Smoke protection pressure- (RDA) and stairway scavenging air systems (TSA)

Smoke protection pressure- and stairway scavenging air systems guarantee smoke control in staircases, airlocks, fireman lifts and anterooms in case of fire. This enables the use of escape routes for people in the building and thus the safe exit of the building.

A smoke protection pressure system (RDA) generates a specified differential pressure between escape routes and adjacent building areas using a supply air fan. Whenever escaping persons open the doors, which lead into the smoke controlled escape route, a flow of fresh air originates from the supply air fan immediately. This prevents the smoke from entering the escape route.

Lifesaving protection of escape routes through smoke protection pressure systems.
Even with opened doors, the smoke spreading is effectively prevented, so that the escape routes can be used without restrictions. In addition to the smoke control of escape routes, the RDA also cares for a significant reduction in building damages caused by smoke. The added smoke-free access for the firefighters to the fire floor allows a fast and effective fire fighting.

Stairway scavenging air systems (TSA) provides ventilation of the entire stairwell by using a fan. The dilution and discharge of smoke thus generated reduce the smoke gas concentration and increase the chances for a quick and successful self rescue for the people in the building significantly.
Regulations and approval

DIN EN 12101-6 contains detailed explanations and specifications to smoke protection pressure systems and stairway scavenging air systems. Additional requirements for smoke discharge, dilution of smoke and smoke control systems are included in the VDMA standard sheet 24188. Furthermore, the legal building guidelines of the specific state building code respectively the high-rise building regulations are to be taken into account.

In the planning phase the RDA has to be coordinated with the architect, without guaranteed fire protection concept and the responsible approval authority. After the installation and adjustment an acceptance inspection by an expert is carried out. With handover of the system equipment the operator receives a training onsite. The functional safety in case of emergency is ensured by the annual maintenance and regular inspections.

Type of system

The VDMA 24188 standard sheet distinguishes five types of smoke control systems:

1) Natural smoke extraction

The VDMA 24188 standard cases.

2) Scavenging air system

without controlled pressure maintenance.

3) Scavenging air system with controlled pressure maintenance without guaranteed release in the storey.

4) Smoke protection pressure system with guaranteed release in the storey.

5) Smoke protection pressure system with guaranteed release in the storey and redundant operating mode and emergency power supply.

Depending on the escape route situation and building height the right system type is defined on the basis of flowcharts for standard cases.

Release of the system

Smoke protection pressure systems are put into operation automatically by smoke detectors. Per door, which leads to the escape route one smoke detector each is to be provided. In anterooms the smoke detector has to be installed in front of their entrance door. Additionally at least one push-button detector must be installed in the access area. The release also can be made by the fire alarm system of the building.

Scavenging of the stairwell

Directly after the release the RDA starts with scavenging the stairwell. For the supply air discharge an opening surface of at least 1 m² is made in the stairwell head – e.g. by a RDA controlled light dome. Possibly penetrated smoke gases are already diluted in the initial phase by the RDA and discharged from the stairwell.

If exclusively a scavenging of the stairwell is requested a planning of a stairway scavenging air system (TSA) is useful. This supplies the stairwell with an air flow volume of more than 10,000 m³/h through which penetrated fire gases are diluted and discharged via the open dome light.

Overpressure build-up

After the initial scavenging a controlled overpressure must be build up between the stairwell and the fireman floor in order to ensure a smoke-free area.

For this a defined air flow volume enters the stairwell by using a fan. For an equal air supply in the stairwell, a supply air duct with air outlet grille must be provided in every third storey. Pressure sensors permanently measure the differential pressure in the stairwell.

The RDA-control provides automatically the stabilization of the differential pressure in the stairwell and a door-opening force of less than 100 N (measured on the door handle) by means of a speed control. With the doors closed in the stairwell the differential pressure between stairwell and adjacent unit is at least 15 Pa. This differential pressure prevents penetrating from smoke into the stairwell through gaps around the door.

Flow of air through doors

If escaping people open the doors, thus a pressure balance occurs immediately between the escape route and area on fire. In order that still no smoke can penetrate into the stairwell, fresh air must flow through the open door within the shortest time. For this fresh air is moved via supply air fan through the open door in direction of the area on fire. To achieve the required air flow velocity through doors a controlled discharge opening (e.g. window with servo motor, shaft) in the unit affected by the fire must be created, which is controlled by the RDA-control.

