

GERHMAN GLOBAL GMBH · SMOKE & FIRE SAFETY

SMOKETOP MSD-EU

Multi-Blade Smoke Control Damper · EN 12101-8



CONTENTS

CONTENTS

The SMOKETOP MSD-EU is a multi-blade smoke control damper for single-compartment smoke and heat control ventilation systems. It has been tested to EN 1366-10 by independent accredited notified bodies, classified in accordance with EN 13501-4 and CE marked to the European product standard EN 12101-8. The damper remains closed during normal ventilation operation and opens on command from the fire alarm or building management system, forming part of a mechanical smoke and heat exhaust ventilation system.

TWO MODEL TYPES

MSD-EU.DT

Duct type – universal 35 mm connection flange for in-line duct installation.

MSD-EU.ST

Wall / shaft type – adaptor casing prepared for a decorative front grille.

SIZE RANGE

Width 300 – 1200 mm
Height 200 – 1200 mm
Installation depth 250 mm max.

03	Applied standards and testing
04	Classification to EN 13501-4
05	Performance against EN 12101-8
06	MSD-EU.DT – construction and main components
07	MSD-EU.DT – dimensions and weights
08	MSD-EU.ST – construction
09	MSD-EU.ST – dimensions and weights
10	Pressure drop and sound power level
11	Operating principle
12	Actuators – Belimo
13	Actuators – Gruner
14	Installation and mounting
15	Mounting arrangements
16	Surface mounting outside the wall
17	Installation in masonry walls
18	Ordering, maintenance, transport and storage

APPLIED STANDARDS AND TESTING

TEST STANDARD

EN 1366-10

Fire resistance tests for service installations
– Smoke control dampers

CLASSIFICATION STANDARD

EN 13501-4

Classification using data from fire
resistance tests on components of smoke
control systems

PRODUCT STANDARD

EN 12101-8

Smoke and heat control systems – Smoke
control dampers. Basis of CE marking.

TESTS PERFORMED

TEST	SCOPE
Open / close cycling	100 open/close cycles at nominal supply voltage; 100 cycles at 10 % reduced supply; 100 cycles at 15% increased supply. Actuator performance and power consumption are verified at reduced and increased supply.
Casing leakage	Leakage through the damper casing under differential pressure.
Cold static test	Leakage and mechanical behaviour at ambient temperature, smallest and largest sizes.
Acoustic performance	Sound power level generated by the damper as a function of face velocity and pressure drop.
Aerodynamic performance	Pressure drop across the damper as a function of face velocity.
Air leakage calculation	Determination of leakage rate per unit face area, referred to the S-class limits.

Requirement for dampers operating in an emergency condition. To EN 1366-10, the actuator must complete the full cycling programme above without loss of function, so that reliable operation is demonstrated across the tolerance band of the supply voltage available in a real installation.

CLASSIFICATION TO EN 13501-4

CLASSIFICATION TO EN 13501-4

E₆₀₀ 120 (ved i ↔ o) S500 C300 AA single

DESIGNATION	MEANING	DEFINITION
E	Integrity	The damper must preserve the integrity of the building element (wall, slab) during the fire and must not allow flame to pass. To satisfy the E criterion the damper must retain its structural integrity.
600	Temperature	Temperature class at which integrity is demonstrated, in °C.
120	Duration	Period of fire resistance in minutes, as stated in the standard.
ved	Mounting position	Suitability for vertical installation, in both duct and wall applications.
i ↔ o	Direction	Tested for fire exposure from both directions (inside to outside and outside to inside).
S500	Leakage class	Dampers not exceeding the leakage limits given in the standard qualify for class S. For class S, the leakage of the smallest and largest damper sizes is assessed at a differential pressure of 500 Pa.
C300	Cycle class	Number of open/close cycles demonstrated without loss of function.
AA	Activation	Indicates that the damper is automatically activated.
single	Application	Single-compartment smoke control system.

Insulation performance (I) is not assessed: for dampers used solely for smoke control, insulation is not a required characteristic.

PERFORMANCE AGAINST EN 12101-8

Essential characteristics of the SMOKETOP MSD-EU assessed against the requirements of EN 12101-8.

ESSENTIAL CHARACTERISTIC	EN 12101-8 CLAUSE	PERFORMANCE CRITERION	MSD-EU PERFORMANCE
Integrity	4.1.1 a) · 4.3.1	Integrity maintained; no flame passage through the separating element	E
Duration of resistance	4.1.1 b) · 4.3.1	Declared period of fire resistance	120 minutes
Suitability for vertical installation (duct and wall)	4.1.1 c) · 4.3.1	Demonstrated in the declared mounting configurations	ved
Direction of fire exposure (both sides)	4.1.1 d)	Tested from both sides of the separating element	i ↔ o
Leakage class	4.1.1 e)	Leakage shall not exceed 200 m³/(h·m²)	S500
Cycle test	4.3.2.2	Declared number of open/close cycles without loss of function	C300
Automatic activation	4.3.2.1 and 4.3.2.2	Damper opens automatically on command from the fire protection system	AA
Enclosure	5.3 / A	Actuator protected against the effects of fire	Ca-Si enclosure

LEAKAGE LIMIT

200 m³/(h·m²)

Maximum permitted leakage per unit face area.

