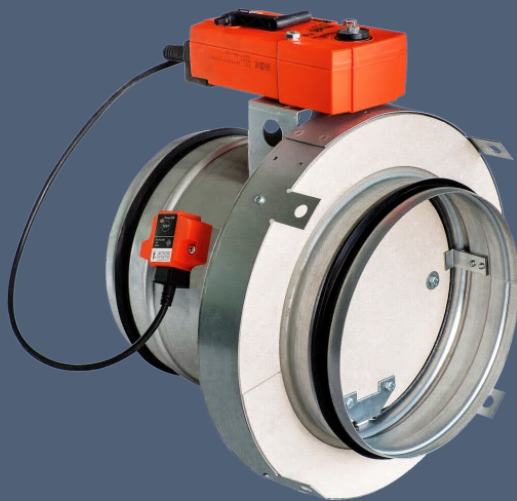


# MANDÍK<sup>®</sup>

## FIRE DAMPER FDMS and FDMS-VAV



These technical specifications state a row of manufactured sizes and models of fire dampers (further only dampers) FDMS / FDSM-VAV. It is valid for production, designing, ordering, delivery, assembly and operation.

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In case of products with "P-mark" certification from RISE Institute in Sweden these technical specifications must be meet in addition to the standard design:

- In addition to activation by means of thermal fuses or links in the actuator, the damper must also be activated by smoke detectors and/or heat detectors that have been installed in suitable positions.
- The smoke and heat detectors used together with the fire damper must be designated and constructed in accordance with one of the following standards EN 54-5, EN 54-7, EN 54-12 or EN 54-20.
- The damper must be controlled by an actuator connected to a higher-level supervisory and control system.
- Correct operation of the damper must be verified by automatic testing of its function at least once per 48 hours.

After reaching o these requirements the product will be provided with this certificate:

- Certified body - RISE Certifiering.
- Number of the certificate - SC1433-17.



## ■ GENERAL INFORMATION

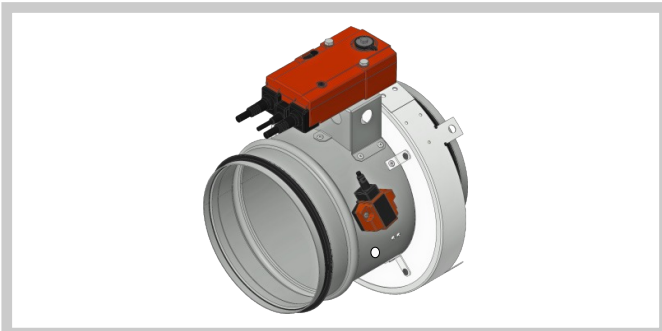
### Description

Fire dampers are shutters in ventilation duct systems that preventing spreading the fire and combustion gases from one fire compartment to the other one by shutting or closing the air duct in the positions of fire separating constructions. In the case of FDMS the fire dampers blade closes automatically air duct using a shutting spring or an return spring of its actuating mechanism in case of fire. In the case of FDMS-VAV the fire damper has an additional function of the variable air flow controller. The return spring of the actuator is started when the thermal fuse is activated or the actuator is without power supply. In the case of thermal electrical fuse the activation (closing) procedure starts, when a reset button on fuse is pushed or when a power supply of the actuating mechanism is stopped. In case FDMS of mechanical control with thermal fuse, the return spring is activated after the moment, when thermal fuse is melted. The damper's blade is sealed with a silicon gasket/packing preventing smoke penetration after closing the blade. At the same time, the damper's blade will be tighten by intumescent tape, which will be expanding in the case of fire. Dampers have no inspection door. For inspection of the damper, there is an inspection hole for camera. For others service works there must be installed inspection door externally on the duct, next to the fire damper. The damper is equipped with additional collar, around the position of the blade. On the collar, there are positioned several metallic plates (fixtures for easy installation on the wall or ceiling construction).

FDMS with mechanical control



FDMS with actuating mechanism



FDMS-VAV only with actuator



### Damper characteristic

- CE certified acc. to EN 15650
- Tested in accordance with EN 1366-2
- Classified acc. to EN 13501-3+A1
- Fire resistance EIS 45, EIS 60, EIS 90
- External casing leakage class min. C, internal leakage class 2 acc. EN 1751
- In case of FDMS cycling test in class C 10 000 acc. to EN 15650.
- In case of FDMS-VAV cycling test in class C 20 000 acc. to EN 15650 - C<sub>MOD</sub> classification
- Corrosion resistant acc. to EN 15650
- ES Certificate of conformity No. 1391-CPR-2020/0131
- Declaration of performance No. PM/FDMS/01/20/2, PM/FDMS-VAV/01/20/2
- Hygienic assessment of fire dampers - Report No. 1.6/pos/19/19b

### Working conditions

Fire damper's proper functioning is determined by the following working conditions:

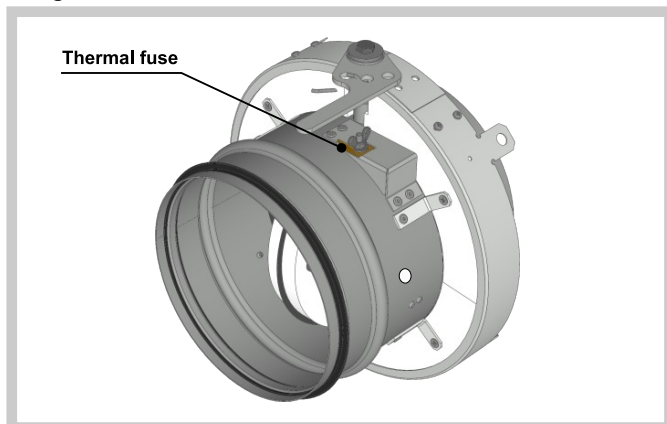
- Maximum air speed: 12m/s.
- Maximum pressure difference: 2500 Pa.
- Operation of the dampers does not depend on the direction of air-flow (circulation). In case of FDMS-VAV the direction of air-flow is strictly given.
- FDMS can be located in any (arbitrary) position.
- Dampers are suitable for ventilation air systems not containing any abrasive, chemical and adhesive particles.
- Dampers are designed for macroclimatic areas with mild climate according to EN 60721-3-3.
- Temperature in the place of installation is permitted to be in the range from -30°C to +50°C.

**Damper design FDMS**

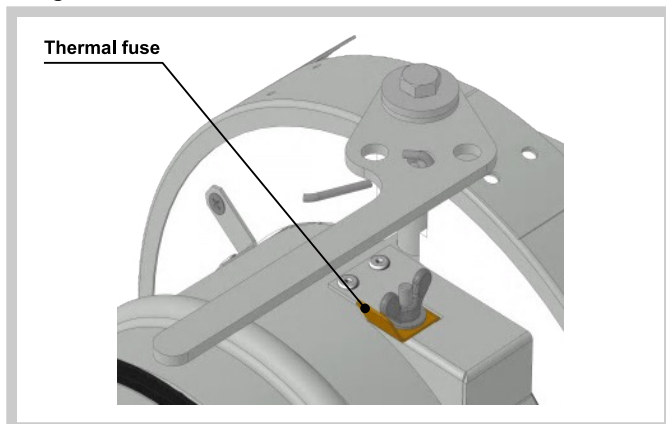
**Design .01 - damper with mechanical control**

Design with mechanical control with a thermal protective fuse which actuates the shutting device within 120 seconds, when the nominal temperature reaches 72°C. Automatic initiation of the shutting device is not activated if the temperature does not exceed 70°C.

**Design .01**



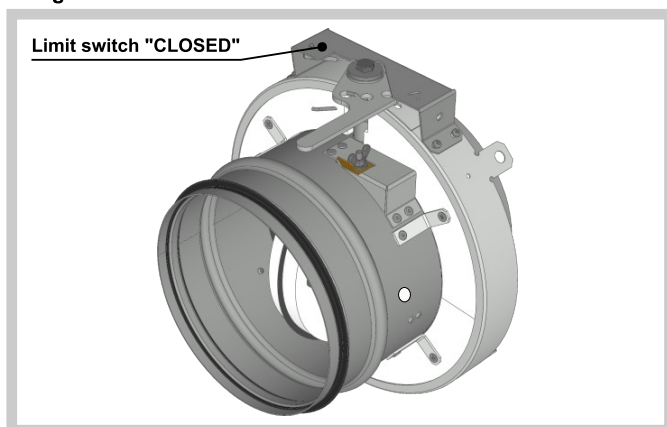
**Design .01 - Thermal fuse**



**Design .11 - damper with mechanical control and limit switch "CLOSED"**

Design with mechanical control can be complemented with a limit switch signaling the damper's blade position "CLOSED". Limit switch is possible connect to the building management system or superordinate control system by wires, which are mounted to the switch.

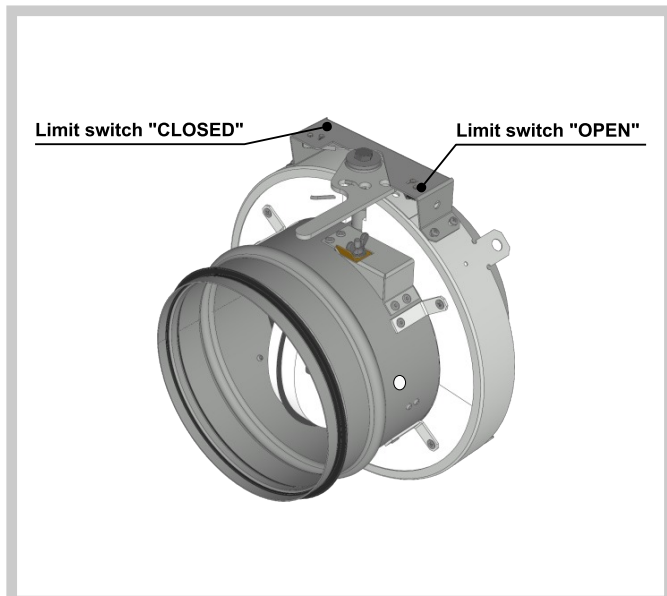
**Design .11**



**Design .80 - damper with mechanical control, limit switches "CLOSED" and "OPEN"**

Design with mechanical control can be complemented with a limit switch signaling the damper's blade position "CLOSED". Limit switch is possible connect to the building management system or superordinate control system by wires, which are mounted to the switch.

**Design .80**



**Limit switch type G905-300E05W1**

Type	G905-300E05W1
Nominal voltage and maximal current	AC 230V / 5A
Class of protection	IP 67
Working temperature	-25°C ... +120°C

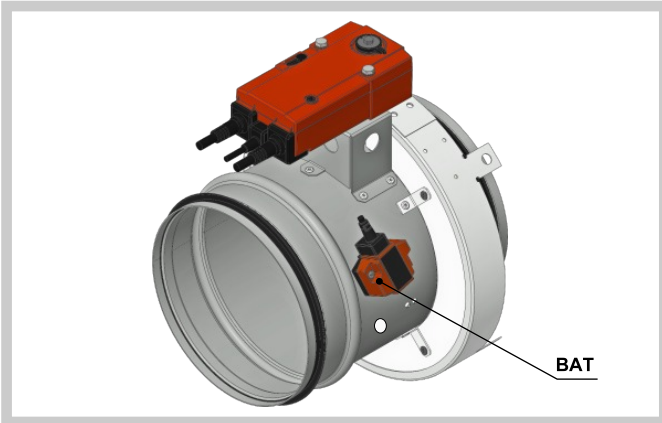
1(COM) - black wire  
 2(NC) - gray wire  
 4(NO) - blue wire

This limit switch is possible to connect in following two versions:  
 a) **CUT-OFF** if the arm is moving ... connect wire 1+2  
 b) **SWITCH-ON** if the arm is moving ... connect wire 1+4

**Design .40 and .50 - damper with electrical actuator**

The damper can be equipped with electric actuating mechanism. There are several actuators: BELIMO BFL, BFN 230-T (version .40) or BFL, BFN 24-T (version .50). After connection to the power supply AC/DC 24V or AC230V, the actuating mechanism displaces the damper blade into operation position "OPEN". At the same time is pre-stretched back spring inside the actuator. When the actuator is under voltage (on power supply), the damper's blade is in the position "OPEN". The back spring is pre-stretched. Time needed for full opening of the damper blade from the position "CLOSED" to the position "OPEN" is maximum 60s. If the power supply of the actuator is cut off (due to disconnection of power supply, or pressing the reset button on the thermo-electrical starting mechanism BAT (thermal fuse), the back spring displaces the damper's blade into the safety position "CLOSED". The time needed for displacing of the blade from the position "OPEN" to the position "CLOSED" takes maximal 20s. In the case that the power supply is restored again (the blade can be in arbitrary position), the actuator starts re-displacing the damper's blade position into the emergency position "OPEN". The thermos-electrical mechanism BAT, which contains two thermal fuses Tf1 and Tf2, is a part of actuator. These fuses are activated when temperature +72°C has been exceeded. The fuse Tf1 measures the temperature in the outside of the damper and Tf2 measure the temperature inside the air duct. Both fuses, they are in serial connection. It means in fact, that when one of them is activated, the power supply of the actuator is cut-off and the actuator displaces the blade in safety position "CLOSED". The signalization of damper position "OPEN" or "CLOSED" is provided by two limit switches, which are built-in inside the actuator. The thermal fuse BAT can be also installed separately, into the spiral air duct, outside of the fire damper (order code for this option is .4V or .5V - see the product code).

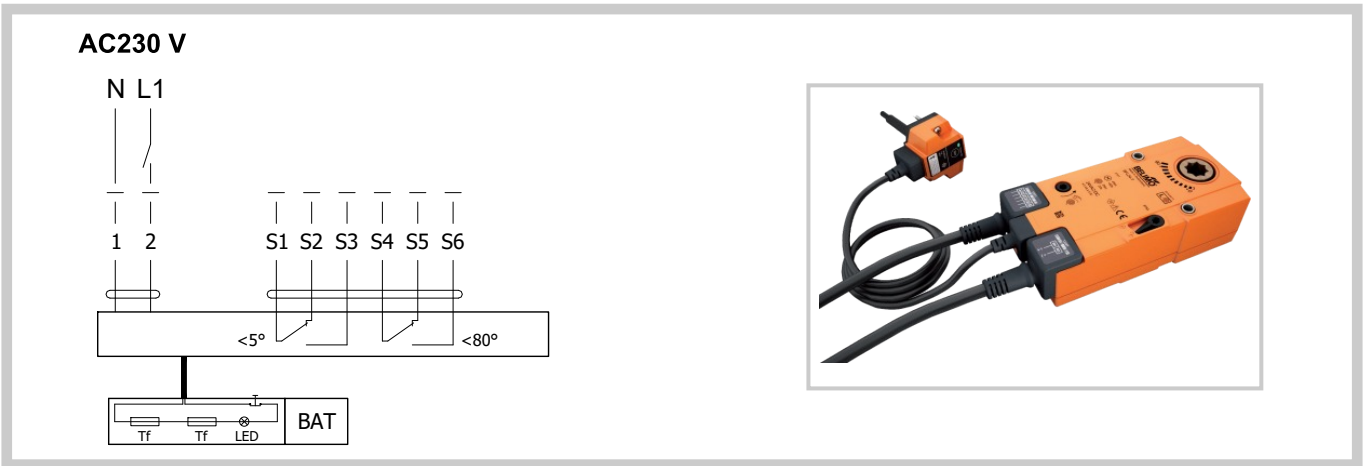
**Design .40 and .50**



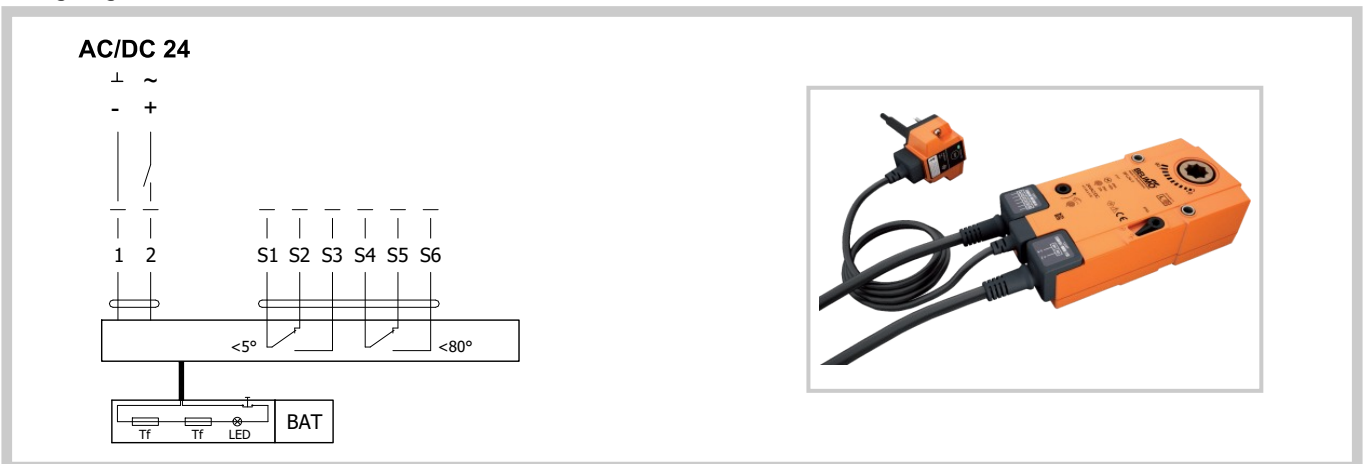
**Design .4V and .5V**



**Wiring diagram of the actuator BFL 230-T, BFN 230-T**



**Wiring diagram of the actuator BFL 24-T, BFN 24-T**



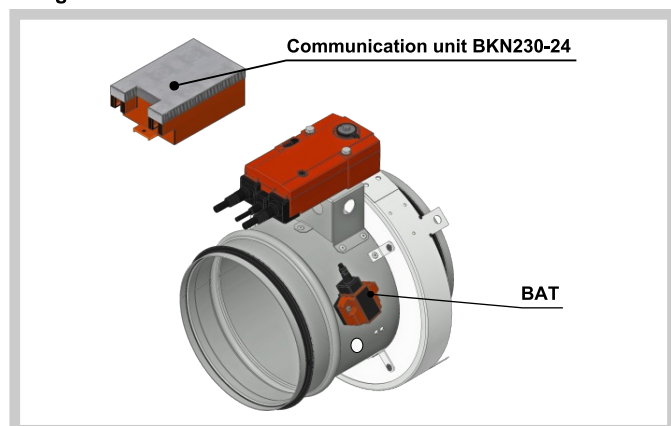
Electrical data for actuators BFL 24-T(-ST), BFN 24-T(-ST), BFL 230-T, BFN 230-T

ACTUATING MECHANISM BELIMO	BFL, BFN 230-T	BFL, BFN 24-T(-ST)
Nominal voltage	AC 230 V 50/60 Hz	AC 24 V 50/60 Hz DC 24 V
Power consumption - motoring - holding	3,5/5 W 1,1/2,1 W	2,5/4 W 0,8/1,4 W
Dimensioning	6,5/10 VA (Imax 4 A @ 5 ms)	4/6 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	
Connecting - motor - auxiliary switch	cable 1 m, 2 x 0,75 mm <sup>2</sup> (BFL/BFN 24-T-ST) with 3-pin plug-in connectors cable 1 m, 6 x 0,75 mm <sup>2</sup> (BFL/BFN 24-T-ST) with 6-pin plug-in connectors	
Thermal trips	duct outside temperature 72 °C duct inside temperature 72 °C	

**Design .60 - damper with electrical actuator and communication and supply device**

This is design with the communication and supply device BKN230-24 and the actuator BFL (BFN) 24-T-ST. It simplifies electrical wiring and interconnection of fire damper. This design facilitates checking of the damper on site and enables central control and check of fire damper during by a simple "2-wire" wiring with superordinate control unit. BKN230-24 is working as a decentralized network device for supplying of the actuator BFL (BFN) 24-T-ST on one hand and on the other hand it transmits the signal information about the fire damper position and failure. Control command SWITCH-ON and SWITCH-OFF from superordinate system controls via the same wiring to the actuating mechanism. To allow more simple connection, the actuator BFL (BFN) 24-T-ST is equipped with two connecting plugs (one with three jacks and one plug with six jacks). They are inserted directly to BKN230-24. BKN230-24 is supplied with a conductor and EURO-plug for connecting to the 230V mains. Two wire cable from superordinate system is connected to BKN230-24 by means of clamps 6 and 7 in BKN. If the drive is supposed to be controlled without any signal from the superordinate, it can be switch-on by means of a bridge between clamps 3 and 4 in BKN. A green LED diode on BKN230-24 is lighting in case the voltage 24V is present in the drive. If the TEST button on BAT is switched-on or if the power supply (e.g. by a signal from ELECTRICAL FIRE SIGNALISATION) is disconnected, the fire damper position will be "FAILURE". It means damper blade goes in position "CLOSED". Communication and supply device BKN230-24 has to be placed near the damper (BKN isn't mounted on damper body). It is necessary for easy connection of actuator equipped by BKN230-24 device.

