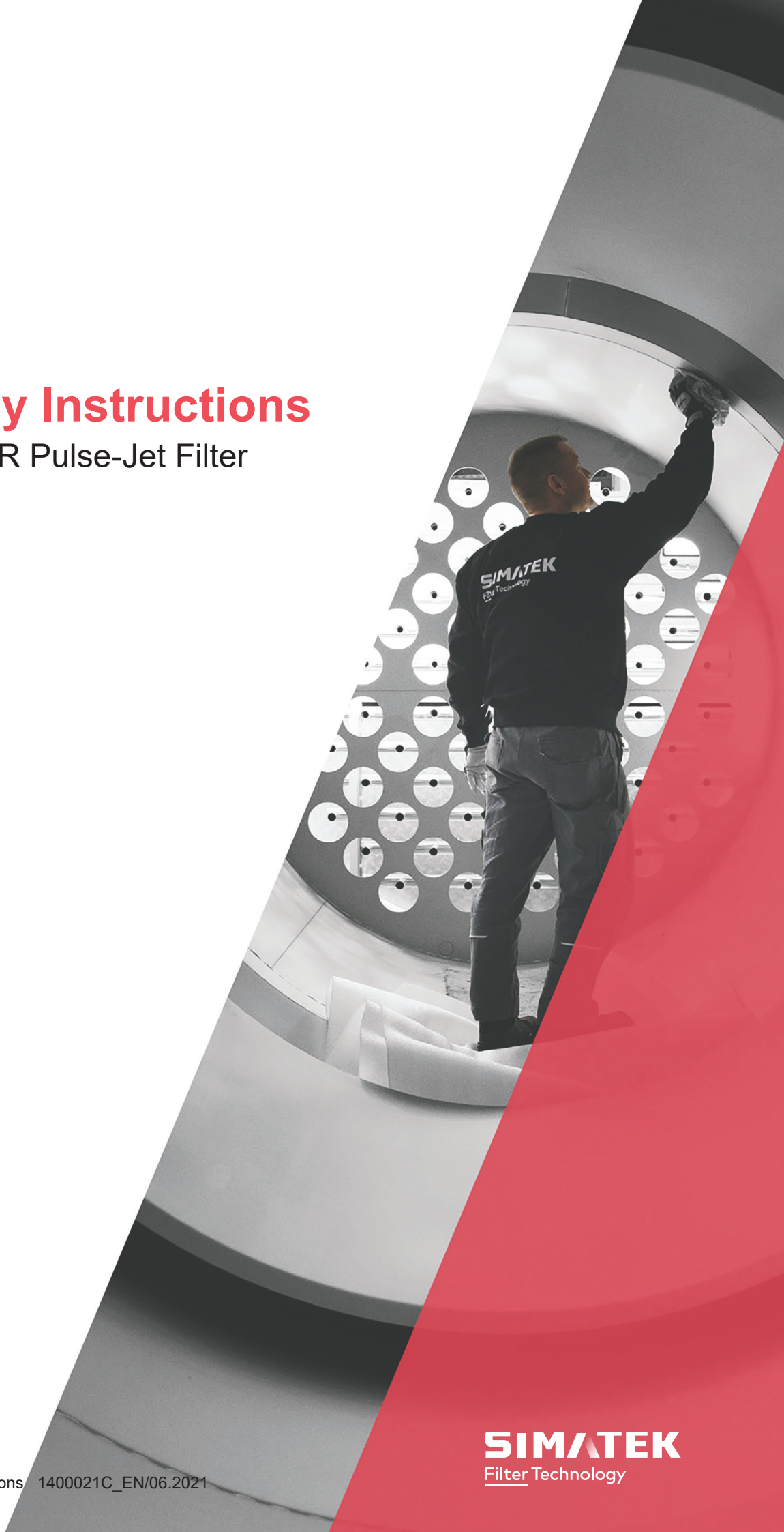
Assembly Instructions

SimPact® 4T-R Pulse-Jet Filter



SIMATEK
Filter Technology

Original Assembly Instructions 1400021C_EN/06.2021

CAUTION! Before use, read the instructions thoroughly to acquire sufficient knowledge of the product. For your convenience, keep this sheet as a quick reference. Subject to change without notice.

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Section 1
Safety

Safety – foreword

	Read these assembly instructions carefully before installing, assembling and commissioning the Simatek 4T-R filter. The assembly instructions may mention components that are not supplied with the Simatek manufacturer for the delivery in question. All the system specific data is available in Section 8 – Specific documentation.

These assembly instructions comply with the Directive 2006/42/EC of the European Parliament and of the Council of 17 May 2006 on machinery (hereinafter named ”Directive 2006/42/EC”), other relevant directives/ordinances and applicable standards.
To ensure that all safety requirements are met, it is important that the safety instructions provided in these assembly instructions and other documentation from Simatek are implemented in the company’s own safety instructions.

Safety symbols in these assembly instructions

The safety-related information in these instructions is indicated by one of the following symbols:

	This symbol indicates points in these instructions of particular relevance to: • observation of applicable directives and regulations • observation of working conditions • preventing personal injury • preventing damage to machinery and equipment
	This symbol indicates possible danger due to electrical fields or cables.
	Risk of crushing
	ATEX information
	This symbol indicates that eye protection must be worn
	This symbol indicates that respirators must be worn
	This symbol indicates that gloves and special work clothes must be worn.
	This symbol indicates that ear protection must be worn
	This symbol indicates that fall protection gear must be worn.

