

## MULTI-PURPOSE FIRE SAFETY SMOKE DAMPER

### KPD Series



Normally Closed Single-Louvre Fire-Safety Dampers, Fire Resistance Rating 180 minutes at Smoke Temperature of 600 °C

#### ■ Application

The dampers are intended for integration into smoke control systems of buildings and structures of various purpose and designed for extraction of combustion products from the spaces of floor corridors, hallways, air locks etc. The dampers can be used as smoke dampers in emergency smoke exhaust ventilation systems in the event of a fire to support evacuation of people from the building at the initial phase of the fire occurring in any of the building spaces. The multi-purpose fire safety smoke damper KPD/ KPDU series are rated to resist fire for 182 minutes (E 180) at the temperature of 600 °C.

### KPDU Series



Normally Closed Multiple-Louvre Fire-Safety Dampers, Fire Resistance Rating 180 minutes at Smoke Temperature of 600 °C

#### ■ Design

The damper casing is made of galvanised steel 1.5 mm thick. The dampers are available in the wall-mounted or duct-mounted variant which have either one or two attachment flanges.

The units are available in 2 control variants:

##### ▶ with an electric magnet (220 or 24 V);

The damper opens via a spring when the electric magnet is energized. When the damper reaches the end position a limit switch opens the circuit disconnecting the electric magnet from the power mains. The electric magnet must not remain energized for more than 10 seconds. The damper is reset to the safety (closed) position manually by means of a

handle. The damper equipped with an electric magnet has a special button for testing the unit performance.

##### ▶ with a Belimo (230 or 24 V) electric actuator and a return spring;

The flaps are automatically set to the normal (closed) position on energization of the electric actuator. On a fire alarm signal the electric actuator is de-energized causing its return spring to set the damper to the open position. The electric actuator is equipped with a contact group to signal its end positions. The damper can also be controlled manually and fixed in any position. The unit can be unlocked either manually using a hex wrench or automatically upon power-up.

##### ▶ with a Belimo (230 or 24 V) electric actuator and two-wire control.

The damper flap is set from the "Open" to the "Closed" position by an external command sending the voltage phase from one actuator contact to the other. The electric actuator is equipped with a contact group which signals reaching its end positions. The damper can be controlled manually by means of a hex key.

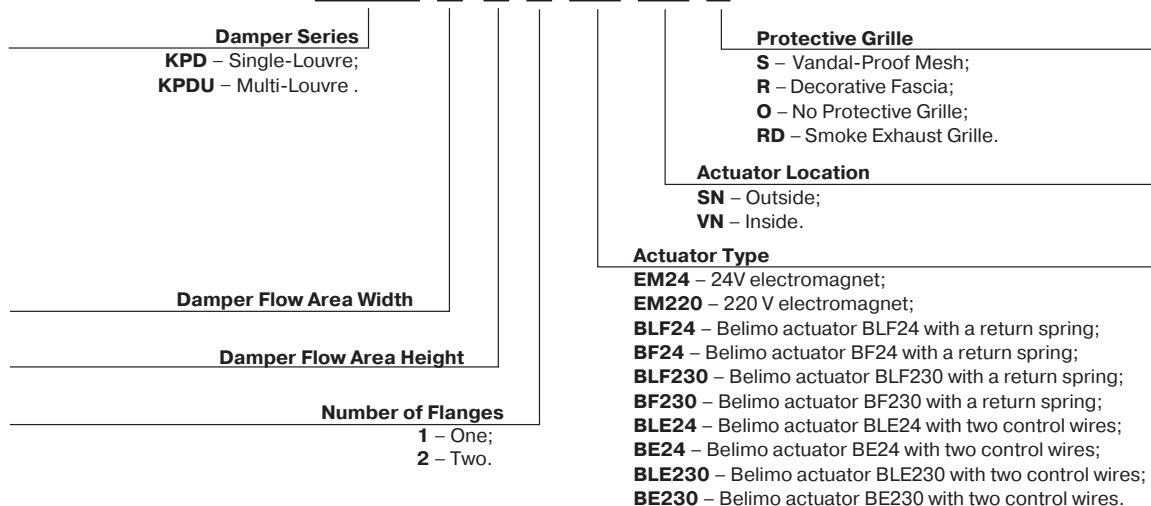
#### ■ Installation

The dampers are not intended for installation in air ducts and channels of spaces rated explosion and fire safety category A and B, in local exhaust systems designed for extraction of flammable and explosive mixtures as well as in systems containing environments more aggressive to plain carbon steels than air or those containing sticky and fibrous materials. Fire safety dampers are only intended for installation in systems subjected to regular cleaning to prevent formation of flammable deposits.

The seal fire resistance must be at least equal to that of the building envelope. When preparing for installation the damper casing should be fitted with wooden

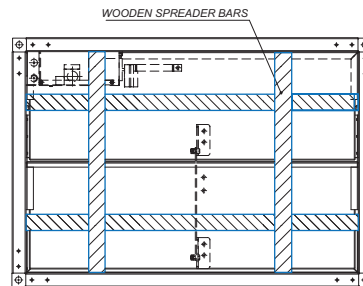
Conventional Designation: \_\_\_\_\_

### **KPDX-XxX-X-XX-XX-X**



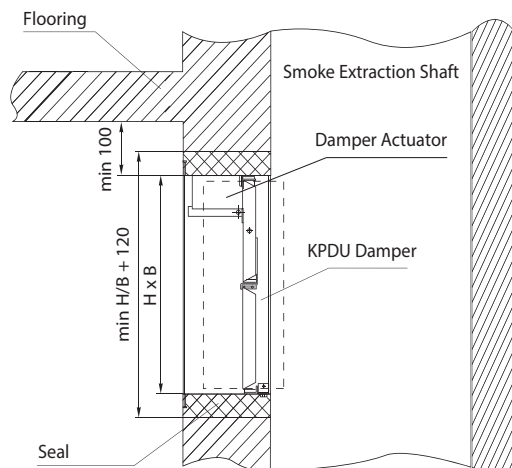
spreader bars to prevent deformation, torsional twisting or geometry perturbation of the casing which may result in louvre jamming and, eventually, loss of the damper functionality.

Upon completion of the damper brickwork envelope in the smoke shaft, fire division wall or flooring and complete cure (setting) of the sealing remove the wooden spreader bars and check the louvre for free and frictionless opening. Earthen the damper, connect the electromagnet or electric actuator (depending on the modification) to the automatic fire-fighting system and test the damper actuation.

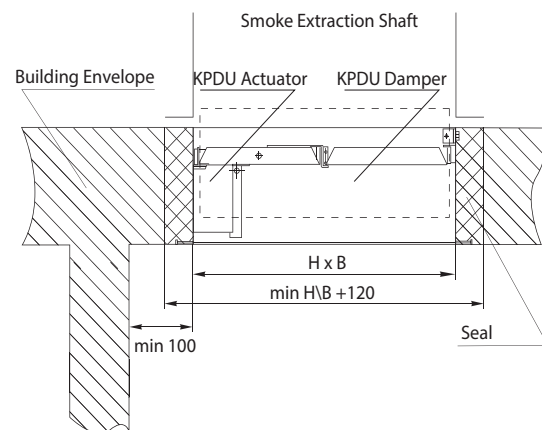


**KPDU Internal-Actuator Damper Installation Recommendations:**

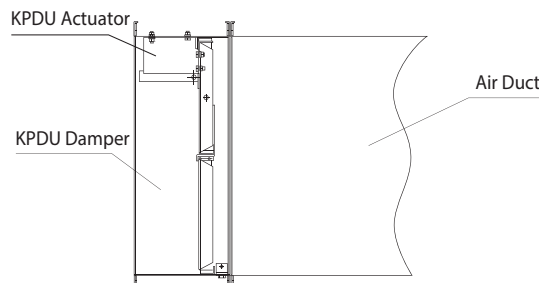
**- In vertical building structures**



**- In horizontal building structures**



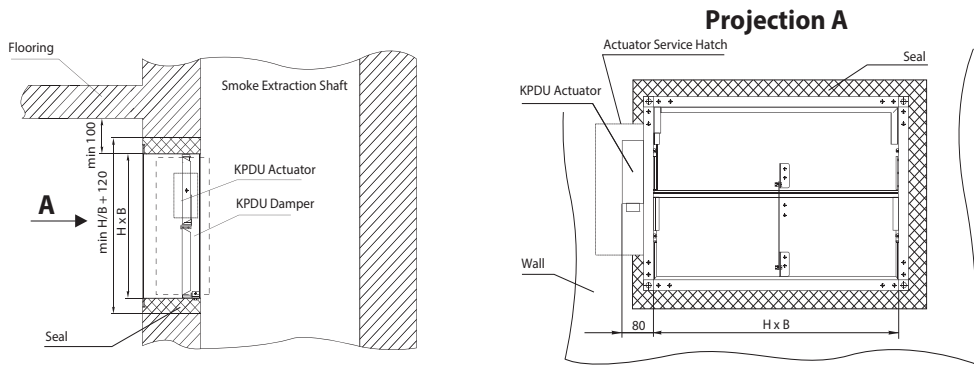
**- Duct modification with an air duct**



