

MANDÍK[®]

INSTRUCTIONS FOR USE

FIRE DAMPERS IN A NON-EXPLOSIVE DESIGN

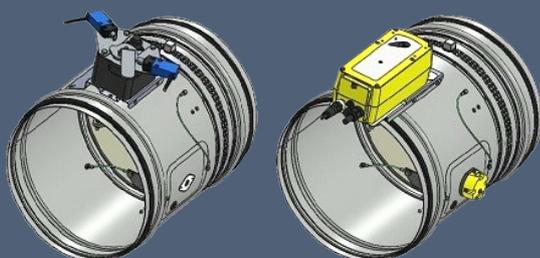
FDMR – round damper DN100-800 acc. to TPM 140/19

FDMA-PM – round damper DN900-1000 acc. to TPM 145/20

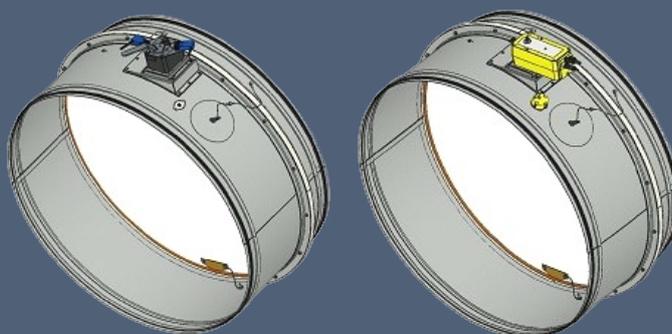
FDMB – square damper acc. to TPM 075/09

FDMQ – square damper DN900-1000 acc. to TPM 103/14

FDMR

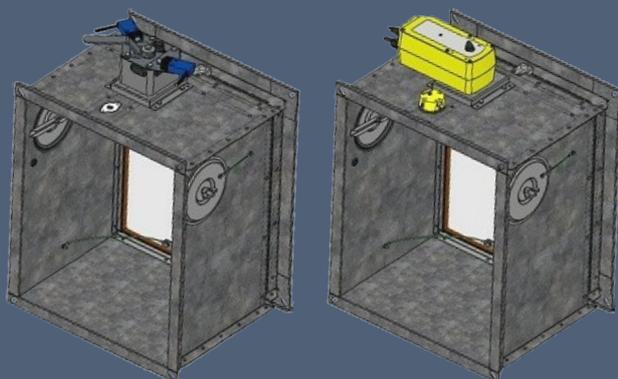


FDMA-PM

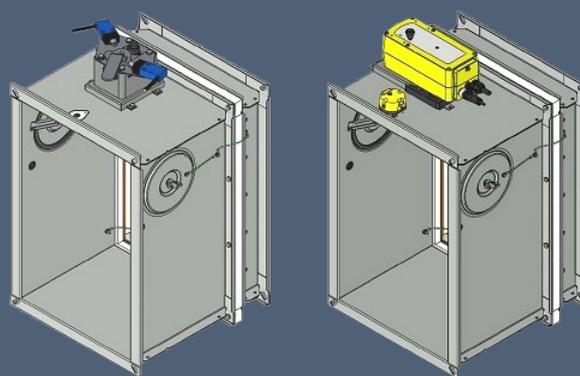


galvanised or stainless-steel construction

FDMB



FDMQ



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II. GENERAL INFORMATION

1. Description

- 1.1.** Fire dampers are closures in the ducts of air-conditioning units, which prevent the spread of fire and combustion products from one fire section to another by closing the air ducts in the places of installation according to EN 73 0872.
The damper leaf automatically closes the air passage by means of the closing the mechanism's spring or the actuator's return spring.
The impulse to release the lowering lever can be manual (pressing the lowering button on the mechanism) or thermal (pressing the thermal fuse).
The actuator return spring is activated when the ExPro-TT temperature sensor is activated (pressing the reset button on the sensor or temperature activation) or the actuator power supply is interrupted.
After closing the leaf, the damper is sealed against the passage of smoke with a silicone seal. At the same time, the damper leaf is embedded in the mass, which increases its volume due to the increasing temperature and closes the air duct airtight.
- 1.2.** Damper fire resistance tests were performed according to the test standard EN 1366-2 and harmonised product standards EN 15650. The classification was performed according to the standard EN 13501-3+A1. Fire resistance depends on the installation method on the construction site. The installation must be in accordance with the latest current version of the relevant TPMs.
- 1.3.** The dampers are designed for environments protected against weather conditions with climatic conditions in 3K22 class with temperature limitation -20°C to +50°C, without condensation, icing, ice formation, without water and sources other than rain according to EN 60721-3-3 zmA2 and environment with danger of explosion of group and category 2G Ex h IIC T6... T3 Gb according to EN ISO 80079-36. If the damper is equipped with electrical elements, the temperature range is narrowed according to the temperature range of the electrical elements used. The non-explosive group of a damper with electrical elements depends on the non-explosive design of the installed electrical elements on the damper. Electrical equipment installed together with the damper must be of a design corresponding to the given zone. When determining spaces, the principle is that it does not matter whether the specified environment is outside or inside the damper.

Tab. 1.3.1. Maximum surface temperature in relation to the flowing medium's temperature and the initialisation temperature of fuses

Initialisation temperature of thermal fuses	Max. temperature of the flowing medium/ Max. surface temperature (without thermal fuse initialisation)	Temperature class
≥ 72°C	68°C	T6
≥ 104°C	93°C	T5
≥ 147°C	140°C	T3

- 1.4.** Fire dampers are designed for air without abrasive, chemical and sticky additives.