REFERENCE PRESSURE

500 Pa

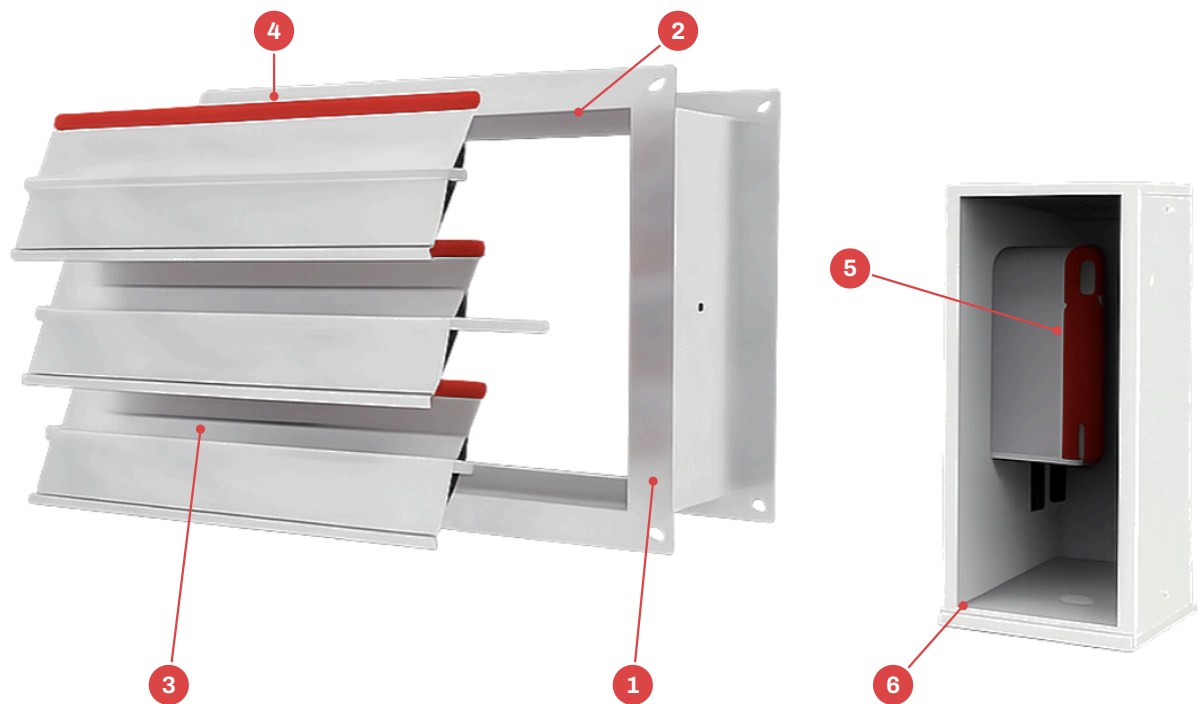
Differential pressure at which the S class is assessed.

CYCLES DEMONSTRATED

300

100 at nominal, 100 at -10% and 100 at +15% supply.

MSD-EU.DT DUCT TYPE CONSTRUCTION AND MAIN COMPONENTS



MAIN COMPONENTS

- | | | |
|----------|-----------------------|---------------------------|
| 1 Casing | 3 Blades | 5 Actuator |
| 2 Frame | 4 Heat-resistant seal | 6 Actuator protection box |

7 – Actuator service cover (not shown above): a front service cover is supplied as standard and a side service cover is available as an option. The orientation of the service cover may vary according to project requirements.

CASING

Manufactured from 1.5 mm galvanised steel sheet, with a universal 35 mm connection flange.

BLADES

Specially formed double-skin galvanised steel blades of 2.4 mm total thickness. The blades carry a high-temperature-resistant sealing gasket.

LEAKAGE PREVENTION

Against both cold and hot leakage the damper is provided with:

- heat-resistant seals at the blade edges and at the blade stops,
- stainless steel spring seals at the shaft-bearing edges,
- intumescent mastic reinforcement at the joints.

MECHANISM

The damper has a complete steel-linked mechanism which ensures that the blades move synchronously with one another.

