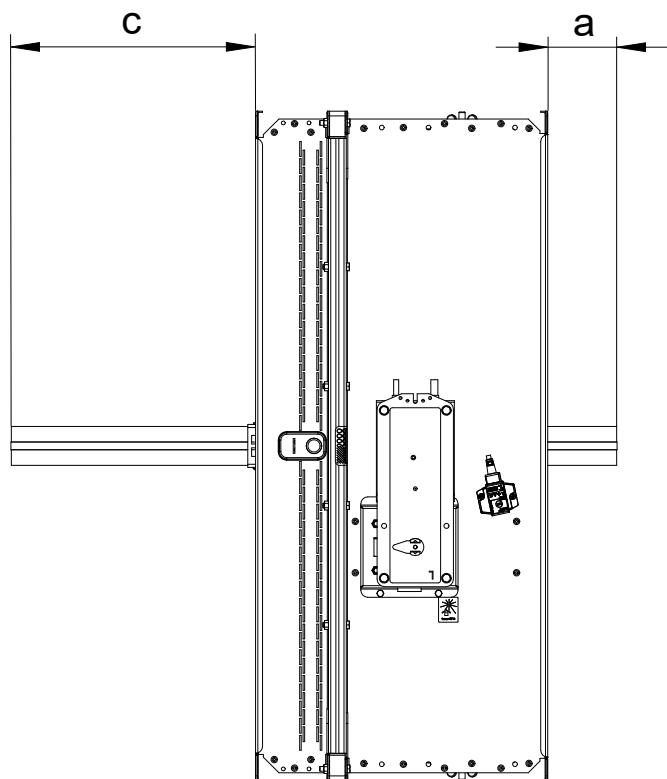


FDMQ 120 with spring return actuator

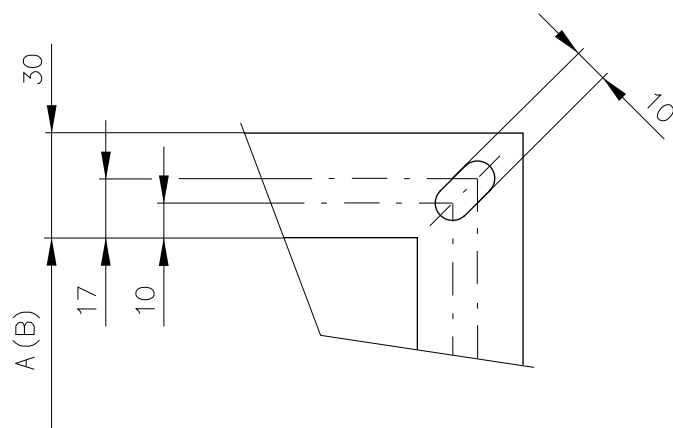
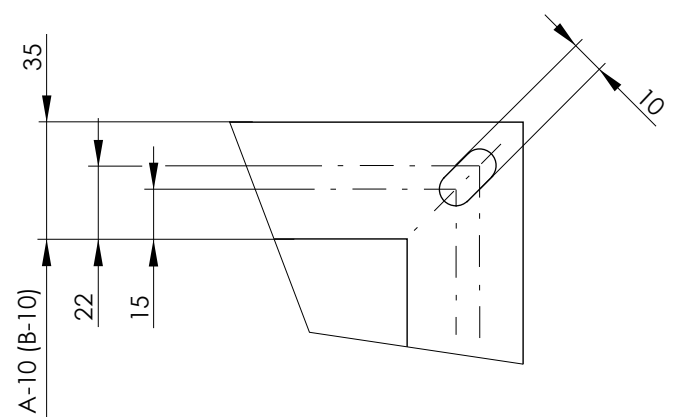


Damper blade overlaps

- 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

A x B [mm]							Damper blade overlaps		Weight		Effective area Sef [m²]	Spring return actuator	Manual control	A x B [mm]							Damper blade overlaps		Weight		Effective area Sef [m²]	Spring return actuator	Manual control
a [mm]							c [mm]		Man. [kg]					Actu. [kg]*		a [mm]							c [mm]				
1500 x	180	-	13	36	37,5	0,1549	BFL	M2	500	-	173	57	60	0,6269	1500 x	BF	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	M4	650	3	248	65,5	68,5	0,8481	M5												
	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.

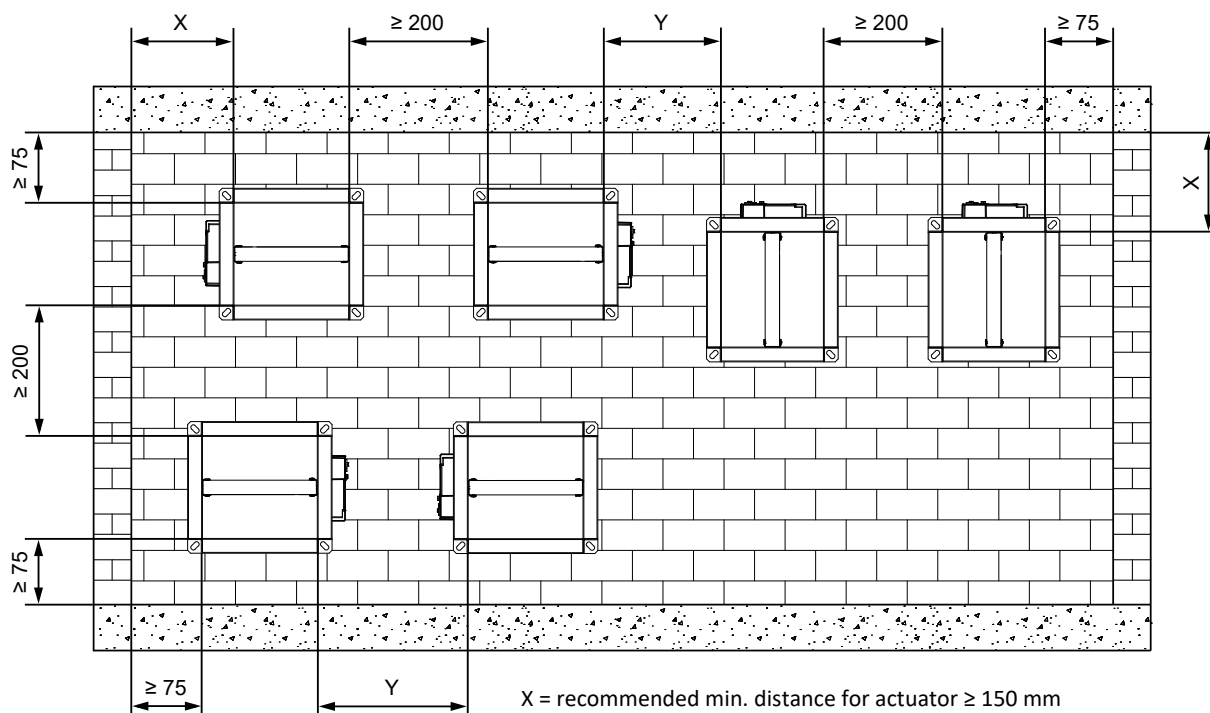
IV. INSTALLATION

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 bricking in. 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 BS 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 BS EN 1366-2.

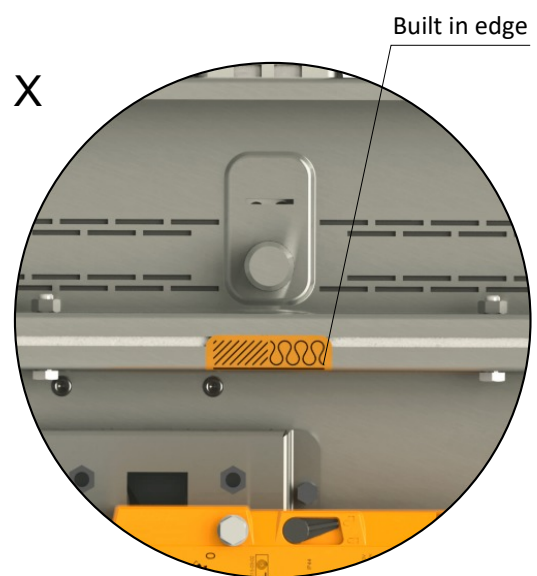
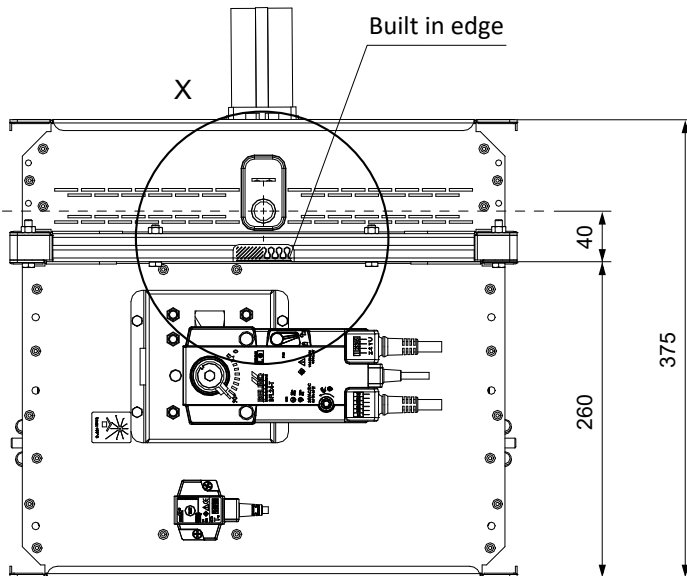
Minimum distance between the fire dampers and the construction

- minimum distance 200 mm between dampers, according to BS EN 1366-2
- minimum distance 75 mm between damper and construction (wall/ceiling), according to BS 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

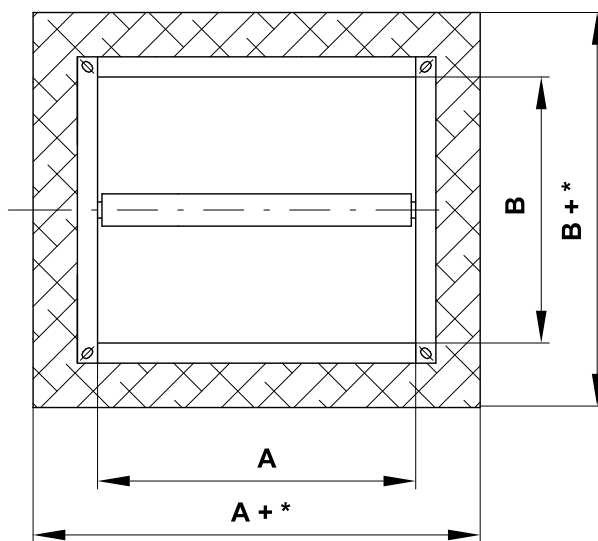


X = recommended min. distance for actuator ≥ 150 mm
 X = recommended min. distance for manual control (≥ 250 mm)
 Y = for actuator (≥ 200 mm) acc. to BS EN 1366-2
 Y = recommended min. distance for manual control (≥ 250 mm)

- 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 BS 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

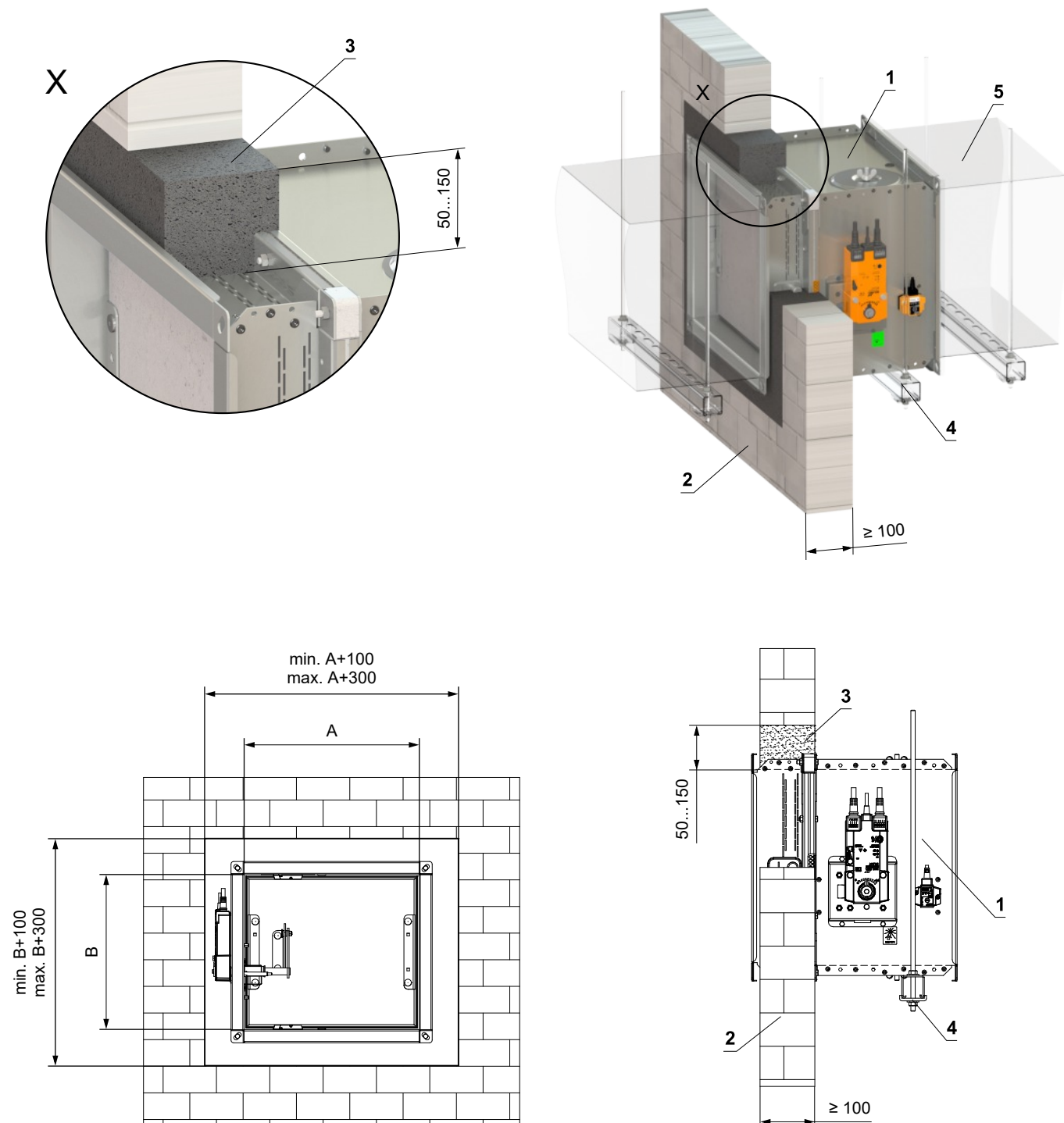
Placement	wall/ceiling min. thickness [mm]	Method of installation	Fire resistance	Page
In solid wall construction	100	Mortar or gypsum	El 120 (v _e i↔o) S - 500 Pa	23
		2 dampers in battery - mortar or gypsum		24
		4 dampers in battery - mortar or gypsum	El 120 (v _e i↔o) S	25
		Ablative Coated Batt		26
Outside solid wall construction	100	ISOVER Ultimate Protect - Ablative Coated Batt	El 120 (v _e i↔o) S	27-28
In gypsum wall construction	100	Mortar or gypsum	El 120 (v _e i↔o) S - 500 Pa	29
		2 dampers in battery - mortar or gypsum		30
		4 dampers in battery - mortar or gypsum	El 120 (v _e i↔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	El 120 (v _e i↔o) S	35-36
In shaft wall construction	105	Mortar or gypsum	El 120 (v _e i↔o) S	37
In solid ceiling construction	150	Mortar or gypsum	El 120 (h _o i↔o) S - 500 Pa	38
		2 dampers in battery - mortar or gypsum		39
		4 dampers in battery - mortar or gypsum	El 120 (h _o i↔o) S	40