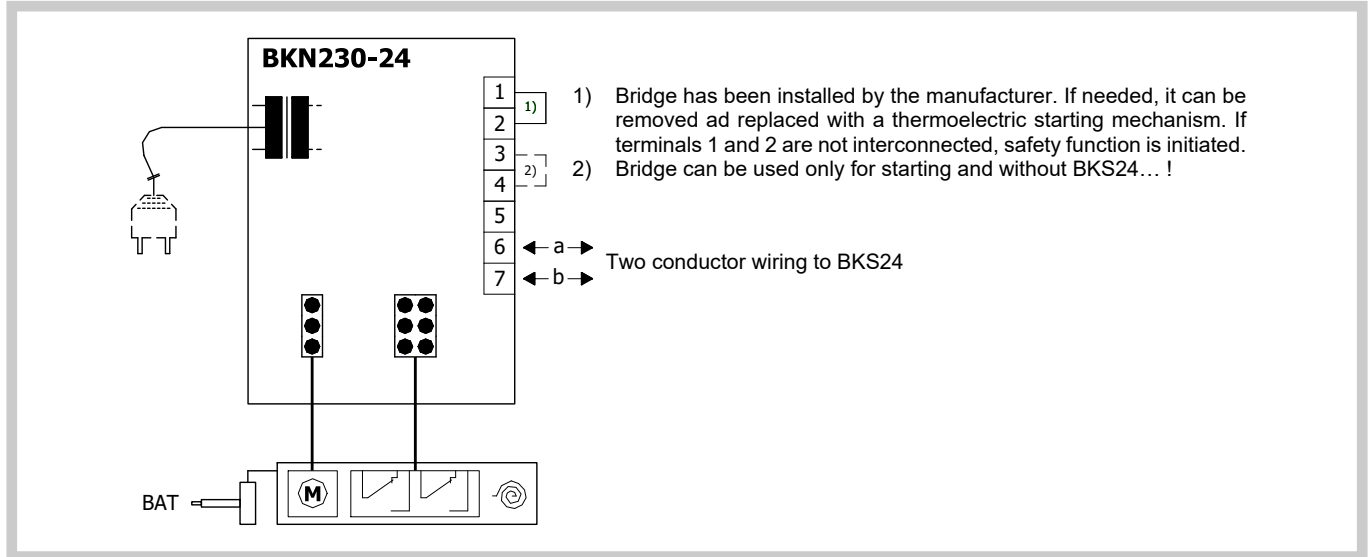
**Design .60**



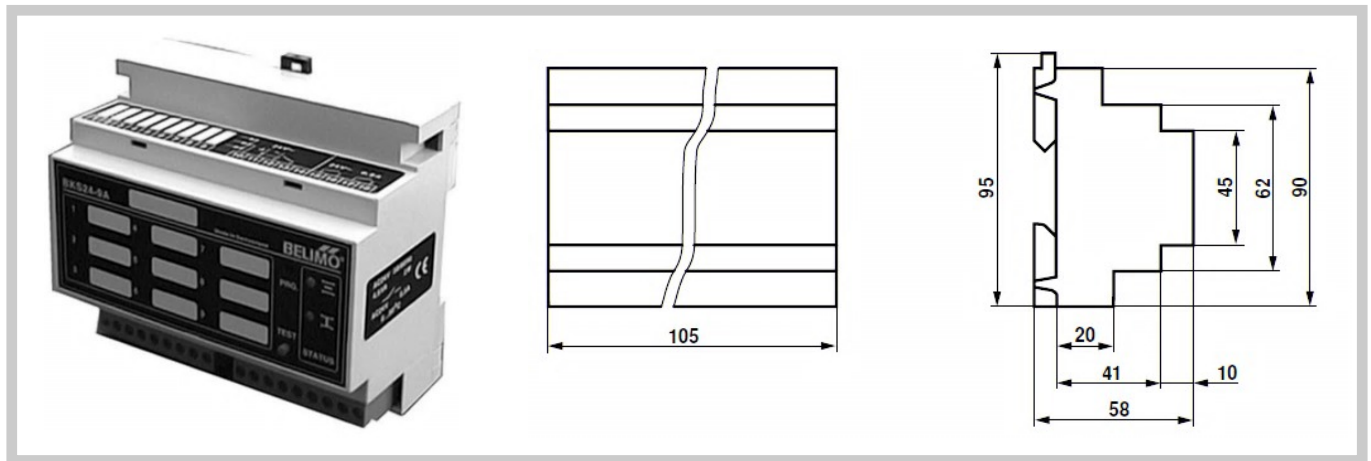
**Technical data of the device BKN230-24**

Communication and Supply Device	BKN230-24
Nominal voltage	AC 230V 50/60Hz
Power consumption	3,5 W (operating position)
Dimensioning	11 VA (including actuating mechanism)
Protection Class	II
Degree of protection	IP 42
Ambient Temperature Storage Temperature	- 30 °C ... + 50 °C - 40 °C ... + 50 °C
Connection - mains - drive - terminal board	Cable 0,9 m with EURO plug of 26 type 6 pole plug, 3 pole plug screw terminals for conductor 2x1,5 mm <sup>2</sup>

Wiring diagram of the BKN device with actuator, with act. mechanism BFL 24-T-ST, BFN 24-T-ST



Communication and control devices



BKS24-9A communication and control device is used for group control and checks of 1 to 9 fire dampers with the actuator BFL (BFN)24-T-ST in connection with the supply and communication device BKN230-24. Signalization of the damper blade position is individual for each damper (9 LED diodes), but the dampers can be controlled and tested only as a group. BKS24-9A is intended for use in superordinate control system, which can display operation mode and failure reports of the connected fire dampers. BKS24-9A receives signals from BKN230-24 through two wire cable. Proper damper operation is indicated by two light LED diodes:

Control LED "OPEN" = damper blade in emergency position OPEN



Control LED "CLOSE" = damper blade in safety position CLOSED



If the damper does not reach the required position within the preset time, the appropriate on-board FAULT LED flashes and, at the same time, the fault contact K1 is activated (K1 is group alarm for all 9 dampers). This contact is overridden as soon the defective damper reaches the required position. The on-board FAULT LED remains on, until the fault is reset. Auxiliary contact K2 is provided for signaling the positions of dampers to a supreme communication controlling system. The function of the auxiliary contact can be programmed via terminal 14 according the next table.

BKS24-9A contacts K1 and K2

K1 Function Contact		Programming K2 Auxiliary Contact		
Situation	State	Function	Interconnection	State
Current Failure	15 ——— 16	K2 contact is on if all the dampers are open	14 ——— 11	17 ——— 18
No Failure	15 ——— 16	K2 contact is on if the damper No. 1 is open	14 ——— 12	
		K2 contact is on if all the dampers are closed	14 open	

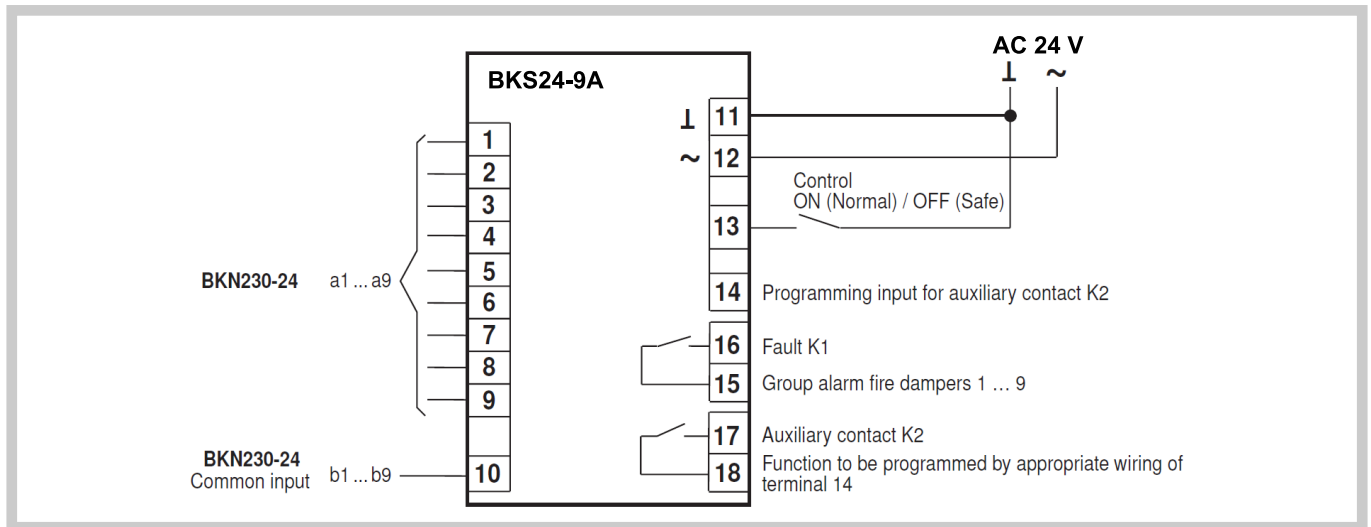
The BKS24-9A unit can be clipped directly onto a 35mm DIN mounting rail and external wiring is connected by two 9-pin terminal connectors.

Functional testing can be performed by pressing the TEST pushbutton. While this button is held depressed, the dampers run to the safe position. Any malfunctions are indicated by the internal FAULT LED's.

**Technical data of the device BKS24-9A**

Communication and Control Device	BKS24-9A
Nominal voltage	AC 24 V 50/60Hz
Power consumption	3,5 W (operating position)
Dimensioning	5,5 VA
Protection Class	III (safe small voltage)
Degree of protection	IP 30
Ambient Temperature	0 ... + 50 °C
Connection	Terminals for conductor 2 x 1,5 mm <sup>2</sup>

**Wiring diagram BKS24-9A**





**Damper design FDMS-VAV**

**Design .50 - damper with electrical actuator**

The damper is equipped with electric actuating mechanism. There are several actuators depending on the damper size: GRUNER 340CTA-024D-XX-S2-V/8F12/ST06/BP8. To ensure the VAV function there is an Gruner universal actuator controller GUAC-DM3 for air flow control and GUAC-PM3 for pressure control. After connection to the power supply AC/DC 24V, the actuating mechanism displaces the damper blade into operation position given by the required air volume flow. At the same time is pre-stretched back spring inside the actuator. When the actuator is under voltage (on power supply), the damper's blade is in the position given by the required air volume flow. The back spring is pre-stretched. If the power supply of the actuator is cut off (due to disconnection of power supply, or pressing the reset button on the thermo-electrical starting mechanism BAT (thermal fuse), the back spring displaces the damper's blade into the safety position "CLOSED". The time needed for displacing of the blade from the position "OPEN" to the position "CLOSE" takes maximal 20s. In the case that the power supply is restored again (the blade can be in arbitrary position), the actuator starts re-displacing the damper's blade position given by the required air volume flow. The thermos-electrical mechanism BAT, which contains two thermal fuses Tf1 and Tf2, is a part of actuator. These fuses are activated when temperature +72°C has been exceeded. The fuse Tf1 measures the temperature in the outside of the damper and Tf2 measure the temperature inside the air duct. Both fuses, they are in serial connection. It means in fact, that when one of them is activated, the power supply of the actuator is cut-off and the actuator displaces the blade in safety position "CLOSED". The signalization of damper position "OPEN" or "CLOSED" is provided by two limit switches, which are built-in inside the actuator. The fire damper has a part with controller consists of the body of the controller with a control blade and pressure probes for determining the through-flow of air. A controller is affixed to the body for controlling the control blade, which is in this case the blade of the fire damper.

**GRUNER actuator and controller**

**GRUNER actuator 340CTA-024D-XX-S2-V/8F12/ST06/BP8**

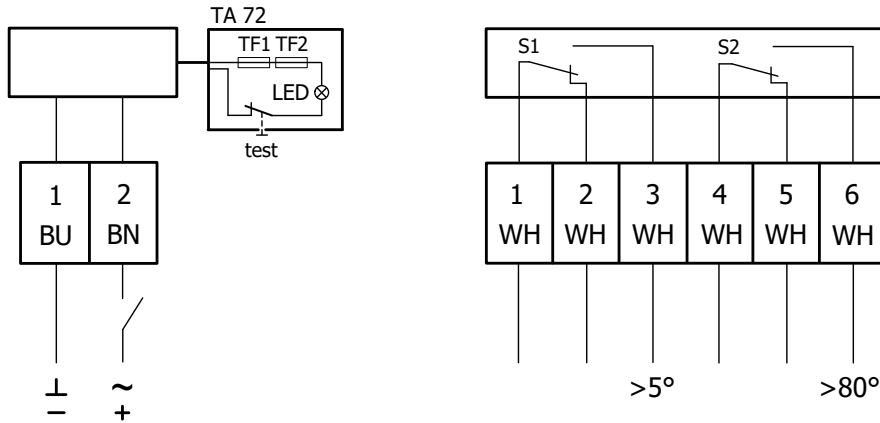


**GRUNER controller GUAC-DM3 / GUAC-PM3**



**GRUNER actuators 340CTA-024D-XX-S2-V/8F12/ST06/BP8 wiring diagram for mains voltage 24 VAC/DC**

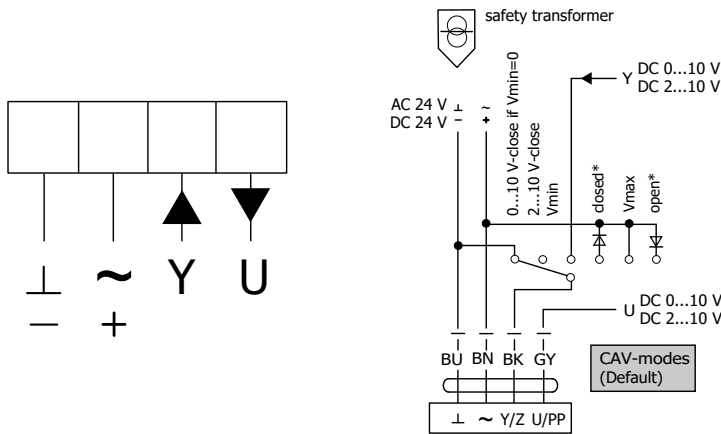
- Caution!**
- Connect through separating transformer!
  - Parallel connection of other servo drives is possible. Respect power input data.
  - Combination of mains voltage and use of signals from limit switches by very low voltage is not allowed.



- Cable colours:**
- BU1 = blue
  - BN2 = brown
  - WH1 = white
  - WH2 = white
  - WH3 = white
  - WH4 = white
  - WH5 = white
  - WH6 = white

**GRUNER controller GUAC-DM3 wiring diagram for mains voltage 24 VAC/DC**

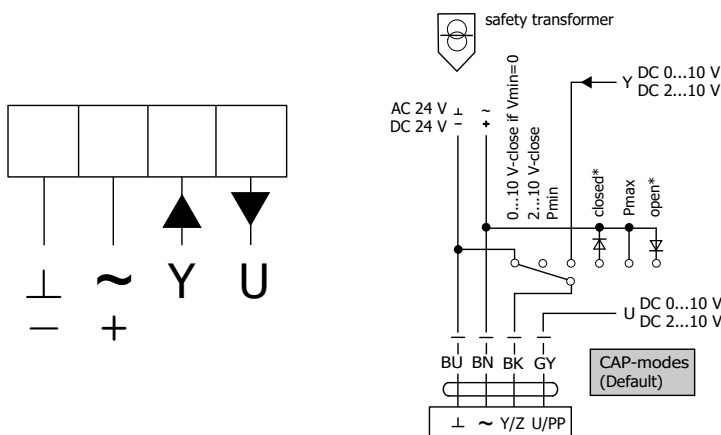
- Caution!**
- Connect via safety isolation transformer!
  - The device is not allowed to be used outside the specified field of application.
  - It may only be installed by suitably trained personnel. Any legal regulations or regulations issued by authorities must be observed during assembly.



- Cable colours:**
- BU = blue
  - BN = brown
  - BK = black
  - GY = Gray

**GRUNER controller GUAC-PM3 wiring diagram for mains voltage 24 VAC/DC**

- Caution!**
- Connect via safety isolation transformer!
  - The device is not allowed to be used outside the specified field of application.
  - It may only be installed by suitably trained personnel. Any legal regulations or regulations issued by authorities must be observed during assembly.



- Cable colours:**
- BU = blue
  - BN = brown
  - BK = black
  - GY = Gray

## Electrical parameters of GRUNER actuators 340CTA-024D-XX-S2-V/8F12/ST06/BP8

Actuating mechanism GRUNER	340CTA-024D-XX-S2-V/8F12/ST06/BP8
Nominal voltage	24V AC/DC 50/60 Hz
Power consumption - motoring - holding	6,5 W 2,0 W
Dimensioning	7,5 VA
Protection class	III
Degree of protection	IP 54
Running time - motor - spring return	< 100 s < 20 s
Ambient Temperature - normal duty - safety duty - non-operating temperature	-30 °C ... +50 °C > +75 °C -30 °C ... +50 °C
Connecting - motor - auxiliary switch	cable 1 m, 2 x 0,75 mm <sup>2</sup> cable 1 m, 6 x 0,75 mm <sup>2</sup>
Thermal trips	TF1 temperature inside Duct +72 °C TF2 temperature outside Duct +71 °C

## Electrical parameters of GRUNER controller GUAC-DM3

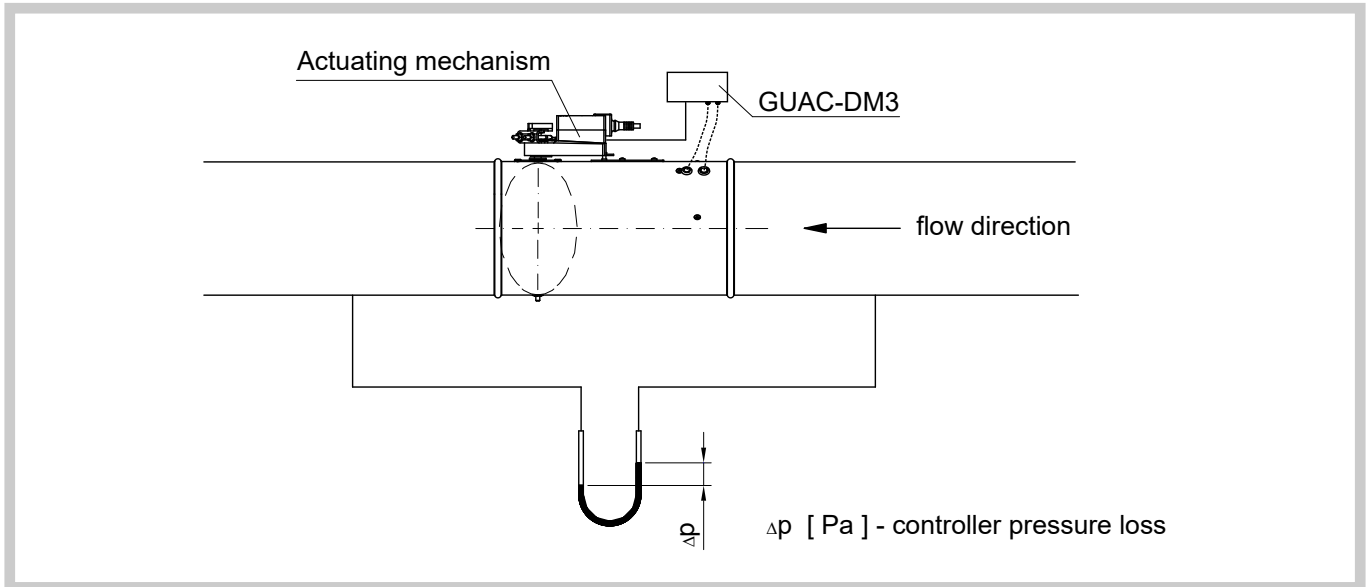
Controller GRUNER	GUAC-DM3
Nominal voltage	24V AC/DC 50/60 Hz
Power consumption	0,6 W
Wire sizing	1,3 VA
Protection class	III
Degree of protection	IP 42
Control	(0)2...10 VDC / Ri > (100 kΩ) 50 kΩ (0)4...20 mA / Rext. = 500 Ω
Feedback signal	(0)2...10 VDC, max. 0,5 mA
Priority control	closed / Vmin / Vmax / open
Ambient Temperature - normal duty - storage temperature	0 °C ... +50 °C -20 °C ... +80 °C
Connecting - controller - actuators	screw terminals, 4-pin, 0,5...2,5 mm <sup>2</sup> cable 1000 mm with Lumberg connector
Connection GUV	via diagnostic connector and feedback signal U/PP
Sensor	300 Pa (dynamic)
Communication	PP-Bus (1200 Bd, max. 15 VDC)

## Electrical parameters of GRUNER controller GUAC-PM3

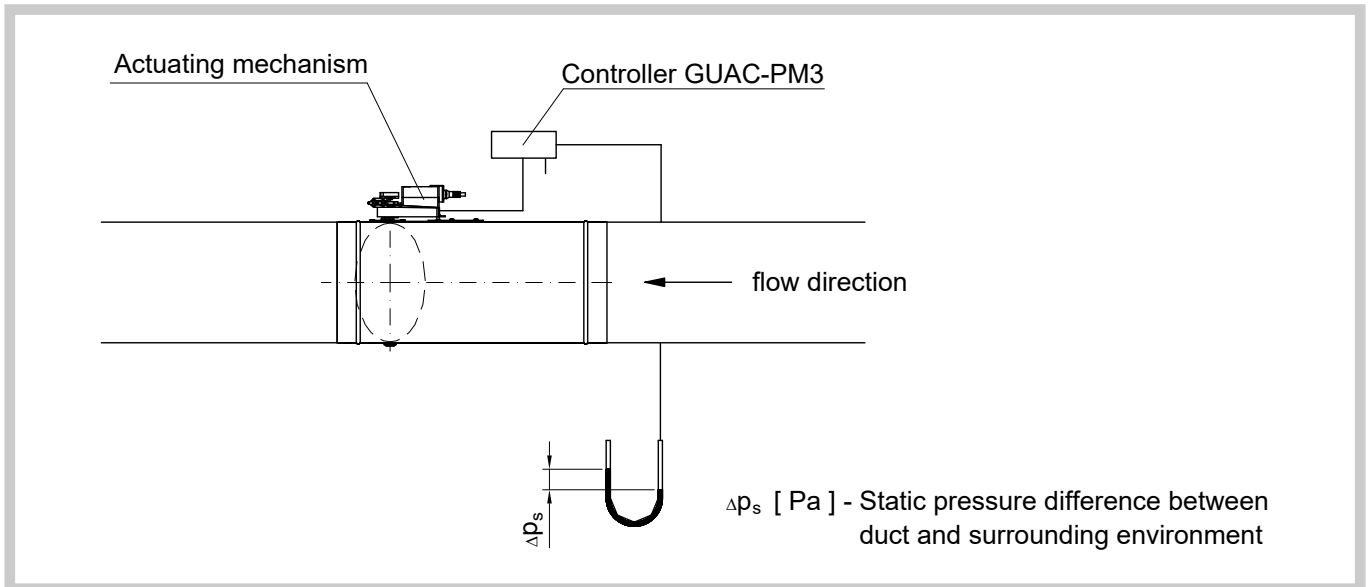
Controller GRUNER	GUAC-PM3
Nominal voltage	24V AC/DC 50/60 Hz
Power consumption	0,6 W
Wire sizing	1,3 VA
Protection class	III
Degree of protection	IP 42
Control	(0)2...10 VDC / Ri > (100 kΩ) 50 kΩ (0)4...20 mA / Rext. = 500 Ω
Feedback signal	(0)2...10 VDC, max. 0,5 mA
Priority control	closed / Pmin / Pmax / open
Ambient Temperature - normal duty - storage temperature	0 °C ... +50 °C -20 °C ... +80 °C
Connecting - controller - actuators	screw terminals, 4-pin, 0,5...2,5 mm <sup>2</sup> cable 1000 mm with Lumberg connector
Connection GUV	via diagnostic connector and feedback signal U/PP
Sensor	300 Pa (static)
Communication	PP-Bus (1200 Bd, max. 15 VDC)

