



BVDAX for smoke extract in combination with a frequency inverter, CE-certified according to EN12101-3 temperature class 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 characteristics

- 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

Material 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

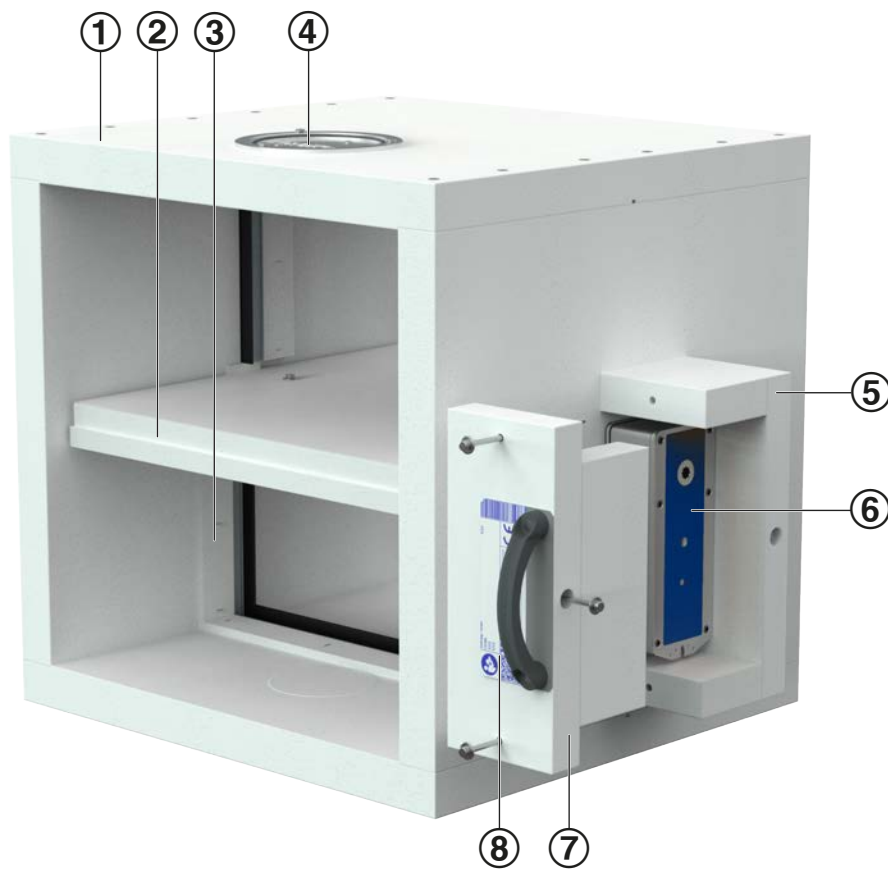
- Smoke control dampers must be operational at all times and must be maintained regularly so that they meet the performance requirements.
 - Maintenance is required at least every 6 months
 - A maintenance report must be created; documents must be kept for reference
- The owner of the smoke extract system 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

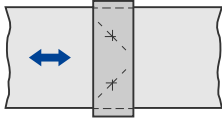
Nominal sizes B × H	200 × 200 mm – 1500 × 800 mm
Volume flow rate range	Up to 12000 l/s or 43200 m³/h
Differential pressure range	Pressure level 3: -1500 – 500 Pa
Operating temperature	-30 – 50 °C without temperatures below the dew point
Upstream velocity*	≤ 10 m/s with the maximum dimensions >10 – 15 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

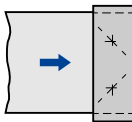
- The installation types A, B and C lead to differences in the pressure loss values and must be taken into account in the sizing.
- Precise values based on project-specific data can be determined with our Easy Product Finder design program.
- You will find the Easy Product Finder on our website

Installation type A, in a duct



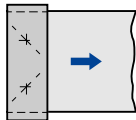
Ducted on both sides, any airflow direction

Installation type B, additional supply air



Ducted on one side, no duct on the downstream side

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 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 m³ 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)

Material 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 × 950 / 03 / Q0 / B24 / P1-RAL 9010

1	2	3	4	5	6	7	8	9	10

1 Type**EK2-EU** Smoke control damper with one damper blade**2 Construction****MA** Manual release (actuator encased for thermal insulation)**AA** Automatic release (actuator not encased)**3 Inspection access panel**

