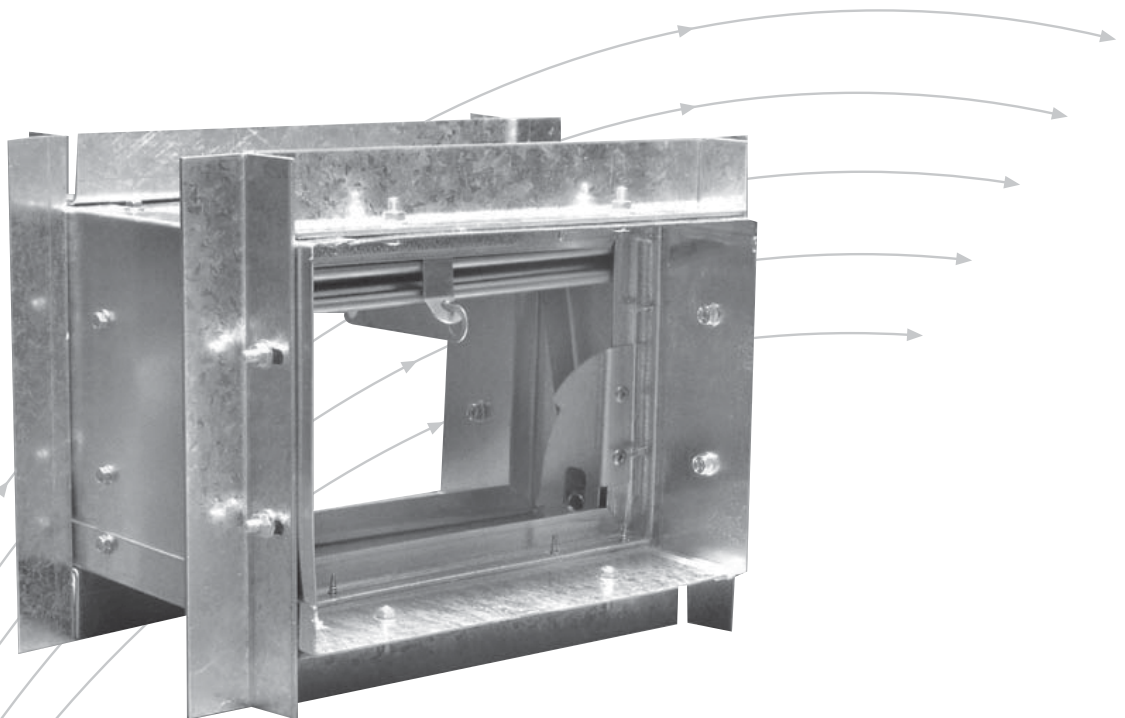


Fire Shutter Dampers

Type FSD/ FSP/ FSE



TROX[®] TECHNIK

TROX Malaysia Sdn. Bhd.
20 Persiaran Bunga Tanjung 1
Senawang Land Industrial Park
70400 Seremban
Negeri Sembilan Darul Khusus
Malaysia

Telephone + 606-678 8188
Telefax + 606-678 8288 / 388
E-mail enquiry@troxapo.com
www.troxapo.com

Description _____	2	Functional Description and Accessories _____	6
Construction · Dimensions and Materials _____	3	Technical data _____	7
Installation Details _____	5	Order details _____	8

The Fire Shutter Damper provides a means to isolate and prevent the spread of fire and products of combustion through mechanical and air conditioning ventilation systems.

The Type FSD/P/E damper is designed to be installed into walls or floor slabs. It is available in a wide range of sizes that are suitable for low and medium pressure system application.

Each damper module is fitted with a standard fusible link rated at 72 °C.

This damper has been tested successfully for up to **four hours** fire integrity to the **British Standard, BS 476 Part 20, 1987** and **Australian Standard, AS 1530.4, 1997**.

This damper has been approved by BOMBA, the Malaysian Fire Services Department and, the Hong Kong Fire Services Department (HKFSD) has given a letter of no objection.

Please note that the damper installation method, which includes the provision of access panel and breakaway joint (to be provided by the others), should meet the requirements of the local standards and fire authority's requirements.

Note: Silicon based sealant will be used on TROX 'FSD' Type fire dampers. If requested, special silicon free sealant can be applied to these dampers.

