



BVDA for smoke extract in combination with a frequency inverter, CE-certified according to EN12101-3 temperature category F400



For mechanical smoke extract systems and pressure differential systems



With TROXNETCOM as an option



CE certified in accordance with EN 12101-8

Smoke control dampers

EK2-EU



For mechanical smoke extract systems and pressure differential systems as well as for providing additional supply air

Rectangular smoke control dampers with ventilation function for heat and smoke exhaust with mechanical smoke extract systems, for the provision of additional supply air and for use in pressure differential systems

- CE-compliant smoke control damper according to EN 12101-8
- Meets the maximum possible performance characteristics for smoke control dampers according to classification standard EN 13501-4
- Use in load-bearing structures (solid and lightweight partition walls and ceiling slabs) to ensure fire integrity (fire compartmentation)
- For the ducts and shafts of heat and smoke exhaust systems.
- For pressure differential systems, mechanical smoke extract systems, gas extinguishing systems and for providing additional supply air
- Control input signal from the fire alarm system and integration into the central BMS with TROXNETCOM
- Remote signalling with open/close actuator and end position feedback
- C_{mod} = for smoke extract and ventilation in combined systems, which allows for pneumatic volume flow rate balancing as the damper blade can take intermediate positions
- Nominal sizes 200 × 200 – 1500 × 800 mm, for smoke gas flow rates up to 43200 m³/h or 12000 l/s at 10 m/s
- Low pressure losses with high upstream velocities, standard value of 10 m/s and above
- Automatic release (AA), option of manual override (MA)
- Simple and quick dry mortarless installation in solid and lightweight partition walls possible

| | | | |
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General information

Application

- Smoke control damper, with CE marking and declaration of performance, for heat and smoke exhaust with mechanical smoke extract systems
- Can be used for the provision of fresh air (additional supply air) to mechanical smoke extract systems
- Can be used in pressure differential systems
- Can be used for ventilation if the mechanical smoke extract system has been certified (general building inspectorate licence) for use with combined systems
- Integration into the central BMS with TROXNETCOM

Special features

- C_{mod} for smoke extract and ventilation in combined systems, which allows for pneumatic volume flow rate balancing as the damper blade can take intermediate positions
- Complies with the requirements of EN 12101-8
- Tested to EN 1366-2 and 1366-10 for fire resistance properties
- Closed blade air leakage to EN 1751, Class 3, and casing leakage to EN 1751, Class C
- Low sound power level and differential pressure
- Any airflow direction
- Manual release is also possible using TROXNETCOM
- Integration into the central BMS with standard bus systems
- Long-time testing to EN 1366-10, with 20000 open/close cycles for classification C_{mod}

Classification

EI 180/120/90 (v_{edw} - h_{odw} -i<->o) S 1500 C_{mod} HOT 400/30 MA multi

Nominal sizes

- Nominal size B × H: (in increments of 5 mm): 200 × 200 to 1500 × 800

Total length L:

- L = 650 (or 750, for IC inspection access panel), to H = 380
- L = 600 (IC inspection access panel possible), H = 380 – H = 545
- L = 800 (IC inspection access panel possible), from H = 550

Parts and characteristics

- Installation orientation is independent of the airflow direction
- Pressure level 3 (operating pressure -1500 to 500 Pa)
- Automatic (AA) or manual release (MA)
- Smoke control damper with ventilation function

Attachment 1 (galvanised steel)

- No entry required: None (standard)
- 1st character refers to the operating side (0, A, B, F)
- 2nd character refers to the installation side (0, A, B, F)

Any combination is possible

- 0 Side without attachment

Flat cover grille: **A** Crimped wire mesh 20 × 20

Flat cover grille: **B** Square perforated metal plate, 10 × 10

Connecting subframe, metal: **F** Connecting subframe, galvanised steel

Attachments 2

- Open/close actuators, 24 V AC/DC or 230 V AC supply voltage
- Network modules for the integration with AS-i networks
- Network modules for other standard bus systems

Optional products

TROXNETCOM

- X-FANS control unit for extract air and smoke extract control

TROX-X FANS smoke exhaust fans from the X-FANS subassembly

- Smoke exhaust fan for roof installation BVDAX/BVD
- Smoke exhaust fan for wall installation BVW/BVWAXN
- Smoke exhaust centrifugal fan BVREH/BVRA
- Smoke exhaust jet fans BVGAX/BVGAXN

All smoke exhaust fans are tested to EN 12101-3, for F200/F300/F400 and F600, depending on the type. A CE marking and declaration of performance are provided.

Speed adjustment for smoke exhaust fans

Certified frequency inverter unit X-FANS control

- Safe and precise speed adjustment of smoke exhaust fans both in one-zone and in multi-zone systems.

Construction features

- Rectangular construction
- Reversible open/close actuator
- Remote control with actuator
- Suitable for the connection of cover grilles or connecting subframes

Materials and surfaces

- Casing, damper blade and actuator encasing made of calcium silicate
- Brass bearings
- Stainless steel bearing axles and drive shaft

Standards and guidelines

- Construction Products Regulation
- EN 12101-8 Smoke and heat control systems – Smoke control dampers
- EN 1366-10 Fire resistance tests for service installations – Smoke control dampers
- EN 1366-2 Fire resistance tests for service installations – Fire dampers
- EN 13501-4 Fire classification of construction products and building elements using data from fire resistance tests
- EN 1751 Ventilation for buildings – Air terminal devices