Installation in solid wall construction

In solid wall construction - mortar or gypsum

El 120 ($v_e i \leftrightarrow o$) S - 500 Pa

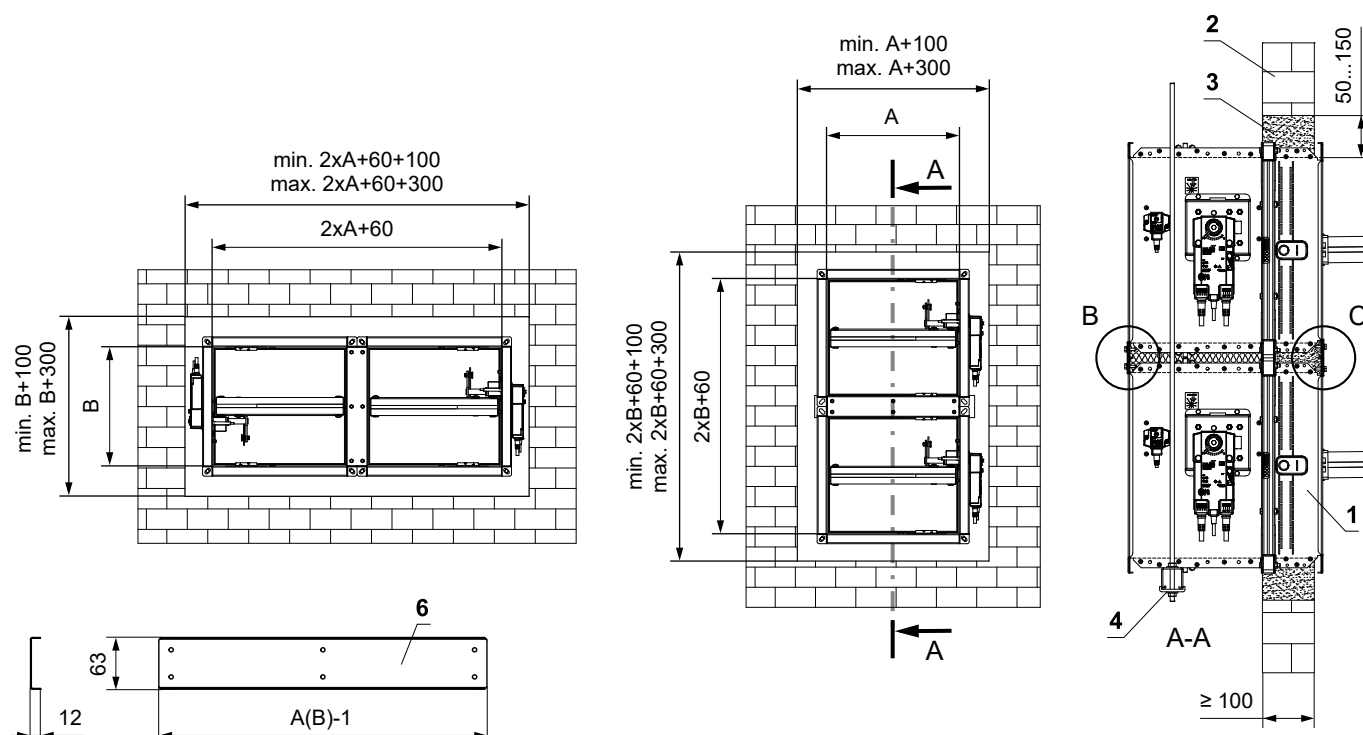
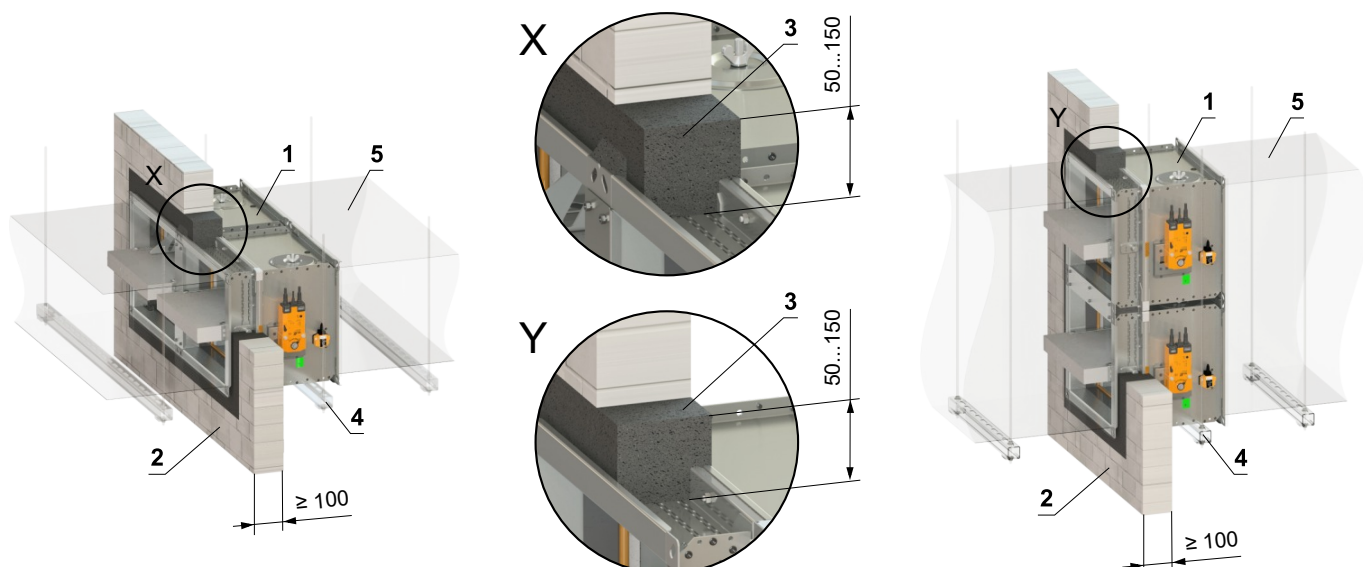
- For connection following duct → see page 43
- This installation was tested without supports. Supports are optional, if are used, follow the manufacturer's instructions and national standards.



- 1 FDMQ 120
- 2 Solid wall construction
- 3 British gypsum thistle bond 60 (or equivalent can be used)
minimum density 670 kg/m³
- 4 Fixing profile with threaded rod → see pages 41 to 42
- 5 Duct

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

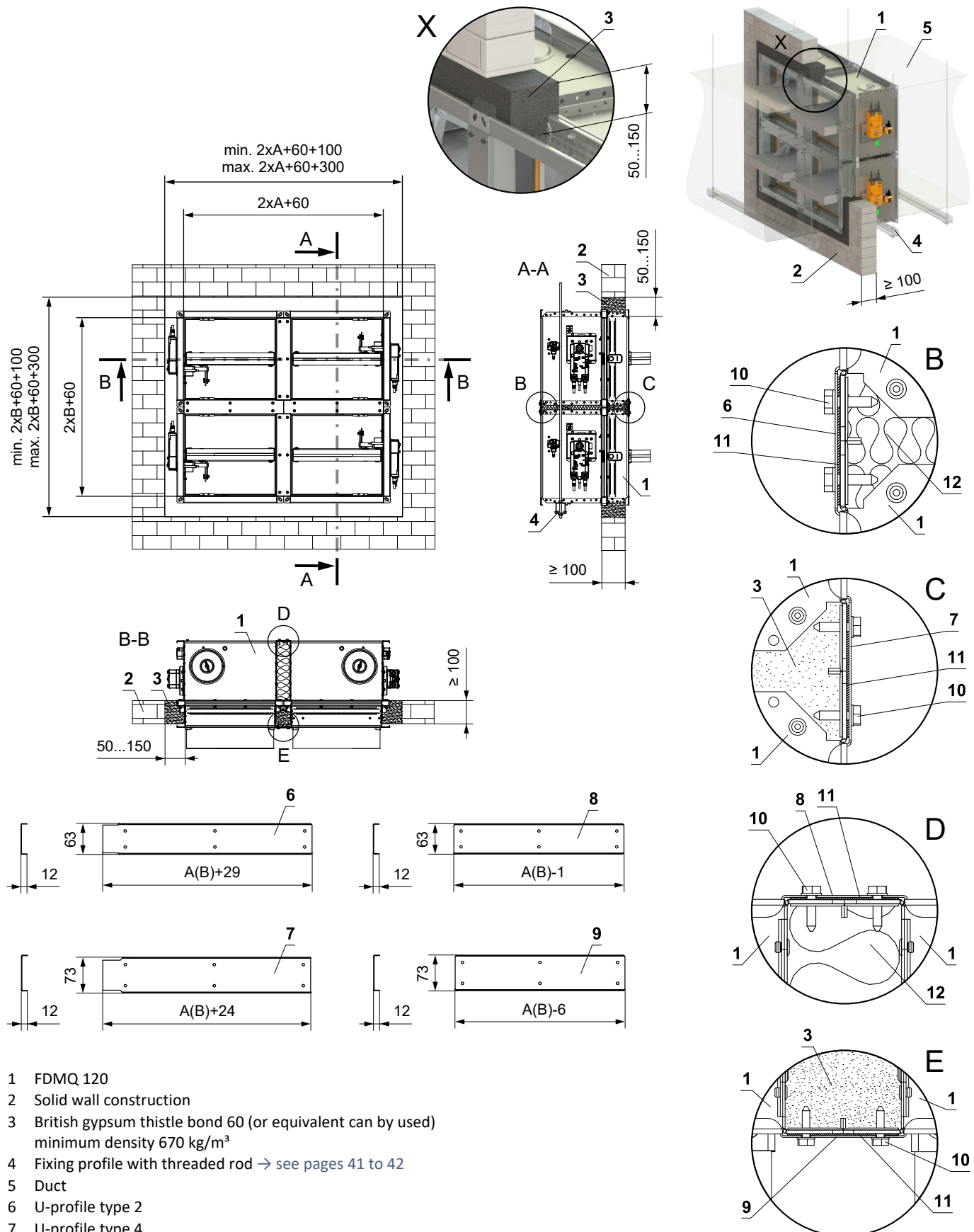
EI 120 ($v_e i \leftrightarrow o$) S



- 1 FDMQ 120
- 2 Solid wall construction
- 3 British gypsum thistle bond 60 (or equivalent can be used) minimum density 670 kg/m³
- 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/m³ (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 - 4 dampers in battery - mortar or gypsum

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

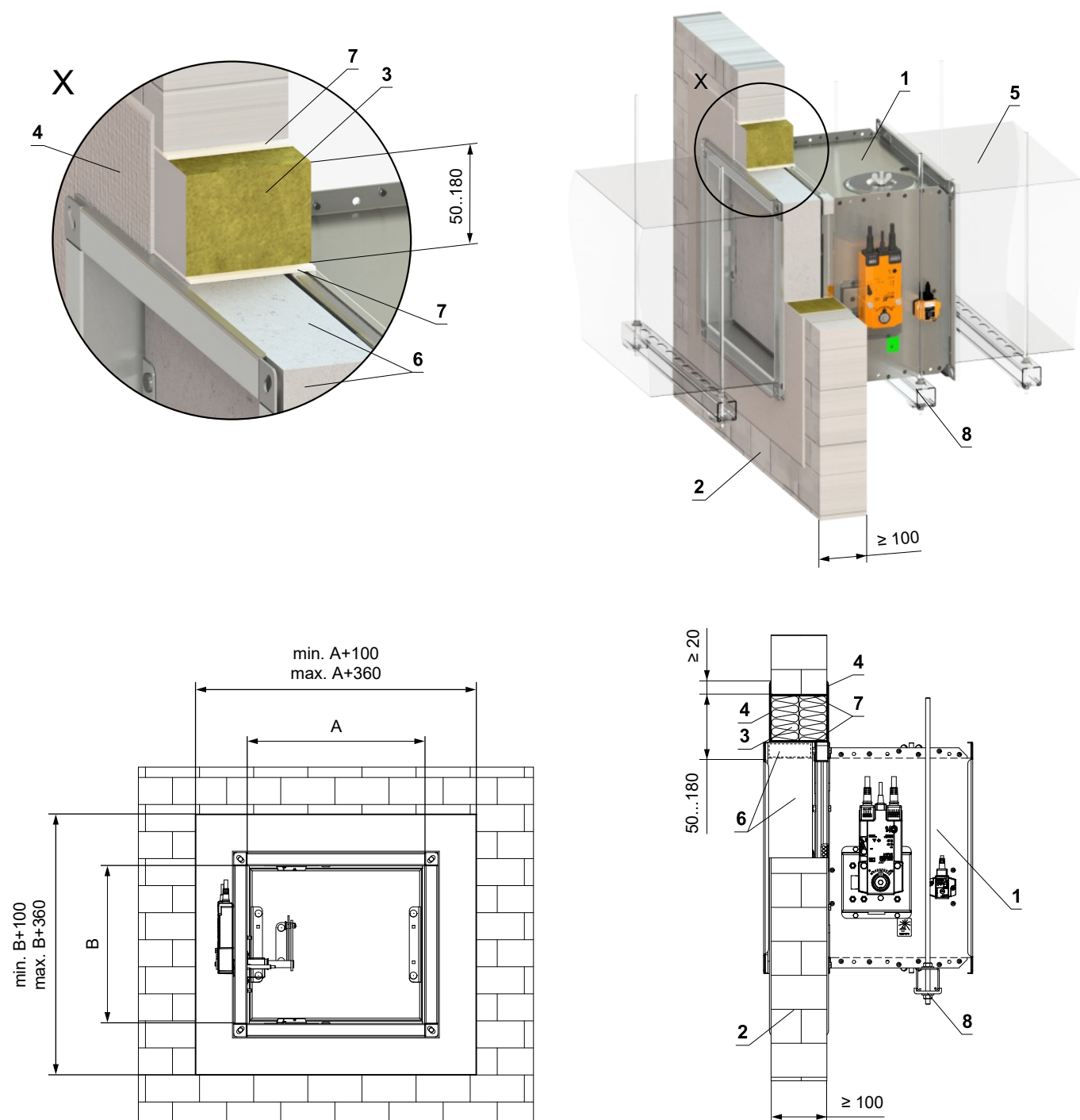
- 1 FDMQ 120
- 2 Solid wall construction
- 3 British gypsum thistle bond 60 (or equivalent can be used)
minimum density 670 kg/m^3
- 4 Fixing profile with threaded rod → see pages 41 to 42
- 5 Duct
- 6 U-profile type 2
- 7 U-profile type 4
- 8 U-profile type 1
- 9 U-profile type 3
- 10 Screw TEK 4,8x18 mm (span $\leq 200 \text{ mm}$)
- 11 Seal
- 12 Insulation board made of stone wool, min. density 66 kg/m^3
(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↔o) S

- For connection following duct → see page 43



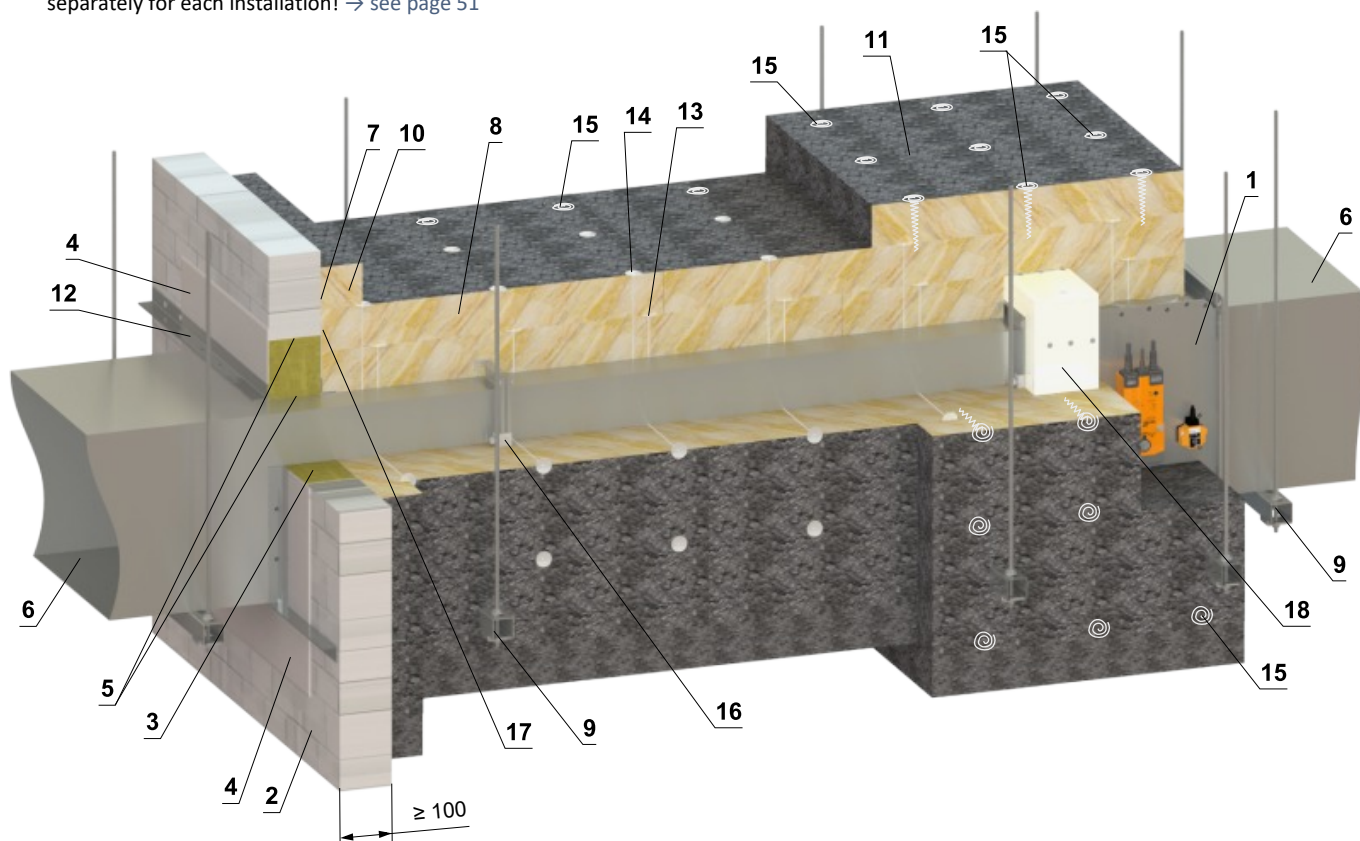
- 1 FDMQ 120
- 2 Solid wall construction
- 3 Ablative Coated Batt (e.g. Firestop Board HILTI CFS-CT B 1S 140/50 - min. density 140 kg/m³ + Firestop acrylic sealant HILTI CFS-S ACR or equivalent)
- 4 Fire stop coating thickness 1 mm (e.g. HILTI CFS-CT, PROMASTOP-CC or equivalent)
- 5 Duct
- 6 Protective 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 solid wall construction