2. Design

The dampers are supplied in the following non-explosive versions:

- 2.1.** **Version with mechanics** (mechanical control) with thermal fuse, which activates the closing device within 120 seconds at the latest when the nominal starting temperature of 72°C is reached. Up to a temperature of 70°C, the closing device will not self-start. If other start temperatures are required, thermal fuses with a nominal start temperature of + 104°C or + 147°C can be supplied (must be specified in the order).
- 2.2.** **Version with mechanical control** according to paragraph 2.1. can be supplemented by signalling the damper leaf position "CLOSED" or "OPEN" with a limit switch.

2.3. Version with Schischek ExMax-15-BF actuator with ExPro-TT thermoelectric activation device (hereinafter only actuator).
 After connection to supply 230V AC or 24V AC/DC the actuator moves the damper leaf to the "OPEN" operating position and at the same time biases its return spring. As long as the actuator is energised, the damper leaf is in the "OPEN" position and the return spring is preloaded. The time for completely opening the damper leaf from the "CLOSED" position to the "OPEN" position is approximately 30 secs. If the actuator's power supply is interrupted (loss of supply voltage, activating the temperature sensor or by pressing the reset button on the temperature sensor), the return spring moves the damper leaf to the emergency position "CLOSED". The time for moving the leaf from the "OPEN" position to the "CLOSED" position is approximately 10 secs. If the supply voltage is restored (the leaf can be in any position), the actuator starts moving the damper leaf again to the "OPEN" position, but only if the temperature sensor has not been activated. The sensor's temperature activation occurs when the temperature exceeds +72°C. Then the supply voltage is permanently and irrevocably interrupted and the actuator moves the damper leaf to emergency "CLOSED" position by means of a pre-loaded return spring.

The damper function can be verified:

- a) by interrupting and re-applying the supply voltage, e.g. by a signal from the EFS
- b) directly on the built-in damper using the button on the temperature sensor (simulates fuse failure)

Actuator control without voltage:

Using a special key (supplied with the actuator), the damper leaf can be manually adjusted to any position and the position secured. Unlocking is done manually with a key or automatically by applying the supply voltage.

CAUTION!

If the actuator is locked manually, the damper leaf will not close in the event of a fire after the temperature sensor has been activated. To restore the damper's correct function, it is necessary to unlock the actuator (manually with a key or by applying the supply voltage).

2.4. The design version of the dampers is indicated by a two-digit number after the TP number

Tab. 2.4.1. Damper design

DAMPER DESIGN	DOUBLE DIGIT BEHIND TP NUMBER	NON-EXPLOSIVE DESIGN
manual and temperature (ZONE 1, 2)	.02	II 2G
manual and temperature with limit switch ("CLOSED") (ZONE 1, 2)	.12	II 2G
with actuator ExMax-15- BF AC 230V, with thermoelectric activation ExPro-TT equipment (ZONE 1, 2)	.42	II 2G
with actuator ExMax-15- BF AC/DC 24V, with thermoelectric activation ExPro-TT equipment (ZONE 1, 2)	.52	II 2G
Manual and thermal with two limit switches ("OPEN", "CLOSED") (ZONE 1, 2)	.81	II 2G

3. Placement and Assembly

3.1. Fire dampers are suitable for installation in vertical and horizontal passages of fire dividing structures. Penetrations regarding damper installation must be done in such a way that the transfer of all loads from the fire dividing structures to the damper body is completely excluded. The adjoining air duct must be suspended or supported in such a way that load transfer from the adjoining duct to the damper flange is completely ruled out.
 To ensure the necessary space for access to the control device, it is recommended that other objects be at least 350 mm away from the control parts of the damper. At least one inspection opening must be accessible.
 The distance between the fire damper and the structure (wall, ceiling) must be at least 75 mm. If two or more dampers are to be installed in one fire dividing structure, the distance between adjacent dampers must be at least 200 mm.

3.2. Ways of installing a fire damper:

The damper must be installed so that the damper leaf (in a closed position) is placed on the edge with the fire dividing structure or in the fire dividing structure - marked on the damper with the sticker "EDGE OF THE WALL" (Fig. 1 and 2). If this solution is not possible, the duct between the fire dividing structure and the damper must be min. to the edge of the wall protected (Fig. 3) as specified in the standard EN 73 0872. The design must be in accordance with the relevant TPM for the given type of damper.

Until the wall is plastered it is necessary to protect the control mechanism from damage and contamination by covering it. The damper body must not be deformed during walling. After installing the damper, the damper leaf must not scrub on the damper body when opening or closing.

