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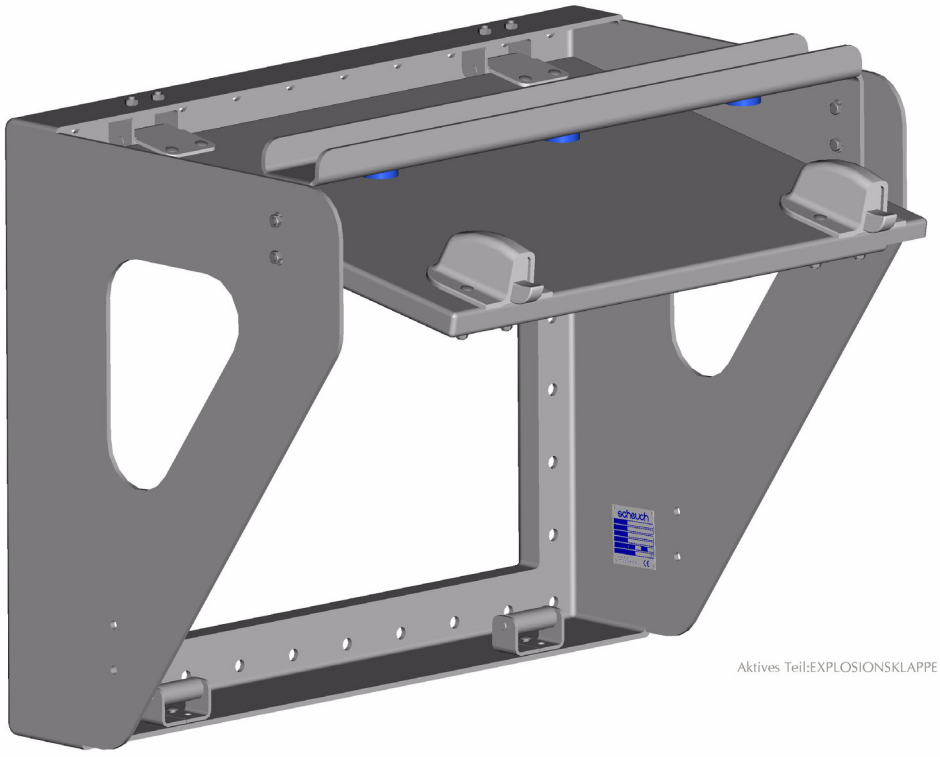
OPERATING MANUAL

Scheuch-Explosion Flap

sfz exk-668x525-0,3
sfz exk-668x525-0,6



All the instructions given in this operating manual must be read, understood and observed, otherwise a hazardous situation could arise and the function of the Scheuch explosion flap is not assured. Immediately contact Scheuch if any of the points are unclear!

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1. EC-Declaration of Conformity

The manufacturer **Scheuch GmbH**
Weierfing 68
A-4971-Aurolzmünster

hereby declares that the following products,

Scheuch Explosion flaps **sfz exk-668x525-0,3**
sfz exk-668x525-0,6

in their standard design, correspond to all applicable provisions of the following Directive:

2006/42/EC Directive on machinery

The following harmonised standards were applied:

EN ISO 12100 Safety of machinery - General principles for design - Risk assessment and risk reduction

In the design for use in/with explosion-prone dust atmospheres, additionaly correspond to the following Directive:

94/9/EC Directive for equipment and protective systems intended for use in potentially explosive atmospheres

The following harmonised standards were applied:

EN 1127-1 Explosive atmospheres-Explosion prevention and protection-
Part 1: Basic concepts and methodology

EN 13463-1 Non-electrical equipment intended for use in potentially explosive atmospheres-Part 1: Basic method and requirements

EN 13463-5 Non-electrical equipment intended for use in potentially explosive atmospheres-Part 5: Protection by constructional safety „c“

EN 13980 Potentially explosive atmospheres-Application of quality systems

EN 14797 Explosion venting devices

EN 14491 Dust explosion venting protective systems

The labelling has been performed in accordance with *Directive 94/9/EC-ATEX* for:

Protection system Ex D

Contact person for technical documents
acc. to directive on machinery: Mr. Bernd Hinterstoisser