Construction · Dimensions · Materials

Type FSD

- The Fire Shutter Dampers are made from 1.2 mm thk sheet steel for the damper casing and 0.8 mm thk steel for the interlocking blades.
- This damper has a number of construction variants as indicated in Table 1 and, they are fitted with standard fusible link rated at 68°C or 72 °C.
- Where side seals are provided (i.e., construction variants BM and EM only) to minimise closed blade leakage between the damper blades and casing, The side seals are made from Grade 301 stainless steel.

Type FSP

This is of similar construction to Type FSD except for the damper blades are made from Grade 430 stainless steel.

Type FSE

Type FSE

This is of similar construction to Type FSD except for the damper casing and blades are made in 430 grade stainless steel.

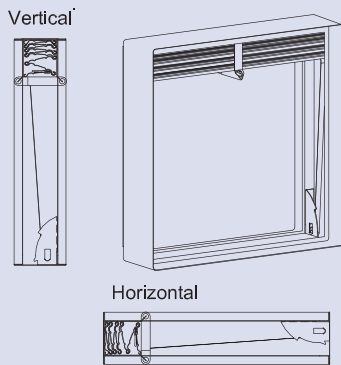
Note: Alternatively, Type 'FSP' or 'FSE' shutter damper can be manufactured in either 304 or 316 Grade stainless steel as optional extra, if required.

Table 1: Construction variants

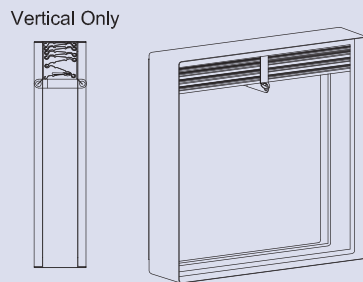
Construction Variants	Description	Installation
AM	With closing springs and catch plates. Blade pack located within air stream.	Vertical or horizontal mounting.
BM	As per AM above but including side seals.	Vertical or horizontal mounting.
CM	Blade pack within air stream but without closing springs, catch plates and side seals.	Suited for vertical mounting only.
DM	With closing springs, spigot connection and catch plates. Blade pack located outside the air stream.	Vertical or horizontal mounting.
EM	As per DM above but including side seals.	Vertical or horizontal mounting.

Note: The construction variants as indicated in the above are suitable for both low and medium system pressure applications.

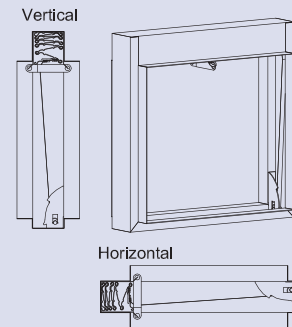
FSD-AM. Maximum duct size:
1m x 1m with single unit.
Minimum: 150mm x 150mm



FSD-CM. Maximum duct size:
1m x 1m with single unit.
Minimum: 450mm x 450mm

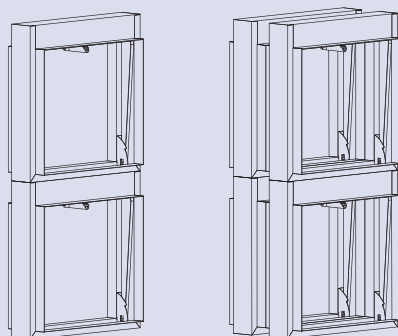


FSD-DM. Maximum duct size:
1m x 1m with single unit.
Minimum: 150mm x 150mm



Multiples and staged units to match all requirements.

Two or more can be linked to match duct size greater than 1m.
Staged units provide doubled duration protection.