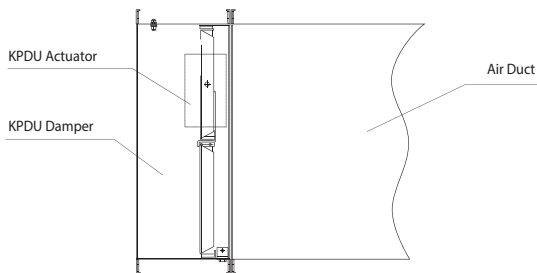
## MULTI-PURPOSE FIRE SAFETY SMOKE DAMPER

### KPDU External-Actuator Damper Installation Recommendations:

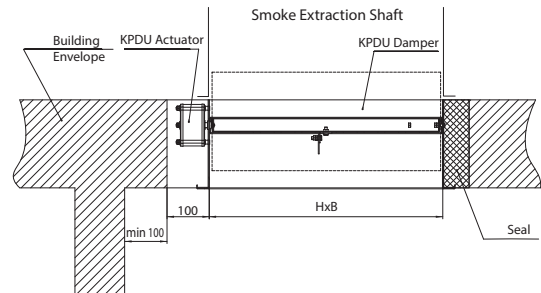
– in vertical building structures



– duct modification with an air duct

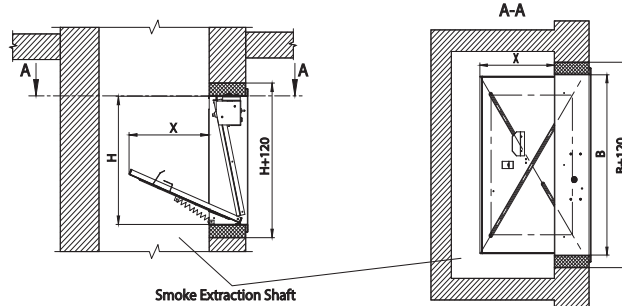


– In horizontal building structures

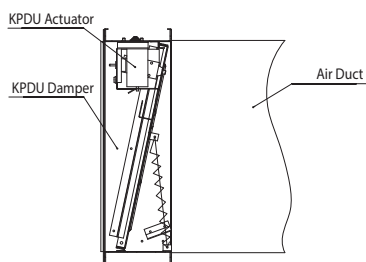


### KPD Internal-Actuator Damper Installation Recommendations:

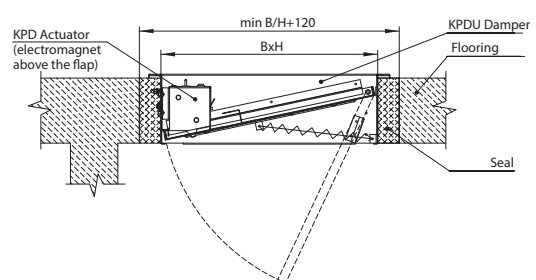
– In vertical building structures



– Duct variant with an air duct



– In horizontal building structures



■ Possible KPDU Damper Variants

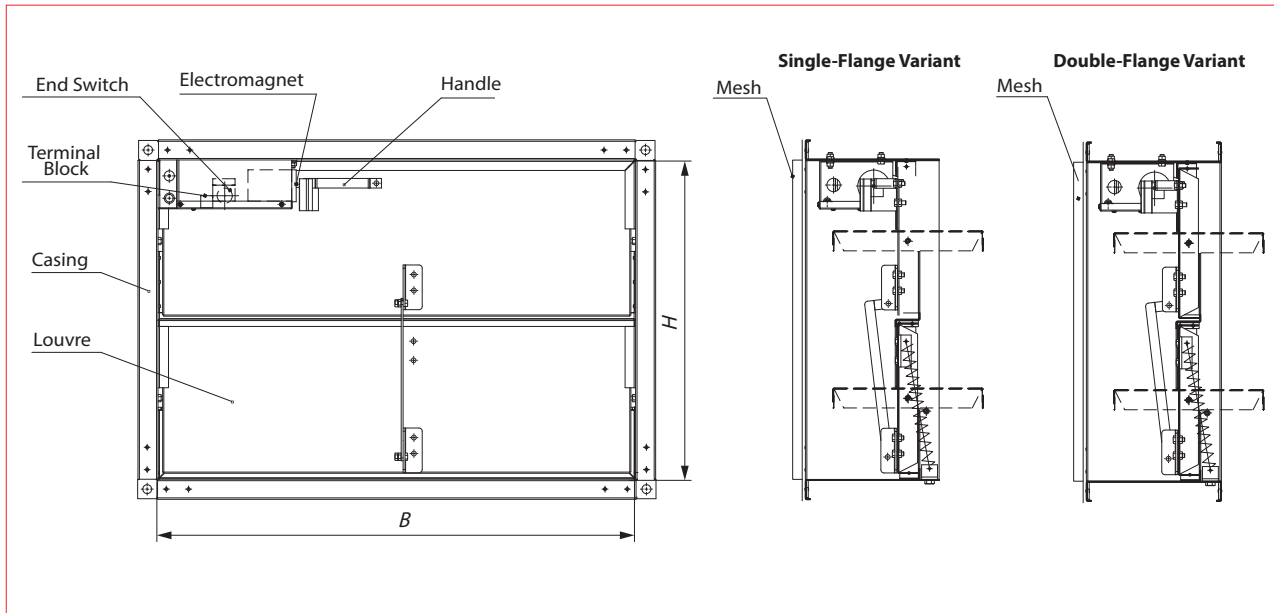
▶ KPDU Damper with Internal Electromagnet (220 or 24V), Single or Double Flange.

- The single-flange variant is intended for wall or ceiling mounting irrespective of the dimensional

orientation. Upon the test or emergency damper actuation the louvres can only be manually reset to the initial position.

- The double-flange variant is intended for

duct installation irrespective of the dimensional orientation. Upon the test or emergency damper actuation the louvres can only be manually reset to the initial position.



Flow Area of KPDU Smoke Extraction Damper with an Electromagnet, m<sup>2</sup>

B/H	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000
300	0.06														
350	0.08	0.10													
400	0.09	0.11	0.12												
450	0.10	0.13	0.14	0.16											
500	0.12	0.14	0.15	0.18	0.20										
550	0.13	0.16	0.17	0.20	0.23	0.25									
600	0.15	0.18	0.19	0.22	0.25	0.28	0.31								
650	0.16	0.19	0.20	0.24	0.27	0.30	0.33	0.37							
700	0.17	0.21	0.22	0.26	0.29	0.33	0.36	0.40	0.43						
750	0.19	0.22	0.24	0.28	0.31	0.35	0.39	0.43	0.46	0.48					
800	0.20	0.24	0.26	0.30	0.34	0.38	0.42	0.46	0.50	0.51	0.55				
850	0.21	0.26	0.27	0.31	0.36	0.40	0.44	0.48	0.53	0.54	0.59	0.63			
900	0.23	0.27	0.29	0.33	0.38	0.42	0.47	0.51	0.56	0.58	0.62	0.67	0.71		
950	0.24	0.29	0.31	0.35	0.40	0.45	0.50	0.54	0.59	0.61	0.66	0.71	0.75	0.80	
1000	0.25	0.30	0.32	0.37	0.42	0.47	0.52	0.57	0.62	0.64	0.69	0.74	0.79	0.84	0.89

**Note:** Select the required BxH cross-section damper according to the completed table cells. Since the damper can be installed in any spatial position a change of the height and width (B and H values) orientation may enable selection of a damper with the cross-section beyond the completed cell range.

