

S-SA2 & S-SA2L

Smoke Control Dampers - AAmulti

User Manual



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Good to know

Current information on all fire safety products is available at design.systemair.com

Introduction

These are the original installation, inspection and operating instructions for the S-SA2 and S-SA2L smoke control dampers.
EVERY S-SA2 AND S-SA2L SMOKE DAMPER NEEDS TO BE INSTALLED IN ACCORDANCE WITH THIS DOCUMENT!

S-SA2

Rectangular smoke control damper without mesh for wall and ceiling installations.

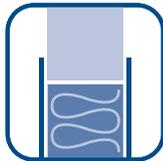
Dimension range (mm):

$W \times H = 200 \times 200$ up to 1600×1000



① Wet Installation

Maximum performance up to EI120S
Using concrete filling



③ Installation into a Soft Crossing (up to Size 1000×800 mm)

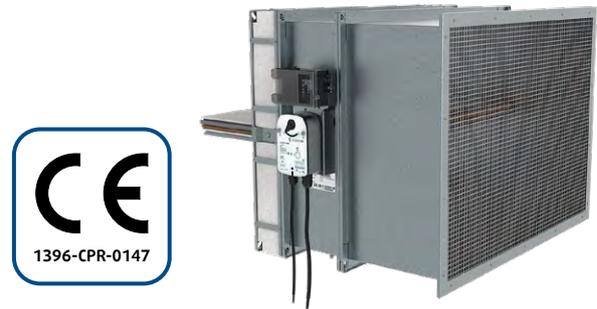
Maximum performance up to EI90S
Using mineral wool filling

S-SA2L

Rectangular smoke control damper with a mesh-fitted extension duct suited for vertical or horizontal duct installations.

Dimension range (mm):

$W \times H = 200 \times 200$ up to 1600×1000



L1V Installation on the Vertical Duct with a Ledge

L2V Installation Directly on the Vertical Duct

L1H Installation on the Horizontal Duct with a Ledge

L2H Installation Directly on the Horizontal Duct

Warnings

Some damper parts may have sharp edges; therefore, to protect yourself, please use gloves during damper installation and manipulation. In order to prevent electric shock, fire or any other damage which could result from incorrect damper usage and operation, it is important to:

1. ensure that installation is performed by a trained person.
2. follow the written and depicted instructions provided within this User Manual closely.
3. perform damper inspection in accordance with this User Manual.
4. check the damper's functionality as per the [☞ "Smoke Damper Functionality Check"](#) chapter before you install the smoke damper. This procedure prevents the installation of a damper that has been damaged during transportation or handling.

IMPORTANT: Do not install non-functioning dampers!

Operating Conditions

S-SA2 and S-SA2L smoke dampers are intended:

- for installation in places which are protected against weather disruptions.
- for ducts, distributing air without any mechanical or chemical contamination.
- for a maximum air flow velocity 12 m/s.
- for a storage temperature range of -20°C to 50°C.

List of Accessories

- D1-S-SA2: Duct Extension with Mesh for S-SA2
- K1-S-SA2L: Kit for Sheet-Metal Duct Installation

Installation

- The duct connected to the smoke damper must be supported or hung in such a way that the damper does not carry its weight. The damper must not support any part of the surrounding construction or wall which could cause damage and consequent damper failure.
- The damper driving mechanism can be placed on either side of the wall, however, it needs to be situated to ensure easy access during inspection.
- According to the EN 1366-2 standard, the distance between the smoke damper bodies must be at least 200 mm.
- According to the EN 1366-2 standard, the distance between smoke damper and the adjacent wall/ceiling and the smoke damper must be at least 75 mm.
- The S-SA2 smoke damper must be installed into a smoke and fire partition structure in such a way that the damper blade is located inside this structure in its closed position. To help you find the suspension plane, a bendable hinge is provided on the damper body. This condition does not apply for S-SA2L.
- The gap in the installation opening between the smoke damper and the wall/ceiling can be increased by up to 50% of the gap area, or decreased to the smallest amount possible that still provides sufficient space for the installation of the seal.
- The gap between the damper blade in the open position and the self-standing grill (when installed) must be at least 200 mm according to EN 1366-10. Otherwise, the damper must be tested together with the grill.
- The smoke damper must be earthed after being installed into or onto the duct.
- Lists of all permitted installation methods are provided on the following pages. Every method only applies to those damper types that are listed in the corresponding paragraph's heading.

Installation Methods

All S-SA2 and S-SA2L smoke dampers are CE certified according to EN 12101-8:2011, tested according to EN 1366-10 :2011+A1:2017, and classified according to EN 13501-4:2016.

The smoke damper, together with its installation, form an inseparable part of the fire resistivity rating.

Tab. 1: S-SA2 fire resistivity

| Dimension Range (mm) | Certificate No. | Product Type | Classification | Supporting Construction | Construction Type/Minimal Thickness (mm) | |
|-----------------------------------|--|--------------|--|-------------------------|--|--|
| | | | | |  1A 1B 1C Wet |  3A 3B 3C Soft |
| 200 × 200 up to 1000 × 800 |  1396 - CPR - 0112 | S-SA2 | EI90 ($v_{ew, i} \leftrightarrow o$) S1500 C_{mod} AAmulti | ve | Rigid/150 Flexible/150 | Rigid/150 Flexible/150 |
| 200 × 200 up to 1600 × 1000 | | | EI120 ($v_{ew, i} \leftrightarrow o$) S1500 C_{mod} AAmulti | ve | | - |
| | | | EI120 ($h_{ow, i} \leftrightarrow o$) S1500 C_{mod} AAmulti | ho | Rigid/150 | - |
| Allowed Blade Axis Orientation | | | | |  | |
| | | | | |  | |

Tab. 2: S-SA2L fire resistivity

| Dimension Range (mm) | Certificate No. | Product Type | Classification | Supporting Construction | Applicable Duct Tested per Standard | | | |
|-----------------------------------|--|--------------|--|-------------------------|---|--|---|--|
| | | | | |  L1H L2H On the Duct/ Bottom Mounted |  L1H L2H On the Duct/ Top Mounted |  L1V L2V L1H L2H On the Duct/ Side Mounted |  In the Duct/ Horizontal Axis |
| 200 × 200 up to 1600 × 1000 |  1396 - CPR - 0147 | S-SA2L | EI120 ($v_{ed, i} \leftrightarrow o$) S1500 C_{mod} AAmulti | ve | EN 1366-9, EN 1366-8 | EN 1366-9, EN 1366-8 | EN 1366-9, EN 1366-8 | - |
| | | | EI120 ($h_{od, i} \leftrightarrow o$) S1500 C_{mod} AAmulti | ho | - | - | EN 1366-9, EN 1366-8 | - |
| Allowed Blade Axis Orientation | | | | |  | | | |
| | | | | |  | | | |

Legend

| | |
|---|--|
| ve | Vertical supporting construction (wall, horizontal duct) |
| ho | Horizontal supporting construction (floor/ceiling, vertical duct) |
|  | ① Wet Installation |
|  | ③ Installation into a soft crossing |
|  | Damper placed on duct surface, bottom side of the duct |
|  | Damper placed on duct surface, top side of the duct |
|  | Damper placed on duct surface, left and right side of the duct |
|  | Damper placed within the duct canal, outside of supporting construction |
| L1V | Installation of S-SA2L on the vertical duct with a ledge |
| L2V | Installation of S-SA2L directly on the vertical duct |
| L1H | Installation of S-SA2L on the horizontal duct with a ledge |
| L2H | Installation of S-SA2L directly on the horizontal duct |
|  | Damper's horizontal blade axis orientation - mechanism can be placed on either side |
|  | Damper's vertical blade axis orientation - mechanism can be placed on top and bottom. |

Opening Preparation for S-SA2 Installation

The S-SA2 smoke damper can be installed in a wall or ceiling between zones classified as “multi-multi”, “multi-single” and “single-multi”.

Opening Preparation for a Rigid Wall

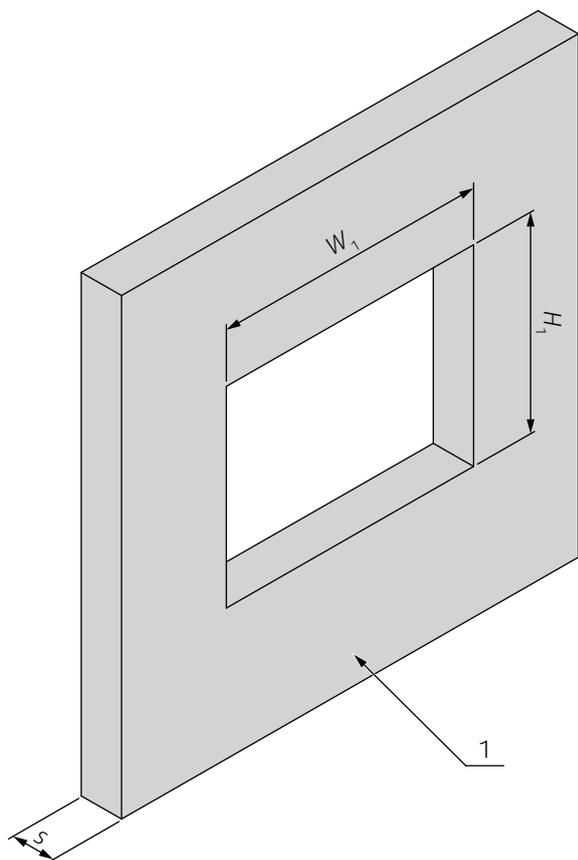


Fig. 1: Rigid wall/ceiling with a rectangular opening
 NOTE: Dimensions W_1 and H_1 are defined in every installation

Legend

| | |
|---|------------------------------------|
| 1 | Concrete/Masonry/Cellular Concrete |
|---|------------------------------------|

Tab. 3: Thickness of tested wall

| Fire Resistivity | Minimum s (mm) | |
|------------------|------------------------------------|---------|
| | Wall | Ceiling |
| 90 | Concrete/Masonry/Cellular Concrete | |
| 120 | 150 ± 10 | |

Opening Preparation for a Flexible Wall

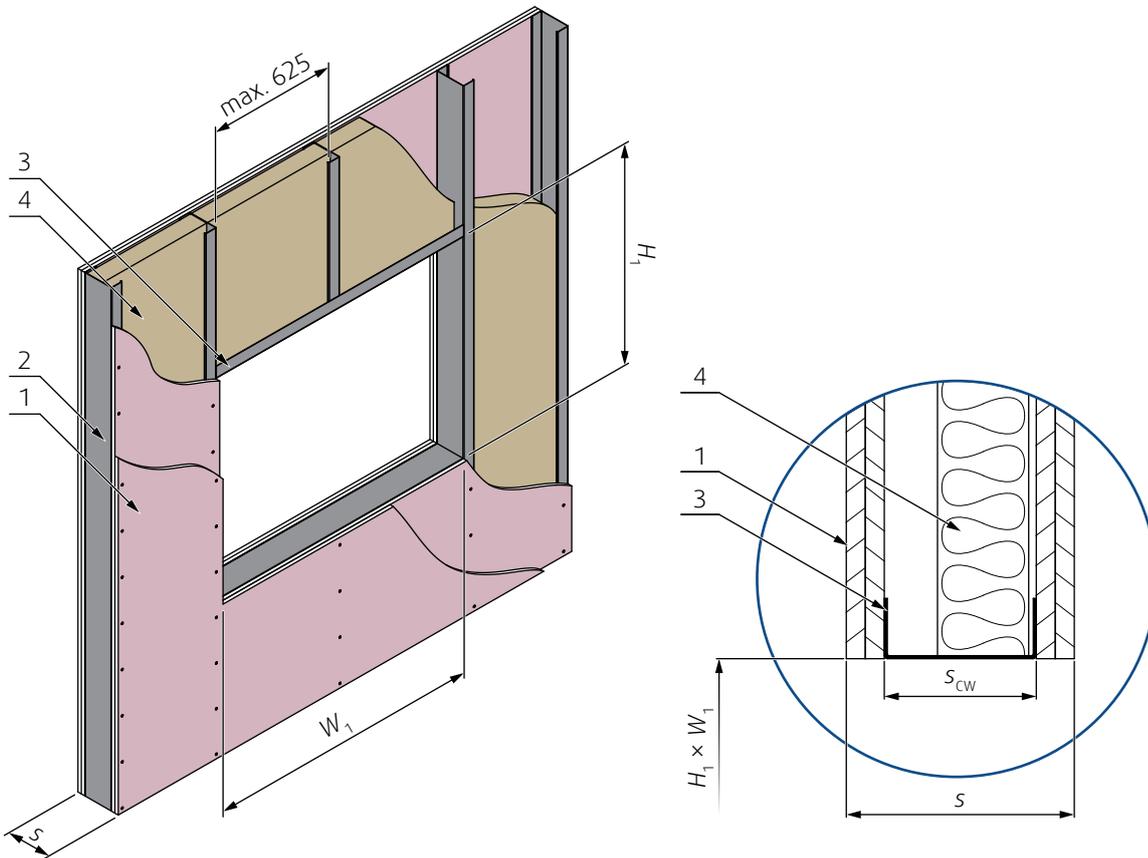


Fig. 2: Flexible (plasterboard) wall with a rectangular opening and vertical cross-section (right)

Legend

| | |
|---|---|
| 1 | On each side - 2 layers of plasterboard fireproof plate type F, EN 520 (thickness see Tab. 4) |
| 2 | Vertical CW-profiles (profiles with s_{CW} based on fire resistivity, see Tab. 4) |
| 3 | Horizontal CW-profiles (profile with s_{CW} based on fire resistivity, see Tab. 4) |
| 4 | Mineral wool; thickness/cubic density see Tab. 4) |

Tab. 4: Thickness of tested wall

| Fire Resistivity | Minimum s | Minimum s_{CW} | Allowed Metal Stud Group | Thickness of Plasterboards | Insulation | |
|------------------|-------------|------------------|--------------------------|----------------------------|------------|----------------------|
| | (mm) | | | | Thickness | Cubic Density |
| | (mm) | | | (mm) | | (kg/m ³) |
| 90 | 150 | 100 | C | 12,5 | 60 ... 70 | 80 ... 115 |
| 120 | | | | | | 85 ... 115 |

Standard Distances Between Damper Bodies

According to the EN 1366-2 standard, the minimum distance from the wall or ceiling to the damper body is 75 mm. For multiple crossings through a fire resistive wall, the minimum distance between two damper bodies is 200 mm. This applies for distances between the damper body and a nearby foreign object crossing the fire resistive wall. Damper clearances vary from the type of mechanism and their rotation (please see Fig. 3 and see Tab. 5).