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

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

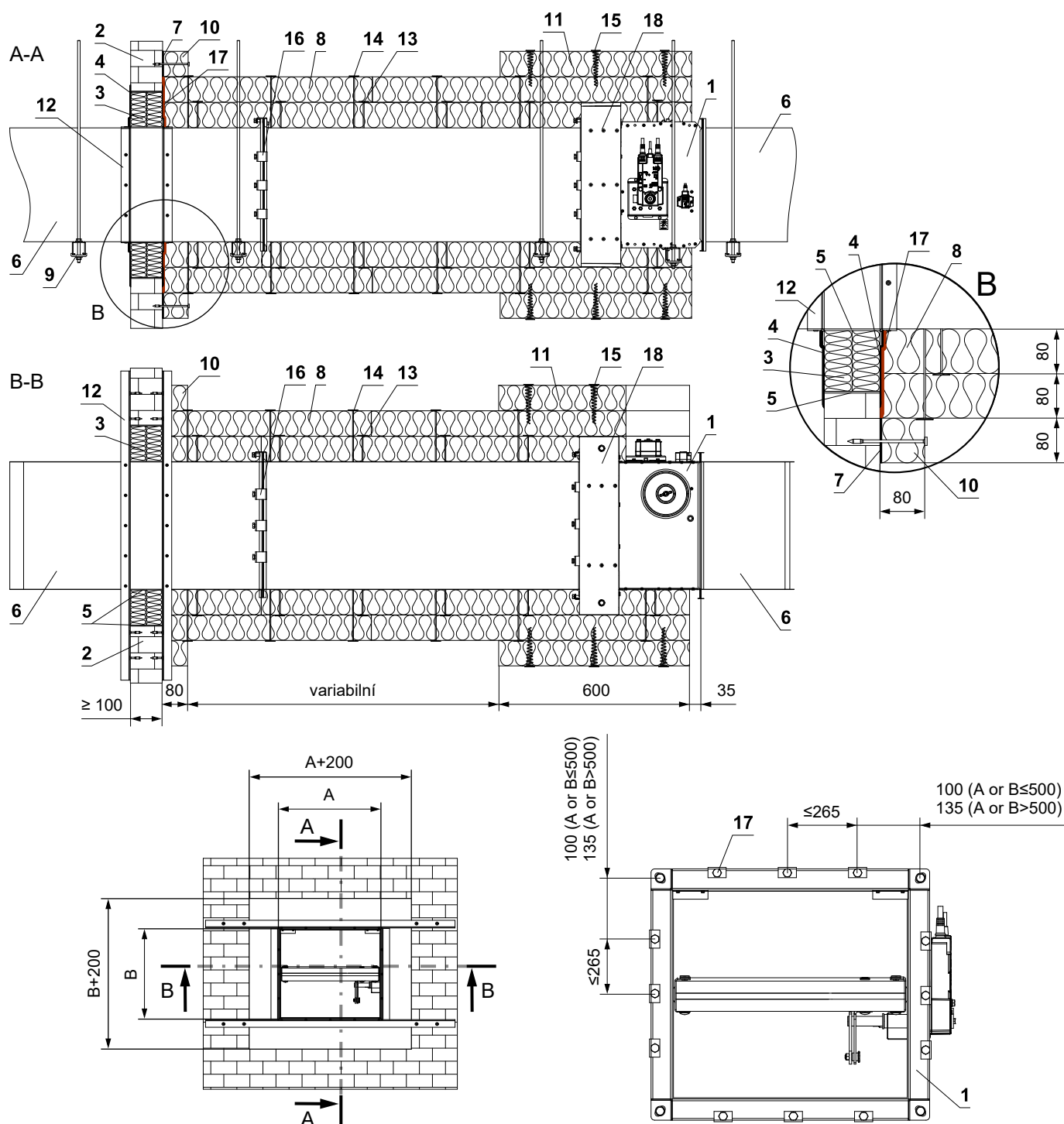
- For connection following duct → see page 43
- Minimum and maximum distance between the wall and the fire damper is unlimited.
- When installing the insulation, follow the ISOVER manufacturer's instructions.
- The fire damper and duct must be suspended separately.
- The duct must be suspended on both 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 BS EN 1507 and DIN 24190 | 15 Fire spiral shaped screws - 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 Steel clamp min. M8 bolts |
| 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-SACR) | 17 ISOVER Protect BSF |
| 9 Fixing profile with threaded rod → see pages 41 to 42 | 18 VRM-Q 120 → see page 51 |

(continued on next page)

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



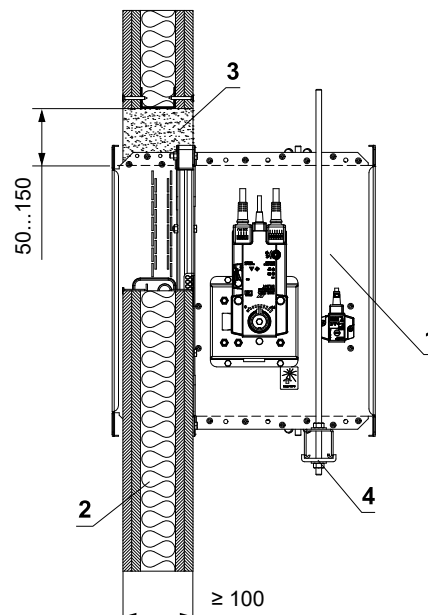
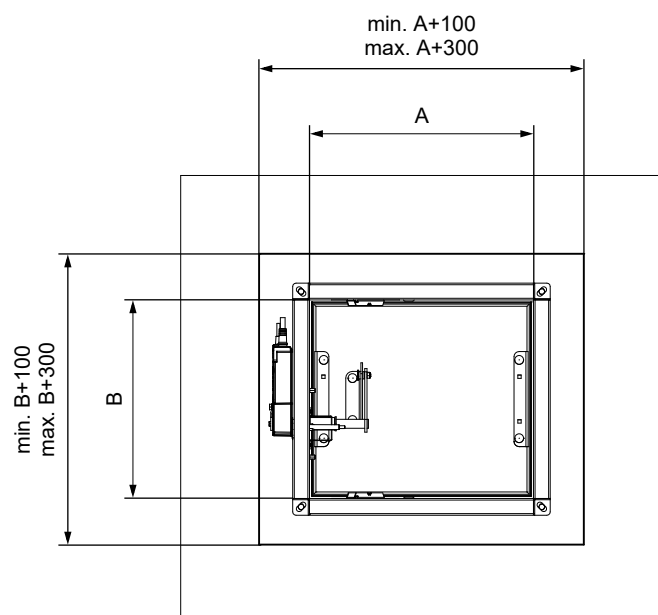
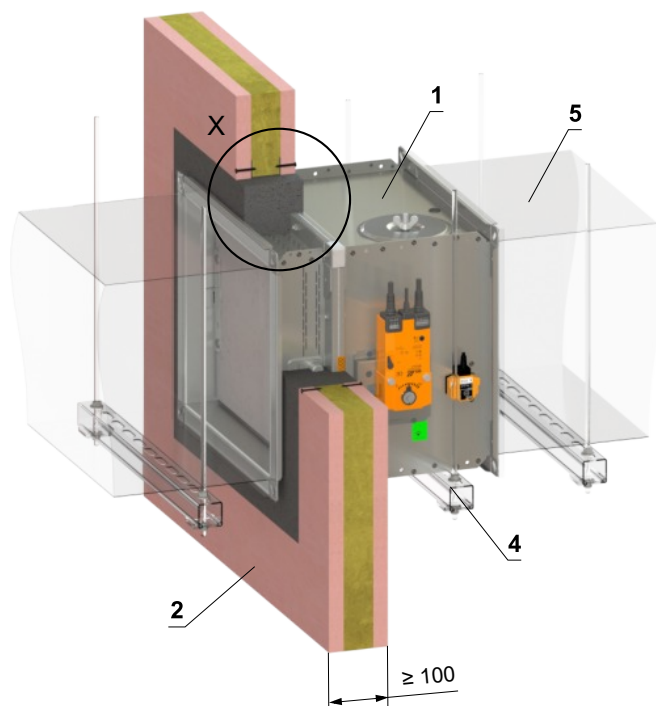
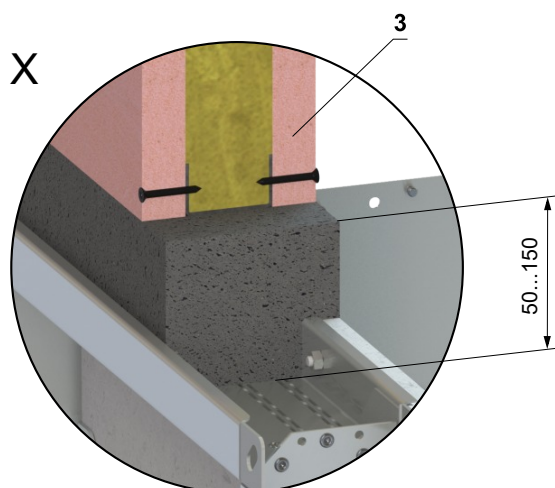
- | | | | |
|---|---|----|---|
| 1 | FDMQ 120 | 10 | Duct penetration insulation collar - ISOVER Ultimate Protect SLAB 4.0 Alu1, th. 80 mm - glued (pos. 7) and fixed with screws to the wall construction |
| 2 | Solid wall construction | 11 | Insulating collar of the damper and duct connection - ISOVER 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/m ³ + 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/m ³ (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 BS EN 1507 and DIN 24190 | 15 | Fire spiral shaped screws - 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 | Steel clamp min. M8 bolts |
| 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-SACR) | 17 | ISOVER Protect BSF |
| 9 | Fixing profile with threaded rod → see pages 41 to 42 | 18 | VRM-Q 120 → see page 51 |

Installation in gypsum wall construction

In gypsum wall construction - mortar or gypsum

El 120 ($v_e i \leftrightarrow o$) S - 500 Pa

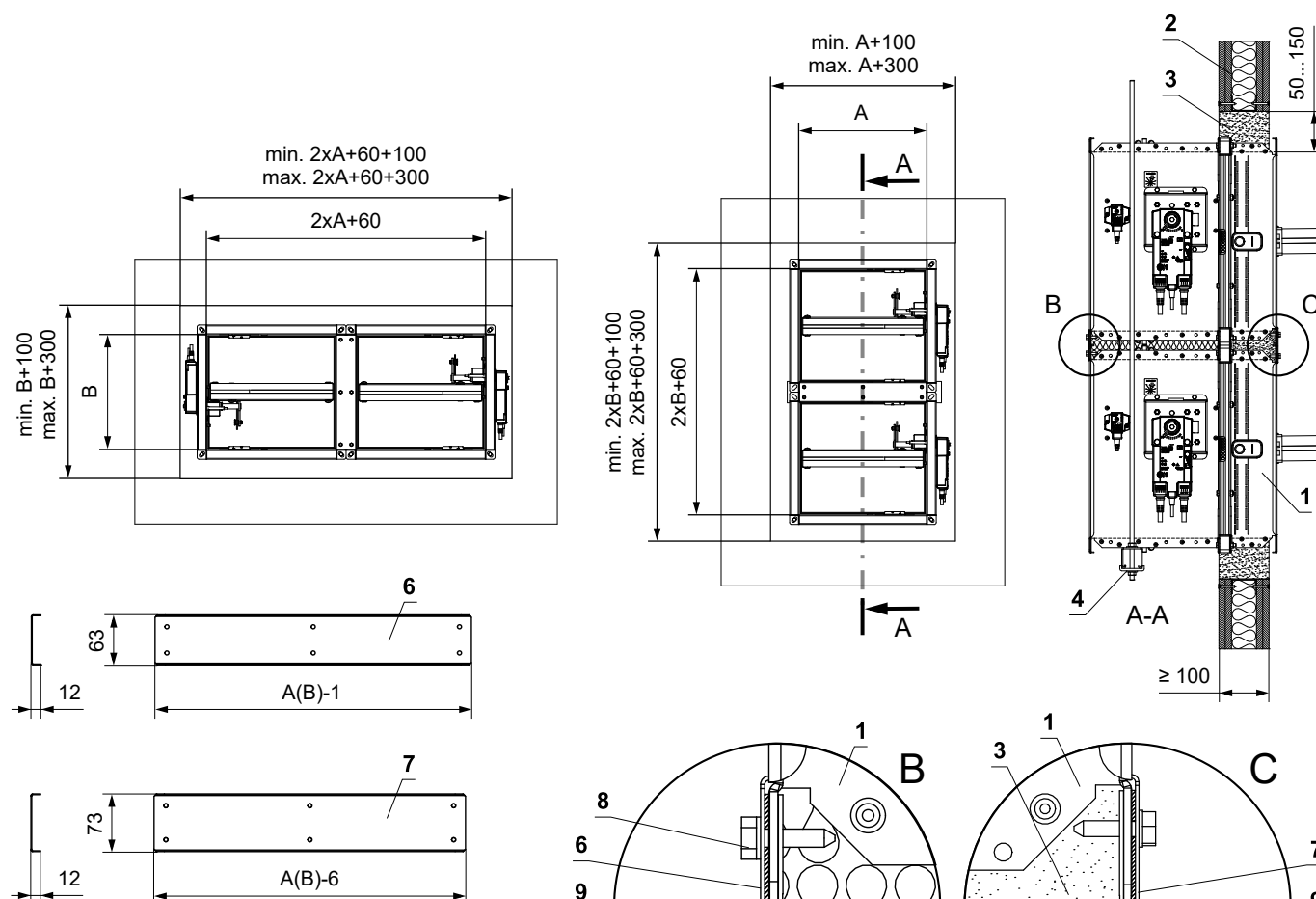
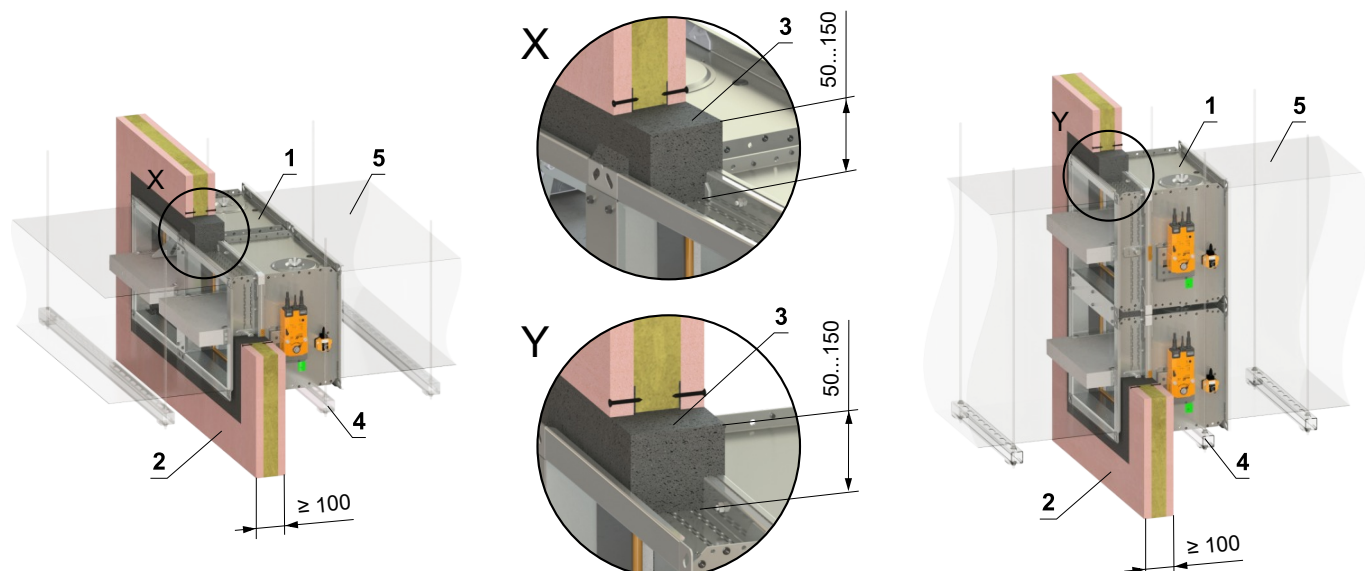
- For connection following duct → see page 43
- This installation was tested without supports. Supports are optional, if are used, follow the manufacturer's instructions and national standards.
- The installation opening is lined with a UW/CW profile.