**Types of regulation FDMS-VAV**

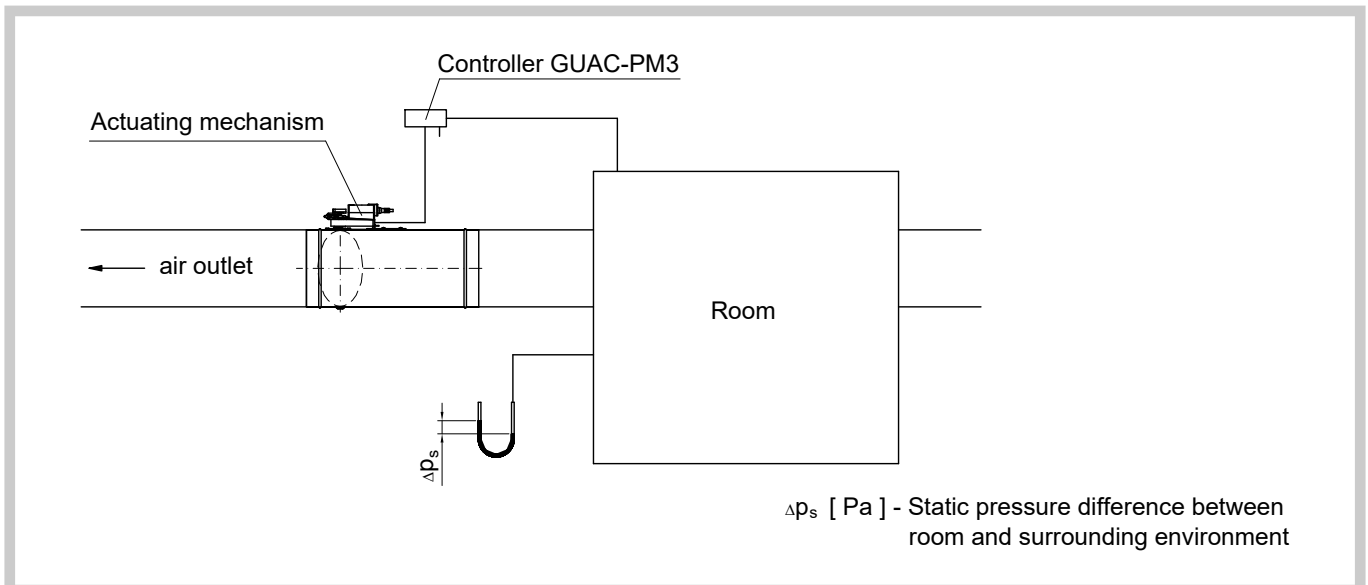
Now has the damper a given air flow direction - important for the installation - AIRFLOW CONTROL



**Pressure control - DUCT**

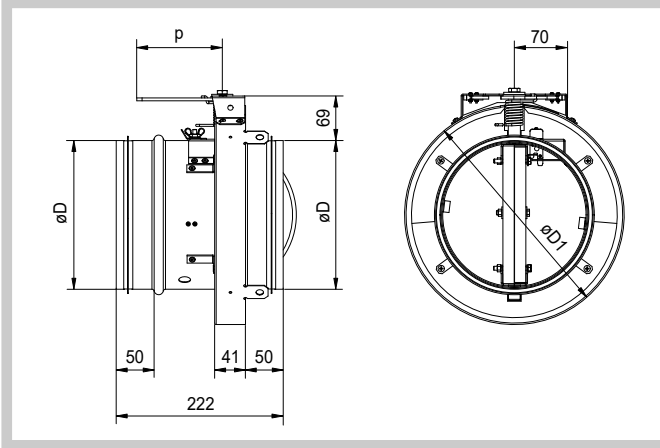


**Pressure control - ROOM**

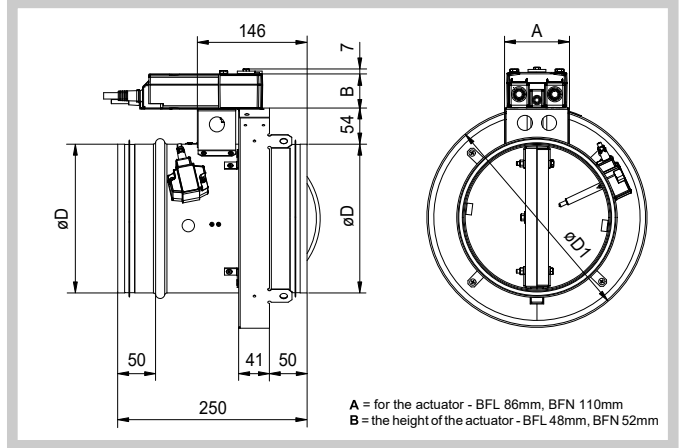


**Dimensions and weights of FDMS**

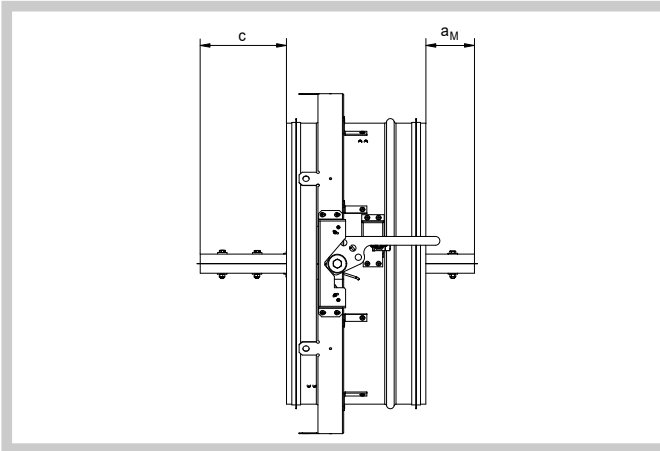
**FDMS with mechanical control**



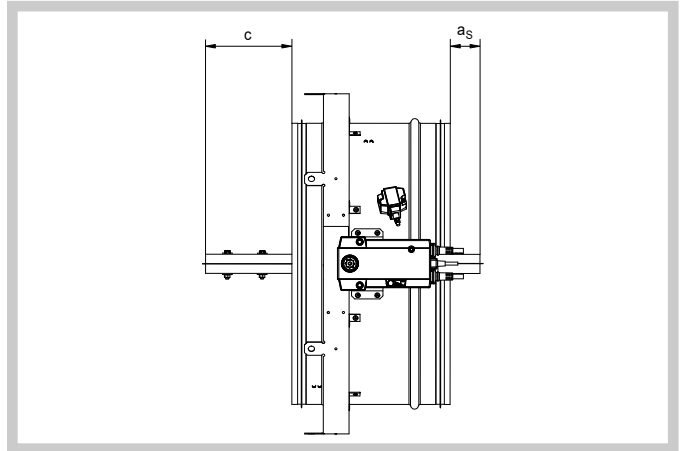
**FDMS with actuating mechanism**



**Blade overlaps - FDMS manual and thermal**



**Blade overlaps - FDMS with actuating mechanism**



**Dimensions of FDMS**

Size	øD	øD1	a <sub>s</sub>	a <sub>M</sub>	c	p	Size	øD	øD1	a <sub>s</sub>	a <sub>M</sub>	c	p
100	98	190	-	-	-	113	315	313	405	-	12	70	163
125	123	215	-	-	-	113	355	353	445	2	32	90	163
160	158	250	-	-	-	113	400	398	490	24,5	54,5	112,5	163
180	178	270	-	-	2,5	113	450	448	540	49,5	79,5	137,5	163
200	198	290	-	-	12,5	113	500	498	590	74,5	104,5	162,5	163
225	223	315	-	-	25	163	560	558	650	104,5	134,5	192,5	163
250	248	340	-	-	37,5	163	630	628	720	139,5	169,5	227,5	163
280	278	370	-	-	52,5	163	-	-	-	-	-	-	-

**Weights of FDMS in kg (design .01, .11, .80)**

Size	100	125	160	180	200	225	250	280
Weight	2,2	2,6	3,2	3,6	4	4,5	5,1	5,8
Size	315	355	400	450	500	560	630	-
Weight	6,7	7,7	9	10,4	12	14,1	16,7	-

**Weights of FDMS in kg (design .40, .50)**

Size	100	125	160	180	200	225	250	280
Weight	3,3	3,7	4,3	4,7	5,1	5,6	6,2	6,9
Size	315	355	400	450	500	560	630	-
Weight	7,8	8,8	10,1	11,5	13,4	15,5	18,1	-

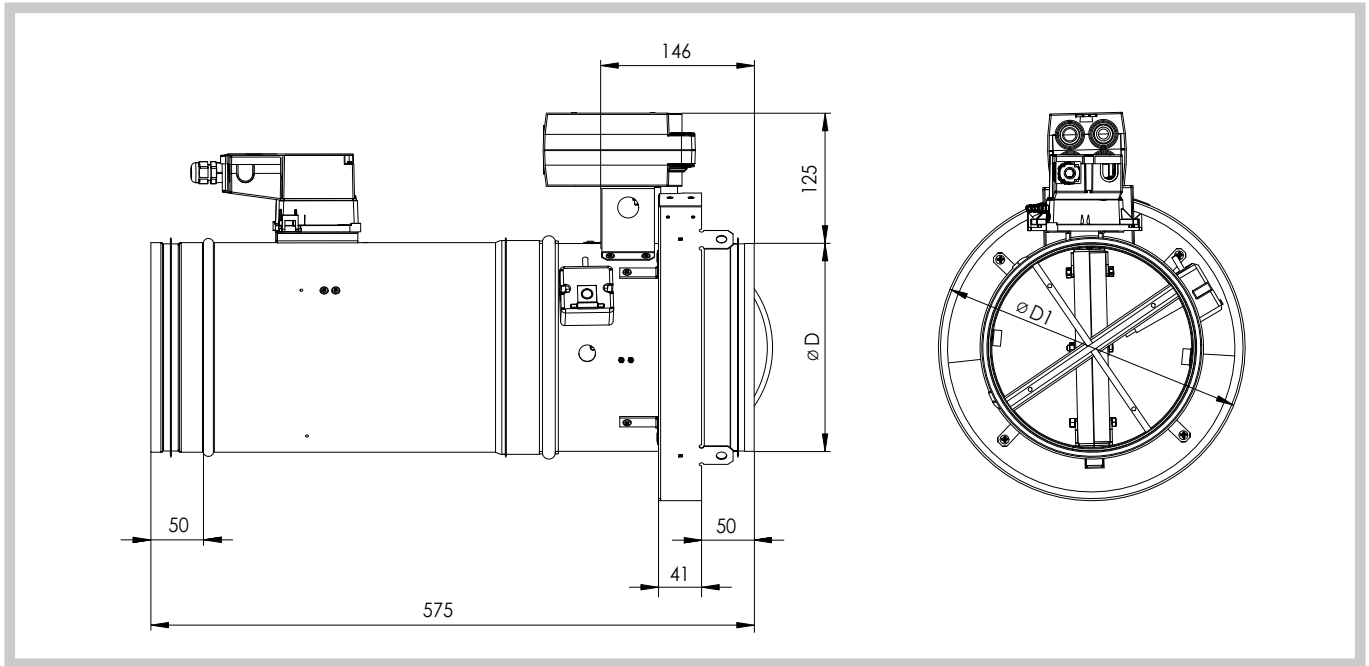
Weight of the communication unit BKN230-24 is 0,55kg (used in design .60)

**Actuator table depending on size for FDMS**

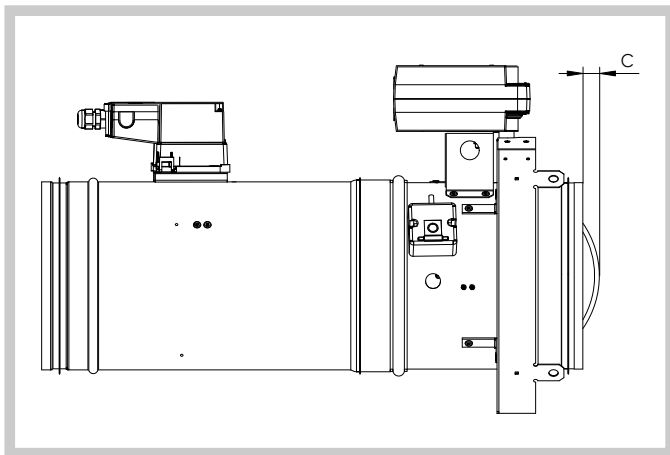
Actuator type	Sizes
BFL24-T(-ST), BFL230-T	100, 125, 160, 180, 200, 225, 250, 280, 315, 355, 400, 450
BFN24-T(-ST), BFN230-T	500, 560, 630

**Dimensions and weights of FDMS-VAV**

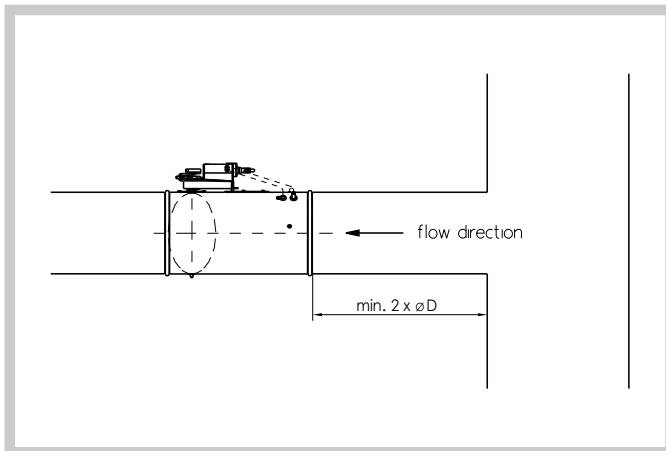
**FDMS-VAV with actuating mechanism**



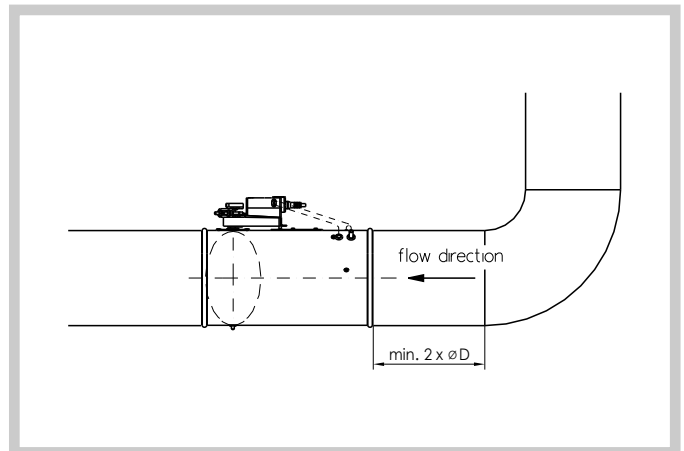
**Blade overlaps - FDMS-VAV with actuating mechanism**



**Recommended distance from double branch joint**



**Recommended distance from bend**



**Dimensions of FDMS-VAV**

Size	øD	øD1	a <sub>s</sub>	a <sub>M</sub>	c	Size	øD	øD1	a <sub>s</sub>	a <sub>M</sub>	c
100	98	190	–	–	–	315	313	405	–	12	70
125	123	215	–	–	–	355	353	445	2	32	90
160	158	250	–	–	–	400	398	490	24,5	54,5	112,5
180	178	270	–	–	2,5	450	448	540	49,5	79,5	137,5
200	198	290	–	–	12,5	500	498	590	74,5	104,5	162,5
225	223	315	–	–	25	560	558	650	104,5	134,5	192,5
250	248	340	–	–	37,5	630	628	720	139,5	169,5	227,5
280	278	370	–	–	52,5	–	–	–	–	–	–

**Weights of FDMS-VAV in kg (design .50)**

Size	100	125	160	180	200	225	250	280
Weight	4,3	4,8	5,6	6,1	6,6	7,3	8,1	9,1
Size	315	355	400	450	500	560	630	–
Weight	10,9	11,5	14,1	17,3	20,1	23,5	28,9	–

**Placement and assembly**

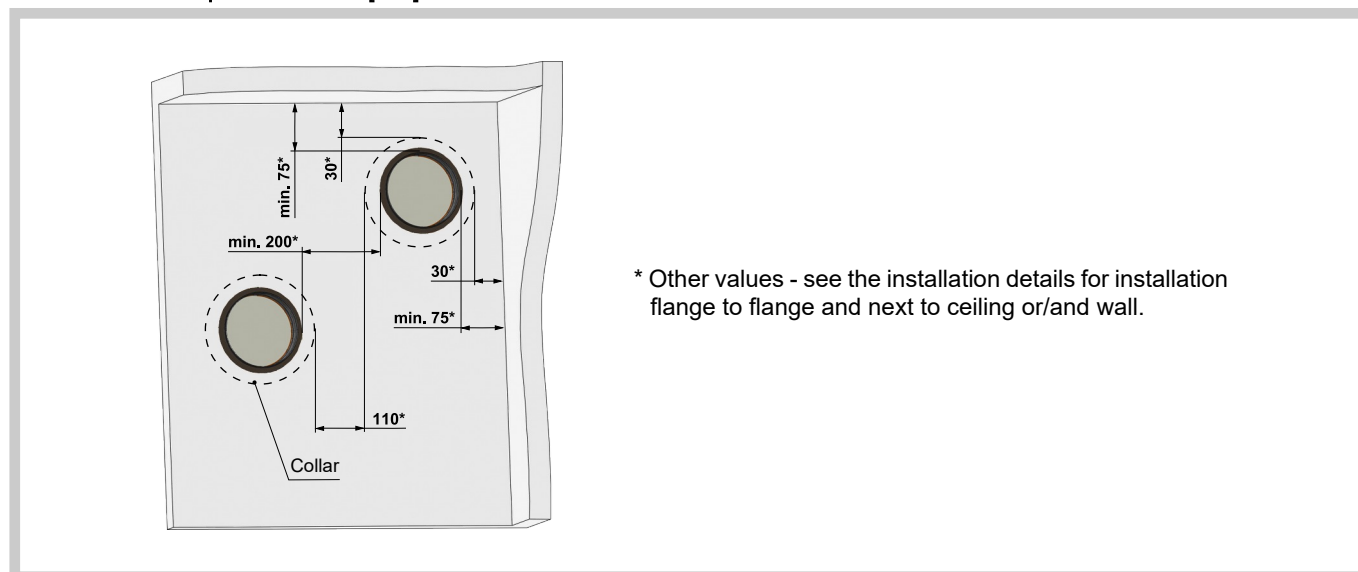
Fire dampers are suitable for installation in arbitrary position in vertical and horizontal passages of fire separating constructions. Damper assembly procedures must be done so as all load transfer from the fire separating constructions to the damper body is absolutely excluded. Back-to-back air-ducting must be hung or supported so as all load transfer from the back-to-back piping to the damper is absolutely excluded. Installation gap must be filled by approved material perfectly in all the installation space volume (installation gap). To be able to provide inspection, inside of the fire damper is the damper with camera inspection hole standardly equipped. For other service works, the external access door (inspection hole) must be installed on the air duct, next to the fire damper.

The distance between the fire damper and the construction (wall, ceiling) must be minimum 75 mm. In case that two or more dampers are supposed to be installed in one fire separating construction, the distance between the adjacent dampers must be at least 200 mm according to EN 1366-2 paragraph 13.6.

The control mechanism has to be protected (covered) against damage and pollution during installation process. All fire dampers has to be closed during installation process. The damper body should not be deformed in the course of bricking in. Once the damper is built in, its blade should not grind on the damper body during opening or closing.

**Fire damper FDMS-VAV has the same possibilities of the installation like fire damper FDMS.**

**Position of the dampers in the wall [mm]**

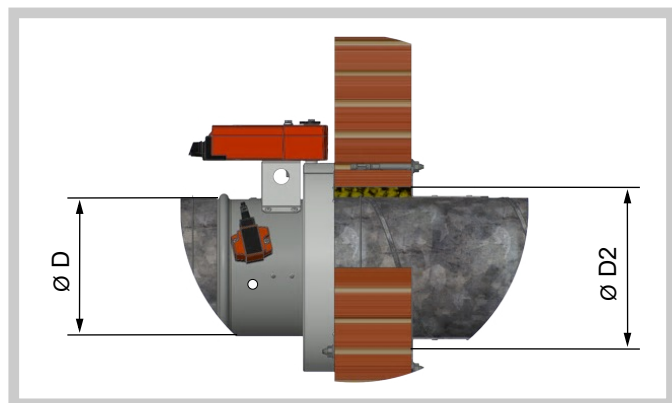


\* Other values - see the installation details for installation flange to flange and next to ceiling or/and wall.

**Installations opening**

The dimensions of installation opening for the connected air duct depends on the type of sealant- see the table.