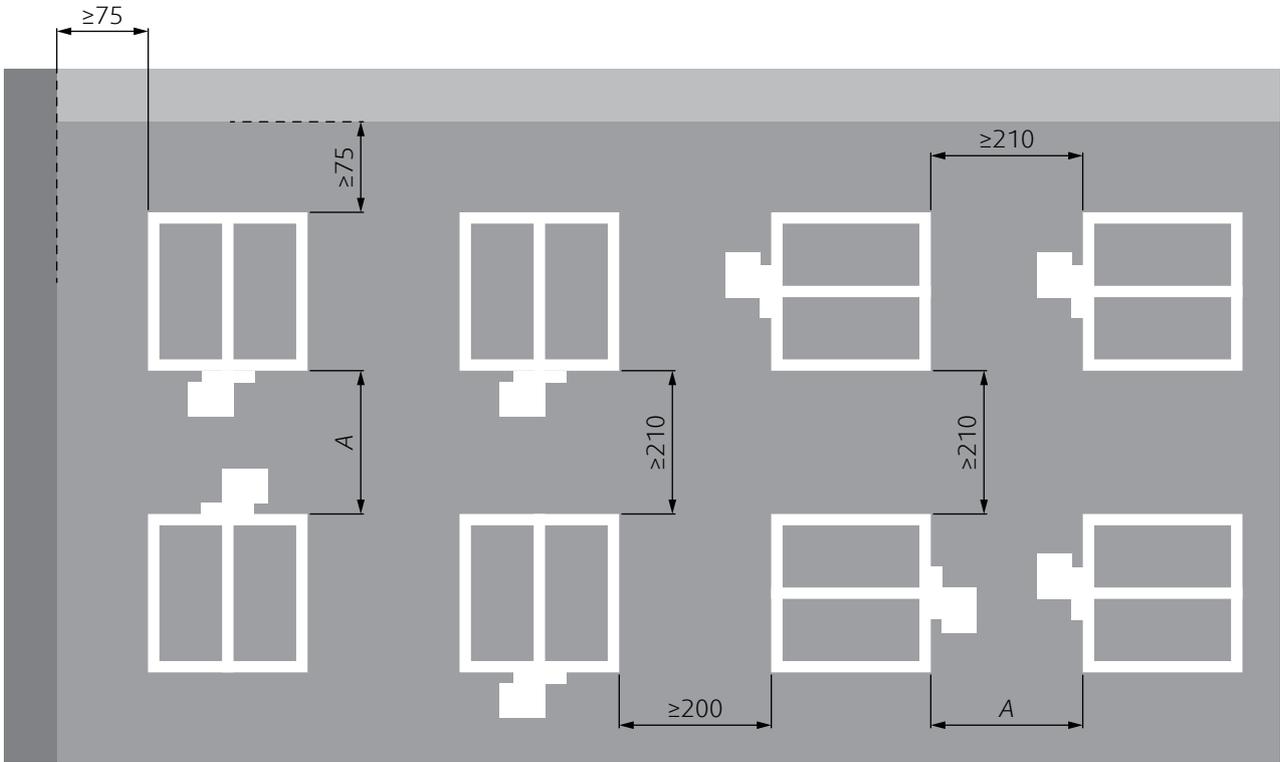


Fig. 3: Installation distances between damper bodies

Tab. 5: Installation distances for minimal clearance to the actuator in Fig. 3

| Clearance | W (mm) | | | | | | | | | | | | | | | | | | | | |
|-----------|--------|----------------------------------|------------|------------|------------|------------|------------|------------|-----|-----|-----|------|------|------|------|------|------|------|---|---|---|
| | 200 | 250 | 300 | 350 | 400 | 450 | 500 | 600 | 700 | 800 | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | | | |
| H (mm) | 200 | | | | | | | | | - | - | - | - | - | - | - | - | - | - | - | |
| | 250 | B230, G230, B24, G24; A = 240 mm | | | | | | | | - | - | - | - | - | - | - | - | - | - | - | |
| | 300 | B230-ST, G24-ST; A = 380 mm | | | | | | | | - | - | - | - | - | - | - | - | - | - | - | |
| | 350 | | | | | | | | | - | - | - | - | - | - | - | - | - | - | - | |
| | 400 | | | | | | | | | - | - | - | - | - | - | - | - | - | - | - | |
| | 450 | - | A = 240 mm | | | | | | | | | | - | - | - | - | - | - | - | | |
| | 500 | - | - | A = 240 mm | | | | | | | | | | - | - | - | - | - | - | | |
| | 600 | - | - | - | A = 240 mm | | | | | | | | | | - | - | - | - | - | | |
| | 700 | - | - | - | - | A = 240 mm | | | | | | | | | | - | - | - | - | | |
| | 800 | - | - | - | - | - | A = 270 mm | | | | | | | | | | - | - | - | - | |
| 900 | - | - | - | - | - | - | A = 270 mm | | | | | | | | | | - | - | - | - | |
| 1000 | - | - | - | - | - | - | - | A = 430 mm | | | | | | | | | | - | - | - | - |

① Wet Installation

Using Concrete Filling



① Wet

1

S-SA2

1. The supporting construction opening must be prepared in a way depicted in the “Opening preparation” section (as per Fig. 1 – Fig. 2). Opening surfaces must be even and cleaned. The flexible wall opening must be reinforced as per the standards for plasterboard walls. The opening dimensions are driven by the nominal dimensions of the damper with added clearance. The opening will be made with dimensions W_1 and H_1 (↗ Fig. 4).
2. Insert the closed damper into the middle of the opening so that the damper blade is in the wall. Use the bendable hanger to secure the damper against the wall by using a suitable screw (3; recommended screw diameter 5,5; e.g. DIN7981).

For damper widths greater than 600 mm, it is recommended to use a duct support inside the damper during installation to avoid any damage to the damper housing from the weight of the filling.

3. Fill in the area between the wall and the damper with gypsum plaster, or mortar or concrete filling (2), while paying attention to prevent the fouling of the damper’s functional parts, which could limit its correct functionality. The best way is to cover the functional parts during installation. To prevent seepage of the filling material, the use of boards is recommended.

First let the plaster, mortar or concrete filling harden and then perform the next steps.

4. After the filling hardens, remove the duct support from inside of the damper.
5. If needed, uncover and clean the damper after installation.
6. Check the damper’s functionality.

| Product Type | Dimension Range (mm) | Classification | Supporting Construction |
|--------------|-----------------------------|--|-------------------------|
| S-SA2 | 200 × 200 up to 1600 × 1000 | EI120 (v_{ew} i ↔ o) S1500 C _{mod} AAmulti | Wall |
| | | EI120 (h_{ow} i ↔ o) S1500 C _{mod} AAmulti | Ceiling/Floor |

S-SA2

1

Wet

Legend for Figures of ① Wet Installation

| | |
|---|--|
| 1 | Smoke damper S-SA2 (actuator side) |
| 2 | Accessory LEAS/Connected ductwork tested according to EN 1366-9 |
| 3 | Screw 5,5 DIN 7981 fixing the Damper through bendable hangers |
| 4 | Gypsum plaster; Mortar; Concrete filling - minimal category M2.5, EN 998-2 |
| | Damper's horizontal blade axis orientation |
| | Damper's vertical blade axis orientation |

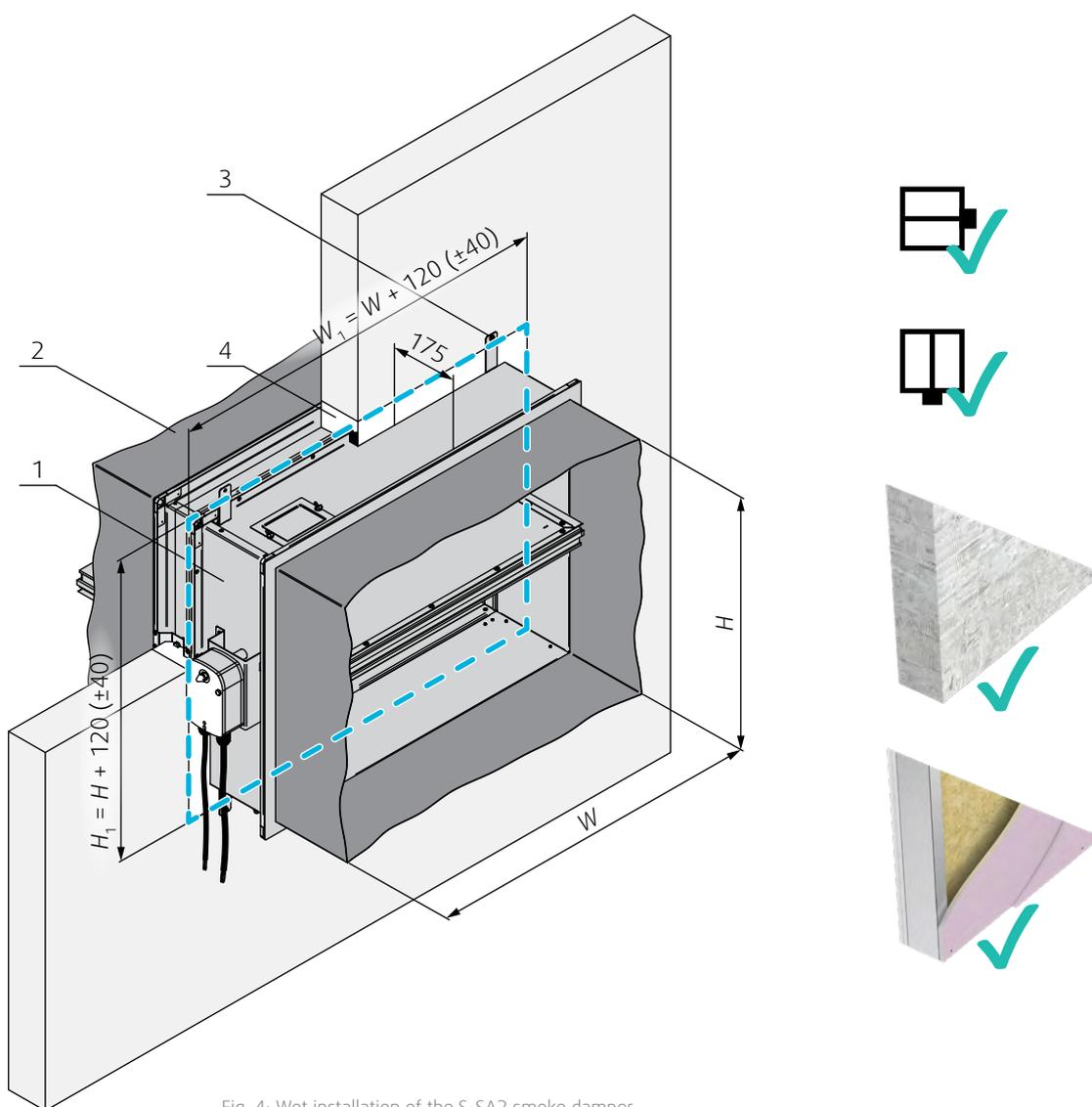


Fig. 4: Wet installation of the S-SA2 smoke damper



① Wet

1

S-SA2

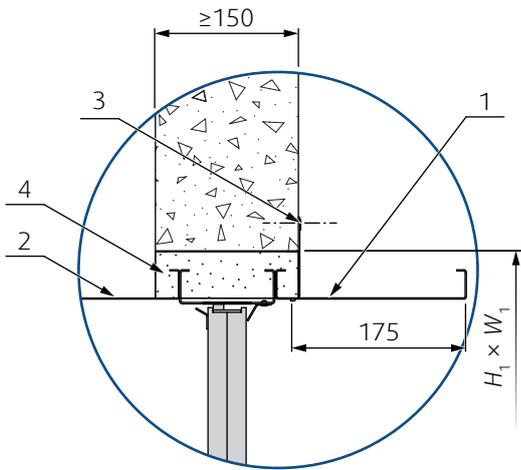


Fig. 5: (EI120S) Cross-section of a wet installation in rigid wall

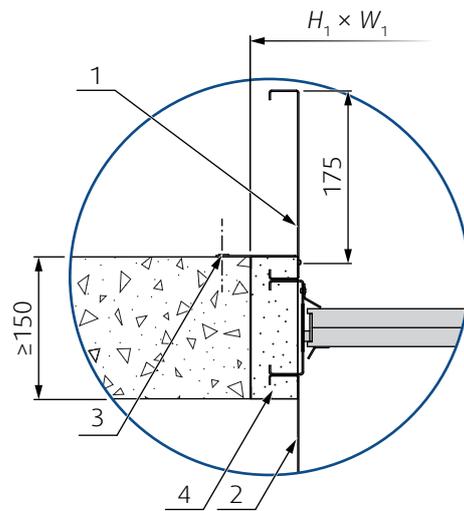


Fig. 7: (EI120S) Cross-section of a wet installation in rigid ceiling/floor (actuator above)

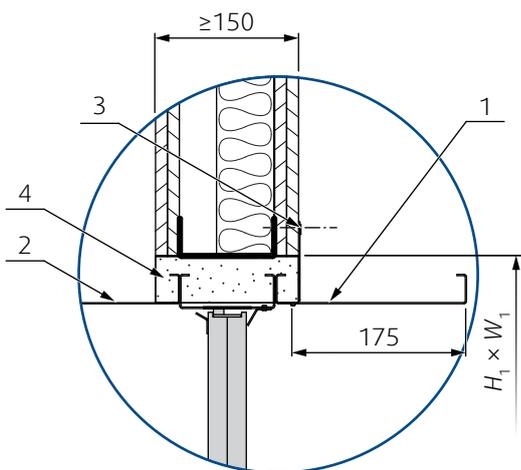


Fig. 6: (EI120S) Cross-section of a wet installation in flexible wall

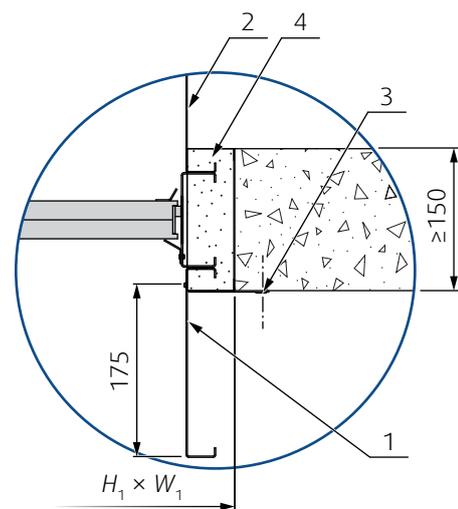


Fig. 8: (EI120S) Cross-section of a wet installation in rigid ceiling/floor (actuator below)



3 Installation into a Soft Crossing (up to Size 1000 × 800 mm)

EI90 - Using Mineral Wool Filling

1. The supporting construction opening must be prepared in a way described in the "Opening Preparation for S-SA2 Installation" section (as per Fig. 1, Fig. 2). Opening surfaces must be even and cleaned. The flexible wall opening must be reinforced as per the standards for plasterboard walls.
2. The opening dimensions are driven by the nominal dimensions of the damper with added clearance. The opening will be made with dimensions W_1 and H_1 (Fig. 9).
3. Prepare mineral wool installation segments (4; with cubic weight of 150 kg/m³, thickness as opening gap). First apply a suitable fire resistive coating (5; CFS-CT {HILTI}) onto the damper at the place of its future placement, assemble and glue the filling of the future installation with the same fire resistive coating. After the fire resistive coating has dried, the damper along with the filling are ready for installation.
4. Apply the same fire resistive coating (5) onto the internal surface of the wall opening. Also apply the fire resistive coating to the external surface of the filling glued to the damper surface. Immediately after applying the fire resistive coating, place the damper into the wall opening. The damper blade must be located in the supporting structure. Then fix the damper using the bendable bracket.
5. After inserting the damper into the opening and fixing it using the bendable hangers and suitable screws (3; recommended screw diameter 5,5 - e.g. DIN7981), apply the same fire resistive coating (5), at least 2 mm thick and 100 mm wide, to the opening filling and wall edges evenly from both sides. Do not apply this layer in the place where the mechanism is located, inspection openings and manufacturer labels.
6. Before the fire resistive coating dries, remove the unwanted remnants of the coating.
7. If needed, uncover and clean the damper after installation.
8. Check the damper's functionality.

| Product Type | Dimension Range (mm) | Classification | Supporting Construction |
|--------------|-------------------------------|--|-------------------------|
| S-SA2 | 200 × 200 up to 1000 × 800 | EI90 ($v_{ew} i \leftrightarrow o$) S1500 C _{mod} AA _{multi} | Wall |