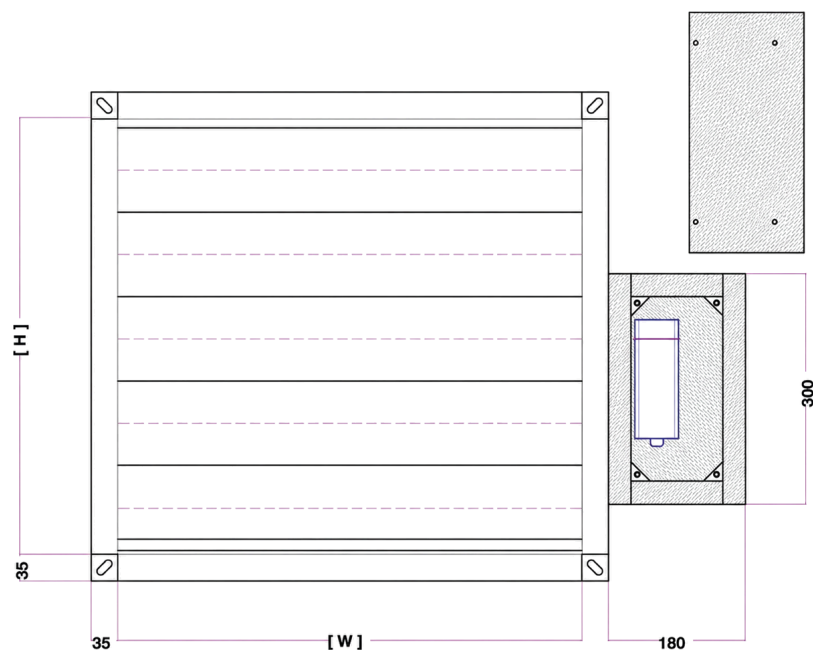
ACTUATOR AND ENCLOSURE

The damper is driven by a non-spring-return On/Off smoke control actuator. The actuator is housed in a calcium silicate (Ca-Si) protective enclosure so that it operates safely and continuously under fire conditions. The enclosure is provided with a cable entry and an easily removable service cover.

ORIENTATION

The damper may be installed independently of the actuator access direction. Separate left-hand and right-hand versions are not required.

MSD-EU.DT DUCT TYPE DIMENSIONS AND WEIGHTS

**WIDTH W****300 – 1200 mm****HEIGHT H****200 – 1200 mm****INSTALLATION DEPTH****250 mm max.******WEIGHT [KG]**

H \ W	300	400	500	600	700	800	900	1000	1100	1200
200	20	22	24	26	28	30	32	34	36	38
300	22	24	27	29	32	34	37	39	41	44
400	24	27	30	33	35	38	41	44	47	50
500	26	29	33	36	39	42	46	49	52	55
600	28	32	36	39	43	46	50	54	57	61
700	31	35	39	43	47	51	54	58	62	66
800	33	37	42	46	50	55	59	63	68	72
900	35	40	45	49	54	59	63	68	73	78
1000	37	42	47	53	58	63	68	73	78	83
1100	39	45	50	56	61	67	72	78	83	89
1200	42	48	53	59	65	71	77	83	89	94

All dimensions in mm. Connection flange 35 mm with universal fixing holes at the corners; actuator protection box 300 × 180 mm. A front service cover is supplied as standard and a side service cover is available as an option.

** Maximum dimension. Please contact Gerhman Global GmbH for other damper depths. Weights are indicative and include the damper casing, blade assembly, linkage and Ca-Si actuator enclosure. Sizes are available in 100 mm increments. Intermediate sizes on request.

MSD-EU.ST WALL / SHAFT TYPE CONSTRUCTION



CASING

Manufactured from 1.5 mm galvanised steel sheet, with a universal 35 mm connection flange. The casing incorporates an adaptor suitable for mounting a decorative front grille.

BLADES

Specially formed double-skin galvanised steel blades of 2.4 mm total thickness. The blades carry a high-temperature-resistant sealing gasket.

LEAKAGE PREVENTION

Against both cold and hot leakage the damper is provided with:

- heat-resistant seals at the blade edges and at the blade stops,
- stainless steel spring seals at the shaft-bearing edges,
- intumescent mastic reinforcement at the joints.

MECHANISM

The damper has a complete steel-linked mechanism which ensures that the blades move synchronously with one another.