Place, Date:Aurolzmünster, 05/07/2012

pp Bernd Hinterstoisser
Manager Design Engineer Duct Work
and Conveying System

Dipl.-Ing. Stefan Scheuch
Managing Director Engineering and Production

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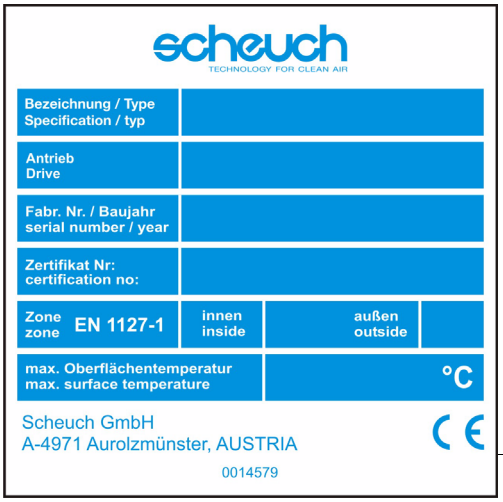
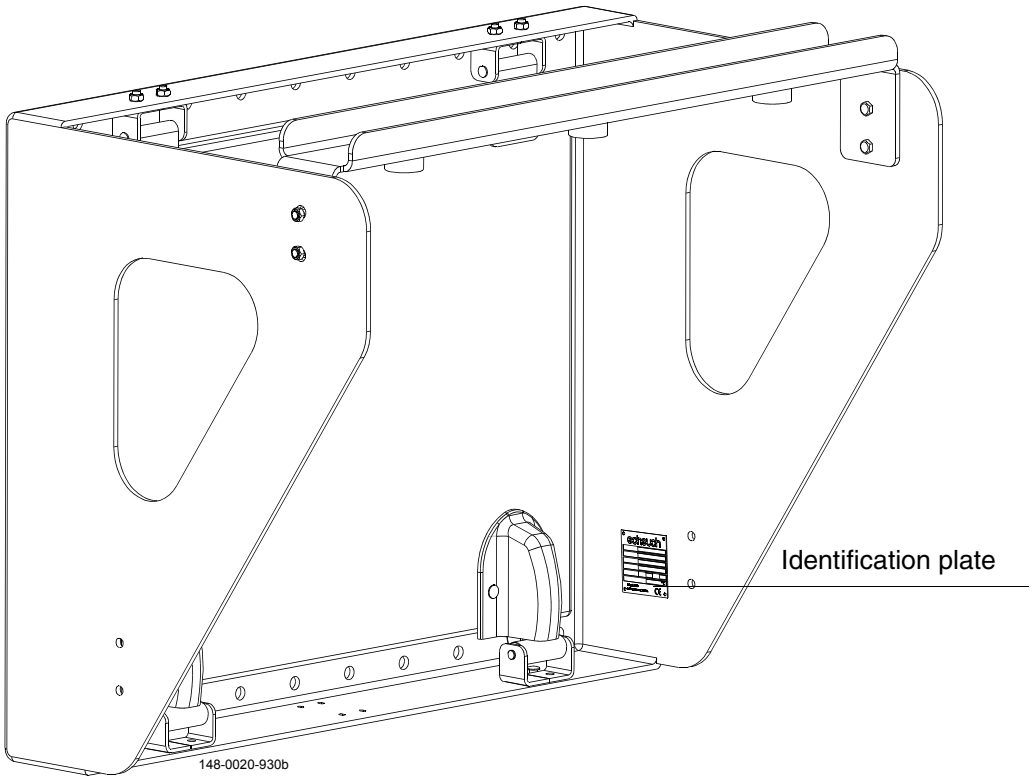
1.1. Identification plate and CE-mark

The explosion flaps are labelled according to their size and design:





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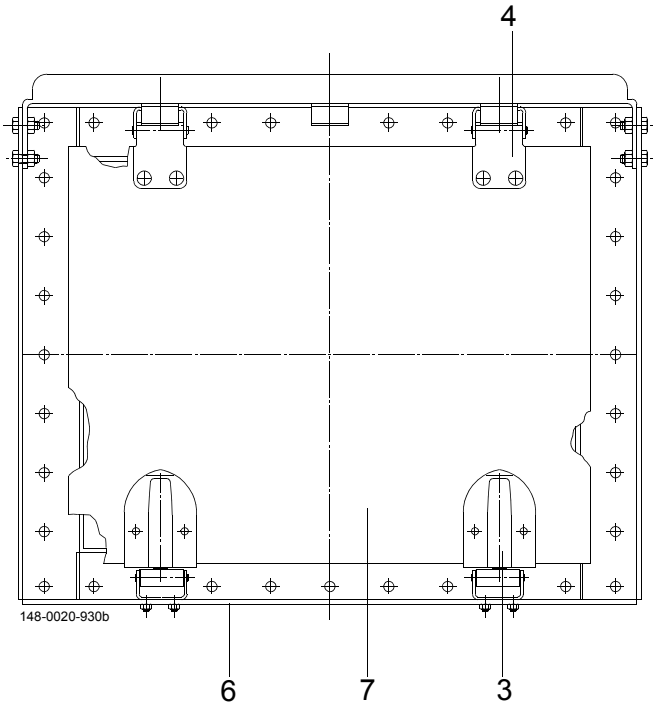
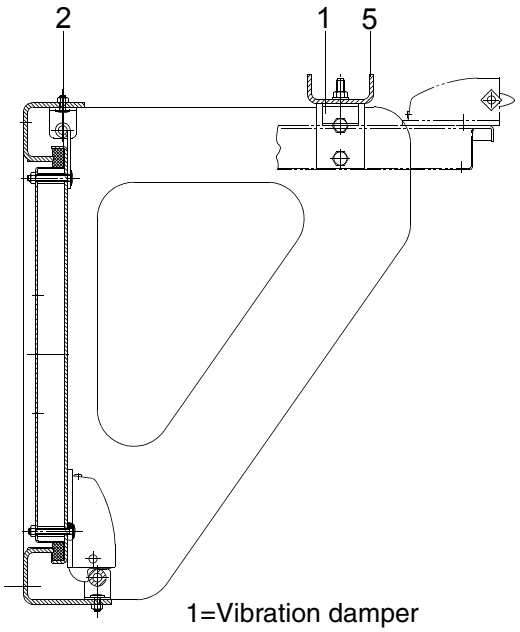
2. Spare parts drawing/Spare parts list

2.1. Spare parts drawing





1=Vibration damper
2=Sealing
3=Latch complete
4=Hinge complete
5=Fixing bracket
6=Casing
7=Flap lid

2.2. Spare parts list

Table 1: Spare parts list

Item	Description	Weight kg	E/V*		
1	Vibration dampers		V		
2	Sealing 15 x 25		V		
3	Latch complete		E		
4	Hinge complete		E		

*E.....Spare part
V.....Part subject to wear

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3. Safety instructions for explosion flaps

All industry standards, regulations and instructions for installation, assembly, maintenance and repair apply to the explosion flap.

- Assembly and installation work, commissioning, maintenance and handling of the flap must only be carried out by trained specialist staff equipped with suitable tools.
- The explosion flap should only be installed by qualified specialist personnel familiar with all applicable standards, regulations and instructions. Subsequent modifications by non-authorised persons are not permitted.
- Maintenance and repair work is only to be carried out when the plant is shut down.
- It is strictly prohibited for persons to remain in the pressure relief zone during operation! The plant operator must ensure that the hazardous zone (calculations to be made by plant operator according to VDI 3673, November 2002) CANNOT be accessed (barriers including signs warning against fatal injury, protective covers...).

ATTENTION!
At low explosive pressures, the leading edge of the flame can have a spherical shape. The area below the explosion flap should therefore also be declared a hazardous zone.

- Fierce flames will occur in the relief zone during a dust explosion. Expelled burning particles represent a further hazard in the relief zone. Pressure surges will occur during an explosion.
- Neither persons nor safety devices should be endangered by the effects of pressure and flames. Parts of the building within the relief zone, e.g. roofs, windows, walls, must be designed to withstand the mechanical and thermal loads exerted by an explosion.
- If the plant is installed in an enclosed room, an exhaust duct must be be fitted to expel the dust/air mixture during an explosion into the open air. Using an exhaust duct may result in a higher or reduced explosive pressure
  -> Calculation according to VDI 3673, November 2002 required!
- Check the correct function of the explosion flap every time the flap trips (opens),
  see 12. “Checking the flap after it has tripped” on page 21!