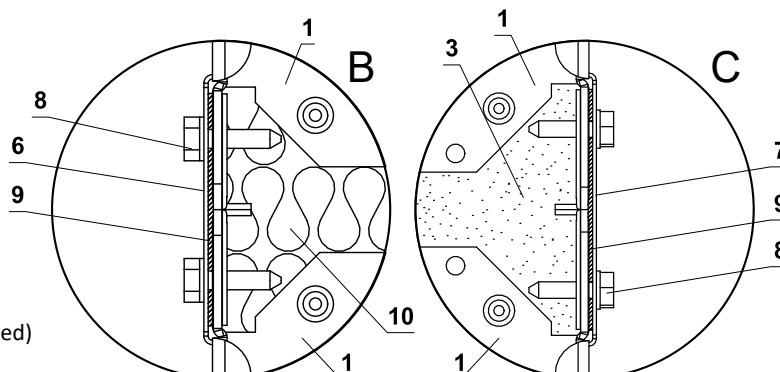
- 1 FDMQ 120
- 2 Gypsum wall construction
- 3 British gypsum thistle bond 60 (or equivalent can be used)
minimum density 670 kg/m³
- 4 Fixing profile with threaded rod → see pages 41 to 42
- 5 Duct

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

EI 120 (v_e i↔o) S

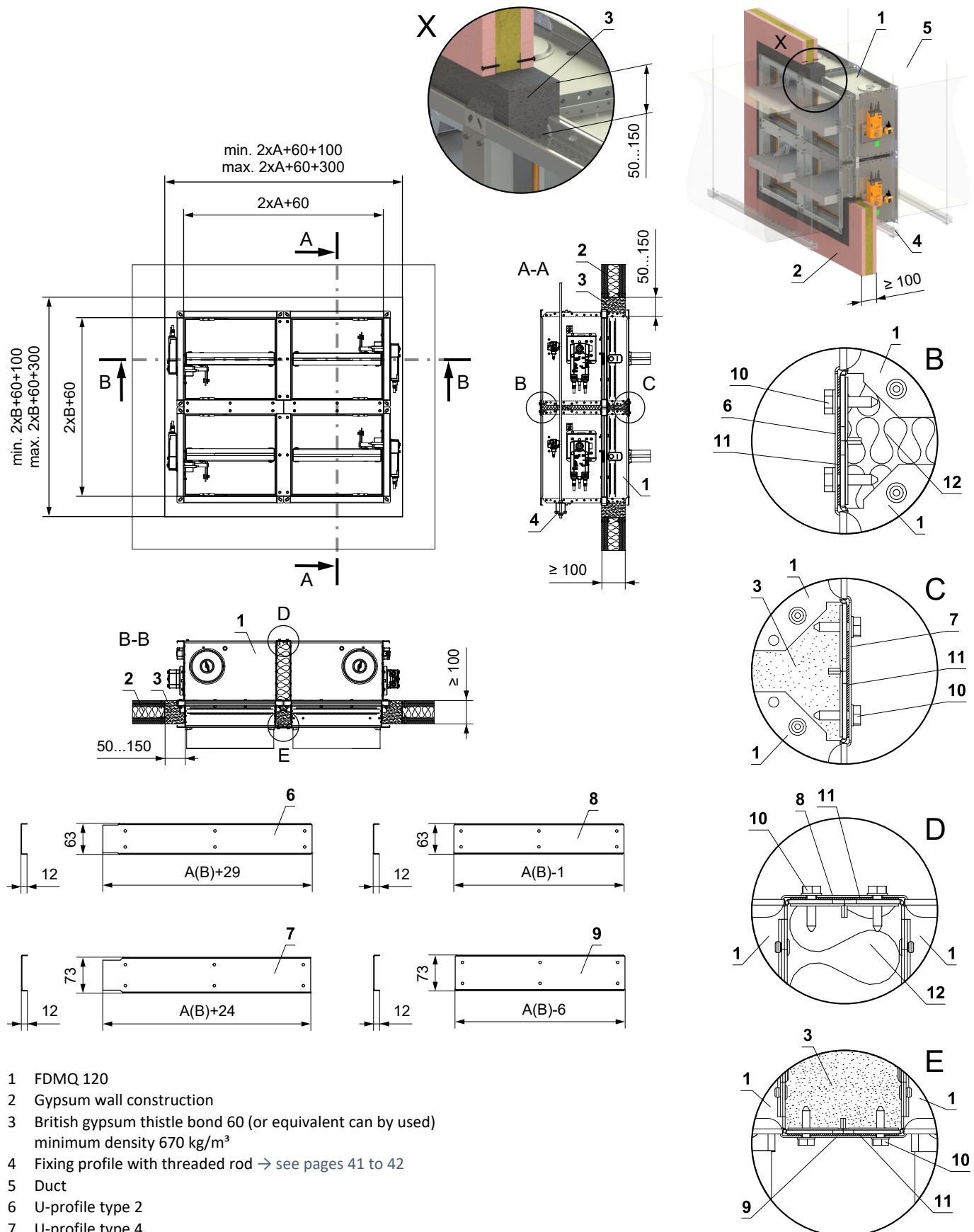


- 1 FDMQ 120
- 2 Gypsum wall construction
- 3 British gypsum thistle bond 60 (or equivalent can be used) minimum density 670 kg/m³
- 4 Fixing profile with threaded rod → see pages 41 to 42
- 5 Duct
- 6 U-profile type 3
- 7 U-profile type 1
- 8 Screw TEK 4,8x18 mm (span ≤ 200 mm)
- 9 Seal
- 10 Insulation board made of stone wool, min. density 66 kg/m³ (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.
- The installation opening is lined with a UW/CW profile.

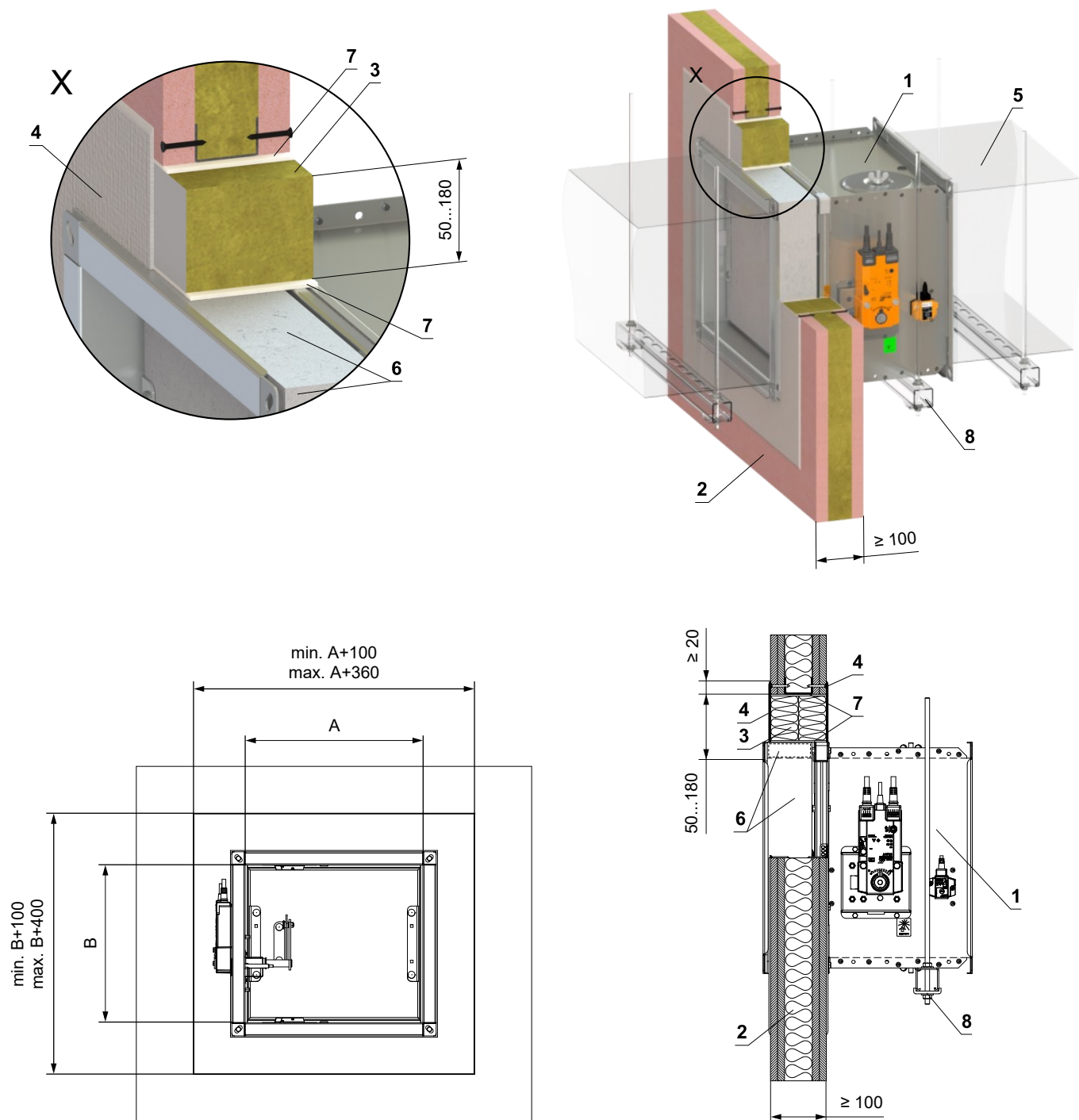
In gypsum wall construction - 4 dampers in battery - mortar or gypsum

EI 120 (v_e i↔o) S

In gypsum wall construction - Ablative Coated Batt

EI 120 (v_e i↔o) S

- For connection following duct → see page 43
- The installation opening is lined with a UW/CW profile.



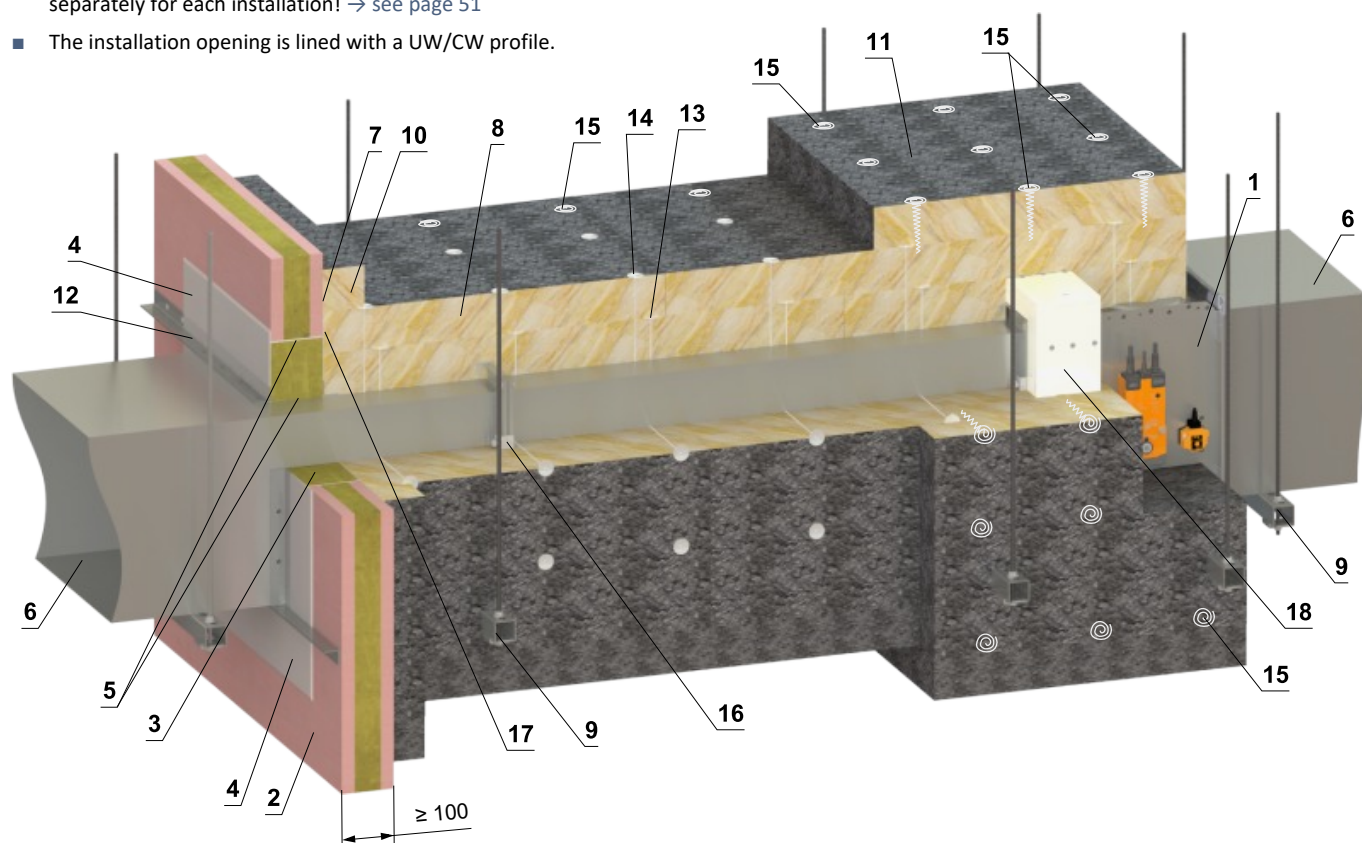
- 1 FDMQ 120
- 2 Gypsum wall construction
- 3 Ablative Coated Batt (e.g. Firestop Board HILTI CFS-CT B 1S 140/50 - min. density 140 kg/m³ + Firestop acrylic sealant HILTI CFS-S ACR or equivalent)
- 4 Fire stop coating thickness 1 mm (e.g. HILTI CFS-CT, PROMASTOP-CC or equivalent)
- 5 Duct
- 6 Protective 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