No entry: without inspection access panel (standard)

IC¹ 2 inspection access panels (operating side)**4 Coating**

No entry: without coating (standard)

C1 Promat impregnation (for all calcium silicate surfaces)**5 Country of destination****DE** Germany**CH** Switzerland**AT** Austria**NL** Netherlands

Other destination countries upon request

6 Nominal size [mm]

Width x height x length

Width

200 – 1500 (in increments of 5 mm)

Height

200 – 800 (in increments of 5 mm)

Length

400, 500, 600, 650, 750, 850, 950, 800, 900, 1100**7 Accessories****01** Fixing tabs (number depends on nominal size)**02** High temperature sealing tape HT (2 strips each for B and H)**03** Fixing tabs and high temperature sealing tape HT**8 Attachment 1**

No entry: without attachments (standard)

2 entries possible: attachment for operating side and for installation side

0 No accessory on this side**A**¹ Crimped wire mesh, flat (mesh aperture 20 × 20 mm)**B**¹ Perforated plate, flat (square holes, 10 × 10 mm)**Q** Perforated plate, curved (circular holes, D = 6 mm)**F** Connecting subframe (flange height: 35 mm; drilled holes: D = 10 mm)**9 Attachment 2**Actuator without extended encasing**B24** Actuator 24 V AC/DC (AC 19.2 – 28.8 V/DC 21.6 – 28.8 V)**B230** Actuator 230 V AC (AC 198 – 264 V)Actuator + control voltage/auxiliary switch**B24SR**^{1,2} Actuator B24 + control voltage Y = DC 2 – 10 V**B24M**^{1,2,3} Actuator B24 + auxiliary switch SN2**B230M**^{1,2,3} Actuator B230 + auxiliary switch SN2Actuator + extended actuator encasing (only with MA)**B24X**³ Actuator B24 + extended actuator encasing**B230X**³ Actuator B230 + extended actuator encasingActuator + control module

TROX control modules for AS-i (TROXNETCOM)

B24A³ Actuator B24 + TROXNETCOM module AS-EM/EK**B24AS**³ Actuator B24 + TROXNETCOM module AS-EM/SIL2**B24AM**^{2,3} Actuator B24 + TROXNETCOM module AS-EM/M

Communication and power supply unit

B24BKNE³ Actuator B24 + Belimo BKNE230-24 with SLC**B24C**³ Actuator B24 + BV control BC24E with SLC®

Smoke control damper with Modbus/RTU protocol

B24D³ Actuator B24 + Agnosys BRM-10-F-ST**B230D**³ Actuator B230 + Agnosys BRM-10-F**10 Surface Attachment 1**

No entry: without surface finish (standard)

P1 powder-coated, specify RAL CLASSIC colour**PS** Powder-coated, specify DB colour

Gloss level

RAL 9010 GU 50

RAL 9006 GU 30

All other RAL colours GU 70

¹ Depends on nominal size² Function C_{mod}: damper blade in intermediate position³ Extended actuator encasing (relevant only with MA)