Fig. 1

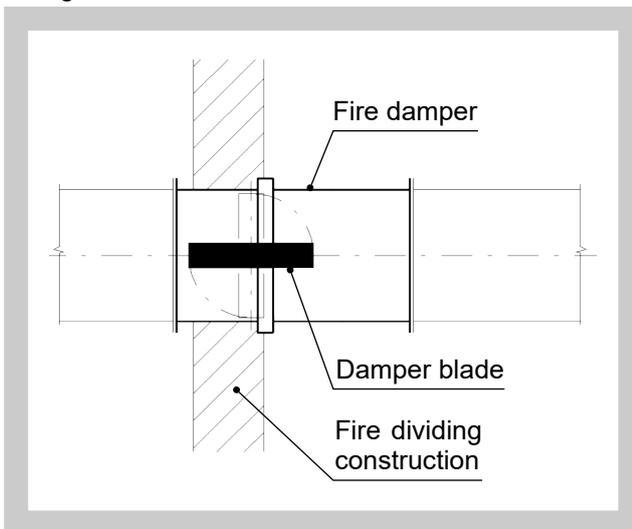


Fig. 2

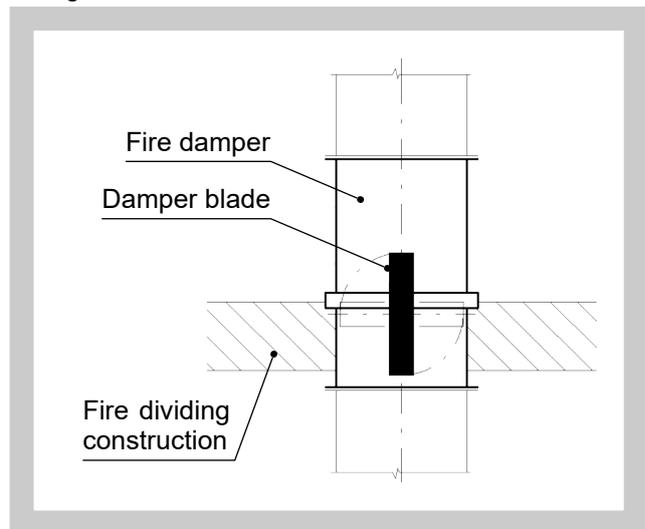
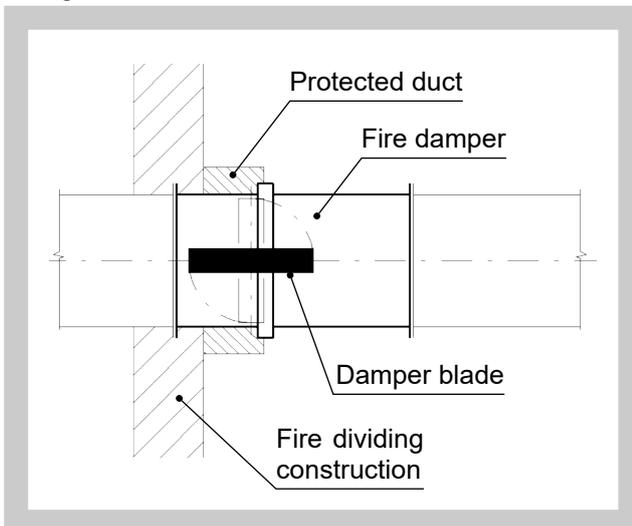


Fig. 3



3.3. The fire damper can be built into a rigid wall structure made of e.g. ordinary concrete/masonry, aerated concrete with min. 100mm thickness or into a rigid ceiling structure made of e.g. ordinary concrete, aerated concrete with min. 110mm thick. Construction openings and penetrations must be made in accordance with the relevant TPM for the given type of damper.

3.4. The fire damper can be built into a light plasterboard wall construction with a min. 100 mm thickness

3.5. The fire damper can be installed outside the wall construction. The ducting and the part of the damper between the wall structure and the damper leaf (marked with the WALL EDGE sticker on the damper) must be protected by fire insulation. The insulation and penetration must be made in accordance with the relevant TPM for the damper type.