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

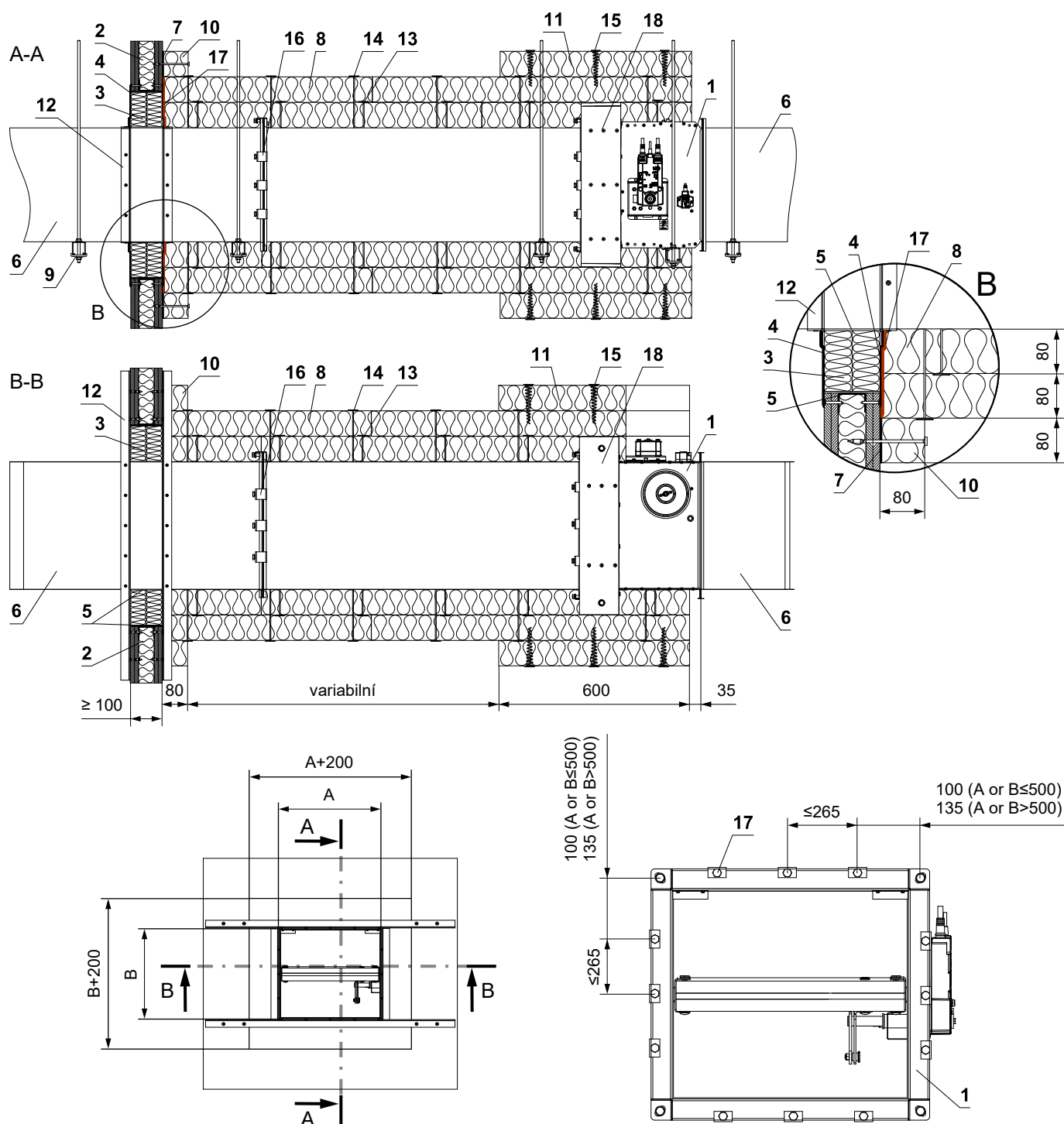
- For connection following duct → [see page 43](#)
- Minimum and maximum distance between the wall and the fire damper is unlimited.
- When installing the insulation, follow the ISOVER manufacturer's instructions.
- The fire damper and duct must be suspended separately.
- The duct must be suspended on 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](#)
- The installation opening is lined with a UW/CW profile.



- | | | | |
|---|--|----|--|
| 1 | FDMQ 120 | 10 | Duct penetration insulation collar - ISOVER Ultimate Protect SLAB 4.0 |
| 2 | Gypsum wall construction | | Alu1, th. 80 mm - glued (pos. 7) and fixed with screws to the wall |
| 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) | | construction |
| 4 | Fire stop coating thickness 1 mm (e.g. HILTI CFS-CT, PROMASTOP-CC or equivalent) | 11 | Insulating collar of the damper and duct connection - ISOVER Ultimate Protect SLAB 4.0 Alu1, th. 80 mm |
| 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) | 12 | L-profile 30x30x3 mm - dimensions and installation acc. to ISOVER manufacturer |
| 6 | Standard air ducts, made of galvanized sheet thickness 0,8 mm, flanges 30 mm, acc. to BS EN 1507 and DIN 24190 | 13 | Stud-welded pins 80 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 | 14 | Stud-welded pins 160 mm - 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) | 15 | Fire spiral shaped screws - quantity and placing acc. to ISOVER manufa. |
| 9 | Fixing profile with threaded rod → see pages 41 to 42 | 16 | Steel clamp min. M8 bolts |
| | | 17 | ISOVER Protect BSF |
| | | 18 | VRM-Q 120 → see page 51 |
- (continued on next page)*

(continued on next page)

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

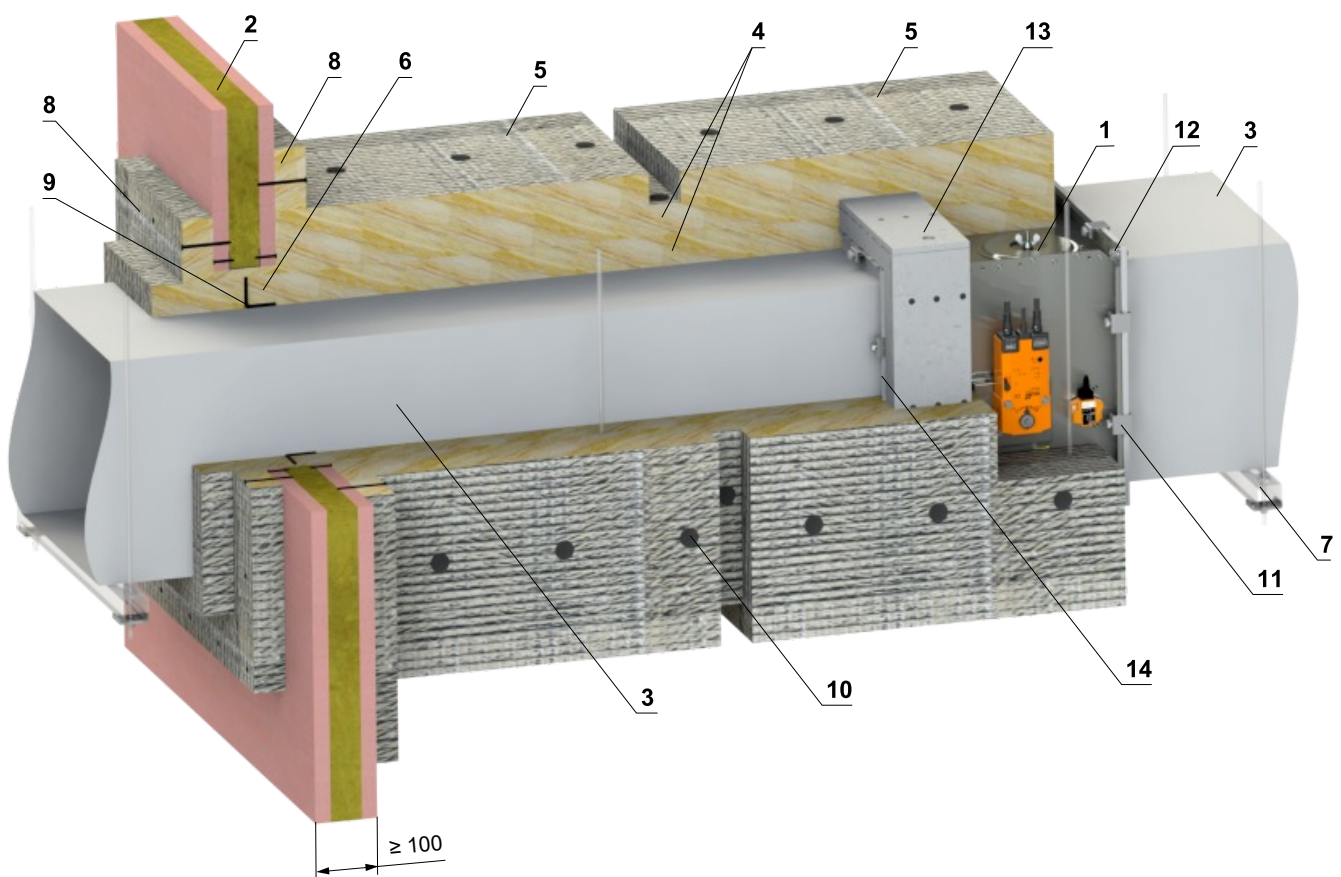


- | | | | |
|---|---|----|---|
| 1 | FDMQ 120 | 10 | Duct penetration insulation collar - ISOVER Ultimate Protect SLAB 4.0 Alu1, th. 80 mm - glued (pos. 7) and fixed with screws to the wall construction |
| 2 | Gypsum wall construction | 11 | Insulating collar of the damper and duct connection - ISOVER 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/m ³ + 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/m ³ (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 BS EN 1507 and DIN 24190 | 15 | Fire spiral shaped screws - 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 | Steel clamp min. M8 bolts |
| 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-SACR) | 17 | ISOVER Protect BSF |
| 9 | Fixing profile with threaded rod → see pages 41 to 42 | 18 | VRM-Q 120 → see page 51 |

Outside gypsum wall construction - Flamebar EN Fire Duct - FPL 110 insulation

EI 120 (v_e i↔o) S

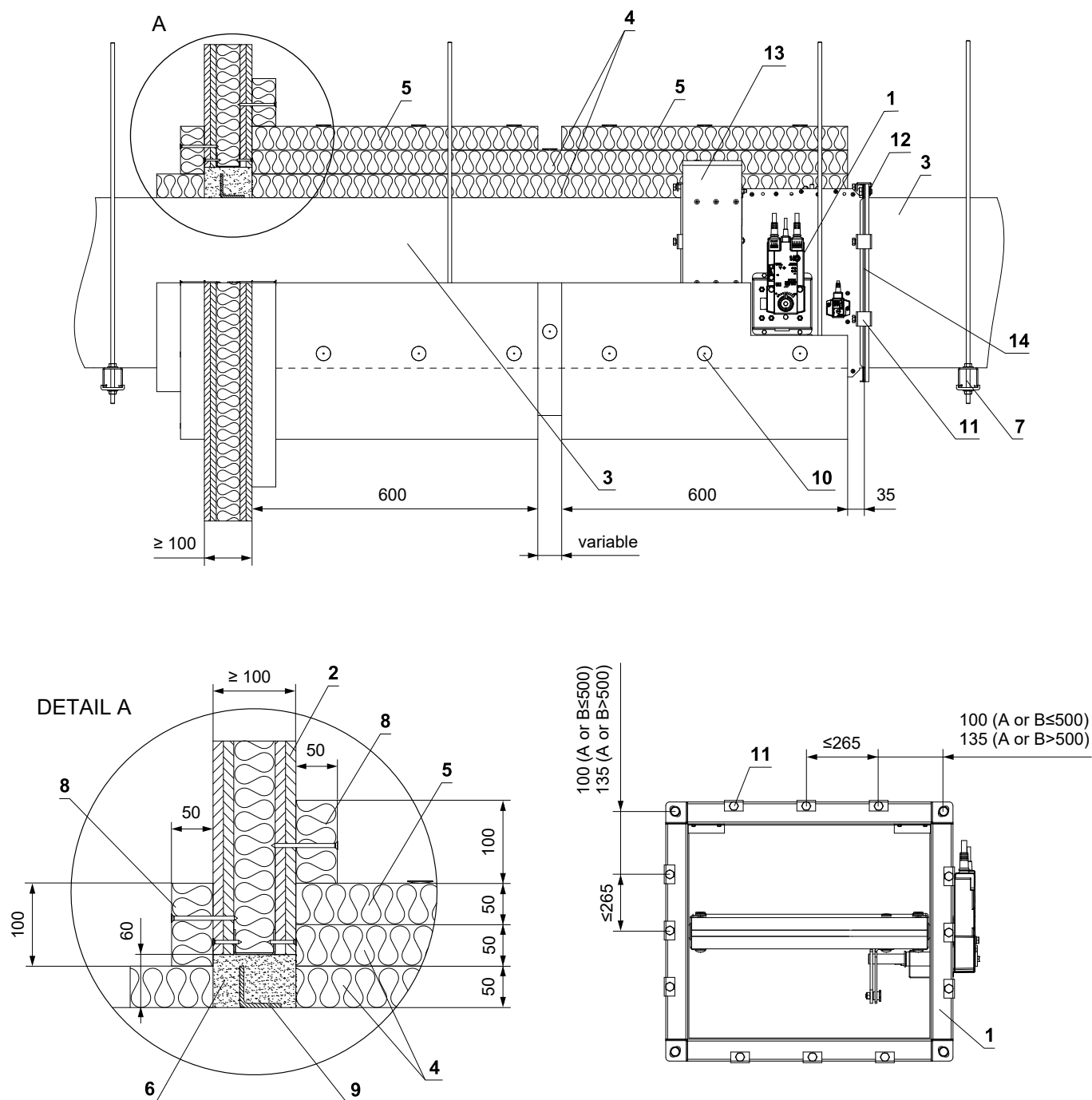
- Minimum and maximum distance between the wall and the fire damper is unlimited.
- The fire damper and duct must be suspended separately.
- The duct must be suspended on both sides of the fire damper in accordance with national standards.
- The duct between the fire damper and the fire separating construction 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
- The installation opening is lined with a UW/CW profile.



- | | | | |
|---|---|----|--|
| 1 | FDMQ 120 | 8 | Penetration insulation pattress - FPL 110 FOIL FACED SLAB, thickness 50 mm - glued with Idenden 10-450 and fixed with screws to the wall construction |
| 2 | Gypsum 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 |
| 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) | 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 |
| 4 | Insulation - two layers of stone wool FPL 110 SLAB, thickness 2x 50 mm, density 105 kg/m ³ , 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 | 11 | Steel clamp - flange connection with Flamebar G-Clamps with M8 bolts, max. spacing 200 mm |
| 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 | 12 | Bolt assembly - flange connection at corners - M10 bolt and nut |
| 6 | Filling - FPL 110 mineral wool - fill the gap between the duct and the wall | 13 | VRM-Q 120 → see page 51 |
| 7 | Fixing profile with threaded rod → see pages 41 to 42 | 14 | Sealing - all joints between duct segments are insulated with Flamebar Fibre Gasket self-adhesive tape and Flamebar Intumescent Sealant |

(continued on next page)