The air flow velocity to be maintained through the door depends on the expected smoke gas temperature and the corresponding protection targets:

- Self rescue of persons ≥ 0,75 m/s
- Firefighting support ≥ 2 m/s

Fireman lifts

Smoke protection pressure systems prevent through the build-up of a controlled overpressure the penetration of smoke gases in the elevator shaft of fireman lifts. In the fireman floor a louvre damper with a cross section of approx. 0,4 m² is opened by the RDA-control, so that a connection is made between elevator shaft and anteroom through which the supply air can flow out of the elevator shaft into the anteroom. If the door of the anteroom is opened in the case of fire, fresh air immediately flows through this with a velocity of at least 0,75 m/s. Therefore the complete fireman lift and its anterooms are held smoke-free by the RDA.

Estimation of the air flow rate

The layout of the right fan takes place in two steps via the determination of the necessary design air flow rate from the sum of the above mentioned protection targets:

1) Air leakage rate

The air leakage rate is to be injected after the release consistently into the stairwell to be able to build up the necessary overpressure. Leaks by which the overpressure escapes into the stairwell are e.g., door gaps and leaking connections between windows and the brickwork. Since the determination of the leakages is often very difficult, leakages not taken into account are compensated by the inclusion of a factor of 1,5.

2) Air flow rate to ensure the required door-flow velocity

Depending on door size and flow velocity the required flow volume is determined.

The final design air flow rate results from the sum of the above mentioned two air flow rates plus a deviation limit of 15 % for flow losses. The supply air fan is laid out on the basis of this design air flow rate as well as the object-specific pressure losses.

Estimation of a complete RDA

Based on the example of the system on page 7, figure 1.

1. Air flow rate in the stairwell:
   - T30 RS doors
   - Front door 550 m³/h
   - Window 50 m³/h
   - External walls 1575 m³/h
   - Internal walls 350 m³/h
   - Stairwell ceiling 4x Overflow valves 100 m³/h
   - Discharge via light dome 3000 m³/h
   - Sum total air leakage rate 4575 m³/h

2. Air flow rate for door flow:
   - 1x open door in safety stairwell, without necessary corridor (k = 1,8)

\[ V_d = k \cdot b \cdot h^{1.5} \]

= 24 650 m³/h

3. Design air flow rate:
   - 4 575 m³/h
   - 24 650 m³/h
   - 29 225 m³/h
   - Safety factor for flow loss (+15 %)
   - 33 609 m³/h

...which means: RDA 35

Helios Ventilation Systems

As a leading manufacturer of fans and ventilation systems Helios offers a wide range of products and fulfills in finest gradations all requirements on air flow rate and pressure. In the RDA and TSA service packages Helios medium pressure axial fans are used whose air flow rates are matched perfectly to smoke protection pressure- and stairway scavenging air systems. Modular designed system packages allow the individual adaptation to the project and thereby increase the planning flexibility and plant safety.

Helios Service

Helios offers a variety of services for the planning, implementation, start-up and approval of smoke protection pressure systems. Please contact us.

| Safety factor for undetected leak paths |
| Discharge via light dome |
| Total air leakage rate |

| Air leakage rates |
| Air flow rate |

| 1.050 m³/h |
| 4 575 m³/h |
| 24 650 m³/h |
| 29 225 m³/h |

Helios Service
Operating modes of smoke protection pressure- (RDA) and stairway scavenging air systems (TSA)

**Overpressure ventilating of stairways – Smoke protection pressure system (RDA)**

- **RDA-packages and their components**
  - Supply air fan
  - RDA-control
  - Light dome
  - Safety pressure switch
  - Pressure sensor
  - Smoke detector
  - Siren/Flashing light
  - Wind- and rain sensor
  - Temperature sensor
  - Ventilation key switch
  - Overflow valve
  - Door closer
  - Supply air intake
  - Discharge opening

**Legend – RDA-packages:**
- Service package RDA
- Smoke package RPT
- Ventilation package LPT
- Accessories
- Redundancy package RDP: 1 and 2

![Diagram of RDA system](image1)

**Operational mode RDA**

If smoke is detected in a unit the Helios RDA is released immediately and the stairwell is supplied through the supply air fan with fresh air. Through the opened light dome in the stairwell head a constant flow through the stairwell takes place with fresh air to dilute and discharge possibly entered smoke gases. In addition, an overpressure builds up in the stairwell, which prevents penetrating of smoke and thus ensures the smoke control of the escape routes. At the same time the RDA-control sends a signal to a servo motor, which opens a controlled discharge opening in the fireman floor. After the air has passed through the escape route and the opened door at a prescribed speed, it escapes through the controlled discharge opening to the outside. Fire gases are thereby held back also by a door opening, a smoke entry in the stairwell is effectively prevented.