3.6. **Explosion-proof dampers must be earthed with an earth bolt**

Fig. 4 The grounding screw on the fire damper



4. **Dimensions**

Fig. 5 FDMQ

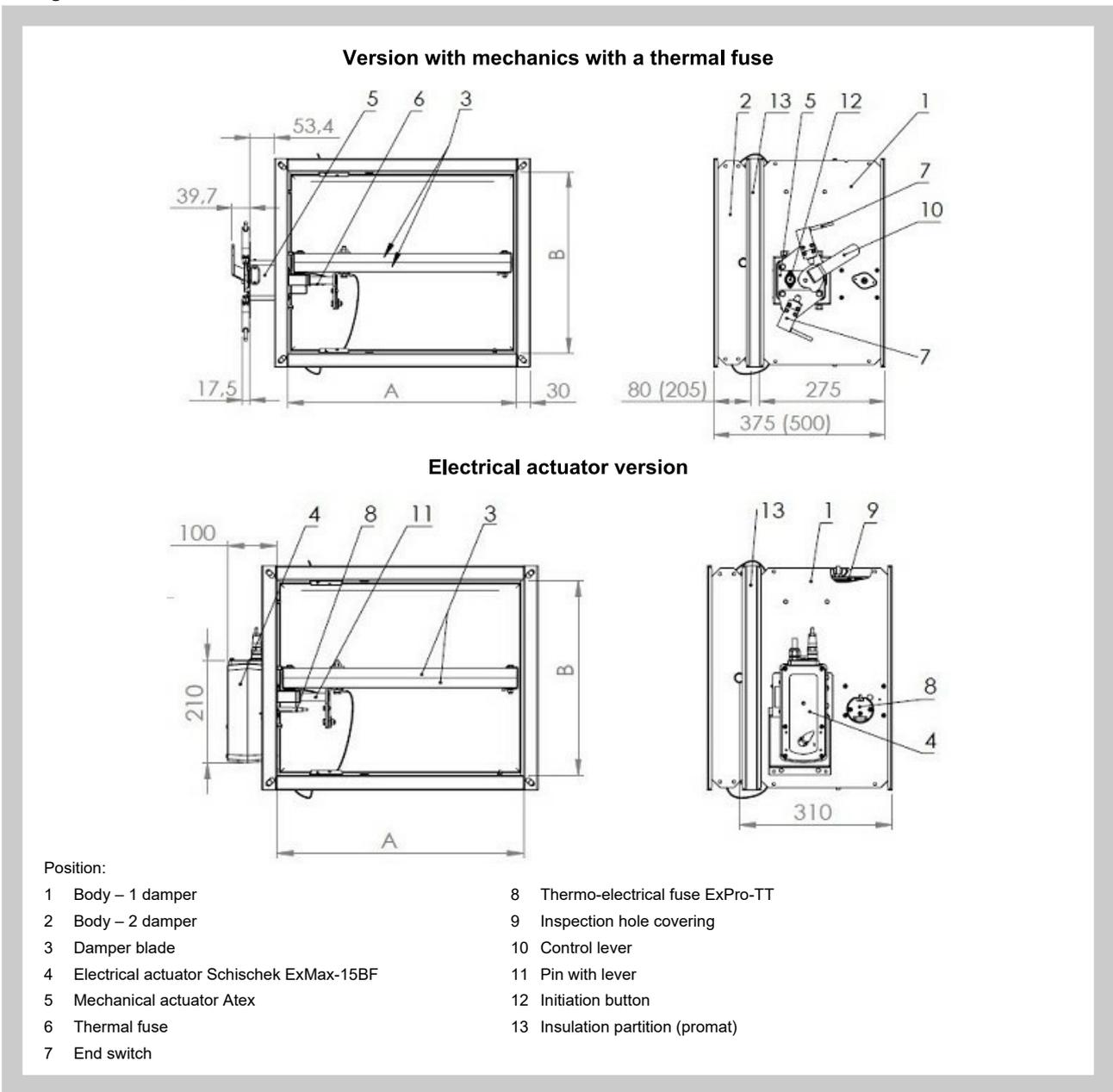
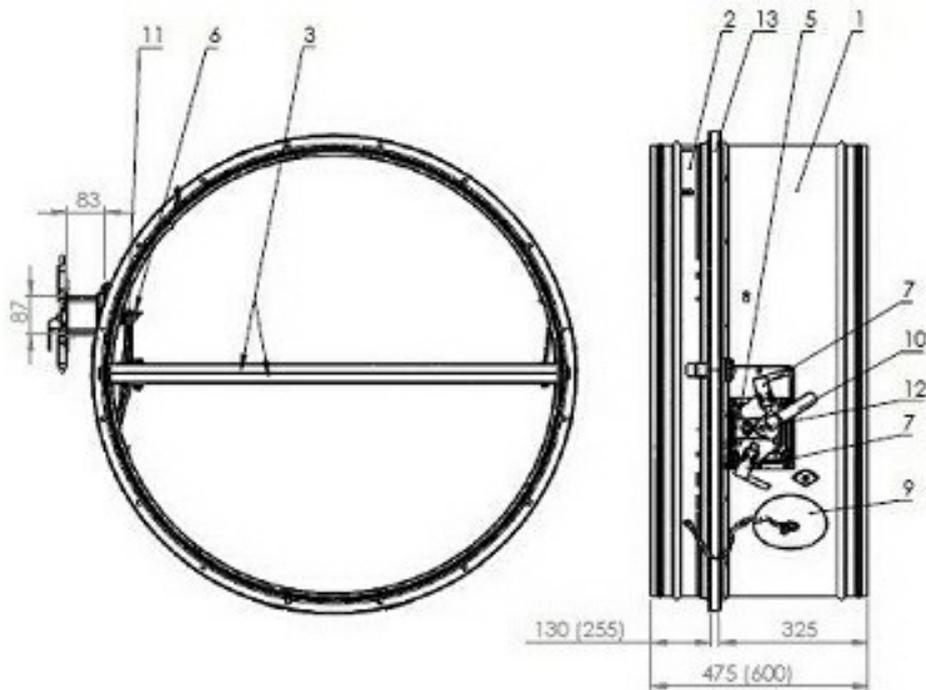
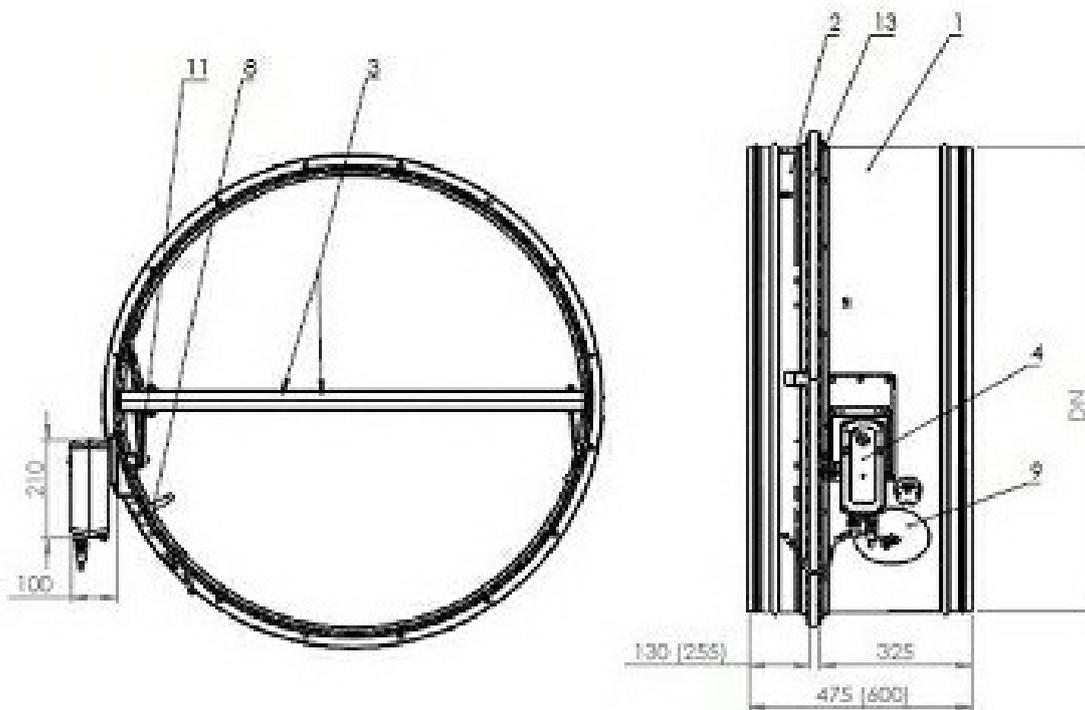