Legend for Figures of 3 Instalation into a Soft Crossing

| | |
|---|---|
| 1 | Smoke damper S-SA2 (actuator side) |
| 2 | Accessory LEAS/Connected ductwork tested according to EN 1366-9 |
| 3 | Screw 5,5 DIN 7981 fixing the Damper through bendable hangers |
| 4 | Mineral wool filling 150 kg/m ³ |
| 5 | Fire resistive coating CFS-CT (HILTI) |
| | Damper's horizontal blade axis orientation |
| | Damper's vertical blade axis orientation |



3 Soft

3

S-SA2

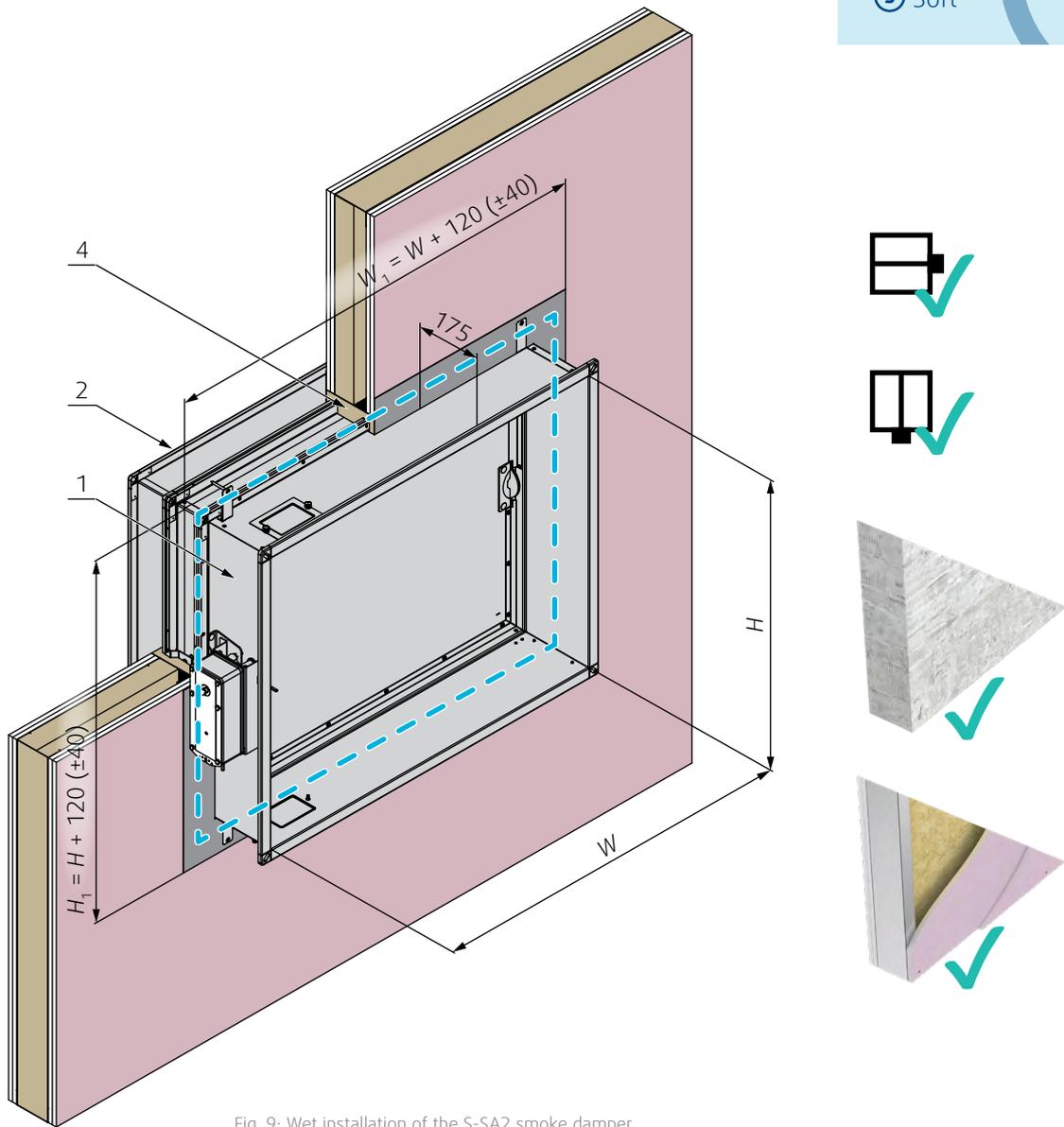


Fig. 9: Wet installation of the S-SA2 smoke damper

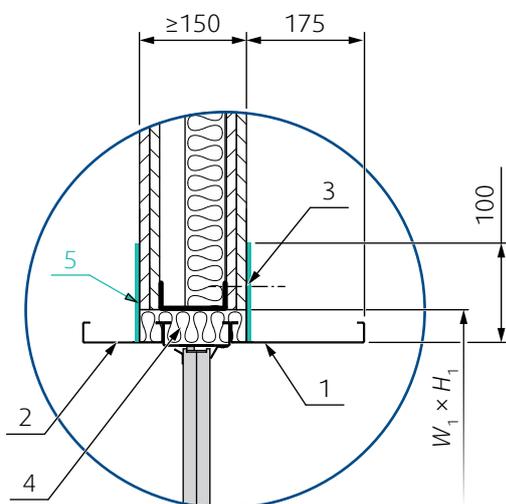


Fig. 10: (EI90S) Cross-section of a soft cross installation in a flexible wall

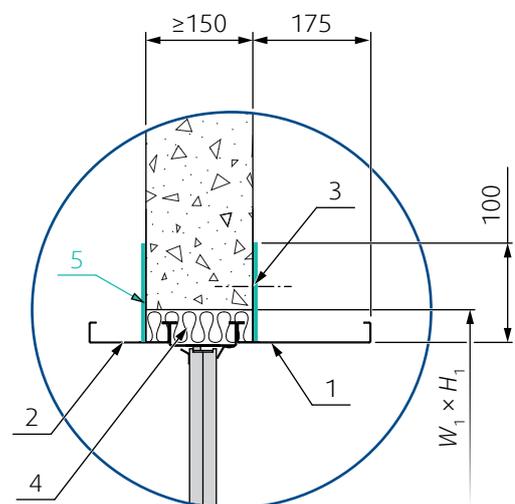


Fig. 11: (EI90S) Cross-section of a soft cross installation in a rigid wall

Connecting S-SA2 to “multi” Ductwork Made of Boards

The S-SA2 smoke damper can be connected to “multi” ductwork made of calcium silicate boards tested according to EN 1366-8. If mounted on a duct classified with lower fire resistivity, the fire resistivity of the S-SA2 smoke damper will be decreased to the duct level.

This section does not depict duct hanger rules as those are dependent on the weight of the duct itself and must be statically approved.

IMPORTANT: The interior of the S-SA2 smoke damper must remain accessible for maintenance. Depending on the installation configuration, it may be necessary to create additional inspection panels in the connecting ducts.

Connection Possibilities:

- **1A 3A** Multi-Single
- **1B 3B** Single-Multi
- **1C 3C** Multi-Multi

Legend for Figures of Connections to “Multi” Classified Ducts

| | | |
|---|---|--|
| 1 | Smoke damper S-SA2 (actuator side) | |
| 2 | Accessory LEAS/Connected ductwork classified according EN 1366-9 | |
| 3 | Screw 5,5 DIN 7981 fixing the damper through bendable hangers | |
| 4 | When the damper is installed using 1 wet method: | When the damper is installed using 3 soft crossing method: |
| | Gypsum plaster; mortar; concrete filling minimal category M2.5, EN 998-2 | Mineral wool filling 150 kg/m ³ and fire resistive coating CFS-CT (HILTI) |
| 5 | Cover plates thickness 10 mm placed on the opening circumference made of Promatect H (Promat) | |
| 6 | Ductwork made of Promatect-L500 boards (Promat). Thickness of boards (P_1) depends on the desired fire resistivity. | |
| 7 | Fire resistive coating Promat K84 (Promat) | |
|  | Damper's horizontal blade axis orientation | |
|  | Damper's vertical blade axis orientation | |

1A/3A Multi-Single

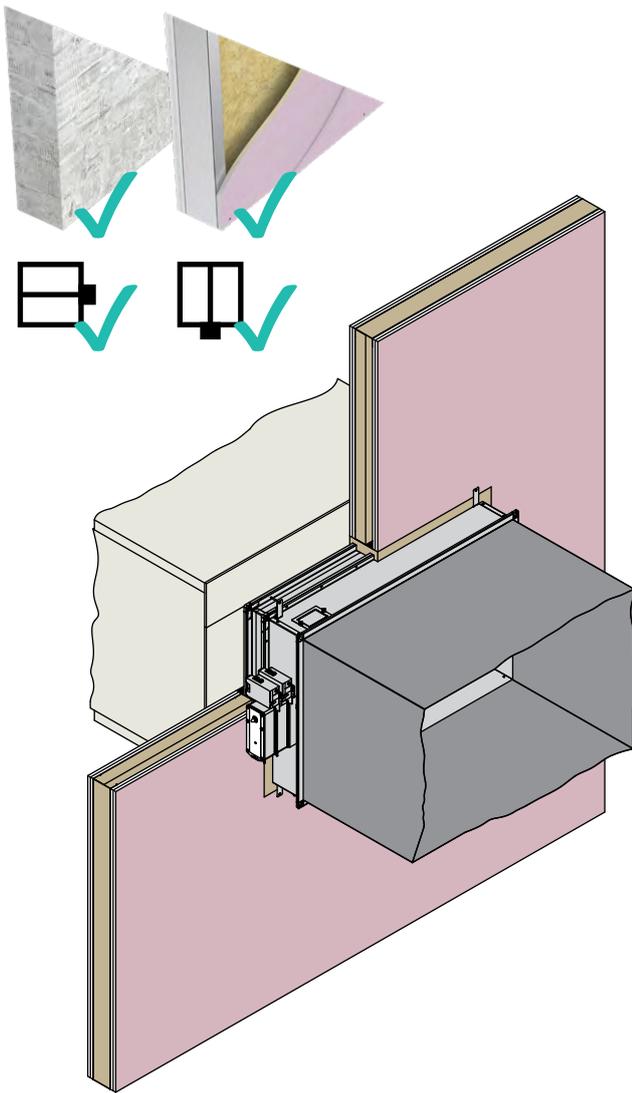


Fig. 12: Connection of the S-SA2 smoke damper to multi compartment ductwork on the damper side without a mechanism

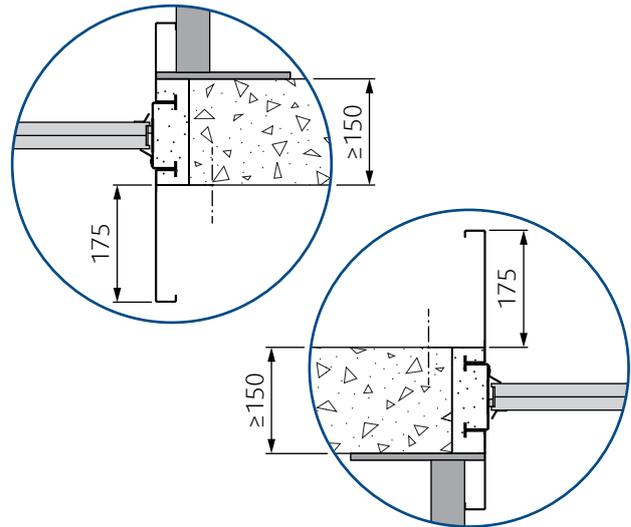


Fig. 14: (EI20S) Cross-section of a 1 Wet installation in a rigid ceiling/floor (for board dimensions follow Fig. 13)

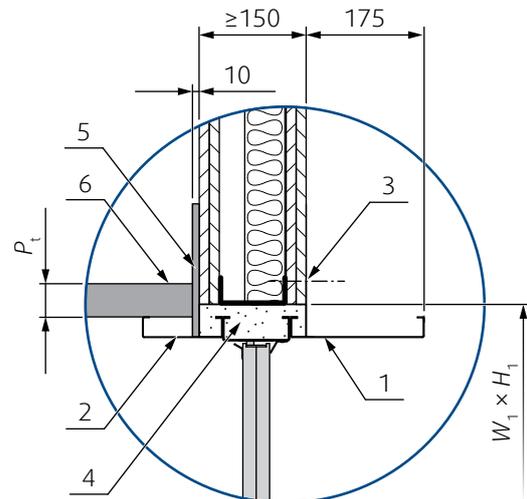


Fig. 15: (EI20S) Cross-section of a 1 Wet installation in a flexible wall

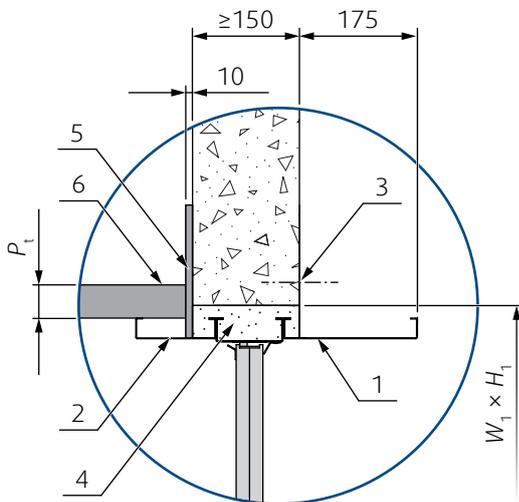


Fig. 13: (EI20S) Cross-section of a 1 Wet installation in a rigid wall

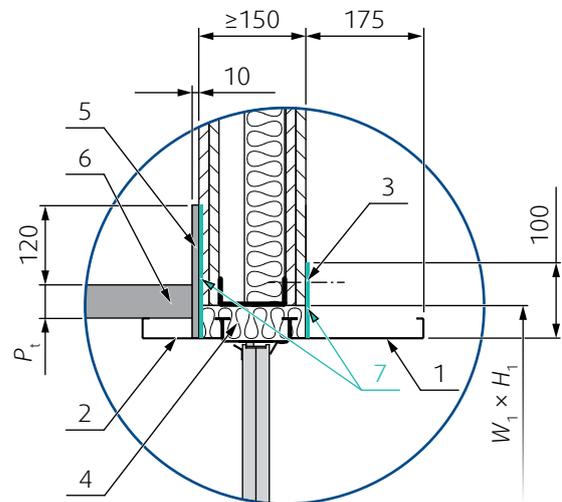


Fig. 16: (EI90S) Cross-section of a 3 Soft cross. installation in a flexible wall