Construction · Dimensions · Materials

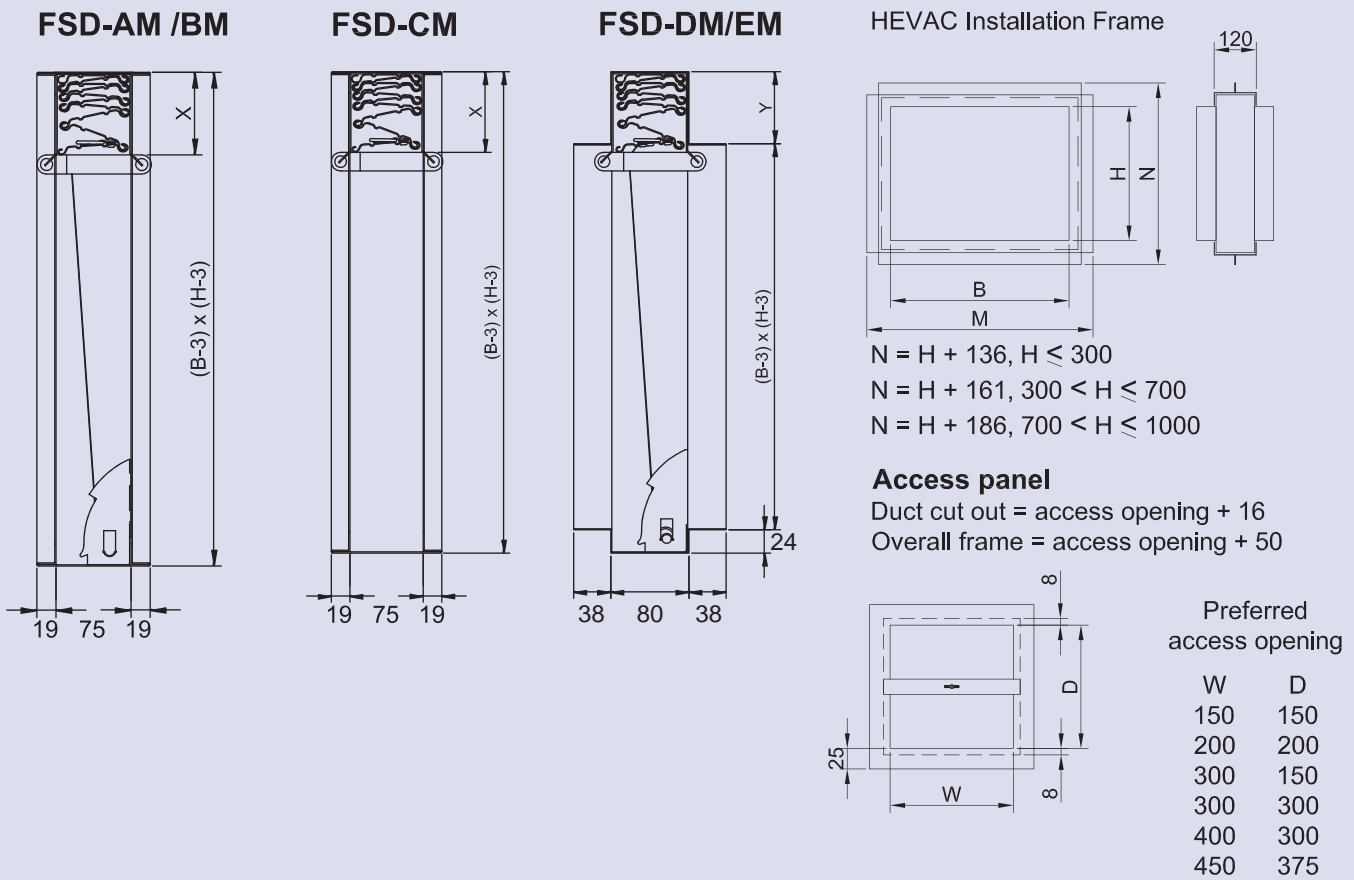


Table 2: Dimensions in mm

Height H(mm)	FSD X	FSD Y
150	34	49
200	34	49
250	49	49
300	49	49
350	49	74
400	49	74
450	74	74
500	74	74
550	74	74
600	74	74
650	74	74
700	74	74
750	74	99
800	74	99
850	99	99
900	99	99
950	99	99
1000	99	99

Table 3: Minimum and maximum module sizes

Type	Min. size B x H (mm)	Max. size B x H (mm)
FSD-AM	150 x 150	1000 x 1000
FSD-BM	150 x 150	1000 x 1000
FSD-CM	450 x 450	1000 x 1000
FSD-DM	150 x 150	1000 x 1000
FSD-EM	150 x 150	1000 x 1000

Note: Standard damper module sizes come in 50 mm increment of B or H dimension, where B and H should be regarded as the connecting duct dimensions

