



TFC

Ceiling mounted particulate filters

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Product overview

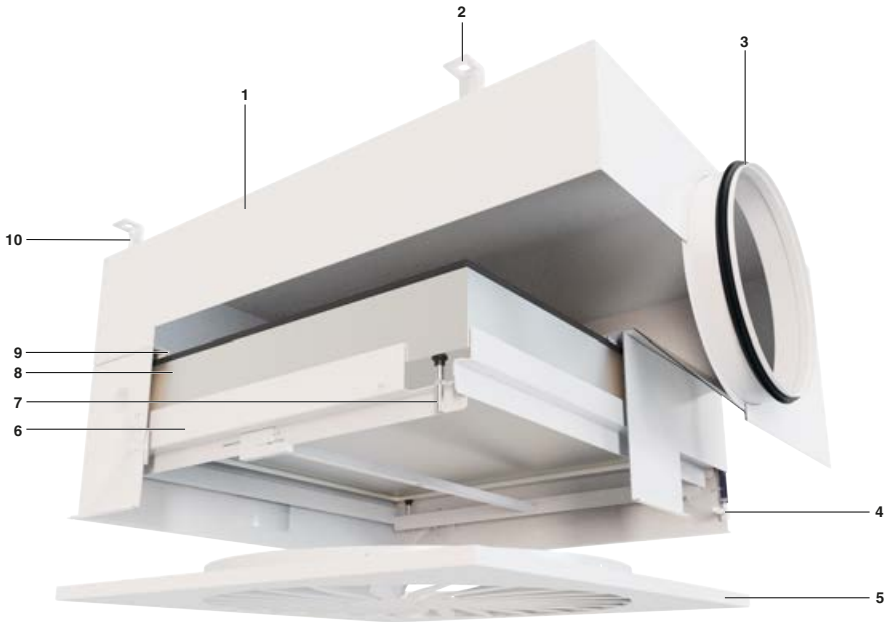


Fig. 1: Schematic illustration, e.g. TFC-SC-FT-0-ED-TDF

- | | | | |
|---|-------------------------|----|---|
| 1 | Casing | 6 | Clamping mechanism for the filter element |
| 2 | Fixing brackets | 7 | Clamping screws |
| 3 | Spigot with lip seal | 8 | Filter element |
| 4 | Internal measuring tube | 9 | Filter fitting |
| 5 | Diffuser face | 10 | Outside pressure measurement point |

Important notes

Informationen zur Montageanleitung

Diese Anleitung ermöglicht den korrekten Einbau sowie den sicheren und effizienten Umgang.

Das Personal muss diese Anleitung vor Beginn aller Arbeiten sorgfältig durchgelesen und verstanden haben. Grundvoraussetzung für sicheres Arbeiten ist die Einhaltung aller angegebenen Sicherheitshinweise und Handlungsanweisungen in dieser Anleitung.

Darüber hinaus gelten die örtlichen Unfallverhütungsvorschriften und allgemeinen Sicherheitsbestimmungen für den Anwendungsbereich.

Correct use

Type TFC particulate filter air terminal devices are used as final filters for the separation of suspended particles, and for air distribution.

TFC can be used in supply air and extract air systems. They are suitable for the fitting of Mini Pleat filter panels for the separation of suspended particles, to ensure critical air cleanliness and meet demanding hygiene requirements.

It is important that you comply with any national hygiene regulations when you install, commission or use the ceiling mounted particulate filter.

Incorrect use



WARNING!

Danger due to incorrect use!

Incorrect use of the unit can lead to dangerous situations.

Never use the unit:

- in areas with potentially explosive atmospheres
- in humid rooms
- in rooms with aggressive or dust-laden air

Limitation of liability

The information in this manual has been compiled with reference to the applicable standards and guidelines, the state of the art, and our expertise and experience of many years.

The manufacturer does not accept any liability for damages resulting from:

- Non-compliance with this manual
- Incorrect use
- Operation or handling by untrained individuals
- Unauthorised modifications
- Technical changes
- Use of non-approved replacement parts

The actual scope of delivery may differ from the information in this manual for bespoke constructions, additional order options or as a result of recent technical changes.