Maintenance

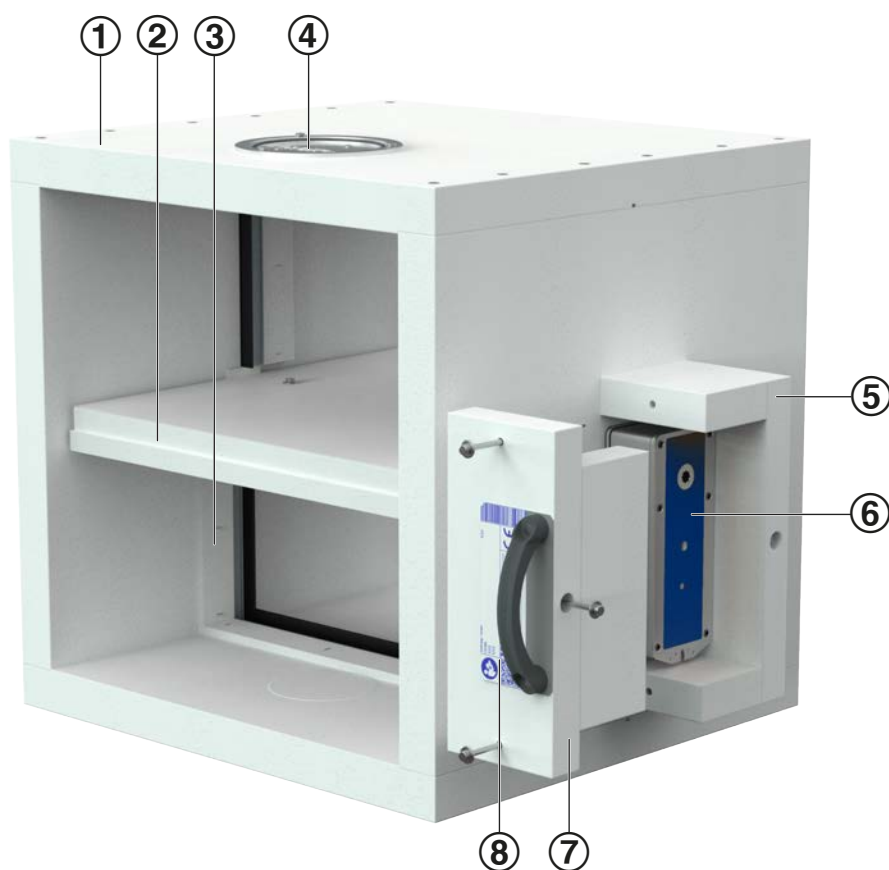
- Smoke control dampers must be operational at all times and must be maintained regularly so that they meet the performance requirements.
- Maintenance is required at least every 6 months
- A maintenance report must be created; documents must be kept for reference
- The owner of the smoke extract system must arrange for a functional check of the smoke control damper every six months. This must be carried out taking the basic maintenance measures according to EN 13306 in conjunction with DIN 31051 into account. If 2 consecutive tests, one 6 months after the other, are successful, the next test on the fire damper can be conducted one year later.
- Depending on where dampers are installed, country-specific regulations may apply.
- For details on maintenance and inspection refer to the installation and operating manual.

Function

Smoke control dampers are used in mechanical smoke extract systems. They are used for extracting smoke gases and for providing additional supply air to one or more fire compartments. The dampers are made of calcium silicate panels and are opened by an encased actuator; when smoke is detected, the actuator is triggered by a signal either from a duct smoke detector or from a fire alarm system. Smoke control dampers have two safe positions: open and closed. In the case of fire-resistant smoke control dampers for multiple compartments, the safe position is either "open" or "closed", depending on the fire site and the path of the smoke to be

extracted. If the safe position is 'open', the free area must be maintained even in the event of a fire. The blade of EK2-EU moves to the defined safe position upon receiving an automatically or manually triggered control signal. According to the specified time-temperature curve, the EK2-EU can still fully open or close after 25 minutes (MA, manual release). Type EK2-EU smoke control dampers are also approved for modulation applications (Cmod) – the damper blade can take any intermediate position, which allows for pneumatic balancing. Regular maintenance of the smoke control damper is required to ensure its functional reliability.

Smoke control damper EK2-EU



- ① Casing
- ② Damper blade
- ③ Travel stop
- ④ Inspection access (optional)

- ⑤ Actuator encasing
- ⑥ Actuator
- ⑦ Cover of the actuator encasing (open)
- ⑧ Rating plate

Technical data

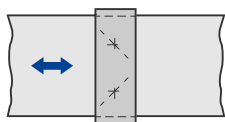
| | |
|---------------------------------|--|
| Nominal sizes B × H | 200 × 200 mm – 1500 × 800 mm |
| Volume flow rate range | Up to 12000 l/s or 43200 m³/h |
| Differential pressure range | Pressure level 3: -1500 – 500 Pa |
| Operating temperature | -30 – 50 °C without temperatures below the dew point |
| Upstream velocity* | ≤ 10 m/s with the maximum dimensions >10 – 15 m/s with smaller dimensions, up to 43200 m³/h |
| Closed damper blade air leakage | EN 1751, at least Class 3 |
| Casing leakage | EN 1751, Class C |
| EC conformity | EU Construction Products Regulation no. 305/2011 EN 12101-8 Smoke and heat control systems – Smoke control dampers EN 1366-10 Fire resistance tests for service installations – Smoke control dampers EN 1366-2 Fire resistance tests for service installations – Fire dampers EN 13501-4 Fire classification of construction products and building elements using data from fire resistance tests EN 1751 Ventilation for buildings – Air terminal devices |
| Declaration of performance | DoP/EK2-EU/001 |

* If actuation (change of damper blade position, moving away from the end position) is safely prevented even with an upstream velocity of more than 10 m/s, all sizes up to the maximum size can be used with an upstream velocity of 15 m/s.

Quick sizing

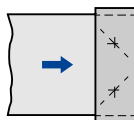
- The installation types A, B and C lead to differences in the pressure loss values and must be taken into account in the sizing.
- Precise values based on project-specific data can be determined with our Easy Product Finder design program.
- You will find the Easy Product Finder on our website

Installation type A, in a duct



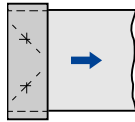
Ducted on both sides, any airflow direction

Installation type B, additional supply air



Connecting cable ending on one side with smoke control damper, airflow direction outwards

Installation type C, smoke extract



Ducted on one side, no duct on the upstream side

Sizing example:

Sizing for smoke extract (installation type "C") based on given volume flow rate and limited installation opening

- Volume flow rate: $q_v \geq 15000 \text{ m}^3/\text{h}$
- Maximum height of the opening: H (installation opening) = 1.2 m
- Inspection access panel, wall connectors and cover grille in RAL 9022 requested
- Determination of nominal height (H) EK2-EU: Wall opening ($H = 1200 \text{ mm}$) - casing thickness (100 mm) - perimeter gap (top 50 mm, bottom 50 mm) = 1000 mm