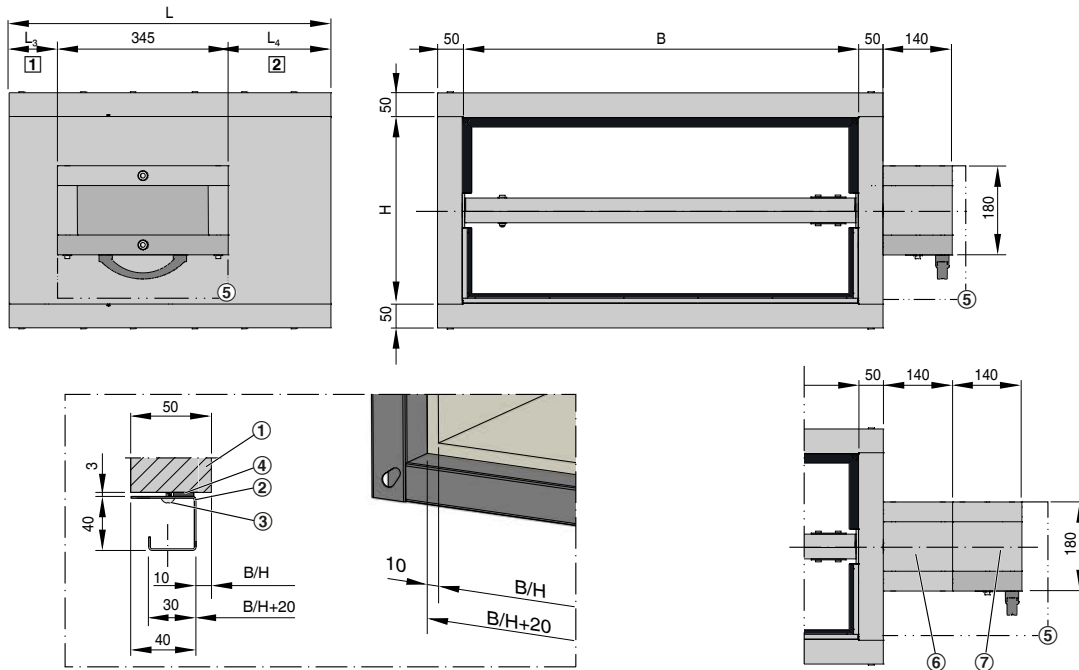


Order example: EK2-EU-MA-IC-C1/DE/1500×800×950/03/Q0/B24/P1-RAL 9010

Type	EK2-EU
Construction	Manual release (actuator encased for thermal insulation)
Inspection access panel	With two inspection access panels
Coating	Promat impregnation (all calcium silicate surfaces)
Country of destination	Germany
Nominal size [mm]	1500 × 800 × 950
Accessories	Fixing tabs and high temperature sealing tape HT
Attachments 1	Operating side: perforated metal plate; installation side: no attachment
Attachments 2	Actuator B24 + TROXNETCOM control module AS-EM/EK
Surface of attachment 1	Powder-coated RAL 9010 (pure white), gloss level approx. GU 50

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

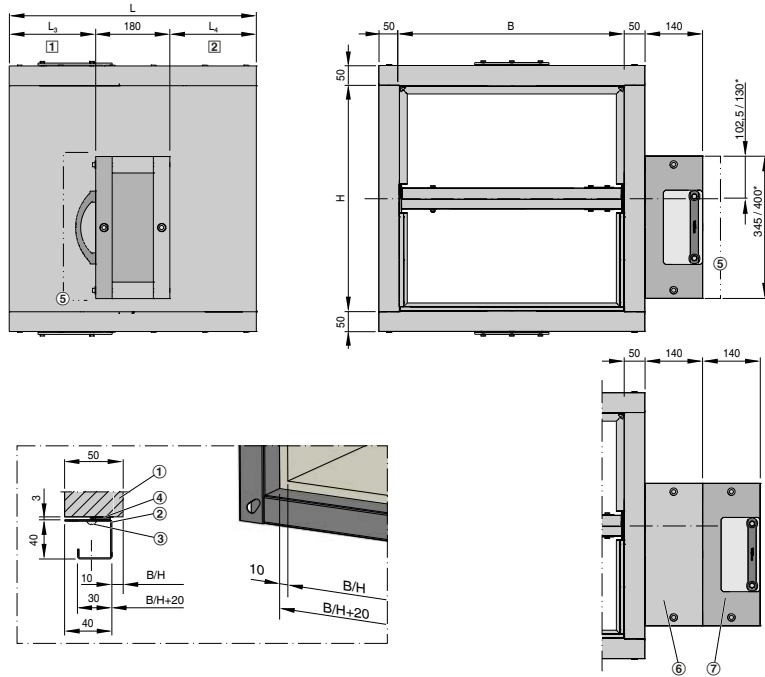
④ Seal

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 ₃	L ₄
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 release (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)
- 2 integrated limit switches with potential-free contacts enable damper position indication OPEN and CLOSED
- Connecting cables of the 24 V actuator are equipped with plugs, which ensure quick and easy connection to the TROX AS-i bus system (retrofitable)
- 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 25 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 of the actuator.