1B/3B Single-Multi

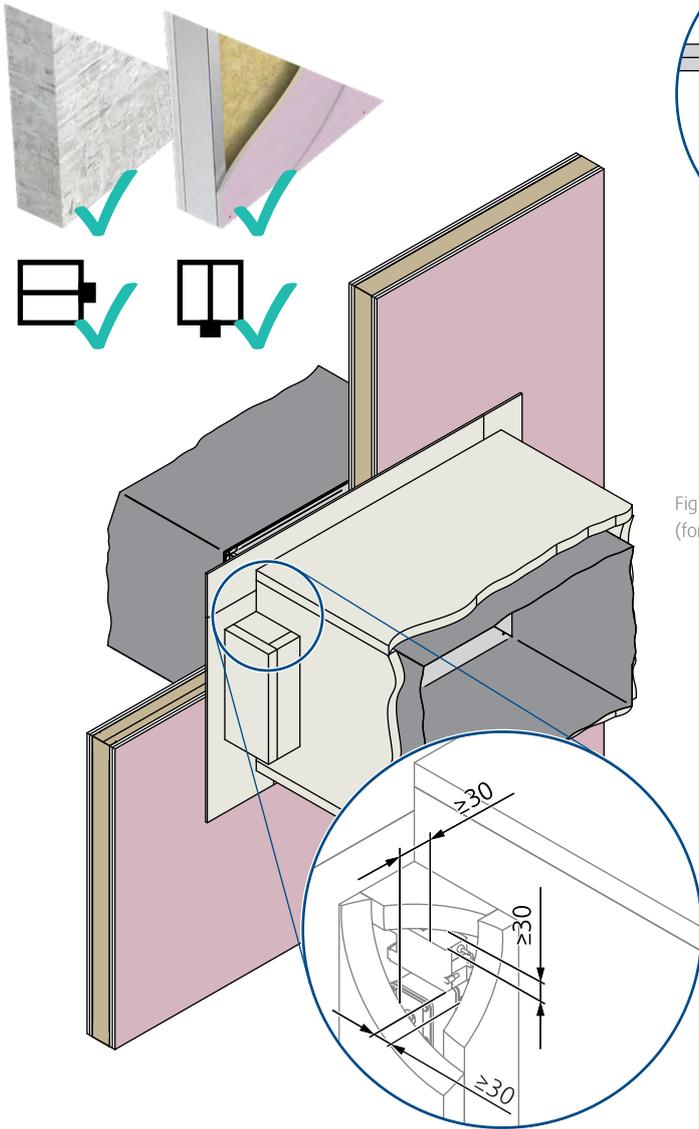


Fig. 17: Connection of the S-SA2 smoke damper to multi compartment ductwork on the damper side with a mechanism

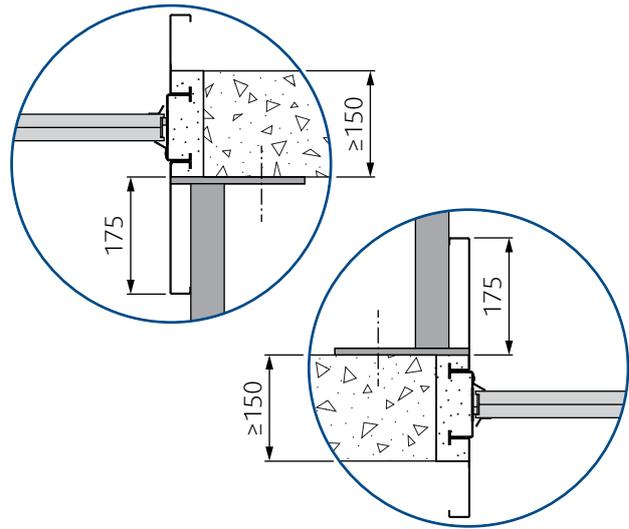


Fig. 19: (EI120S) Cross-section of a 1 Wet installation in a rigid ceiling/floor (for board dimensions follow Fig. 18)

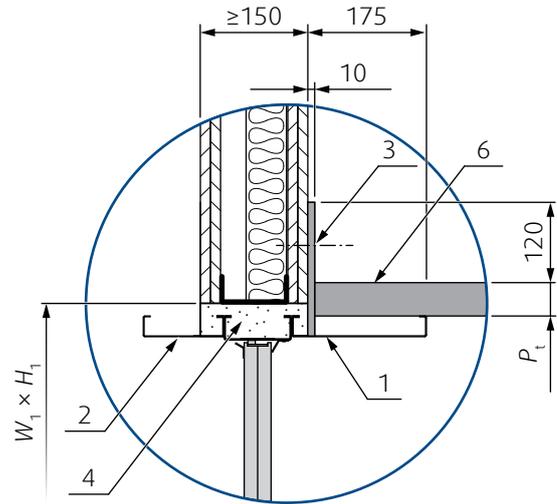


Fig. 20: (EI120S) Cross-section of a 1 Wet installation in a flexible wall

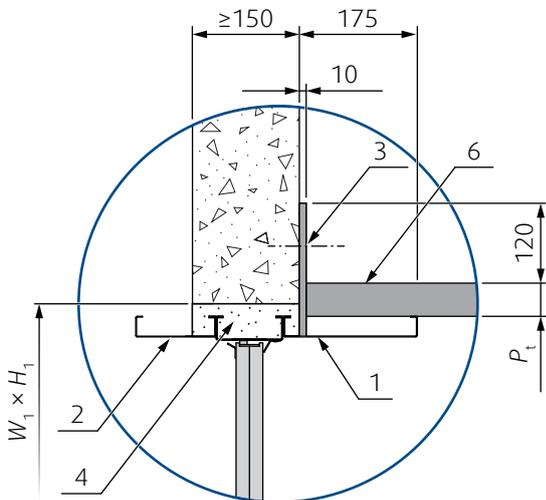


Fig. 18: (EI120S) Cross-section of a 1 Wet installation in a rigid wall

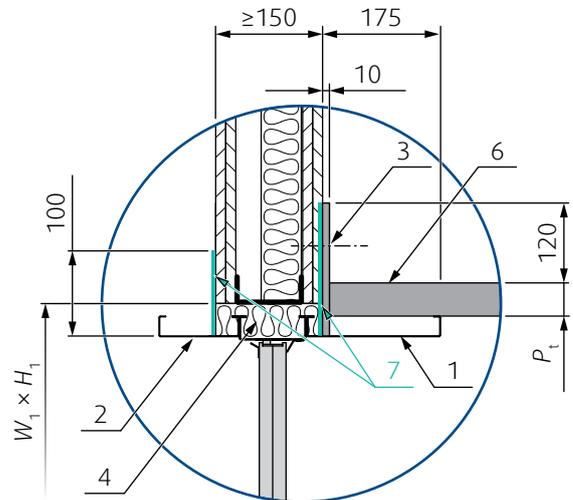


Fig. 21: (EI90S) Cross-section of a 3 Soft cross. installation in a flexible wall

TC3C Multi-Multi

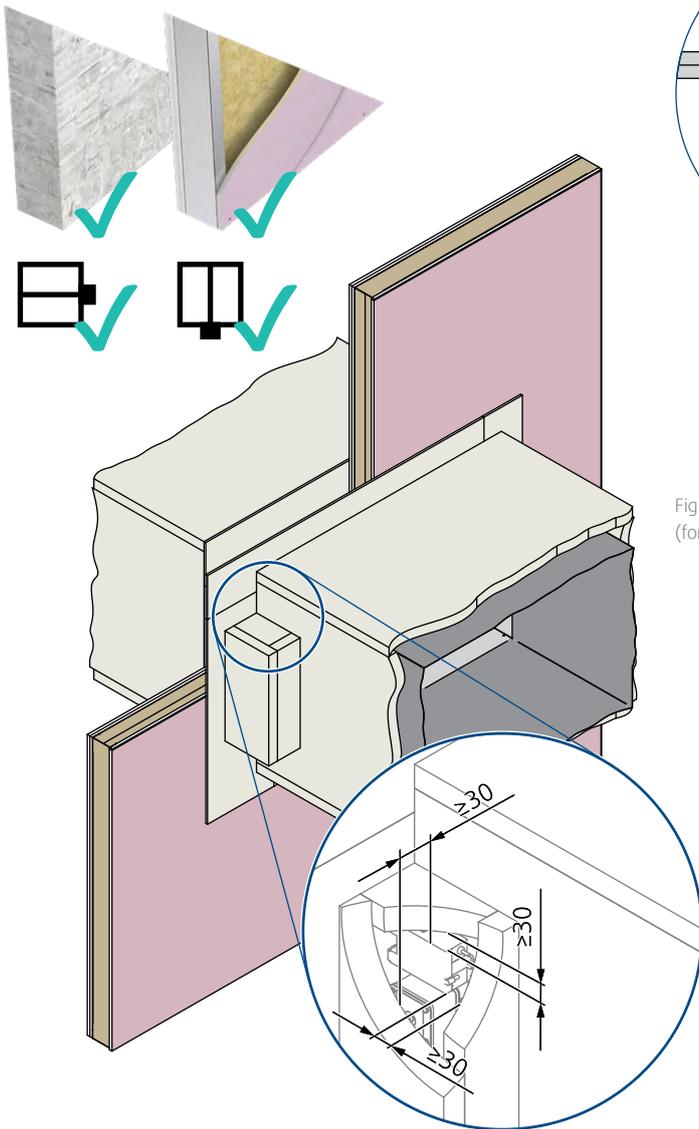


Fig. 22: Connection of the S-SA2 smoke damper to multi compartment ductwork on both sides of the damper

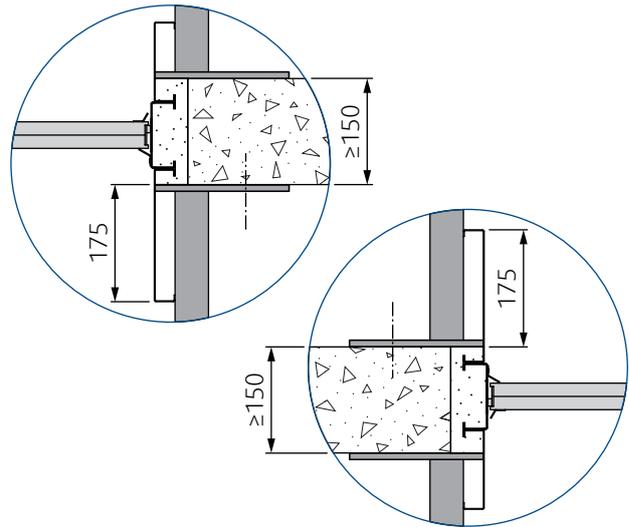


Fig. 24: (EI120S) Cross-section of a ① Wet installation in a rigid ceiling/floor (for board dimensions follow Fig. 23)

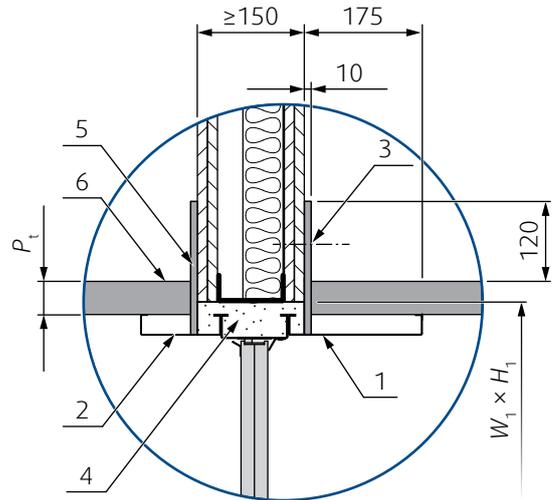


Fig. 25: (EI120S) Cross-section of a ① Wet installation in a flexible wall

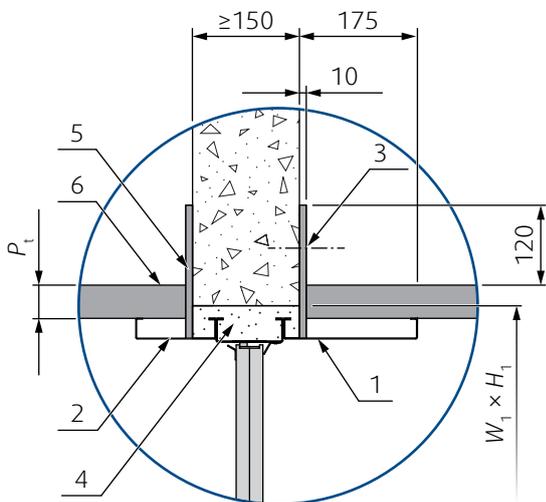


Fig. 23: (EI120S) Cross-section of a ① Wet installation in a rigid wall

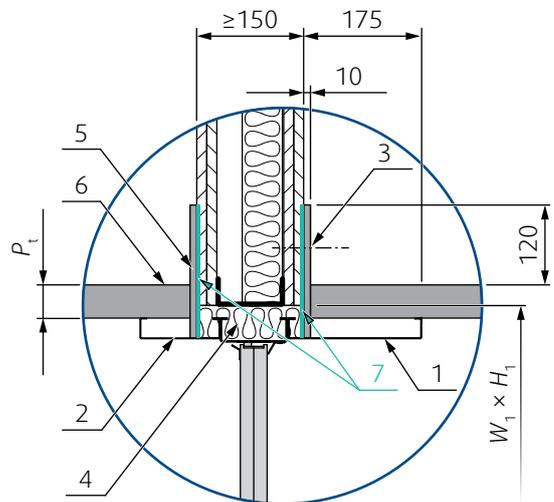


Fig. 26: (EI90S) Cross-section of a ③ Soft cross installation in a flexible wall

S-SA2L Installation

The S-SA2L smoke damper can be installed on "single" (tested according to EN 1366-9) or "multi" (tested according to EN 1366-9) ductwork. If mounted on a duct classified with lower fire resistivity, the fire resistivity of the S-SA2L smoke damper will be decreased to the duct level.

This section does not depict duct hanger rules as those are dependent on the weight of the duct itself and must be statically approved.

Smoke control dampers can be suspended from solid ceiling slabs using adequately sized threaded rods. When using anchors in the ceiling, use a fire-rated anchor (with suitable a fire rating certificate).

IMPORTANT: The suspension of the damper must be loaded only with the weight of the damper. The connection surfaces must be flattened and clean before the fire resistive coat is applied. Suspension systems longer than 1,5 m require fire-resistant insulation.

Fixing the S-SA2L Smoke Damper

Each S-SA2L smoke damper has a connection flange with openings in the corners (Fig. 27).

For damper widths greater than 750 mm, another fixing point in the middle of the widest side is added and must be connected as per instructions in [Fig. 28 - Fig. 33](#).