ATEX information

The Simatek filter is supplied with an Annex II B declaration of incorporation for partly completed machinery in accordance with Directive 2006/42/EC.
The filter may be marked in accordance with Directive 2014/34/EU of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to equipment and protective systems intended for use in potentially explosive atmospheres (hereinafter named ”Directive 2014/34/EU”).

A declaration of ATEX conformity may also be included in the Annex II B declaration of incorporation.
The Simatek order confirmation note states whether the filter is sold for installation in an ATEX zone and which class of ATEX zone it may be installed in.
If this is the case, all the relevant components will be supplied with ATEX declarations of conformity/ATEX certificates supplied by the manufacturers.
The Simatek order confirmation note also indicates which type of dust the filter in question is intended to work with.
There are no known ignition sources inside the filter.
Correct potential equalisation and correct procedures for checking potential equalisation are described in these assembly instructions.
The hazardous area in front of the explosion relief device must be marked and secured.

Electrical work and ATEX-related work must be performed by qualified personnel and in accordance with applicable legislation.

All electrical components supplied by Simatek and included in Simatek's Annex II B declaration of incorporation/ATEX declaration of conformity are purchased with marking/declarations/certificates in accordance with applicable legislation.

These components must be installed and used in accordance with the manufacturers' documentation (supplied).

Explosion inside the filter

In the event of an explosion inside the filter, see manufacturer's documentation regarding the explosion relief device (Fike, Brilex, etc.). This documentation is available in Section 8 – Specific documentation.
The filter must be checked for damage (if any) caused by the explosion.
All components must be checked to ensure that they continue to work safely.
See also Simatek's description, "What to do after an explosion" in Section 5 – Service and maintenance.

ATEX information

ATEX risk assessment

According to Directive 2006/42/EC, Annex 1, item 1.5.7, any possible risk of explosion inside the filter must be included in the risk assessment.
If there is explosive dust inside the filter or duct system and in the duct system or air surrounding the filter, a risk assessment in accordance with Directive 2014/34/EU is also required.

If this is the case, all the safety measures described in this section (ATEX information) will normally be required as air and dust moving through ducts and filter bags can potentially generate sufficient static electricity to ignite combustible dust.

In isolated cases, in which the minimum ignition energy of the dust is significantly higher than the maximum for the ignition source present in the filter and duct system connected to it, the risk assessment may, however, vindicate omission of these safety measures.

Explosion relief venting and suppression system

The filter must be fitted with explosion relief venting or an explosion suppression system.
By dint of the agreement between Simatek and TÜV, the filter must also be shock-resistant.

The data applicable to the filter in question and calculations, etc. regarding the explosion relief venting are available on the ”Machine data” page in Section 8 – Specific documentation.

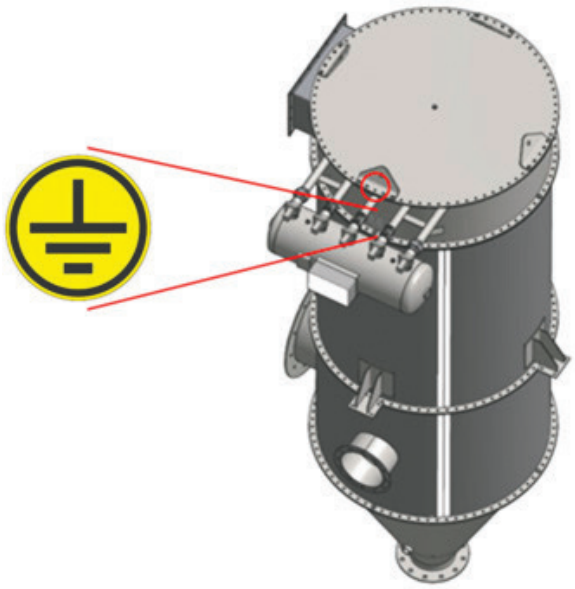
The explosion relief device is equipped with an electric indicator, which shows whether the surface is ejected so that other devices, such as the fan and rotary valve, can be disconnected. The indicator must be connected via an approved barrier. We recommend reference to locally applicable regulations for electrical equipment in potentially explosive areas. Suppression systems must be installed according to the system supplier’s instructions. NB: installation of a suppression system may entail welding nozzles to the filter housing.
This applies in particular to construction form 03, which is designed for fitting in silos or similar. Explosion relief CAN be achieved via the silo’s own explosion relief system. If so, filter volume and shock-resistance must be taken into account when calculating explosion relief for the silo.

Explosion isolation systems

Explosion isolation systems must be installed not only in the duct system leading to the filter inlet, but also in the duct system leading from the filter powder outlet.
The system must prevent an explosion in the filter from spreading to other equipment and ducts/pipes.
Further measures are also required to ensure than explosions in other equipment cannot spread to the filter via the duct system.

Potential equalisation

The filter is modular. The modules can be assembled during filter installation.
The potential of all filter modules, ducts and components must be electrically equalised.
To create safe electrical connections between flange joints, safety washers are fitted. Four of the bolts in each flange connection must be fitted with safety washers on both sides of the flanges. If the filter is to be fitted with flange reinforcement gaskets on the bolts, the safety washer must be positioned between the flange and the flange reinforcement gasket.
The potential equalisation on the filter must be connected to the system’s main potential equalising bar.
See separate description of potential equalisation in Section 3 – Installation and assembly.
The Simatek filter is fitted with a sign showing the recommended potential equalisation point.
The sign is located centrally close to the air receiver towards the upper flange joint and opposite the safety washers.



Spare parts for the filter

Only original spare parts may be used.
Failure to comply with this recommendation could mean that the filter fails to conform with its stated material group and category on the ”Machine data” page in Section 8 – Specific documentation.