The obligations agreed in the order, the general terms and conditions, the manufacturer's terms of delivery, and the legal regulations in effect at the time the contract is signed shall apply.

We reserve the right to make technical changes.

Warranty claims

The provisions of the respective general delivery terms apply to warranty claims. For purchase orders placed with TROX GmbH, these are the regulations in section "VI. Warranty claims" of the Delivery Terms of TROX GmbH, see www.trox.de/en/.

Qualified staff

HVAC technician

HVAC technicians are individuals who have sufficient professional or technical training in the field they are working in to enable them to carry out their assigned duties at the level of responsibility allocated to them and in compliance with the relevant guidelines, safety regulations and instructions. HVAC technicians are individuals who have in-depth knowledge and skills related to HVAC systems; they are also responsible for the professional completion of the work under consideration.

HVAC technicians are individuals who have sufficient professional or technical training, knowledge and actual experience to enable them to work on HVAC systems, understand any potential hazards related to the work under consideration, and recognise and avoid any risks involved.

Properly trained person

Properly trained persons are trained individuals who understand any potential hazards related to the work under consideration, and who recognise and avoid any risks involved. Training is provided by the HVAC contractor when the system is handed over.

Properly trained persons are responsible for cleaning the unit, and for carrying out functional tests, regular checks and smaller adjustments.

Skilled qualified electrician

Skilled qualified electricians are individuals who have sufficient professional or technical training, knowledge and actual experience to enable them to work on electrical systems, understand any potential hazards related to the work under consideration, and recognise and avoid any risks involved.

Personal protective equipment

Personal protective equipment must be worn for any work in order to reduce health or safety hazards to the minimum.

The appropriate protective equipment for a job must be worn for as long as the job takes.

Industrial safety helmet



Industrial safety helmets protect the head from falling objects, suspended loads, and the effects of striking the head against stationary objects.

Light respiratory protection



Light respiratory protection is used to provide protection from harmful dusts.

Protective gloves



Protective gloves protect hands from friction, abrasions, punctures, deep cuts, and direct contact with hot surfaces.

Safety shoes



Safety shoes protect the feet from crushing, falling parts and prevent slipping on a slippery floor.

Supply package, transport and storage

The supply package includes:

- TFC casing
- Diffuser face
- Filter element (optional)

Transport



CAUTION!

Danger of injury from sharp edges, sharp corners and thin sheet metal parts!

Sharp edges, sharp corners and thin sheet metal parts may cause cuts or grazes.

- Be careful when carrying out any work.
- Wear protective gloves, safety shoes and a hard hat.

Use only lifting and transport gear designed for the required load. Always secure the load against tipping and falling.

Upon delivery, carefully remove the packaging and check the unit for transport damage and completeness.

Storage

Please note:

- Store the product only in its original packaging
- Protect the product from the effects of weather
- Protect the product from humidity, dust and contamination
- Storage temperature: 14 °F to 122 °F.
- Relative humidity: 95% max., no condensation

Assembly

General information

- Fix the unit only to load-bearing ceilings or suspended ceilings.
- Load suspension systems only with the weight of the unit. Adjacent components and connecting ducts must be supported separately.
- Do not unpack the diffuser face and any filter element until you are ready to install them.



NOTICE!

Possible malfunction due to a damaged casing

If the casing has been damaged, unfiltered (contaminated) air may leak.

Do not drill any holes into the casing.

Personnel:

- HVAC technician

Protective equipment:

- Industrial safety helmet
- Protective gloves
- Safety shoes

TFC can weigh up to 84 lbs, depending on the construction. Use only approved and adequately sized suspension systems. Fixing material is not included in the supply package.

Only work in pairs; preferably use a lift.



DANGER!

Danger of death from the fall of a suspended unit!

- Only use fixing materials designed for the required load.
 - Use all hanging brackets supplied.
 - Stand clear of suspended loads, unless properly secured.
 - Check secure fixing after installation.
1. ▶ Push the clamping mechanism to the side and lift it out upwards. Remove the clamping mechanism (Fig. 1/4) and store it for further use.