Fig. 6 FDMA-PM

Version with mechanics with a thermal fuse



Electrical actuator version

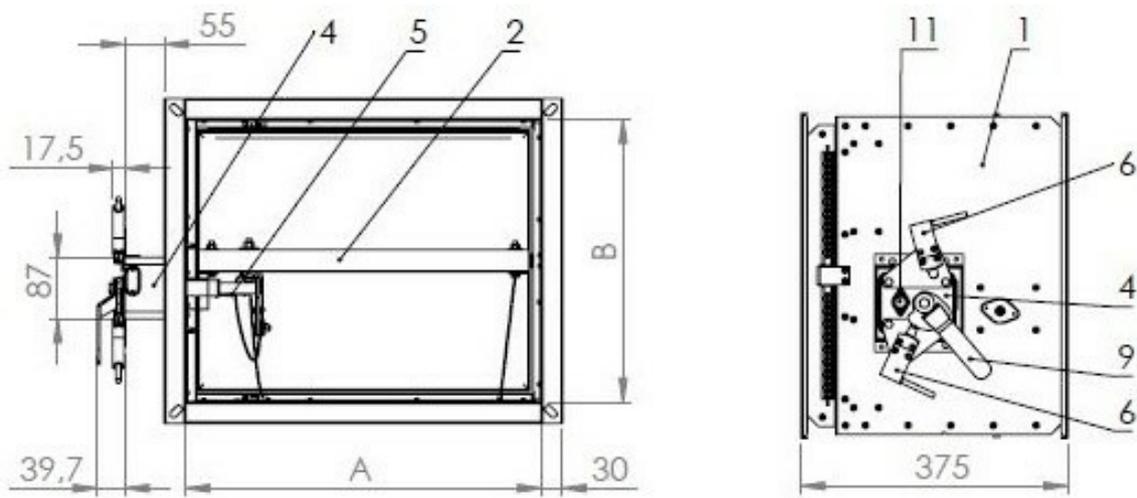


Position:

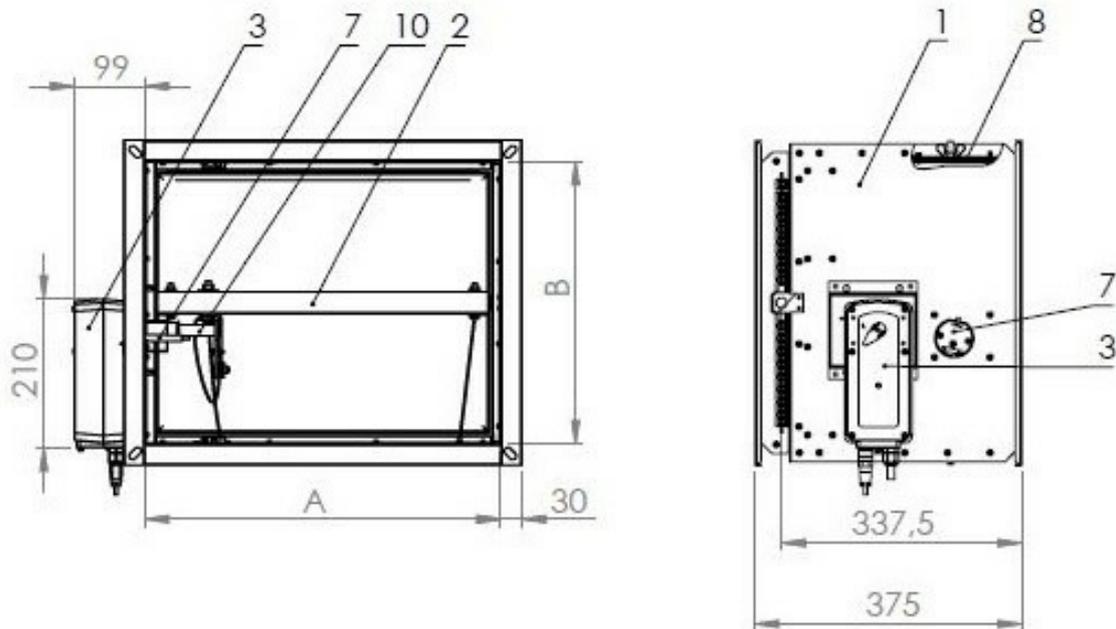
- | | |
|--------------------------------------------|-----------------------------------|
| 1 Body – 1 damper | 8 Thermo-electrical fuse ExPro-TT |
| 2 Body – 2 damper | 9 Inspection hole covering |
| 3 Damper blade | 10 Control lever |
| 4 Electrical actuator Schischek ExMax-15BF | 11 Pin with lever |
| 5 Mechanical actuator Atex | 12 Initiation button |
| 6 Thermal fuse | 13 Insulation partition (promat) |
| 7 End switch | |