The end user's responsibilities

During the tender phase:

- inform Simatek of the type of dust the filter is to be designed/used for.
- inform Simatek of any ATEX installation zone
- inform Simatek of any possible "like ATEX zone XX" inside the filter
- inform Simatek whether insulation is required on the filter due to a risk of contact with very hot or very cold surfaces.

On-site:

- ensure that the system, of which the Simatek filter is a part, is subject to a risk assessment and CE-marked in accordance with Directive 2006/42/EC and complies with other relevant ordinances/directives and applicable legislation.
- takes into account the residual risks identified (these risks are described below).
- ensure that access routes and workplaces comply with applicable legislation.
- ensure that personnel working with or in front of this filter and parts are familiar with these assembly instructions and their contents.
- integrate Simatek's safety instructions into the safety rules for the relevant area.
- ensure that all personnel working with Simatek products during: offloading, handling, assembly, installation, use, cleaning, service/maintenance, dismantling and disposal are trained and therefore qualified safely and appropriate to perform the duties in question.
- ensure that filter and any parts of it are assembled as described in these assembly instructions.
- ensure that the necessary personal protective items are available.
- ensure correct lighting for the entire plant and for work performed inside the filter. Furthermore, the end user must check whether components in certain areas need to be EX-approved.
- ensure that data sheets for the product in use are available to personnel working with, in and around the plant to ensure that the necessary precautions with regard to safety and protection can be taken.
- ensure that potential equalisation is correct according to Simatek's instructions, and tested as described in Section 3 – Installation and assembly.
- mark out the hazardous area in front of explosion venting (if any), to ensure that there are no access routes, operating stations, etc. within the hazardous area.
- ensure provision of notices concerning measures to be taken when standing under service platforms while work is in progress on them.
- ensure that the compressed air supply cannot exceed the maximum permitted working pressure for the air receiver.
- inform whether there is a risk of contact with very hot or very cold surfaces.
- ensure that all safety systems are correctly connected to the plant.
- ensure that there is a lockable main switch on the electrical panel, which shuts down the entire filter and all its parts.
- determine whether what is needed is a normal and/or an emergency machine stop directly from the electrical panel.

CE-marking and risk assessment of the completed machinery

The party responsible for final CE-marking of the machine, of which the Simatek partly completed machinery is a part, is responsible for handling the residual risks identified by Simatek described in these assembly instructions.

Residual risks in connection with risk assessment of 4T-R Filter in accordance with Directive 2006/42/EC

Risk that personnel are not trained

The safety instructions and education/training are important elements in training personnel who will work with and around Simatek filters. The end user is responsible for training and education.

Risk of accident when parts or all of the filter are handled

Correct lifting and fitting instructions are described in these assembly instructions.

Risk of contact with sharp surfaces, edges and corners

There is a risk of contact with sharp surfaces, edges and corners.
All components made by Simatek or manufactured according to Simatek's drawings and instructions are made according to the highest standards to avoid sharp surfaces, edges and corners as much as possible. EN ISO 12100 is applied.
All components purchased from sub-suppliers are manufactured in accordance with applicable directives and/or standards. Liability for such components rests with the supplier.
We recommend that the appropriate personal protective items are worn.

Risk of incorrect assembly

These assembly instructions are prepared by employees who have many years of experience at Simatek. There is always the risk of human error when fitting the filters. At Simatek's final inspection, we do everything we can to prevent incorrectly assembled elements from reaching the customer.
In these assembly instructions, Simatek makes every attempt to describe in detail any fitting work to be performed by customers.

Risk that correct ergonomic work posture cannot be achieved

In these assembly instructions, Simatek describes how best to resolve tasks identified in the risk assessment as representing a risk that an ergonomically correct working posture can be difficult to achieve.
Simatek's proposals are based on EN 1005-04 Safety of machinery. Human physical performance. Part IV: Evaluation of working postures and movements in relation to machinery.

Risk of misunderstanding the marking on the filter

All markings/warnings on the filter are described in these assembly instructions.

Risk of electric shock

All electrical components supplied by Simatek are purchased in accordance with applicable, harmonised standards.
The end user is responsible for ensuring that all electrical work is performed by qualified technicians and in accordance with applicable legislation.

Potential equalisation

These assembly instructions describe how and when the potential equaliser should be checked to prevent a build-up of static electricity.

Risk of objects falling from service platform

There is a risk of objects and tools falling from a service platform while work is performed on them.
We recommend that helmets are always worn when working beneath the service platform(s).

Risk of falling into the filter

A warning sign is fitted on the inspection hatch.
The end user is responsible for describing the safety equipment needed if an operator is required to work inside/down in the filter

Risk of injury to feet/legs when assembling/dismantling filter bags and cages from above

In these assembly instructions, Simatek describes how best to resolve tasks identified in the risk assessment as representing a risk of injury to feet/lower leg when assembling/dismantling filter bags and cages from above.

Risk that the hatch on 4T2-R folds up in the fitter's face

The hinge on hatch on 4T2-R is fitted with a strong spring mechanism. The springs help to open the hatch. There is a warning sign on the hatch. These assembly instructions describes Simatek's proposals for resolving the task.

Risk of contact with cold/hot surfaces

During the offer phase, the parties must establish whether the filter will be subject to very high or very low temperatures. Simatek can offer to deliver a filter with insulation brackets, i.e. so that the filter surface can be insulated.
The end user must specify which items of personal protective equipment must be worn if there is a risk that personnel can come into contact with very hot or very cold surfaces on the filter.
The following standards and CENELEC guide should be referred to when selecting PPE: EN ISO 13732-1 Ergonomics of the thermal environment — Methods for the assessment of human responses to contact with surfaces — Part 1: Hot surfaces and EN ISO 13732-3 Ergonomics of the thermal environment — Methods for the assessment of human responses to contact with surfaces — Part 3: Cold surfaces and the guidelines set down in CENELEC Guide 29 Temperatures of hot surfaces likely to be touched.