Suspension from the ceiling

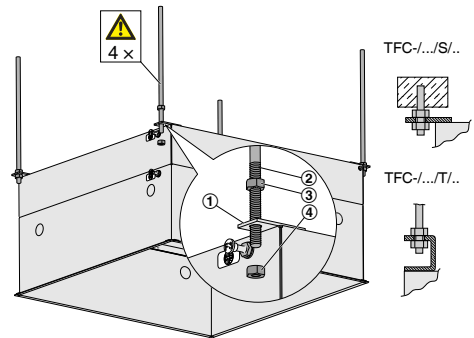


Fig. 2: Suspension from fixing brackets

- ① Fixing bracket with drilled hole \varnothing 0.5 in
 - ② Threaded rod
 - ③ Lock nut
 - ④ Nut
2. ▶ If possible, install the device before fixing the ceiling tiles; if this is not possible, remove the adjacent ceiling tiles.
Fix any suspension elements, e.g. threaded rods (Fig. 2/2), to the ceiling.
 3. ▶ Start by suspending the TFC casing on three suspension lugs (Fig. 2/1); ensure that the casing is horizontal, fix the nuts accordingly (Fig. 2/4), then use the locknuts (Fig. 2/3) to secure the suspended casing.
Loads imposed on the casing may impair the function of the unit. Be sure to install the unit without torsion.
 4. ▶ Fix the fourth threaded rod without changing the position of the TFC casing and secure it with a locknut.

Fixing to the suspended ceiling

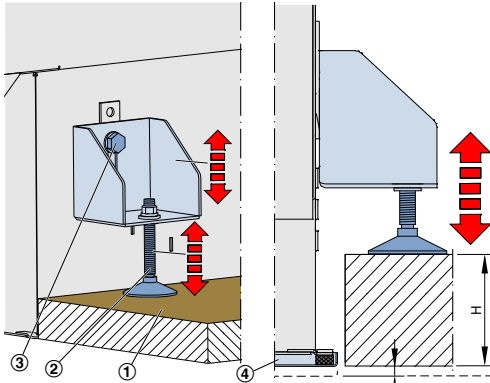


Fig. 3: Fixing to suspended ceiling, TFC-xx-FC with suspended ceiling support (4 pieces)

- 1 Suspended ceiling
- 2 Levelling foot
- 3 Angle adjusting screw
- 4 Diffuser face

5. ► **Note:** The filter casing TFC is installed on the suspended ceiling in the course of the ceiling construction or subsequently above the suspended ceiling. Subsequent installation or height adjustment in the finished suspended ceiling, which is not accessible from above, is not possible.

Measure the ceiling thickness (H) where the filter casing is to be placed on the ceiling. Pre-adjust the bracket and levelling foot accordingly.

- 6. ► Place the filter casing at the installation location and adjust it with the levelling foot. When adjusting, make sure that all levelling feet rest on the ceiling without wobbling.



If there is a lengthy break between installation and commissioning, cover all openings of the casing (e.g. with plastic) to protect the interior and avoid cumbersome cleaning procedures at the time of commissioning.

Ceiling systems

Ceiling mounted particulate filters are usually installed in suspended ceilings. Installation in the most common ceiling systems is shown below.