Product selection

EK2-EU-MA-IC/DE/1000 × 600 × 800/01/B24/P1-RAL 9022

Results

- $q_v = 15120 \text{ m}^3/\text{h}$ (volume flow rate)
- $v = 7.0 \text{ m/s}$ (airflow velocity based on the nominal size or upstream cross section)
- $\Delta p_t = 55 \text{ Pa}$ (total pressure loss with cover grille, installation type "C")

Sizing for providing additional supply air (installation type "B") of 15000 m^3 based on specified maximum upstream velocity of 3.5 m/s

- Volume flow rate: $q_v \geq 15000 \text{ m}^3/\text{h}$
- Upstream velocity: $v \leq 3.5 \text{ m/s}$
- Inspection access panel, wall connectors and cover grille in RAL 9022 requested

Product selection

EK2-EU-MA-IC/DE/1500 × 800 × 800/01/B24/P1-RAL 9022

Results

- $q_v = 15120 \text{ m}^3/\text{h}$ (volume flow rate)
- $v = 3.5 \text{ m/s}$ (airflow velocity based on the nominal size or upstream cross section)
- $\Delta p_t = 14 \text{ Pa}$ (total pressure loss with cover grille, installation type "B")

Specification text

This specification text describes the general properties of the product. Texts for variants can be generated with our Easy Product Finder design programme.

Rectangular or square smoke control dampers to product standard EN 12101-8, tested to EN 1366-10 and EN 1366-2, for use in smoke extract systems. Smoke control dampers not only prevent the spreading of smoke and combustion products between fire compartments, they also prevent the leakage of emitted, dangerous and poisonous fire suppression gases from the affected area, and they maintain positive pressure in pressure differential systems. The EK2-EU is suitable as a pressure relief damper for gas fire extinguishing systems. For extracting smoke gases and for providing additional supply air to one or more fire compartments. The EK2-EU can be used in smoke extract systems which have been approved for ventilation. The fire-resistant smoke control damper for multiple compartments is suitable for installation in solid walls and shafts, lightweight partition walls and ceiling slabs, as well as in and on fire-resistant smoke extract ducts. Open/Close actuator, with fully wired and ready-to-operate control module in a temperature resistant encasing as an option.

Equivalence criteria

- Classification according to EI 180/120/90 (v_{edw} - h_{odw} -i<->o) S 1500 C_{mod} HOT 400/30 MA multi in wall and duct installation
- Pressure level 3 (operating pressure from -1500 to 500 Pa)
- Tested manual release (MA) including bus control module (allows for override by fire and rescue services)
- For smoke extract ducts from 35 mm wall thickness
- Adjoined damper installation (side by side or on top of each other)

Special features

- Declaration of performance according to Construction Products Regulation
- Classification according to EI 180/120/90 (v_{edw} - h_{odw} -i<->o) S 1500 C_{mod} HOT 400/30 MA multi
- Complies with the requirements of EN 12101-8
- Tested for fire resistance properties to DIN 1366-10 and EN 1366-2
- Air leakage according to EN 1751, Class 3 and Class C
- Low sound power level and differential pressure
- Any airflow direction
- Integration into the central BMS with TROXNETCOM
- Tested to EN 1366-10 with a weight being attached to the blade, with 10000 open/close cycles and 10000 cycles in intermediate position (Cmod)

Materials and surfaces

- Casing, damper blade and actuator encasing made of calcium silicate
- Brass bearings
- Stainless steel bearing axles and drive shaft

Order code

EK2-EU – MA – IC – C1 / DE / 1500 × 800 × 800 / 03 / A0 / B24A / P1
 1 2 3 4 5 6 7 8 9 10

1 Type

EK2-EU

Smoke control damper with one blade, to EN 12101-8

2 Construction

Encasing:

MA Construction with encasing

3 Inspection access panel

No entry required: None (standard)

IC With two inspection access panels, depending on casing length L

4 Coating

No entry required: None (standard)

C1 Promat SR impregnation on calcium silicate surfaces

5 Country of destination

DE Germany

CH Switzerland

AT Austria

NL Netherlands

and others

6 Nominal size B x H x total length L [mm]

Nominal size B x H: (in increments of 5 mm)

of **200 × 200 – 1500 × 800**

Total length L:

L = **650** (or **750**, for construction IC with inspection access panel), to H = 380

L = **600** (IC inspection access panel possible) H = 385 to H = 545

L = **800** (IC inspection access panel available) from H = 550

7 Accessories

01 Fixing tabs (quantity depends on B x H)

02 Fibre paper (2 high-temperature insulation strips each, for dimensions B and H)

03 Fixing tab and fibre paper

8 Attachments 1 (galvanised steel)

No entry required: None (standard)

First character signifies operating side (**0, A, B, F**)

Second character signifies installation side (**0, A, B, F**)

Combinations possible

0 side without attachment

Flat cover grille:

A Crimped wire mesh 20 × 20

B Square perforated metal plate, 10 × 10

Connecting subframe, metal:

F Connecting subframe, galvanised steel

9 Attachments 2

Belimo actuators

24 V AC/DC:

B24 BE 24-12-ST TR; BEE 24-ST TR, BEN 24-ST TR

230 V AC:

B230 BE 230-12 TR; BEE 230 TR, BEN 230 TR

Actuator + expansion: pre-fitted with encasings 1 + 2:

B24X BE 24-12-ST TR; BEE 24-ST TR, BEN 24-ST TR

B230X BE 230-12 TR; BEE 230 TR, BEN 230 TR

Ventilation function C_{mod}¹: Continuously regulating actuator or auxiliary switch:

24 V AC/DC: with operating range DC 2...10 V, function C_{mod}¹

B24SR BEE 24 SR TR, BEN 24 SR TR (not at 40 Nm)

24 V AC/DC: with auxiliary switch for function C_{mod}¹

B24M BE 24-12-ST TR (24 V AC/DC) (only with 40 Nm)

230 V AC: with auxiliary switch for function C_{mod}¹

B230M BE 230-12 TR (230 V AC) (only with 40 Nm)

Combinations of actuator and control module

Module for signalling, TROXNETCOM:

B24A BE24 + AS-EM/EK, 30 V DC (AS-i)²

B24AS BE24 + AS-EM/SIL2, 30 V DC (AS-i)²

B24AM BE24 + AS-EM/M, 30 V DC (AS-i)², for function C_{mod}¹

Other communication modules:

Belimo: Communication and power supply unit

B24BKNE BE24 + BKNE230-24

BV-Control: Communication and power supply unit with SLC® technology:

B24C BE24 + BC24 G2

Agnosys: BRM-10-F fire damper and smoke control damper module

B24D BE24 + BRM-10-F-ST

B230D BE230 + BRM-10-F

¹ Function C_{mod} for damper blade in intermediate position

² The AS-i system is based on the industrial standard AS-Interface technology

10 Surface (Attachments 1)

No entry required: None (standard)

P1 Powder-coated, specify RAL CLASSIC colour

PS Powder-coated, DB colour ...