Risk of being trapped inside the filter

The inspection hatch is designed to allow the operator(s) inside the filter to lock the hatch in the open position (using padlocks).

Risk that the lockable main switch on the electrical panel is not locked before work is started on the filter

The end user is responsible for ensuring that there is a lockable main switch on the electrical panel. These assembly instructions stipulate that a lockable main switch must be locked before starting to work on the filter.

Risk of explosion inside the filter and hazardous area in front of the explosion relief device

When the filter is used to extract potentially explosive dust, there is a risk of explosion inside the filter chamber.
By agreement (which is stated in Simatek's order confirmation note), the filter can be supplied with an explosion relief device, possibly with a level limit switch underneath, to prevent the product from accumulating in front of the explosion relief device inside the filter.
The end user is responsible for ensuring that the hazardous area in the front of the explosion relief device is marked/secured.

Risk of contact with a harmful product

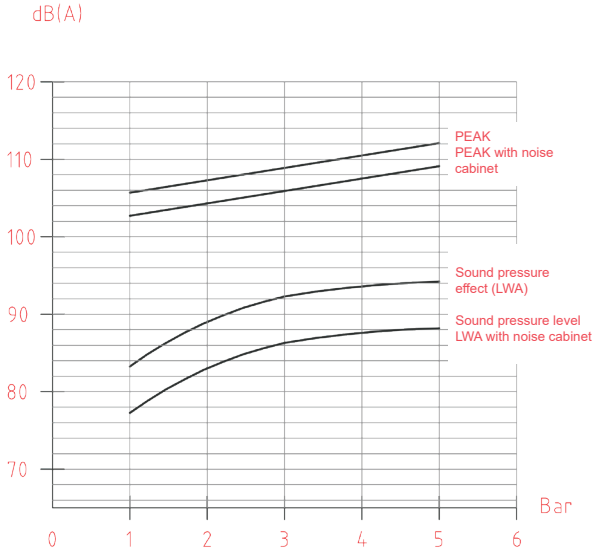
There are no known hazards associated with the materials, of which the filter is made.
There may be a risk of contact with a harmful product depending on the type of product handled in the filter, e.g. in connection with cleaning/service after an explosion inside the filter.
The end user is responsible for ensuring that data sheets for the product in use are available to personnel working with, in and around the plant to ensure that the necessary precautions with regard to safety and protection can be taken.
The end user must also ensure that the necessary personal protective equipment is available.

Risk that personnel cannot reach normal stop/emergency stop

The end user determines whether what is needed is a normal and/or an emergency machine stop directly from the electrical panel.

Noise risk

The noise levels on 4T-R filters have been measured.



Risk of crushing

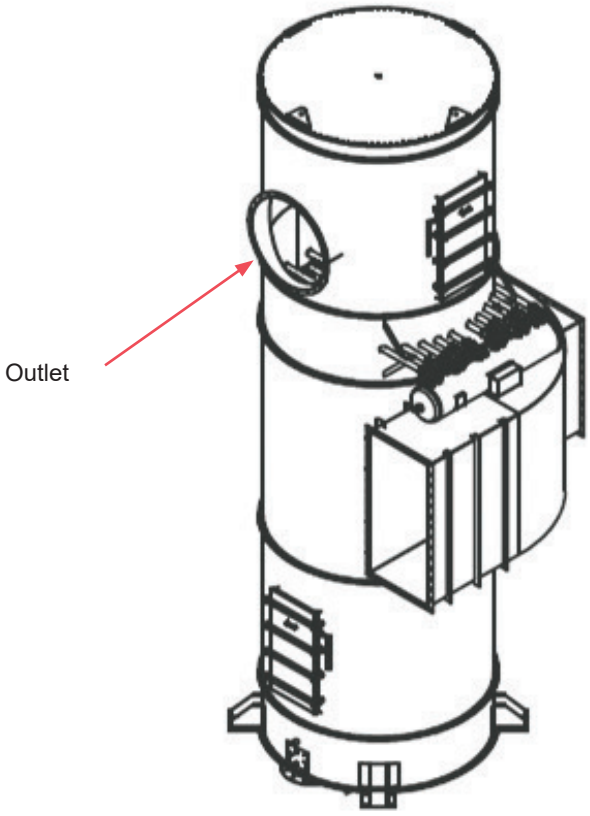
There is a risk of crushing inside the scraper bottom. On delivery from Simatek, a safety switch is fitted to the scraper bottom cleaning hatch. This safety switch must be connected to ensure that the scraper bottom stops moving when the safety switch is thrown.
A safety switch can also be fitted to the inspection hatch.
This safety switch has safety level PLd.
The cleaning and inspection hatches are also both bolted on. Tools are required to open these hatches.
There is a risk of crushing hands and feet when putting parts of the T1 top cover into place and a risk of crushing when the T2 lid is to be closed.
These assembly instructions describe Simatek'sthe filter manufacturer's proposals for resolving the task.

	If a safety switch on one of the doors is activated while the filter is in operation, an alarm must be given and fan, scraper bottom and rotary valve must be stopped. An accidental opening of the filter may have occured,leading to potential personal injury.

Risk of falling from outlet when the outlet is placed in the penthouse (T3 top)

If the filter has an outlet in the penthouse section, the machine construction engineer must assess the risk and determine whether this outlet must be secured to prevent personal injury, e.g. caused by a fall from the outlet opening.