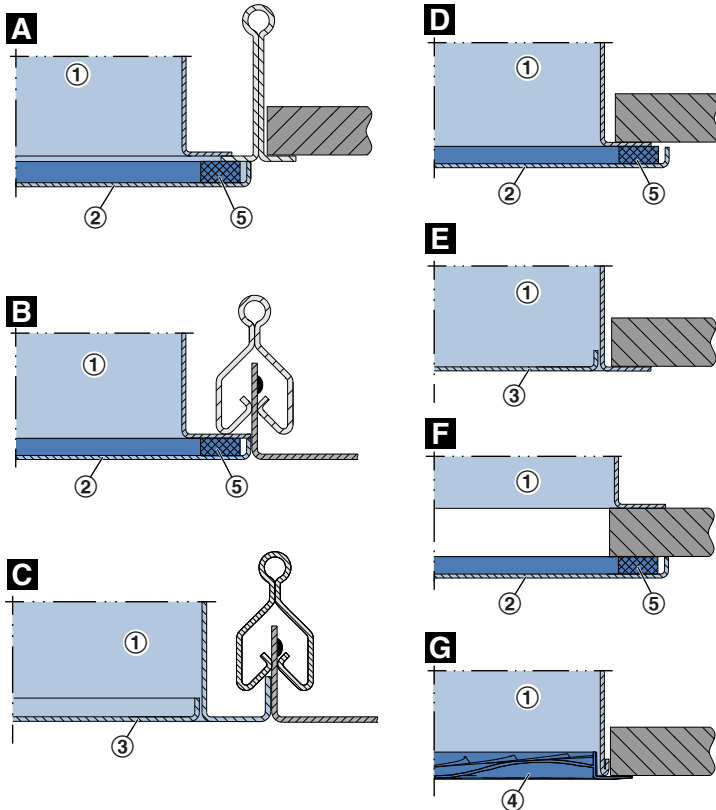


Fig. 4: TFC connection to suspended ceiling

- | | | | |
|---|------------------------------------|---|---------------------------------------|
| A | T-bar ceiling | G | TFC-xx-AIRNAMIC, plasterboard ceiling |
| B | TFC-xx-CC-ED, clip-in tile ceiling | 1 | TFC filter casing |
| C | TFC-xx-CC-ID, clip-in tile ceiling | 2 | Diffuser face, ED position |
| D | TFC-xx-ED, plasterboard ceiling | 3 | Diffuser face, ID position |
| E | TFC-xx-ID, plasterboard ceiling | 4 | Diffuser face, AIRNAMIC-R |
| F | TFC-xx-ED, walk-on ceiling | 5 | Seal |

Connecting the ductwork

Type TFC ceiling mounted particulate filters are available with various spigots:

- Side entry circular spigot
- Top entry circular spigot
- Side entry rectangular spigot

Circular spigots are fitted with a lip seal and fit onto circular ducts to EN 1506 or EN 13180.

Connect the duct in such a way that the connection is tight.

To protect the filter elements once installed as much as possible from excessive contamination, proceed as follows when you install the ventilation system:

- Keep the ducts clean when you install them.
- If you have to interrupt the installation procedure, protect all openings from the ingress of dust.
- If necessary, clean the ducts before you commission the ventilation system.

Electrical connection

Connecting the electric actuator

Personnel:

- Skilled qualified electrician

Supply voltage	24 to 240 V AC -20% to +10%
	24 to 125 V DC \pm 10%
Power rating (max.)	9.5 VA (AC)
	6 W (DC)

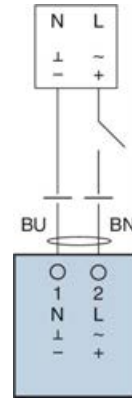


Fig. 5: Wiring example

- 1 (BU) Blue
- 2 (BN) Brown

- Connect devices with shut-off dampers and electric actuator (TFC-SCE) as shown in the connection example.

Commissioning

General information

Before you start commissioning:

- Check that the filter casings are correctly seated.
- Remove protective film, if any.
- Ensure that all filter casings are clean and free from residues and foreign matter.
- Prime the ventilation and air conditioning system for 24 hours before you insert the filter element.

Volume flow rate balancing

To adjust the ventilation and air conditioning system you first have to carry out volume flow rate balancing for each ceiling mounted particulate filter. Volume flow rate balancing is required before initial commissioning.

Units with an optional volume flow limiter (TFC-SCV): Once the volume flow rate has been set (by others), it will be maintained (mechanical self-powered).

Units with an optional damper blade: Adjust the damper blade to set the volume flow rate. You can adjust the damper blade before you install or after you remove the diffuser face and the filter element.

Inserting filters

- Do not unpack filter elements until you are ready to install them.
- Do not touch the filter; hold it by the edge only.
- Check filter elements for any damage; replace damaged filter elements.
- Insert only suitable Mini Pleat filter elements with a flat seal or fluid seal.