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- **WARNING when working in areas with danger of explosion:**

  - Air/dust mixtures are liable to explode in contact with hot surfaces (electrical and non-electrical) as well as electrically conducting equipment parts, and may lead to serious or fatal injury.
  - The regulations pertaining to explosion protection in accordance with EN 1127-1, directive 1999/92/EU and directive 94/9/EU-ATEX are to be observed.
  - Assembly and installation work, commissioning and maintenance must only be carried out by trained specialist staff equipped with suitable tools.
  - Ignition sources (e.g. due to welding and grinding work) are NOT PERMITTED in EX-areas! **RISK OF EXPLOSION !!**

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4. Designated use of explosion flaps

Explosion flaps serve to relieve the pressure from containers, in particular filters. The required relief area is calculated according to VDI 3673, November 2002.

- When using these flaps in explosion-prone atmospheres containing a dust/air mixture, observe all the applicable standards and regulations concerning explosion protection.
- We will not accept any liability for damage caused by improper storage, installation, commissioning, operation, maintenance or repairs.

4.1. Prerequisites for operation

- Operation of the explosion flaps is only permitted under the agreed conditions and using the agreed transportation mediums. The explosion flap must be in a perfect technical condition.
- The product being stored inside the protected container should never block the explosion flap (fill level monitoring may be required). Furthermore, any installed components such as filter bags or similar, should not close off the relief openings (making them inoperative) when the pressure is being relieved.
- Explosion flaps must be regularly checked and maintained (written records required).

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4.1.1 Usage in explosion-prone atmospheres with dust-air mixture

- **Inner zone (INSIDE the container being relieved) of the explosion flap "Zone 20 (21)" according to EN 1127-1:**
  - Explosion flaps are suitable for operation with flammable and/or explosive dusts having a K_{st}<=200 bar.m.s^{-1}.
  - Explosion flaps should only be employed under "normal" ambient conditions (inside and outside). When used in/with corrosive atmospheres (e.g. in the open air), regularly check if the strength and/or function is impaired due to the effects of corrosion (see 11. “Maintenance” on page 20).
  - The maximum permitted operating temperature should not exceed 150 °C. If necessary, install a temperature monitoring system which switches off the plant when the temperature limit is reached.
  - The ignition temperature of the dust used must be at least 1.5 times higher than the maximum operating temperature.
  - The glowing combustion temperature of dust deposits must be at least 75 °C higher than the maximum operating temperature.
  - The explosion flap is only suitable for vertical installation (lid is pointing down when closed).
  - Explosion flap protection (pressure relief) should only be employed where persons and plant components are not endangered by flames and the effects of pressure!!

- **Outside zone of flap: Generally it is not permitted to place the flap in such zones as the pressure relief could result in secondary explosions.**

- **Use as a protective system in accordance with 94/9/EU-ATEX:**
  - Explosion flap for providing pressure relief with EU prototype certification for dust, dust explosion class St1 (K_{st} 0-200 bar.m.s-^{1}), up to maximum explosion pressure (p_{redmax}) of 0.3 bar or 0.6 bar depending on model.

Ex **D**

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- **Do not misuse**
  - Operation with non-agreed or undefined (explosion-prone) dusts is not permitted.
  - Never alter or modify the explosion flaps or component devices, otherwise the explosion flap is no longer a certified protection system and the approval is void.
  - Scheuch is to be contacted in the event of any deviations in relation to the usage of the explosion flap.
  - The transportation temperature during operation must lie well below the maximum permitted surface temperature of the explosion flap.
  - If necessary, install a temperature monitoring system which switches off the plant when the temperature limit is reached.
  - The explosion flap must be kept ice-free to prevent the lid and latches from icing up and ensure the correct function.
  - Dust deposits should be avoided as they could result in fire or risk of explosion due to possible overheating.

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5. Function

The explosion flap is closed during operation; it is pre-tensioned by the latches. If a dust explosion occurs, the flap opens to prevent an excessive pressure increase in the plant. The explosive pressure is released into the open air to reduce it to a level below the pressure shock resistance of the plant.

If the pressure increase is brief or weak, the flap automatically closes the release opening after the pressure has been relieved. In this case, ensure that any low pressure created by the cooling of hot gases cannot damage the container (fit a low pressure protection device).

The flap will remain open after a severe explosion; the flap may have become deformed.