**Scavenging of stairways - Stairway scavenging air system (TSA)**

- **TSA-packages and their components**
  - Supply air fan
  - TSA-control
  - Light dome
  - Safety pressure switch
  - Smoke detector
  - Push button alarm
  - Siren/Flashing light
  - Wind- and rain sensor
  - Temperature sensor
  - Ventilation key switch
  - Door closer
  - Supply air intake

**Legend – TSA-packages:**
- Service package TSA
- Smoke package RPT
- Ventilation package LPT

![Diagram of TSA system](image2)

**Operational mode TSA**

If units are endangered by smoke the Helios TSA will be released e.g. by a smoke detector. After the immediate, complete opening of the light dome in the stairwell head fresh air is transported into the stairwell via the supply air fan. The fresh air flows through the whole stairwell, dilutes at the same time the penetrated smoke gases and discharges them through the opened light dome into the atmosphere. A constant air flow rate of about 10,000 m³ / h ensures significant reduction of smoke gas concentration in the scavenged stairwell.
Helios protection pressure systems RDA provide in the case of fire through overpressure build-up for the safe smoke control of stairwells, air locks, fireman lifts and their anterooms. The complete RDA product range of Helios is made up of pre-configured packages with components coordinated on each other. The modular system allows:
- The individual expansion and adaptation to almost all structural conditions and project requirements.
- A trouble-free planning, installation and start-up as well as a safe operation.

### Description
Smoke protection pressure system with differential pressure regulation
By using a specially configured frequency inverter in combination with a powerful medium pressure axial fan and an innovative control technology, the Helios RDA meets all building regulations and normative requirements on the differential pressure regulation.

### Scope of delivery/Packages
The RDA scope of service is modularly structured in packages with coordinated components, which can be ordered individually:
- Service package RDA
  - Contains the following as a basis of each RDA, in all objects required components:
    - Medium pressure axial fan AMD. According to the table below in four sizes, depending on the required supply air flow volume.
- Redundancy package RDP
  - To fulfill the requirement of two independently operating fans and separate controls (Description see next page).

#### System sketch RDA
- Light dome, colour white, RAL 9010. With 24 V spindle drive and heat-insulated 300 mm GPF-skylight base.
- Control cabinet with complete RDA control, including frequency inverter. Expandable with multiple functions using pre-configured modules, see table on right side.
- Safety pressure switch and pressure sensor for the differential pressure regulation.

#### Start-up
Complete adjustment and start-up of the smoke protection pressure system. Including service-, smoke- and if necessary ventilation- and redundancy package. On request support of the acceptance procedure.

### Note
As standard, the RDA control is powered by the battery integrated in the control cabinet during a power failure for at least 72 hours. During this time the light dome can be opened in case of fire for natural smoke extraction.

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**RDA service package**

- **Description**
  - Smoke protection pressure system with differential pressure regulation

- **Scope of delivery/Packages**
  - The RDA scope of service is modularly structured in packages with coordinated components, which can be ordered individually:
    - Service package RDA
    - Redundancy package RDP

- **Start-up**
  - Complete adjustment and start-up of the smoke protection pressure system. Including service-, smoke- and if necessary ventilation- and redundancy package. On request support of the acceptance procedure.

---

**System sketch RDA**

**RDA control**
- Pressure sensor
- Safety pressure switch
- Smoke detector
- Push button alarm
- Windknob sensor
- Temperature sensor
- Clock timer
- Key switch
- Duct smoke detector

**RDA control (redundancy)**
- Light dome
- Smoke and fire alarm
- Air outlet at control air shunt
- Air outlet at fireman lift
- Controlled discharge opening