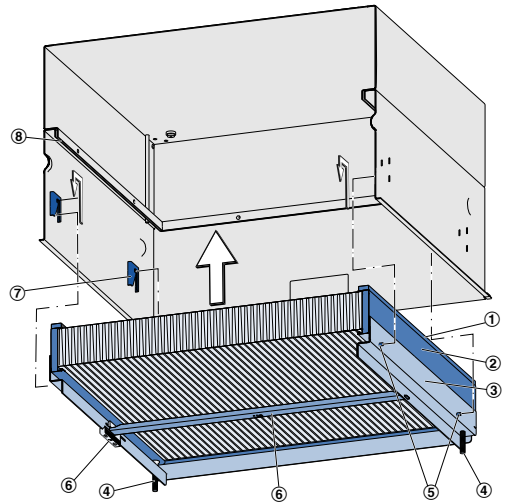


Fig. 6: Inserting filters

1. ▶ Remove the clamping mechanism (Fig. 6/3) from the HEPA filter housing.

! NOTICE!

Do not damage the filter

Handle filter elements with care and hold them only by the edges.

2. ▶ Set the filter element (Fig. 6/2) with the seal (Fig. 6/1) facing upwards into the clamping frame.
3. ▶ Insert the clamping mechanism with filter into the casing so that the four supports (Fig. 6/5) lock into the brackets (Fig. 6/7).

4. ▶ Screw in the four clamping screws (Fig. 6/4) evenly with an Allen key size 4 to press the filter onto the filter holder (Fig. 6/8), max. torque 2 Nm.
 5. ▶ Once you have inserted the filter element, check that there are no leaks, ☞ 'Leakage test on an installed filter' on page 11.
 6. ▶ Installing the diffuser face, ☞ 'Installing the diffuser face' on page 10.
1. ▶ If the diffuser face has been supplied with a separate seal, glue the seal onto the back of the diffuser face.
 2. ▶ Set the diffuser face (Fig. 7/3) onto the filter casing and fix it with the central fixing screw (Fig. 7/2). In the process, the central fixing screw can simply be inserted into the holding fixture (Fig. 7/4).
 3. ▶ Put the decorative cap (Fig. 7/1) on the central fixing screw.

Installing the diffuser face

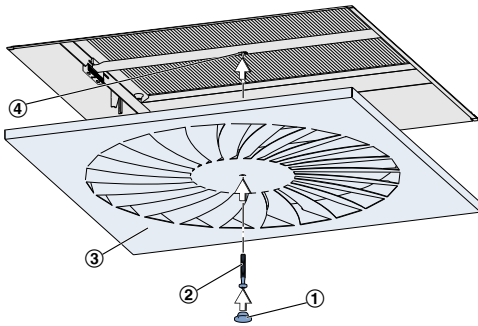


Fig. 7: Installing the diffuser face

PCD diffuser face (PROCONDIF)

Turn the clamping screw M6 × 70 with the washer 6.4 × 20 × 1.5 into the clamping frame (A) and tighten it; then fix the spacer (tube) with an M6 nut to the threaded part.

For diffuser face type PCD (PROCONDIF):
Insert the central honeycomb.

CAUTION!

Risk of injury from a falling diffuser face!

Ensure that the diffuser face is correctly seated and secured.

Maintenance

Maintenance applies mainly to the filter element. Check the filter regularly and replace it, if necessary.

The service life of a filter depends mainly on how polluted the air is. Check the filter in intervals that are short enough so that you can anticipate any defects or problems before they actually occur.

Replace the filter immediately if any of the following is true:

- The reaching of the intended final differential pressure
- Hygiene problems (micro-organisms, fungal spores, odours, etc.)
- Filter defects (particle count has been exceeded)
- The maximum filter usage time has been reached (8 years, to VDI 3803, part 4).



You may replace a filter even before the defined final differential pressure has been reached if it is more economic.

Removing the diffuser face

Some maintenance jobs, such as sealing integrity testing, leakage testing, filter changes or cleaning, require you to remove the diffuser face.

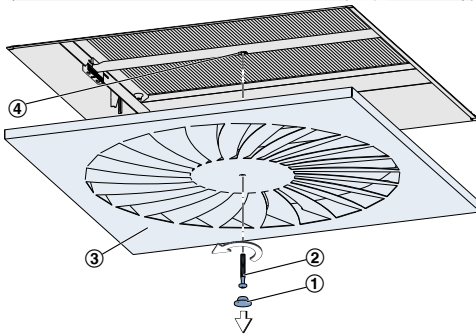


Fig. 8: Removing the diffuser face

1. ▶ Remove the decorative cap (Fig. 8/1) from the diffuser face (Fig. 8/3). **For diffuser face type PCD (PROCONDIF):** Remove the central honeycomb.
2. ▶ Remove the central fixing screw (Fig. 8/2) and then the diffuser face.