Fire stopper type	Recommended material	D2 (mm)
Glass fibers	<b>PROMAGLAF:</b> Mat: thick 13mm, Paper: thick: 6mm + <u>from outside</u> <b>HILTI:</b> Firestop Acrylic sealant CFS-S ACR or similar	D+28, D+14
Glass fiber fabric	<b>KOBEMAT:</b> Mat: thick 9mm + <u>from outside</u> <b>HILTI:</b> Firestop Acrylic sealant CFS-S ACR or similar	D+20
Fire resistant sealant	<b>HILTI:</b> Firestop Acrylic sealant CFS-S ACR or similar	D+10
Stone wool	<b>ISOVER:</b> Orstech LSP H thick 20mm + from outside mastic <b>HILTI:</b> Firestop coating CFS-CT or PROMASTOP-P or K or similar	D+40
Mortar or gypsum	<b>HILTI:</b> Fire mortar CFS-M RG or similar	D+80



**Statement of installation**

The damper is designed for installation on a wall or intermediate floor for circular air-duct connection.

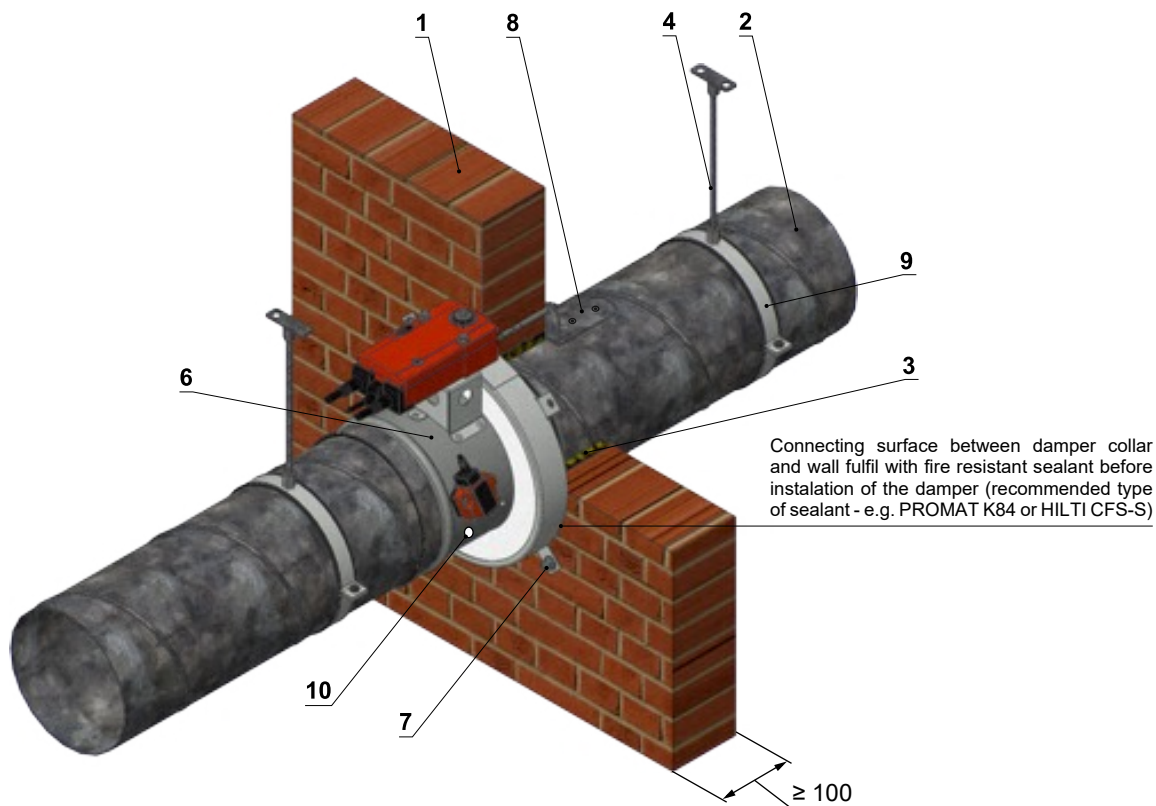
Construction	Installation in the wall or ceiling	Material of stuffing box
Solid wall construction (t≥100mm)	Dry	Fire resistant sealant or stone wool or glass fiber fabric
Solid wall construction (t≥100mm)	Wet	Mortar or gypsum
Outside solid wall construction with t≥100mm (insulation of the pipe between wall and damper made from stone wool)	Dry	Fire resistant sealant or stone wool or glass fiber fabric
Outside solid wall construction with t≥100mm (insulation of the pipe between wall and damper made from stone wool)	Wet	Mortar or gypsum
Solid ceiling construction 110 - Concrete / 125 - Aerated concrete	Dry	Fire resistant sealant or stone wool or glass fiber fabric
Solid ceiling construction 110 - Concrete / 125 - Aerated concrete	Wet	Mortar or gypsum
Outside solid ceiling construction with 110 - Concrete / 125 - Aerated concrete (insulation of the pipe between wall and damper made from stone wool)	Dry	Fire resistant sealant or stone wool or glass fiber fabric
Outside solid ceiling construction with 110 - Concrete / 125 - Aerated concrete (insulation of the pipe between wall and damper made from stone wool)	Wet	Mortar or gypsum
Gypsum wall construction (t≥100mm)	Dry	Fire resistant sealant or stone wool or glass fiber fabric
Gypsum wall construction (t≥100mm)	Wet	Mortar or gypsum
Outside gypsum wall construction with t≥100mm (insulation of the pipe between wall and damper made from stone wool)	Dry	Fire resistant sealant or stone wool or glass fiber fabric
Outside gypsum wall construction with t≥100mm (insulation of the pipe between wall and damper made from stone wool)	Wet	Mortar or gypsum
Sandwich wall (insulated wall panel) construction	Dry	Fire resistant sealant or stone wool or glass fiber fabric
Outside sandwich wall (insulated wall panel) construction with insulation of the pipe	Dry	Fire resistant sealant or stone wool or glass fiber fabric



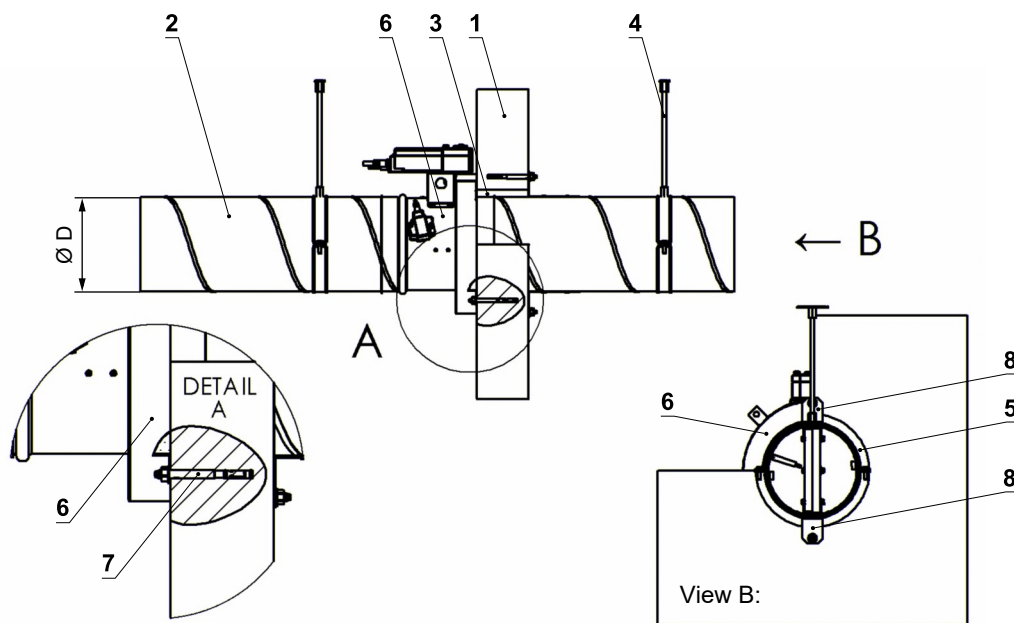
**Descriptions of particular installations**

**FDMS - damper on the solid wall**

Fire classification: **EI90S**



Connecting surface between damper collar and wall fulfil with fire resistant sealant before installation of the damper (recommended type of sealant - e.g. PROMAT K84 or HILTI CFS-S)

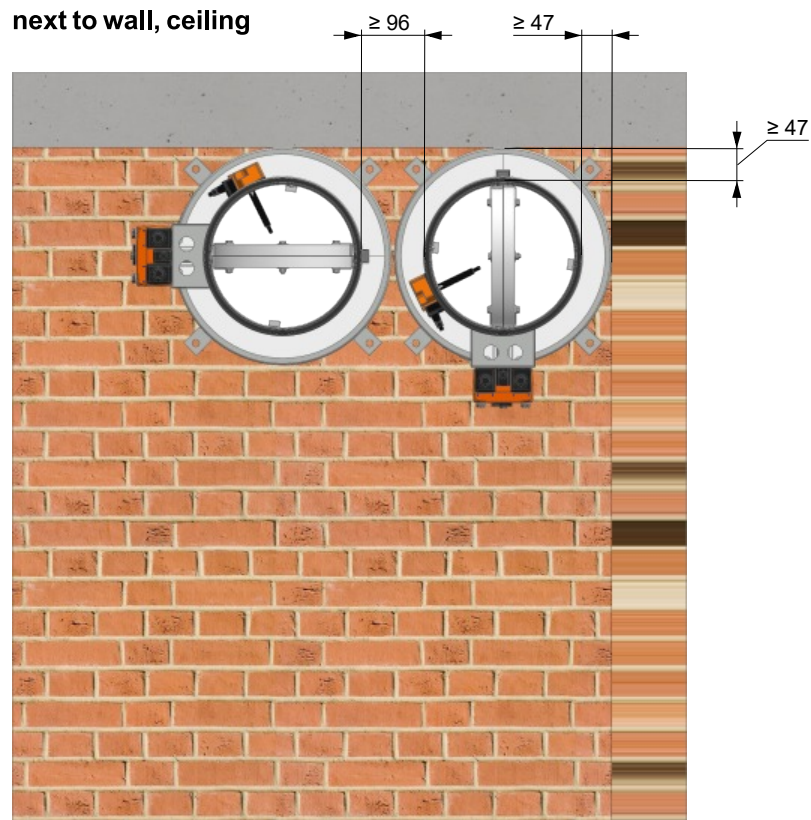


**POSITION**

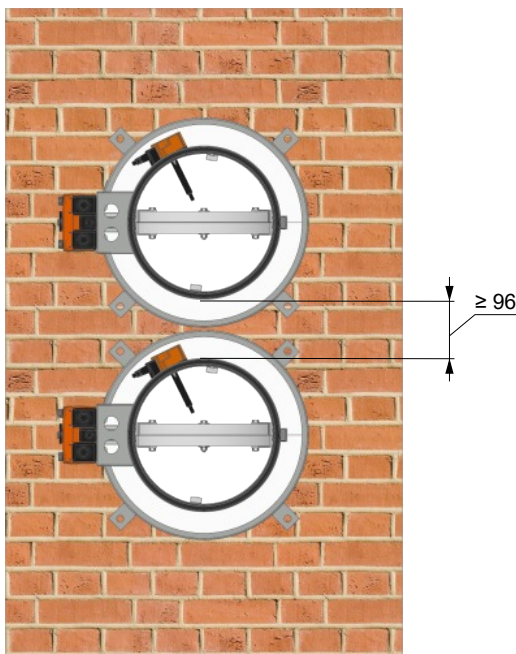
- 1 Solid wall construction
- 2 Spiral pipe
- 3 Fire resistant fill (for recommended materials see separate table)
- 4 Threaded rod and anchor to the wall (or ceiling) (e.g. threaded rod M8 and anchor type according pipe weight)
- 5 Fire protection mastic min. thickness 1mm (e.g. PROMASTOP-P or K)
- 6 Fire damper FDMS
- 7 Anchor for damper collar (e.g. FISCHER - type ZYKON FZA M8x30)
- 8 Fixing part of the pipe between wall and pipe (only recommended)
- 9 Hanging ring (e.g. FISCHER - type LGS)
- 10 Inspection hole for camera covered with removable air-tight rubber cap

FDMS - damper on the solid wall - flange to flange and installation next to wall, ceiling

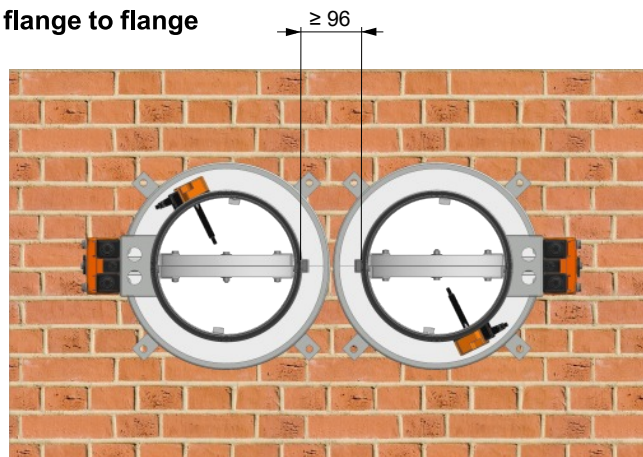
Fire classification: **EI90S**



flange to flange



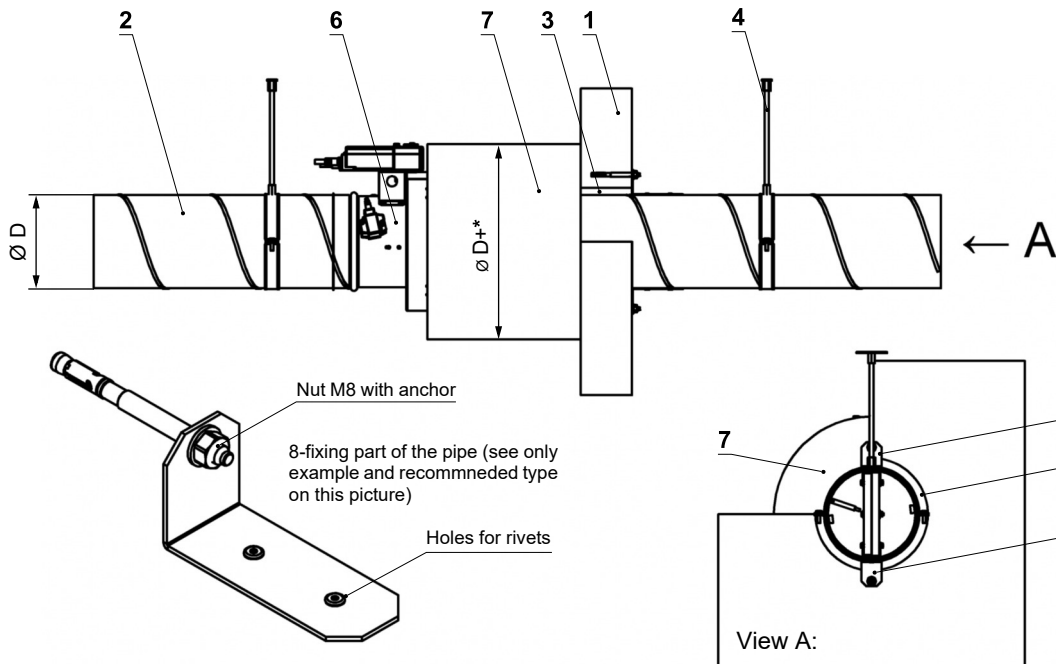
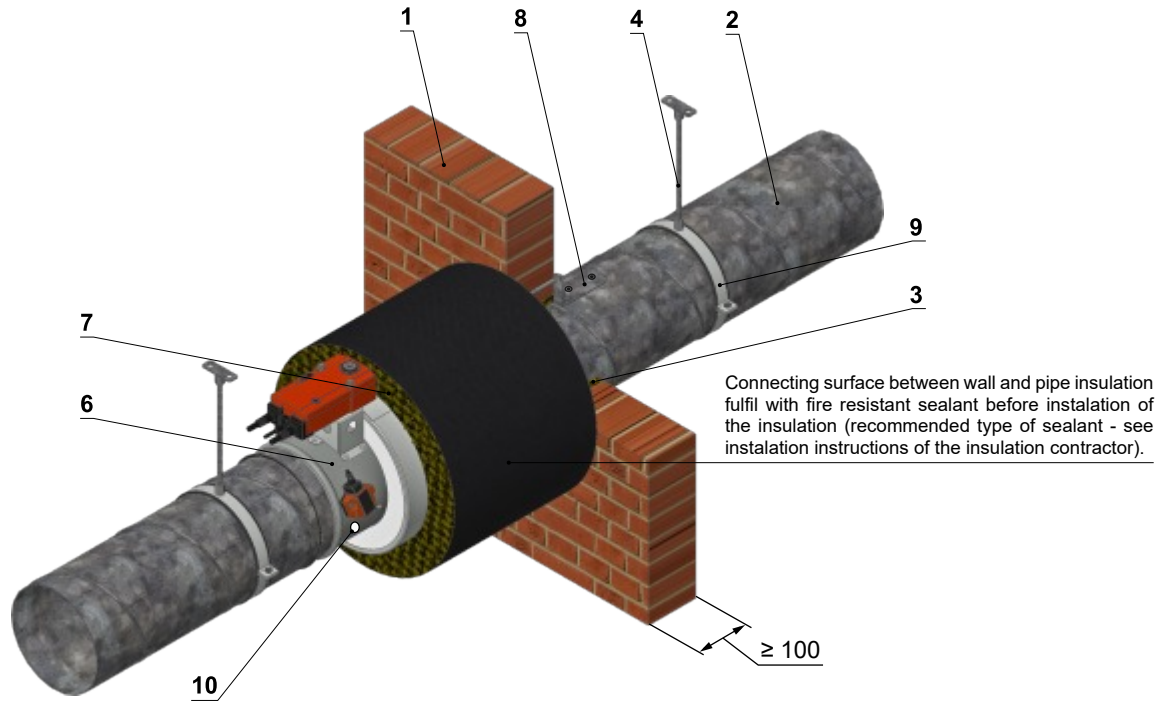
flange to flange



The same installation like on the solid wall and the same materials.

**FDMS - damper outside the solid wall**

Fire classification: **EI60S**



**POSITION**

- 1 Solid wall construction
- 2 Spiral pipe
- 3 Fire resistant fill (for recommended materials see separate table)
- 4 Threaded rod and anchor to the wall (or ceiling) (e.g. threaded rod M8 and anchor type according pipe weight)
- 5 Fire protection mastic min. thickness 1mm (e.g. PROMASTOP-P or K)
- 6 Fire damper FDMS
- 7 Pipe insulation with min. fire resistance EI60 (e.g. ISOVER Ulimat protect Wired MAT 4.0 ALU1, PAROC hvac Fire Mat BlackCoat)\*
- 8 Fixing part of the pipe between wall and pipe (optional)\*\*
- 9 Hanging ring (e.g. FISCHER - type LGS)
- 10 Inspection hole for camera covered with removable air-tight rubber cap

**\* Material properties:**

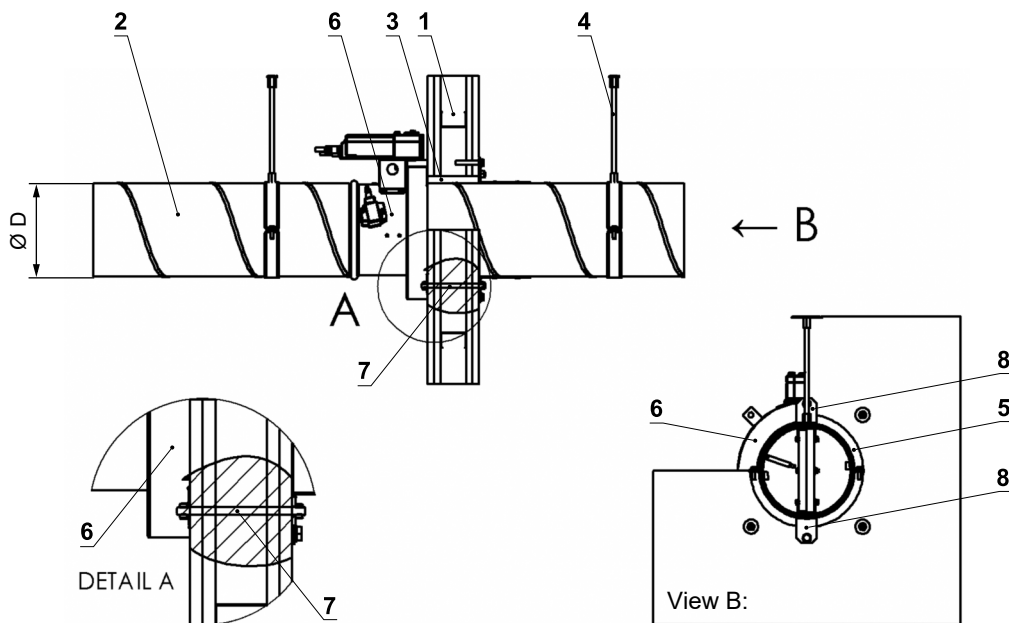
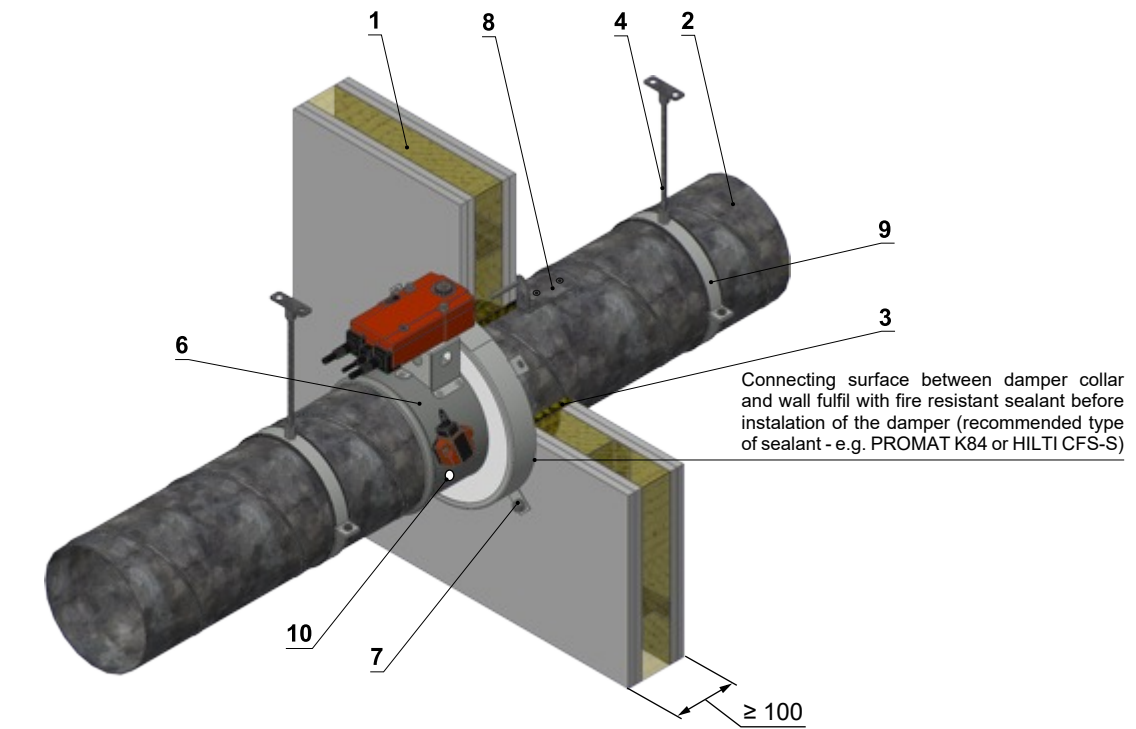
ISOVER with min. density 66 kg/m<sup>3</sup>, min. th. 100 mm  
 PAROC with min. density 80 kg/m<sup>3</sup>, min. th. 50 mm

\* Installation of pipe insulation perform according instructions of the manufacturer.

