Fire and smoke damper
Since 1974, Systemair has been taking care of a vital resource. Today, the company is one of the global leaders in the field of ventilation technology. A success story which started in Skinnskatteberg, Sweden which has revolutionised the world of ventilation with the invention of the circular duct fan.
Since then, the company has continued to grow, and today it offers a complete range of standard-setting ventilation technologies. Whether it is the ventilation concept for a shopping mall, the controlled residential ventilation of a single-family home or the ventilation of tunnels and metro stations - Systemair experts are familiar with the conditions and have the necessary know-how. More than 4,100 employees in more than 56 subsidiaries in over 45 countries ensure the necessary proximity to the customer.
Systemair India

Systemair India Pvt. Ltd. (100% owned subsidiary of Systemair AB, Sweden) is having sales offices in 9 Cities- Noida, Bangalore, Chennai, Hyderabad, Kolkata, Pune, Mumbai, Ahmedabad, Cochin and 2 state-of-art, ultra modern manufacturing plants having 12000 m² area in Greater Noida & Hyderabad to support local market needs with minimum possible time for delivery. The Greater Noida unit is a LEED Certified Platinum Rated building. A team of more than 400 professionals are working for the company today, looking after sales, technical support, production and logistics.

Systemair India is a proud member of AMCA. We have build up a test rig in accordance to AMCA 210-07 at Greater Noida facility to test our products performance.

Core values and vision
- Core values - simplicity and reliability
- Mission - develop, manufacture and market high-quality ventilation products
- Trust - reliability and trust are most important factors to our customers.

Goals and strategies
- Innovative product development and extensive product range together with a focus on energy efficient ventilation products.
- High product availability and fast delivery through efficient production and logistics.
- Development and expansion of distribution network.
- Good relationships with installers, distributors and consultants to help Systemair to be perceived as a leading supplier of high quality ventilation products.
- To increase export business in Asian countries for Air handling Units and Air distribution products.
Modern and efficient production
• Over 12000 m² of production area in 2 factories.
• Greater Noida unit is LEED Certified Platinum rated Green Building
• Well invested and specialised factories.
• ISO Certification 9001:2008
• Strategy of modernising production facilities to keep quality and reducing lead time.

Certified products for clean indoors!!
• Focus on energy efficient, environment and user friendly products.
• Proud member of AMCA.
• Axial Fan are certified as per AMCA international.
• High temperature fans are certified as per EN12101-3 for 300°C for 2 hours.
• Follows ETL Testing Lab U.S.A for Performance testing of Air distribution products like Grilles & Diffusers.

• Combination Fire & Smoke dampers are certified & listed as UL555 & UL555 S for Class 1 leakage.
• Fire Damper series FSD-A-L, FSD-A-S are certified by UL.
• Fire dampers are certified by CBRI Roorkee (as per UL555 for 120 mins) and also certified as per BS-476 Part 20.
• Sound Attenuators certified in SRL, U.K for the static insertion loss as per BS 4718-1971.
• EUROVENT certified BA series of AHUs.
• BS/EN1886:2007 for strength of casing, tightness, thermal resistance, thermal bridging and Filter bypass leakage for AHU.
• EN13053 for air flow-static pressure performance, heat transfer and heat recovery performance.
Fire Safety in Ventilation Systems

Fire Safety

Regarding fire safety of ventilation systems, the most important is: To save lives and valuable inventory, and to ensure good working conditions for the rescue team. A fire occurrence must be limited before it develops into a disaster. Foremost to save lives, but also significant values may be lost. The requirements for personal safety and the emergency response capacity are very closely linked to the risk of fire spreading and stability of the building. Strategically, this means that in case of a fire, persons must be able to exit the building by themselves or with help from the rescue team.

Buildings – and especially inventory – contain an amount of combustible material. A correct fire safety of ventilation systems can prevent heat and smoke from spreading through the ventilation system. Should for example a too early destabilization of the building occur, a collapse can cause a disaster risk of a significant size. Fire safety in ventilation plants is thus necessary in modern buildings.