**RDA service package**

<table>
<thead>
<tr>
<th>Type</th>
<th>Ref. No.</th>
<th>Air flow volume (max.) m³/h</th>
<th>Type</th>
<th>Motor power (nominal) kW</th>
<th>Voltage</th>
<th>Current at full load A</th>
<th>Cabinet dimensions (mm)</th>
<th>Nominal dimensions (mm)</th>
<th>Lift effective (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RDA 20</td>
<td>4996</td>
<td>20000</td>
<td>AMD 560/2</td>
<td>7.5</td>
<td>400 x 690</td>
<td>3.9</td>
<td>800 x 1000 x 280</td>
<td>1200 x 1200</td>
<td>500</td>
</tr>
<tr>
<td>RDA 25</td>
<td>4997</td>
<td>25000</td>
<td>AMD 710/4</td>
<td>10.9</td>
<td>400 x 690</td>
<td>3.9</td>
<td>800 x 1000 x 280</td>
<td>1200 x 1200</td>
<td>500</td>
</tr>
<tr>
<td>RDA 35</td>
<td>4998</td>
<td>35000</td>
<td>AMD 800/4</td>
<td>11</td>
<td>400 x 690</td>
<td>2.1</td>
<td>800 x 1000 x 280</td>
<td>1500 x 1500</td>
<td>500</td>
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<tr>
<td>RDA 65</td>
<td>4999</td>
<td>65000</td>
<td>AMD 900/4</td>
<td>30</td>
<td>400 x 690</td>
<td>5.4</td>
<td>1000 x 1200 x 280</td>
<td>1500 x 1500</td>
<td>500</td>
</tr>
</tbody>
</table>

**Smoke package**
- Includes the system elements, which are necessary for the alerting and activation of the system. (Description see next page).

**Ventilation package**
- For an ideal, demand-driven ventilation (Description see next page).

**Redundancy package**
- To fulfill the requirement of two independently operating fans and separate controls (Description see next page).

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**Accessories for RDA**

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</thead>
<tbody>
<tr>
<td>RDA 20</td>
<td>4973</td>
<td>JKG 130/60 1300x600 4275</td>
<td>JKG 70/50</td>
<td>4979</td>
<td>JKG 80/50*</td>
<td>ASG-SSD 560 1421</td>
<td>RVS 560</td>
<td>2589</td>
<td>VR 560</td>
<td>1409</td>
<td>STS 560</td>
<td>1226</td>
<td>.2</td>
<td>1453/1455</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>RDA 25</td>
<td>4974</td>
<td>JKG 140/60 1400x600 4976</td>
<td>JKG 70/50</td>
<td>4979</td>
<td>JKG 80/50*</td>
<td>ASG-SSD 710 1423</td>
<td>RVS 710</td>
<td>2601</td>
<td>VR 710</td>
<td>1411</td>
<td>STS 710</td>
<td>1229</td>
<td>.2</td>
<td>1453/1455</td>
<td></td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>RDA 35</td>
<td>4975</td>
<td>JKG 150/80 1500x800 4977</td>
<td>JKG 70/50</td>
<td>4979</td>
<td>JKG 80/50*</td>
<td>ASG-SSD 800 1424</td>
<td>RVS 800</td>
<td>2602</td>
<td>VR 800</td>
<td>1412</td>
<td>STS 800</td>
<td>1233</td>
<td>.3</td>
<td>1367/1366</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>RDA 65</td>
<td>4976</td>
<td>JKG 160/140 1600x1400 4978</td>
<td>JKG 70/50</td>
<td>4979</td>
<td>JKG 80/50*</td>
<td>ASG-SSD 900 1399</td>
<td>RVS 900</td>
<td>2603</td>
<td>VR 900</td>
<td>1311</td>
<td>STS 900</td>
<td>1234</td>
<td>.3</td>
<td>1367/1369</td>
<td></td>
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</tr>
</tbody>
</table>

* The fireplace lift is a separate fire section. The installation of the damper JKG 80/50 must be coordinated in advance with the approval authorities or the fire protection planner.

1) When using the redundancy package, cabinet dimension on request.
System packages
Smoke package
Smoke protection pressure system RDA

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>Ref.No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>RPT</td>
<td>Smoke package</td>
<td>4987</td>
</tr>
<tr>
<td></td>
<td>Contains the following components:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Smoke detector,</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Push button alarm</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Combined unit with siren and flashing light</td>
<td></td>
</tr>
<tr>
<td></td>
<td>The package components are also available individually as accessories, see description right column.</td>
<td></td>
</tr>
</tbody>
</table>

Accessories
Smoke detector
Smoke detector for the automatic activation of the system in case of smoke detection. Simple installation by bayonet lock and local test option.