The risk assessment and any safety measures must be made before finally fitting the filter.



Safety marking on the 4T-R Filter

The filter may be marked as follows:

	Read these assembly instructions carefully before installing, assembling and commissioning the Simatek 4T-R filter.
	The environment inside the filter is described as ”like ATEX zone xx”
	Danger of falling down into the filter
	Potential equalisation point
	Risk of cutting/crushing
	The hinge on 4T2-R is fitted with a strong spring mechanism
	Heavy lifting – marked on 4T1-R top cover parts
	Lifting point
	No lifting
	Respirator must be worn
	Safety harness/safety line must be used
	If Simatek has supplied a heating cable, this will be marked. The marking is available in several languages. This is an example.
	If Simatek has supplied the system with an approved safety line anchor point, this sign will be placed close to the anchor point.

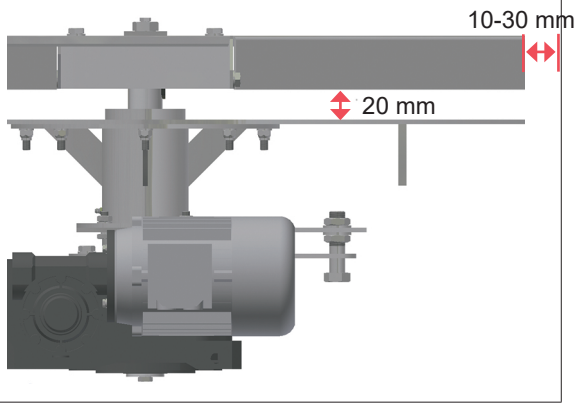
Safety info

	**Safety guide** The 4T-R filter is designed with safety in mind. The 4T-R filter is fitted with safety devices in compliance with relevant legislation. The risk assessment includes a safety analysis of the 4T-R filter.
	**Trained personnel** Only trained personnel qualified to perform the relevant tasks safely and appropriately are permitted to work with the filter.
	**Hazards in and around the 4T-R filter** When working in and around the filter, all applicable safety rules must be observed. This applies to the end user's accident prevention regulations and regional/national rules. We recommend that helmets are always worn when working beneath the service platform(s).
	**Working with electricity and ATEX on filter 4T-R** All work with electricity and ATEX must be performed by qualified personnel and in accordance with relevant legislation.
	**Potential equalisation of 4T-R filter** The 4T-R filter must be potential-equalised to avoid static electricity. This applies to all assemblies on the filter itself and parts attached to it. Potential equalisation is described in Section 3 – Installation and assembly.
	**Lighting around, on and inside the 4T-R filter** All elements of lighting around, on and inside the filter (for service work performed inside the filter) and for parts supplied with these must be installed by the end user. We recommend the use of a headlamp or transportable work lamps when working inside the filter. Check whether EX-approved lighting components are required.
	**Supply separator – compressed air** A lockable supply separator should be fitted on the air receiver. This applies to the compressed air supplied to the air receiver as well as the flap valve.
	**Safety valve on air receiver** As the air receiver is not fitted with a separate safety valve, ensure that the compressed air supply cannot exceed the max. permitted working pressure*) of the air receiver. This is the end user's responsibility. *) See air receiver certificate in Section 8 – Specific documentation or the air receiver name plate.
	**Hazardous area in front of explosion relief device** If an explosion relief device is fitted to the filter, it is important to ensure that the hazardous area in front of it is marked/secured. This is the end user's responsibility.

Level limit switch under explosion relief device
The end user must ensure that no material can accumulate in front of the explosion relief device inside the filter.
This can be achieved by placing the level limit switch under the explosion relief device.
When the limit switch is activated, filter cleaning and fan should stop.
See also text regarding safety levels in section Residual risks established in connection with risk assessment in accordance with Directive 2006/42/EC.

Hazards on and around service platforms
All relevant safety rules must be observed when working on service platforms.
The purpose of service platforms is to allow personnel to stand with both feet on the platform's floor grating.
If it is necessary to stand on something to reach higher, an approved safety harness and line must be worn.
If the operator has to crawl into the filter chamber, an approved safety harness and line must be worn.
The safety line must be secured to an approved anchor point.
We recommend that helmets are always worn when working beneath the service platform(s).

Scraper bottom
Before starting the filter for the first time, check that there is sufficient space between the scraper arm and the scraper bottom.
If the inspection or cleaning hatch has been open or if the motor has been stopped due to overload, the
distance between the scraper arm and scraper bottom must be checked before restarting the filter.
Check the scrapers can turn freely by checking horizontal clearance between scrapers and filter casing is in the range of 10-30mm and make sure that there is a nominal gap of 20 mm between the scraper arm and the scraper bottom.



Filtering potentially explosive dust
Filter 4T-R can be supplied in shock-resistant materials and an explosion relief device may be fitted on the filter.
If the filter is sold for erection in a potentially explosive area, this will be stated on the Simatek filter order confirmation and the identification plate on the filter.
If the filter is sold for use with potentially explosive dust, this will be stated on the Simatek filter manufacturer's order confirmation.