Fire control system

Systemair’s fire control system has been prepared for easy and simple installation; it is configurable and therefore extremely flexible. The fire control system contains all the necessary functions such as monitoring, testing and verifying the operation of fire- and smoke dampers, smoke dampers, smoke evacuation dampers, and communicating with the unit and possibly, the smoke extract fan.
Fire Safety in Ventilation Systems

Key features:
- Disables the dampers and disconnects the fan/unit in case of a fire
- Weekly tests of dampers and possibly, the smoke extract fan, to ensure that they are operational
- Manual testing is possible
- Ensures that the dampers are open during normal operation, and ventilation is functioning as planned
- When smoke-/fire is detected, you can choose to have all dampers closed and shut down the ventilation in the entire building or only in the current fire section
- Detailed error message on each damper
- 24 V supply and control via the bus system for each damper.

The fire control system consists of the following components:

Control panel
- Display for monitoring and setting of the necessary parameters
- Alarm readout for fire- and service alarms and alarm log
- Reset of the alarms above.
- Manual exercise of fire- and smoke dampers, smoke dampers, smoke evacuation dampers, and possibly, smoke extract fan
- Timer-setting for weekly exercise
- A control panel can be connected to max. 16 section controllers
- Event log for the latest 84 exercises and service receipts are saved automatically.

Section controller
- Max. 62 damper units can be controlled and monitored
- When using more than 62 dampers an extra section controller must be connected as a “slave”
- Smoke detector (max. 10 pcs.)
- Temperature sensor with reset on the control panel, 40 °C (default)
- Detailed error message on each damper
- Stop of the fan/unit
- External fire detection system or signal device
- Start and control of smoke fan
- Service signal
- Differential pressure transmitter for monitoring and control of fan
- IP 54 box enclosed
- Main power supply 230 V AC
- Power supply 24 V DC for 5 dampers
- The section controller can work without any control panel.

Damper module
- One damper module used by each fire- and smoke damper, smoke damper or smoke evacuation damper
- Mounting bracket included
- Terminals and cable clamp for connection of damper and bus cable.

Power supply
- The section controller can supply the first 5 dampers
- Hereafter use a power supply for every 8 dampers
- Max. 100 m cable to the farthest damper
- Max. total bus length 1200 m.

Smoke detector for duct type
- Smoke detector for measuring/detection of smoke in the duct system
- Air velocity between 0.2 and 20 m/s.

Temperature sensor type
- The temperature sensor detects a set temperature due to fire and transmit the signal to the section controller.

Differential pressure transmitter
- Differential pressure transmitter incl. connector and measure hose, detects the pressure in the duct and transmits the signal to the section controller
- Monitors the exhaust fan operation
- Control of smoke fan operation by weekly exercising
- Pressure control of the smoke fan in a fire situation.
Damper-secured system

Damper-secured systems are most suitable for usage in all buildings for daytime occupancy, where ventilation often will be stopped at night. These categories include for instance:

1: Offices, industrial and warehouse buildings, certain garages, outbuildings and airport.

2: Teaching rooms, school day-care centers, after-school facilities, day centers.

3: Shops, shopping malls, places of public assembly, meeting rooms, canteens, restaurants, cinemas, discotheques, theatres.

4: Elderly housing, treatment rooms and wards in hospitals, nursery homes, homes and institutions for people with physical or mental difficulties, nurseries and kindergartens.

Spreading of smoke and fire through the duct system

The duct system must be such designed, that the risk of smoke and fire spreading to other fire cells, fire sections or similar building units is not increased.

Penetration of fire sections must be ensured with fire- and smoke dampers BRS. Penetration of fire cells must be secured with smoke dampers RS. For usage category 1, 2 and 3, there will be some exceptions for penetration of fire cells, for example, if there is already established automatic fire alarm- and warning systems, sprinkler- and warning systems, smaller secondary rooms for short stay or if there is established a direct escape route to the outside from the room.

Systemair fire control system ensures that smoke dampers and fire- and smoke dampers closes by fire and by night stop.

Detection of fire must be made for each fire section in the exhaust duct. Smoke dampers between cells are activated by the shared detector of the current fire section.