Gloss level:

RAL 9010 50 %

RAL 9006 30 %

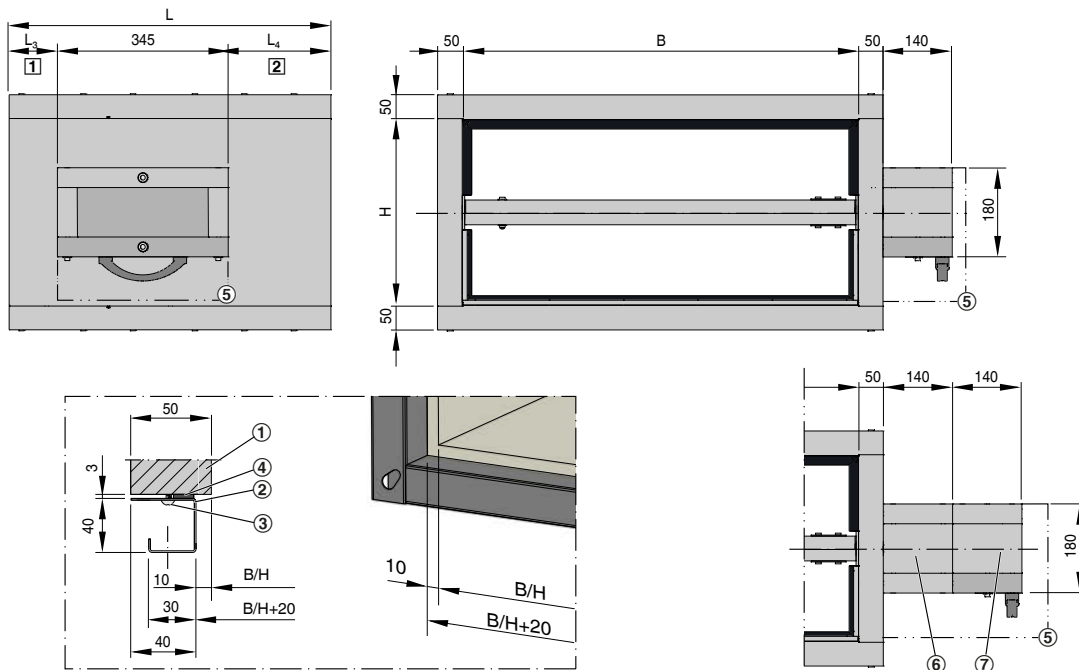
All other RAL colours 70 %

**Order example: EK2-EU/MA-IC-C1 /DE/1500x800x800/03 /A0/B24/P1-RAL9010-50%**

| | | | |
|---|------------------------|------------------|---|
| 1 | Type | EK2-EU | Smoke control damper with one blade |
| 2 | Construction | MA | Construction with encasing |
| 3 | Coating | C1 | Calcium silicate surfaces with Promat SR impregnation |
| 4 | Country of destination | DE | Germany |
| 5 | Nominal size | 1500 × 800 × 800 | B = 1500, H = 800, L = 800 [mm] |
| 6 | Accessories | 03 | Supply package including fixing tabs and fibre paper |
| 7 | Attachment 1 | A0 | Operating side: Flat cover grille with wire mesh, 20 x 20 |
| 8 | Attachment 2 | B24 | Depending on nominal size, preselected 24 V actuator |
| 9 | Grille surfaces | P1-RAL9010 50 % | Cover grille with powder coating, RAL 9010, pure white |

Dimensions

EK2-EU size S



[1] Operating side

[2] Installation side

① EK2-EU

② Connecting subframe (optional)

ATTENTION: Nominal size of the connecting subframe is always $B + 20$ mm and $H + 20$ mm (10 mm distance to the open damper blade edge on each side).

③ Fixing screw

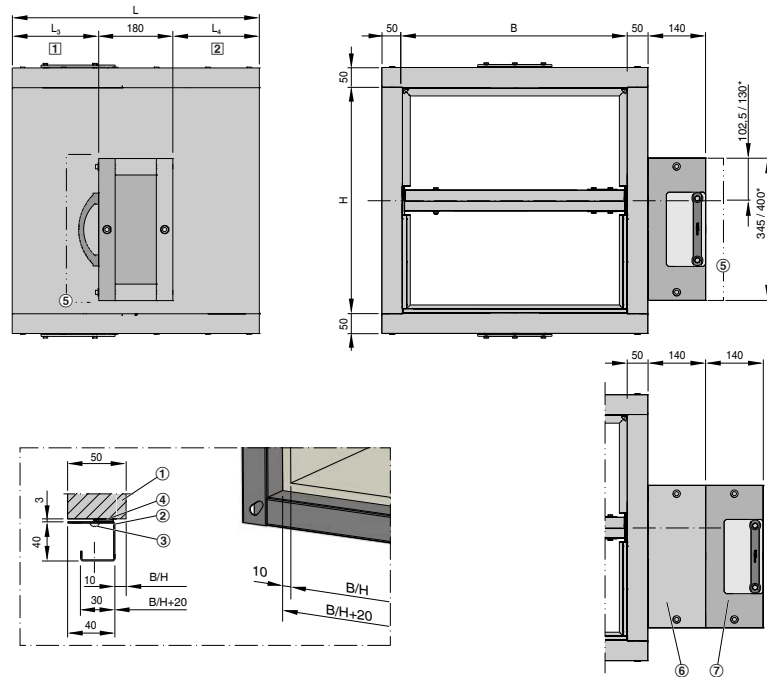
④ Seal

⑤ Keep clear to provide access to the actuator encasing

⑥ Actuator encasing

⑦ Module encasing

EK2-EU sizes M and L



[1] Operating side

[2] Installation side

* For size L, the actuator/module encasing is supplied in two constructions, depending on the actuator required. For 15 Nm and 25 Nm (small), for 40 Nm (large).