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

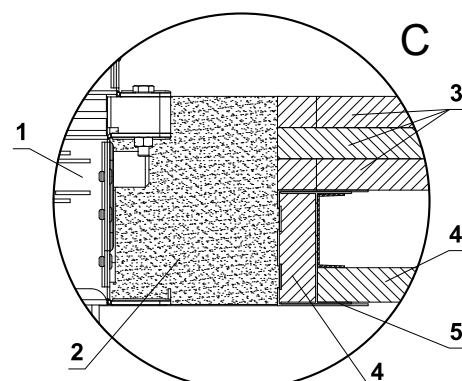
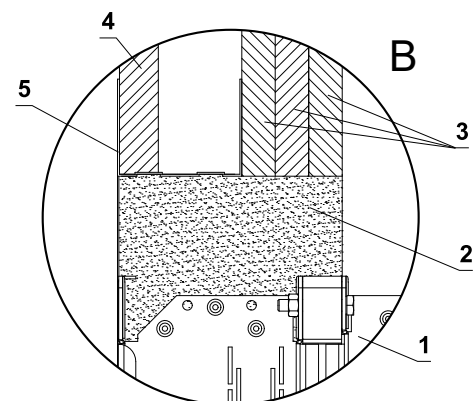
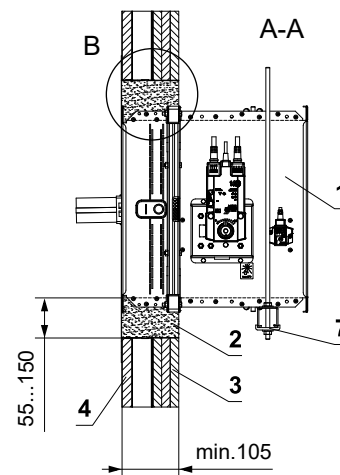
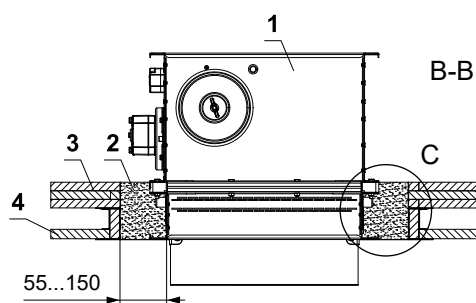
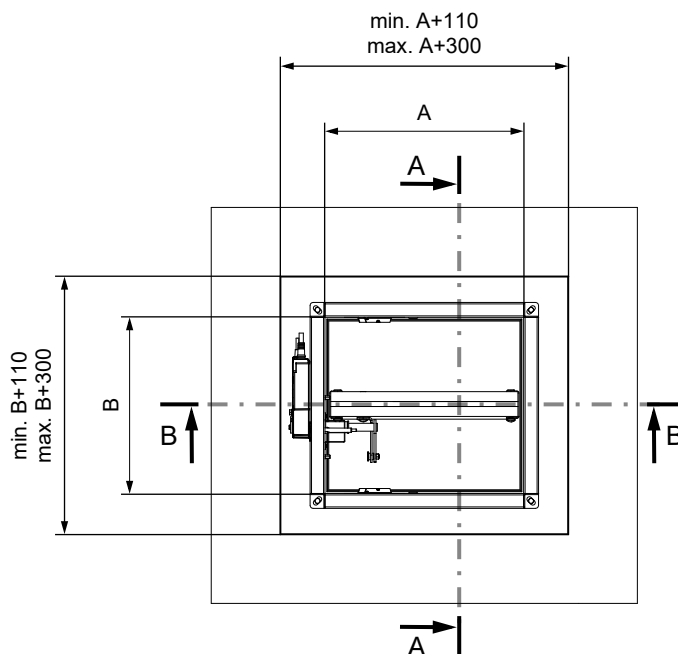
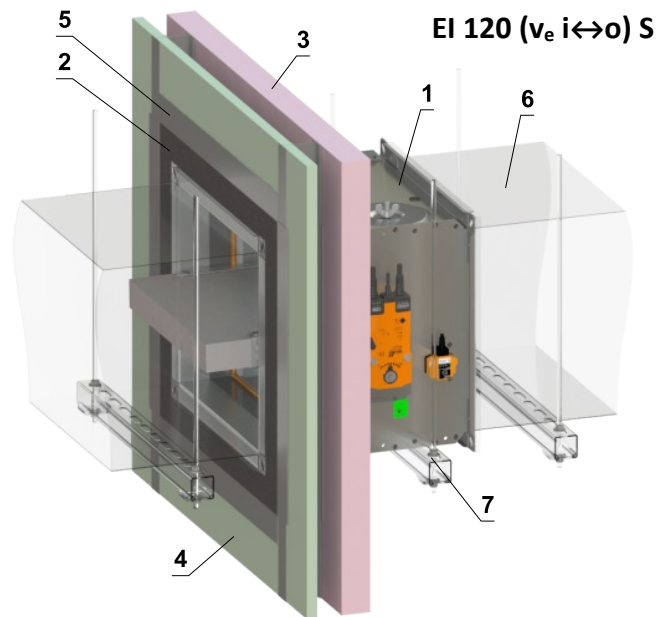


- 1 FDMQ 120
- 2 Gypsum wall construction
- 3 Flamebar EN fire Duct - made of galvanised sheet metal, thickness is dependant on duct size, type BW18 fire sprayed with Flamebar BW18 (insulated duct), type BW11 fire sprayed with Flamebar BW11 (not insulated duct)
- 4 Insulation - two layers of stone wool FPL 110 SLAB, thickness 2x 50 mm, density 105 kg/m³, 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 pattress - 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 or RNS 121, RNS 122... from www.siniat.co.uk
- 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.



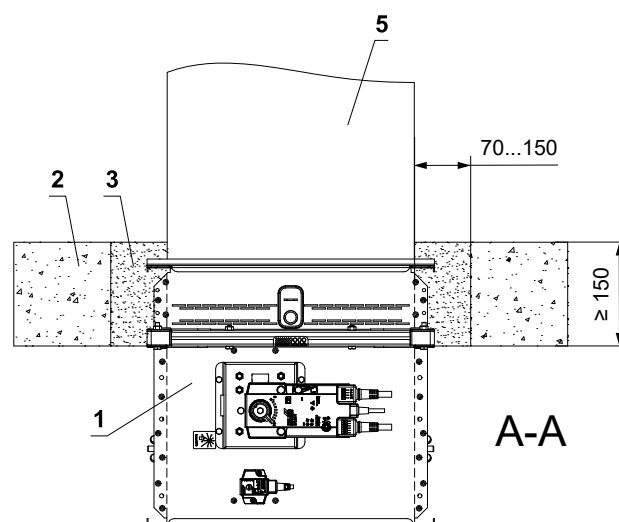
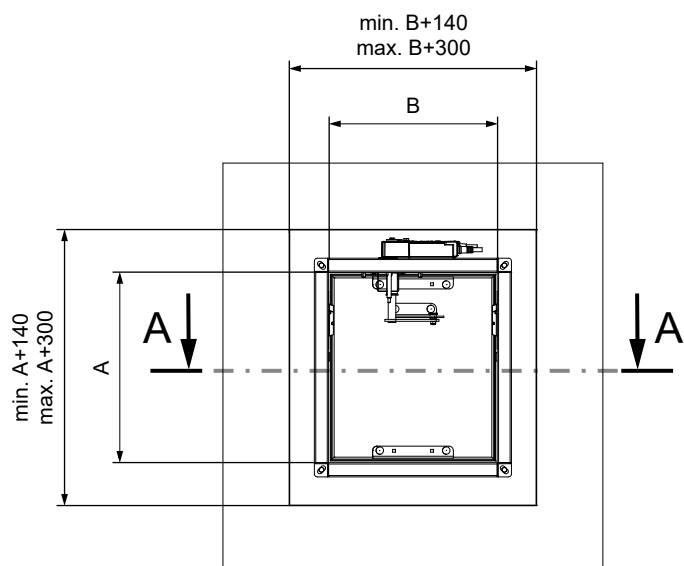
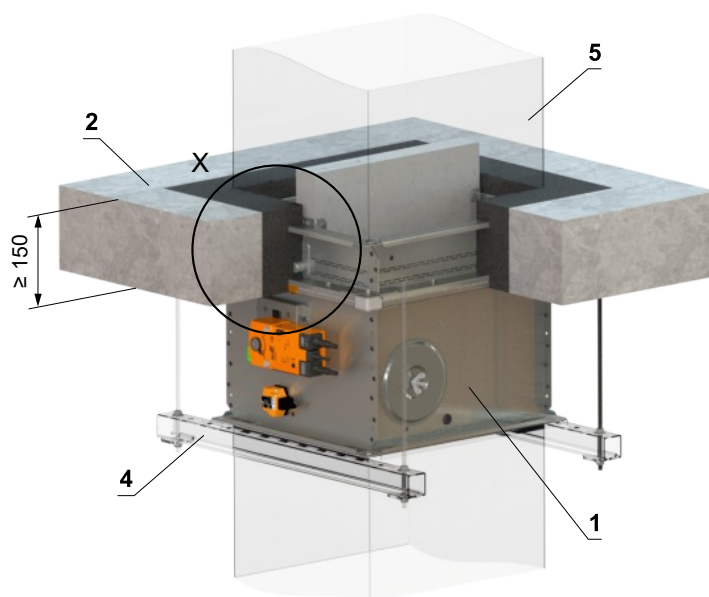
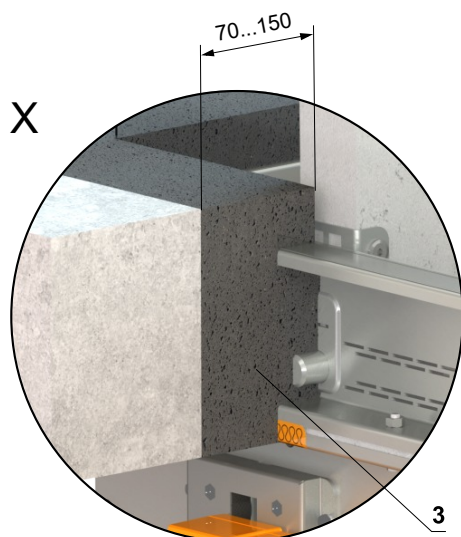
- 1 FDMQ 120
- 2 British gypsum thistle bond 60 (or equivalent can be used) minimum density 670 kg/m³
- 3 Plasterboard BS EN 520 - Type F - min. 3x15 mm
- 4 Plasterboard BS EN 520 - Type F - min. 1x19 mm
- 5 Plasterboard profile
- 6 Duct
- 7 Fixing profile with threaded rod → see pages 41 to 42

Installation in solid ceiling construction

In solid ceiling construction - mortar or gypsum

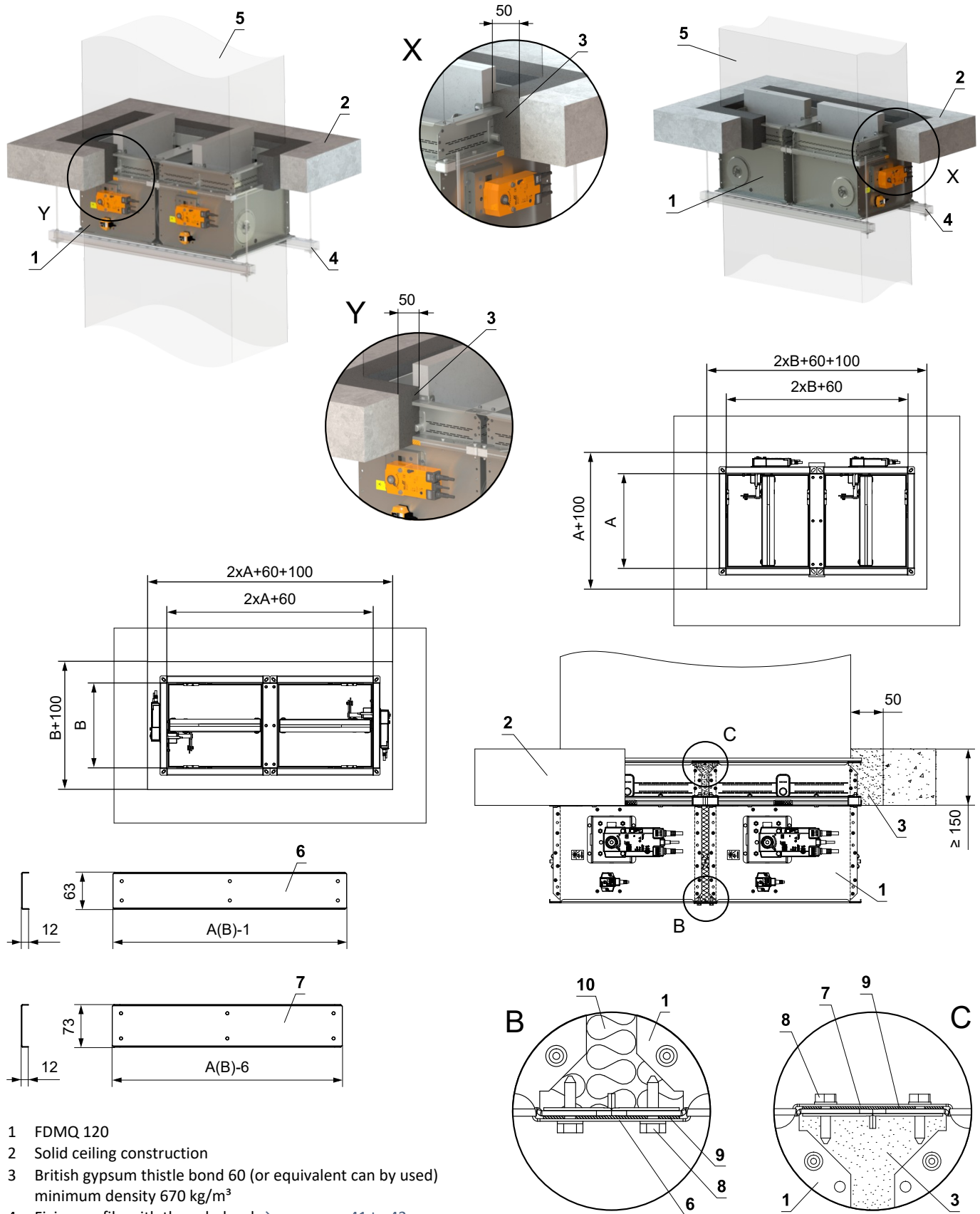
El 120 ($h_o \text{ i} \leftrightarrow o$) S - 500 Pa

- 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 by used)
minimum density 670 kg/m³
- 4 Fixing profile with threaded rod → see pages 41 to 42
- 5 Duct

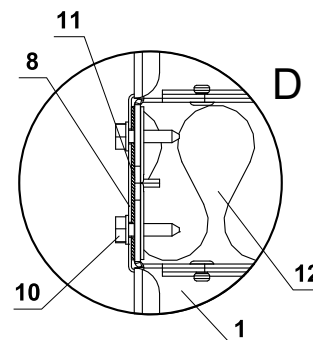
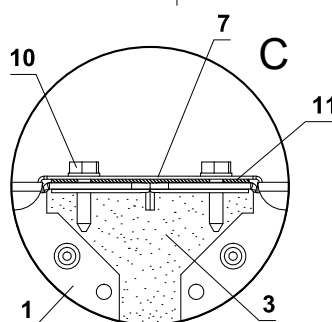
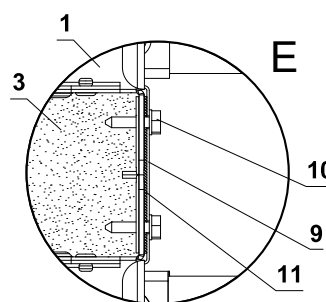
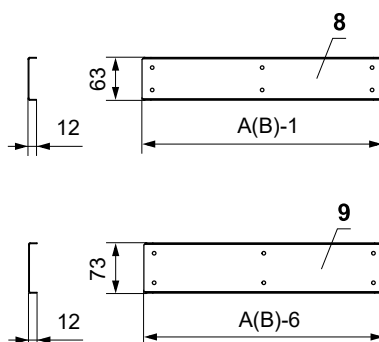
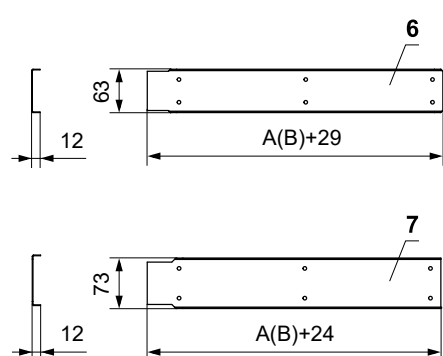
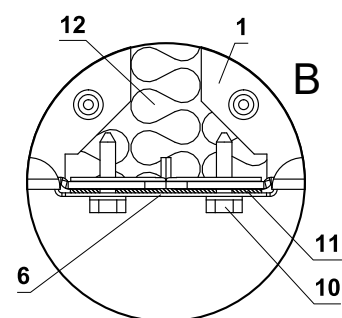
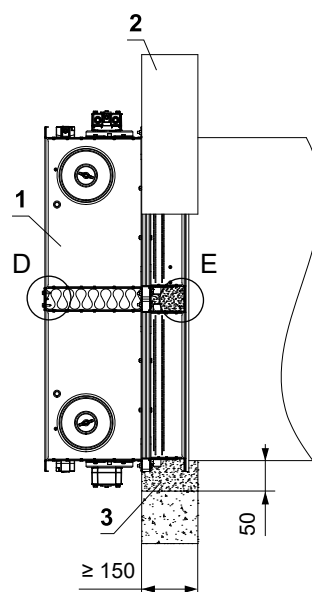
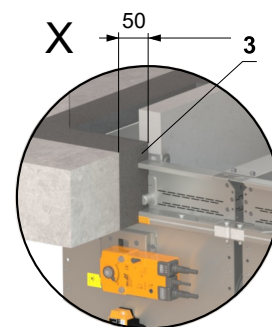
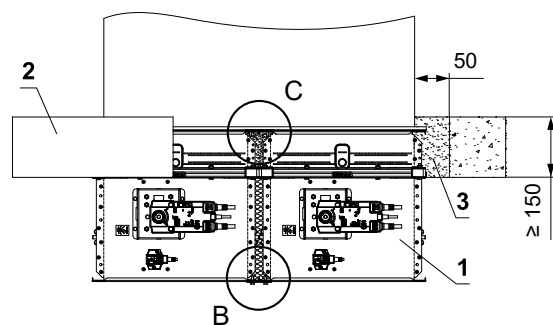
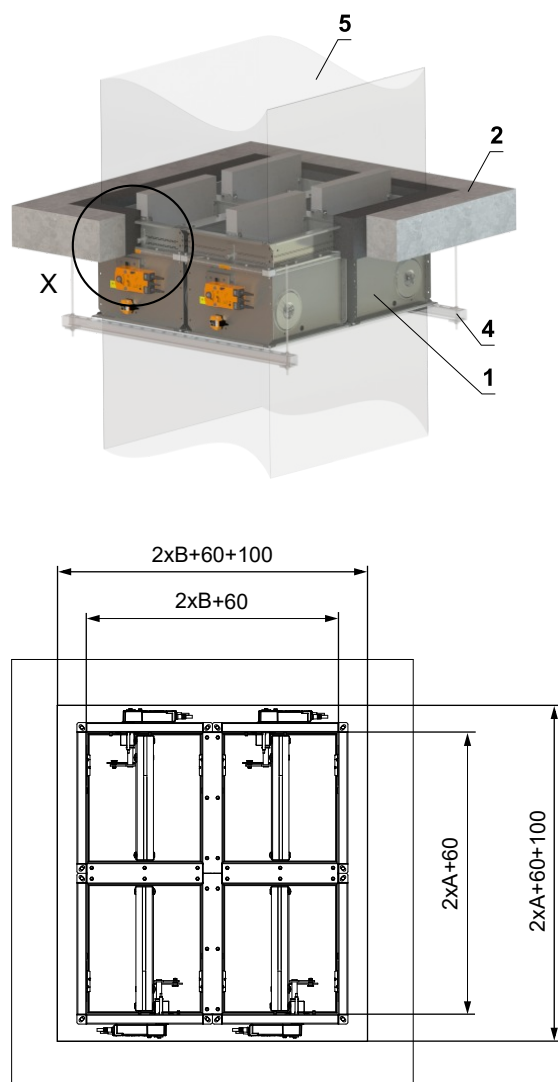
In solid ceiling construction - 2 dampers in battery - mortar or gypsum