At fire detection, you can choose to let supply- and exhaust fans continue to run, and only close the smoke dampers and fire- and smoke dampers that are operating the fire affected section.

Air intake- and exhaust dampers must also be closed. You can also choose to stop the supply- and exhaust fans. Then all smoke dampers and fire- and smoke dampers must close.

Weekly exercise of smoke dampers and ensuring that the dampers are open during normal operation. It is possible to do manual testing of dampers.
Smoke-ventilated system

Smoke-ventilated systems can be used in all buildings, but are especially suitable for usage in buildings whose upper floors are higher than 22 meters above the ground. Another category for example residential buildings & youth housing, where there is a requirement for 24 hours of operation of the ventilation system. In hotels, hostels, inns, dorms and guesthouses there is a requirement for full automatic fire alarm- & warning systems, if there are more than 10 beds.

Alternatively there must be established a damper-ensured system, which must be either for 24 hours of operation or with an automatic fire alarm- and warning system, which is required if there are more than 10 beds. Usage category 6 Elderly housing, treatment rooms and wards on hospitals, nurseryhomes, homes and institutions for people with physical or mental difficulties, nurseries and kinder- gardens. All buildings where a complete automatic fire alarm- and warning system is demanded.

A smoke-ventilated system must be such designed, that smoke in the system is discharged to the outside with reasonable safety. A smoke-ventilated system cannot be combined with fire-, flame- and/or smoke damper, which prevents the discharge of smoke that has entered the system. In a smoke-ventilated system, the smoke must run via a duct, by-passing parts of the system with large flow resistance or components in which the risk of clogging of the smoke particles from a fire is high. This includes filters, heat recovery components, heating- and cooling coils etc. A by-pass duct is equipped with a smoke evacuation damper that is closed at normal operation with voltage (currentless open). A smoke-ventilated system is generally performed as a duct class EI 30/E60 A2-s1,d0, which also includes ducts in installation shafts and unexploitable attics.

An exception to this is ducts in the ventilation room, ducts in the open air (outdoor) and ducts that only serve one fire section and are located within this. Ducts in an unexploitable attic, which only serves one fire section and are located within this, must be insulated with minimum 50 mm insulation class A2-s1,d0. Branches from a fire insulated duct should be fire insulated corresponding to the diameter of the branch, but a minimum of 0.2 m. For an extraction system, reasonable safety for the discharge of smoke to the outside can be achieved by: Smoke-ventilated system with smoke fan in operation, where all residential fire cells is performed with a minimum of 50 Pa smoke resistance. For supply air systems, where the extract system in the operated fire sections or similar fire units are designed as smoke-ventilated system, can reasonable safety for the discharge of smoke to the outside be achieved by: Converted system, where the supply air system is designed as a smoke-ventilated duct system, supplemented with a smoke fan or coupled with the smoke fan in the extract system.

All residential fire units are performed with a minimum of 30 Pa smoke resistance. A smoke resistance including connected ducts and possible flexible connections must everywhere be performed as material class A2-s1, d0 with a melting point of at least 850 °C. The smoke fan can be the extract fan for the normal operation or a separate fan exclusively for smoke extraction. The connection point for the smoke fan must be at or above the upper channel system branching to the operating area, so that smoke will not be sucked down into a duct system with branches.

A smoke fan must be able to withstand the occurring temperature for 60 min. after the fire has started, valid from a normal-temperature operating fan with a minimum of 1 hours operation and at an ambient temperature of 20 °C without cooling from wind or rain. Functional requirement is documented by manufacturer.

The temperature at the smoke fan is set as a mixing temperature, consisting of 945 °C from the fire room, and 20 °C from the remaining rooms (the mixing temperature must be at least 100 °C). The fire room is usually determined as the fire cell with the largest air volume - for systems with variable air volume, uses the maximum air volume rate. For calculation of the maximum flue gas temperature, the maximum air volume in the fire room is used. For remaining rooms, use diversity factor 0.2 for the difference in air volume between minimum and maximum air volume without inclusion of other diversity factors.