Leakage test on an installed filter

A leakage test is used as a functional test of the filter system to ensure that there are no leaks and that the filter element is without any defects (no small holes on the filter frame or on the seal, no leaks at the filter frame).

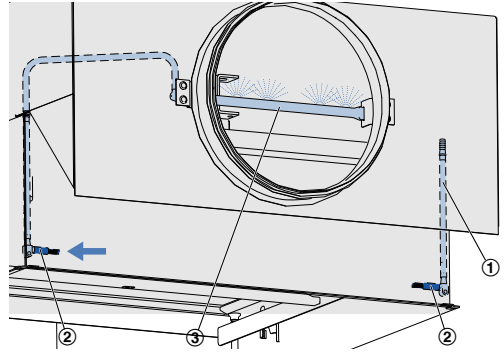


Fig. 9: Measuring tube and aerosol feed

- 1 Measuring tube for raw air side measurement
- 2 Sealing cap
- 3 Aerosol feed

Leakage test due to particle measurement

1. ▶ Remove the diffuser face, ↪ 'Removing the diffuser face' on page 11.
2. ▶ Open the measuring tube by removing the sealing cap.
3. ▶ Measure the particle concentration on the upstream side to ISO 14644-3 B6.
4. ▶ Measure the particle concentration on the downstream side to ISO 14644-3 B6.

If there is a leak, seal it; then test for leak-ages again.

5. ▶ Close the measuring tube by putting the sealing cap into place.
6. ▶ Reinstall the diffuser face.

Leakage test by means of aerosol feed

1. ▶ Remove the diffuser face, ↪ 'Removing the diffuser face' on page 11.
2. ▶ Open the aerosol feed by removing the sealing cap.
3. ▶ Feed the test aerosol.
4. ▶ Measure the particle concentration on the downstream side to ISO 14644-3 B6.
If there is a leak, seal it; then test for leakages again.
5. ▶ Close the aerosol feed by putting the sealing cap into place.
6. ▶ Reinstall the diffuser face.

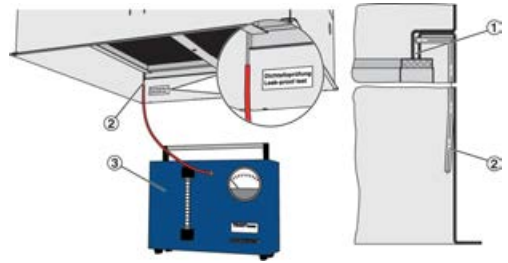
Sealing integrity test (option: FT or FTL)

Fig. 10: Sealing integrity test

Filter casings (option: FT or FTL) have a device for leakage testing. Sealing integrity is tested with a sealing integrity test device (see operating manual).

1. ▶ Connect the sealing integrity test device (Fig. 10/3) to the connection point on the filter (Fig. 10/2).
2. ▶ Apply at least 2000 Pa to the test groove (Fig. 10/1).
3. ▶ Check the leakage rate on the flow rate meter of the sealing integrity test device.
⇒ The value must not exceed 0.003% of the nominal volume flow rate.

If this value is exceeded, adjust the clamping screws or the clamping frame; also check the seal, test groove and filter element for damage. Then repeat the sealing integrity test.

Differential pressure measurement

The initial differential pressure for TROX filters is given on the label on the filter frame.

There are two ways to measure the differential pressure:

Permanent measurement: Continuous differential pressure measurement and monitoring of the final differential pressure. This is done with a static differential pressure measuring device (Fig. 11/1), e.g. TROX MD-UT, MD-APC or MD-DPC, using the pressure measurement points (Fig. 11/2) at the side or on the top of the casing.