① EK2-EU

② Connecting subframe (optional)

ATTENTION: Nominal size of the connecting subframe is always $B + 20$ mm and $H + 20$ mm (10 mm distance to the open damper blade edge on each side).

③ Fixing screw

④ Seal

⑤ Keep clear to provide access to the actuator encasing

⑥ Actuator encasing

⑦ Module encasing

Dimensions

| (1) | H | L | L _s | L _s |
|-----|-----------|-------|----------------|----------------|
| S | 200 – 380 | 650 * | 97 | 208 |
| S | 200 – 380 | 750 * | 197 | 208 |
| M | 385 – 545 | 600 | 210 | 210 |
| L | 550 – 800 | 800 | 310 | 310 |

(1) Size

* 650 mm without inspection access panel and 750 mm with inspection access panel

Weights [kg] (standard lengths)

| (1) | L | H | B | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| | | | 200 | 300 | 400 | 500 | 600 | 700 | 800 | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 |
| S | 650 | 200 | 31 | 36 | 41 | 46 | 51 | 55 | 60 | 65 | 70 | 75 | 80 | 84 | 89 | 94 |
| | | 250 | 33 | 39 | 44 | 49 | 54 | 59 | 64 | 69 | 74 | 79 | 84 | 89 | 94 | 99 |
| | | 300 | 36 | 41 | 47 | 52 | 57 | 62 | 67 | 72 | 77 | 83 | 88 | 93 | 98 | 103 |
| | | 380 | 38 | 44 | 49 | 55 | 60 | 65 | 71 | 76 | 81 | 86 | 92 | 97 | 102 | 108 |
| M | 600 | 400 | 39 | 44 | 49 | 55 | 60 | 65 | 70 | 75 | 81 | 86 | 91 | 96 | 101 | 107 |
| | | 450 | 41 | 47 | 52 | 57 | 63 | 68 | 73 | 79 | 84 | 90 | 95 | 100 | 106 | 111 |
| | | 500 | 44 | 49 | 55 | 60 | 66 | 71 | 77 | 82 | 88 | 93 | 99 | 104 | 110 | 116 |
| | | 545 | 46 | 51 | 57 | 63 | 69 | 74 | 80 | 86 | 91 | 97 | 103 | 108 | 114 | 120 |
| L | 800 | 600 | 60 | 67 | 74 | 81 | 88 | 96 | 103 | 110 | 117 | 124 | 131 | 138 | 146 | 153 |
| | | 650 | 63 | 70 | 77 | 85 | 92 | 99 | 107 | 114 | 121 | 129 | 136 | 143 | 150 | 158 |
| | | 700 | 66 | 73 | 81 | 88 | 96 | 103 | 110 | 118 | 125 | 133 | 140 | 148 | 155 | 163 |
| | | 750 | 69 | 76 | 84 | 91 | 99 | 107 | 114 | 122 | 130 | 137 | 145 | 153 | 160 | 168 |
| | | 800 | 72 | 79 | 87 | 95 | 103 | 110 | 118 | 126 | 134 | 142 | 150 | 157 | 165 | 173 |

(1) Size

Attachments 1

F, A, B, Q – connecting subframes and cover grilles

Application

- A connecting subframe (F) is required for sheet steel smoke extract ducts
ATTENTION: Nominal size of the connecting subframe is always B + 20 mm (10 mm distance to the open damper blade edge on each side).
- Cover grilles are attached to the damper or to the end of ducts; this application has been approved based on a fire test to EN 1366-10
- The cover grille free area is approx. 80% for crimped wire mesh (A) and approx. 70% for perforated metal plates
- Connecting subframes and cover grilles are factory mounted to the dampers
- Connecting subframes and cover grilles may also be ordered separately

Materials and surfaces

- F: Connecting subframe made of galvanised sheet steel

Cover grilles

- A: Crimped wire mesh made of galvanised steel
- B: Perforated metal plate made of galvanised sheet steel
- Q: Perforated metal plate, bent, made of galvanised steel

Surface finish of attachments

- No entry required: None (standard)
- P1 Powder-coated, specify RAL CLASSIC colour
- PS Powder-coated, DB colour ...

Gloss level

- RAL 9010 50 %
- RAL 9006 30 %
- All other RAL colours 70 %

Attachments 2

Application

- Open/close actuators for the opening and closure of smoke control dampers, with automatic (AA) or manual release (MA).
- With integral limit switches for capturing the end positions
- Override control for up to 25 minutes
- Ambient temperature for normal operation: -30 to 50 °C, up to 95%, without temperatures below the dew point, no condensation (EN 60730-1)
- Two integral limit switches with volt-free contacts can indicate the damper blade position (OPEN and CLOSED)
- The connecting cables of the 24 V actuator are fitted with plugs, which ensure quick and easy connection to the TROX AS-i bus system
- The connecting cable of the 230 V AC actuator is fitted with wire end ferrules

Variants

B24

- 24 V AC/DC supply voltage
- BEN24-ST TR: Torque 15 Nm
- BEE24-ST TR: Torque 20 Nm
- BE24-12-ST TR: Torque 40 Nm

B230

- Supply voltage 230 V AC
- BEN230 TR: Torque 15 Nm
- BEE230 TR: Torque 25 Nm
- BE230-12 TR: Torque 40 Nm

B24-SR

- BEN24-SR: Torque 15 Nm
- BEE24-SR: Torque 25 Nm

The torque required to operate the smoke control damper depends on the size which is why the actuator type cannot be chosen freely.

Installation information

- Feeding the electric connecting cable through the actuator encasing requires a drilled hole of the exact size (Ø max. + 1 mm)
- A wire clamping bracket is required
- For details on maintenance and inspection, refer to the installation and operating manual.