Fig. 7 FDMB

Version with mechanics with a thermal fuse



Electrical actuator version

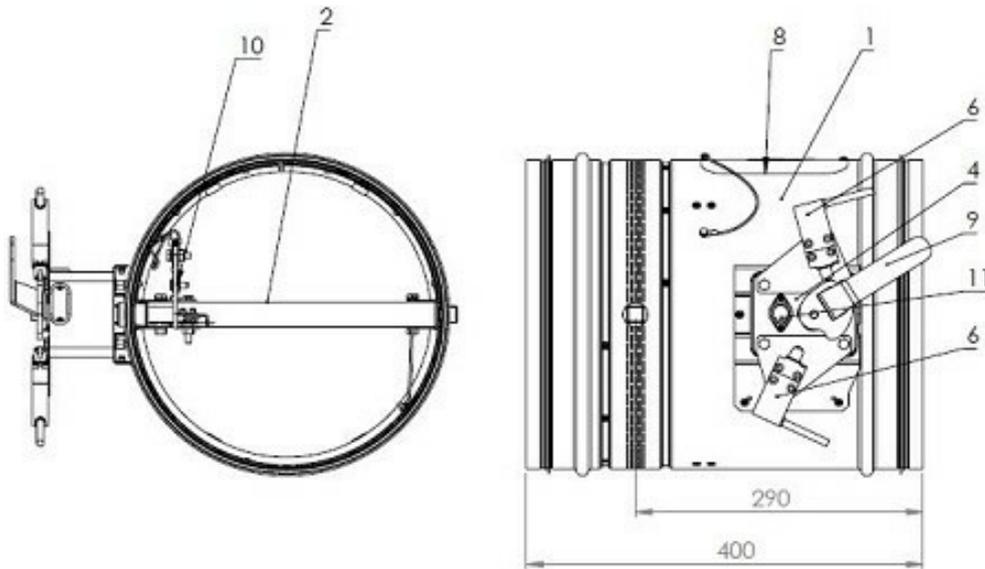


Position:

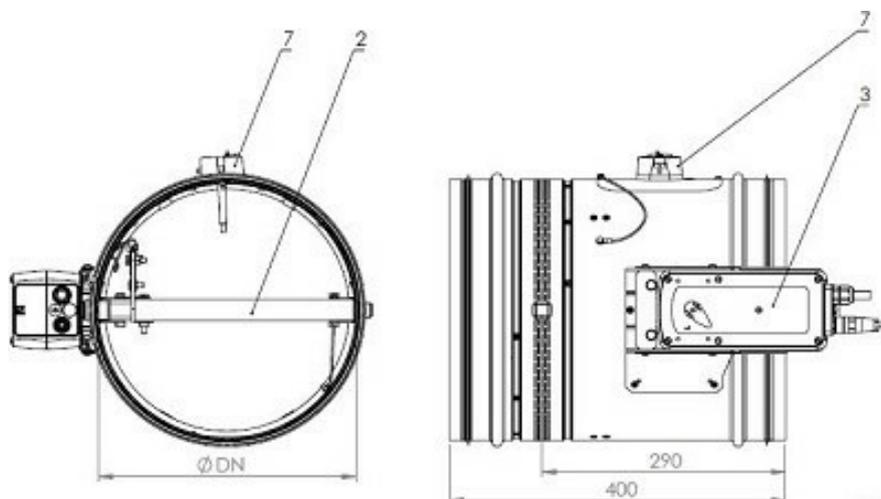
- | | |
|--------------------------------------------|-----------------------------------|
| 1 Damper casing | 7 Thermo-electrical fuse ExPro-TT |
| 2 Damper blade | 8 Inspection hole covering |
| 3 Electrical actuator Schischek ExMax-15BF | 9 Control lever |
| 4 Mechanical actuator Atex | 10 Pin with lever |
| 5 Thermal fuse | 11 Initiation button |
| 6 End switch | |

Fig. 8 FDMR

Version with mechanics with a thermal fuse



Electrical actuator version



Position:

- | | |
|--------------------------------------------|-----------------------------------|
| 1 Damper casing | 7 Thermo-electrical fuse ExPro-TT |
| 2 Damper blade | 8 Inspection hole covering |
| 3 Electrical actuator Schischek ExMax-15BF | 9 Control lever |
| 4 Mechanical actuator Atex | 10 Pin with lever |
| 5 Thermal fuse | 11 Initiation button |
| 6 End switch | |

- 4.1. **Square dampers** are manufactured in the size range (A x B): from 150 x 150 mm to 1500 x 800 mm.
Circular dampers: from a diameter of 100 mm to 1000 mm.

Square:

FDMB: from 160x160 to 1000x500, or 500x1000 (max. area 0,5 m², max. side length 1000 mm)

FDMQ: from 150x150 to 1500x800

Round:

FDMR: from $\varnothing 100$ to $\varnothing 800$ mm

FDMA-PM: $\varnothing 900$ and $\varnothing 1000$

- 4.2. Square damper flanges with a width of 30 mm are provided with oval holes in the corners. The connection dimensions of the round damper flanges are according to ON 120517.

In the case of dampers for SPIRO ducting, the circular dampers are supplied without flanges with a fitted lip seal.