Legend for Figures of S-SA2L Smoke Damper Fixing

| | |
|---|--|
| 1 | Smoke damper S-SA2L (actuator side) |
| 2 | Ductwork made of calcium silicate boards. Thickness and depth of boards depends on installation type. |
| 3 | Combi screw M8 |
| 4 | Nut M8 |
| 5 | Bendable hanger (delivered on the damper) |
| 6 | Screw 4,8×16 DIN 7982 (delivered on the damper) |
| 7 | Screw 4,8×25 DIN 7982 |

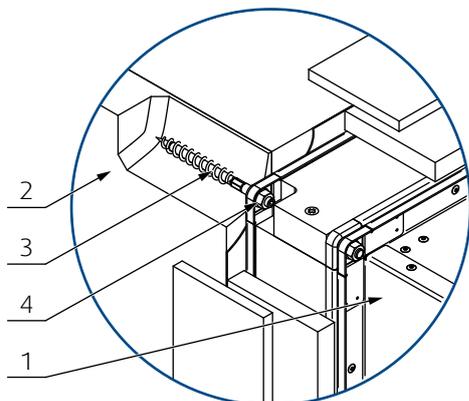


Fig. 27: Detail of S-SA2L damper's corner fixing

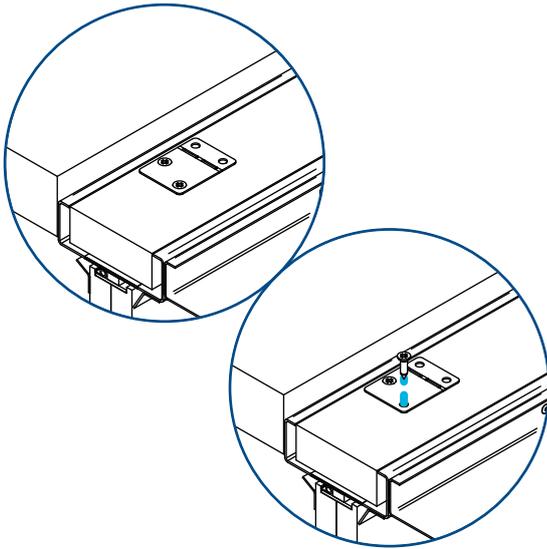


Fig. 28: Removing the fixing screw

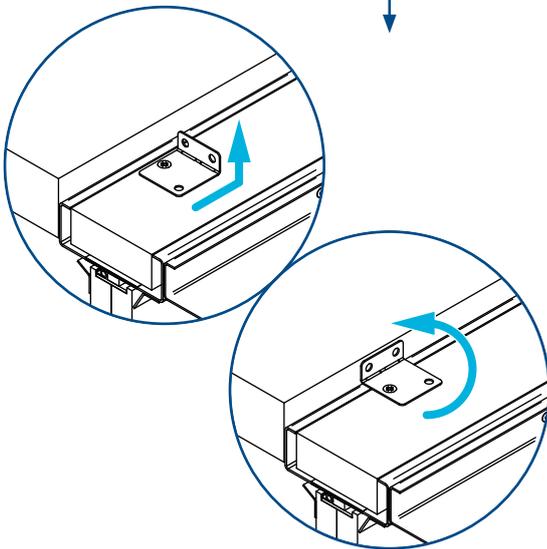


Fig. 29: Hanger bending and rotating flush with suspension plane

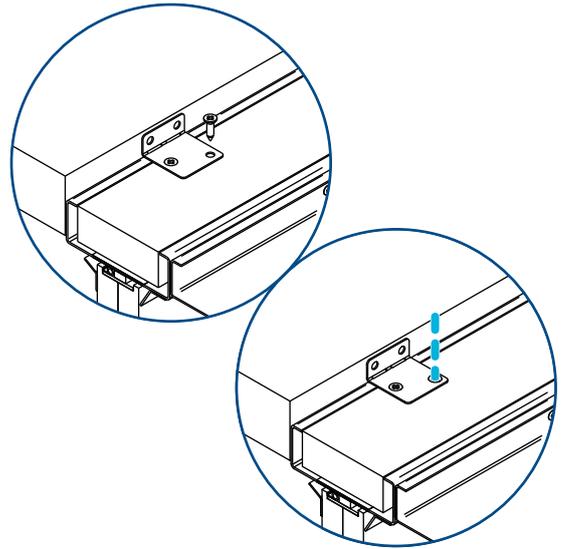


Fig. 30: Fixing the bendable hanger in place

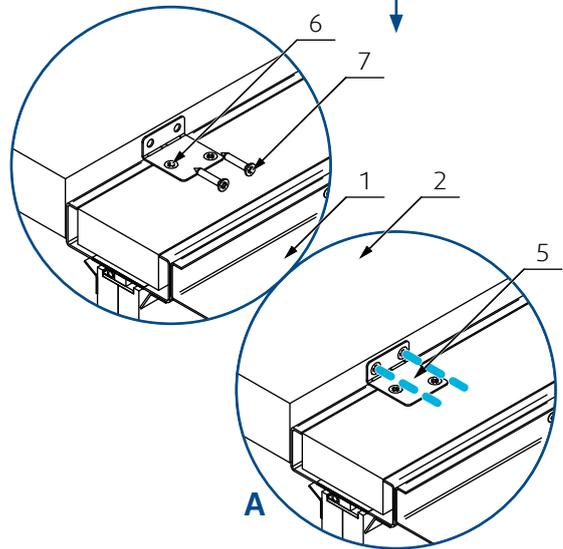


Fig. 31: Fixing the damper to the duct boards

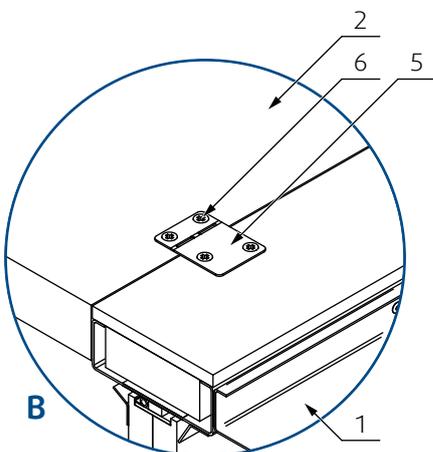


Fig. 32: Middle fixing to 40 mm thick board

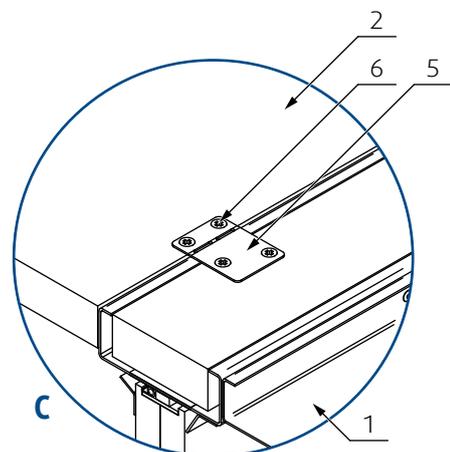


Fig. 33: Middle fixing to 30 mm thick board



L1V Installation on the Vertical Duct with a Ledge

1. Prepare the duct connection or opening as per  Fig. 36 - Fig. 41, clean and flatten the connecting surface.
2. Apply a fire resistive coat (3) on the connection surfaces as depicted in Fig. 36 - Fig. 41.
3. Connect the damper's flange (on the blade side) to the duct as per the  "Fixing the S-SA2L Smoke Damper" section.
4. From boards (4 and 7) create a collar overlapping the connection as depicted in Fig. 36 - Fig. 41.
5. Fix the overlapping collar to the damper with screws (5). Fix the collar to the duct by using screws as per instructions of duct system manufacturer.

IMPORTANT: The opening dimensions must be created according to the details of each type and thickness of the connected duct.

The fire resistivity of the S-SA2L smoke damper must be decreased to the duct performance. The maximum resistivity for L1V installation is EI120S with pressure level 3 (-1500 Pa ... 500 Pa).

Legend for Figures of **L1V** Installation

| | |
|---|--|
| 1 | Smoke damper S-SA2L (actuator side) |
| 2 | Connected ductwork classified according EN 1366-9 |
| 3 | Fire resistive coating Promat K84 (Promat) |
| 4 | Collar made of Promatect H (Promat) - thickness per detail |
| 5 | Screw 5,5×40 DIN 7981 fixing the collar with the damper |
| 6 | Screws or pins as per duct system manufacturer instructions |
| 7 | Cover plates thickness 10 mm placed on the opening circumference made of Promatect H (Promat) |
| 8 | Combi screw size 8 |
| 9 | Accessory K1-S-SA2L-W×H (size of damper = <i>W</i> - nominal width; <i>H</i> - nominal height) |
|  | Damper's horizontal blade axis orientation |
|  | Damper's vertical blade axis orientation |

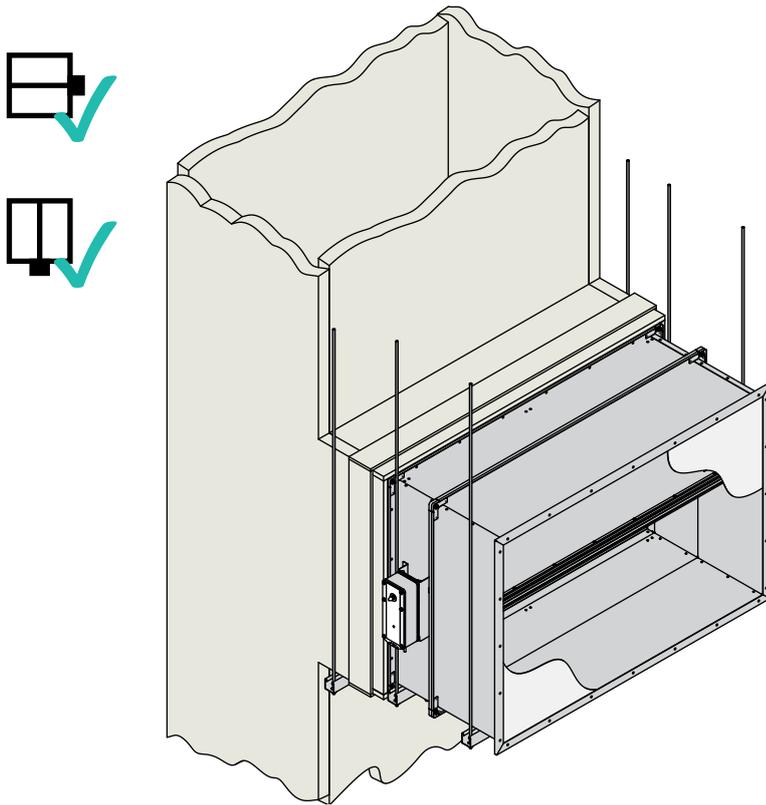


Fig. 34: Installation of S-SA2L on a vertical duct with ledge

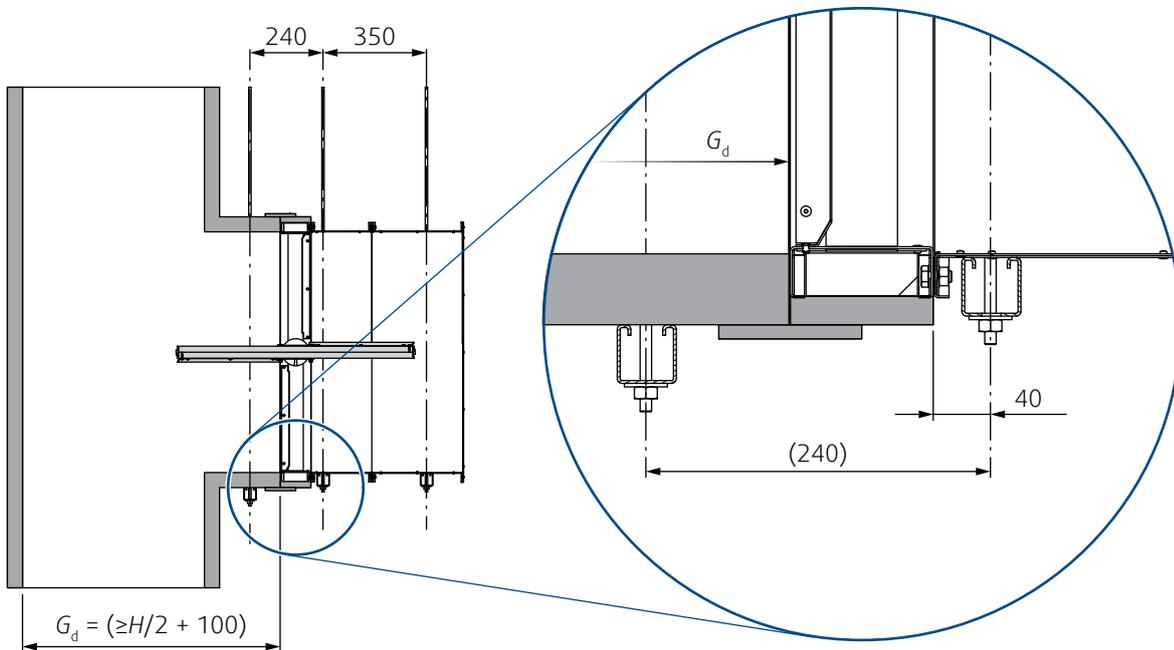


Fig. 35: Hanger position for L1V installation

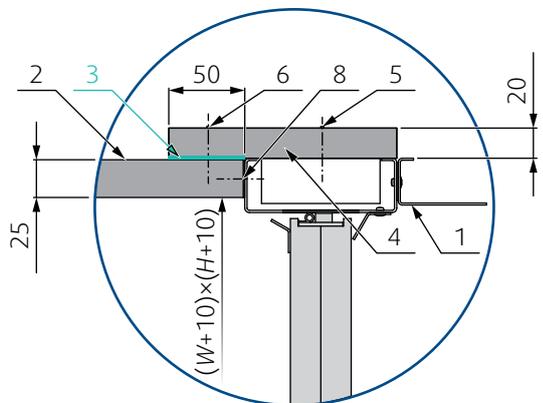


Fig. 36: Cross-section of connection to 25 mm thick board duct

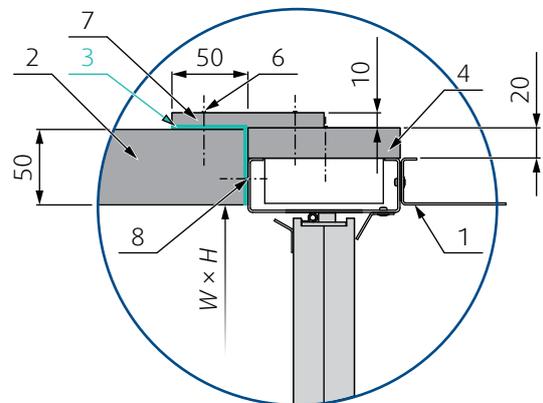


Fig. 39: Cross-section of connection to 50 mm thick board duct

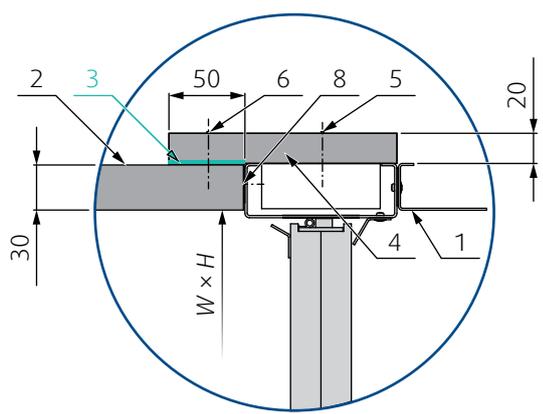


Fig. 37: Cross-section of connection to 30 mm thick board duct

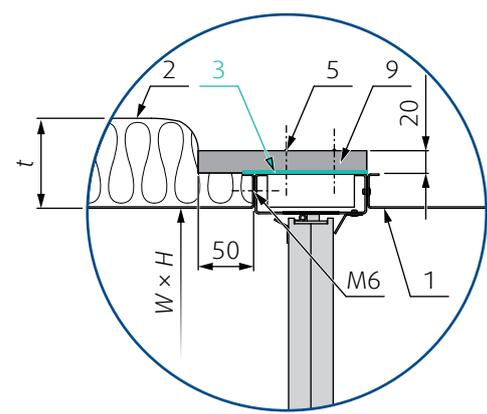


Fig. 40: Cross-section of connection to a mineral wool insulated sheet metal duct with the K1-S-SA2L accessory

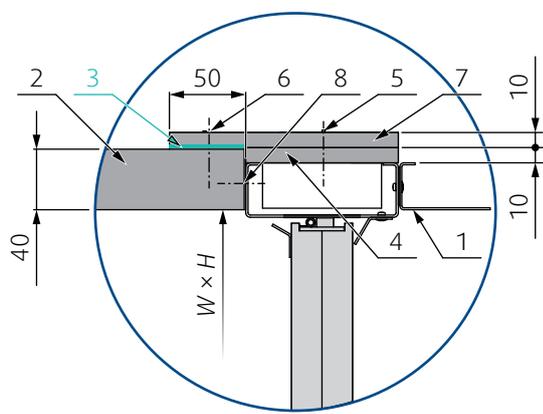


Fig. 38: Cross-section of connection to 40 mm thick board duct

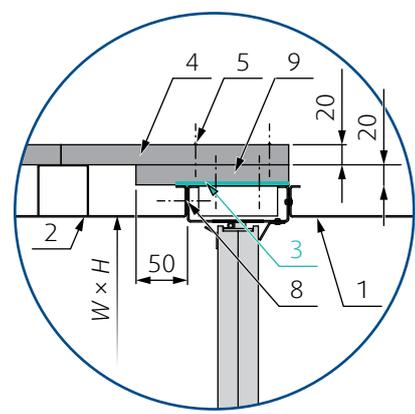


Fig. 41: Cross-section of connection to a board insulated sheet metal duct with the K1-S-SA2L accessory

L2V Installation Directly on the Vertical Duct

1. Prepare the duct connection or opening as per  Fig. 43, clean and flatten the connecting surface.
2. Apply a fire resistive coat (8) on the connection surfaces as depicted in the detail in Fig. 43.
3. Connect the damper's flange (on the blade side) to the duct as per the  "Fixing the S-SA2L Smoke Damper" section.
4. From boards (4 and 5) create a collar overlapping the connection as depicted in Fig. 43.
5. Fix the overlapping collar to the damper with screws (5). Fix the collar to the duct by using screws as per instructions of duct system manufacturer.