Installation information

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

Torque table

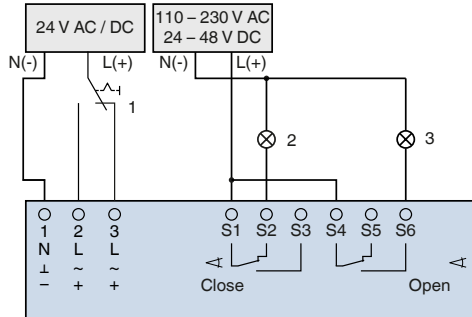
		B														
		200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	
E	S	200	15	15	15	15	15	15	15	15	15	15	15	15	15	15
		250	15	15	15	15	15	15	15	15	15	15	15	15	15	15
		300	15	15	15	15	15	15	15	15	15	15	15	15	15	15
		350	15	15	15	15	15	15	15	15	15	15	15	15	15	15
	M	385	15	15	15	15	15	15	15	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

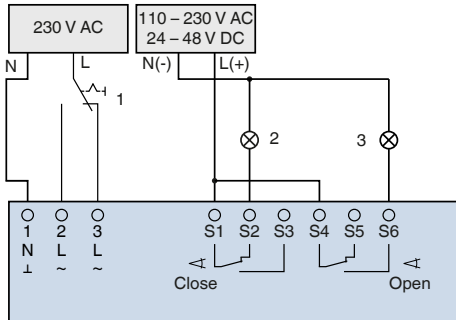
Wiring example 24 V AC / DC



- 1 switch for opening and closing, to be provided by others
 2 Control lamp CLOSED, to be provided by others
 3 Control lamp OPEN, 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 @ 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

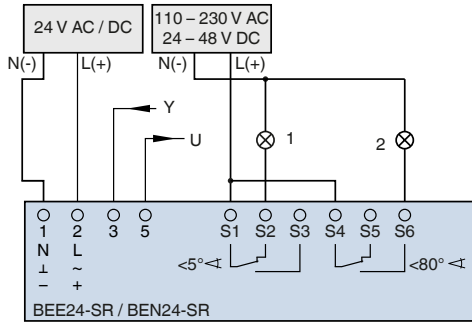
Wiring example 230 V AC



- 1 switch for opening and closing, to be provided by others
- 2 Control lamp CLOSED, to be provided by others
- 3 Control lamp OPEN, to be provided by others

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 @ 5 ms		I_{max} 7,9 A @ 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 variable