The air volume depends on the building’s density and is typically smaller than the air volume. The volume must be sufficient to ensure the system’s required smoke resistance, however pressure limited to a maximum of 100 Pa negative pressures at the upper branch to the operating area. This negative pressure must be maintained at maximum and minimum opening of diffusers and dampers in systems with variable air volume.
1. Scope

1.1 These requirements cover fire dampers that are intended for use where air ducts penetrate or terminate at openings in walls or partitions; in air transfer openings in partitions; and where air ducts extend through floors as specified in the Standard for Installation of Air-Conditioning and Ventilating Systems, NFPA 90A. Fire dampers are intended for installation in accordance with codes such as the BOCA National Mechanical Code, SBCCI Standard Mechanical Code, ICBO Uniform Mechanical Code, and the International Mechanical Code.

1.2 Fire dampers are evaluated for use as either:
   a) Fire Dampers for Static Systems - For HVAC systems that are automatically shut down in the event of a fire or for air transfer openings in walls or partitions,
   b) Fire Dampers for Dynamic Systems - For HVAC systems that are operational in the event of a fire,
   c) Combination Fire and Smoke Dampers - For locations in HVAC systems where a fire damper and a smoke damper are required at a single location, or
   d) Corridor Dampers - For locations in HVAC Systems where air ducts penetrate or terminate at openings in the ceilings of interior corridors when permitted by authority having jurisdiction.

1.3 Under these requirements a fire damper is subjected to a standard fire exposure, controlled to achieve specified temperatures throughout a specified time period, followed by the application of a specified standard hose stream. This exposure by itself is not representative of all fire conditions; conditions vary with changes in the amount, nature, and distribution of fire loading, ventilation, compartment size and configuration, and heat sink characteristics of the compartment. These requirements provide a relative measure of fire performance of fire damper assemblies under these specified fire exposure conditions. Any variation from the construction or conditions that are tested such as method of installation and materials has the potential to substantially change the performance characteristics of the fire damper assembly.

1.4 Fire dampers for static systems (no air flow through the damper) are intended to close automatically upon the detection of heat by a heat responsive device.

1.5 Under these requirements combination fire and smoke dampers, corridor dampers and fire dampers for dynamic systems are exposed to standardized heat and airflow conditions and are evaluated for dynamic closure under these conditions.

1.6 Combination fire and smoke dampers and corridor dampers shall also comply with the applicable requirements in the Standard for Smoke Dampers, UL 555S.

1.7 Fire dampers for dynamic systems are intended for use where the airflow is operational at the time of fire, such as in a smoke control system, or from other situations in which the fan system is operational at the time of a fire.

1.8 Where fire dampers are required in ducts that penetrate fire barriers and where the duct is also used as part of a smoke control system, the system designer shall ascertain which type of fire damper is appropriate for the application. Fire dampers for dynamic systems are evaluated only for dynamic closure under heated airflow conditions. Combination fire and smoke dampers and corridor dampers that have an elevated temperature rating are evaluated for dynamic closure under heated airflow conditions and they are also evaluated to operate under heated air conditions.

1.9 Tests conducted in accordance with these requirements are intended to demonstrate the performance of fire dampers during the period of fire test exposure and are not intended to determine
The acceptability of fire dampers for use after exposure to fire.

1.10 It is the intent that tests conducted in accordance with the test methods described herein develop data to enable regulatory authorities to determine the acceptability of fire damper assemblies for use in locations where fire resistance of a specified duration is required.

1.11 Fire dampers are intended to close automatically upon the detection of heat by the use of a fusible link or other heat responsive device.

1.12 These requirements do not cover:
   a) Performance of the fire damper assembly in walls, partitions, or floors constructed of materials other than those tested.
   b) The performance of the fire damper assembly when installed using methods other than those fire tested.
   c) Measurement of heat transmission through a fire damper assembly.
   d) Measurement of the degree of control or limitation of the passage of smoke or products of combustion through the fire damper assembly.