**For example,** a 700x500 damper can be ordered as 500x700.

## MULTI-PURPOSE FIRE SAFETY SMOKE DAMPER

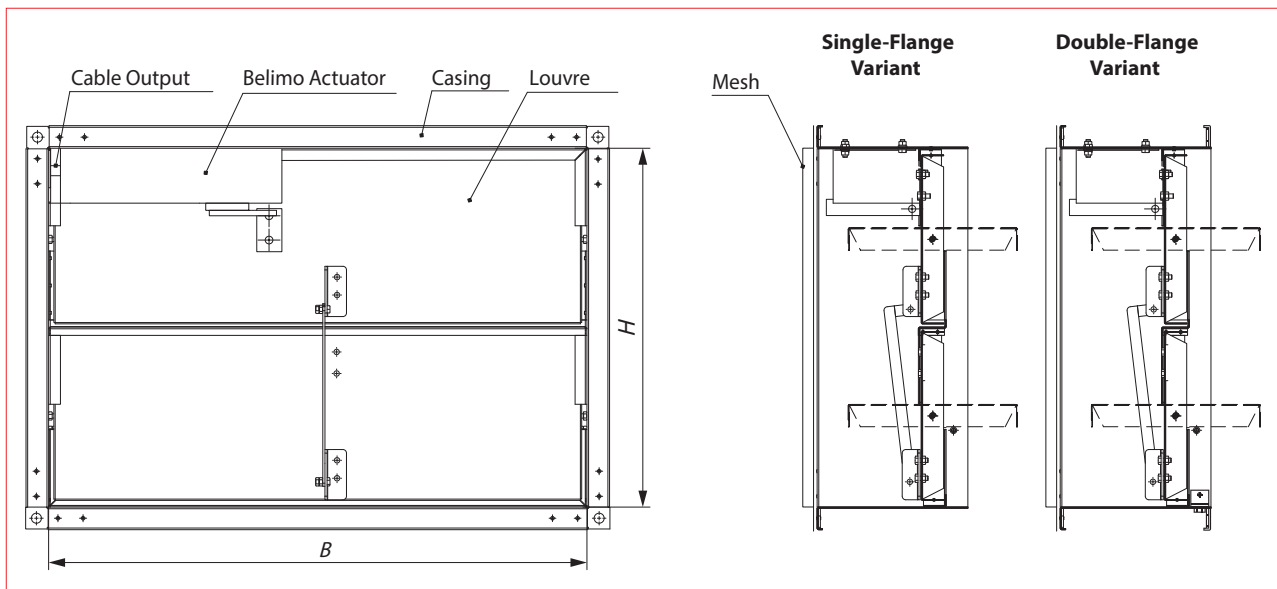
### ► KPDU Damper with Belimo Electric Actuator (230 or 24V) Inside the Damper, Single or Double Flange.

– The single-flange variant is intended for wall or ceiling mounting irrespective of the dimensional

orientation.

– The double-flange variant is intended for duct installation irrespective of the dimensional orientation. The louvres of dampers equipped with a BLE or BE actuator are set to the "open" or "closed"

position by an external actuating signal. After a test or emergency actuation the louvres of dampers equipped with BLF or BF actuators can return to the initial position automatically upon feeding the supply voltage.



Flow Area of KPDU Smoke Extraction Damper with Internal Belimo Electric Actuator, m<sup>2</sup>

B/H	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000
300	0.06														
350	0.08	0.10													
400	0.09	0.11	0.12												
450	0.10	0.13	0.14	0.16											
500	0.12	0.14	0.15	0.18	0.20										
550	0.13	0.16	0.17	0.20	0.23	0.25									
600	0.15	0.18	0.19	0.22	0.25	0.28	0.31								
650	0.16	0.19	0.20	0.24	0.27	0.30	0.33	0.37							
700	0.17	0.21	0.22	0.26	0.29	0.33	0.36	0.40	0.43						
750	0.19	0.22	0.24	0.28	0.31	0.35	0.39	0.43	0.46	0.48					
800	0.20	0.24	0.26	0.30	0.34	0.38	0.42	0.46	0.50	0.51	0.55				
850	0.21	0.26	0.27	0.31	0.36	0.40	0.44	0.48	0.53	0.54	0.59	0.63			
900	0.23	0.27	0.29	0.33	0.38	0.42	0.47	0.51	0.56	0.58	0.62	0.67	0.71		
950	0.24	0.29	0.31	0.35	0.40	0.45	0.50	0.54	0.59	0.61	0.66	0.71	0.75	0.80	
1000	0.25	0.30	0.32	0.37	0.42	0.47	0.52	0.57	0.62	0.64	0.69	0.74	0.79	0.84	0.89

**Note:**

Select the required BxH cross-section damper according to the completed table cells. Since the damper can be installed in any spatial position any change of the height and width (B and H values) orientation may enable selection of a damper with the cross-section beyond the completed cell range.

For example, a 700x500 damper can be ordered as 500x700.

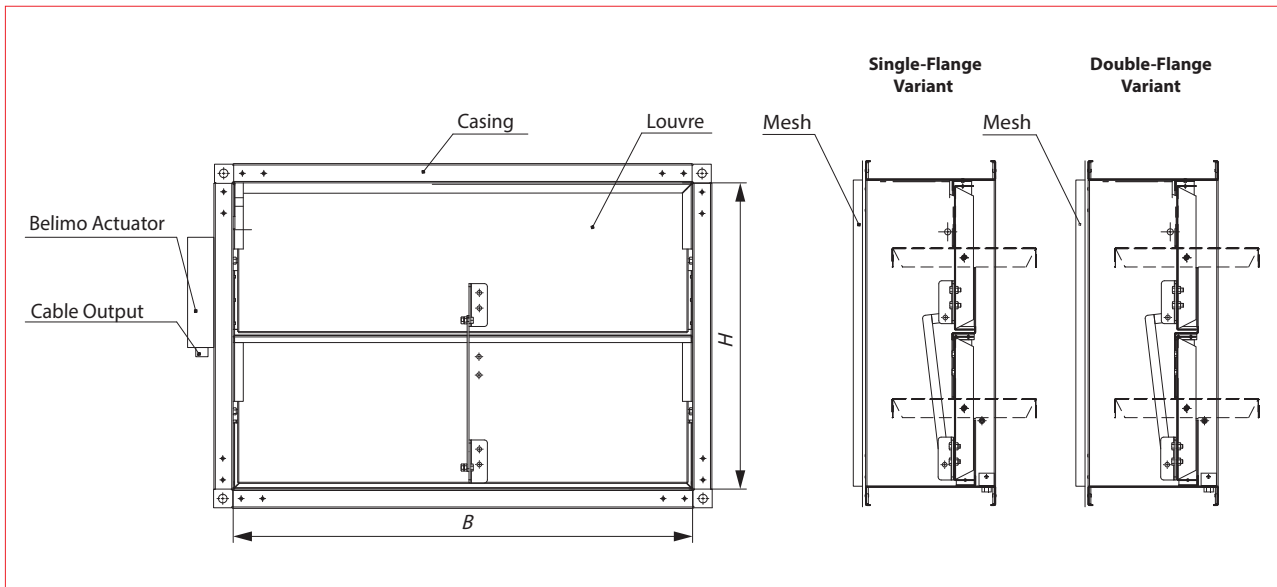
The table cells correspond to the following: □ – BLF230 or BLF24 (BLE230/24); ■ – BF230 or BF24 (BLE 230/24); ■ – BE230 or BE24 (BF230/24).

► **KPDU Damper with External Belimo Electric Actuator (230 or 24V), Single or Double Flange.**

– The single-flange variant is intended for wall or ceiling mounting irrespective of the dimensional orientation.