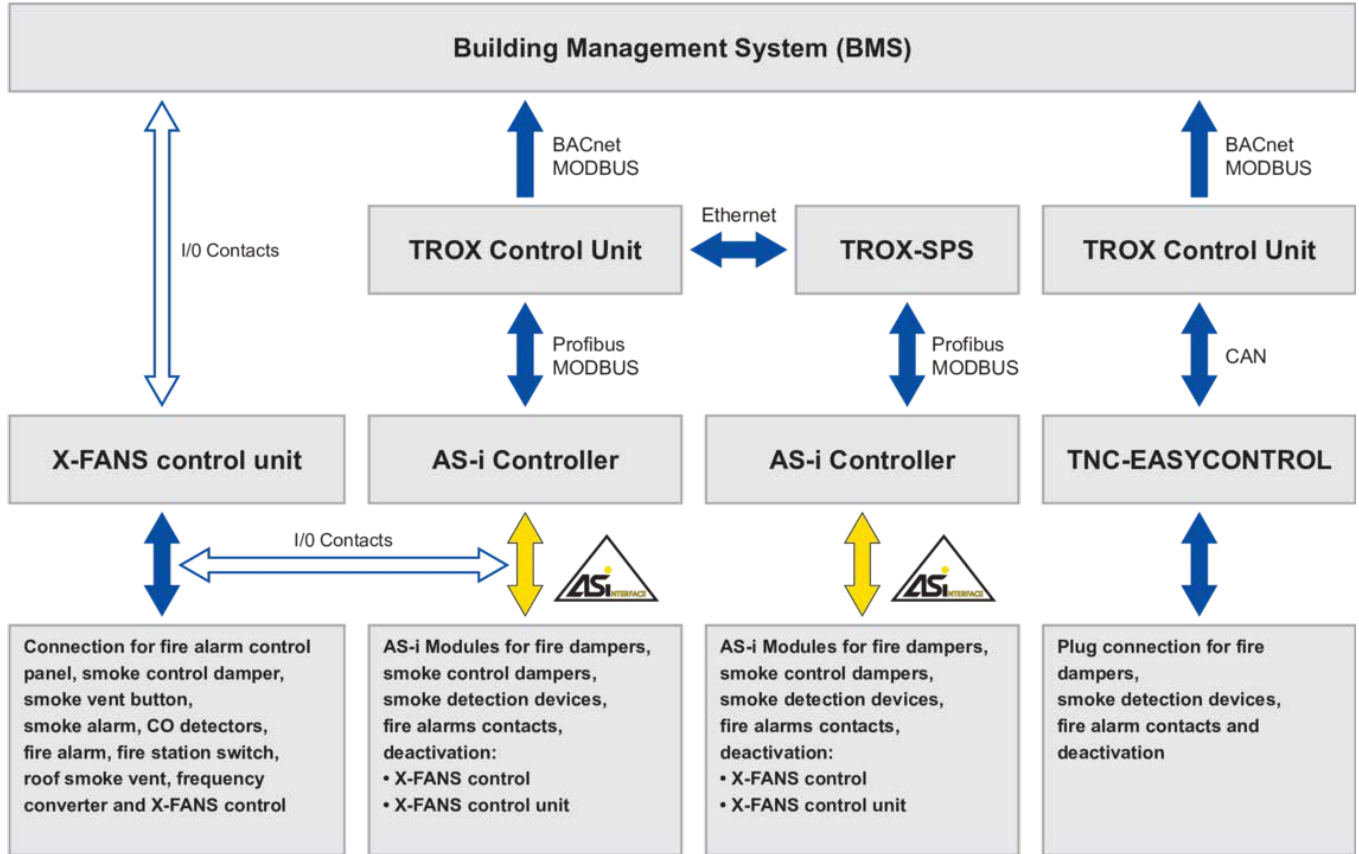


- 1 Control lamp CLOSED, to be provided by others
- 2 Control lamp OPEN, to be provided by others
- Y: 0(2) - 10 V DC Operating range (setpoint)
- U: 2 - 10 V DC Position feedback (actual value)

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 @ 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
	AS-EM/EK	AS-EM/SIL2	BKNE230-24	BC24-G2	BRM-10-F	BRM-10-F-ST	AS-EM/M
EK-EU	x	x	x	x	x	x	x
EK-JZ	x	x	x	x	x	x	x
EK-JS	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

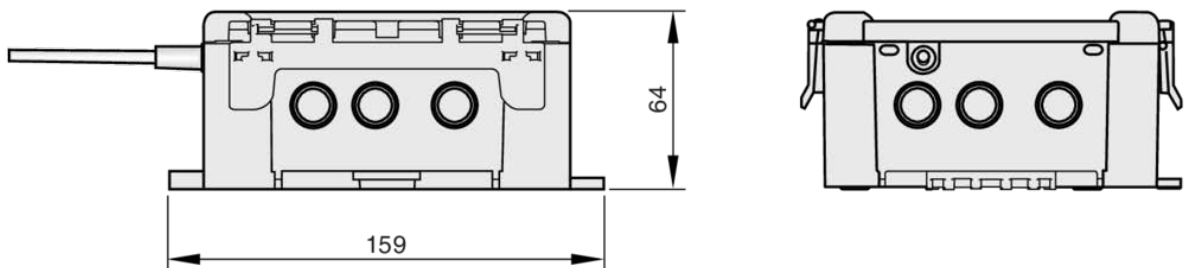
- Module for the control of smoke control dampers
- Detection of the damper position "CLOSED" and "OPEN"
- Opening the smoke control damper even without controller communication
- LEDs for OPEN and CLOSED positions; monitoring of run time errors
- Integrated AS-Interface slave
- Monitoring of signal 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)
- Ready to plug in for Belimo actuators (factory mounted and wired)

Use

B24A - mounted on 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	–
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