A summary of the tests required to qualify dampers to the standard is as under:

**Fire endurance test and hose stream test**

Dampers are exposed to a standard test fire for a period of either 1½ or 3 hours. This standard test fire is controlled to follow the time-temperature curve illustrated. Immediately after conclusion of this fire test, the dampers are subjected to a high pressure hose stream test during which water, at a nozzle pressure of 30 psi for 1½ hour dampers and 45 psi for 3 hour dampers is applied to the dampers from a distance of 20 ft. The hose stream test provides an extreme shock that ensures the dampers are structurally strong enough to withstand the rigors of the severest fire conditions.

**Operational reliability cycle test**

Fire Smoke Dampers intended for operation by gravity or spring force (not driven by an actuator) must be cycled open and closed 250 times. Fire Smoke Dampers that are driven by an electric or pneumatic actuator must be cycled open and closed (by their actuator) 20,000 times. If the Fire Smoke Damper is also intended for use as a volume control damper, it must be cycled open and closed (by its modulating actuator) 100,000 times. These operational cycling tests are accomplished prior to the temperature degradation and leakage tests (described below) and ensure that the damper will function reliably after repeated operations.

**Salt spray exposure test**

A damper sample is exposed to salt spray in a test chamber for a period of 120 hours. After this exposure, the damper must close (and latch if a latch is provided). This test demonstrates a damper’s ability to function after a more severe fouling than the damper is likely to experience during its intended application.
Smoke dampers are subject to the following test:

1. Cycling test
2. Temperature degradation/cycling test
3. Operation test
4. Air leakage test

Tests are carried out in accordance to the sequence as shown above on the same smoke damper.

Cycling test

The cycling test pre-conditions the smoke damper to become a used damper before other tests are carried out on the damper. A smoke damper shall continue to function as intended after being mechanically operated for 20,000 full-stroke (that is close and re-open) in operations, while using the recommended actuator.

Temperature degradation/Cycling test

The smoke damper (including its actuator) shall be subject this test before air leakage test. The smoke damper is position in an oven during the temperature degradation/cycling test. The elevated temperatures are to be in increments of 100°F (56°C), and the minimum temperature is to be 250°F (121°C). The damper is to be exposed to the elevated temperature, ±5 percent, for 30 minutes in the completely closed position. After the 30-minute period and while at the elevated temperature, the damper shall function as intended while being operated through three complete operation cycles. The closing time shall not exceed 75 seconds nor shall the reopening time of the damper exceed 75 seconds. The damper is to be cycled by using the actuator that has also been subjected to the test temperature.

Operation test

Following the completion of the leakage test, smoke damper is then subject to an operation test at ambient temperature to rated pressure and airflow. This test is bi-directional in that the smoke damper is tested with air flow from both directions. The smoke damper shall function as intended, and without damage to the dampers or their components and shall completely close, during each of three opening and closing cycles. The test pressures/differential created in the closed position shall be not less than the Leakage Classification rating (that is 1000, 2000, or 3000 Pa)

Leakage test

The smoke damper is subject to the leakage test at ambient temperature. The amount of leakage measured during this test shall determine the leakage class of the smoke damper, in accordance to the criteria set out in table below. This test is bi-directional in that the smoke damper is tested with air flow from both directions. The smoke damper used for this test is to be the one previously subject to the Cycling Test and Temperature Degradation/Cycling Test. The smoke damper is cycled 3 times before leakage measurements are taken.

Leakage classifications

<table>
<thead>
<tr>
<th>Classification</th>
<th>Leakage, ft³/min/ft² (m³/s/m²×196), at standard air conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>At 4.5 inches water (1.1 kPa)</td>
</tr>
<tr>
<td>I</td>
<td>8</td>
</tr>
<tr>
<td>II</td>
<td>20</td>
</tr>
<tr>
<td>III</td>
<td>80</td>
</tr>
<tr>
<td></td>
<td>At 8.5 inches water (2.1 kPa)</td>
</tr>
<tr>
<td>I</td>
<td>11</td>
</tr>
<tr>
<td>II</td>
<td>28</td>
</tr>
<tr>
<td>III</td>
<td>112</td>
</tr>
</tbody>
</table>

At 12.5 inches water (3.1 kPa)
Fire Damper
UL555 1 ½ Hour Fire Rating

Model FSD – A – L & FSD – A – S Fire damper is designed with 2v double skin aero foil blade, to be installed in static systems vertically.