\*\* This fixing part isn't mandatory if the installation opening was fulfill by mortar or gypsum. In other cases of the fire resistant fill is this fixing part of the pipe mandatory. This fixing part can by mounted on the both sides of the wall.

FDMS - damper on the gypsum wall

Fire classification: **EI90S**

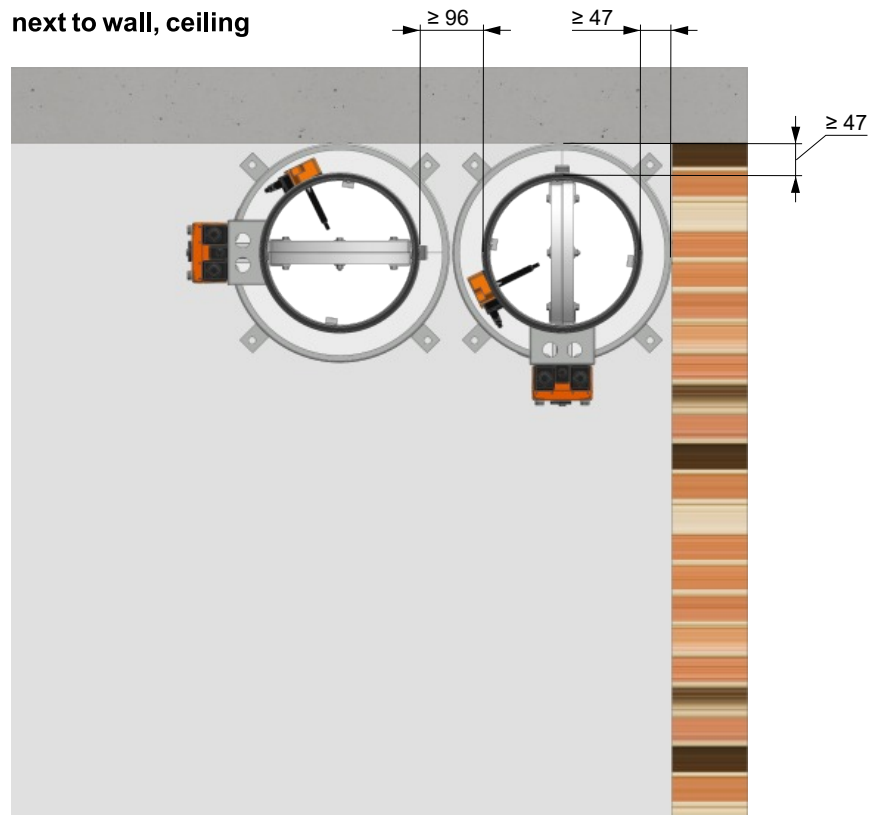


**POSITION**

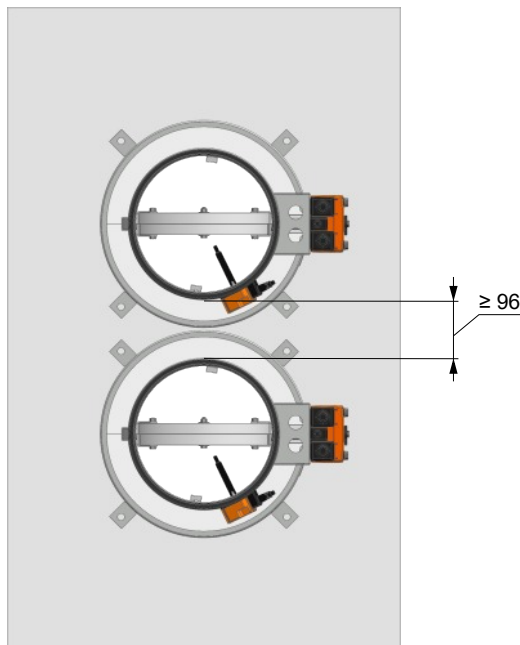
- 1 Gypsum wall construction
- 2 Spiral pipe
- 3 Fire resistant fill (for recommended materials see separate table)
- 4 Threaded rod and anchor to the wall (or ceiling) (e.g. threaded rod M8 and anchor type according pipe weight)
- 5 Fire protection mastic min. thickness 1mm (e.g. PROMASTOP-P or K)
- 6 Fire damper FDMS
- 7 Anchor for damper collar (threaded rod and nuts M8 or e.g. anchor FISCHER - type KD8)
- 8 Fixing part of the pipe between wall and pipe (only recommended)
- 9 Hanging ring (e.g. FISCHER - type LGS)
- 10 Inspection hole for camera covered with removable air-tight rubber cap

**FDMS - damper on the gypsum wall - flange to flange and installation next to wall, ceiling**

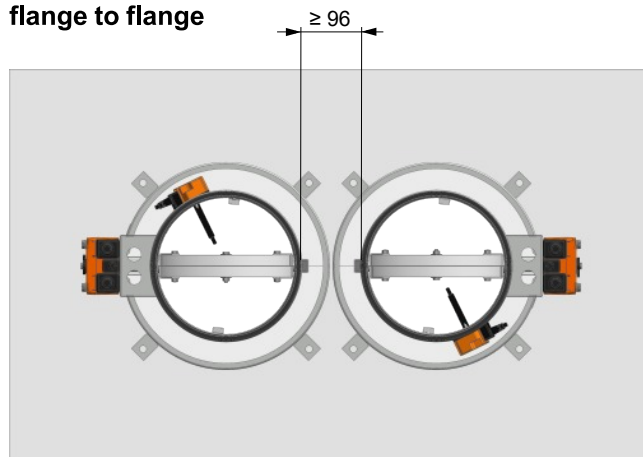
Fire classification: **EI90S**



**flange to flange**



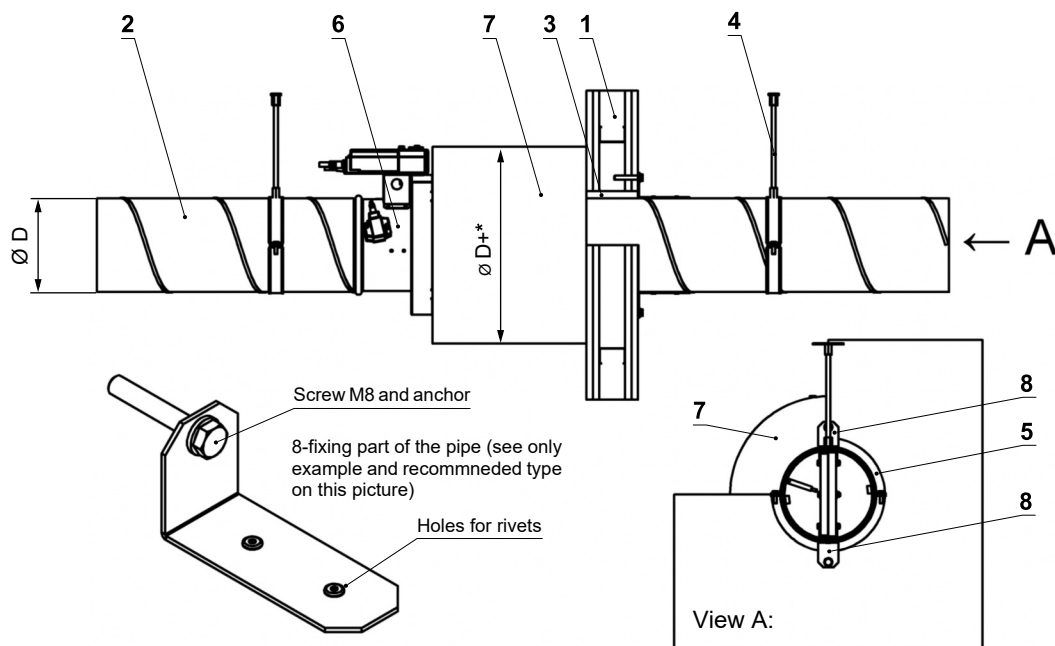
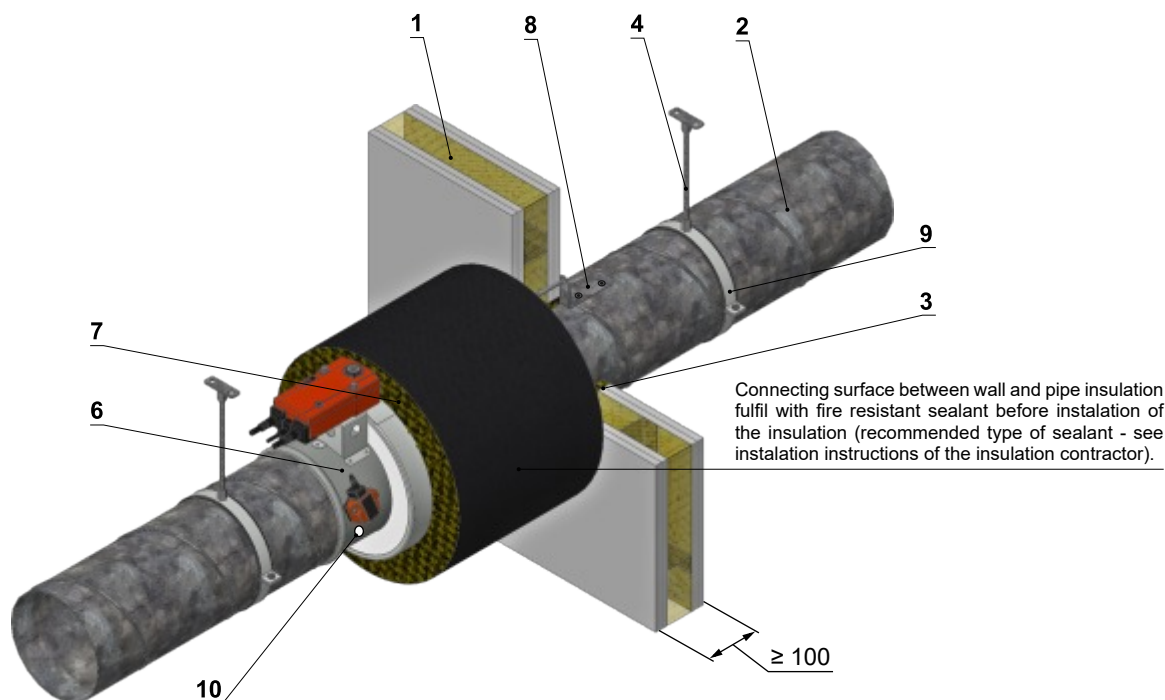
**flange to flange**



**The same installation like on the gypsum wall and the same materials.**

**FDMS - damper outside the gypsum wall**

Fire classification: **EI60S**



**POSITION**

- 1 Gypsum wall construction
- 2 Spiral pipe
- 3 Fire resistant fill (for recommended materials see separate table)
- 4 Threaded rod and anchor to the wall (or ceiling) (e.g. threaded rod M8 and anchor type according pipe weight)
- 5 Fire protection mastic min. thickness 1mm (e.g. PROMASTOP-P or K)
- 6 Fire damper FDMS
- 7 Pipe insulation with min. fire resistance EI60 (e.g. ISOVER Ulimat protect Wired MAT 4.0 ALU1, PAROC hvac Fire Mat BlackCoat)\*
- 8 Fixing part of the pipe between wall and pipe (optional)\*\*
- 9 Hanging ring (e.g. FISCHER - type LGS)
- 10 Inspection hole for camera covered with removable air-tight rubber cap

**\* Material properties:**

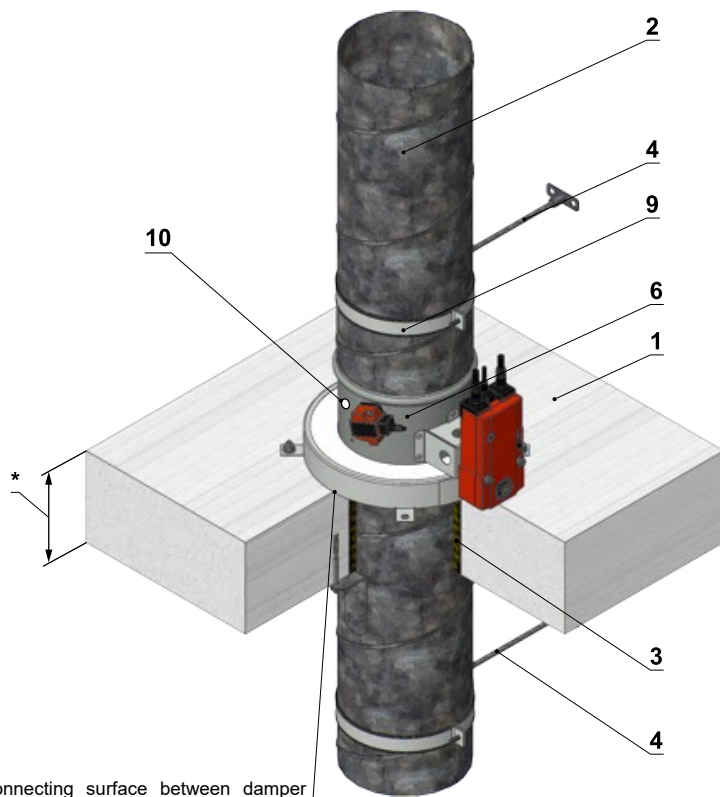
ISOVER with min. density 66 kg/m<sup>3</sup>, min. th. 100 mm  
 PAROC with min. density 80 kg/m<sup>3</sup>, min. th. 50 mm

\* Installation of pipe insulation perform according instructions of the manufacturer.

\*\* This fixing part isn't mandatory if the installation opening was fulfill by mortar or gypsum. In other cases of the fire resistant fill is this fixing part of the pipe mandatory. This fixing part can by mounted on the both sides of the wall.

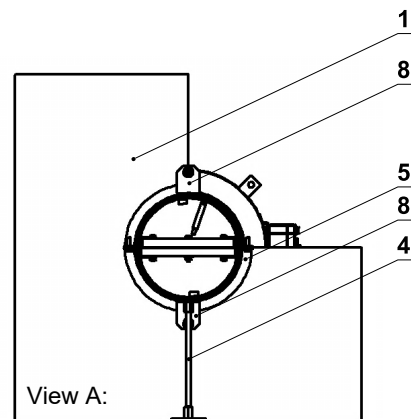
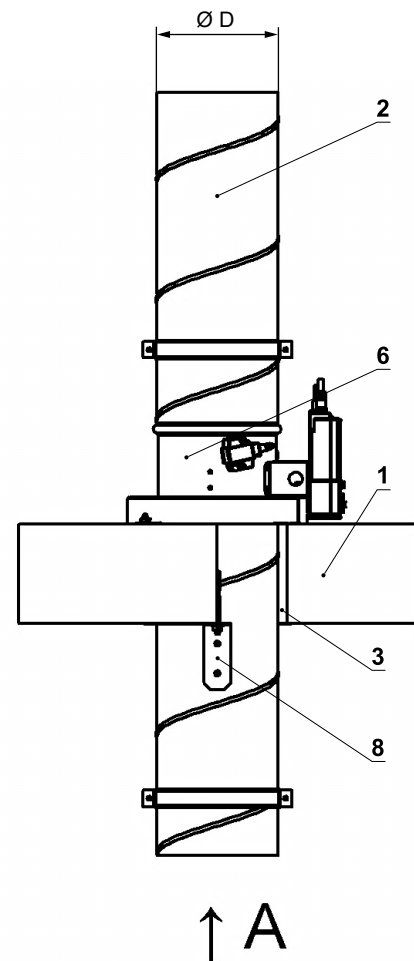
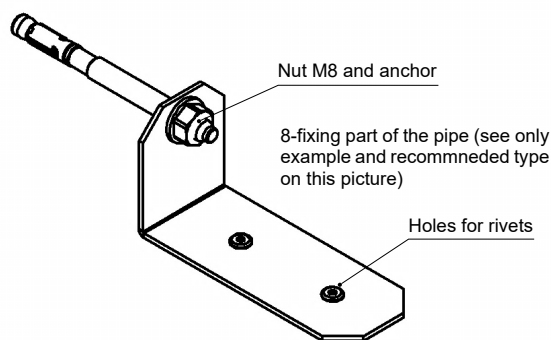
**FDMS - damper on the concrete ceiling construction**

Fire classification: **EI60S**



Connecting surface between damper collar and wall fulfil with fire resistant sealant before installation of the damper (recommended type of sealant - e.g. PROMAT K84 or HILTI CFS-S)

\* min. 110 - Concrete/ min. 125 - Aerated concrete

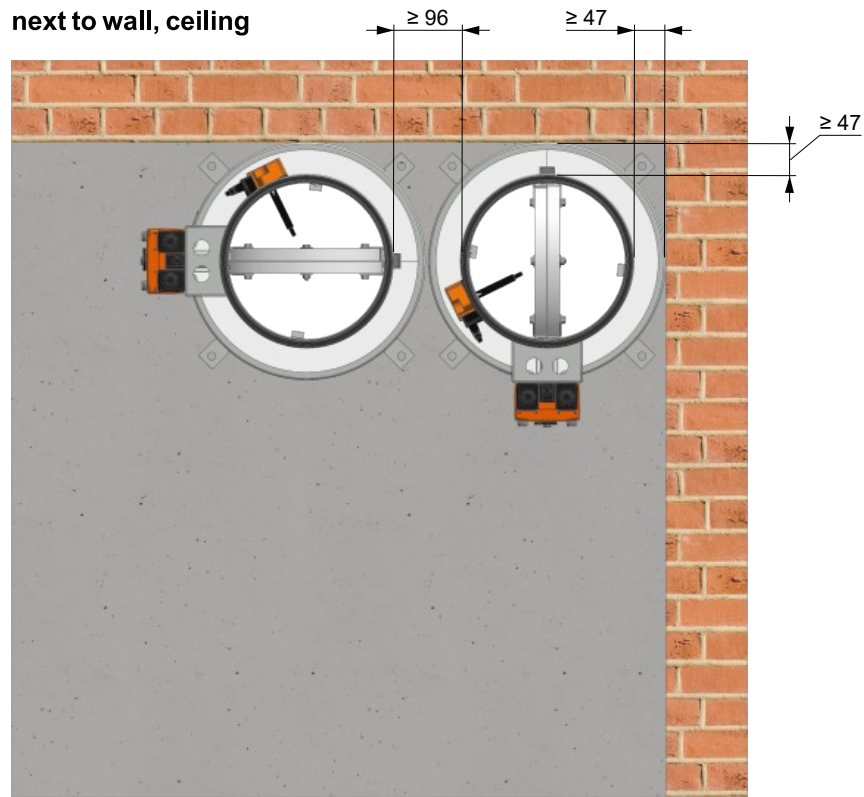


**POSITION**

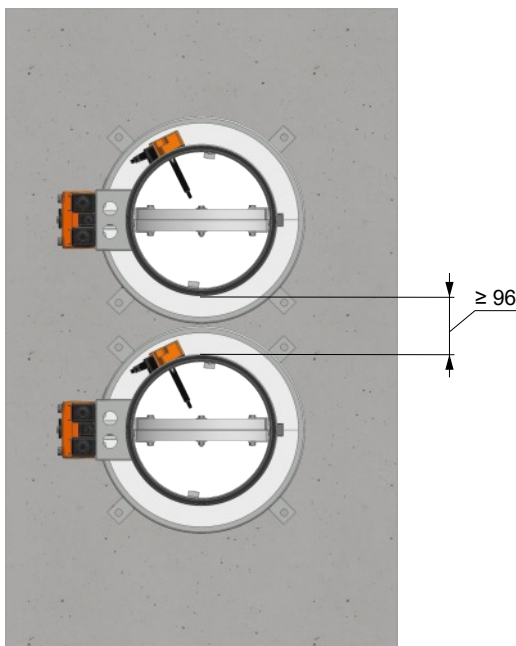
- 1 Solid ceiling construction
- 2 Spiral pipe
- 3 Fire resistant fill (for recommended materials see separate table)
- 4 Threaded rod and anchor to the wall (or ceiling) (e.g. threaded rod M8 and anchor type according pipe weight)
- 5 Fire protection mastic min. thickness 1mm (e.g. PROMASTOP-P or K)
- 6 Fire damper FDMS
- 7 Anchor for damper collar (e.g. FISCHER - type ZYKON FZA M8x30)
- 8 Fixing part of the pipe between wall and pipe (optional)
- 9 Hanging ring (e.g. FISCHER - type LGS)
- 10 Inspection hole for camera covered with removable air-tight rubber cap

FDMS - damper on the concrete ceiling construction - flange to flange and installation next to wall, ceiling

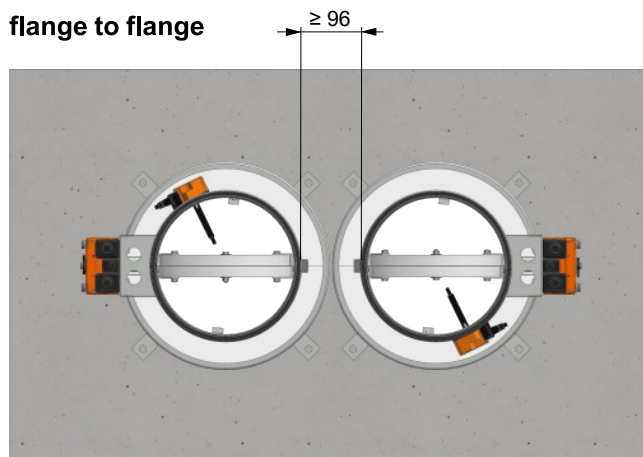
Fire classification: **EI60S**



flange to flange



flange to flange

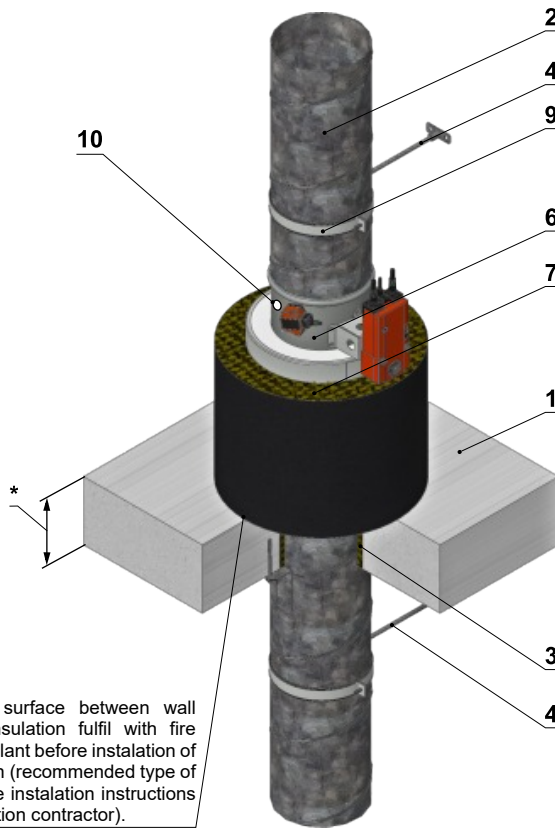


The same installation like on the ceiling wall and the same materials.