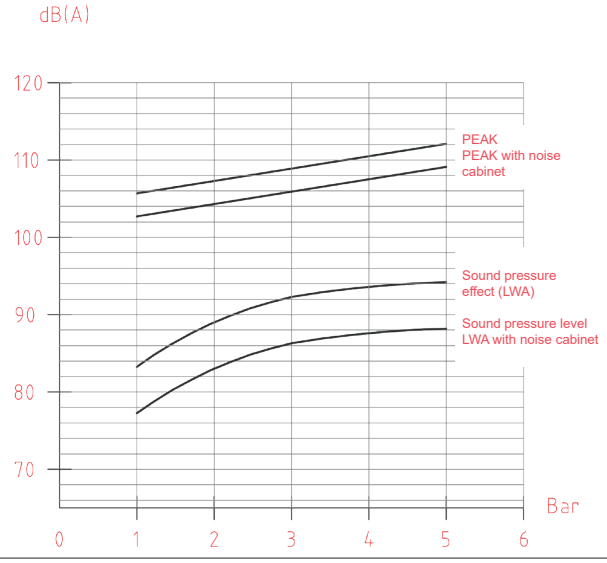
Hazardous dust
Refer to the section on "Working with dust" in Section 1 – Safety.

Temperature-related hazards
Some 4T-R filters can operate at very high temperatures, for which operation special safety precautions are required.
Service and maintenance personnel must wear suitable protective equipment.

Risk of crushing inside the filter
There is a risk of crushing fingers/hands/arms inside close to the scraper bottom.
A safety switch is fitted to the scraper bottom cleaning hatch to prevent contact with rotating parts.

The safety switch must be connected to ensure that all movements on the scraper bottom cease as soon as the cleaning hatch is opened.

Hazardous noise levels
The noise levels on 4T-R filters have been measured.
Soundproofing may be fitted to attenuate noise.



Mechanical hazards
All inspection hatches/inspection doors are bolted on.
Service and maintenance of 4T-R filters are forbidden during operation.
The filter must always be disconnected from the mains and prevented from restarting during service and maintenance work.
Refer to the section on ”Safety when working inside the filter”. See Section 1 – Safety in these assembly instructions.

Electrical hazards
Service and maintenance of 4T-R filters are forbidden during operation.
The filter must be disconnected from the mains and prevented from restarting during service and maintenance work.
The end user is responsible for ensuring that all electrical work is performed by qualified technicians and in accordance with applicable legislation.

Personal protective equipment

Respirator

A respirator must always be worn when working inside the filter. See the ”Working with dust”’ page in Section 1 – Safety.

Eye protection

Various types of safety glasses (depending on whether protection is needed from airborne particles or from chemicals) should be worn.

Gloves and special work clothes

Gloves and special work clothes protect the skin against chemical attack. This type of protective equipment must be worn when working with very hazardous substances and materials that can penetrate the skin.
Suitable insulated protective clothing should be worn where there is a risk of intense heat.

Ear protectors

Ear protectors are compulsory if noise exceeds harmful levels. Ear protectors should also be worn at noise levels of under 80 dB(A) if the noise is deemed to be harmful.
All personnel should be instructed in use of such equipment and the hazards associated with failing to observe safety rules. Instructions must include adjustment, cleaning and storage.

There are two types of ear protectors:

- Ear plugs placed in the ear canal (noise reduction of 10-20 dB)
- Ear protectors that cover the ears (noise reduction of 20-30 dB)

The levels of noise reduction stated only apply if the equipment is worn at all times, and is cleaned and worn correctly.

	**WARNING!** **Always evaluate hazards to health before entering the filter:** In addition to the instructions in these assembly instructions, the applicable rules regarding safety and accident prevention must be observed.

Safety harness and line

When undertaking cleaning, service or maintenance work for which service personnel cannot stand on a firm surface (e.g. service platform floor grating) but only on a stepladder or the like, a safety harness and line must always be worn.
When undertaking cleaning, service or maintenance work inside the filter, a safety harness and line must always be worn.
The safety line must be secured to an approved anchor point.

	**WARNING!** The filter chamber should be regarded as an enclosed space. Working alone inside is forbidden.

Working with dust



If in doubt, consult the local Working Environment Authority representative.

Evaluating hazards to health

When performing service work inside a dust filter, the nature and concentration of dust or gases in the filter should be evaluated. Some dust types are very harmful to health, whereas others are only harmful in high concentrations.
Toxic gases or low oxygen concentration are other hazards that should be taken into account. Some dust filters operate at high temperatures that require special precautions.

A Supplier's Data Sheet* for the material should state which personal protective equipment must be used. **ALL RELEVANT SAFETY PRECAUTIONS SHOULD OTHERWISE BE OBSERVED.**

We recommend an individual evaluation of hazards to health at all times. Apparently harmless dust can represent a health risk due to high concentration, and certain dust types can provoke allergic reactions.
Suitable personal protective equipment should therefore always be used in accordance with relevant regulations.
Examples of PPE (personal protection equipment):

- Respirator
- Eye protection
- Gloves
- Dust-resistant work clothes
- Protective suit

Respirator

A respirator should always be worn when undertaking service work inside a filter. There are many different types of respirators, but they can be divided into two main groups:

- Air-purifying respirators
- Air-supplied respirators

There are several sub-types within each of the main groups, which are used depending on the nature and concentration of the contaminants. It is important that respirators are close-fitting.

Eye protection

Various types of safety glasses (depending on whether protection is needed from airborne particles or from chemicals) should be worn. As such, they are used when hazardous substances and high concentrations of dust are present.

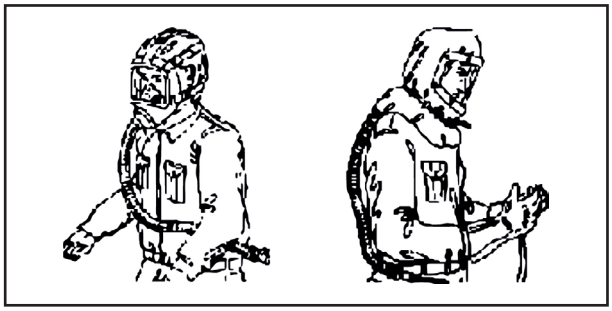
Gloves and special work clothes

Gloves and special work clothes are designed to protect the skin from chemicals. They are used for working with substances and materials of a particularly hazardous nature that can penetrate the skin.