Standard Construction

Frame: 2mm (14 gauge) galvanized steel. Formed from four hat channel shaped piece 165 mm wide having flanges for connecting damper to sleeve.

Blades: 1mm (20 gauge) galvanized steel, 2V groove style.

Linkage: Stainless steel, concealed in jamb seal

Bearings: Flange type bearing, pressed in to frame

Jamb Seals: 0.3mm thick stainless steel, flexible metal compression type

Blade Seals: Silicone edge type 250°F

Closure Device: Electric actuator connected with drive assembly

Damper Sizes

Minimum Size: 8” W x 8.54” H
Maximum Size: Single Section 36” W x 36” H Vertical Mount

Operation Control

Actuators: Electric 24 V, 230 V
Temperature Response Device

Options
- Retaining Angles supplied on customer demand
- Manual Reset Switch
- Open / Close Indication Switch
- ACCESS Door
- Flange on request

Model: FSD – A – L & FSD – A – S

Ratings

UL555 Fire Resistance Rating: 1 ½ Hour

UL CLASSIFIED
UL555 Listing R27629
Section details

Suggested specification

Fire dampers meeting or exceeding the following specifications shall be furnished and installed at locations shown on plans or as described in schedules. Dampers shall be classified for use for fire resistance ratings of less than 3 hours.

Dampers and their actuators shall be qualified in accordance with UL555. Appropriate electric actuators shall be installed by the damper manufacturer at time of damper fabrication.

Damper blades shall be 20 gauge galvanized steel 2V type with double skin aero foil. Damper frame shall be 14 gauge galvanized steel. Bush shall be stainless steel flange type rotating in extruded holes in the damper frame.

Damper must be rated for mounting vertically and be UL 555 rated for fire static systems. Each damper shall be supplied TRD sensor with suitable Actuator. The basis of design is Model FSD –A – L & FSD – A – S.
Combination Fire & Smoke Damper

UL555S 1 ½ Hour Fire Rating with Leakage Class I

Model FSD(FS)-A-L-F90-C1 and FSD(FS)-A-S-F90-C1, Combination fire & smoke damper designed with 2v double skin aero foil blade and qualified for closure in dynamic systems with velocities to 2000 fpm and pressures to 4" WC for vertical installation.

**Standard Construction**

**Frame:** 2mm (14 gauge) galvanized steel. Formed from four hat channel shaped piece 165 mm wide having flanges for connecting damper to sleeve.

**Blades:** 1mm (20 gauge) galvanized steel, 2V groove style

**Linkage:** Stainless steel, concealed in jamb seal

**Bearings:** Flange type bearing, pressed into frame

**Jamb Seals:** 0.3mm thick stainless steel, flexible metal compression type

**Blade Seals:** Silicone edge type 250°F

**Closure Device:** Electric actuator connected with drive assembly

**Damper Sizes**

**Minimum Size** 8" W x 8.54" H

**Maximum Size** Single Section 36" W x 36" H Vertical Mount

**Operation Control**

Actuators: Electric 24 V, 230 V

Temperature Response Device

**Options**

- Retaining Angles supplied on customer demand
- Manual Reset Switch
- Open / Close Indication Switch
- ACCESS Door
- Smoke Sensor
- Flange on request

**Model:**

FSD (FS)-A-L-F90-C1 & FSD (FS)-A-S-F90C1

**Ratings**

UL555S Fire Resistance Rating: 1 ½ Hour

Velocity: 2000 fpm

Pressure: 4 in. w. g.

Temperature: 250°F

UL CLASSIFIED

UL555 Listing R27629
Section details

Suggested specification

Combination fire & smoke damper meeting or exceeding the following specifications shall be furnished and installed at locations shown on plans or as described in schedules. Dampers shall be classified for use for fire resistance ratings of less than 3 hours, in accordance with UL555 and classified as Smoke Dampers in accordance with UL555S Standard. UL555S leakage rating shall be Leakage Class 1.