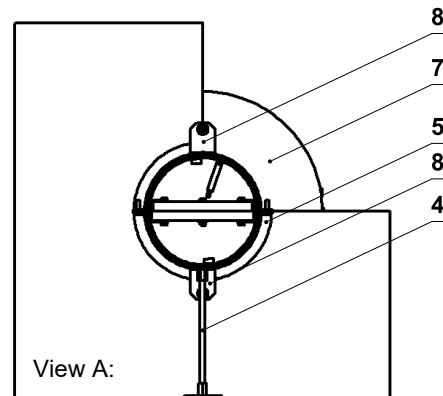
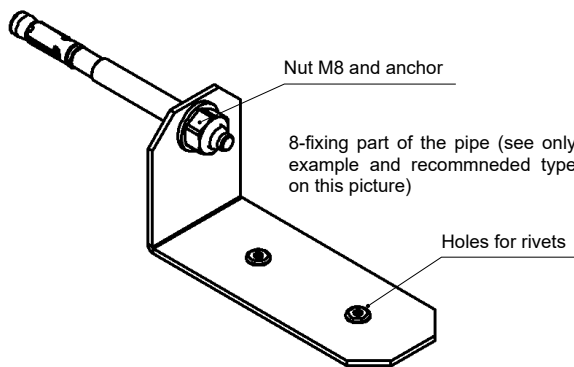
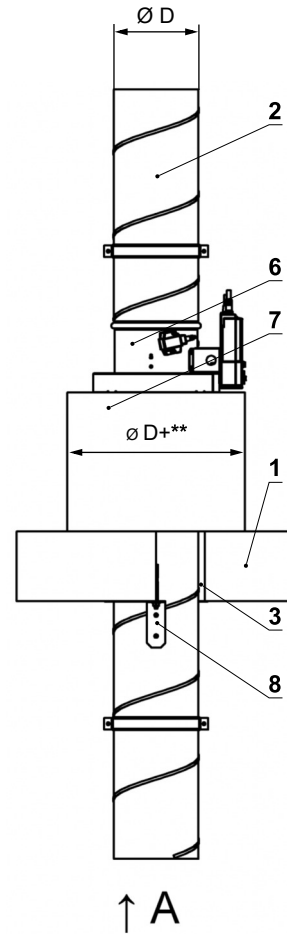
**FDMS - damper outside the concrete ceiling construction**

Fire classification: **EI60S**



Connecting surface between wall and pipe insulation fulfil with fire resistant sealant before instalation of the insulation (recommended type of sealant - see instalation instructions of the insulation contractor).

\* min. 110 - Concrete/ min. 125 - Aerated concrete



**POSITION**

- 1 Solid ceiling construction
- 2 Spiral pipe
- 3 Fire resistant fill (for recommended materials see separate table)
- 4 Threaded rod and anchor to the wall (or ceiling) (e.g. threaded rod M8 and anchor type according pipe weight)
- 5 Fire protection mastic min. thickness 1mm (e.g. PROMASTOP-P or K)
- 6 Fire damper FDMS
- 7 Pipe insulation with min. fire resistance EI60 (e.g. ISOVER Ulimat protect Wired MAT 4.0 ALU1, PAROC hvac Fire Mat BlackCoat)\*\*
- 8 Fixing part of the pipe between wall and pipe (optional)\*\*\*
- 9 Hanging ring (e.g. FISCHER - type LGS)
- 10 Inspection hole for camera covered with removable air-tight rubber cap

\*\* Installation of pipe insulation perform according instructions of the manufacturer .

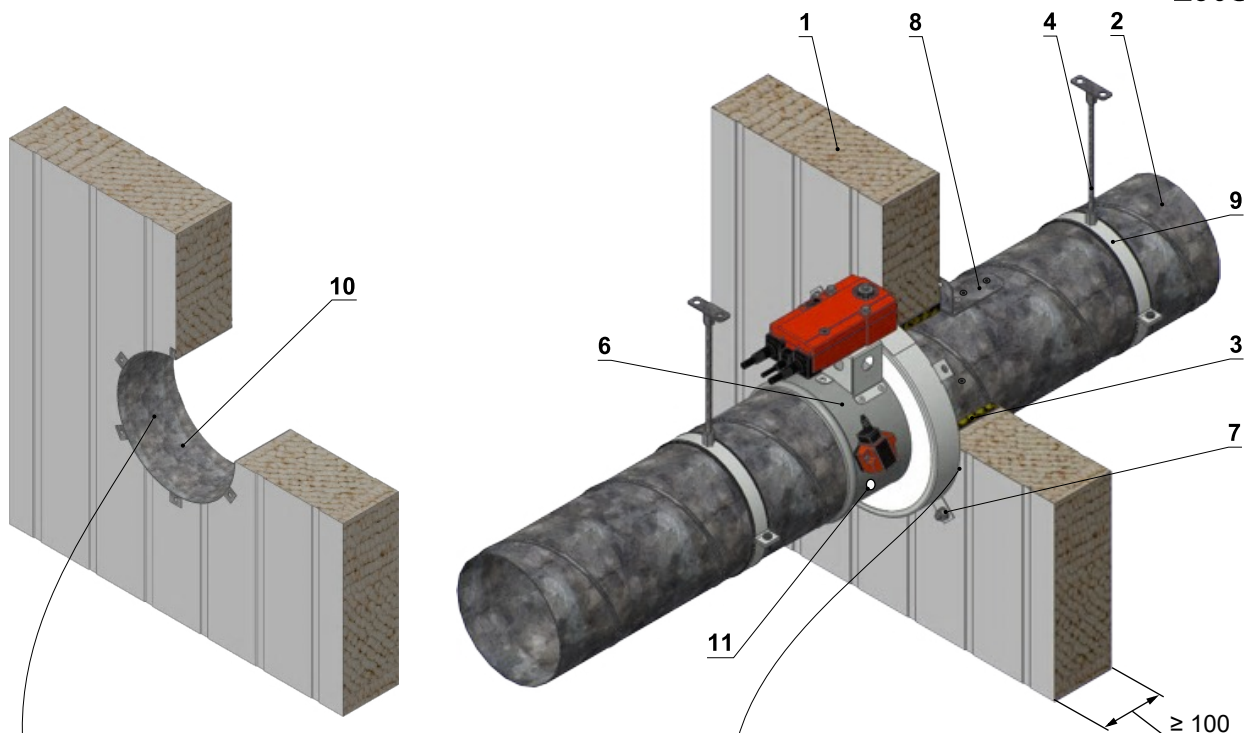
\*\*\* This fixing part isn't mandatory if the installation opening was fulfill by mortar or gypsum. In other cases of the fire resistant fill is this fixing part of the pipe mandatory. This fixing part can by mounted on the both sides of the wall.

**\*\* Material properties:**

ISOVER with min. density 66 kg/m<sup>3</sup>, min. th. 100 mm  
 PAROC with min. density 80 kg/m<sup>3</sup>, min. th. 50 mm

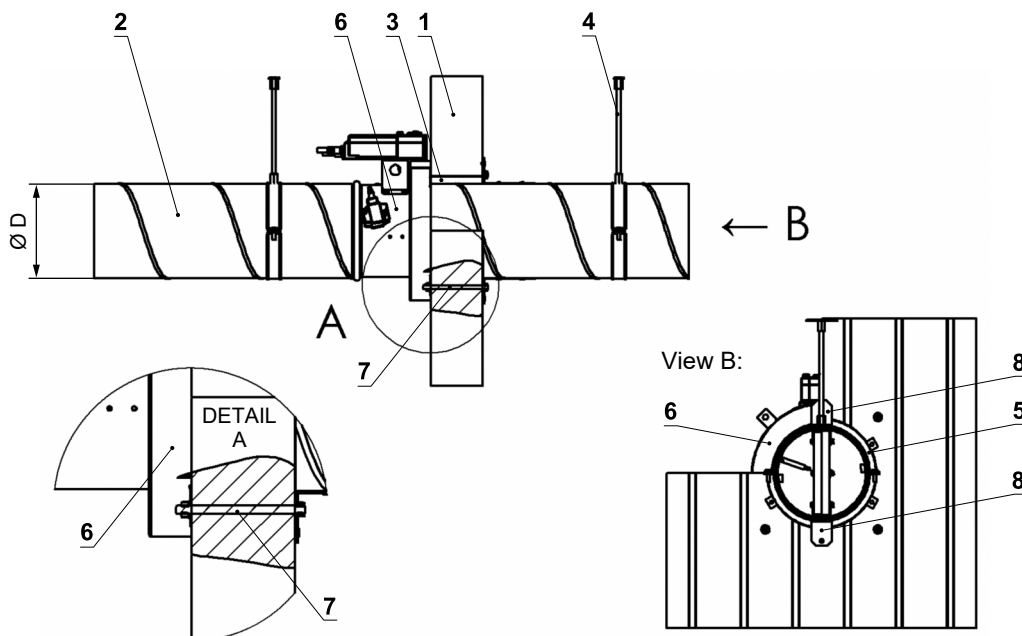
FDMS - damper on the insulated wall panels

Fire classification: **EI45S**  
**E90S**



Before the fire seal is installed, it is necessary to cover the opening with sheet metal element/cover. This part covers the insulation in the panel and connects the panel sheets.

Connecting surface between damper collar and wall fulfil with fire resistant sealant before installation of the damper (recommended type of sealant - e.g. PROMAT K84 or HILTI CFS-S)

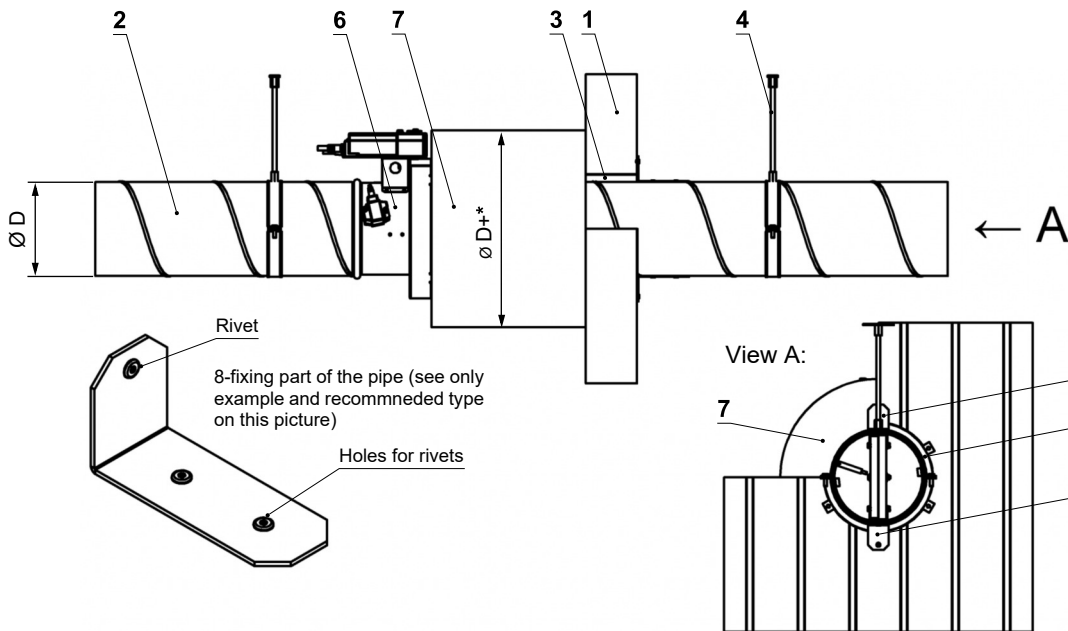
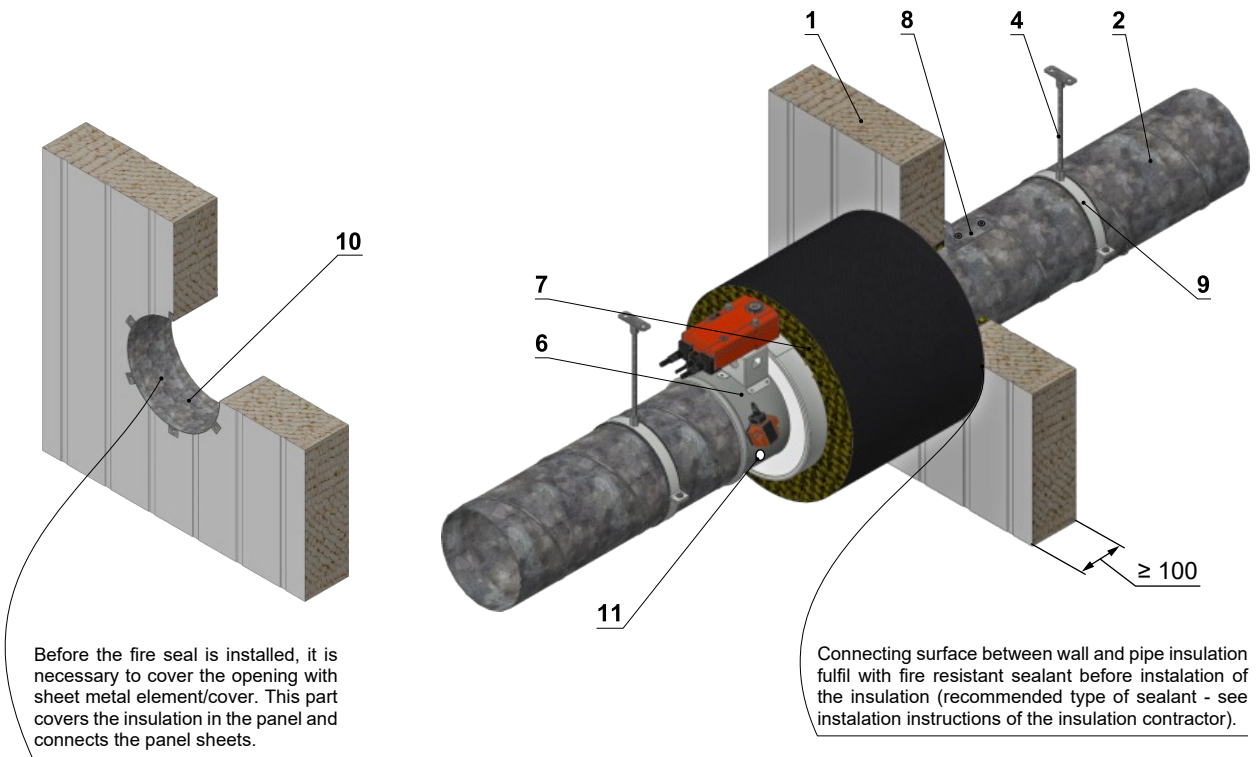


**POSITION**

- 1 Insulated wall construction (e.g. KINGSPAN - type KS1150 FR)
- 2 Spiral pipe
- 3 Fire resistant fill (for recommended materials see separate table)
- 4 Threaded rod and anchor to the wall (or ceiling) (e.g. threaded rod M8 and anchor type according pipe weight)
- 5 Fire protection mastic min. thickness 1mm (e.g. PROMASTOP-P or K)
- 6 Fire damper FDMS
- 7 Anchor for damper collar (threaded rod and nuts M8)
- 8 Fixing part of the pipe between wall and pipe (only recommended)
- 9 Hanging ring (e.g. FISCHER - type LGS)
- 10 Permeation shielding (sheet metal element is not included in supply of manufacturer)
- 11 Inspection hole for camera covered with removable air-tight rubber cap

**FDMS - damper outside the insulated wall panels**

Fire classification: **EI60S**



**POSITION**

- 1 Insulated wall construction (e.g. KINGSPAN - type KS1150 FR)
- 2 Spiral pipe
- 3 Fire resistant fill (for recommended materials see separate table)
- 4 Threaded rod and anchor to the wall (or ceiling) (e.g. threaded rod M8 and anchor type according pipe weight)
- 5 Fire protection mastic min. thickness 1mm (e.g. PROMASTOP-P or K)
- 6 Fire damper FDMS
- 7 Pipe insulation with min. fire resistance EI60 (e.g. ISOVER Ulimite protect Wired MAT 4.0 ALU1, PAROC hvac Fire Mat BlackCoat)\*
- 8 Fixing part of the pipe between wall and pipe (optional)\*\*
- 9 Hanging ring (e.g. FISCHER - type LGS)
- 10 Permeation shielding (sheet metal element is not included in supply of manufacturer)
- 11 Inspection hole for camera covered with removable air-tight rubber cap

**\* Material properties:**

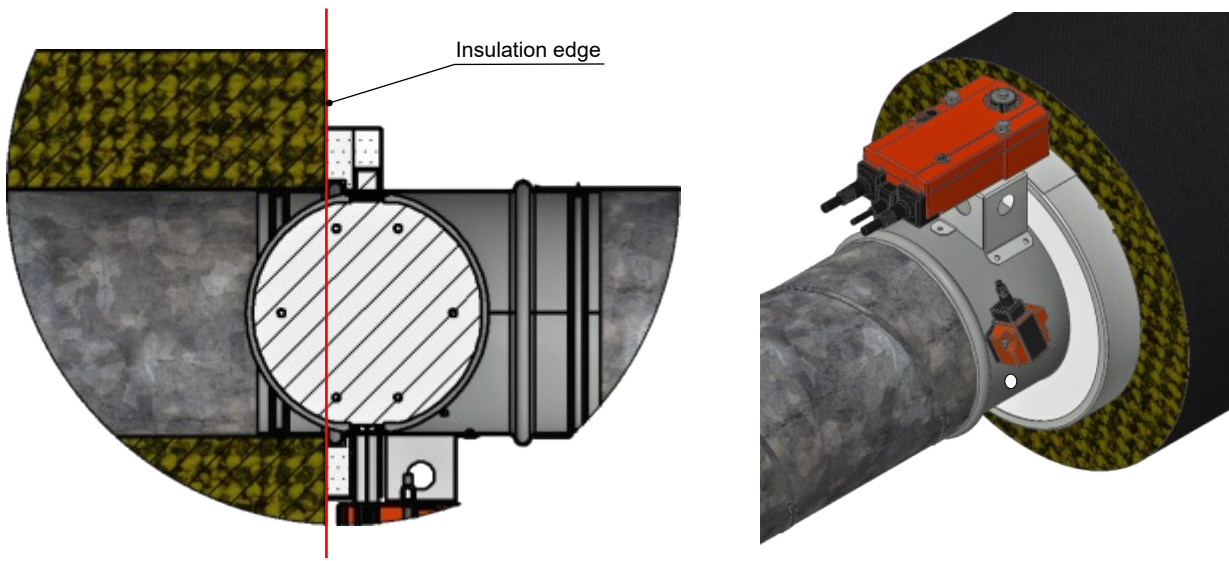
ISOVER with min. density 66 kg/m<sup>3</sup>, min. th. 100 mm  
 PAROC with min. density 80 kg/m<sup>3</sup>, min. th. 50 mm

\* Installation of pipe insulation perform according instructions of the manufacturer.

\*\* This fixing part isn't mandatory if the installation opening was fulfill by mortar or gypsum. In other cases of the fire resistant fill is this fixing part of the pipe mandatory. This fixing part can by mounted on the both sides of the wall.