Fig. 9 Flange of Damper

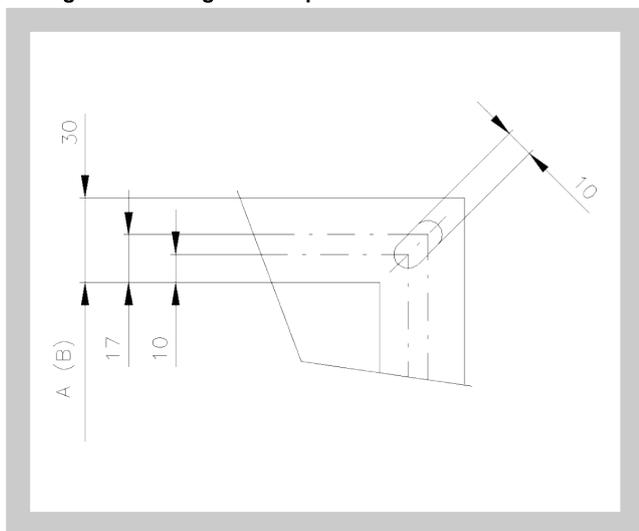
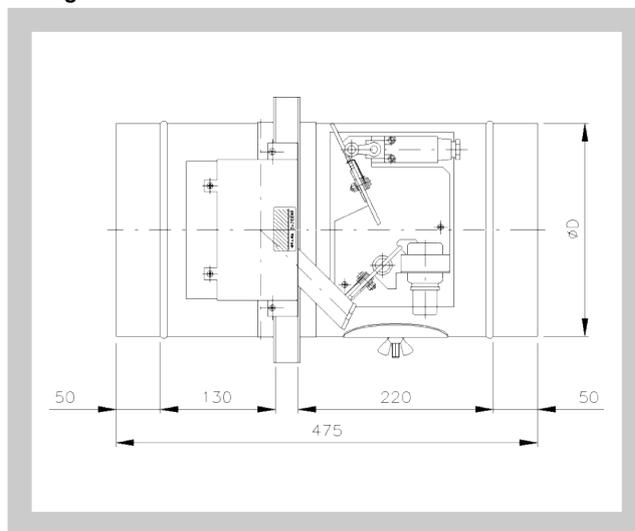


Fig. 10

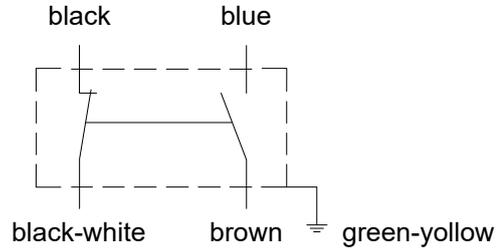


III. TECHNICAL DATA

5. Electrical elements, wiring diagram

Fig. 11 End switch XCWD 2115 (ZONE 1, 2)

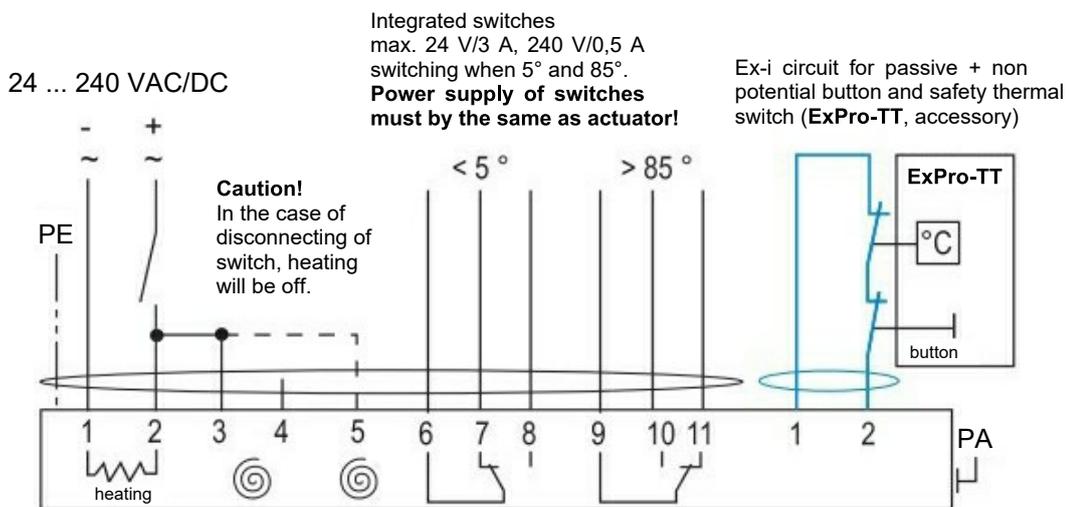
Max. nominal voltage	AC 400V
Max. nominal tep. current	6A
Non-explosive version Ex d IIC T6 Gb, Ex tb IIIC T85°C Db IP66-67	II 2 GD
Ambient operating temp.	-20°C ... +60°C



Tab. 5.1.1. Electrical actuator ExMax-15-BF

Power voltage	AC/DC 24/240 V, 50/60Hz
Power consumption - when opening the damper max. in the rest position	max. 20 W max. 12 W
Protection class	I (grounded)
Coverage according to EN 60 529	IP 66
Non-explosion design	II2 (1) G Ex d [ia] IIC T6,T5 zone 1 a 2 II2 (1) D Ex tD A21 [iaD] IP66 T80 °C zone 21 a 22
Adjustment time - drive - reverse gear	~ 30 s ~ 10 s
Ambient operating temperature Storage temperature	-40°C ... +40°C at T6, -40°C ... +50°C at T5 -40°C ... +70°C Humidity 0...95%rH non-condensing
Connection - optional accessory	ExBox terminal block For connecting power supply and auxiliary limit switches

Fig. 12 Electrical actuator ExMax-15-BF



Normal connection = return spring ~ 10 sec.
next connector for 5 = return spring ~ 3 sec.

6. Material, surface protection

- 6.1.** The damper bodies are usually supplied in galvanised sheet metal without further surface treatment, alternatively with a special paint Alesta® AS AS3040-7403627 (RAL 7035-GL LIGHT GREY) with a max. total thickness coating $120 \pm 20\mu\text{m}$, or the body can be completely made of class AISI 304, possibly AISI 316L stainless-steel sheet. The damper leaves are made of asbestos-free fire-resistant boards made of Promatect-H or Promatect-MST. The control damper devices are supplied in a class AISI 304 or AISI 316L stainless-steel material without other surface treatments. The main torsion spring in the mechanics is galvanised. Thermal fuses are made of 0.5 mm thick brass sheet. The connecting material is galvanised, the moving parts are made of class AISI 304 or AISI 316 stainless-steel. All moving parts in the damper are conductively connected to the frame, the damper body.