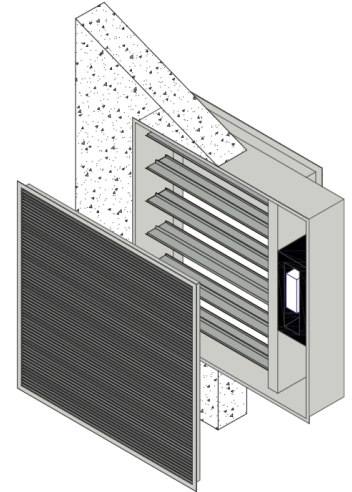
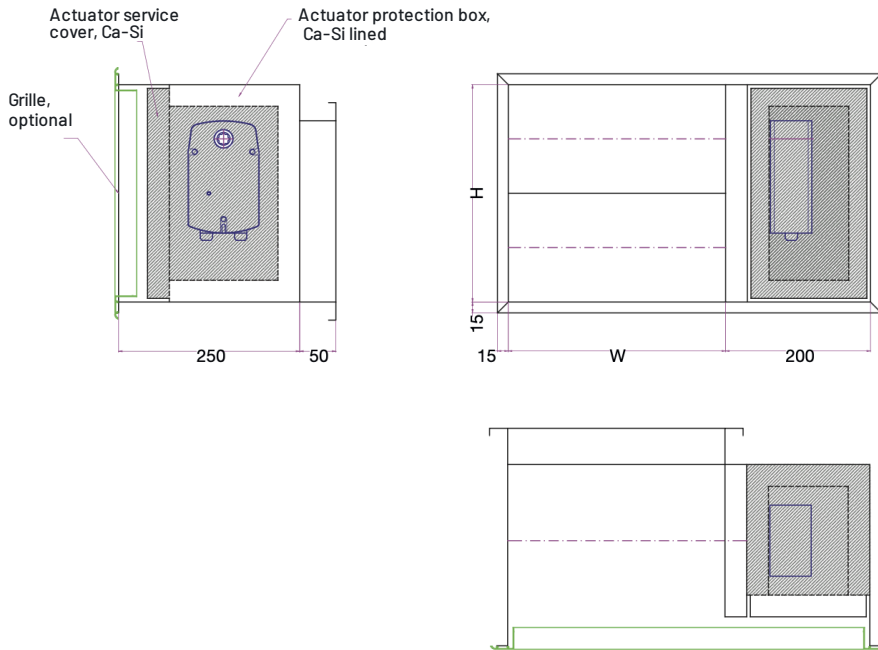
ACTUATOR AND ENCLOSURE

The damper is driven by a non-spring-return On/Off smoke control actuator. The actuator is housed in a calcium silicate (Ca-Si) protective enclosure so that it operates safely and continuously under fire conditions. The enclosure is provided with a cable entry and an easily removable service cover.

ORIENTATION

The damper may be installed independently of the actuator access direction. Separate left-hand and right-hand versions are not required.

MSD-EU.ST WALL / SHAFT TYPE DIMENSIONS AND WEIGHTS

**WIDTH W****300 – 1200 mm****HEIGHT H****200 – 1200 mm****INSTALLATION DEPTH****250 mm max.******WEIGHT [KG]**

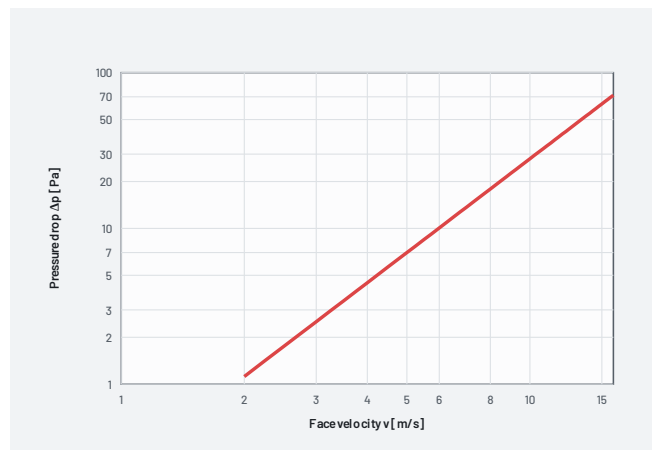
H \ W	300	400	500	600	700	800	900	1000	1100	1200
200	20	22	24	26	28	30	32	34	36	38
300	22	24	27	29	32	34	37	39	41	44
400	24	27	30	33	35	38	41	44	47	50
500	26	29	33	36	39	42	46	49	52	55
600	28	32	36	39	43	46	50	54	57	61
700	31	35	39	43	47	51	54	58	62	66
800	33	37	42	46	50	55	59	63	68	72
900	35	40	45	49	54	59	63	68	73	78
1000	37	42	47	53	58	63	68	73	78	83
1100	39	45	50	56	61	67	72	78	83	89
1200	42	48	53	59	65	71	77	83	89	94

All dimensions in mm. The front adaptor frame projects 15 mm beyond the nominal opening on each side, giving an overall face dimension of $(W + 30) \times (H + 30)$. The actuator is housed in a Ca-Si lined protection box closed by a Ca-Si service cover; a grille is available as an option.

** Maximum dimension. Please contact Gerhman Global GmbH for other damper depths. Weights are indicative and include the damper casing, blade assembly, linkage and Ca-Si actuator enclosure. Sizes are available in 100 mm increments. Intermediate sizes on request.