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>Ref.No.</th>
<th>Voltage</th>
<th>Standby current</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>RMR</td>
<td>Smoke detector</td>
<td>4984</td>
<td>8-30 V DC</td>
<td>50 µA</td>
<td>Ø 105 x H 58</td>
</tr>
</tbody>
</table>

Push button alarm
Push button alarm for the manual activation of the system. Easy replaceable glass pane in the lockable casing.

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>Ref.No.</th>
<th>Voltage</th>
<th>Colour</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>DKM</td>
<td>Push button alarm</td>
<td>4985</td>
<td>24 V DC</td>
<td>RAL 2011</td>
<td>W 123 x H 123 x D 40</td>
</tr>
</tbody>
</table>

Siren/Flashing light
Combined unit with xenon flashing light and volume-adjustable siren. Protected in impact resistant polymer casing, for ceiling and wall mounting.

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>Ref.No.</th>
<th>Voltage</th>
<th>Rated current</th>
<th>Sound level</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>BLH</td>
<td>Siren/Flashing light</td>
<td>4983</td>
<td>18-30 V DC</td>
<td>170 mA</td>
<td>ca. 110 dB</td>
<td>Ø 93 x H 120</td>
</tr>
</tbody>
</table>

Duct smoke detector
Duct smoke detector for early detection of smoke gases in the supply air intake.

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>Ref.No.</th>
<th>Voltage</th>
<th>Standby current</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>RMK</td>
<td>Duct smoke detector</td>
<td>4982</td>
<td>12/24 V DC</td>
<td>120 µA</td>
<td>W 370 x H 128 x D 64</td>
</tr>
</tbody>
</table>

Overflow valve
Overflow valve DN 200 for pressure balance between the pressurized stairwell and its adjoining air locks. Pressure adjustment range 15-50 Pa. Required wall thickness min. 210 mm. Diameter mm Ø 200

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>Ref.No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>UV200</td>
<td>Overflow valve</td>
<td>4981</td>
</tr>
</tbody>
</table>

Volume control damper with guard
with 24V servo motor and safety guard for the supply air shaft. Dimensions mm W 700 x H 500 x D 120

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>Ref.No.</th>
</tr>
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<tbody>
<tr>
<td>JKG70/50</td>
<td>Volume control damper with guard</td>
<td>4979</td>
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</table>

Connection options to RDA controls

<table>
<thead>
<tr>
<th>Type</th>
<th>Quantity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>RMR</td>
<td>10 x</td>
<td>Smoke detector</td>
</tr>
<tr>
<td>RMK</td>
<td>1 x</td>
<td>Duct smoke sensor</td>
</tr>
<tr>
<td>AMD..</td>
<td>1 x</td>
<td>Medium pressure axial fan</td>
</tr>
<tr>
<td>DDR</td>
<td>1 x</td>
<td>Pressure sensor</td>
</tr>
<tr>
<td>BLH</td>
<td>1 x</td>
<td>Siren/Flashing light</td>
</tr>
<tr>
<td>DKB</td>
<td>1 x</td>
<td>Push button alarm</td>
</tr>
<tr>
<td>KJG..</td>
<td>2 x</td>
<td>Volume control damper</td>
</tr>
<tr>
<td>LK..</td>
<td>1 x</td>
<td>Light dome with 24V spindle drive</td>
</tr>
<tr>
<td>DSB</td>
<td>1 x</td>
<td>Safety pressure switch</td>
</tr>
<tr>
<td>LPT</td>
<td>1 x</td>
<td>Ventilation package</td>
</tr>
</tbody>
</table>

Extension modules for RDA controls (for integration in control cabinet)

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>Ref.No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>EM 1</td>
<td>for 5 additional supply air dampers with 24V</td>
<td>4968</td>
</tr>
<tr>
<td>EM 2</td>
<td>for 20 additional smoke detectors RMR</td>
<td>4969</td>
</tr>
<tr>
<td>EM 3</td>
<td>for 10 additional push button alarm DKM</td>
<td>4970</td>
</tr>
<tr>
<td>EM 4</td>
<td>Additional output 24V DC, max. 4A (e.g. window in stairwell)</td>
<td>4971</td>
</tr>
<tr>
<td>EM 5</td>
<td>For the control of up to 20 free-swinging door closers</td>
<td>4972</td>
</tr>
<tr>
<td>EM 6</td>
<td>Selective damper control 24V (each floor)</td>
<td>4973</td>
</tr>
<tr>
<td>EM 7</td>
<td>Selective detector analysis (each floor)</td>
<td>4940</td>
</tr>
</tbody>
</table>
**TSA Service package**

**System sketch TSA**

**Description**
- **Stairway scavenging air system TSA**
  The TSA supplies the stairwell in case of fire with a supply air flow volume of at least 10,000 m³/h. Thus the entered smoke gases are diluted and discharged through the open skylight in the stairwell head.