Installation Details

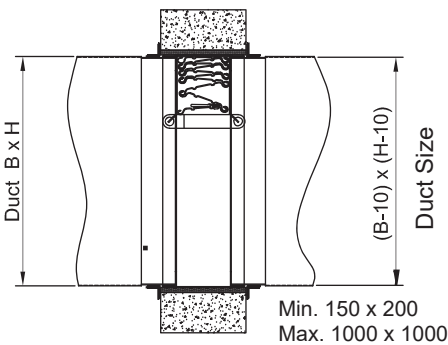
Installation with sleeve and retaining angles:

The damper should be installed centrally within the thickness of the wall or floor slab. The centre line of the damper casing as shown in the diagram below should be at least 50 mm from both faces of the wall or floor slab.

The gap between the damper casing and the opening should be maintained and filled with compressible non-combustible mineral wool to allow for thermal expansion. The minimum dimension of the expansion gap is given in the table below.

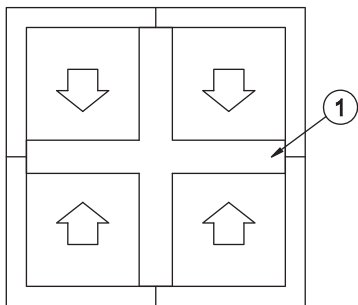
If the fire damper is connected to ductwork at both ends of the dampers, then the installer should provide access panel for access to the damper for inspection and maintenance purpose. The damper connection to the adjoining ductwork should have suitable breakaway joint. It should be noted however, that the installation of the fire damper must comply with the requirements laid down by the local fire authorities.

**Installation
Type FSD...P...E - AM.. - CM**



**Type FSD...P...E - AM.. - EM
(not Type FSD...P...E - CM)**

**Multiple Assembly in
Horizontal Mounting**



① Type U Channel Frame Suitable for FSD-DM/EM only.

When the damper is installed into the opening and locked in position with the retaining angles, it is recommended that the angles must overlap the opening by at least 25 mm¹ to ensure that the fire integrity of the damper installation is maintained.

Caution:

If the expansion gap is inadequate, the damper will not be able to close in the event of fire. However, if the expansion gap is too big, this may compromise the performance of the fire damper installed in the opening. To avoid any of this, TROX can offer the HEVAC frame which will overcome these potential problems, which are largely due to poor workmanship on site. This is only available with 'DM' and 'EM' construction variants. Kindly refer to TROX for more information.

¹ Note: For further information, refer to "Fire, Smoke and Radiation Damper Installation – Guide for HVAC Systems." Pub. SMACNA, 4th Edition, 1992.

Table 4: Expansion Gap

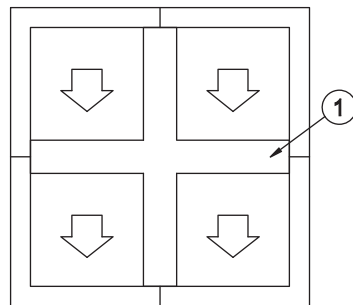
Damper Size B or H (mm)	Minimum clearance on each side of the casing
100 to 500	3 mm
501 to 1000	6 mm

Notes:

1. The provision of the expansion gap around the damper casing is critical to the performance of the fire damper in the event of a fire.
2. The sleeve 'B' and 'H' dimensions are designed for "S" cleat joints to the metal ductwork.

**Type FSD...P...E - AM.. - EM
(not Type FSD...P...E - CM)**

**Multiple Assembly in
Vertical Mounting**



Functional Description · Accessories

Optional damper closing mechanisms

a. Standard 72°C fusible release link

This device automatically releases the damper shutter blades to closed position when the air temperature surrounding the fusible release link reaches 72°C.

b. Electro-Thermal Link (ETL)

This device can be operated in either one of the following ways;

i. When the air temperature surrounding the ETL reaches 72°C similar to the standard fusible link as stated earlier.

ii. When it receives a low power signal from a smoke detector such as the TROX 'RM' Type smoke detector, this will cause the ETL to break and release the damper shutter blades to close fully.