***Always* check the correct function of the explosion flap every time the flap trips (opens), see 12. “Checking the flap after it has tripped” on page 21!**

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6. Technical data

Cross-section of opening	668 x 525 mm = 0.35 m²
Angle of opening	90°
Latch components	2 pcs. "Brixon Latches No. 3P"
Static tripping pressure (rated at 20 °C)	0.030 bar (+0 % -5 %)
Temperature range	-20 °C to +150 °C
Effect relief area Aw for strength 0.3 bar (Type sfz exk-668 x 525 - 0.3)	0.32 m²
Effect relief area Aw for strength 0.6 bar (Type sfz exk - 668 x 525 - 0.6)	0.23 m²

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7. Mechanical design

- Scheuch explosion flaps are designed according to the specified conditions (see section 2, Designated use).
- The welded steel base frame is designed to be fitted directly to the container being relieved (connections shown on dimensional drawing).
- Maintenance-free hinges ensure high functional reliability and ease of lid movement. This compensates any alignment errors, manufacturing tolerances and different rates of thermal expansion.
- The flap lid is sealed using cellular rubber seals.
- The flap lid is pressed against the base frame using specially pre-tensioned sprung latches. The latches release and the lid opens when the spring pre-tension is exceeded.
- Vibration dampers absorb the forces if the lid is thrown open by a fierce explosion.
- **The following standards and regulations are to be considered in relation to explosion protection:**

- **EN 1127-1** Explosion protection
- **94/9/EU-ATEX**: Devices for proper use in areas with danger of explosion
- **EN 14797** Explosive pressure relief devices
- Ignition risk evaluation according to **EN 13463-1**
- Ignition protection type structural safety "c" according to **EN 13463-5**

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8. Delivery, transportation and storage

8.1. Transportation

- Transportation must be undertaken with a type of packaging that is suited to the means of transportation and the environmental conditions.
- Ropes, hooks and other aids should not be directly attached to the explosion flap, eye bolts (use DIN 580) can be directly attached next to the hole pattern illustration (observe the maximum permitted load for the lifting equipment).
- Severe shocks (e.g. when dropped) should be avoided, as this may cause deformation or malfunctions.
- On delivery check that the explosion flap is complete and has not been damaged during transport. No liability can be accepted for damage caused by improper transportation and handling.

8.2. Storage

- Only store in well-ventilated and dry rooms.
- Condensed water formation (e.g. due to temperature deviations) is to be avoided.
- Explosion flaps must be stored on pallets or storage racks in order to protect against rising damp.
- A plastic cover to protect against dust, dirt, etc, as well as protective measures against mechanical damage should be provided.
- Check for condensation at least every two months. If necessary, take appropriate measures to remove any humidity and check the flap for signs of corrosion as well as verifying it is functioning correctly.

8.3. Long-term storage (longer than 4 months)

- The same measures as for normal storage apply.
- In addition, all unprotected parts must be treated with a long-term anti-corrosion agent prior to storage.
- Remove the sealing from the cover and store it in a location protected against the cold and UV-rays to prevent it becoming brittle.
- Remove the anti-corrosion agent and replace with grease prior to commissioning. The sealing should also be fitted, check the elasticity beforehand!

- After fitting the sealing, ensure that the flap closes tight (dust cannot escape) and that the tripping pressure has been correctly set (see 12. “Checking the flap after it has tripped” on page 21).

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9. Assembly

- The explosion flaps are tested before delivery.
- Installation should be performed under due consideration of safety measures (accident prevention regulations, laws etc.).
- All transport mountings and covers are to be removed prior to assembly.
- Check that all connecting surfaces are flat and clean.
- Explosion flaps are installed with the cover pointing down. A tilted position is not permitted.
- The explosion flap must not be subject to stresses or torques when installed. A suitable sealing should be chosen (e.g. sealing compound, flat seal etc.) and the fixing screws tightened in a crosswise order.
- It is not permitted to attach or weld any other items to the explosion flap.
- All connections and fastening elements are to be checked for correct position and tightness after completing assembly. Mounting tools and aids are to be removed.
- Check and record the tripping pressure after the explosion flap has been installed
(see 12. “Checking the flap after it has tripped” on page 21).

- **WARNING when working in areas with danger of explosion:**

- Before commencing assembly, make sure there is NO explosive air in the vicinity of the explosion flap. If necessary, a written release notice from the operator may be required. A suction removal of the dust-air mixture is to be undertaken if required.
- The electrical equipment must be certified for the corresponding usage (zone) according to directive 94/9/EU-ATEX.
- Assembly work should be carried out with the correct tools and by relevantly qualified staff.
- Welding and grinding work in explosion-prone areas is FORBIDDEN!
Risk of explosion!!