– The double-flange variant is intended for duct installation irrespective of the dimensional orientation. The louvres of dampers equipped with a BLE or BE actuator are set to the "open" or "closed" position by an external actuating signal. After a test

or emergency actuation the louvres of dampers equipped with BLF or BF actuators can return to the initial position automatically upon feeding the supply voltage.



**Flow Area of KPDU Smoke Extraction Damper with External Belimo Electric Actuator, m<sup>2</sup>**

B/H	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000
300	0.07														
350	0.09	0.11													
400	0.10	0.12	0.13												
450	0.11	0.14	0.15	0.17											
500	0.13	0.15	0.16	0.19	0.21										
550	0.14	0.17	0.18	0.21	0.24	0.26									
600	0.16	0.18	0.20	0.23	0.26	0.29	0.32								
650	0.17	0.20	0.21	0.25	0.28	0.31	0.34	0.38							
700	0.18	0.22	0.23	0.27	0.30	0.34	0.37	0.41	0.44						
750	0.20	0.23	0.25	0.29	0.32	0.36	0.40	0.44	0.47	0.49					
800	0.21	0.25	0.27	0.31	0.35	0.39	0.43	0.47	0.51	0.52	0.56				
850	0.22	0.27	0.28	0.32	0.37	0.41	0.45	0.49	0.54	0.55	0.60	0.64			
900	0.24	0.28	0.30	0.34	0.39	0.43	0.48	0.52	0.57	0.59	0.63	0.68	0.72		
950	0.25	0.30	0.32	0.36	0.41	0.46	0.51	0.55	0.60	0.62	0.67	0.72	0.76	0.81	
1000	0.26	0.31	0.33	0.38	0.43	0.48	0.53	0.58	0.63	0.65	0.70	0.75	0.80	0.85	0.90

**Note:** Select the required BxH cross-section damper according to the completed table cells. Since the damper can be installed in any spatial position any change of the height and width (B and H values) orientation may enable selection of a damper with the cross-section beyond the completed cell range.

**For example,** a 700x500 damper can be ordered as 500x700. The table cells correspond to the following:  
 □ – BLF230 or BLF24 (BLE230/24); □ – BF230 or BF24 (BLE230/24); □ – BE230 or BE24 (BF230/24)

## MULTI-PURPOSE FIRE SAFETY SMOKE DAMPER

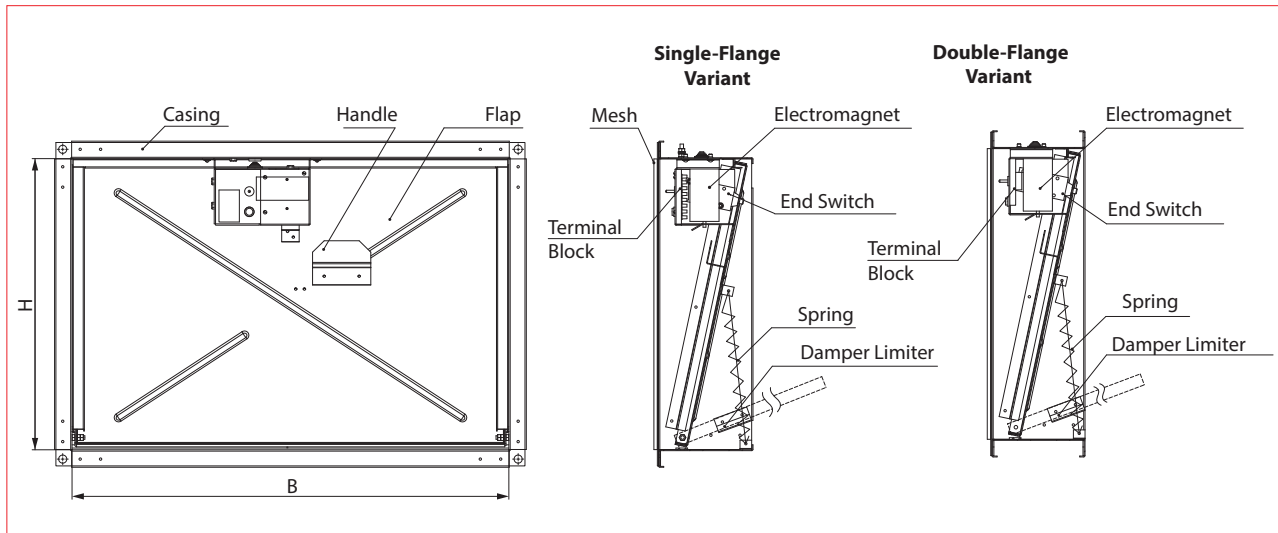
### ■ Possible KPD Damper Variants

#### ▶ KPD Damper with Internal Electromagnet (220 or 24V), Single or Double Flange.

– The single-flange variant is intended for wall or ceiling installation. The damper must be installed

according to the installation guidelines for KPD damper with an internal actuator (see page 24). Upon the test or emergency damper actuation the louvres can only be manually reset to the initial position.

– The double-flange variant is intended for duct installation. Upon the test or emergency damper actuation the louvres can only be manually reset to the initial position.



Flow Area of KPD Smoke Extraction Damper with an Electromagnet, m<sup>2</sup>

B/H	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000
300	0.06														
350	0.08	0.10													
400	0.09	0.11	0.12												
450	0.10	0.13	0.14	0.16											
500	0.12	0.14	0.15	0.18	0.20										
550	0.13	0.16	0.17	0.20	0.23	0.25									
600	0.15	0.18	0.19	0.22	0.25	0.28	0.31								
650	0.16	0.19	0.20	0.24	0.27	0.30	0.33	0.37							
700	0.17	0.21	0.22	0.26	0.29	0.33	0.36	0.40	0.43						
750	0.19	0.22	0.24	0.28	0.31	0.35	0.39	0.43	0.46	0.48					
800	0.20	0.24	0.26	0.30	0.34	0.38	0.42	0.46	0.50	0.51	0.55				
850	0.21	0.26	0.27	0.31	0.36	0.40	0.44	0.48	0.53	0.54	0.59	0.63			
900	0.23	0.27	0.29	0.33	0.38	0.42	0.47	0.51	0.56	0.58	0.62	0.67	0.71		
950	0.24	0.29	0.31	0.35	0.40	0.45	0.50	0.54	0.59	0.61	0.66	0.71	0.75	0.80	
1000	0.25	0.30	0.32	0.37	0.42	0.47	0.52	0.57	0.62	0.64	0.69	0.74	0.79	0.84	0.89

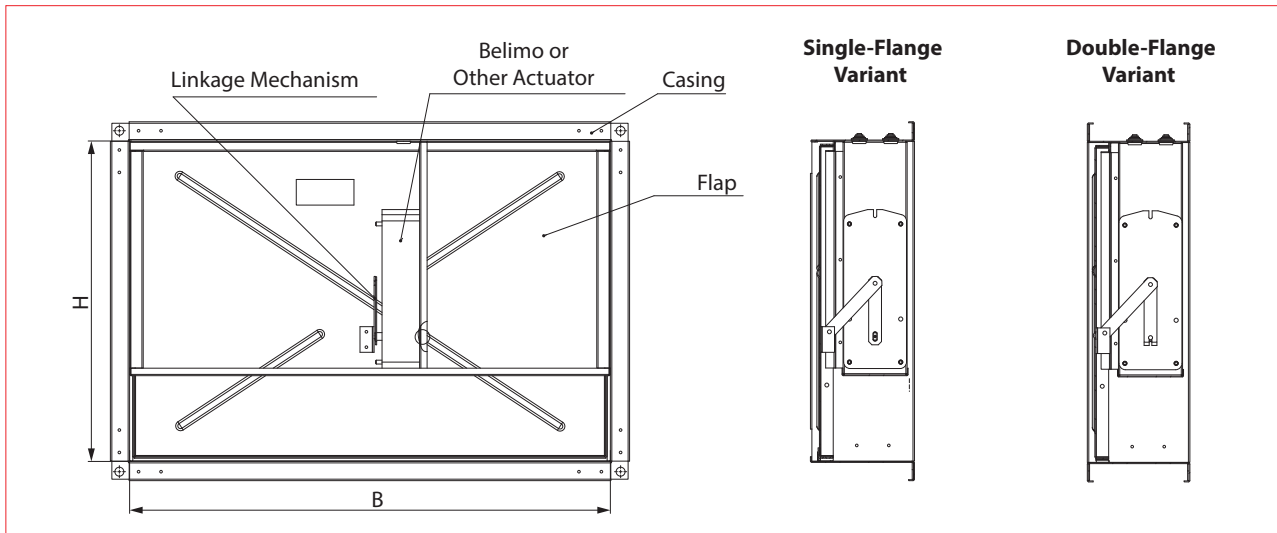
**Note:** Select the required BxH cross-section damper according to the completed table cells.