Dampers and their actuators shall be qualified in accordance with UL555S. Appropriate electric actuators shall be installed by the damper manufacturer at time of damper fabrication.

Damper blades shall be 20 gauge galvanized steel 2V type with double skin aero foil. Damper frame shall be 14 gauge galvanized steel. Bush shall be stainless steel flange type rotating in extruded holes in the damper frame.

Damper must be rated for mounting vertically and be UL 555 rated for fire static systems. Each damper shall be supplied TRD sensor with suitable Actuator. The basis of design is Model FSD (FS)–A–L–F90–C1 and FSD (FS)–A–S–F90–C1.
**Electrical connection diagram for damper control panel**

<table>
<thead>
<tr>
<th>EXTERNAL PANEL</th>
<th>TEMP. SENSE</th>
<th>DAMPER ACTUATOR</th>
<th>A.H.U</th>
<th>ALARM</th>
</tr>
</thead>
<tbody>
<tr>
<td>COM</td>
<td>N/C</td>
<td>BLK RED</td>
<td>-</td>
<td>+ O/P</td>
</tr>
</tbody>
</table>

**Actuator Connections**

- For spring return actuators, use connection nos. 1, 2, 3, 4, 5, 6 & 7.
- For non-spring return actuators, use connection nos. 1, 2, 3, 4, 5, 6, 7.
- Damper Status indications (OPEN/CLOSE) shall be available only if either AUX contacts or microswitch connections are done at points 4, 5, 6 & 7.

Wires from the heat detector (temperature sensor) provided with the control panel. In case heat detector (temperature sensor) is not used, keep these two points shorted with a piece of wire.

Wire from the common point & normally closed point of any operative relay on external panel (fire panel). Note that these two points should be at zero potential. Also, in case external panel (fire panel) is not used, keep these two points shorted with a piece of wire.
Fire and smoke damper control panel

- POWER
- TEST
- RESET

- DAMPER OPEN
- DAMPER CLOSE
- A.H.U. STATUS
- FAULT STATUS

1.5 metre power cable with 5AMP plug

- SW1 (FILTER)
- SW1 (MANUAL)

Dimensions:
- 175 mm x 123 mm
- 50 mm x 10 mm
- 10 mm x 175 mm

FOR WIRING
REMOVE THIS COVER

D = 6 mm
Installation and operation instructions:

a) Type of wall for vertically mounted damper: Masonry wall.
b) Inch (1/4" per feet) or 6.3 mm clearance is required on top and sides for expansions.
c) For installing damper in wall, we need sleeve and retaining angles.
d) Sleeve:

e) Sleeve thickness must be equal to or thicker than the duct connected to it.
f) Sleeve gauge required are listed in SMACNA fire, smoke and radiation damper installation guide for HVAC systems and in NFPA 90A. Sleeve must not exceed in length out of the wall as follows:

iv) Six inches (152.4mm) on one side and sixteen in (406.4mm) on damper side for fire dampers intended to be installed outside of wall on floor plane.
v) For sleeve gauge thickness – Refer NFPA 90(A) Table 3-4.6.3, where the sleeve gauge thickness mentioned according to the damper size (width/length). The material is of Galvanized Sheet Steel.

g) Retaining angles:
The perimeter mounting angles shall be M.S with a thickness 3.0 mm and size 40 X 40 mm. Minimum 1 in. overlap of angles to wall and require angles both sides of wall.

h) Damper sleeve attachment:

i) For attaching the fire damper and sleeve use screw at an intervals of 80 mm distance and 25 mm from the edges distance.