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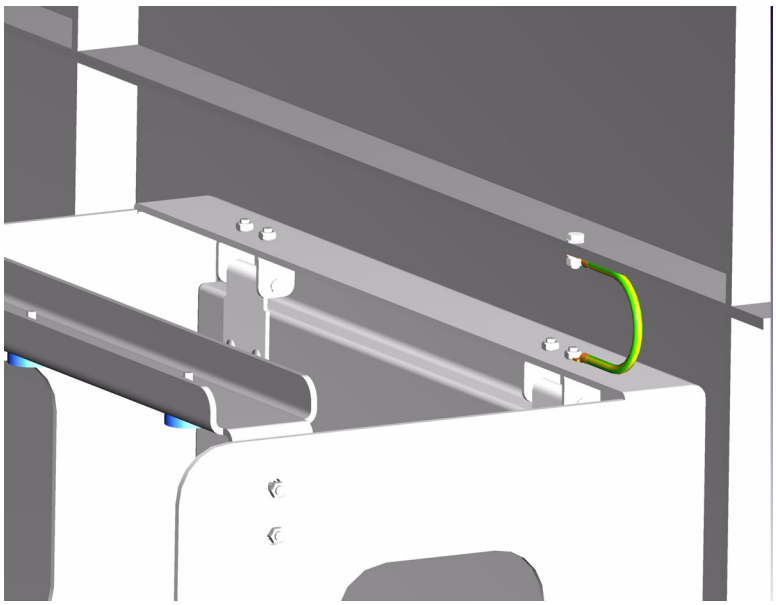
9.1. Grounding the explosion flap

- A reliable and permanent electrical conducting connection is required on the explosion flap.
- Replaceable screw fittings should therefore be used to connect an earth cable between the flap and the container being relieved. The connection (earth contact) between the earth cable and the painted metal surface must be made using a toothed lock washer.
- Ensure that the resistance to earth is $<10^6$ Ohm.



Take into account any local regulations when installing the earth.

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10. Commissioning

- The explosion flaps are usually supplied ready to install and ready for operation.
- The explosion flaps are factory set to a tripping pressure of 3000 Pa (0.03 bar). This setting should only be modified by a specialist after consultation with the factory. The tripping pressure setting must be checked using a spring balance (3000 Pa = 525 N). The tripping pressure is increase and decreased by turning the adjustment screw in and out respectively.
  ¾ turns will change the tripping pressure by roughly 500 Pa.
- Set the explosion flap to the closed position, pay careful attention to any unusual noises or other malfunctions. The plant should only be started up when the explosion flap is closed. If there is any foreign noise from the feeder screw, switch off at once and determine the cause.
- Shut down the plant after 5-10 operating hours and check the operating condition.
- Caution, only check the tripping pressure after the plant has come to a standstill
  (see 12. “Checking the flap after it has tripped” on page 21).
- **WARNING when working in areas with danger of explosion:**

- Before commencing commissioning, make sure there is NO explosive air in the vicinity of the explosion flap.
- Commissioning work should only be carried out by trained specialist personnel.
- Devices and components must be designed and certified for the specific application.

10.1. Standstill

- Clean the flap and apply a suitable anti-corrosion agent prior to long periods of standstill.
- Ensure that it is not possible for unauthorised persons to start up the plant and explosion flap (at the very least attach a warning sign to the main circuit breaker, however it is recommended to lock the main circuit breaker and remove the key).

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11. Maintenance

- Components which are subject to natural wear and tear do not come under the guarantee. The same applies to operational conditions that are not specified in the design data.
- Explosion flaps must be kept free of dust and material deposits.
- 1x year (or after a maximum of 3000 operating hours) perform a visual inspection for wear and check the correct function of the flaps. This interval reduces under more severe usage conditions (corrosive atmosphere, open-air installation, …).
- The correct function of the explosion flap is not assured if the housing, hinges, latches and/ or flap cover are damaged or worn. It may be necessary to replace the flap. A specialist from Scheuch should inspect the flap before it is used again.
- Replace the sealing if there are signs of wear. The hinges and latches used are maintenance-free.
- The explosion flap must be kept ice-free to prevent the lid and latches from icing up and ensure the correct function.
- **WARNING when working in areas with danger of explosion:**

  - Before commencing any maintenance, make sure there is NO explosive air in the vicinity of the explosion flap. If need be, switch off equipment in the vicinity and clean the area.
  - Maintenance work should be carried out with the correct tools and by relevantly qualified staff.
  - The correct function of the explosion flap is not assured if the housing, hinges, latches and/or flap cover are damaged or worn. It may be necessary to replace the flap.