PRESSURE DROP AND SOUND POWER LEVEL

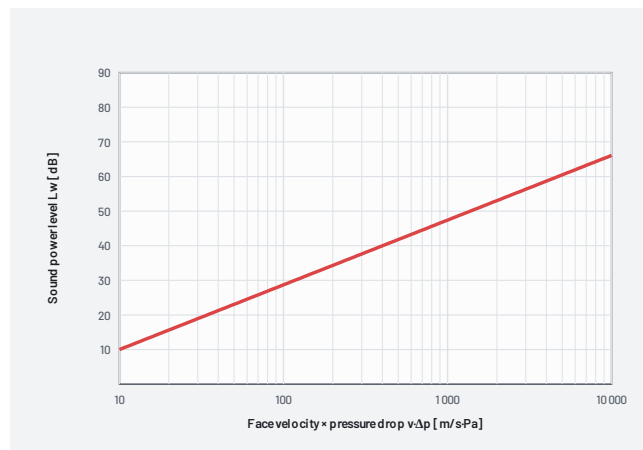
VELOCITY – PRESSURE DROP



PRESSURE DROP

The pressure drop across the fully open damper follows a square-law relationship with the face velocity. Face velocity is calculated on the nominal free face area $W \times H$.

SOUND POWER LEVEL



SOUND POWER LEVEL

The sound power level generated by the damper is read from the product of face velocity and pressure drop, $v \cdot \Delta p$, in m/s·Pa. Values are A-weighted sound power levels determined in accordance with ISO 3741 / ISO 3744.

WORKED EXAMPLE

STEP	VALUE
Damper size	1000 × 600 mm
Air flow	10 800 m ³ /h = 3.00 m ³ /s
Face velocity $v = Q / (W \times H)$	3.00 / 0.60 = 5.0 m/s
Pressure drop Δp (from chart)	7 Pa
$v \cdot \Delta p$	35 m/s·Pa
Sound power level L_w (from chart)	20 dB

Performance curves are valid for the fully open damper installed with straight duct runs upstream and downstream. Values in the worked example are rounded.

OPERATING PRINCIPLE

Under a typical fire scenario the SMOKETOP MSD-EU multi-blade smoke control damper is closed while the ventilation system is in normal operation.

01

NORMAL OPERATION

The ventilation system runs normally and the smoke control damper remains in the closed position.

02

ALARM

On fire or emergency, a command is received from the fire control panel, the building management system or from detectors. The ventilation system is taken out of service.

03

SMOKE EXHAUST

The smoke exhaust scenario starts. The dampers serving the affected floor or floors receive the command and open automatically.

04

MONITORING

OPEN / CLOSED position is reported through the microswitches integrated in the actuator and can be monitored continuously.

Control of the actuator shall be provided by the fire protection system. The damper is not intended to be controlled from the comfort ventilation control system.

NOTE

Operating principles may differ according to the project details and the fire strategy adopted for the building. The sequence above is indicative only and shall be co-ordinated with the fire engineering design for each project.

ACTUATORS

BELIMO

ACTUATOR TYPE	BLE 24	BLE 230	BE 24	BE 230
Nominal voltage	AC 24 V, 50/60 Hz DC 24 V	AC 230 V 50/60 Hz	AC 24 V, 50/60 Hz DC 24 V	AC 230 V 50/60 Hz
POWER CONSUMPTION				
In operation	7.5 W	5 W	12 W	8 W
In standby	< 0.5 W	< 1 W	0.5 W	0.5 W
Power for cable sizing	9 VA (I max 2.7 A @ 5 ms)	12 VA (I max 6 A @ 5 ms)	18 VA (I max 8.2 A @ 5 ms)	15 VA (I max 7.9 A @ 5 ms)
Protection class	III	II	III	II
Degree of protection	IP 54	IP 54	IP 54	IP 54
Running time motor	< 30 s / 90°	< 30 s / 90°	< 60 s / 90°	< 60 s / 90°
Torque motor	15 Nm	15 Nm	40 Nm	40 Nm

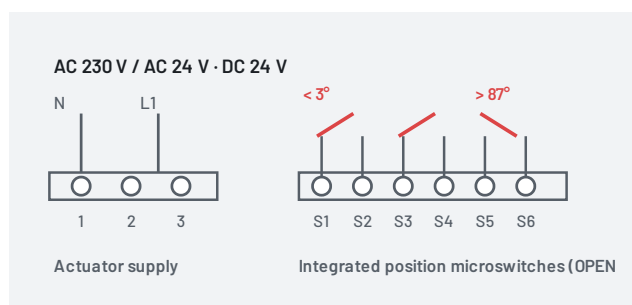
ACTUATOR SELECTION

W → H ↓	300	400	500	600	700	800	900	1000	1100	1200
200										
300										
400										
500										
600										
700										
800										
900										
1000										
1100										
1200										

BLE 24 / BLE 230 – 15 Nm
 BE 24 / BE 230 – 40 Nm

Rows: nominal height H [mm]. Columns: nominal width W [mm].