Torque table

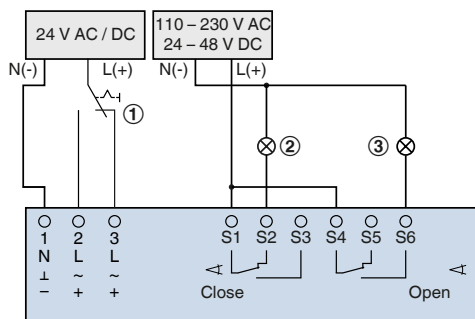
| | | | B | | | | | | | | | | | | | |
|---|---|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| | | | 200 | 300 | 400 | 500 | 600 | 700 | 800 | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 |
| H | S | 200 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 |
| | | 250 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 |
| | | 300 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 |
| | | 350 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 |
| | | 380 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 |
| | M | 385 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 |
| | | 400 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 |
| | | 450 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 |
| | | 545 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 25 | 25 | 25 |
| | L | 550 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 25 | 25 | 25 | 25 | 25 |
| | | 600 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 25 | 25 | 25 | 25 | 25 | 25 | 40 |
| | | 650 | 15 | 15 | 15 | 15 | 15 | 15 | 25 | 25 | 25 | 25 | 25 | 40 | 40 | 40 |
| | | 700 | 15 | 15 | 15 | 15 | 15 | 25 | 25 | 25 | 25 | 40 | 40 | 40 | 40 | 40 |
| | | 750 | 15 | 15 | 15 | 15 | 25 | 25 | 25 | 25 | 40 | 40 | 40 | 40 | 40 | 40 |
| | | 800 | 15 | 15 | 15 | 25 | 25 | 25 | 25 | 40 | 40 | 40 | 40 | 40 | 40 | 40 |

| Drehmoment / torque | | Antrieb / actuator | | |
|----------------------------------|--------|--------------------|-------------|---------------|
| | | 15 Nm | 25 Nm | 40 Nm |
| Bestellschlüssel / order code | B24 | BEN24-ST TR | BEE24-ST TR | BE24-12-ST TR |
| | B230 | BEN230 TR | BEE230 TR | BE230-12 TR |
| | B24-SR | BEN24-SR TR | BEE24-SR TR | — |
| | B24M | — | — | BE24-12-ST TR |
| | B230M | — | — | BE230-12 TR |

The actuators of the EK2-EU are designed according to the size depending on the torque and the order option (order code detail). The torque table can be used to determine the correct actuator. For intermediate sizes choose the next larger dimension.

Wiring examples, technical data

Wiring example 24 V AC / DC



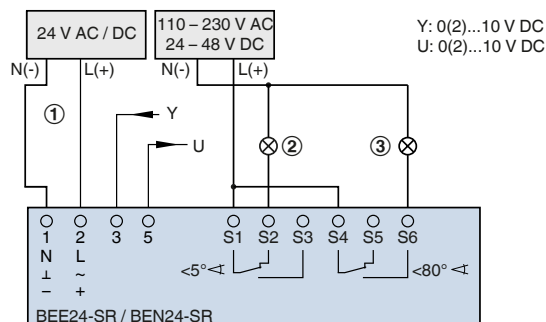
- ① Switch for opening and closing, to be provided by others
- ② Indicator light for CLOSED position, to be provided by others
- ③ Indicator light for OPEN position, to be provided by others

| | | | |
|-----------------------------------|--|----------|--|
| Actuator | BEN24-ST | BEE24-ST | BE24-ST |
| Supply voltage (AC) | AC 19.2 – 28.8 V, 50/60 Hz | | |
| Supply voltage (DC) | DC 21.6 – 28.8 V, 50/60 Hz | | |
| Power consumption – when running | 3 W | 2.5 W | 12 W |
| Power consumption – when idle | 0.1 W | | 0.5 W |
| Power rating for cable sizing | I _{max} . 8.2 A at 5 ms | | |
| Torque | 15 Nm | 25 Nm | 40 Nm |
| Run time for 90° | < 30 s | | |
| Limit switch contacts | 2 × EPU | | |
| Switching current | 1 mA – 3 A (0.5 A inductive), AC 250 V | | 1 mA – 6 A (0.5 A inductive), AC 250 V |
| Limit switch – open | 5° | | 3° |
| Limit switch – close | 80° | | 87° |
| Connecting cable – actuator | Cable 1 m, 3 × 0.75 mm ² , halogen-free | | |
| Connecting cable – limit switches | Cable 1 m, 6 × 0.75 mm ² , halogen-free | | |
| IEC protection class | III safety extra low voltage (SELV) | | |
| Protection level | IP 54 | | |
| EC conformity | CE according to 2014/30/EU Low Voltage Directive CE according to 2014/35/EU | | |
| Operating temperature | -30 to 55 °C | | |
| Weight | 0.9 kg | 1.1 kg | 2.7 kg |

[illegible]

- | | | | |
|-----------------------------------|--|-----------|--|
| Actuator | BEN230 TR | BEE230 TR | BE230 TR |
| Supply voltage (AC) | AC 198 – 264 V, 50/60 Hz | | |
| Power consumption – when running | 4 W | 3.5 W | 8 W |
| Power consumption – when idle | 0.4 W | | 0.5 W |
| Power rating for cable sizing | I _{max} . 4 A at 5 ms | | I _{max} . 7.9 A at 5 ms |
| Torque | 15 Nm | 25 Nm | 40 Nm |
| Run time for 90° | < 30 s | | |
| Limit switch contacts | 2 × EPU | | |
| Switching current | 1 mA – 3 A (0.5 A inductive), AC 250 V | | 1 mA – 6 A (0.5 A inductive), AC 250 V |
| Limit switch – open | 5° | | 3° |
| Limit switch – close | 80° | | 87° |
| Connecting cable – actuator | Cable 1 m, 3 × 0.75 mm ² , halogen-free | | |
| Connecting cable – limit switches | Cable 1 m, 6 × 0.75 mm ² , halogen-free | | |
| IEC protection class | II reinforced insulation | | |
| Protection level | IP 54 | | |
| EC conformity | CE according to 2014/30/EU | | |
| | Low Voltage Directive CE according to 2014/35/EU | | |
| Operating temperature | -30 to 55 °C | | -30 to 50 °C |
| Weight | 0.9 kg | 1.1 kg | 2.7 kg |