► **KPD Damper with Internal Belimo Electric Actuator (230 or 24V), Single or Double Flange:**

– The single-flange variant is intended for wall or ceiling mounting irrespective of the dimensional orientation.

– The double-flange variant is intended for duct installation irrespective of the dimensional orientation. The louvres of dampers equipped with a BLE or BE actuator are set to the "open" or "closed" position by an external actuating signal. After a test

or emergency actuation the louvres of dampers equipped with BLF or BF actuators can return to the initial position automatically upon feeding the supply voltage.



**Flow Area of KPD Smoke Extraction Damper with Internal Belimo Electric Actuator, m<sup>2</sup>**

B/H	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000
300	0.06														
350	0.08	0.10													
400	0.09	0.11	0.12												
450	0.10	0.13	0.14	0.16											
500	0.12	0.14	0.15	0.18	0.20										
550	0.13	0.16	0.17	0.20	0.23	0.25									
600	0.15	0.18	0.19	0.22	0.25	0.28	0.31								
650	0.16	0.19	0.20	0.24	0.27	0.30	0.33	0.37							
700	0.17	0.21	0.22	0.26	0.29	0.33	0.36	0.40	0.43						
750	0.19	0.22	0.24	0.28	0.31	0.35	0.39	0.43	0.46	0.48					
800	0.20	0.24	0.26	0.30	0.34	0.38	0.42	0.46	0.50	0.51	0.55				
850	0.21	0.26	0.27	0.31	0.36	0.40	0.44	0.48	0.53	0.54	0.59	0.63			
900	0.23	0.27	0.29	0.33	0.38	0.42	0.47	0.51	0.56	0.58	0.62	0.67	0.71		
950	0.24	0.29	0.31	0.35	0.40	0.45	0.50	0.54	0.59	0.61	0.66	0.71	0.75	0.80	
1000	0.25	0.30	0.32	0.37	0.42	0.47	0.52	0.57	0.62	0.64	0.69	0.74	0.79	0.84	0.89

**Note:**

Select the required BxH cross-section damper according to the completed table cells. Since the damper can be installed in any spatial position any change of the height and width (B and H values) orientation may enable selection of a damper with the cross-section beyond the completed cell range.

**For example,** a 700x500 damper can be ordered as 500x700.

The table cells correspond to the following: □ – BLF230 or BLF24 (BLE230/24); □ – BF230 or BF24 (BLE 230/24); □ – BE230 or BE24 (BF230/24).



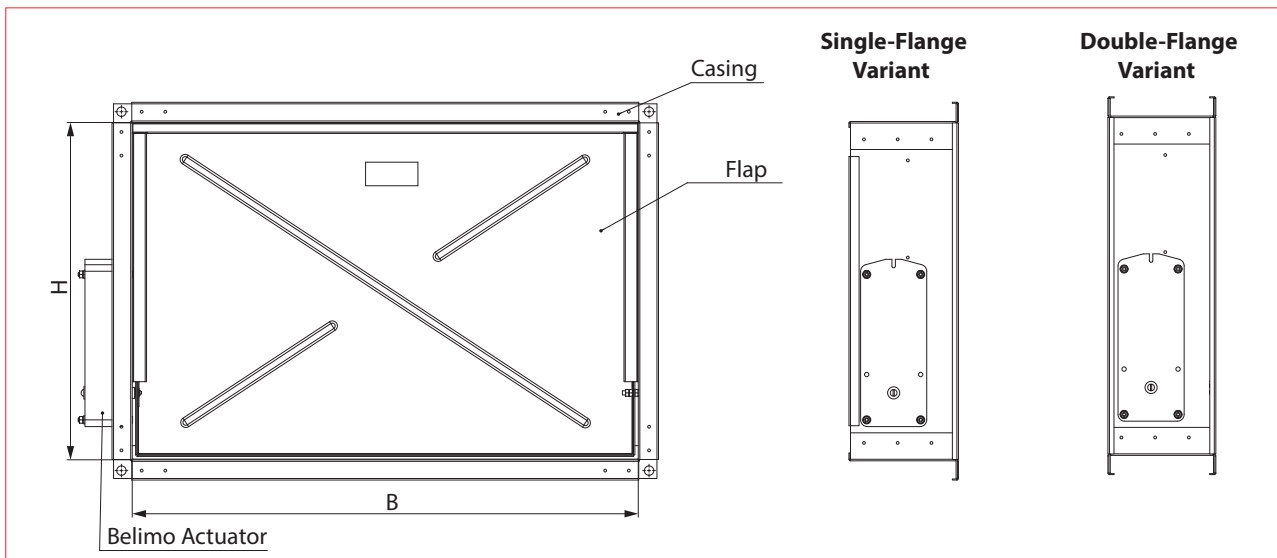
## MULTI-PURPOSE FIRE SAFETY SMOKE DAMPER

### ► KPD Damper with External Belimo Electric Actuator (230 or 24V), Single or Double Flange.

– The single-flange variant is intended for wall or ceiling mounting irrespective of the dimensional orientation.

– The double-flange variant is intended for duct installation irrespective of the dimensional orientation. The louvres of dampers equipped with a BLE or BE actuator are set to the "open" or "closed" position by an external actuating signal. After a test

or emergency actuation the louvres of dampers equipped with BLF or BF actuators can return to the initial position automatically upon feeding the supply voltage.



Flow Area of KPD Smoke Extraction Damper with External Belimo Electric Actuator, m<sup>2</sup>

B/H	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000
300	0.07														
350	0.09	0.11													
400	0.10	0.12	0.13												
450	0.11	0.14	0.15	0.17											
500	0.13	0.15	0.16	0.19	0.21										
550	0.14	0.17	0.18	0.21	0.24	0.26									
600	0.16	0.18	0.20	0.23	0.26	0.29	0.32								
650	0.17	0.20	0.21	0.25	0.28	0.31	0.34	0.38							
700	0.18	0.22	0.23	0.27	0.30	0.34	0.37	0.41	0.44						
750	0.20	0.23	0.25	0.29	0.32	0.36	0.40	0.44	0.47	0.49					
800	0.21	0.25	0.27	0.31	0.35	0.39	0.43	0.47	0.51	0.52	0.56				
850	0.22	0.27	0.28	0.32	0.37	0.41	0.45	0.49	0.54	0.55	0.60	0.64			
900	0.24	0.28	0.30	0.34	0.39	0.43	0.48	0.52	0.57	0.59	0.63	0.68	0.72		
950	0.25	0.30	0.32	0.36	0.41	0.46	0.51	0.55	0.60	0.62	0.67	0.72	0.76	0.81	
1000	0.26	0.31	0.33	0.38	0.43	0.48	0.53	0.58	0.63	0.65	0.70	0.75	0.80	0.85	0.90

**Note:**

Select the required BxH cross-section damper according to the completed table cells. Since the damper can be installed in any spatial position any change of the height and width (B and H values) orientation may enable selection of a damper with the cross-section beyond the completed cell range.