CONNECTION



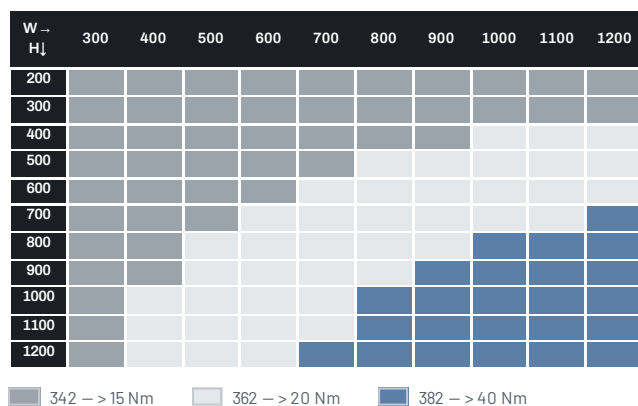
The actuator is supplied without spring return. Position feedback is taken from the integrated microswitches. Control of the actuator shall be provided by the fire protection system.

ACTUATORS

GRUNER

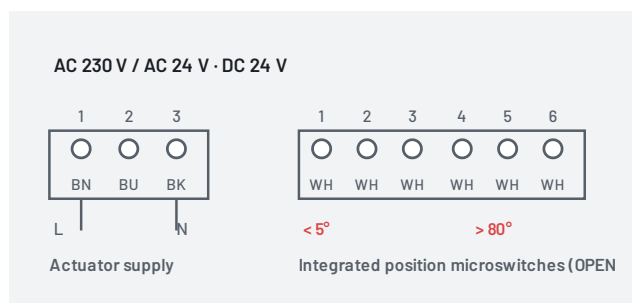
ACTUATOR TYPE	342-024	342-230	362-024	362-230	382-024	382-230
Nominal voltage	AC 24 V DC 24 V	AC 230 V 50/60 Hz	AC 24 V DC 24 V	AC 230 V 50/60 Hz	AC 24 V DC 24 V	AC 230 V 50/60 Hz
POWER CONSUMPTION						
In operation	7 W	7 W	4 W	3 W	8 W	8.5 W
In standby	1.5 W	1.5 W	1.5 W	1.5 W	1.5 W	1.5 W
Power for cable sizing	9.5 VA	12 VA	6 VA	7 VA	10 VA	15.5 VA
Protection class	III	II	III	III	III	II
Degree of protection	IP 54	IP 54	IP 54	IP 54	IP 54	IP 54
Running time motor	< 30 s / 90°	< 30 s / 90°	< 60 s / 90°	< 60 s / 90°	< 60 s / 90°	< 60 s / 90°
Torque motor	> 15 Nm	> 15 Nm	> 20 Nm	> 20 Nm	> 40 Nm	> 40 Nm

ACTUATOR SELECTION



Rows: nominal height H [mm]. Columns: nominal width W [mm].

CONNECTION



The actuator is supplied without spring return. Position feedback is taken from the integrated microswitches. Control of the actuator shall be provided by the fire protection system.

INSTALLATION AND MOUNTING

The SMOKETOP MSD-EU multi-blade smoke control damper may be installed in concrete walls, in slabs and ceilings, and on ductwork outside the wall.

INSTALLATION REQUIREMENTS

- Installation depth including the connection flange: **250 mm maximum** – other damper depths available on request
- Connection to the duct system is made with a **35 mm flange** having universal connection holes at the corners
- Solid wall installation: minimum required wall thickness **100 mm** (density > 500 kg/m³)
- Slab installation: minimum required thickness **150 mm** (density > 600 kg/m³)
- Minimum clear distance from load-bearing elements: **75 mm**

FILLING THE SURROUNDING GAP

- The gap remaining around the damper shall be filled with a fire-stopping material, or with an equivalent material providing 2 hours of fire insulation, or fixed with concrete
- Filling materials having fire insulation properties should be preferred, because in a fire condition they accommodate the thermal expansion of the damper
- Where the damper is mounted on the face of the wall, a supporting structure shall be fitted and the space between the damper and the wall shall be insulated with thermal insulation material

FIRE-RESISTING CONSTRUCTION

The certified performance of the SMOKETOP MSD-EU is guaranteed when the damper is installed in walls of at least 100 mm thickness and at least 120 minutes fire resistance, or in slabs of at least 150 mm thickness and at least 120 minutes fire resistance.

ORIENTATION

Dampers can be positioned independently of the direction from which the actuator is accessed. Separate right-hand or left-hand versions are not required.

BLADE POSITION

In the open position the blades do not project beyond the damper casing.

ACTUATOR SERVICE COVER

A front service cover is supplied as standard; a side service cover is available as an option. The orientation of the service cover may vary according to project requirements.

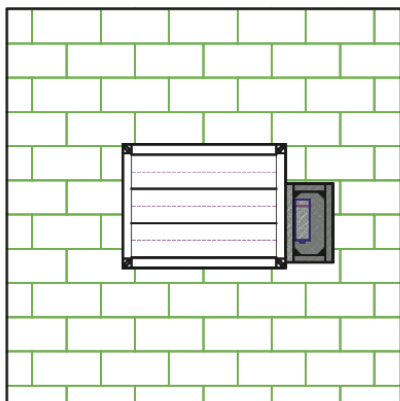
MORTAR

Use mortar of class M10 or higher, suitable for use in fire-resisting construction, to EN 998-2, to fill the gap around the damper.