IMPORTANT: The opening dimensions must be created according to the details of each type and thickness of the connected duct.

The fire resistivity of the S-SA2L smoke damper must be decreased to the duct performance. The maximum resistivity for L2V installation is EI120S with pressure level 3 (-1500 Pa ... 500 Pa).

Legend for Figures of **L2V** Installation

| | |
|---|---|
| 1 | Smoke damper S-SA2L (actuator side) |
| 2 | Connected ductwork classified according EN 1366-9 |
| 3 | Collar made of Promatect H (Promat) - thickness per detail |
| 4 | Cover plates thickness 10 mm placed on the opening circumference made of Promatect H (Promat) |
| 5 | Cover plates thickness 10 mm placed on the opening circumference made of Promatect H (Promat) |
| 6 | Screw 5,5×40 DIN 7981 fixing the collar with the damper |
| 7 | Combi screw size 8 |
| 8 | Fire resistive coating Promat K84 (Promat) |
|  | Damper's horizontal blade axis orientation |
|  | Damper's vertical blade axis orientation |

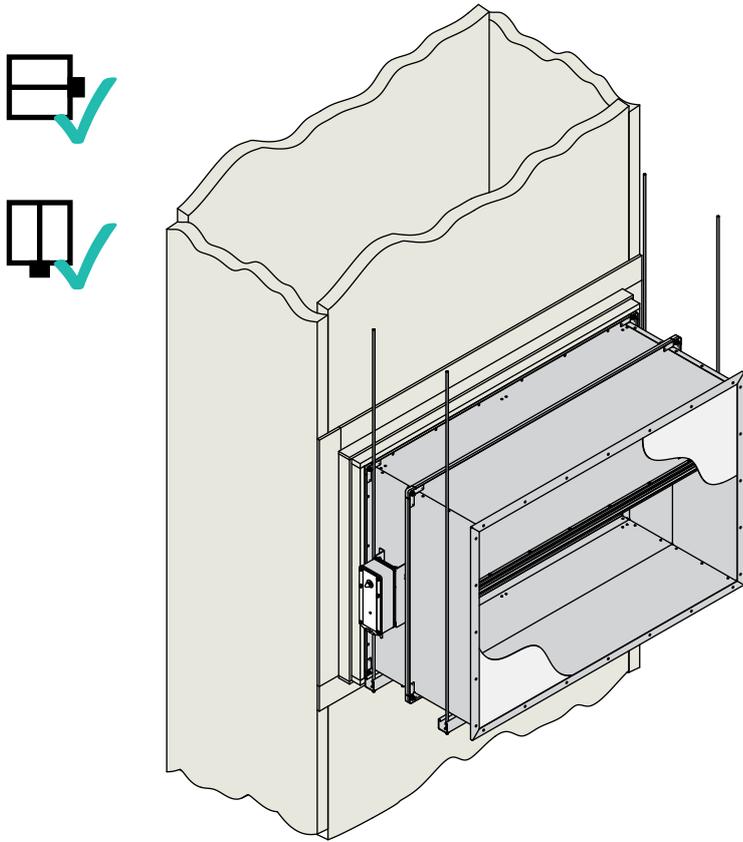
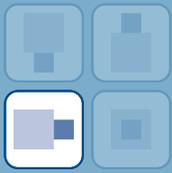


Fig. 42: Installation of S-SA2L, directly on the vertical duct

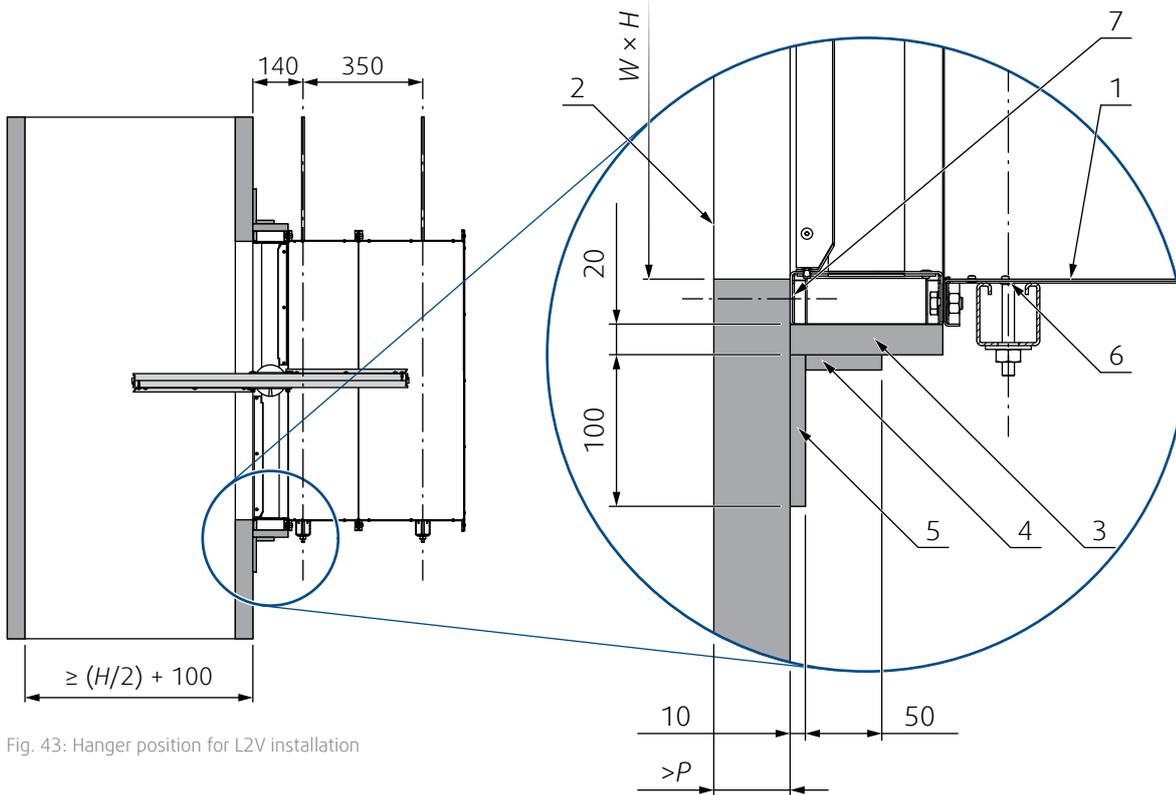


Fig. 43: Hanger position for L2V installation



L1H Installation on the Horizontal Duct with a Ledge

1. Prepare the duct connection or opening as per  Fig. 46 - Fig. 51, clean and flatten the connecting surface.
2. Apply a fire resistive coat (3) on the connection surfaces as depicted in Fig. 46 - Fig. 51.
3. Connect the damper's flange (on the blade side) to the duct as per the  "Fixing the S-SA2L Smoke Damper" section.
4. From boards (4 and 7) create a collar overlapping the connection as depicted in Fig. 46 - Fig. 51.
5. Fix the overlapping collar to the damper with screws (5). Fix the collar to the duct by using screws as per instructions of duct system manufacturer.

IMPORTANT: The opening dimensions must be created according to the details of each type and thickness of the connected duct.

The fire resistivity of the S-SA2L smoke damper must be decreased to the duct performance. The maximum resistivity for L2V installation is EI120S with pressure level 3 (-1500 Pa ... 500 Pa).

Legend for Figures of **L1H** Installation

| | |
|---|--|
| 1 | Smoke damper S-SA2L (actuator side) |
| 2 | Connected ductwork classified according EN 1366-9 |
| 3 | Fire resistive coating Promat K84 (Promat) |
| 4 | Collar made of Promatect H (Promat) - thickness per detail |
| 5 | Screw 5,5×40 DIN 7981 fixing the collar with the damper |
| 6 | Screws or pins as per duct system manufacturer instructions |
| 7 | Cover plates thickness 10 mm placed on the opening circumference made of Promatect H (Promat) |
| 8 | Combi screw size 8 |
| 9 | Accessory K1-S-SA2L-W×H (size of damper = <i>W</i> - nominal width; <i>H</i> - nominal height) |
|  | Damper's horizontal blade axis orientation |
|  | Damper's vertical blade axis orientation |

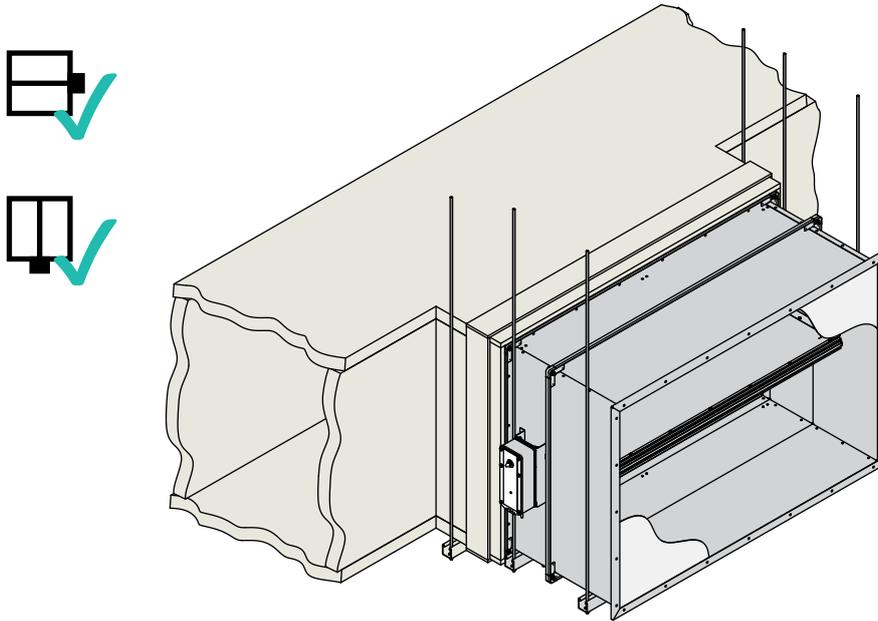


Fig. 44: Installation of S-SA2L on the vertical duct with a ledge

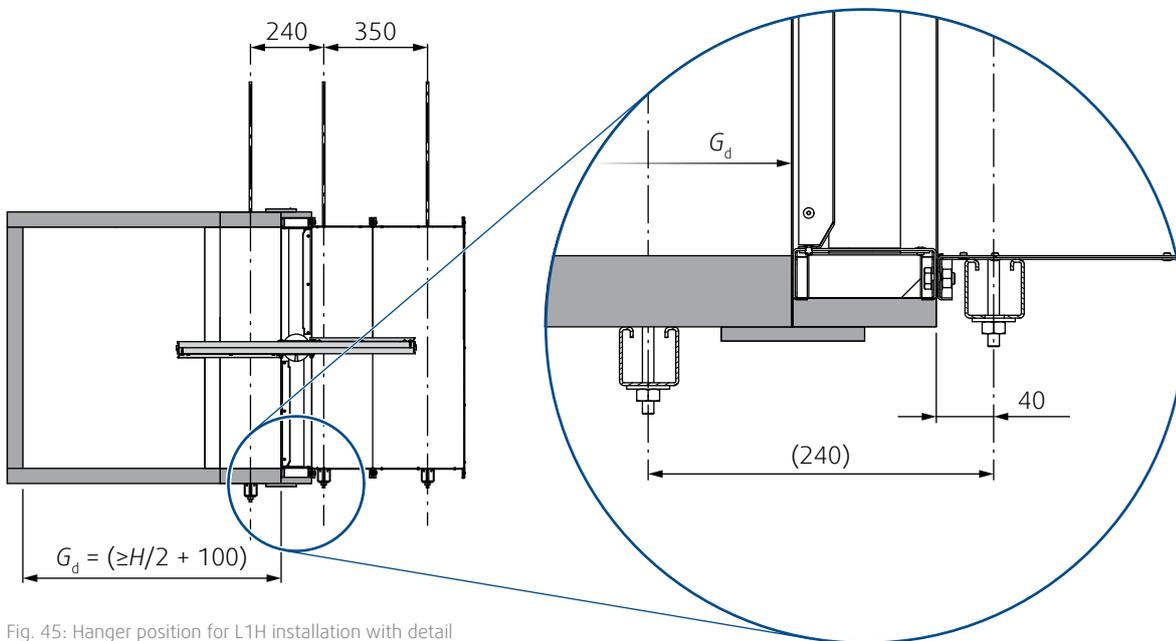


Fig. 45: Hanger position for L1H installation with detail

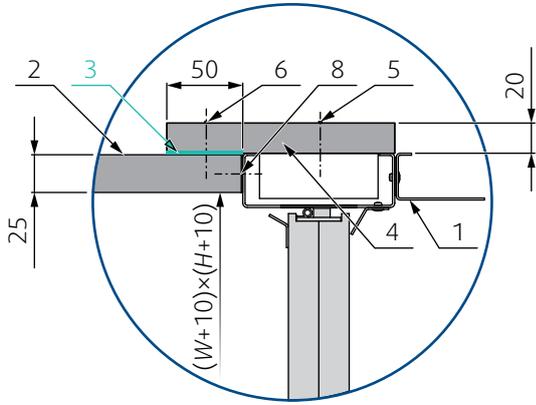


Fig. 46: Cross-section of connection to 25 mm thick board duct

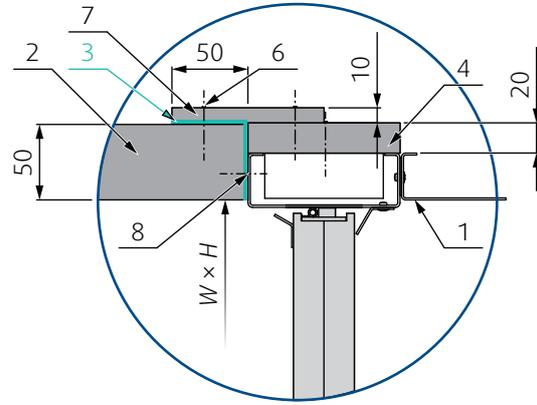


Fig. 49: Cross-section of connection to 50 mm thick board duct

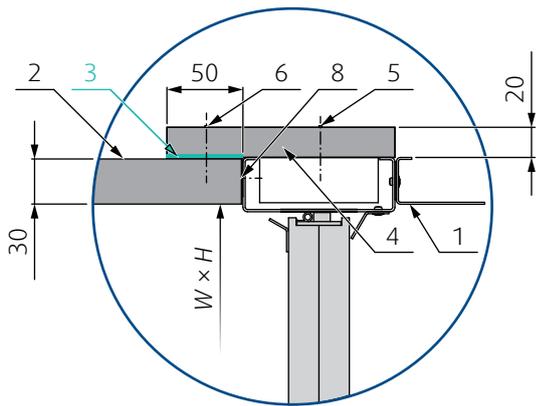


Fig. 47: Cross-section of connection to 30 mm thick board duct

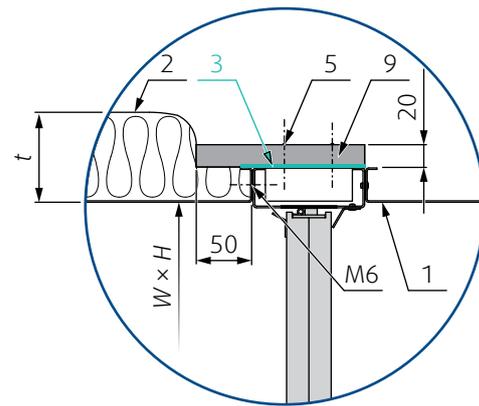


Fig. 50: Cross-section of connection to a mineral wool insulated sheet metal duct with the K1-S-SA2L accessory