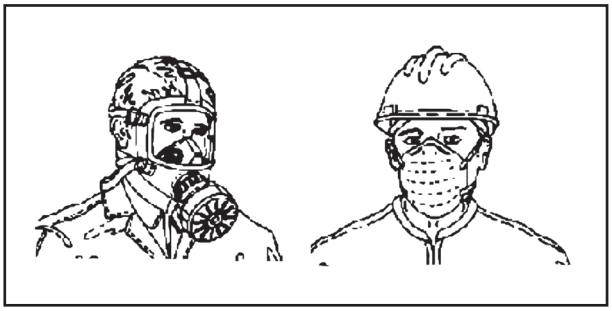
If the hazard to health consists wholly or in part of the affects of heat, protection with suitable thermal insulation should be worn.

	**WARNING!** **Always evaluate hazards to health before entering the filter:** In addition to the instructions in these assembly instructions, the applicable rules regarding safety and accident prevention must be observed.

** Information on product composition, precautions for use, etc.*



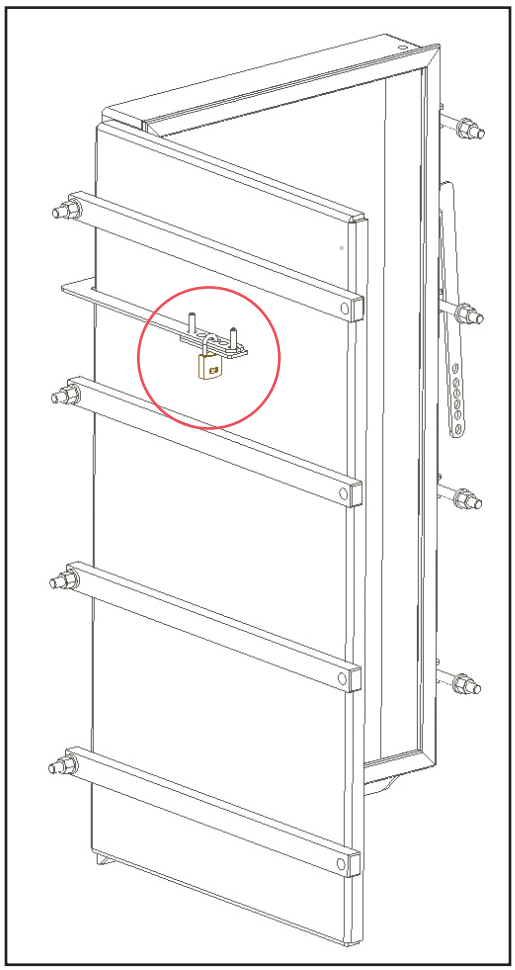
Air-supplied respirators. Examples of use:
Risk of low oxygen
High concentration of air pollution
Unknown concentration of air pollution
Long-term work wearing a respirator



Air-purifying respirators. Used when air-supplied respirators are not needed. It is important to use the right filter type, e.g. a dust filter
(particle filter) provides no protection from gas and
Unknown substances fumes.

Safety during work inside the filter

When working inside the filter, always ensure that the lockable switch on the electrical panel is switched to off.
The filter chamber inspection hatch must be locked open.
Simatek recommends that a safety harness and line are always worn when working inside the filter.
The safety line must be attached to an approved anchor point.
Personal protective equipment must be worn in accordance with established guidelines for the area in question.



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Section 2
General information

General information

Before lifting, assembling, installing, commissioning, cleaning or performing service and maintenance, see Section 1 – Safety.
Section 1 – Safety also describes the residual risks in connection with risk assessment of Simatek 4T-R filters and the end user's responsibilities.
Section 1 – Safety also lists safety marking on the filter and the symbols used in these assembly instructions.

Intended use

Simatek 4T-R filters are intended for the filtration of dry dust.
The filter in question is designed for the type of dust specified in Simatek's order confirmation note and the machine data page. The machine data page is available in Section 8 – Specific documentation.
Please note that non-intended use (see examples below) can cause danger or damage.

Non-intended use that can reasonably be expected

Dust type

The filter is designed for a specific purpose. If exposed e.g. to a more abrasive or coarse dust type, the excessive wear on the filter bags can cause damage to impellers or fans, accompanied by dust discharge.
Excessive wear to the filter housing can cause structural collapse.

Operating pressure

The filter is designed to operate within a specific pressure range. Do not operate outside that range.
Note that Simatek filters are designed for standard operation with negative pressure in the filter.

Operating temperature

The filter is designed to operate within a specific temperature range. Do not operate outside that range.

Cleaning air/gas

Unless otherwise specifically stated, compressed air only (in the specific quality) can be used for cleaning air.

ATEX classification

1. If the filter is installed in an ATEX-classified zone, always ensure that it is designed for such a zone.

NB: If explosive dust or air is conducted through the filter, always ensure that:

2. The filter is designed and installed correctly for that purpose (explosion relief device and relief duct, explosion suppression, etc.).
3. The Kst and Pmax values of the most explosive dust types must not exceed design data. For details, see section "ATEX information" in Section 1 – Safety.

Accumulated weight in the filter

Always ensure that accumulation of dust/product in the filter is limited to avoid overloading the support structure (including filter supporting brackets). Using water for fire extinguishing and/or cleaning should also be limited to avoid overloading the support structure (including filter supporting brackets).