Wiring example 24 V AC / DC



- ① Switch for opening and closing, to be provided by others
- ② Indicator light for CLOSED position, to be provided by others
- ③ Indicator light for OPEN position, to be provided by others

| | | |
|-----------------------------------|--|----------|
| Actuator | BEN24-SR | BEE24-SR |
| Supply voltage (AC) | AC 19.2 – 28.8 V, 50/60 Hz | |
| Supply voltage (DC) | DC 21.6 – 28.8 V, 50/60 Hz | |
| Power consumption – when running | 3 W | |
| Power consumption – when idle | 0.3 W | |
| Power rating for cable sizing | I _{max} . 8.2 A at 5 ms | |
| Torque | 15 Nm | 25 Nm |
| Run time for 90° | < 30 s | |
| Limit switch contacts | 2 × EPU | |
| Switching current | 1 mA – 3 A (0.5 A inductive), AC 250 V | |
| Limit switch – open | 5° | |
| Limit switch – close | 80° | |
| Connecting cable – actuator | Cable 1 m, 4 × 0.75 mm ² , halogen-free | |
| Connecting cable – limit switches | Cable 1 m, 6 × 0.75 mm ² , halogen-free | |
| IEC protection class | III safety extra low voltage (SELV) | |
| Protection level | IP 54 | |
| EC conformity | CE according to 2014/30/EU Low Voltage Directive CE according to 2014/35/EU | |
| Operating temperature | -30 to 55 °C | |
| Weight | 1.1 kg | 0.9 kg |

Interfaces to higher level systems

TROX fire and smoke protection systems have standardised interfaces for central building management systems. In the simplest case, the interface consists of discrete signalling contacts that connect the alternating inputs and outputs of TROX systems and other building components.

Control and communication modules for smoke control dampers

| Type | B24A | B24AS | B24BKNE | B24C | B230D | B24D | B24AM |
|-------|----------|------------|------------|------|----------|-------------|--------|
| Type | AS-EM/EK | AS-EM/SIL2 | BKNE230-24 | BC24 | BRM-10-F | BRM-10-F-ST | ASEM/M |
| EK-EU | x | x | x | x | x | x | x |
| EK-JZ | x | x | x | x | x | x | x |

Note:

Actuators and communication modules are factory tested together; only tested combinations must be used.

B24A – AS-EM/EK

Application

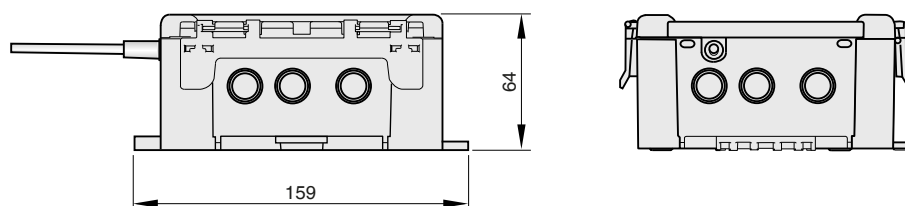
- Module for the control of smoke control dampers
- Capturing damper blade positions OPEN and CLOSED
- Actuators can be started even without controller communication
- LEDs for OPEN and CLOSED positions; monitoring of run time errors
- Integral AS-Interface slave
- Monitoring of signal reception
- Master can be used to monitor the run time of the damper blade actuator
- Supply voltage of the module and the 24 V DC actuator using AS-Interface (2-wire control)
- Plug-in connection for Belimo actuators (factory mounted and wired)

Use

B24A – Mounted to the smoke control damper

| | |
|---|--|
| Description | AS-EM/EK |
| Electrical design | 4 inputs/3 outputs |
| Output function | PNP transistor |
| Supply voltage | 26.5 – 31.6 V DC |
| Current consumption, including actuator | 450 mA |
| Inputs | |
| Switching | DC PNP |
| Sensor voltage supply | AS-i |
| Voltage range | 18 – 30 V AC |
| With short circuit protection | Yes |
| Switching level – high signal 1 | 10 |
| Input current high/low | > 7 mA/< 2 mA |
| Input characteristic | IEC 61131-2 Type 2 |
| Outputs, PNP | |
| Galvanically isolated | No |
| Max. current load per output | 400 mA per output/400 in total (from AS-i) |
| Outputs, relay | |
| Galvanically isolated | Yes |
| Maximum voltage | 32 V |
| Max. current load | 500 mA |
| Ambient temperature | -5 to 75 °C |
| Protection level, IEC protection class | IP 42 |
| AS-i profile | S-7.A.E |
| I/O configuration | 7 Hex |
| ID code | 7 Hex |
| EMC | EN 61000-6-2; EN 61000-6-3 |

AS-EM/EK



B24AS – AS-EM/SIL2

Application

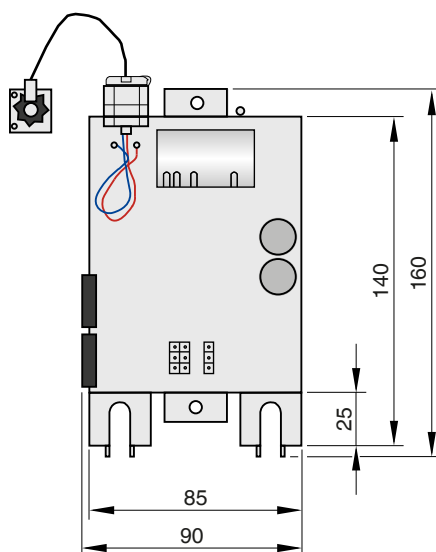
- Module for the control of smoke control dampers
- Capturing damper blade positions OPEN and CLOSED
- Approved up to SIL2 to IEC/EN 61508
- Integral AS-Interface slave
- Monitoring of signal reception
- Master can be used to monitor the run time of the damper blade actuator
- Connection with terminals
- Supply voltage of the module and the 24 V DC actuator using AS-Interface (2-wire control)
- Plug-in connection for Belimo actuators (factory mounted and wired)

Use

B24AS – Mounted to the smoke control damper

| | |
|--|--|
| Description | AS-EM/SIL2 |
| Supply voltage | 26.5 – 31.6 V DC |
| Current consumption | < 400 mA from AS-i |
| Max. current load per output | 340 mA |
| Max. current load per module | 340 mA |
| Status LED | |
| AS-i power | 1 × green |
| PeripheralFault | 1 × red, blinking |
| ComError | 1 × red, static |
| Output Q0 | 1 × yellow (DO0) |
| Output Q1 | 1 × yellow (DO1) |
| Input status LED SI-1 | 1 × yellow |
| Input status LED SI-2 | 1 × yellow |
| Input status DI0 | 1 × yellow (DI0) |
| Input status DI1 | 1 × yellow (DI1) |
| Input status DI2 | 1 × yellow (DI2) |
| Binary inputs | 2 outputs with transistor (typically 24 V DC from AS-i, voltage range 18 – 30 V) |
| Operating temperature | -20 to 70 °C |
| Storage temperature | -20 to 75 °C |
| Protection level, IEC protection class | IP 54 |
| Casing material | Plastic |
| AS-i profile | S-7.B.E (Safety at Work) and S7.A.E (motor module) |
| EMC | EN 61000-6-2; EN 61000-6-3 |