Connecting point between air duct insulation and damper collar

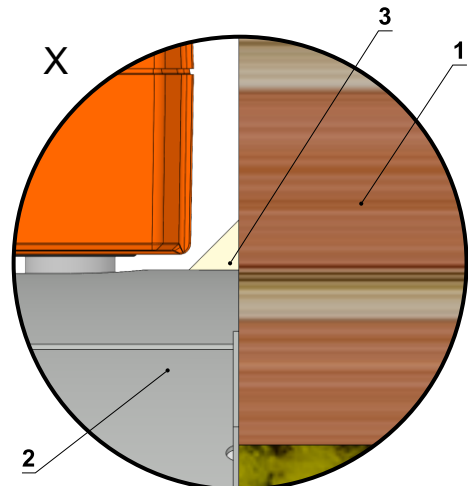
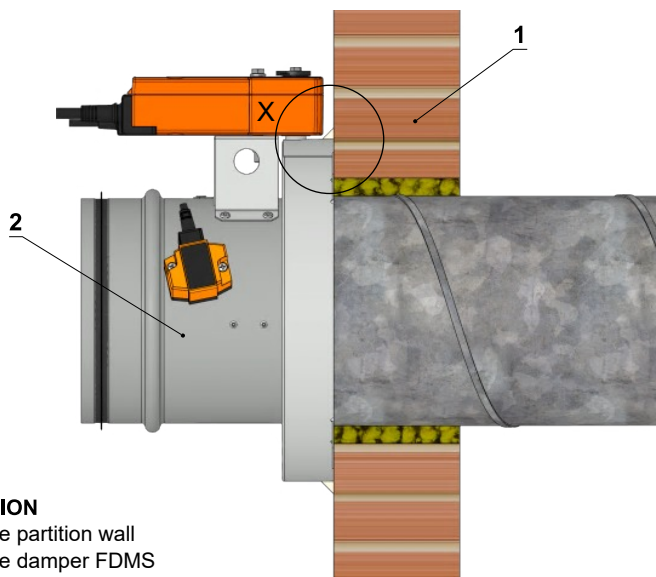
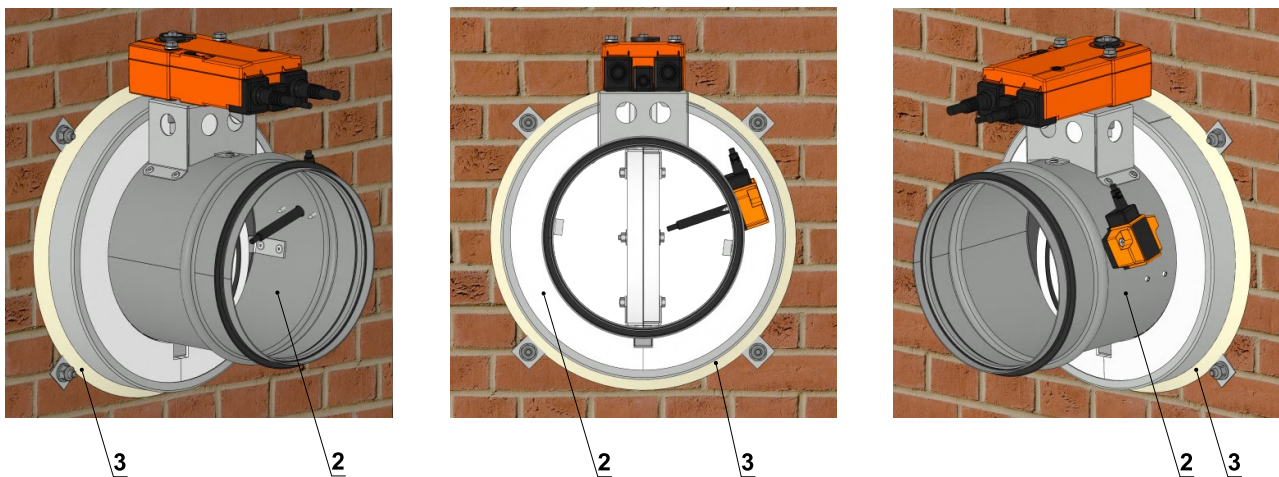
The insulation of the air duct must cover the damper collar from back side.



Substituted method of sealing instead of sealing between the collar and the wall

Substituted method of sealing around collar, sealing joint between FDMS and wall

Leaks and joints are sealed with Hilti CFS-S ACR fire sealant.



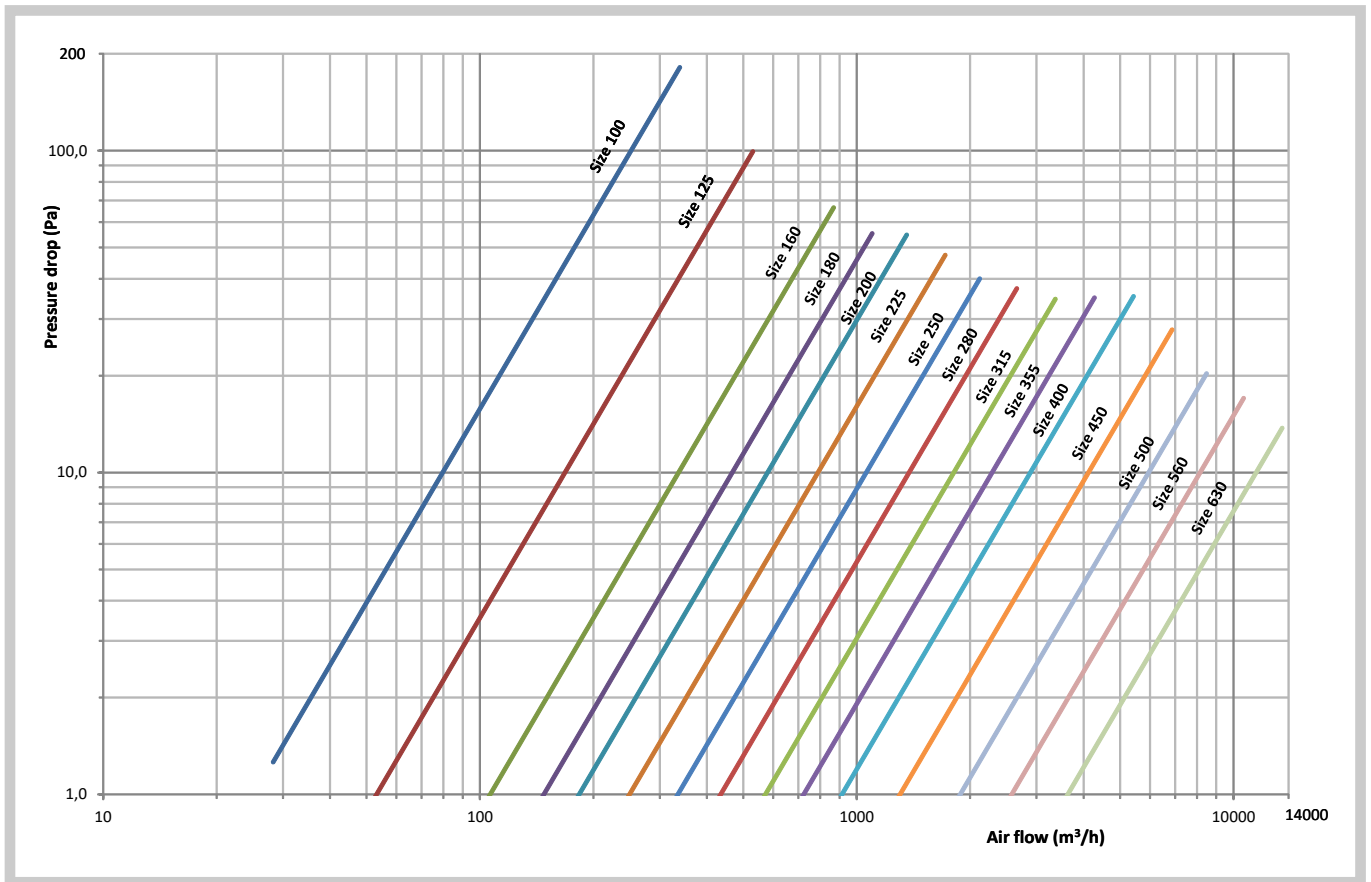
POSITION

- 1 Fire partition wall
- 2 Fire damper FDMS
- 3 Hilti CFS-S ACR fire sealant

■ TECHNICAL DATA OF FDMS

Pressure loss - please use next diagram

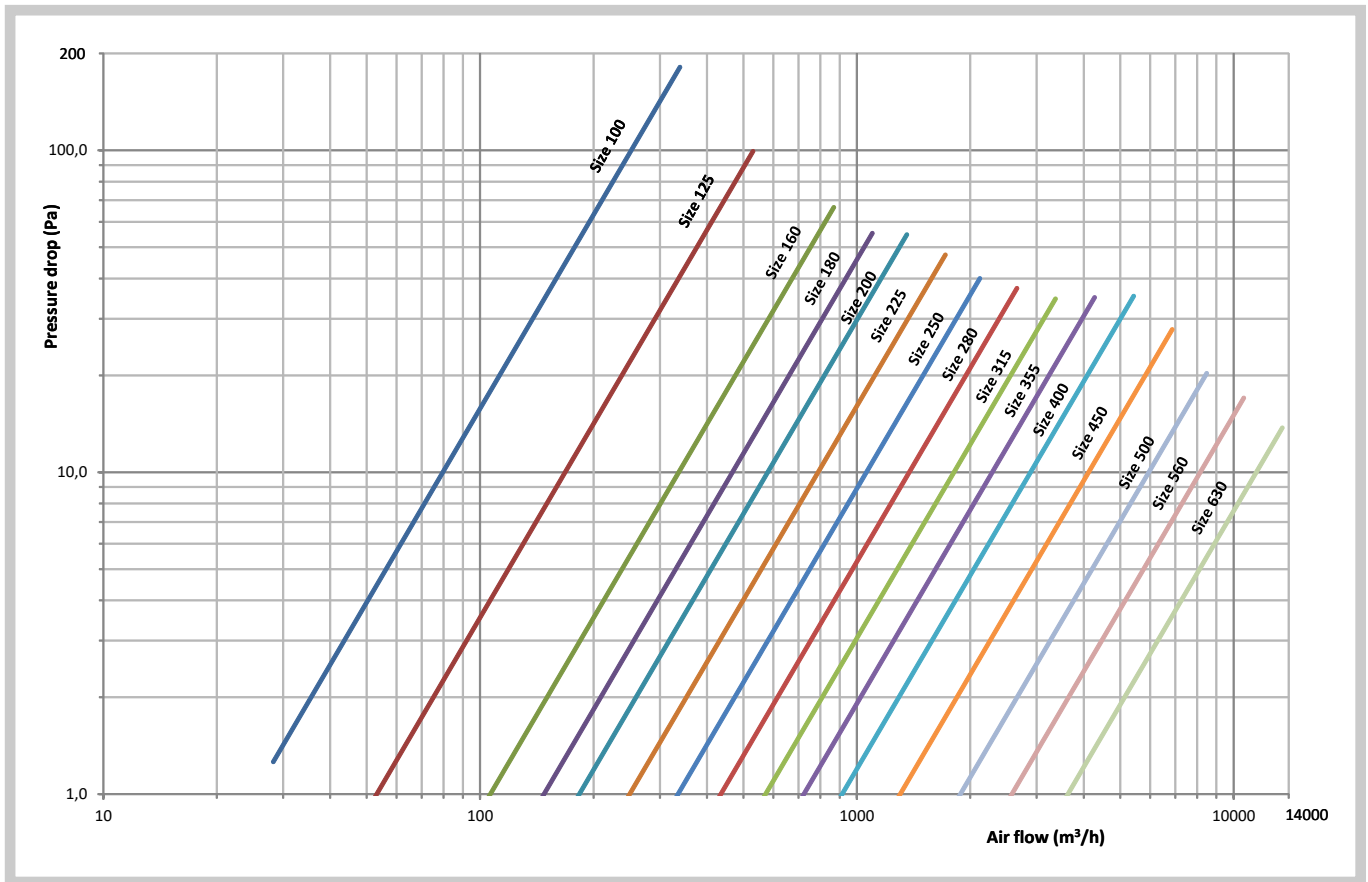
**CAUTION:**  
All the data is valid for dampers in the full "OPEN" position!!!



■ TECHNICAL DATA OF FDMS-VAV

Pressure loss - please use next diagram

**CAUTION:**  
All the data is valid for dampers in the full "OPEN" position!!!



Air volume flow

Air volume flow

Size	Air volume [m³.h <sup>-1</sup> ]		V <sub>nom</sub> [m³.h <sup>-1</sup> ]
	Minimum (w ≈ 1 m.s <sup>-1</sup> )	Maximum (w ≈ 7 m.s <sup>-1</sup> )	
100	30	200	200
125	45	310	310
140	55	400	400
160	70	500	500
180	90	650	650
200	115	800	800
225	145	1000	1000
250	180	1250	1250
280	220	1550	1550
315	280	2000	2000
355	355	2500	2500
400	455	3200	3200
500	710	5000	5000
630	1120	7900	7900

**Operating mode and setup**

**GUAC-DM3**

**Operating mode**

Through connecting the power supply to BU+BN (1+2) and a reference signal Y to BK (3) in the range of (0)2...10 VDC, the connected actuator regulates to the set point. The current flow in % of Vnom is provided as a feedback signal U on GY (4) for other actuators and can be communicated via PP-Bus.

CAP modes / override controls:  
AC\*/DC signal to terminal BK (3)

The controller is overload-proof.

**GUAC-PM3**

**Operating mode**

Through connecting the power supply to BU+BN (1+2) and a reference signal Y to BK (3) in the range of (0)2...10 VDC, the connected actuator regulates to the specified set point. The current pressure in % of Pnom is provided as a feedback signal U on GY (4) for other actuators and can be communicated via PP-Bus.

CAP modes / override controls:  
AC\*/DC signal to terminal BK (3)

The controller is overload-proof.

**Edit**

The selector allows the changing of values. The position of the arrow shows the value set. The changes are displayed as soon as the selector is moved ±10° from the position.

**Flow / Unit**

Setting the desired actual volume flow unit in m³/h and l/s.

**Vmin**

Adjust the desired flow Vmin (setpoint Y = 0 / 2 VDC).

**Vmax**

Adjust the desired flow Vmax (setpoint Y = 10 VDC).

**Diag**

Diagnostic menu:

- off - diagnostic mode is off
- on - diagnostic mode is on
- oP - opens the damper
- cL - closes the damper
- Lo - activated Vmin
- Hi - activated Vmax
- 123 - software version

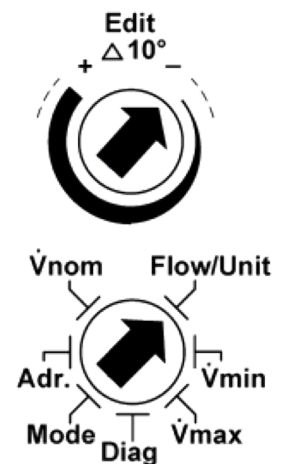
**Mode**

Setting the direction of rotation:

- 0-n...0-10 VDC normal
- 2-n...2-10 VDC normal
- 0-i ...0-10 VDC invers
- 2-i ...2-10 VDC invers

**Vnom**

Setting the nominal volumetric flow depending on the VAV-box.



**Edit**

The selector allows the changing of values. The position of the arrow shows the value set. The changes are displayed as soon as the selector is moved ±10° from the position.

**Pres / Unit**

Setting the desired actual pressure unit to Pa and H²O.

**Pmin**

Adjust the desired flow Pmin (setpoint Y = 0 / 2 VDC).

**Pmax**

Adjust the desired flow Pmax (setpoint Y = 10 VDC).

**Diag**

Diagnostic menu:

- off - diagnostic mode is off
- on - diagnostic mode is on
- oP - opens the damper
- cL - closes the damper
- Lo - activated Vmin
- Hi - activated Vmax
- 123 - software version

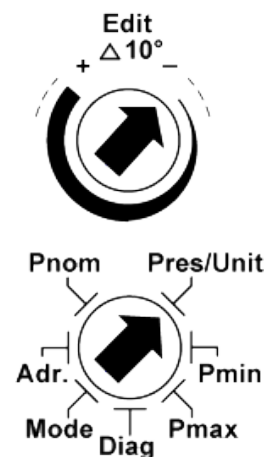
**Mode**

Setting the direction of rotation:

- 0-n...0-10 VDC normal
- 2-n...2-10 VDC normal
- 0-i ...0-10 VDC invers
- 2-i ...2-10 VDC invers

**Pnom**

Shows the nominal pressure setting.



**Noise data FDMS / FDMS-VAV - level of acoustic power corrected with filter A**

$L_{WA}$  - acoustic power level corrected with filter A (dB(A))

f - frequency in octave range (Hz)

w - air flow velocity (m/s)

**CAUTION:**

**All the data is valid for dampers in the full "OPEN" position!!!**

**$L_{WA}$  values for size 100 (dB(A))**

f (Hz)	w (m/s)										
	2	3	4	5	6	7	8	9	10	11	12
63	< 2	< 2	2	8	13	16	19	22	25	27	29
125	< 2	4	12	18	23	27	31	34	36	39	41
250	< 2	8	17	24	29	34	37	41	44	46	49
500	< 2	9	18	26	31	36	40	44	47	50	53
1000	< 2	5	16	24	30	35	40	43	47	50	53
2000	< 2	< 2	10	18	25	30	35	39	43	46	49
4000	< 2	< 2	< 2	9	16	22	27	32	36	39	43
8000	< 2	< 2	< 2	< 2	5	11	16	21	25	29	32
<b>Total</b>	<b>&lt; 15</b>	<b>&lt; 15</b>	<b>23</b>	<b>30</b>	<b>36</b>	<b>41</b>	<b>45</b>	<b>49</b>	<b>52</b>	<b>55</b>	<b>57</b>

**$L_{WA}$  values for size 125 (dB(A))**

f (Hz)	w (m/s)										
	2	3	4	5	6	7	8	9	10	11	12
63	< 2	< 2	< 2	5	9	13	16	19	21	23	25
125	< 2	< 2	8	15	20	24	27	30	33	35	37
250	< 2	4	13	20	26	30	34	37	40	43	45
500	< 2	5	15	22	28	33	37	41	44	47	49
1000	< 2	< 2	12	20	26	32	36	40	43	46	49
2000	< 2	< 2	6	14	21	27	32	36	39	43	46
4000	< 2	< 2	< 2	6	13	19	24	28	32	36	39
8000	< 2	< 2	< 2	< 2	< 2	7	13	18	22	25	29
<b>Total</b>	<b>&lt; 15</b>	<b>&lt; 15</b>	<b>19</b>	<b>26</b>	<b>32</b>	<b>37</b>	<b>41</b>	<b>45</b>	<b>48</b>	<b>51</b>	<b>54</b>

**$L_{WA}$  values for size 160 (dB(A))**

f (Hz)	w (m/s)										
	2	3	4	5	6	7	8	9	10	11	12
63	< 2	< 2	< 2	5	10	13	16	19	22	24	26
125	< 2	< 2	9	15	20	24	27	31	33	36	38
250	< 2	5	14	21	26	31	34	38	41	43	46
500	< 2	6	15	23	28	33	37	41	44	47	50
1000	< 2	2	13	21	27	32	37	40	44	47	50
2000	< 2	< 2	7	15	22	27	32	36	40	43	46
4000	< 2	< 2	< 2	6	13	19	24	29	33	36	40
8000	< 2	< 2	< 2	< 2	< 2	8	13	18	22	26	29
<b>Total</b>	<b>&lt; 15</b>	<b>&lt; 15</b>	<b>20</b>	<b>27</b>	<b>33</b>	<b>38</b>	<b>42</b>	<b>45</b>	<b>49</b>	<b>52</b>	<b>54</b>

**$L_{WA}$  values for size 180 (dB(A))**

f (Hz)	w (m/s)										
	2	3	4	5	6	7	8	9	10	11	12
63	< 2	< 2	< 2	4	9	13	16	18	21	23	25
125	< 2	< 2	8	14	19	23	27	30	32	35	37
250	< 2	4	13	20	25	30	34	37	40	42	45
500	< 2	5	15	22	28	33	37	40	43	46	49
1000	< 2	< 2	12	20	26	31	36	40	43	46	49
2000	< 2	< 2	6	14	21	27	31	35	39	42	45
4000	< 2	< 2	< 2	6	13	19	24	28	32	36	39
8000	< 2	< 2	< 2	< 2	< 2	7	12	17	21	25	29
<b>Total</b>	<b>&lt; 15</b>	<b>&lt; 15</b>	<b>19</b>	<b>26</b>	<b>32</b>	<b>37</b>	<b>41</b>	<b>45</b>	<b>48</b>	<b>51</b>	<b>54</b>



L<sub>WA</sub> values for size 200 (dB(A))

f (Hz)	w (m/s)										
	2	3	4	5	6	7	8	9	10	11	12
63	< 2	< 2	< 2	5	10	13	17	19	22	24	26
125	< 2	< 2	9	15	20	24	28	31	33	36	38
250	< 2	5	14	21	26	31	35	38	41	43	46
500	< 2	6	15	23	29	33	38	41	44	47	50
1000	< 2	3	13	21	27	32	37	41	44	47	50
2000	< 2	< 2	7	15	22	27	32	36	40	43	46
4000	< 2	< 2	< 2	6	14	19	25	29	33	37	40
8000	< 2	< 2	< 2	< 2	< 2	8	13	18	22	26	30
<b>Total</b>	<b>&lt; 15</b>	<b>&lt; 15</b>	<b>20</b>	<b>27</b>	<b>33</b>	<b>38</b>	<b>42</b>	<b>46</b>	<b>49</b>	<b>52</b>	<b>55</b>

L<sub>WA</sub> values for size 225 (dB(A))

f (Hz)	w (m/s)										
	2	3	4	5	6	7	8	9	10	11	12
63	< 2	< 2	< 2	4	9	12	15	18	21	23	25
125	< 2	< 2	8	14	19	23	27	30	32	35	37
250	< 2	4	13	20	25	30	33	37	40	42	45
500	< 2	5	14	22	27	32	36	40	43	46	49
1000	< 2	< 2	12	20	26	31	36	39	43	46	49
2000	< 2	< 2	6	14	21	26	31	35	39	42	45
4000	< 2	< 2	< 2	5	12	18	23	28	32	35	39
8000	< 2	< 2	< 2	< 2	< 2	7	12	17	21	25	28
<b>Total</b>	<b>&lt; 15</b>	<b>&lt; 15</b>	<b>19</b>	<b>26</b>	<b>32</b>	<b>37</b>	<b>41</b>	<b>45</b>	<b>48</b>	<b>51</b>	<b>53</b>