**For example,** a 700x500 damper can be ordered as 500x700. The table cells correspond to the following:  
 □ – BLF230 or BLF24 (BLE230/24); ■ – BF230 or BF24 (BLE230/24); ▒ – BE230 or BE24 (BF230/24)

### ■ Technical Specifications of BF and BLF Electric Actuators

Technical Specifications	BF24	BLF24	BF230	BLF230
Rated Operation Voltage [V] / 50 Hz	24		230	
Permissible Operating Voltage Tolerance [V]	19.2...28.8		198...264	
Maximum Power Consumption in Louvre Open Position [W]	2	2.5	3	3
Maximum Power Consumption at Louvre Reset to Initial Position upon Damper Actuation [W]	7	5	8	6
Maximum Design Capacity [VA]	10	7	12.5	7
Protection Class	III		II	
IP Code	IP 54			
Auxiliary Switches	2xSPDT 3(0.5) A 250 V			
Electric Motor Line Cable	1 m. 2x0.75 mm <sup>2</sup>			
Auxiliary Switch Line Cable	1 m. 6x0.75 mm <sup>2</sup>			
Maximum Time for Louvre Reaching Operating (Protective) Position by Spring [s]	16	20...60	16	20...60
Maximum Time for Louvre Resetting to Initial Position by Electric Motor [s]	140	40...75	140	40...75
Service Life	At least 60,000 duty cycles			
Technical Maintenance	Not Required			

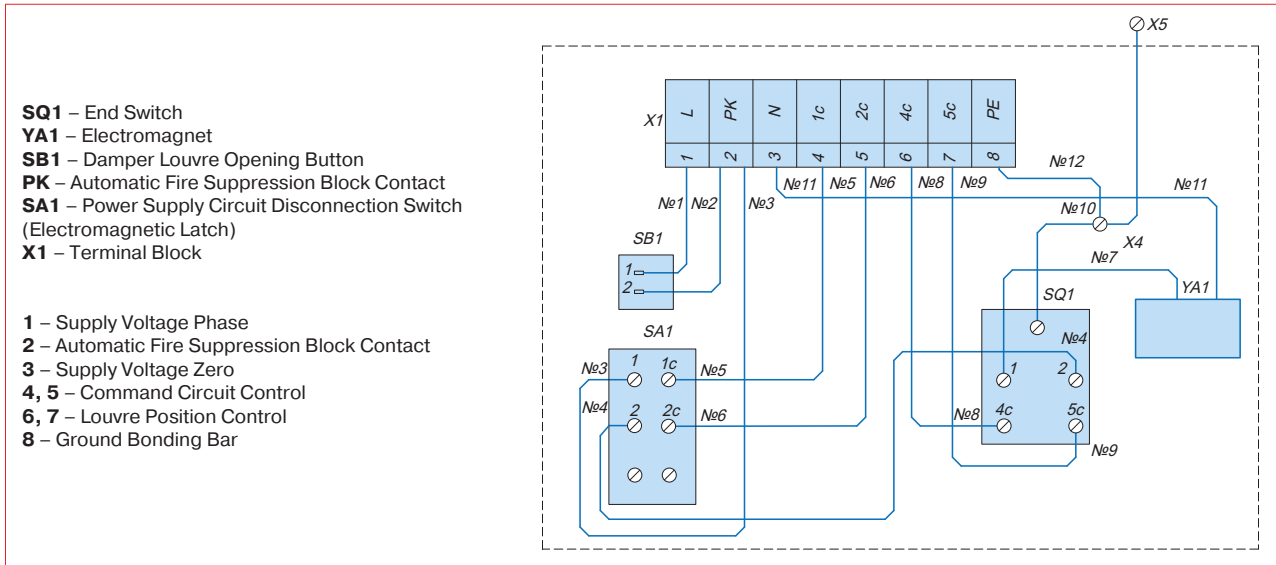
### ■ Technical Specifications of BE and BLE Electric Actuators

Technical Specifications	BE24	BLE24	BE230	BLE230
Rated Operation Voltage [V] / 50 Hz	24		230	
Permissible Operating Voltage Tolerance [V]	19.2...28.8		198...264	
Maximum Power Consumption in Louvre Open Position [W]	0.5	< 0.5	0.5	< 1
Maximum Power Consumption at Louvre Reset to Initial Position upon Damper Actuation [W]	12	7.5	8	5
Maximum Design Capacity [VA]	18	9	15	12
Protection Class	III		II	
IP Code	IP 54			
Auxiliary Switches	2xSPDT 3(0.5) A 250 V			
Electric Motor Line Cable	1 m. 3x0.75 mm <sup>2</sup>			
Auxiliary Switch Line Cable	1 m. 6x0.75 mm <sup>2</sup>			
Maximum Time for Louvre Reaching Operating (Protective) Position by Spring [s]	60	30	60	30
Maximum Time for Louvre Resetting to Initial Position by Electric Motor [s]	At least 10,000 duty cycles			
Service Life	Not Required			
Technical Maintenance	Not Required			

## MULTI-PURPOSE FIRE SAFETY SMOKE DAMPER

### KPD / KPDU Damper Electrical Connection Diagrams

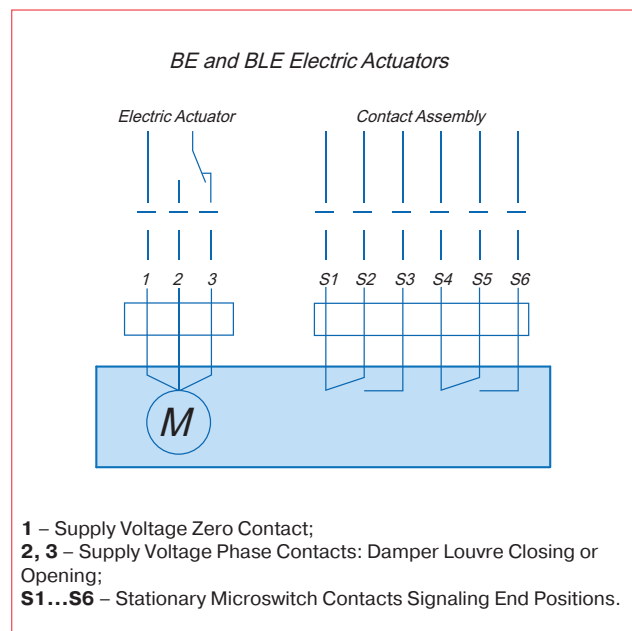
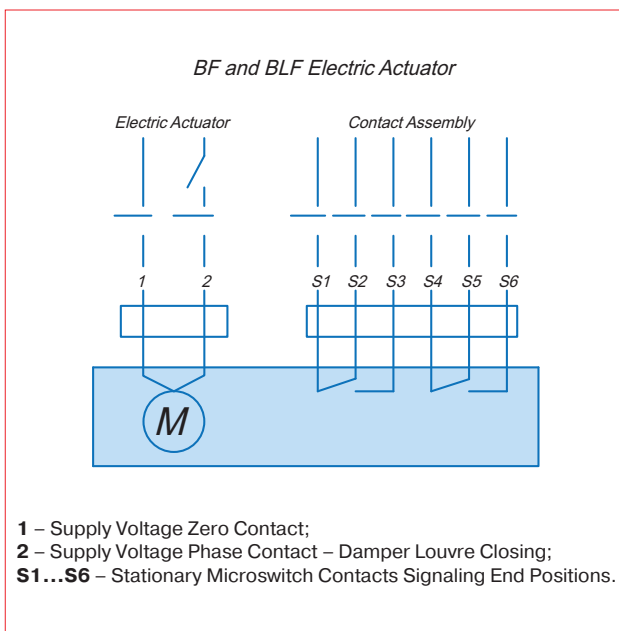
Electrical Connection Diagram for KPD / KPDU Dampers Equipped with an Electromagnet



### Main Technical Specifications of the Electromagnet

Rated Operation Voltage [V]	Alternating Current, 50 Hz	220
	Direct Current	24
Rated Power Consumption [W], max	at ~ 220 V	600
	at ~ 24 V	60
Climatic Variant		U3