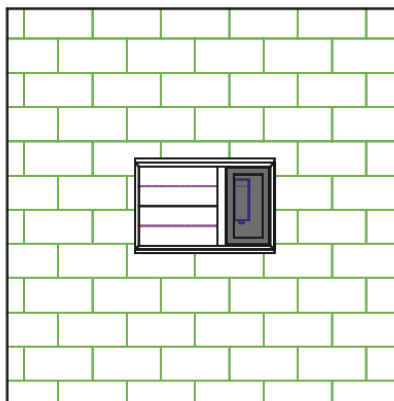
MOUNTING ARRANGEMENTS

Both model types may be installed with the actuator enclosure at the side of, or on top of, the damper casing.

ACTUATOR AT SIDE

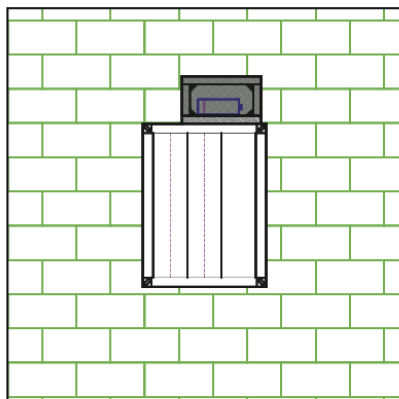


MSD-EU.DT Duct type

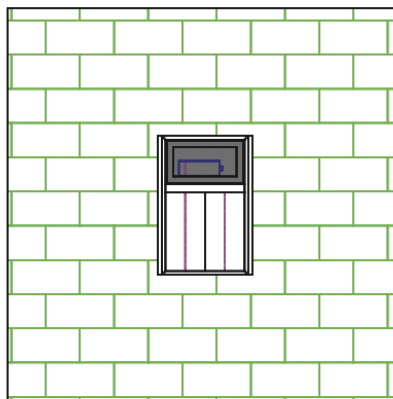


MSD-EU.ST Wall / shaft type

ACTUATOR ON TOP



MSD-EU.DT Duct type



MSD-EU.ST Wall / shaft type

CA-SI PANEL

The actuator is protected by a calcium silicate enclosure. A removable service cover gives access to the actuator and to the cable entry without disturbing the installation.

SENSOR PROVISION

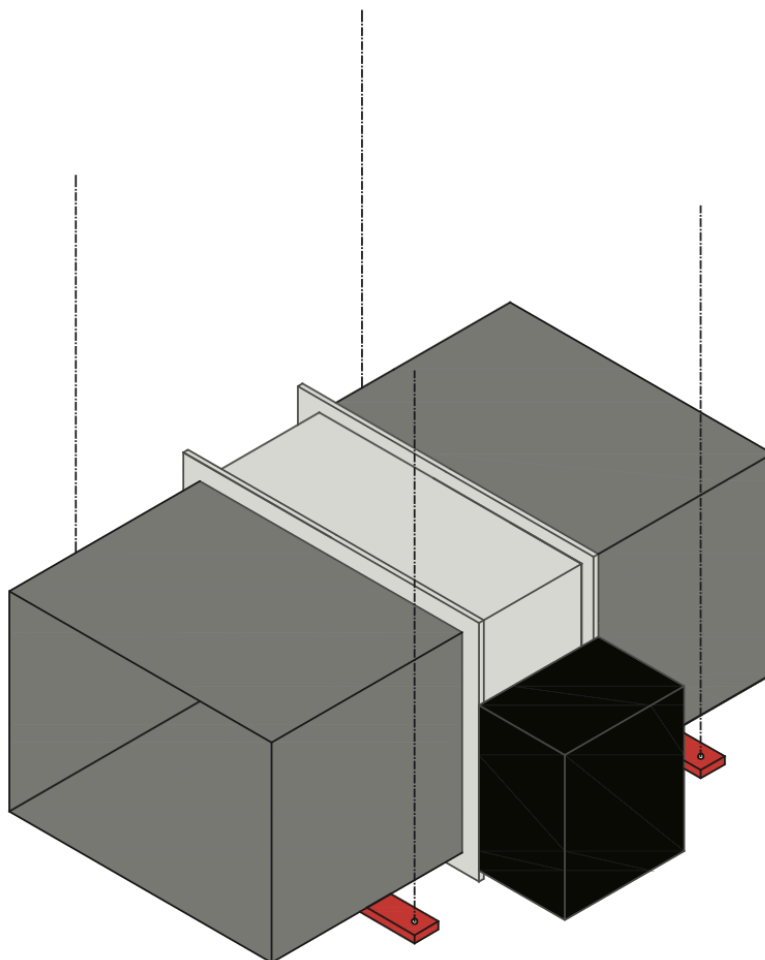
The enclosure is prepared to receive additional sensors where these are required by the fire strategy.