**Scope of delivery/Packages**
- The TSA scope of service is modularly structured in packages with coordinated components, which can be ordered individually:
  - Service package TSA
  - Contains the following as a basis of each RDA, in all objects required components
    - High performance medium pressure axial fan AMD with a supply air flow volume of at least 10,000 m³/h for air scavenging of the stairwell.
    - Light dome, colour white, RAL 9010. With 24 V spindle drive and heat-insulated 300 mm GFP skylight base.
    - Control cabinet with complete TSA control. Expandable with multiple functions using pre-configured modules, see table on right side.
    - Safety pressure switch to shut off the supply air fan at too high differential pressure.
  - Altogether four service packages are available
    - Standard version TSA as well as silent version TSAS with lower sound power level.
    - Both types are optionally available as "L"-version with two-stage fan. This allows in combination with the ventilation package LPT an economic, demand-driven ventilation.

**Ventilation function**
- Using appropriate control cabinet and additional ventilation packages the TSA service packages "L" allow the manual and automatic stairwell ventilation, e.g. at high temperatures in summer.

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**TSA Service package includes**

<table>
<thead>
<tr>
<th>Type</th>
<th>Ref. No.</th>
<th>a) Supply air fan</th>
<th>b) Control cabinet</th>
<th>c) Light dome</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Volume flow volume (m³/h)</td>
<td>Motor power (nominal)</td>
<td>Current at full load</td>
</tr>
<tr>
<td></td>
<td></td>
<td>m³/h</td>
<td>kW</td>
<td>V</td>
</tr>
<tr>
<td>TSA</td>
<td>4992</td>
<td>10000</td>
<td>AMD 450/2</td>
<td>3.0</td>
</tr>
<tr>
<td>TSA-L</td>
<td>4963</td>
<td>10000</td>
<td>AMD 450/4/2</td>
<td>0.8/3.1</td>
</tr>
<tr>
<td>TSAS</td>
<td>4964</td>
<td>10000</td>
<td>AMD 560/4</td>
<td>2.2</td>
</tr>
<tr>
<td>TSAS-L</td>
<td>4965</td>
<td>10000</td>
<td>AMD 560/4/8</td>
<td>0.65/2.4</td>
</tr>
</tbody>
</table>

**Accessories for TSA**

<table>
<thead>
<tr>
<th>Type</th>
<th>Ref. No.</th>
<th>Bell mouth with guard</th>
<th>Automatic back draught shutter</th>
<th>Extension duct</th>
<th>Flanged flexible connector</th>
<th>Anti vibration mounts SBD Comp./SD2 Susp.</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSA</td>
<td>JK 70/50</td>
<td>70x500 4965 ASO-SGD 450 1419</td>
<td>RVS 450 2597</td>
<td>VR 450 1407</td>
<td>STS 450 1224</td>
<td>.../...</td>
</tr>
<tr>
<td>TSA-L</td>
<td>JK 70/50</td>
<td>70x500 4965 ASO-SGD 450 1419</td>
<td>RVS 450 2597</td>
<td>VR 450 1407</td>
<td>STS 450 1224</td>
<td>.../...</td>
</tr>
<tr>
<td>TSAS</td>
<td>JK 70/50</td>
<td>70x500 4965 ASO-SGD 560 1421</td>
<td>RVS 560 2599</td>
<td>VR 560 1409</td>
<td>STS 560 1226</td>
<td>.../...</td>
</tr>
<tr>
<td>TSAS-L</td>
<td>JK 70/50</td>
<td>70x500 4965 ASO-SGD 560 1421</td>
<td>RVS 560 2599</td>
<td>VR 560 1409</td>
<td>STS 560 1226</td>
<td>.../...</td>
</tr>
</tbody>
</table>

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**Smoke package RPT**
- Includes the system elements, which are necessary for the alerting and activation of the system (Description see next page).

**Ventilation package LPT**
- For an ideal, demand-driven ventilation of TSA-L and TSAS-L (Description see next page).

**Start-up**
- Complete adjustment and start-up of the stairway scavenging air system. Including service-, smoke- and ventilation package.
- On request support of the acceptance procedure.