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12. Checking the flap after it has tripped

- Check the correct function of the explosion flap every time the flap trips (opens)!!
- Ensure that it is not possible for unauthorised persons to start up the plant and explosion flap (attach a warning sign to the main circuit breaker or lock the main circuit breaker and remove the key).
- The correct function of the explosion flap is not assured if the casing, hinges, latches, flap cover and/or brackets are deformed. It may be necessary to replace the flap. A specialist from Scheuch should inspect the flap before it is used again.
- If there is no discernible deformation of the explosion flap, check the ease of movement of the flap cover. This is done by opening the cover and moving it up or down. If no additional resistance is noticeable when moving the cover (jammed, friction, pinching, …), the flap can continue to be used, otherwise it should be checked by a specialist from Scheuch.
- Before re-using the explosion flap, check the tripping pressure (see 12.1. “Checking the static tripping pressure” on page 21) and document the results.

12.1. Checking the static tripping pressure

- Ensure that it is not possible for unauthorised persons to start up the plant and explosion flap when checking the tripping pressure (attach a warning sign to the main circuit breaker or lock the main circuit breaker and remove the key).
- A calibrated spring balance (not supplied by Scheuch) is attached to the underside of the cover (in the middle) to check the tripping pressure of the explosion flap. The flap cover opens when steadily pulling the spring balance attached to the cover. The maximum applied force must be reached within 20 seconds and should correspond to the settings (3000 Pa = 525 N). A tolerance of -5 % is permitted.

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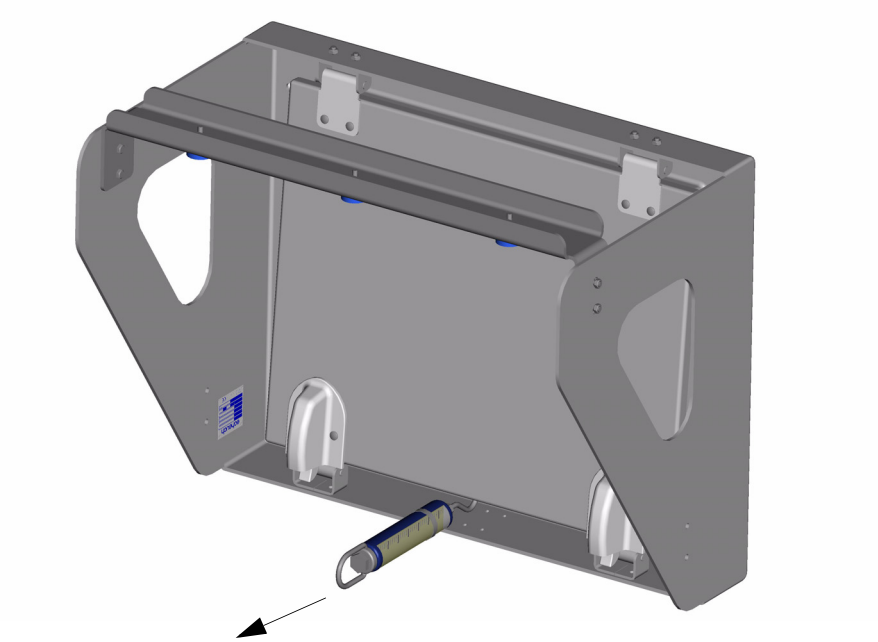
Checking the static tripping pressure:



- This test must be performed in accordance with prEN 14797, 2003 , i.e. at least 3 x for each explosion flap. The results must always lie within the specified tolerance.

- This explosion flap setting should only be modified by a specialist after consultation with the factory. The tripping pressure setting must be checked using a spring balance (3000 Pa = 525 N). The tripping pressure is increase and decreased by turning the adjustment screw in and out respectively.
  ¾ turns will change the tripping pressure by roughly 500 Pa.