The damper's conductive connection parts must never be modified or removed!

7. Product data

- 7.1. The data plate is attached to the damper body with the following information:**

- | | | |
|----------------------------------------|-------------------|-----------------------|
| • company logo - manufacturer | • fire resistance | • serial number |
| • company name and registered office | • type and design | • year of manufacture |
| • number of technical conditions /TPM/ | • size and weight | • certification |

Furthermore, there is a sign of damper non-explosivity on the damper.

IV. PACKAGING, TRANSPORT, ACCEPTANCE, STORAGE, WARRANTY

8. Logistic terms

- 8.1.** The dampers are delivered as bulk cargo. Any other packing methods must be agreed with the manufacturer in advance. The potential packages will be considered non-returnable and their price will not be included in the product price. The dampers are transported by box freight vehicles; no sharp shocks must occur and the ambient temperature must not exceed $+40^{\circ}\text{C}$. For handling during transport, the dampers must be protected against mechanical damages and weather impact. If the customer wishes it, the dampers can be transported on pallets. During transport, the damper blade must be in the "CLOSED" position. Unless another method of reception is specified in the purchase order, the handover of the dampers to the forwarder shall be understood as reception.
- 8.2.** The dampers must be stored in covered buildings, in an environment without aggressive vapours, gases and dust. A temperature in a range of -5°C and $+40^{\circ}\text{C}$ and a relative humidity of max. 80% must be maintained in the buildings. For handling during storage, the dampers must be protected against mechanical damage.
- 8.3.** The scope of delivery includes a complete damper and a certificate of quality and completeness with a stamp of inspection (the certificate is attached to the invoice).

9. Warranty

- 9.1.** The warranty for fire dampers provided by the manufacturer becomes completely null and void after any unprofessional handling by untrained workers (see Article 10.1.), when dismantling electrical components, i.e. limit switches, actuators and thermoelectric starting devices. The warranty also becomes null and void if the dampers are used for purposes, equipment and working conditions other than those permitted by these technical conditions or after mechanical damage during handling.
- 9.2.** If the dampers are damaged by transport, it is necessary to draft a report with the carrier upon acceptance for the possibility of a later complaint.

V. INSTALLATION, OPERATION, MAINTENANCE, OPERATIONAL CHECK

10. Installation

- 10.1.** Installation, maintenance and serviceability checks of dampers may only be performed by persons qualified for these activities, i.e. "AUTHORISED PERSONS" trained by the manufacturer. The training is performed by MANDÍK, a.s. and issues a "CERTIFICATE" of professional competence, which is valid for 5 years and its extension is ensured by the "AUTHORISED PERSON" themselves, directly with the trainer.

Upon the expiry of the validity of the "CERTIFICATE", it loses its validity and is excluded from the trainer's registration.

Only professionals who take over the warranty for the work performed may be trained.

- 10.2.** The dampers must be installed in compliance with all applicable safety standards and regulations.
- 10.3.** Flange and bolt connections must be conductively connected during installation in accordance with EN 332000-4-41, -4-47 and -5-54 for protection against dangerous contact. For conductive connections, 2 pieces of fan-shaped washers in galvanised design are used, which are placed under the head of one bolt and under the screwed-on nut.

- 10.4.** Prior to commissioning the dampers and during subsequent serviceability checks, all versions, including the operation of electrical components, must be inspected and functionally tested, and the conductive connections of all moving and fixed parts (inside and outside the damper) must be checked on the damper. After commissioning, these serviceability checks must be performed at least twice annually. If no fault is found during two consecutive serviceability checks, then it is possible to carry out serviceability checks once a year.

In the event that, for any reason, the dampers are found unfit to perform their function, this must be clearly indicated. The operator is obliged to ensure that the damper is brought into a state where it is able to perform its function again and during this time must provide fire protection in another sufficient way.

The results of regular inspections, deficiencies found and all important facts concerning the dampers function must be entered in the "FIRE BOOK" and reported to the operator immediately.

- 10.5.** For reliable operation of dampers, care must be taken to ensure that the closing mechanism and the bearing surfaces of the leaf are not clogged with dust deposits, fibrous or sticky substances and solvents.

- 10.6.** Prior to commissioning dampers after installation and during subsequent serviceability checks, the following checks must be carried out:

Visual inspection of a damper's correct installation, the damper's internal space, the damper leaf, the bearing surfaces of the leaf and the silicone seal.

Removing the inspection opening cover: loosen the cover by turning the wing nut and release it from the locking bracket by moving the cover left or right. Then tilting and removing the cover from its original position. In the case of a screw cap, loosen and remove the screws with washers and remove the cap cover.

for dampers with mechanics:

- Checking the thermal fuse of the drive - the drive must be removed.
- Checking damper closing - pressing the release button on the mechanism will release the closing mechanism and move the sheet to the "CLOSED" position. The closing must be vigorous, the leaf must be in the "CLOSED" position on the stops. If the damper closure is not strong enough or the leaf is not in the "CLOSED" position, the mechanism must be replaced.
- The damper leaf is moved to the "OPEN" position by the mechanism's lever to the second extreme position, where it must be locked.

for actuator dampers:

- Inspection of the leaf movement to the emergency position "CLOSED" is performed after the power supply to the servo-drive is interrupted (e.g. by pressing the reset button on the thermoelectric starting device, by interrupting the power supply from the EFS).
- The check for moving the leaf back to the "OPEN" position is performed after the supply voltage has been restored (e.g. by releasing the reset button, restoring the power supply from the EFS).

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