**TSAS-L JK 70/50**
- 700x500 4965
- 1419
- RVS 450 2597
- VR 450 1407
- STS 450 1224
- .../...
- 2/1.2
- 1437/1435

**TSAS JK 70/50**
- 700x500 4965
- 1419
- RVS 560 2599
- VR 560 1409
- STS 560 1226
- .../...
- 3/1.3
- 1367/1365

**TSAS-L JK 70/50**
- 700x500 4965
- 1421
- RVS 560 2599
- VR 560 1409
- STS 560 1226
- .../...
- 3/1.7
- 1367/1929
System packages

Smoke package

RPT Ref.No. 4987
Contains the following components (1 piece each):
- Smoke detector,
- Push button alarm,
- Combined unit with siren and flashing light.
The package components are also available individually as accessories, see description right column.

Smoke package

Ventilation package

LPT Ref.No. 4986
Extends the RDA function to the demand-driven ventilation mode (summer): With open dome light, the fan runs on low speed. Content of the package for activation of the ventilation mode (1 piece each):
- Key switch
- Temperature sensor
- Timer
- Wind- and rain sensor, stops the ventilation in bad weather and closes the dome light.

Note

As standard, the RDA control is powered by the battery integrated in the control cabinet during a power failure for at least 72 hours. During this time the light dome can be opened in case of fire for natural smoke extraction.

Connection options to TSA controls

<table>
<thead>
<tr>
<th>Type</th>
<th>Quantity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>RMR</td>
<td>10 x</td>
<td>Smoke detector</td>
</tr>
<tr>
<td>RMK</td>
<td>1 x</td>
<td>Duct smoke detector</td>
</tr>
<tr>
<td>AMD..</td>
<td>1 x</td>
<td>Medium pressure axial fan</td>
</tr>
<tr>
<td>BLH</td>
<td>1 x</td>
<td>Siren/Flashing light</td>
</tr>
<tr>
<td>DKM</td>
<td>10 x</td>
<td>Push button alarm</td>
</tr>
<tr>
<td>JKG..</td>
<td>2 x</td>
<td>Volume control damper with 24 V servomotor</td>
</tr>
<tr>
<td>LK..</td>
<td>1 x</td>
<td>Light dome with 24 V spindle drive</td>
</tr>
<tr>
<td>DDB</td>
<td>1 x</td>
<td>Safety pressure switch</td>
</tr>
<tr>
<td>LPT</td>
<td>1 x</td>
<td>Ventilation package</td>
</tr>
</tbody>
</table>

Accessories

Smoke detector

RMR Ref.No. 4984
Smoke detector for the automatic activation of the system in case of smoke detection. Simple installation by bayonet lock and local test option.
Voltage 8-30 V DC
Standby current 50 µA
Dimensions mm Ø 105 x H 58

Push button alarm

DKM Ref.No. 4985
Push button alarm for the manual activation of the system. Easy replaceable glass pane in the lockable casing.
Voltage 24V DC
Colour RAL 2011
Dimensions mm W 123 x H 123 x D 40

Siren/Flashing light

BLH Ref.No. 4983
Combined unit with xenon flashing light and volume-adjustable siren. Protected in impact resistant polycarbonate casing, for ceiling and wall mounting.
Voltage 18-30 V DC
Rated current 170 mA
Sound level ca. 110 dB
Dimensions mm Ø 93 x H 120

Duct smoke detector

RMK Ref.No. 4982
Duct smoke detector for early detection of smoke gases in the supply air intake.
Voltage 12/24 V DC
Standby current 120 µA
Dimensions mm W 370 x H 128 x D 64

Extension modules for TSA controls (for integration in control cabinet)

<table>
<thead>
<tr>
<th>Type</th>
<th>Ref.No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>EM 1</td>
<td>4968</td>
<td>for 5 additional supply air dampers with 24V</td>
</tr>
<tr>
<td>EM 2</td>
<td>4969</td>
<td>for 20 additional smoke detectors RMR</td>
</tr>
<tr>
<td>EM 3</td>
<td>4970</td>
<td>for 10 additional push button alarm DKM</td>
</tr>
<tr>
<td>EM 4</td>
<td>4971</td>
<td>Additional output 24V DC, max. 4A (e.g. window in stairwell)</td>
</tr>
<tr>
<td>EM 5</td>
<td>4972</td>
<td>for the control of up to 20 free-swinging door closers</td>
</tr>
</tbody>
</table>