AS-i module AS-EM/SIL2



B24AM – AS-EM/M

Application

- Module for the control of smoke control dampers with C_{mod} Function:
- Capturing the damper blade end positions (CLOSED and OPEN)
- Time-controlled selection of 8 intermediate positions of the damper blade (opening angle between 20% – 70%)
- Actuators can be started even without controller communication
- Emergency position can be set (OPEN or CLOSED)
- LEDs for OPEN and CLOSED positions; monitoring of run time errors
- Integral AS-Interface slave
- Monitoring of signal reception
- Master can be used to monitor the run time of the damper blade actuator
- Supply voltage of the module and 24 V DC actuator using AS-Interface (2-wire control)
- Plug-in connection for Belimo actuators

Use

B24AM – Mounted to the smoke control damper

| | |
|---|--|
| Description | ASEM/M |
| Electrical design | 4 inputs/3 outputs |
| Output function | PNP transistor |
| Supply voltage | 26.5 – 31.6 V DC |
| Current consumption, including actuator | 450 mA |
| Inputs | |
| Switching | DC PNP |
| Sensor voltage supply | AS-i |
| Voltage range | 18 – 30 V AC |
| With short circuit protection | Yes |
| Switching level – high signal 1 | 10 |
| Input current high/low | > 7 mA/< 2 mA |
| Input characteristic | IEC 61131-2 Type 2 |
| Outputs, PNP | |
| Galvanically isolated | No |
| Max. current load per output | 400 mA per output/400 in total (from AS-i) |
| Outputs, relay | |
| Galvanically isolated | Yes |
| Maximum voltage | 32 V |
| Max. current load | 500 mA |
| Ambient temperature | -5 to 75 °C |
| Protection level, IEC protection class | IP 42 |
| AS-i profile | S-7.A.E |
| I/O configuration | 7 Hex |
| ID code | 7 Hex |
| EMC | EN 61000-6-2; EN 61000-6-3 |

B24BKNE – Communication module

Application

- Communication and power supply unit for 24 V actuators in smoke extract applications, status LEDs, retention of the damper control input signal, 230 V AC connection, 1 m cable, free of halogens

Use

B24BKNE – BKNE230-24 communication module

| | |
|------------------------|---|
| Description | BKNE230-24 |
| Nominal voltage | 230 V AC 50/60 Hz |
| Functional range | 198 – 264 V AC |
| Rating | 19 VA (including actuator) |
| Power consumption | 10 W (including actuator) |
| Length / cross section | On the actuator = 1 m, 3 (6*) × 0.75 mm ² (free of halogens) |
| IEC protection class | II (protective insulation) |
| Ambient temperature | -30 to 50 °C |
| Storage temperature | -40 to 80 °C |
| Protection level | IP 54 |
| EC conformity | EMC to 89/336/EEC, 73/23/EEC |
| Mode of action | Type 1 (EN60730-1) |
| Software class | A (EN60730-1) |
| Maintenance | Maintenance-free |
| Weight | 680 g |

B24C – Communication module

Application

- SLC technology
- The BC 24 module is used for the control of damper actuators
- Power supply and communication are implemented with an interchangeable two core cable, SLC24-16B system.
- A thermoelectric release mechanism and a duct smoke detector can be connected without the need for additional devices

Use

B24C – BC24-G2 communication module from BV-Control AG

| | |
|----------------------|-----------------------------------|
| Description | B24C |
| Nominal voltage | From SLC® control module |
| Power consumption | 1 W |
| Connections | Plug connections, screw terminals |
| Damper power supply | 24 V |
| Ambient temperature | -20 to 50 °C |
| Storage temperature | -20 to 80 °C |
| Humidity | 95% rh, no condensation |
| Weight | 255 g |
| B × H × T | 114 × 153 × 54 mm |
| Max. impulse voltage | 2.5 kV (EN60730-1) |

B24D, B230D – Communication module**Application**

- AGNOSYS system
- BRM-F-ST module is used for the monitoring and control of smoke control dampers
- Up to 126 modules can be connected in a ring topology

Use

B24D – AGNOSYS BRM10FST communication module

B230D – AGNOSYS BRM10F communication module

| | |
|---------------------|-----------------------------------|
| Description | B24D/B230D |
| Nominal voltage | 18 – 32 V DC (typically 24 V) |
| Connections | Plug connections, screw terminals |
| Damper power supply | 24/230 V AC 24 V DC |
| Ambient temperature | 0 to 45 °C |
| Humidity | 90 % rh, no condensation |
| Weight | 510 g |
| B × H × T | 158 × 180 × 65 mm |

Product details

Installation and commissioning

- Installation in concrete or masonry shaft walls
- Installation in lightweight partition walls
- Installation in or on tested, fire-resistant vertical or horizontal smoke extract ducts
- Installation in fire-resistant REI 90 or EI 90 walls
- For smoke extract ducts made of calcium silicate from 35 mm wall thickness
- For sheet steel smoke extract ducts
- After installation the damper must remain accessible for inspection, cleaning and repair
- Connected smoke extract ducts must have an inspection access
- Mechanical smoke extract systems require that the power supply is maintained even in the event of a fire

Note:

Smoke control dampers must be installed, connected and attached according to the operating and installation manual

Explanation

L [mm]

Length of the smoke control damper

B [mm]

Width of the smoke control damper

H [mm]

Height of the smoke control damper

q_v [m³/h]; [l/s]

Volume flow rate

L_{wa} [dB(A)]

A-weighted sound power level of air-regenerated noise for the smoke control damper

A [m²]

Free area

Δp_t [Pa]

Total differential pressure

v [kg]

Airflow velocity based on the upstream cross section (B × H)