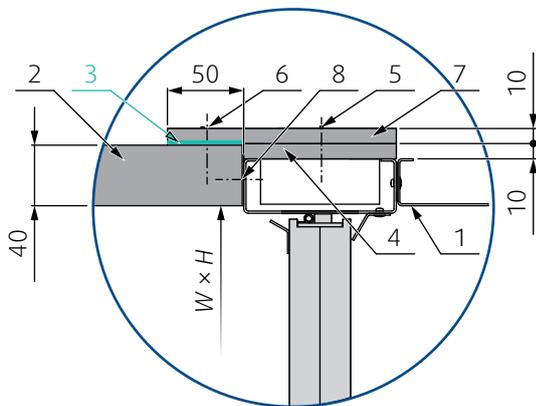


Fig. 48: Cross-section of connection to 40 mm thick board duct

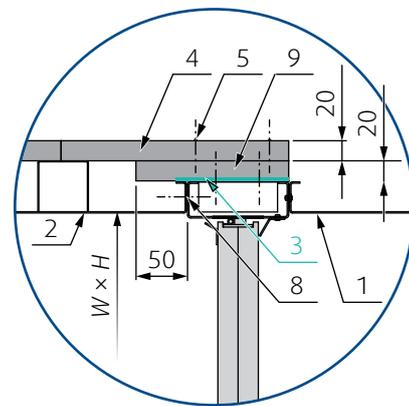
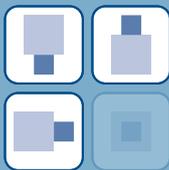


Fig. 51: Cross-section of connection to a board insulated sheet metal duct with the K1-S-SA2L accessory



L2H Installation Directly on the Horizontal Duct

1. Prepare the duct connection or opening as per  Fig. 53, clean and flatten the connecting surface.
2. Apply a fire resistive coat (8) on the connection surfaces as depicted in Fig. 53
3. Connect the damper's flange (on the blade side) to the duct as per the  "Fixing the S-SA2L Smoke Damper" section.
4. From boards (4 and 5) create a collar overlapping the connection as depicted in Fig. 53.
5. Fix the overlapping collar to the damper with screws (6). Fix the collar to the duct by using screws as per instructions of duct system manufacturer.

IMPORTANT: The opening dimensions must be created according to the details of each type and thickness of the connected duct.

The fire resistivity of the S-SA2L smoke damper must be decreased to the duct performance. The maximum resistivity for L2H installation is EI120S with pressure level 3 (-1500 Pa ... 500 Pa).

Legend for Figures of L2H Installation

| | |
|---|---|
| 1 | Smoke damper S-SA2L (actuator side) |
| 2 | Connected ductwork classified according EN 1366-9 |
| 3 | Collar made of Promatect H (Promat) - thickness per detail |
| 4 | Cover plates thickness 10 mm placed on the opening circumference made of Promatect H (Promat) |
| 5 | Cover plates thickness 10 mm placed on the opening circumference made of Promatect H (Promat) |
| 6 | Screw 5,5×40 DIN 7981 fixing the collar with the damper |
| 7 | Combi screw size 8 |
| 8 | Fire resistive coating Promat K84 (Promat) |
|  | Damper's horizontal blade axis orientation |
|  | Damper's vertical blade axis orientation |

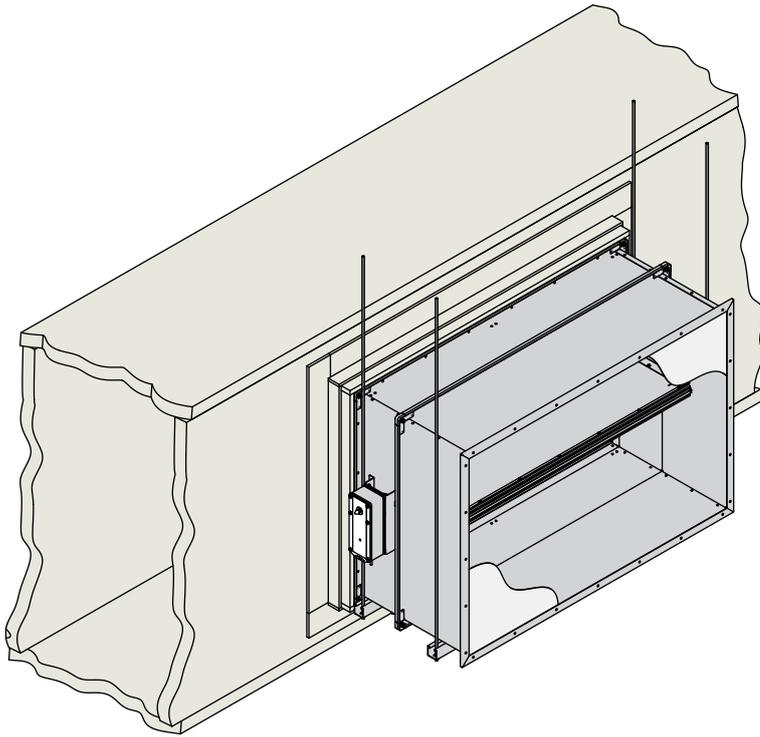


Fig. 52: Installation of S-SA2L on the vertical duct with a ledge

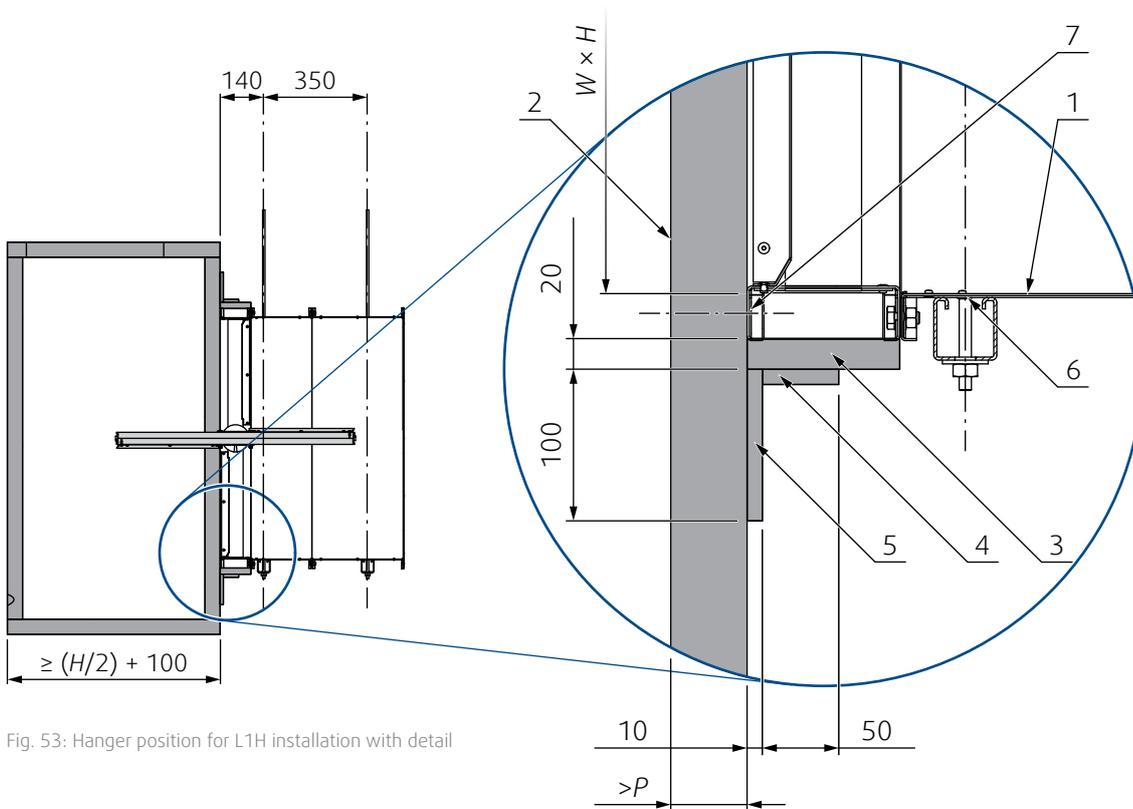


Fig. 53: Hanger position for L1H installation with detail

Electrical Connections

IMPORTANT: Danger of electric shock!
 Switch off the power supply before working on any electrical equipment.
 Only qualified electricians are allowed to work on the electrical system.

Legend for Tab. 6 and Tab. 7

| | |
|--|--|
| | One actuator per damper For Belimo „Bxxx-ST“ versions add 4 W and 10 VA For Gruner „Gxxx-ST“ versions add 2 W and 2 VA |
| | Two actuators per damper For Belimo „Bxxx-ST“ versions add 8 W and 20 VA |
| | Two actuators per damper For Gruner „Gxxx-ST“ versions add 4 W and 4 VA |

Tab. 6: Electric parameters of Belimo mechanism types (B230; B24) for S-SA2 and S-SA2L based on the size

| Consumption per: Type/ In Operation/In Rest/ Wire Sizing/Voltage | | W (mm) | | | | | | | | | | | | | | | | | |
|--|-----|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|------|
| | | 200 | 250 | 300 | 350 | 400 | 450 | 500 | 600 | 700 | 800 | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 |
| H (mm) | 200 | | | | | | | | | | - | - | - | - | - | - | - | - | - |
| | 250 | | | | | | | | | | | - | - | - | - | - | - | - | - |
| | 300 | | | | | | | | | | | | - | - | - | - | - | - | - |
| | 350 | | | | | | | | | | | | | - | - | - | - | - | - |
| | 400 | | | | | | | | | | | | | | | - | - | - | - |
| | 450 | | | | | | | | | | | | | | | | | - | - |
| | 500 | | | | | | | | | | | | | | | | | | - |
| | 600 | | | | | | | | | | | | | | | | | | |
| | 700 | | | | | | | | | | | | | | | | | | |
| | 800 | | | | | | | | | | | | | | | | | | |
| | 900 | | | | | | | | | | | | | | | | | | |
| 1000 | | | | | | | | | | | | | | | | | | | |

B24 = 7,5 W/0,5 W/9 VA (AC/DC 24 V)
 B230 = 5 W/1 W/12 VA (AC 230 V)
 Belimo BLE

B24 = 12 W/0,5 W/18 VA (AC/DC 24 V)
 B230 = 8 W/0,5 W/15 VA (AC 230 V)
 Belimo BE

B24 = 24 W / 1 W / 36 VA (AC/DC 24 V)
 B230 = 16 W / 1 W / 30 VA (AC 230 V)
 2 × Belimo BE

Tab. 7: Electric parameters of Gruner mechanism types (G230; G24) for S-SA2 and S-SA2L based on the size

| Consumption per: Type/ In Operation/In Rest/ Wire Sizing/Voltage | | W (mm) | | | | | | | | | | | | | | | | | |
|--|-----|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|------|
| | | 200 | 250 | 300 | 350 | 400 | 450 | 500 | 600 | 700 | 800 | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 |
| H (mm) | 200 | | | | | | | | | | - | - | - | - | - | - | - | - | - |
| | 250 | | | | | | | | | | | - | - | - | - | - | - | - | - |
| | 300 | | | | | | | | | | | | - | - | - | - | - | - | - |
| | 350 | | | | | | | | | | | | | - | - | - | - | - | - |
| | 400 | | | | | | | | | | | | | | | - | - | - | - |
| | 450 | | | | | | | | | | | | | | | | | - | - |
| | 500 | | | | | | | | | | | | | | | | | | - |
| | 600 | | | | | | | | | | | | | | | | | | |
| | 700 | | | | | | | | | | | | | | | | | | |
| | 800 | | | | | | | | | | | | | | | | | | |
| | 900 | | | | | | | | | | | | | | | | | | |
| 1000 | | | | | | | | | | | | | | | | | | | |

G24 = 7,5 W/1,5 W/9 VA (AC/DC 24 V)
 G230 = 7 W/1,5 W/12 VA (AC/DC 230 V)
 Gruner 342-15

G24 = 8 W/1,5 W/10 VA (AC/DC 24 V)
 G230 = 8,5 W/1,5 W/14 VA (AC/DC 230 V)
 Gruner 362-40

G24 = 16 W/3 W/20 VA (AC/DC 24 V)
 G230 = 17 W/3 W/28 VA (AC 230 V)
 2 × Gruner 362-40

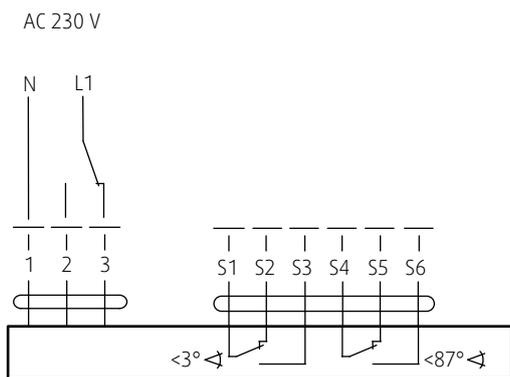


Fig. 54: B230 connection scheme; actuator BELIMO

NOTES:

- Caution! Main power supply voltage!
- Parallel connection of several actuators possible.
- Power consumption and switching thresholds must be observed!
- When power supply is connected to wires 1 and 3, actuator drives to position OPEN.
- When power supply is connected to wires 1 and 2, actuator drives to position CLOSED.
- Circuit switch between wires 2 and 3 is not part of the damper delivery.

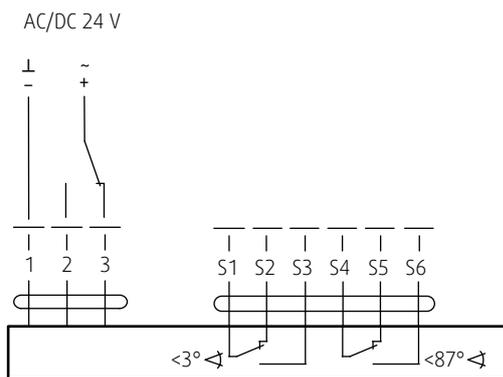


Fig. 55: B24 connection scheme; actuator BELIMO

NOTES:

- When power supply is connected to wires 1 and 3, actuator drives to position OPEN.
- When power supply is connected to wires 1 and 2, actuator drives to position CLOSED.
- Circuit switch between wires 2 and 3 is not part of the damper delivery.

AC/DC 24 V (B24)
AC 230 V (B230)

NOTES:

- Caution! Main power supply voltage!
- Supply via isolation transformer.
- Power consumption and switching thresholds must be observed!