L<sub>WA</sub> values for size 250 (dB(A))

f (Hz)	w (m/s)										
	2	3	4	5	6	7	8	9	10	11	12
63	< 2	< 2	< 2	4	9	12	15	18	21	23	25
125	< 2	< 2	8	14	19	23	27	30	32	35	37
250	< 2	4	13	20	25	30	33	37	40	42	45
500	< 2	5	14	22	27	32	36	40	43	46	49
1000	< 2	< 2	12	20	26	31	36	39	43	46	49
2000	< 2	< 2	6	14	21	26	31	35	39	42	45
4000	< 2	< 2	< 2	5	12	18	23	28	32	35	39
8000	< 2	< 2	< 2	< 2	< 2	7	12	17	21	25	28
<b>Total</b>	<b>&lt; 15</b>	<b>&lt; 15</b>	<b>19</b>	<b>26</b>	<b>32</b>	<b>37</b>	<b>41</b>	<b>44</b>	<b>48</b>	<b>51</b>	<b>53</b>

L<sub>WA</sub> values for size 280 (dB(A))

f (Hz)	w (m/s)										
	2	3	4	5	6	7	8	9	10	11	12
63	< 2	< 2	< 2	5	10	13	16	19	22	24	26
125	< 2	< 2	9	15	20	24	27	30	33	36	38
250	< 2	5	14	21	26	30	34	38	41	43	45
500	< 2	6	15	23	28	33	37	41	44	47	49
1000	< 2	2	13	21	27	32	37	40	44	47	50
2000	< 2	< 2	6	15	22	27	32	36	40	43	46
4000	< 2	< 2	< 2	6	13	19	24	29	33	36	39
8000	< 2	< 2	< 2	< 2	< 2	8	13	18	22	26	29
<b>Total</b>	<b>&lt; 15</b>	<b>&lt; 15</b>	<b>20</b>	<b>27</b>	<b>33</b>	<b>38</b>	<b>42</b>	<b>45</b>	<b>49</b>	<b>52</b>	<b>54</b>

**L<sub>WA</sub> values for size 315 (dB(A))**

f (Hz)	w (m/s)										
	2	3	4	5	6	7	8	9	10	11	12
63	< 2	< 2	< 2	6	10	14	17	20	22	24	26
125	< 2	< 2	9	16	21	25	28	31	34	36	38
250	< 2	5	14	21	27	31	35	38	41	44	46
500	< 2	6	16	23	29	34	38	41	45	48	50
1000	< 2	3	13	21	27	33	37	41	44	47	50
2000	< 2	< 2	7	15	22	28	33	37	40	44	47
4000	< 2	< 2	< 2	7	14	20	25	29	33	37	40
8000	< 2	< 2	< 2	< 2	2	8	14	18	23	26	30
<b>Total</b>	<b>&lt; 15</b>	<b>&lt; 15</b>	<b>20</b>	<b>27</b>	<b>33</b>	<b>38</b>	<b>42</b>	<b>46</b>	<b>49</b>	<b>52</b>	<b>55</b>

**L<sub>WA</sub> values for size 355 (dB(A))**

f (Hz)	w (m/s)										
	2	3	4	5	6	7	8	9	10	11	12
63	< 2	< 2	< 2	7	11	15	18	21	23	25	27
125	< 2	2	10	17	22	26	29	32	35	37	39
250	< 2	6	15	22	28	32	36	39	42	45	47
500	< 2	7	17	24	30	35	39	42	46	49	51
1000	< 2	4	14	22	28	34	38	42	45	48	51
2000	< 2	< 2	8	16	23	29	34	38	41	45	48
4000	< 2	< 2	< 2	8	15	21	26	30	34	38	41
8000	< 2	< 2	< 2	< 2	3	9	15	19	24	27	31
<b>Total</b>	<b>&lt; 15</b>	<b>&lt; 15</b>	<b>21</b>	<b>28</b>	<b>34</b>	<b>39</b>	<b>43</b>	<b>47</b>	<b>50</b>	<b>53</b>	<b>56</b>

**L<sub>WA</sub> values for size 400 (dB(A))**

f (Hz)	w (m/s)										
	2	3	4	5	6	7	8	9	10	11	12
63	< 2	< 2	< 2	8	12	16	19	22	24	26	28
125	< 2	3	11	18	23	27	30	33	36	38	40
250	< 2	7	16	23	29	33	37	40	43	46	48
500	< 2	8	18	25	31	36	40	43	47	50	52
1000	< 2	5	15	23	29	35	39	43	46	49	52
2000	< 2	< 2	9	17	24	30	35	39	42	46	49
4000	< 2	< 2	< 2	9	16	22	27	31	35	39	42
8000	< 2	< 2	< 2	< 2	4	10	16	20	25	28	32
<b>Total</b>	<b>&lt; 15</b>	<b>&lt; 15</b>	<b>22</b>	<b>29</b>	<b>35</b>	<b>40</b>	<b>44</b>	<b>48</b>	<b>51</b>	<b>54</b>	<b>57</b>

**L<sub>WA</sub> values for size 450 (dB(A))**

f (Hz)	w (m/s)										
	2	3	4	5	6	7	8	9	10	11	12
63	< 2	< 2	< 2	6	11	15	18	21	23	25	27
125	< 2	< 2	10	16	21	25	29	32	35	37	39
250	< 2	6	15	22	27	32	36	39	42	45	47
500	< 2	7	17	24	30	35	39	42	46	48	51
1000	< 2	4	14	22	28	33	38	42	45	48	51
2000	< 2	< 2	8	16	23	29	33	38	41	45	48
4000	< 2	< 2	< 2	8	15	21	26	30	34	38	41
8000	< 2	< 2	< 2	< 2	3	9	15	19	24	27	31
<b>Total</b>	<b>&lt; 15</b>	<b>&lt; 15</b>	<b>21</b>	<b>28</b>	<b>34</b>	<b>39</b>	<b>43</b>	<b>47</b>	<b>50</b>	<b>53</b>	<b>56</b>

L<sub>WA</sub> values for size 500 (dB(A))

f (Hz)	w (m/s)										
	2	3	4	5	6	7	8	9	10	11	12
63	< 2	< 2	< 2	4	9	12	16	18	21	23	25
125	< 2	< 2	8	14	19	23	27	30	32	35	37
250	< 2	4	13	20	25	30	34	37	40	42	45
500	< 2	5	14	22	28	32	37	40	43	46	49
1000	< 2	< 2	12	20	26	31	36	40	43	46	49
2000	< 2	< 2	6	14	21	26	31	35	39	42	45
4000	< 2	< 2	< 2	5	13	18	24	28	32	36	39
8000	< 2	< 2	< 2	< 2	< 2	7	12	17	21	25	28
<b>Total</b>	<b>&lt; 15</b>	<b>&lt; 15</b>	<b>19</b>	<b>26</b>	<b>32</b>	<b>37</b>	<b>41</b>	<b>45</b>	<b>48</b>	<b>51</b>	<b>53</b>

L<sub>WA</sub> values for size 560 (dB(A))

f (Hz)	w (m/s)										
	2	3	4	5	6	7	8	9	10	11	12
63	< 2	< 2	< 2	5	10	13	17	19	22	24	26
125	< 2	< 2	9	15	20	24	28	31	33	36	38
250	< 2	5	14	21	26	31	35	38	41	43	46
500	< 2	6	15	23	29	33	38	41	44	47	50
1000	< 2	3	13	21	27	32	37	41	44	47	50
2000	< 2	< 2	7	15	22	27	32	36	40	43	46
4000	< 2	< 2	< 2	6	14	19	25	29	33	37	40
8000	< 2	< 2	< 2	< 2	< 2	8	13	18	22	26	29
<b>Total</b>	<b>&lt; 15</b>	<b>&lt; 15</b>	<b>20</b>	<b>27</b>	<b>33</b>	<b>38</b>	<b>42</b>	<b>46</b>	<b>49</b>	<b>52</b>	<b>54</b>

L<sub>WA</sub> values for size 630 (dB(A))

f (Hz)	w (m/s)										
	2	3	4	5	6	7	8	9	10	11	12
63	< 2	< 2	< 2	3	8	12	15	18	20	22	24
125	< 2	< 2	7	13	18	22	26	29	32	34	36
250	< 2	3	12	19	25	29	33	36	39	41	44
500	< 2	4	14	21	27	32	36	39	43	45	48
1000	< 2	< 2	11	19	25	31	35	39	43	45	48
2000	< 2	< 2	5	13	20	26	30	35	39	41	45
4000	< 2	< 2	< 2	5	12	18	23	27	31	35	38
8000	< 2	< 2	< 2	< 2	< 2	6	12	16	21	24	28
<b>Total</b>	<b>&lt; 15</b>	<b>&lt; 15</b>	<b>18</b>	<b>25</b>	<b>31</b>	<b>36</b>	<b>40</b>	<b>44</b>	<b>47</b>	<b>50</b>	<b>53</b>

## ■ MATERIAL, FINISHING

Damper bodies are supplied in the design made of galvanized steel plate without any other surface finishing. The round duct joint is made of galvanized steel and boards from mineral fibers. Damper blades are made of fire resistant asbestos free boards made of mineral fibers. Damper controls are made of galvanized materials with no other surface finish. Springs are galvanized. Thermal protective fuses are made of sheet brass, thickness = 0.5 mm. Fasteners are made of galvanized steel.

**According to the customer's requirements, damper can be made of stainless material.**

Specifications for stainless-steel models – classification of stainless steel:

- Class A2 – Food-grade stainless steel (AISI 304 – EN 17240)
- Class A4 – Chemistry-grade stainless steel (AISI 316, 316L – EN 17346, 17349)

The respective stainless steel is the material for all components present or accessing the damper interior; components outside the damper body are typically from galvanized sheet metal (fasteners for mounting the servo drive or mechanics, mechanics components except Item 4), frame components.

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

- 1) Damper body and all components permanently attached
- 2) Leaf holders, including pins, metal parts of leaf
- 3) Control components inside the damper (leaf angle selector, pin with lever)
- 4) Mechanical components entering the interior of damper body (lower sheet of mechanics, lock holder "1", lock lever "2", lock spring, 8 dia. stopper pin, mechanics pin)
- 5) Inspection hole cover including the clip and fasteners (if they are parts of the cover)
- 6) Bearing for torque transfer from the lever with pin on the angle selector at the leaf (made from AISI 440C)

The leaf of the damper is made from two Promatect-H sheets, thickness 15 mm, connected with stainless-steel fasteners of corresponding class.

Plastic, rubber and silicon components, sealants, foaming bands, glass-ceramic seals, housings, brass bearings of the leaf, servo drives, and end switches are identical for all material variants of the dampers.

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

The temperature-dependent initiator of the servo drive (sensor) is modified for stainless-steel variants of the dampers; the standard galvanized screws are replaced with stainless-steel M4 screws of corresponding class the counterpart has stainless-steel riveting M4 nuts.

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

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

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

## ■ INSPECTION, TESTING

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

## ■ TRANSPORT AND STORAGE

Dampers are transported on trucks, on transport palettes or boxes, so that the fire dampers are protected from direct water impact. During transportation, handling and installation processes. The ambient temperature must not exceed +40°C. During transport, the damper blade must be in CLOSE position. Dampers are stored indoor in environment without any aggressive vapors, gases or dust. Indoor temperature must be in the range from -30 °C to +40 °C and maximum relative humidity 95 % (avoid condensation on the damper body). Dampers must be protected against mechanic damages when transported and manipulated.

## ■ ASSEMBLY, ATTENDANCE, MAINTENANCE AND REVISIONS

All effective safety standards and directives must be observed during fire damper assembly. To ensure reliable fire damper function it is necessary to avoid blocking the closing mechanism and contact surfaces with collected dust, fiber and sticky materials and solvents. 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.

**Entry into service and revisions**

Before entering the dampers into operation after their assembly and by sequential checks, the following checks must be carried out. Visual inspection of proper damper integration , inside damper area, damper blade, contact surfaces and silicon sealing. Check of thermal protective fuse and closing mechanism. Check the closing function of the damper blade. This can be done by removing of thermal fuse from damper body.


Before entering the dampers with actuating mechanism into operation after their assembly and by sequential checks. Check of blade displacement into the breakdown position "CLOSED" can be done after cutting off the actuating mechanism supply (e.g. by pressing the RESET button at the thermoelectrical starting mechanism BAT or cutting off the supply from ELECTRICAL FIRE SIGNALISATION). Check of blade displacement back into the "OPEN" position can be done after restoration of power supply (e.g. by releasing the RESET 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.

For regular or exceptional inspection of interior of fire damper, micro-camera device can be used. On each fire damper is inspection hole. 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.

**DATA LABELS**

Data label FDMS (placed on the casing of fire damper)

<b>MANDÍK</b> ®		MANDÍK, a.s. Dobříšská 550, 267 24 Hostomice, Czech Republic		 MANUAL	
FIRE DAMPER - FDMS					
DIMENSION:		ACTUATING SYSTEM:			
YEAR/SER.NO.:		WEIGHT (kg):			
FIRE PROTEC. CLASS: EI 60 (ve ho i ↔ o) S					
TPM 125/17	Cert. No.: 1391-CPR-2020/0131, DoP: PM/FDMS(FDMS-VAV)/01/20/2	EN 15650:2010	CE 1391		

Data label FDMS-VAV with air flow control GUAC-DM3 (placed on the casing of fire damper)

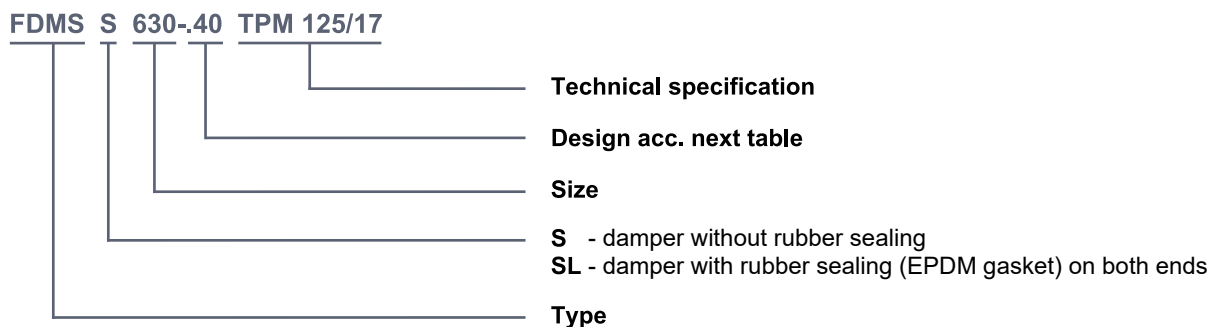
<b>MANDÍK</b> ®		MANDÍK, a.s. Dobříšská 550, 267 24 Hostomice, Czech Republic	
FIRE DAMPER FDMS-VAV			
DIMENSION:		ACT. SYSTEM:	
SER. NO.:		WEIGHT (kg):	
FIRE PROTECTION CLASS: EI 60 (ve ho i ↔ o) S			
Cert. 1391-CPR-2020/0131		EN 15650:2010	
V <sub>NOM</sub> (m <sup>3</sup> /hod)		CONTROL VOLTAGE	
V <sub>MIN</sub> (m <sup>3</sup> /hod)		V <sub>MAX</sub> (m <sup>3</sup> /hod)	
GRUNER type GUAC-DM3+340CTA-024D-03-S2/V, PP Bus			CE 1391

Data label FDMS-VAV with pressure control GUAC-PM3 (placed on the casing of fire damper)

<b>MANDÍK</b> ®		MANDÍK, a.s. Dobříšská 550, 267 24 Hostomice, Czech Republic	
FIRE DAMPER FDMS-VAV			
DIMENSION:		ACT. SYSTEM:	
SER. NO.:		WEIGHT (kg):	
FIRE PROTECTION CLASS: EI 60 (ve ho i ↔ o) S			
Cert. 1391-CPR-2020/0131		EN 15650:2010	
P <sub>NOM</sub> (m <sup>3</sup> /hod)		CONTROL VOLTAGE	
P <sub>MIN</sub> (m <sup>3</sup> /hod)		P <sub>MAX</sub> (m <sup>3</sup> /hod)	
GRUNER type GUAC-PM3+340CTA-024D-03-S2/V, PP Bus			CE 1391

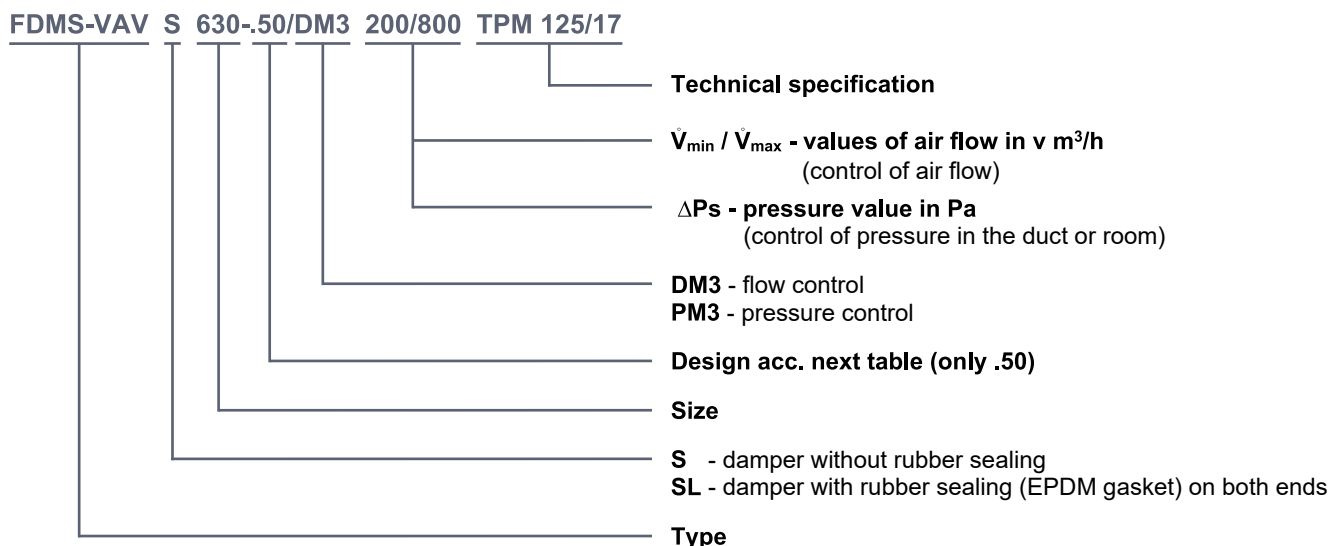
■ ORDERING KEY

**Fire dampers FDMS**



Damper design	Additional Nr.
Thermal with mechanical control	.01
Thermal with mechanical control and limit switch ("CLOSED")	.11
Thermal with mechanical control and two limit switches ("CLOSED" and "OPEN")	.80
With actuating mechanism BFL(BFN)230-T (AC 230 V)	.40
With actuating mechanism BFL(BFN)24-T (AC/DC 24 V)	.50
With actuating mechanism BFL(BFN)230-T, sensor BAT is not mounted on the damper's body, only connected with actuator by cable	.4V
With actuating mechanism BFL(BFN)230-T, sensor BAT is not mounted on the damper's body, only connected with actuator by cable	.5V
With actuating mechanism BFL(BFN)24-T-ST and communication unit BKN230-24	.60
With actuating mechanism BFL(BFN)230-T, sensor BAT is not mounted on the damper's body, only connected with actuator by cable	.6V

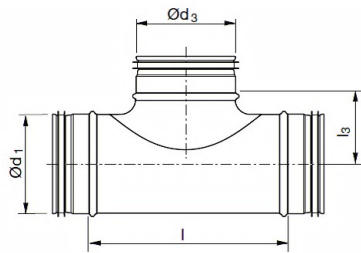
**Fire dampers FDMS-VAV**



Damper design	Additional Nr.
With actuating mechanism GRUNER - 340CTA-024D-XX-S2-V/8F12/ST06/BP8 (AC/DC 24 V) With controller GRUNER - GUAC-DM3 / GUAC-PM3 (AC/DC 24 V)	.50

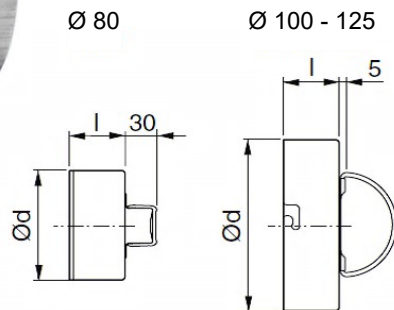
■ ACCESSORIES

**T-piece for inspection**



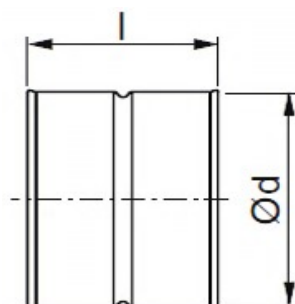
Size FDMS	d1 (mm)	d3 (mm)	l (mm)	l3 (mm)
100	98	80	97	60
125	123	80	97	72
160	158	100	130	95
180	178	100	175	105
200	198	100	175	115
225	223	100	175	127
250	248	100	175	140
280	278	100	175	155
315	313	100	175	173
355	353	100	175	193
400	398	125	225	220
450	448	125	225	245
500	498	125	225	270
560	558	125	225	300
630	628	125	225	335

**Access door for T-piece**



Size FDMS	d (mm)	l (mm)
100	80	48
125	80	48
160	100	40
180	100	40
200	100	40
225	100	40
250	100	40
280	100	40
315	100	40
355	100	40
400	125	40
450	125	40
500	125	40
560	125	40
630	125	40

**Female coupling**



Size FDMS	d (mm)	l (mm)
100	100	97
125	125	97
160	160	97
180	180	97
200	200	97
225	225	97
250	250	139
280	280	139
315	315	139
355	355	139
400	400	184
450	450	184
500	500	184
560	560	184
630	630	184

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The producer reserves the right for innovations of the product. For actual product information see  
[www.mandik.com](http://www.mandik.com)