Table 4: Damper position Indictors

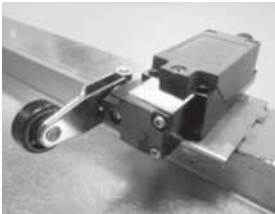
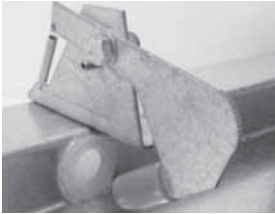

Accessories	Description
	Electrical limit switch to provide a remote indication of damper closure position.
	A local mechanical visual indicator to indicate damper position. <u>This is only available with 'DM' and 'EM' construction variants.</u>

Table 5: Optional accessories and product code

Description	Complete with	Product code
Base Holder with standard 72°C fuse link. 	<ol style="list-style-type: none"> Without additional accessory. With limit switch to indicate 'closed' position. With visual indicator to indicate damper closed position. With limit switch and visual indicator. (Note: This is only available with 'DM' and 'EM'). 	<p>Z00</p> <p>Z01</p> <p>Z02</p> <p>Z03</p>
Universal release holder with 72 °C fuse link. This device enables the closure damper test to be carried out easily and to re-load the fuse link with one hand.	<ol style="list-style-type: none"> Without additional accessory. With limit switch to indicate 'closed' position. With visual indicator to With limit switch and visual indicator. (Note: This is only available with 'DM' and 'EM'). 	<p>Z 08</p> <p>Z 09</p> <p>Z 10</p> <p>Z 11</p>

Fire Integrity Tests

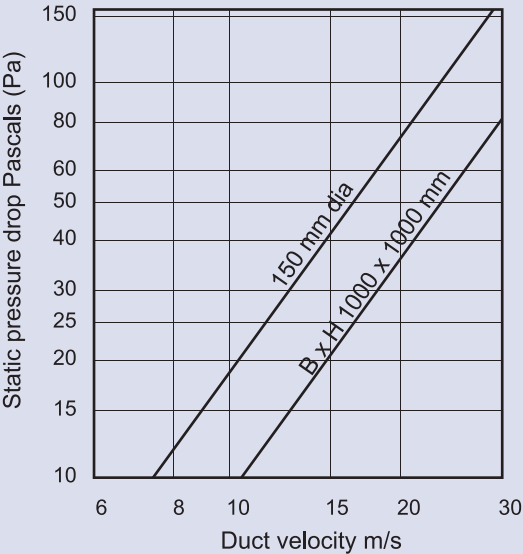
The Type FSD/FSP/FSE damper has been tested successfully by an independent fire test centre to;

- a. BS 476 Part 20, 1987 for FOUR hours.
- b. AS 1530.4, 1997 for FOUR hours.

The pressure losses across the damper are indicated in the graphs below for both construction variants with damper blades within and outside the air stream.

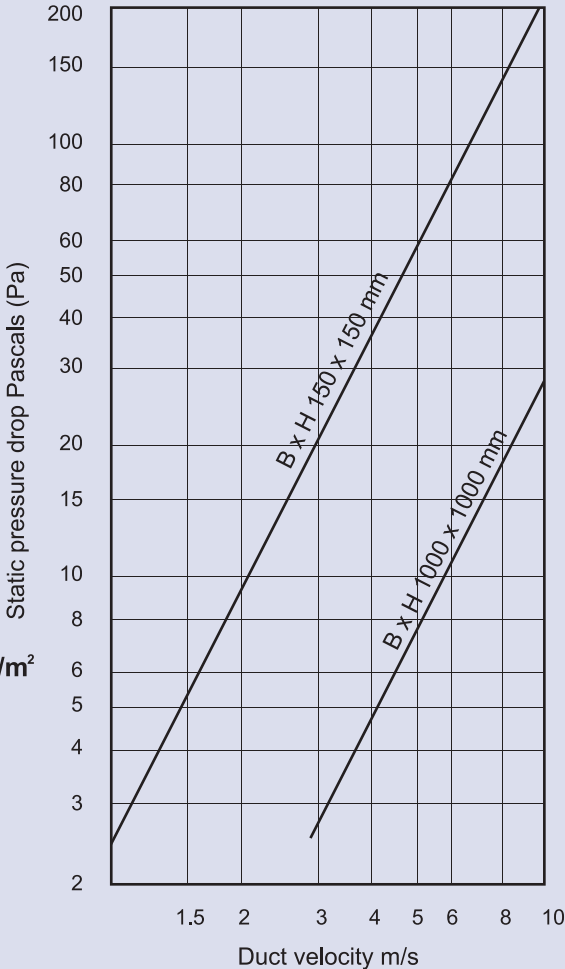
Pressure losses

Blades out airstream-FSD-DM...EM series



Note: 1Pa=1N/m²

Blades in airstream-FSD-AM...CM



General Specification:

This damper has been fully tested to BS 476 Part 20 and Australian Standard, AS 1530.4 for up to **4 hours fire integrity** by an independent fire test centre. It is designed for low and medium pressure applications only and is suitable for rectangular or circular ductwork connection. For high pressure system application, a special construction for this type of damper is available if required which will meet the requirements of British and Australian standards as stated above for 4 hours fire integrity.

The FSD-EM was tested for closed blade leakage test, which meets the requirements of Singapore Standard SS 333.

It can be installed to either horizontal or vertical ducting EXCEPT 'CM' type construction variant as stated in this catalogue. Standard 'FSD' Type damper is supplied with a 72°C fusible link to each module in the damper.

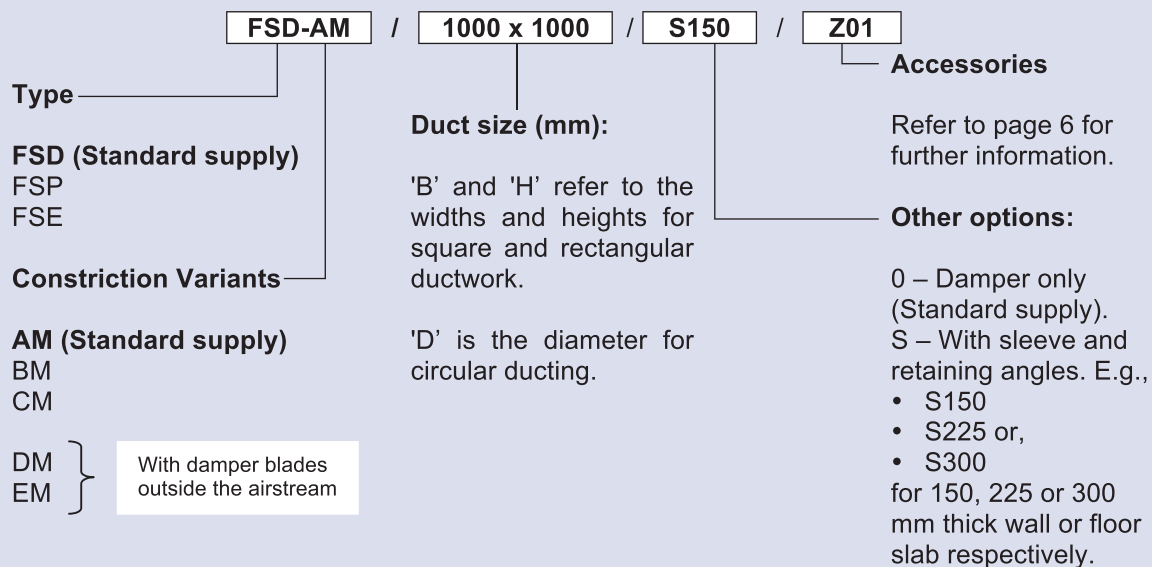
The maximum module size for this type of damper is 1000 mm (B) by 1000 mm (H) as stated clearly in the independent test report. Please take note of the minimum module size for this type of damper as stated in this catalogue.

Electric limit switch and mechanical visual indicator are available with this type of damper as optional extras, if required. Refer to page 6 of this catalogue for more information.

Materials:

For standard construction, this damper is made from galvanised sheet steel. Stainless steel construction for this type of damper is also available. For detail, please refer to this catalogue on page 3.

Order Code:



Order example:

Make: TROX
Type: FSD-AM/ 1000 x 1000/ 0/ 0/ Z01
Quantity: 10 nos.

Notes:

1. FSD-AM will be regarded as standard supply unless stated otherwise.
2. FSD-CM is only suitable for **vertical** mounting.