EI 120 ($h_o \leftrightarrow o$) S

- 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 ceiling construction - 4 dampers in battery - mortar or gypsum

EI 120 (h_o 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/m³
- 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/m³ (e.g. ISOVER Ultimate Protect SLAB 4), th. 60 mm

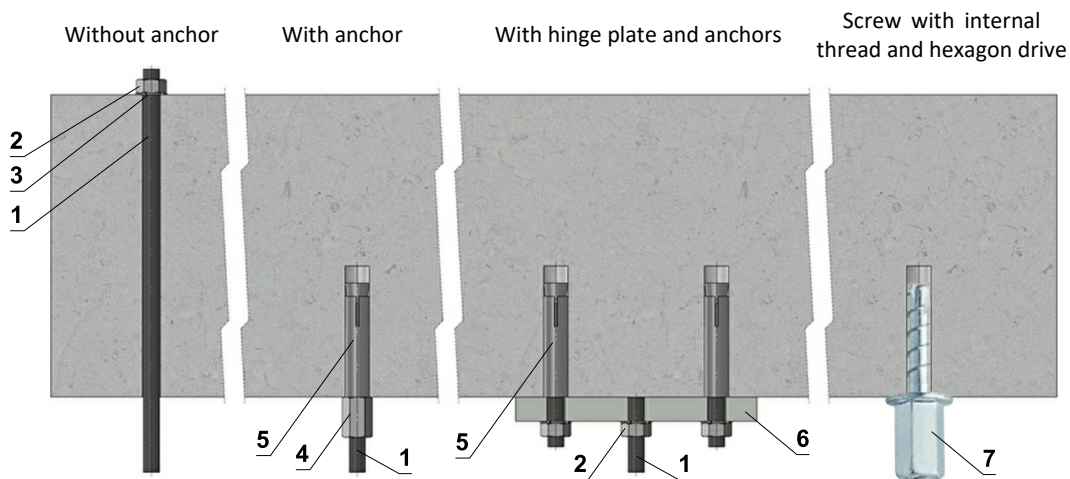
- For connection following duct → see page 43
- Gap between damper and construction is filled by mortar or gypsum
- This installation was tested without supports. Supports are optional, if are used, follow the manufacturer's instructions and national standards.

V. SUSPENSION SYSTEMS

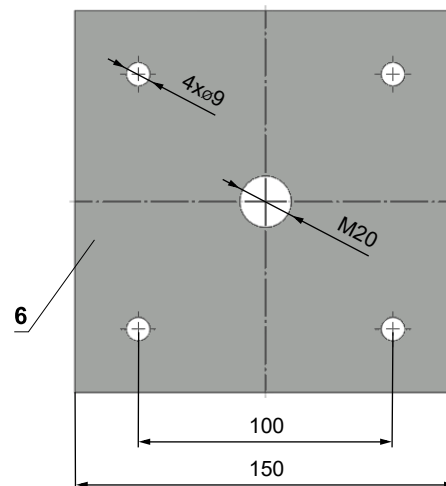
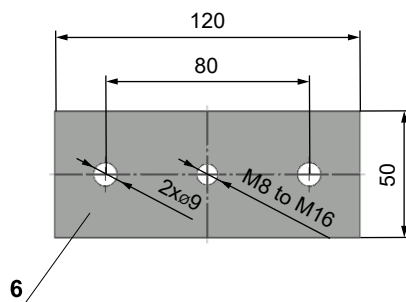
Mounting to the ceiling wall

- 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



Hinge plates



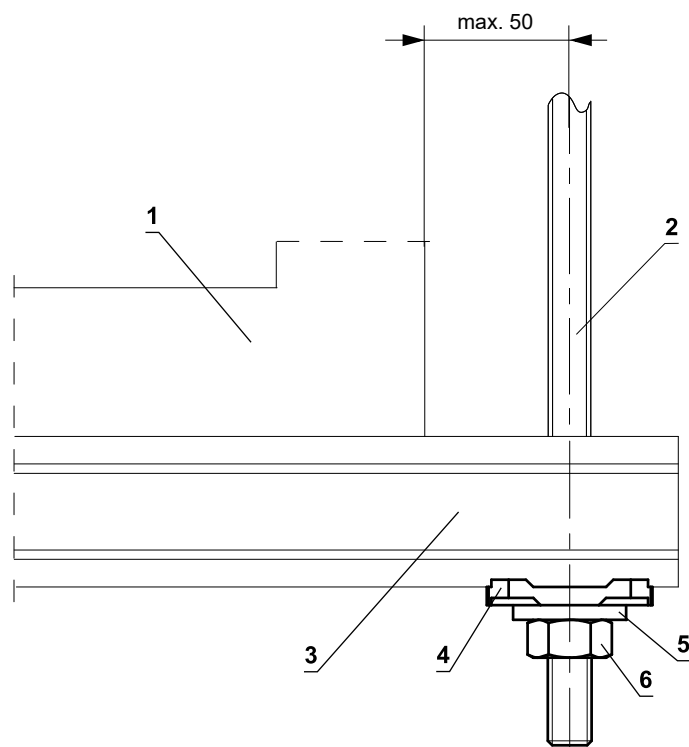
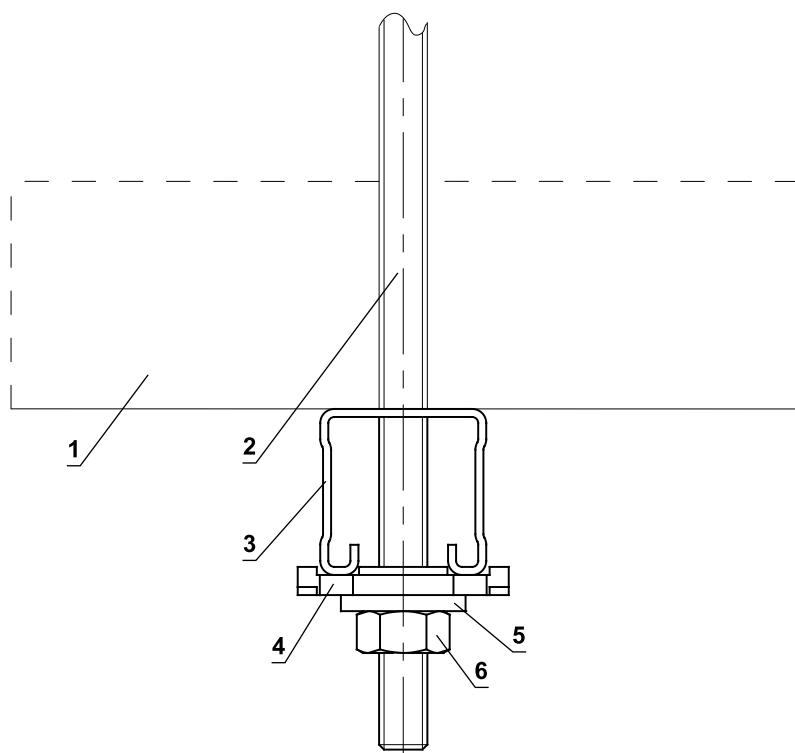
- If in doubt, always consult an anchor specialist engineer such as Halfen or Hilti.

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

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

- 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)

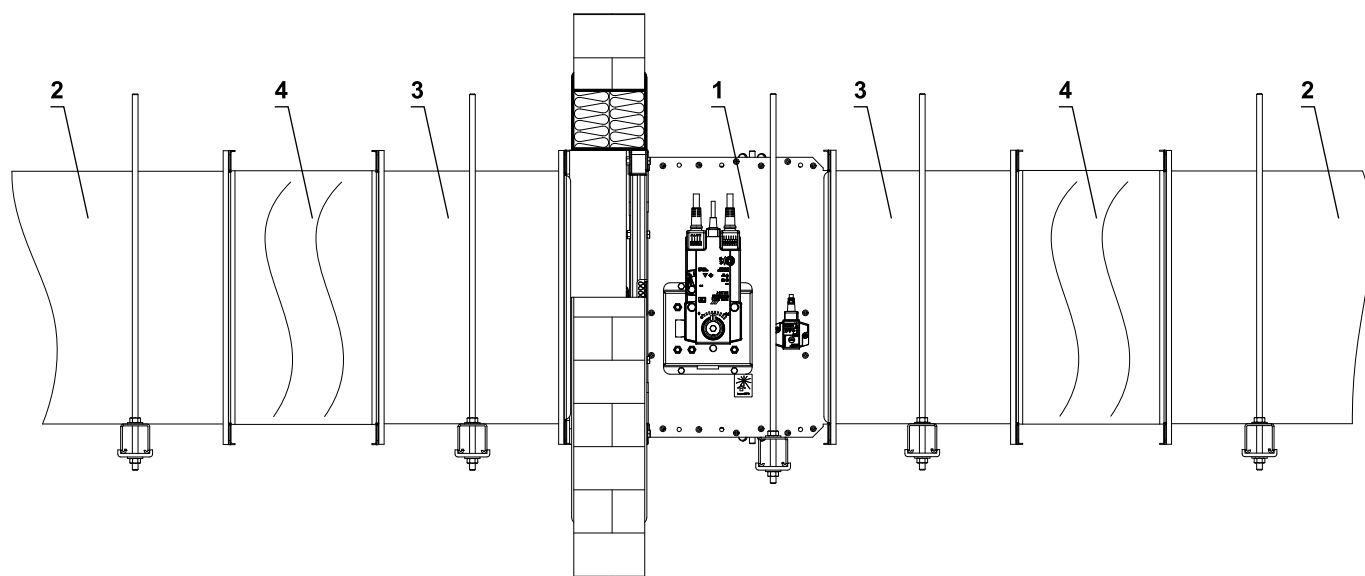
Example of placing of mounting profiles HILTI



- 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

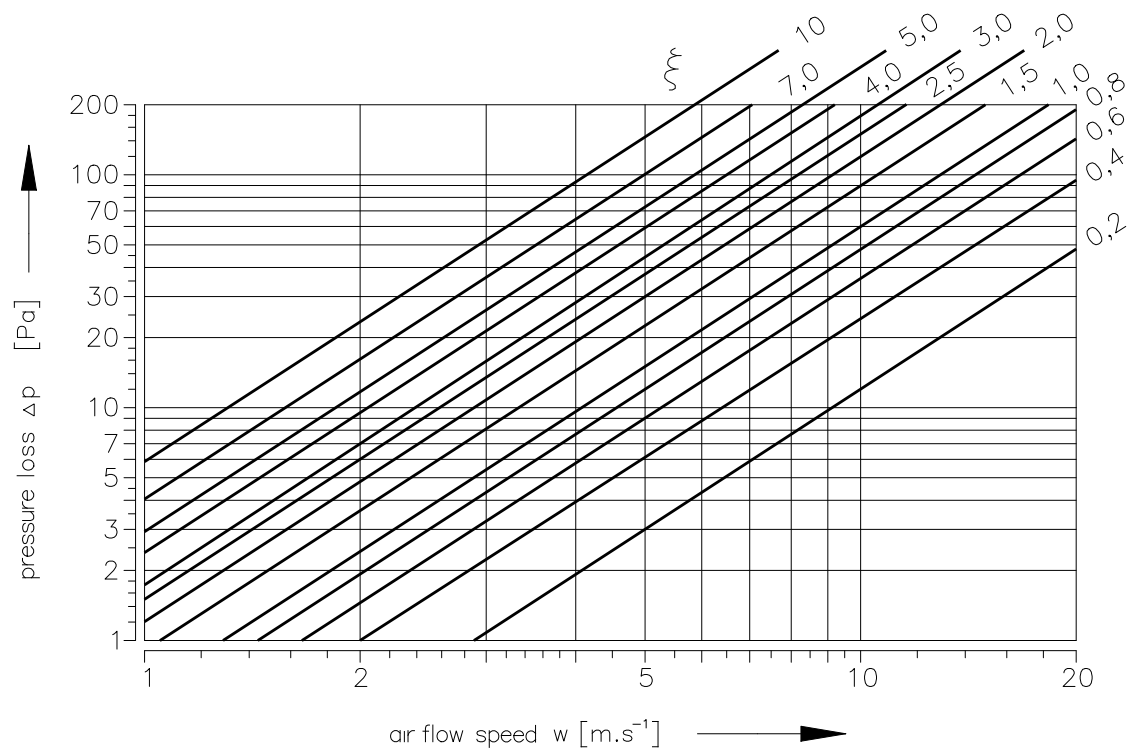
Pressure loss

Pressure loss calculation

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

Δp	[Pa]	pressure loss
w	[m/s]	air flow speed in nominal damper section
ρ	[kg/m³]	air density
ξ	[-]	coefficient of local pressure loss for the nominal damper section → see page 45

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



Noise data

Level of acoustic output corrected with filter A

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

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

Level of acoustic output in octave ranges

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

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

Tables of acoustics values

Level of acoustic output L_{W1} [dB] related to the 1 m ² section																	
w [m/s]	ξ [-]																
	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 – BS EN 1.4301)
- Class A4 – Chemistry-grade stainless steel (AISI 316, 316L – BS EN 1.4401, BS 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).

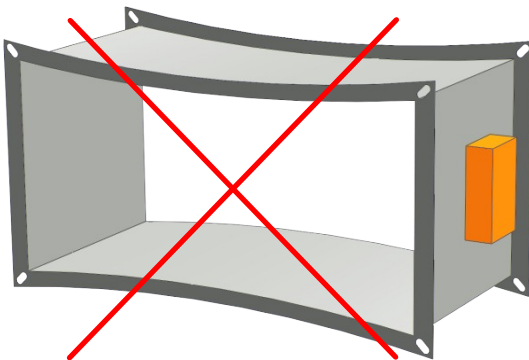
Limit switches

- 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 dismantled).
- 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.

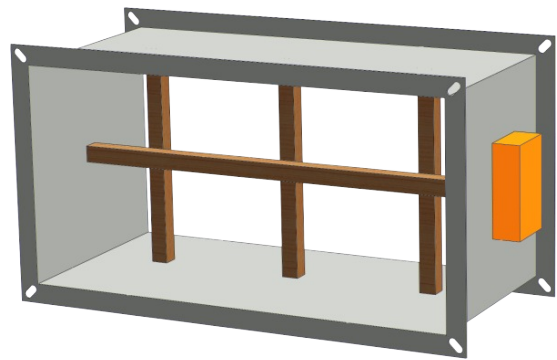
Installation / fixing the damper

- The damper casing shall not be deformed in the course of bricking in.
- 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!