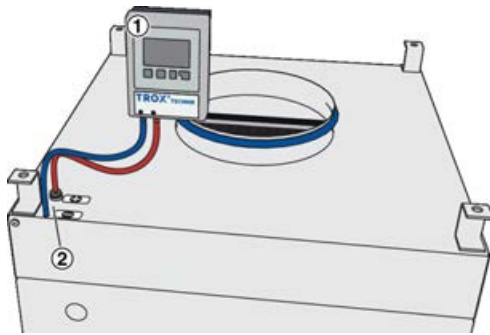


Fig. 11: TROX MD-DPC connection

Connecting a stationary measuring device

Plus (+) - to the 'Plus' measurement point (+)

Minus (-) - to the 'Minus' measurement point (-)

Temporary measurement: Temporary differential pressure measurement with a mobile measurement device connected to the internal measuring tube (Fig. 11/2). For this, you have to remove the diffuser face, see '11'.

Connecting a mobile measuring device

Plus (+) - to the internal measuring tube (Fig. 11/2)

Minus (-) - Don't connect; the differential pressure is measured against the room pressure.

Changing the filter

Personnel:

- Properly trained person

Protective equipment:

- Industrial safety helmet
- Light respiratory protection
- Protective gloves

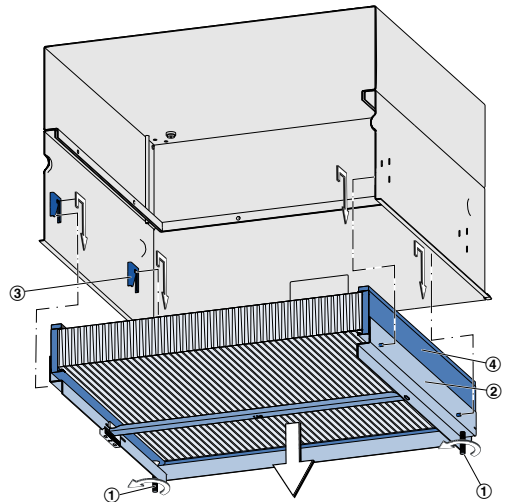



Fig. 12: Filter change

Before you start changing filters, switch off the ventilation and air conditioning system, or close the shut-off damper (if any) on TFC.

- ▶ Remove the diffuser face, see 'Removing the diffuser face' on page 11.
- ▶ Remove the clamping frame. To do so, loosen the four clamping screws (Fig. 12/1) (hexagon socket size 4). Lift the clamping mechanism (Fig. 12/2) out of the brackets (Fig. 12/3). Then remove it downwards.
- ▶ Remove the dust-laden filter (Fig. 12/4) from the clamping frame, and put it into a plastic bag and dispose of it properly; see 'Disposal' on page 14.
- ▶ If the filter casing is dirty, clean and disinfect it, see 'Cleaning the filter casing' on page 14.

5. ▶ Insert a new filter element, and reinstall the clamping frame and the diffuser face; see  'Inserting filters' on page 9.

Disposal



ENVIRONMENT!

Risk of harm to the environment due to the incorrect handling of hazardous materials and substances.

Filters and cleaning materials that have been contaminated with bacterial, toxic or radioactive particles are considered hazardous waste and have to be disposed of by an authorised business in compliance with local regulations.

Disposing of filter elements with household waste is allowed only in the following cases:

- For unused filter elements
- For filter elements that have been exposed only to atmospheric outdoor air

Ordering replacement filters

To ensure permanent protection from particulate matter and other pollutants we recommend using only original TROX filters.

Original TROX filters carry a sticker on the frame with information on how to order replacements.



To avoid downtime of the ventilation and air conditioning system, we recommend you to always have the required filters in stock.

To order replacement filters: <https://www.trox.de/onlineshop/filtergeraete-und-filterelemente-1df986693c21980d>

Cleaning the filter casing

Personnel:

- Properly trained person

Protective equipment:

- Light respiratory protection

It is usually not possible to regularly clean and disinfect the ductwork between the second filter stage and the filter casing, and neither is it required for hygienic reasons. As a prerequisite, however, you have to keep the ducts clean during installation.

It is then sufficient to clean and disinfect (wipe) the filter casing and the diffuser face; this has to be done for the first time just before the ventilation and air conditioning system is switched on for the first time.

The casing may be cleaned with a damp cloth. Sticky dirt or contamination may be removed with a commercial, non-aggressive cleaning agent. Cleaning agents that contain chlorine must not be used.

Once you have completed cleaning, disinfect the filter casing and any connecting rooms.