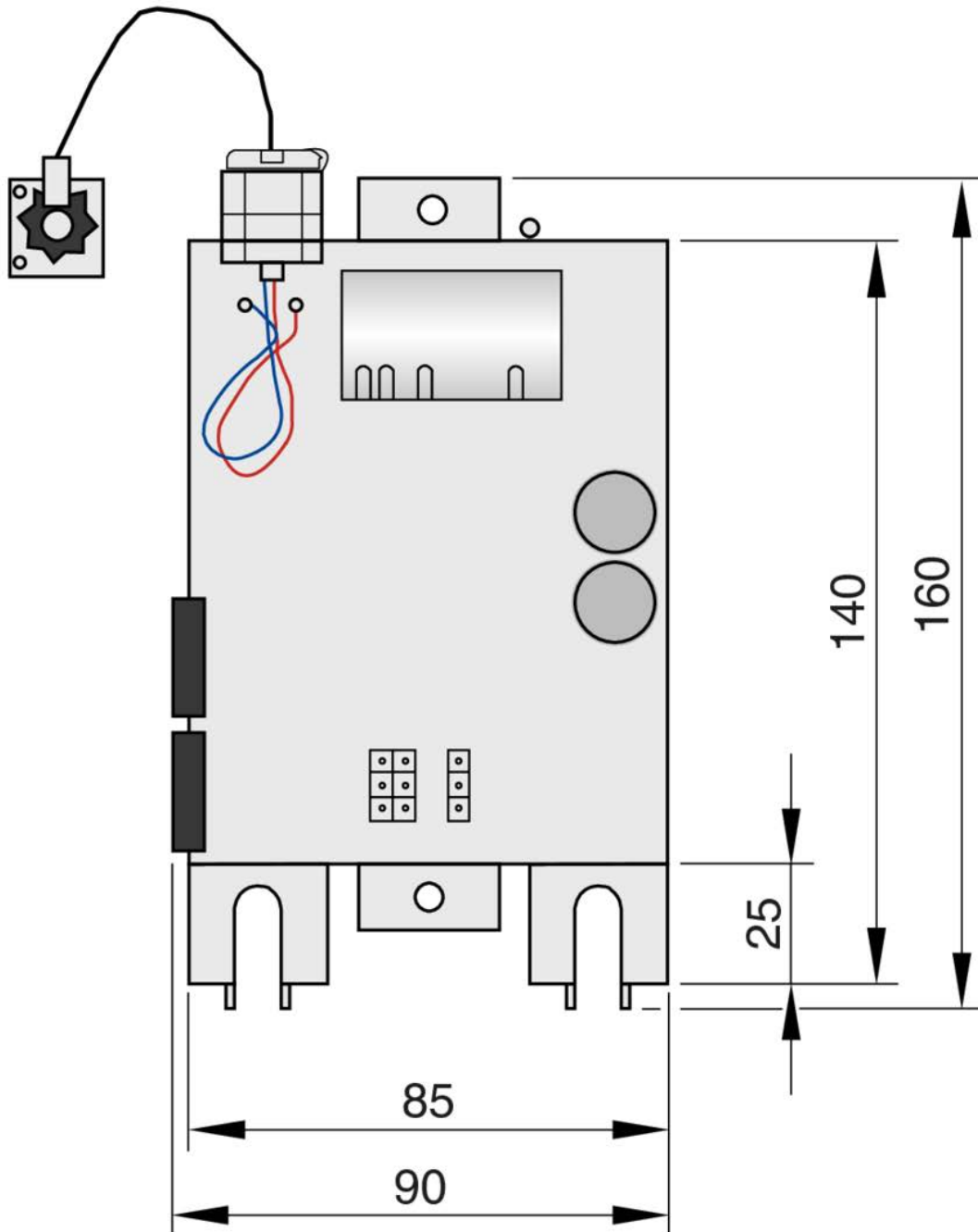
- Module for the control of smoke control dampers
- Detection of the damper position "CLOSED" and "OPEN"
- Approved up to SIL2 to IEC/EN 61508
- Integrated AS-Interface
- Monitoring of signal reception
- Master can be used to monitor the run time of the damper blade actuator
- Connection with terminals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

Use

B24AS - mounted on smoke control damper

Description	AS-EM/SIL2
Supply voltage	26.5 to 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
AS-i power	1 × green
Peripheral error	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 LED DI0	1 × yellow (DI0)
Input status LED DI1	1 × yellow (DI1)
Input status LED DI2	1 × yellow (DI2)
Binary inputs	2 safe digital inputs
Binary outputs	2 transistor outputs (typically 24 V DC from AS-i, voltage range 18 – 30 V)
Ambient temperature	-20 – 50 °C
Protection level, IEC protection class	IP 42
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
Casing dimensions (B × H × D)	139 × 159 × 64 mm

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	AS-EM/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	–
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-E communication module 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

Nomenclature

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 cross section

Δp_t [Pa]

Total differential pressure

v [kg]

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