MOUNTING KIT

A mounting kit is not required for the MSD-EU.ST wall / shaft type.

SURFACE MOUNTING OUTSIDE THE WALL

Where the damper is mounted on the face of the wall, on the ductwork rather than within the wall opening, a supporting structure is required.



REQUIREMENTS

- A supporting structure shall be fitted to carry the weight of the damper
- The space between the damper casing and the wall face shall be insulated with thermal insulation material
- The wall shall be at least 100 mm thick with at least 120 minutes fire resistance

NOTES

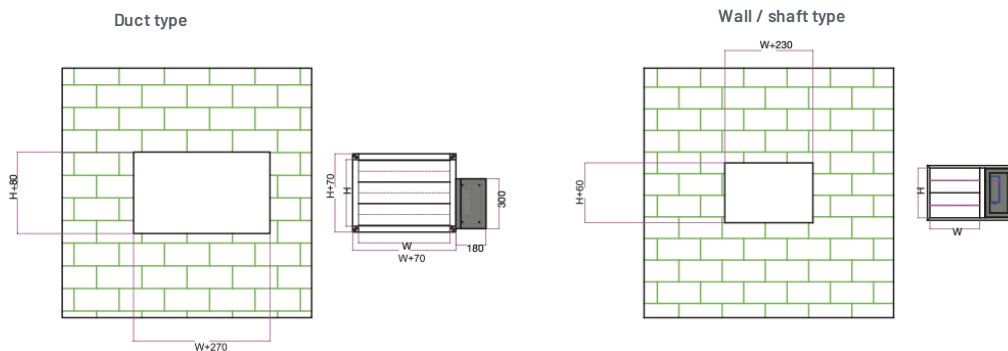
The damper shall not impose load on the duct system. Duct connections are made with the universal 35 mm flange at each end of the casing.

Access to the actuator service cover shall be maintained after installation.

INSTALLATION IN MASONRY WALLS

The SMOKETOP MSD-EU guarantees its certified performance when installed in walls of at least 100 mm thickness having at least 120 minutes fire resistance.

1. Wall opening



2. Positioning the damper



3. Final filling



WALL OPENING

MODEL TYPE	OPENING
MSD-EU.DT duct type	$(W + 270) \times (H + 80)$ mm
MSD-EU.ST wall / shaft type	$(W + 230) \times (H + 60)$ mm

The opening allows for the 35 mm connection flange on each side, the actuator protection box and a nominal fitting clearance.

MORTAR

Fill the gap around the damper with mortar of class M10 or higher to EN 998-2, suitable for use in fire-resisting construction. Place the damper so that the blade assembly remains within the thickness of the wall.

Concrete slabs. The same sequence and the same opening dimensions apply to installation in concrete slabs of at least 150 mm thickness having at least 120 minutes fire resistance. Maintain a minimum clear distance of 75 mm from load-bearing elements.

ORDERING, MAINTENANCE TRANSPORT AND STORAGE

ORDERING

When ordering, state the **model type** (MSD-EU.DT duct type or MSD-EU.ST wall / shaft type), the **nominal width W** and **nominal height H** in mm, the **actuator make and supply voltage**, and any accessories required. A decorative front grille is available as an option for the MSD-EU.ST and is despatched together with its frame. Sizes are available in 100 mm increments; intermediate sizes and damper depths other than the 250 mm maximum are available on request.

MAINTENANCE

The surface protection applied to the components of the SMOKETOP MSD-EU multi-blade smoke control damper, together with the quality of the materials used, secures durable and reliable operation.

The multi-blade smoke control damper does not require special maintenance. However, in order to ensure correct closing and tightness, continuous cleaning of the damper blades is mandatory.

Although the dampers are safe and durable components, a functional check every six months is recommended. Where a monitoring system is installed, this check can be carried out remotely from the actuators and their limit switch sensors.

RECOMMENDED INTERVAL

6 months

Functional check of each damper.

TRANSPORT AND STORAGE

SMOKETOP MSD-EU multi-blade dampers shall be transported facing upwards or downwards, that is with the damper blades parallel to the pallet.

To prevent damage, actuators fitted with protective enclosures shall be secured to the pallet with straps so that they cannot move.

Where more than one damper is despatched, dampers may be stacked one above another to save space, after turning the actuators to face one another.

Dampers may be stored indoors and shall be protected against humidity and impact.

STORAGE CONDITIONS

- Indoors only
- Protected against humidity
- Protected against impact
- Blades parallel to the pallet

SMOKETOP MSD-EU

Multi-blade smoke control damper for single-compartment smoke and heat control ventilation systems. Tested to EN 1366-10, classified to EN 13501-4, CE marked to EN 12101-8.



Gerhman Global GmbH
www.gerhman.com

Technical data are subject to change without notice. All dimensions in mm unless otherwise stated. Performance data apply to the fully open damper under the test conditions of the referenced standards.