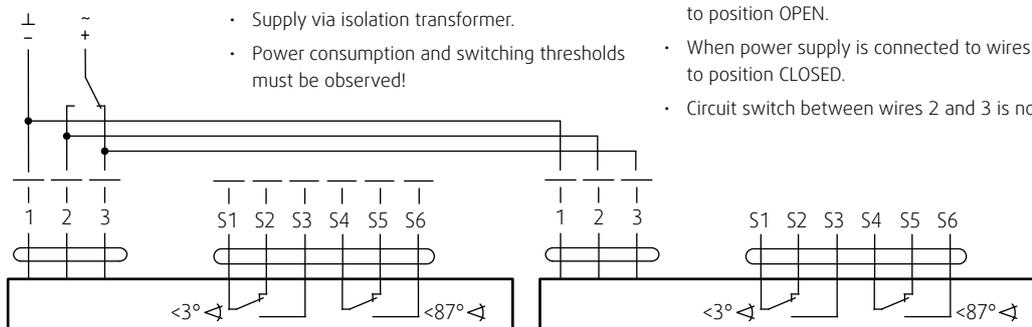
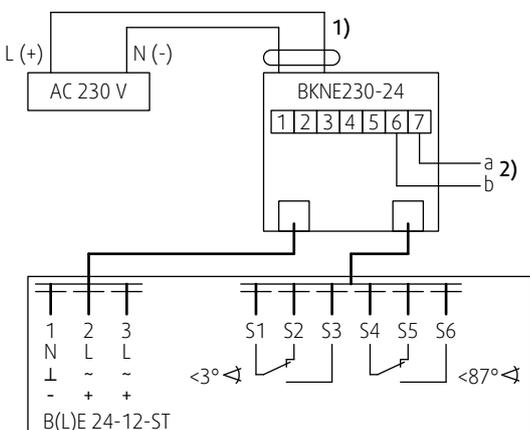


Fig. 56: Parallel connection of two coupled BELIMO actuators on one smoke damper

- When power supply is connected to wires 1 and 3, actuator drives to position OPEN.
- When power supply is connected to wires 1 and 2, actuator drives to position CLOSED.
- Circuit switch between wires 2 and 3 is not part of the damper delivery.



Legend

| | |
|----|----------------|
| 1) | Supply voltage |
| 2) | 2-wire cable |

NOTES:

- The actuator and the control module are factory wired.
- Connect the supply voltage to the connecting cable (approx. 1 m, with ferrules). 2-wire cable for signals (terminals 6 and 7).

Fig. 57: BST connection scheme; communication unit with BELIMO actuator

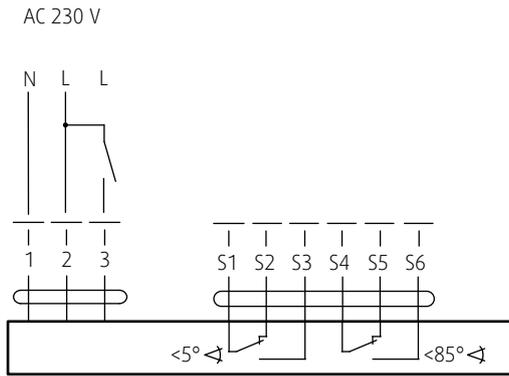


Fig. 58: G230 connection scheme; actuator GRUNER

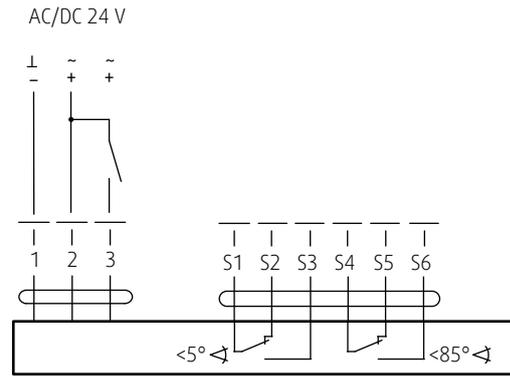


Fig. 59: G24 connection scheme; actuator GRUNER

NOTES:

- Caution! Main power supply voltage!
- Parallel connection of several actuators possible.
- Power consumption and switching thresholds must be observed!
- Connect power supply to wire 1+2, actuator drives to position OPEN (1).
Is also wire 3 connected to the power supply, actuator drives to position CLOSED (0).

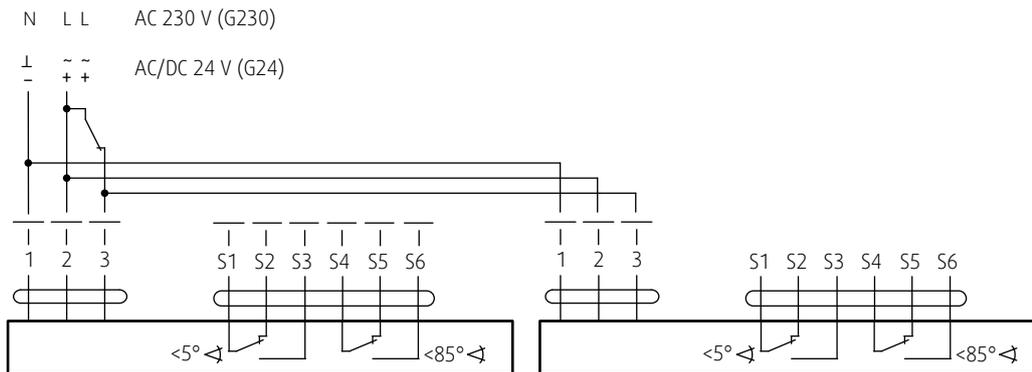


Fig. 60: Parallel connection of two coupled GRUNER actuators on one Smoke damper

NOTES:

- Caution! Main power supply voltage!
- Supply via isolation transformer.
- Power consumption and switching thresholds must be observed!
- Connect power supply to wire 1+2, actuator drives to position OPEN (1).
Is also wire 3 connected to the power supply, actuator drives to position CLOSED (0).

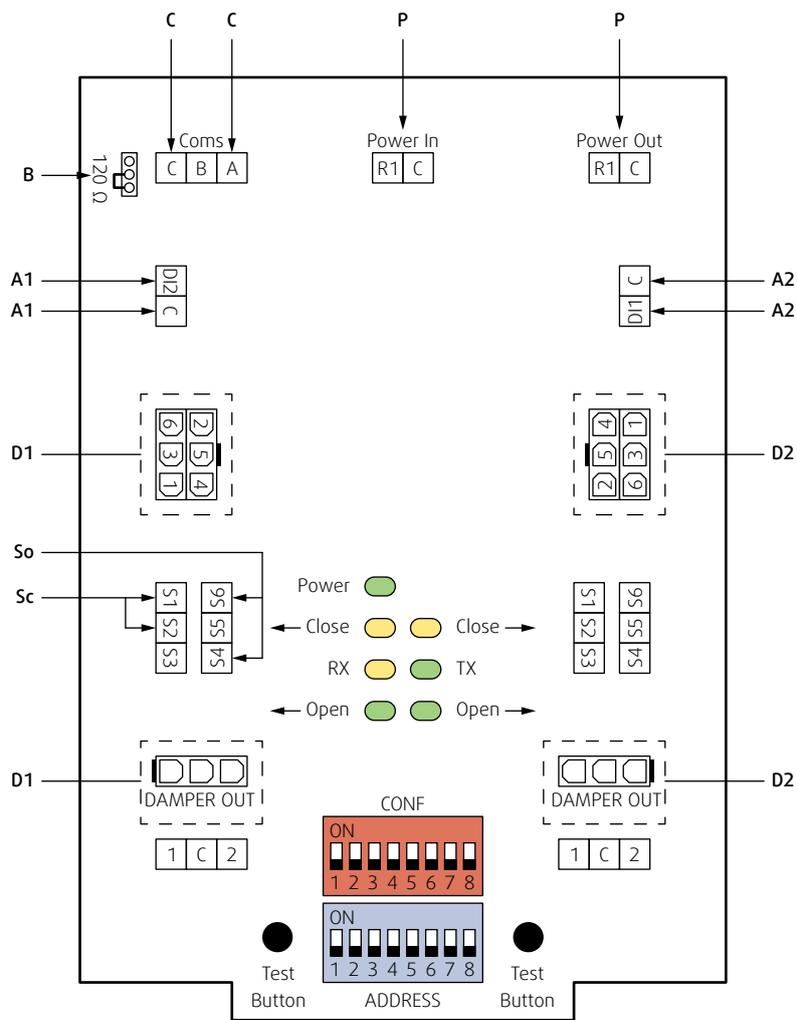


Fig. 61: GST connection scheme; communication unit with 1 or 2 Gruner actuators

Legend

| | |
|---------------|---|
| A1, A2 | Analog Application; Digital input for manual override Can be selected via bus as „Normally Open“ (= standard open) or „Normally Closed“ (= standard closed) Default: „Normally Open“ |
| B | Position of line termination 120 ohm if FS-UFC24-2 is last Modbus or BACnet device in line |
| C | RS-485 Coms; Modbus RTU or BACnet MS/TP dip switch selectable |
| D1, D2 | Damper 1, Damper 2; Fire or smoke extraction application |
| P | Main power 24 V AC/DC; Daisy chain from and to other FS-UFC24-2 |
| So | Contact open |
| Sc | Contact closed |

Operation Manual

After installation, it is necessary to adjust the damper into its operating position “closed”.

In case, that the damper is used for extraction of pollutants, adjust the damper into its operating position “open”.

Connect the actuator to the relevant electric power supply (🔗 Fig. 54 - Fig. 61).

The electromotor is activated and adjusts the damper into its operating position.

Smoke Damper Functionality Check

Switching the damper to the “open” position:

- The blade must come to the fully open position within 60 seconds and must remain locked.
- After reaching the end position of the blade, the appropriate signaling circuit must switch on
 - wires S1 and S2 must be connected.

Switching damper to the “closed” position:

- The blade must come up to the fully closed position within 60 seconds and must remain locked.
- After reaching the end position of the blade, the appropriate signaling circuit must switch on
 - wires S4 and S6 must be connected.

Smoke Damper Inspection

The actuator keeps the dampers on stand-by during their entire life cycle in accordance with this manual issued by the manufacturer. It is not permitted to alter the dampers in any way or to perform any changes to their structure without the manufacturer’s consent.

The operator performs regular checks of the dampers as per established regulations and standards at least once every 3 months.

The check needs to be performed by an employee who has been specifically trained for this purpose by the manufacturer. The current damper condition evaluated during the inspection must be entered into the 🔗 “Operating Journal” along with the date of the inspection, the legible name, surname and signature of the employee who performed the inspection. The Operating Journal includes a copy of the employee’s authorization. If any discrepancies are discovered, these need to be entered in the Operating Journal along with a proposal for their removal.

The Operating Journal can be found 🔗 on page 38 of this user manual.

Immediately after the installation and activation of the damper, it must be checked under the identical conditions as apply to the above mentioned six-month inspections. On its external side, the damper housing and the actuator movement are checked. Due to the need to perform a visual check of the damper’s internal parts, it is possible to dismount the body extension fitted with the grille, which will enable access inside the damper or open the inspection lid if the damper is equipped with one.

The damper’s internal casing, sealings, foaming substance, the damper blade condition and accuracy of its closure during its leaning against the backstop in the closed position must all be checked. There must not be any strange objects or a layer of impurities from the air distribution systems inside the damper.

NEVER OPEN THE INSPECTION LID WHEN THERE IS AIR FLOWING IN THE DUCT CONNECTED TO THE SMOKE DAMPER.

Recommended Course of Action and Inspection Log as per EN 12 101:

1. Identification of damper
2. Date of inspection
3. Check actuator wiring for damage
4. Check the wiring of the end switches for damage
5. Check the damper cleanliness and clean where necessary
6. Check the inspection lid, cover tightness
7. Check the blade and sealings, and correct and record where necessary (where applicable)
8. Check the damper functionality (open and close) as per the [“Smoke Damper Functionality Check”](#) chapter and confirm operation by using the control system, tracking the physical behavior of the damper and signalization of the end positions, and correct and record where necessary (where applicable).
9. The damper is part of the SHEVS. Therefore, the complete system must be checked as specified in its operational and maintenance requirements.
10. Set into the operating position – as per the [“Operation Manual”](#) chapter.
11. Record the result into the [“Operating Journal”](#) with the name and signature of the Inspection Technician.

Warranty Conditions

For warranty conditions, contact your local Systemair representative.

Functionality of every S-SA2 and S-SA2L smoke damper is tested in the production factory before being shipped.

Before you can install the fire damper, its functionality must be tested as per the [“Smoke Damper Functionality Check”](#) chapter.

DO NOT INSTALL NON-FUNCTIONING SMOKE DAMPERS.

Changes of smoke damper functionality caused by transport or installation are not reclaimable after installation (deformation, damages, mechanical damage of the sealing material, foreign objects which may constrain the blade movement, incorrect handling of the activation mechanism, etc.).

Operating Journal

| Activation of the Damper | | | |
|---|---|---|---|
| Mark the Applied Installation Method with a Cross: | | | |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|  1 Wet |  1A Wet |  1B Wet |  1C Wet |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|  3 Soft |  3A Soft |  3B Soft |  3C Soft |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|  L1V On a Duct |  L2V On a Duct |  L1H On a Duct |  L2H On a Duct |
| Date | Description of the Discovered Defects and the Date of the Following Inspection after the Elimination of Deficiencies. | Inspection Technician's Signature | |
| | | | |

| Periodic Damper Inspections – at Least Once Every 3 Months | | |
|--|--|-----------------------------------|
| Date | Description of the Discovered Defects and the Date of the Following Inspection after the Elimination of Deficiencies | Inspection Technician's Signature |
| | | |

| | |
|---|----------------------------------|
|  1396 | |
| Systemair Production a.s. 15 1396-CPR-0112 | |
| EN 12101-8:2011 Smoke control damper Multi compartment S-SA2 | |
| Nominal activation conditions/sensitivity | Automatic activation - passed |
| Closure/opening during test at correct time and in allowable time | |
| Response delay/closure time: | Automatic activation - passed |
| Operational reliability: | 10 000 operations - passed |
| Fire resistance: | |
| - Integrity E EI120(v_{ew}, h_{ow}, i↔o)S1500C_{mod}AAmulti - Insulation I - Smoke leakage S - Mechanical stability (under E) - Maintenance of cross section (under E) | |
| Durability: | |
| - of response delay | Pass |
| - of operational reliability | Pass |

| | |
|---|----------------------------------|
|  1396 | |
| Systemair Production a.s. 19 1396-CPR-0147 | |
| EN 12101-8:2011 Smoke control damper Multi compartment S-SA2L | |
| Nominal activation conditions/sensitivity | Automatic activation - passed |
| Closure/opening during test at correct time and in allowable time | |
| Response delay/closure time: | Automatic activation - passed |
| Operational reliability: | 10 000 operations - passed |
| Fire resistance: | |
| - Integrity E EI120(v_{ed}, h_{od}, i↔o)S1500C_{mod}AAmulti - Insulation I - Smoke leakage S - Mechanical stability (under E) - Maintenance of cross section (under E) | |
| Durability: | |
| - of response delay | Pass |
| - of operational reliability | Pass |

| Damper Identification | | | |
|-----------------------|--|----------------|--|
| Building Object | | Position No. | |
| Placement | | Identification | |
| Room No. | | Signalization | |

Warranty Service

| Date of Warranty Repair Notification | Date of Warranty Repair Finalization | Description of Warranty Repair Performed | Representative of the Manufacturer (Stamp, Signature) |
|--------------------------------------|--------------------------------------|--|---|
| | | | |
| | | | |
| | | | |