### Minimum sleeve thickness permitted in accordance with UL555

<table>
<thead>
<tr>
<th>Air duct diameter or maximum width</th>
<th>Minimum sleeve thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td>in/mm</td>
<td>in/mm</td>
</tr>
<tr>
<td>12 or less</td>
<td>305</td>
</tr>
<tr>
<td>13-30</td>
<td>330-762</td>
</tr>
<tr>
<td>31-54</td>
<td>787-1372</td>
</tr>
<tr>
<td>55-84</td>
<td>1397-2134</td>
</tr>
<tr>
<td>85 or more</td>
<td>2159</td>
</tr>
</tbody>
</table>

i) Six inches (152.4) on each side for fire dampers intended to be installed in the plane of a fire barrier and for use without an actuator or a factory installed access door in the sleeve.

ii) Six inches (152.4) on one side and 16 in (406.4mm) on the opposite side for fire dampers intended for use with an actuator and/or a factory installed access door on the longer side.

iii) Sixteen inches (152.4mm) on each side and fire dampers intended for use with an actuator on one side and a factory installed access door on the other side.
Damper – the mounting attachment (Retaining angle) are fastened on the perimeter of sleeve on both sides of damper as per wall thickness (where to install) with the help of M6 bolts at a distance of 75 mm from corner and 150mm pitch.

The connecting ducts should not be continuous and should be terminated at the sleeve or frame.

For the type of duct sleeve joint / connection, ref. (as per UL 555 Standards – Attached) – PLAIN “S” SLIP

Once the installation is finished the contractor should note / record complete operation of the damper. Also, on the damper performance the contractor should record the readings at every 3 months intervals, the complete operation of the damper from full close and full open position. By noting the time, date and maintenance engineer’s name and sign.

Screw to join sleeve/duct to damper frame
CERTIFICATE OF COMPLIANCE

Certificate Number: 20131231-R27629
Report Reference: R27629-20131230
Issue Date: 2013-DECEMBER-31

Issued to: SYSTEMAIR INDIA PVT LTD
A 19, SECTOR 64
NOIDA UP 201304 INDIA

This is to certify that representative samples of DAMPERS FOR FIRE BARRIER AND SMOKE APPLICATIONS
Fire Dampers for use in static systems

Have been investigated by UL in accordance with the Standard(s) indicated on this Certificate.

Standard(s) for Safety: UL555 -FIRE DAMPERS
Additional Information: See the UL Online Certifications Directory at www.ul.com/database for additional information

Only those products bearing the UL Classification Mark should be considered as being covered by UL’s Classification and Follow-Up Service.

The UL Classification Mark includes: UL in a circle: with the word “CLASSIFIED” (as shown); a control number (may be alphanumeric) assigned by UL; a statement to indicate the extent of UL’s evaluation of the product; and the product category name (product identity) as indicated in the appropriate UL Directory.

Look for the UL Classification Mark on the product.

William R. Casey, Director, North America Certification Programs
UL LLC

Any information and documentation involving UL Mark services are provided on behalf of UL LLC [UL] or any authorized licensee of UL. For questions, please contact a local UL Customer Service Representative at www.ul.com/contactus

Page 1 of 1
CERTIFICATE OF COMPLIANCE

Certificate Number: 20160202-R27629
Report Reference: R27629-20160202
Issue Date: 2016-FEBRUARY-02

Issued to: SYSTEMAIR INDIA PVT LTD
PLOT NO.-03, SECTOR-31
ECOTECH-1,SITE IV
KASNA
GREATER NOIDA UTTAR PRADESH 201308 INDIA

This is to certify that representative samples of DAMPERS FOR FIRE BARRIER AND SMOKE APPLICATIONS
Combination Fire and Smoke Dampers Models:
1.5 Hr. Fire endurance rating, Leakage Class I, Model FSD(FS)-A-L-F90-C1, FSD(FS)-A-S-F90-C1

Have been investigated by UL in accordance with the Standard(s) indicated on this Certificate.

Standard(s) for Safety:
UL 555, Standard for Safety for Fire Dampers
UL 555S, Standard for Smoke Dampers

Additional Information:
See the UL Online Certifications Directory at www.ul.com/database for additional information

Only those products bearing the UL Certification Mark should be considered as being covered by UL’s Certification and Follow-Up Service.

Look for the UL Certification Mark on the product.

Bruce Mahrenholz, Director North American Certification Program
UL LLC

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