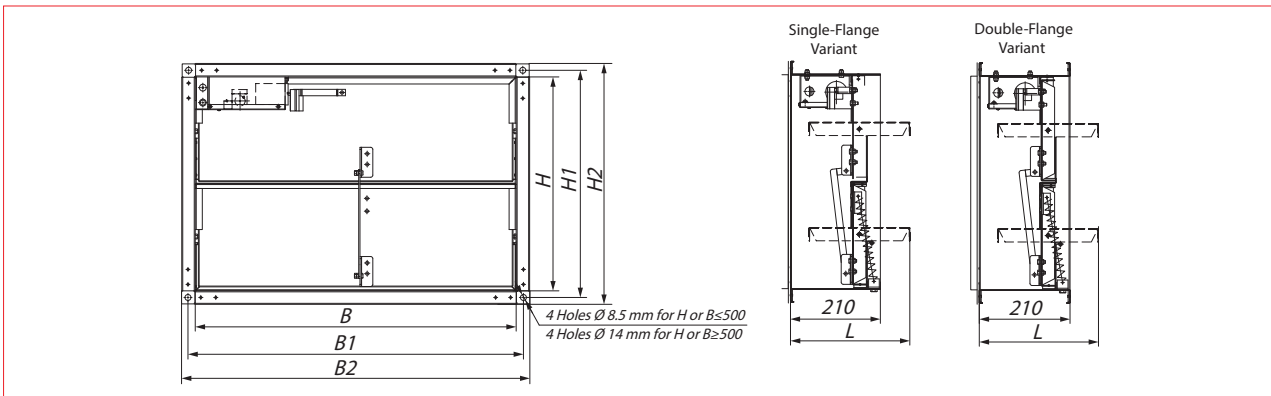
### Electrical Connections Diagram of KPD / KPDU Dampers with Belimo Electric Actuators



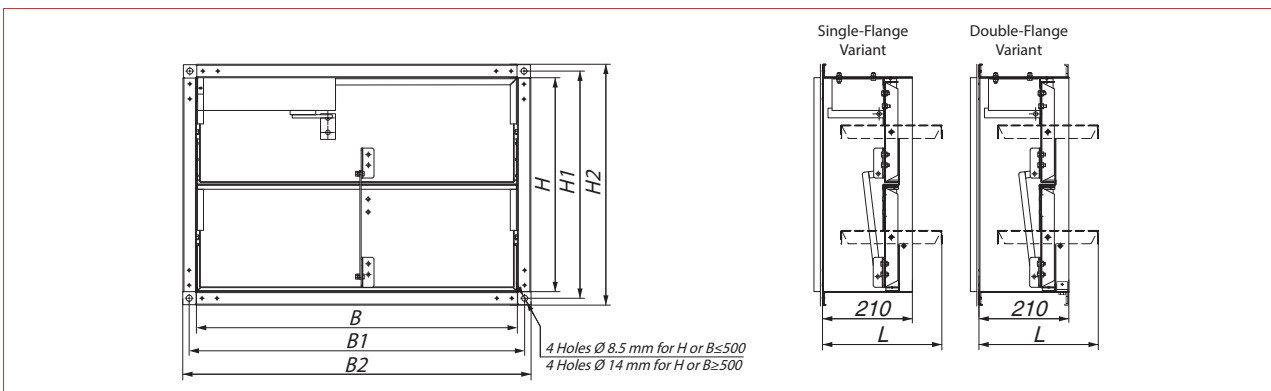
■ Outside and Connecting Dimensions of KPDU Multi-Louvre Dampers:

Standard Damper Size	Minimum Flow Area [m <sup>2</sup> ]	KPDU Size [mm]							Maximum KPDU Weight [kg]
		H	H1	H2	B	B1	B2	L	
400x400	0.12	400	420	440	400	420	440	298	9.5
500x500	0.2	500	520	540	500	520	540	297	12.1
600x600	0.31	600	630	660	600	630	660	348	17
700x700	0.43	700	730	760	700	730	760	398	20.3
800x800	0.55	800	830	860	800	830	860	448	24.1
900x900	0.71	900	930	960	900	930	960	498	27.4
1000x1000	0.9	1000	1030	1060	1000	1030	1060	548	31.7

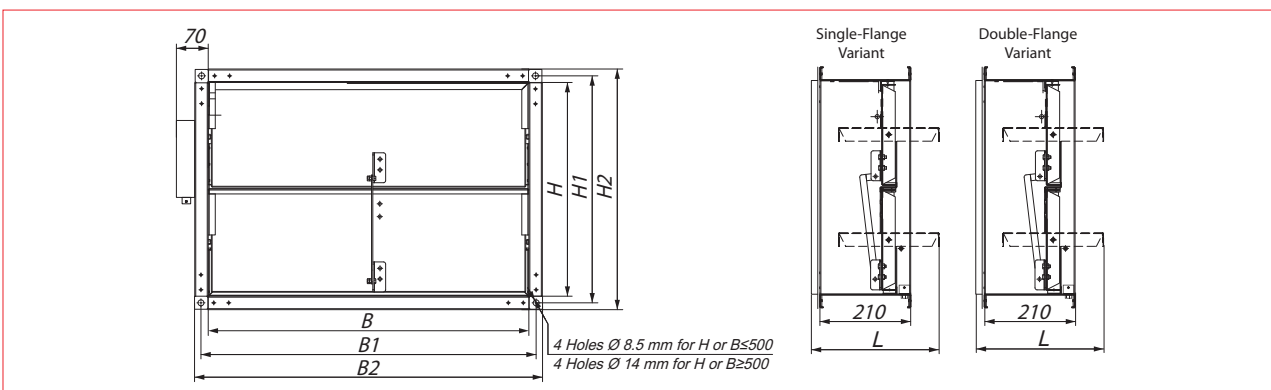
▶ KPDU Damper with Internal Electromagnet (220 or 24V), Single or Double Flange.



▶ KPDU Damper with Belimo Electric Actuator (230 or 24V) Inside the Damper, Single or Double Flange.



▶ KPDU Damper with External Belimo Electric Actuator (230 or 24V), Single or Double Flange.

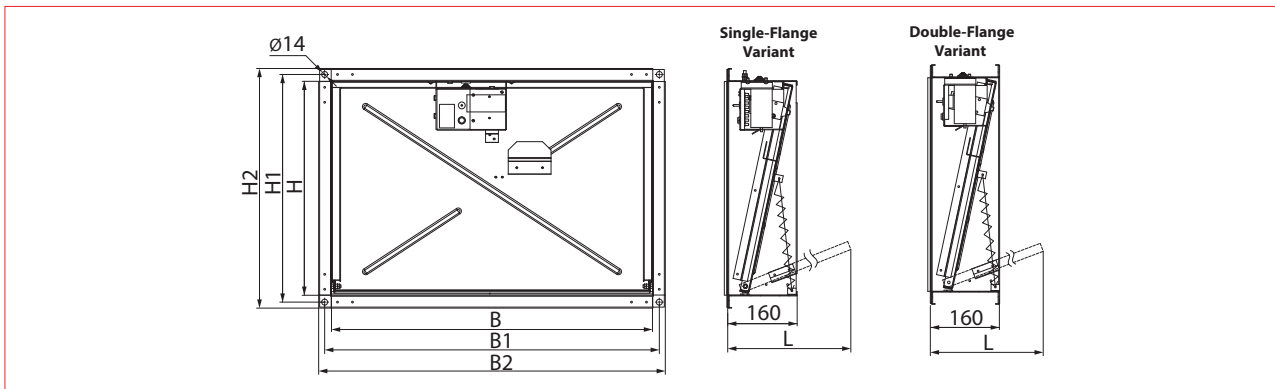


## MULTI-PURPOSE FIRE SAFETY SMOKE DAMPER

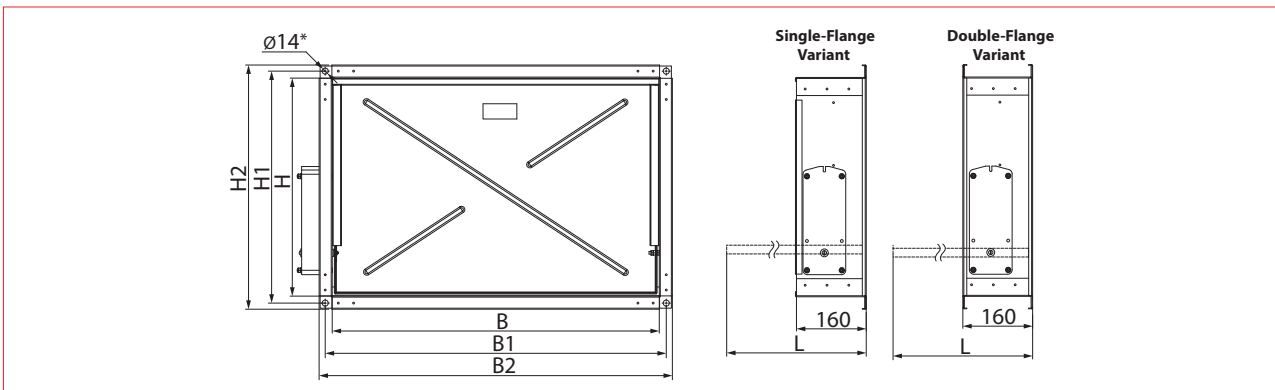
### KPD Single-Louvre Damper Dimensional and Mounting Sizes:

Standard Damper Size	Minimum Flow Area [m <sup>2</sup> ]	KPD Size, mm							Maximum KPD Weight [kg]
		H	H1	H2	B	B1	B2	L	
400x400	0.12	400	430	460	400	430	460	470	8.2
500x500	0.2	500	530	560	500	530	560	570	10.6
600x600	0.31	600	630	660	600	630	660	670	13.2
700x700	0.43	700	730	760	700	730	760	770	16
800x800	0.55	800	830	860	800	830	860	870	19
900x900	0.71	900	930	960	900	930	960	970	22.2
1000x1000	0.9	1000	1030	1060	1000	1030	1060	1070	25.6

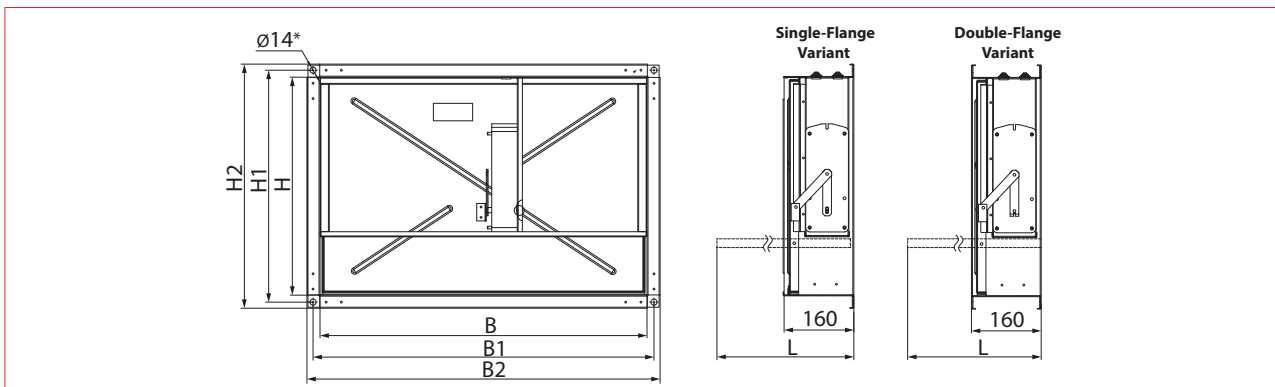
#### ▶ KPD Damper with Internal Electromagnet (220 or 24V), Single or Double Flange.



#### ▶ KPD Damper with External Belimo Electric Actuator (230 or 24V), Single or Double Flange.



#### ▶ KPD Damper with Internal Belimo Electric Actuator (230 or 24V), Single or Double Flange.



**Extra Accessories**

▶ **Vandal-Proof Mesh;**

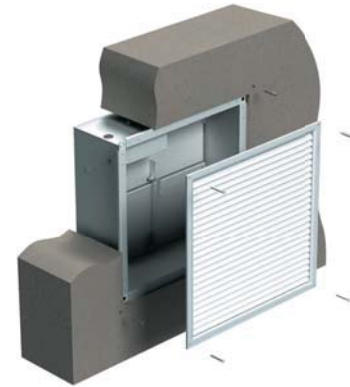


KPD/KPDU dampers can be equipped with a vandal-proof mesh.

▶ **Aluminium Decorative Fascia;**

The unit can be equipped with a decorative fascia made of aluminium for a more aesthetic appearance. The fascia has a single horizontal row of non-

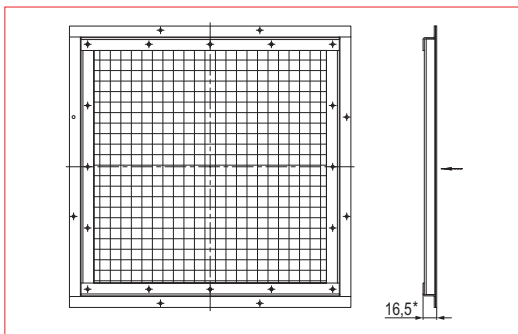
adjustable air flow guides fixed at 45 degrees. The fascia is given a polymer finish and anodised for extra protection against the weather elements. To enable the decorative fascia installation the damper must be embedded at least 40 mm deep into the wall as measured from the wall face to the damper flange.



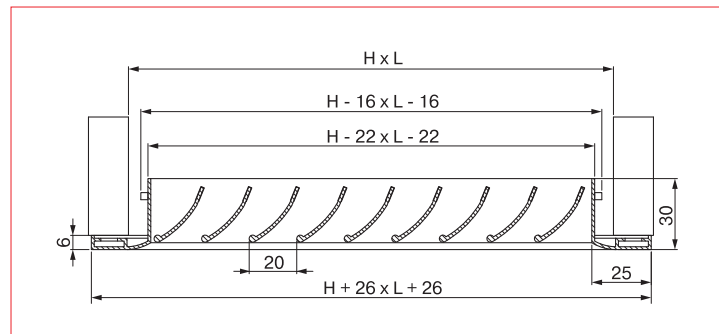
**Note:**

While selecting the aluminium decorative fascia mind the wall opening dimensions.

**Vandal-Proof Mesh**



**Aluminium Decorative Fascia**



**Effective Cross-Section Dimensions and Area [m<sup>2</sup>]**

Height H, mm	Length L, mm													
	100	150	200	250	300	350	400	450	500	600	700	800	900	1000
100	0.004	0.007	0.010	0.012	0.015	0.018	0.021	0.024	0.027	0.033	0.039	0.045	0.051	0.057
150	0.070	0.010	0.015	0.018	0.023	0.027	0.031	0.035	0.039	0.047	0.055	0.064	0.072	0.080
200	0.010	0.015	0.021	0.026	0.033	0.038	0.045	0.051	0.058	0.070	0.081	0.093	0.105	0.115
250	0.012	0.018	0.026	0.032	0.041	0.047	0.055	0.062	0.070	0.084	0.098	0.106	0.113	0.128
300	0.015	0.023	0.033	0.041	0.051	0.059	0.069	0.077	0.086	0.096	0.115	0.132	0.149	0.168
350	0.017	0.026	0.038	0.047	0.059	0.068	0.080	0.090	0.099	0.111	0.132	0.151	0.170	0.193
400	0.020	0.030	0.044	0.054	0.069	0.079	0.093	0.103	0.117	0.142	0.166	0.189	0.212	0.237
450	0.023	0.035	0.051	0.062	0.080	0.090	0.107	0.117	0.131	0.160	0.186	0.214	0.239	0.265
500	0.026	0.039	0.056	0.070	0.089	0.100	0.119	0.130	0.145	0.178	0.206	0.238	0.265	0.293
600	0.031	0.047	0.067	0.084	0.105	0.121	0.142	0.158	0.173	0.214	0.246	0.287	0.318	0.349
700	0.036	0.055	0.078	0.094	0.124	0.145	0.170	0.184	0.203	0.251	0.288	0.336	0.372	0.408
800	0.042	0.063	0.090	0.112	0.141	0.163	0.190	0.211	0.232	0.288	0.330	0.385	0.426	0.467
900	0.048	0.072	0.103	0.129	0.160	0.185	0.228	0.238	0.262	0.325	0.372	0.435	0.481	0.527
1000	0.053	0.079	0.113	0.141	0.177	0.204	0.239	0.266	0.292	0.361	0.414	0.484	0.536	0.587