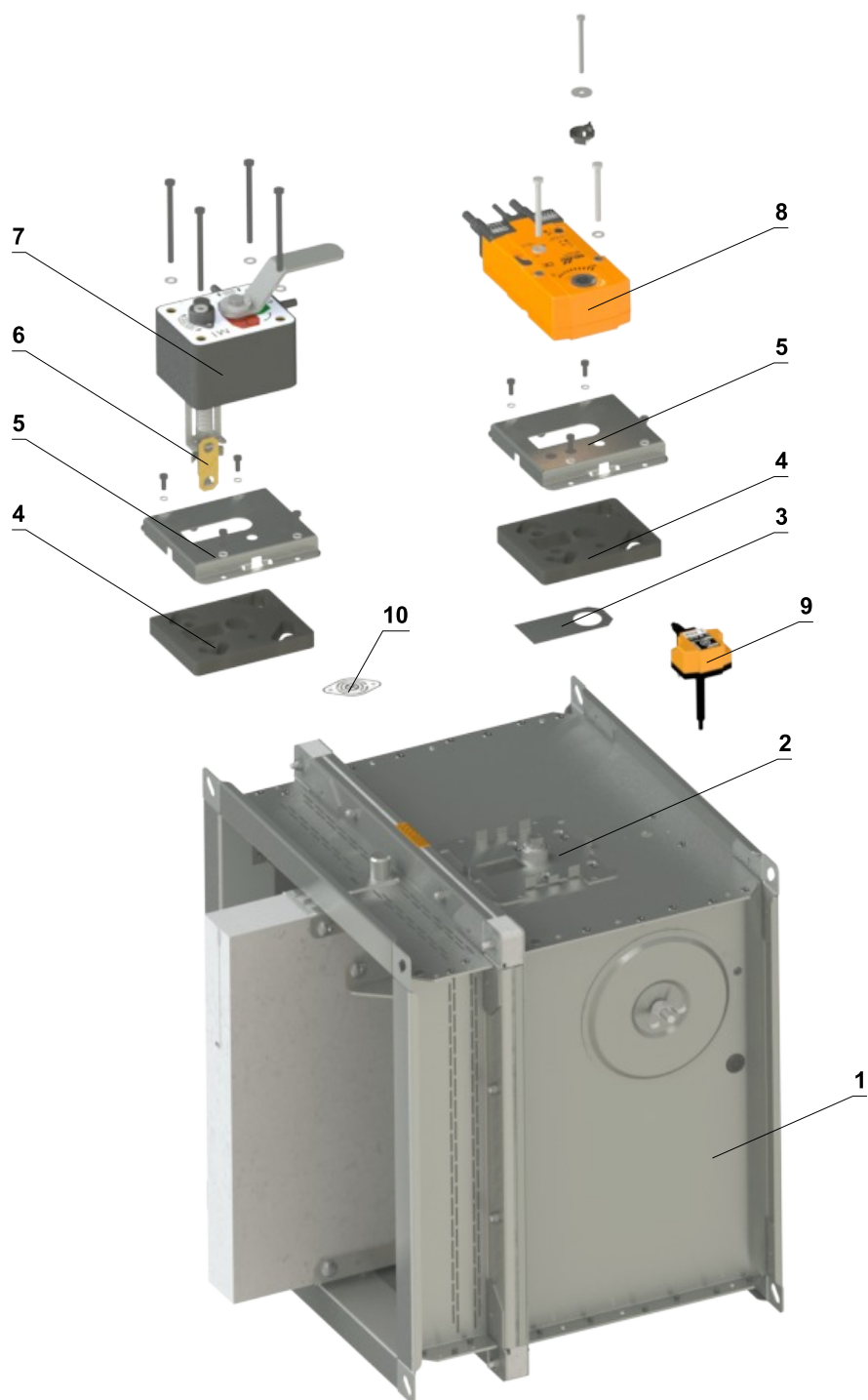


WRONG!



Reinforcement of the casing with wooden beams

Change of manual control for the actuator or vice versa

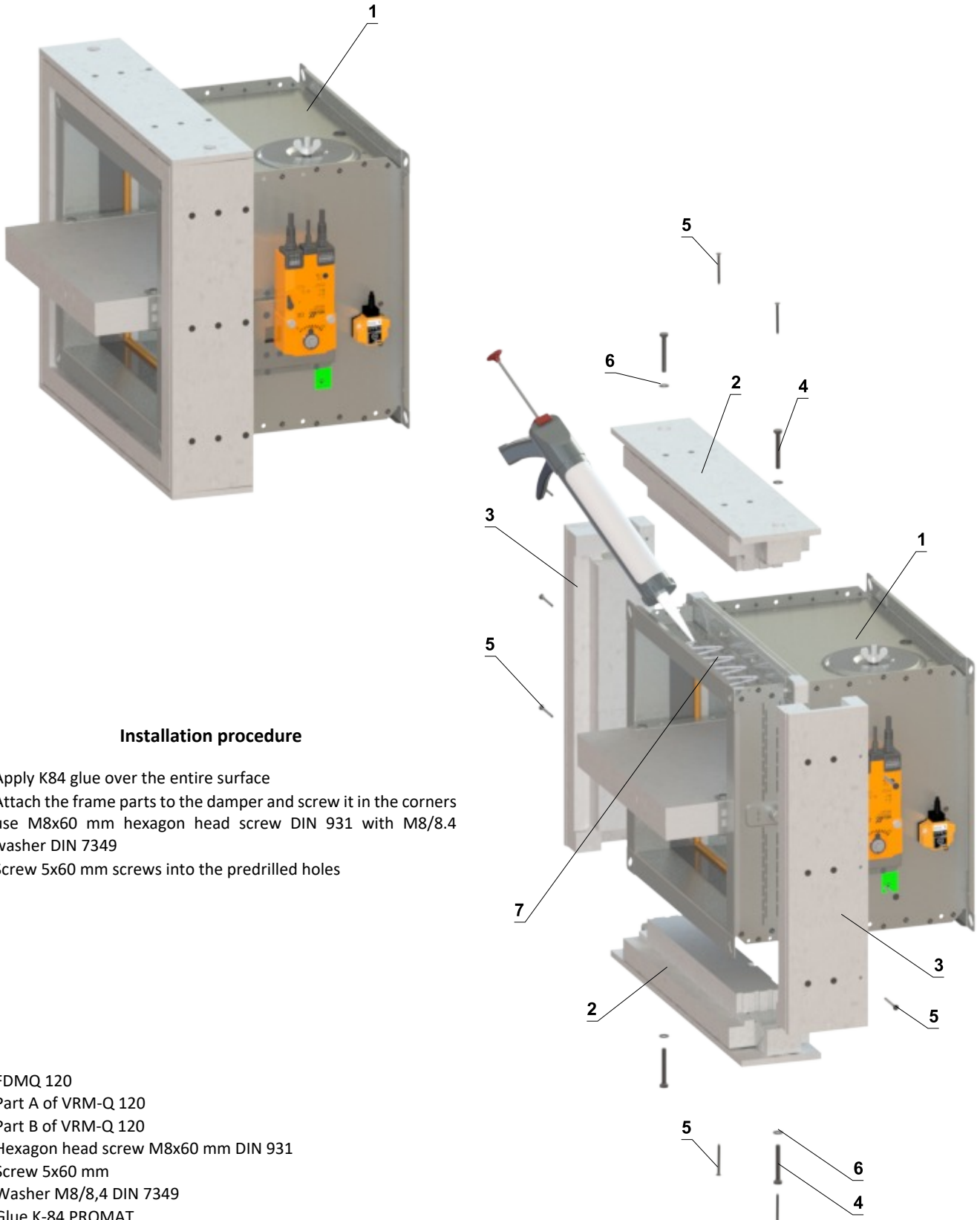


- | | |
|-------------------------------|--|
| 1 Damper | 6 Thermal fuse |
| 2 Mounting plate | 7 Manual control |
| 3 Sealing cover | 8 Spring return actuator |
| 4 Sealing of a mounting plate | 9 Thermoelectric activation device BAT |
| 5 Cover of a mounting plate | 10 Sensor sticker |

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



Installation procedure

- 1) Apply K84 glue over the entire surface
- 2) Attach the frame parts to the damper and screw it in the corners use M8x60 mm hexagon head screw DIN 931 with M8/8.4 washer DIN 7349
- 3) Screw 5x60 mm screws into the predrilled holes

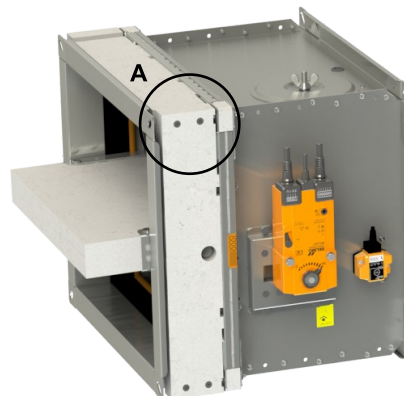
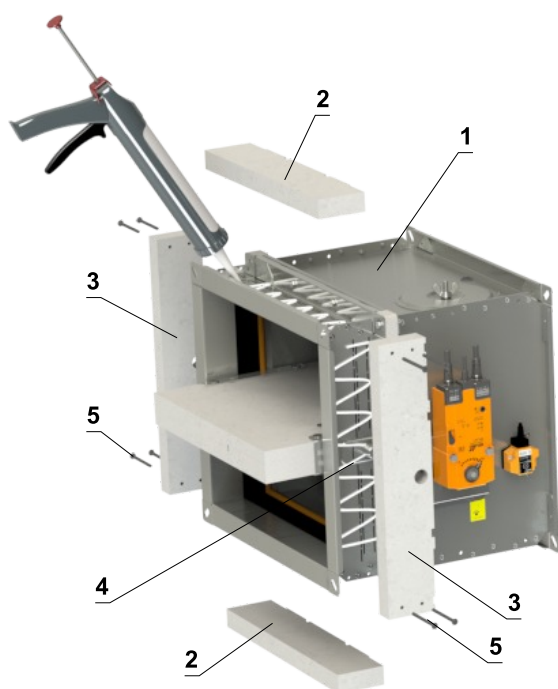
- 1 FDMQ 120
- 2 Part A of VRM-Q 120
- 3 Part B of VRM-Q 120
- 4 Hexagon head screw M8x60 mm DIN 931
- 5 Screw 5x60 mm
- 6 Washer M8/8,4 DIN 7349
- 7 Glue K-84 PROMAT

Protective cladding boards

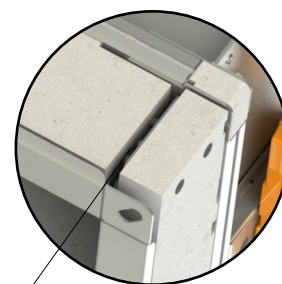
- Protective cladding boards must be used as part of the penetration filling of installation with ablative coated batt
- Can be ordered from MANDIK (installed on the damper or as an accessory) or can be sourced from local supplier
- If protective cladding boards are required, this must be specified in 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



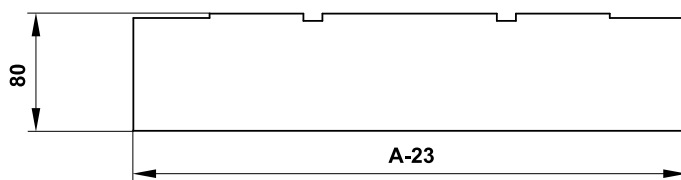
DETAIL A



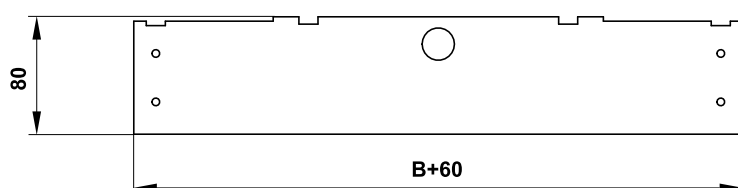
Completely fill the gaps between boards!

- 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



Part B



- Detailed dimensions of protective cladding boards on request

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

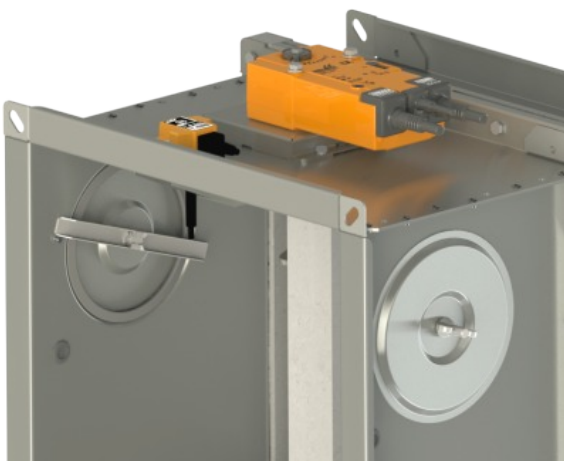
- Check the rotation of the blade to "CLOSED" failure position after disconnection the power supply of the actuator (e.g. by pressing the test button on the thermoelectric activation device BAT or by disconnection the power supply from electrical fire signalization). Check the rotation of the blade back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

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



Inspection opening detail

- 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.

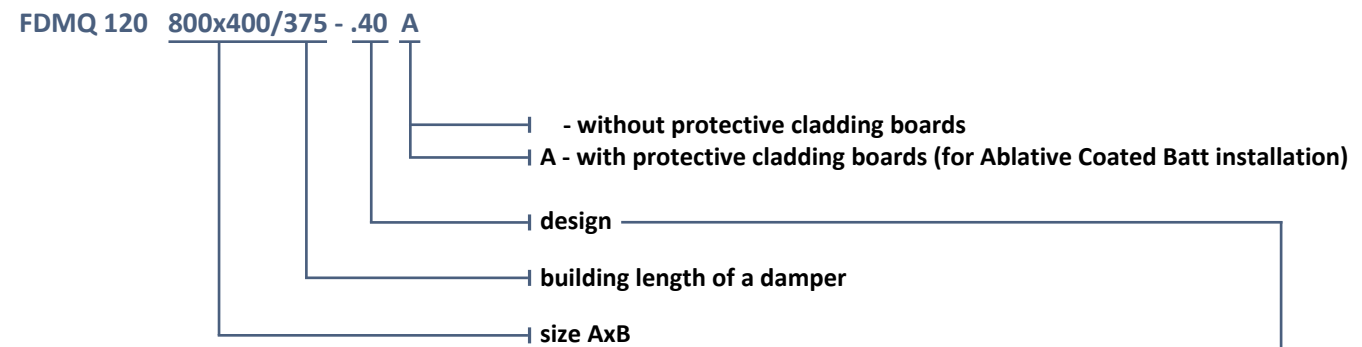
How to proceed after Tf1 or Tf2 fuses have been activated

- 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

X. ORDERING INFORMATIONS

Ordering key

Fire damper



EXAMPLE:
FDMQ 120 800x400/375 - .40 A - 800x400-damper size, /375-building length 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)

MANDÍK®

MANDÍK, a.s.
Dobříšská 550, 267 24 Hostomice, Czech Republic

FIRE DAMPER - XXXX

DIMENSION:

DESIGN:

SERIAL.NO.:

WEIGHT (kg):

CLASSIFICATION:

TPM XXX/XX

Cert. No.: 2822-UKCA-CPR-XXXX, DoP: PM/XXXX/XX/XX/X

EN 15650:2010



MANUAL

UK
CA
2822

MANDÍK®

MANDÍK, a.s.
Dobříšská 550, 267 24 Hostomice, Czech Republic

FIRE DAMPER - XXXX

DIMENSION:

DESIGN:

SERIAL.NO.:

WEIGHT (kg):

CLASSIFICATION:

TPM XXX/XX

Cert. No.: 1391-CPR-XXXX/XXXX, DoP: PM/XXXX/XX/XX/X

EN 15650:2010



MANUAL

CE
1391

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

MANDÍK[®]
www.mandik.co.uk

Manufacturer
MANDÍK, a. s. • Dobříšská 550 • 267 24 Hostomice • Czech Republic • Tel.: +420 311 706 742 • E-Mail: mandik@mandik.cz
Authorized representative
MANDIK UK Ltd • 130 Aztec West • Bristol BS32 4UB • United Kingdom • Tel.: +44 117 4526376 • E-Mail: help@mandik.co.uk