Corrosion

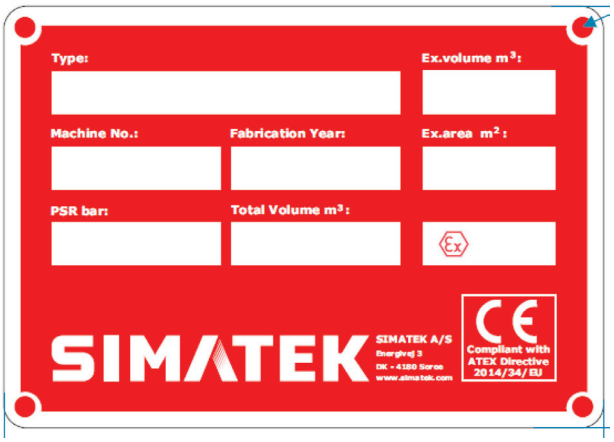
If the filter is not maintained correctly, corrosion can damage any part of the filter.
Loss of metal thickness due to corrosion can cause leaks and structural collapse.

Supervision

If in doubt whether the above (or any other part of the filter system) are in order, contact Simatek.
If the filter system is to be used for any other type of dust than the above, consult Simatek to determine whether the system can handle that type of dust.
Certain parameters can be relatively easily upgraded to fulfil other conditions. Others cannot.
Please quote machine number and type when contacting Simatek.
Refer to these assembly instructions and the identification plate.

Identification plate on the filter

All safety marking is shown and specified in Section 1 – Safety. The system carries Simatek's identification plate.
The Simatek identification plate will usually be fitted to the inspection door on the filter.
The plate carries the relevant filter data.



Contact details

Simatek A/S
Energiens Hus
Energivej 3
DK-4180 Sorø, Denmark

Tel.: +45 5884 1500
E-mail: office@simatek.dk
Website: www.simatek.com

If possible, quote the Machine No. (on identification plate) and Simatek's order no. when contacting us.

After Sales contact details:

Hotline: +45 4046 7525
Mobile: +45 5884 1595
E-mail: after-sales@simatek.dk

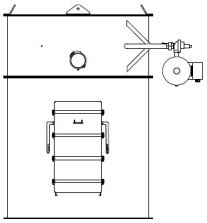
Warranty

Refer to Simatek's order confirmation note or contract.

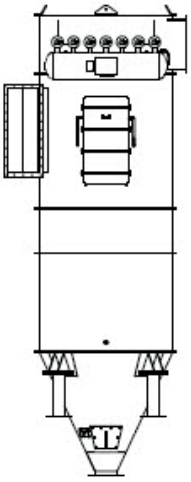
Key to type designation

E.g.: JM 41/20 – 17 4T-R WB

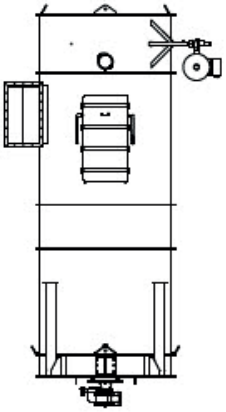
JM	=	Manufacturer: Simatek, Denmark
41	=	Number of filter bags
20	=	10 = 1.0 m bag length 15 = 1.5 m bag length 20 = 2.0 m bag length And so on.
17	=	Filter construction form
WB	=	Wide Body



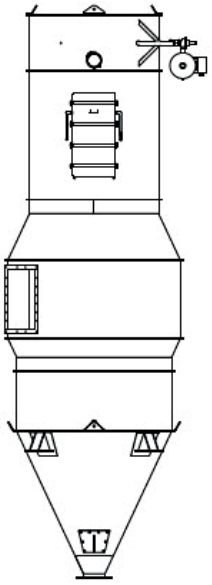
Construction form
03



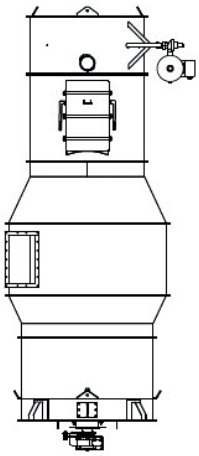
Construction form
04



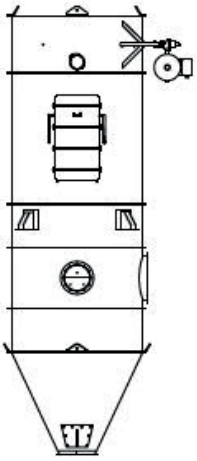
Construction form
05



Construction form
12



Construction form
14



Construction form
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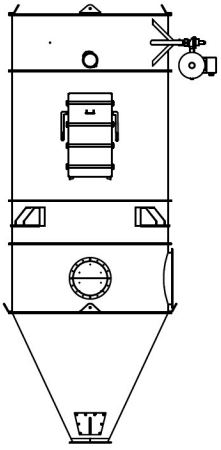


Construction form
17 WB

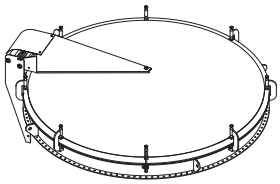
Key to type designation

E.g.: JM 41/20 – 17 4T-R WB

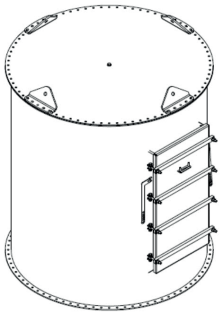
4T-R = Filter top

Top type 4T-R

Top type 4T1-R



Top type 4T2-R



Top type 4T3-R

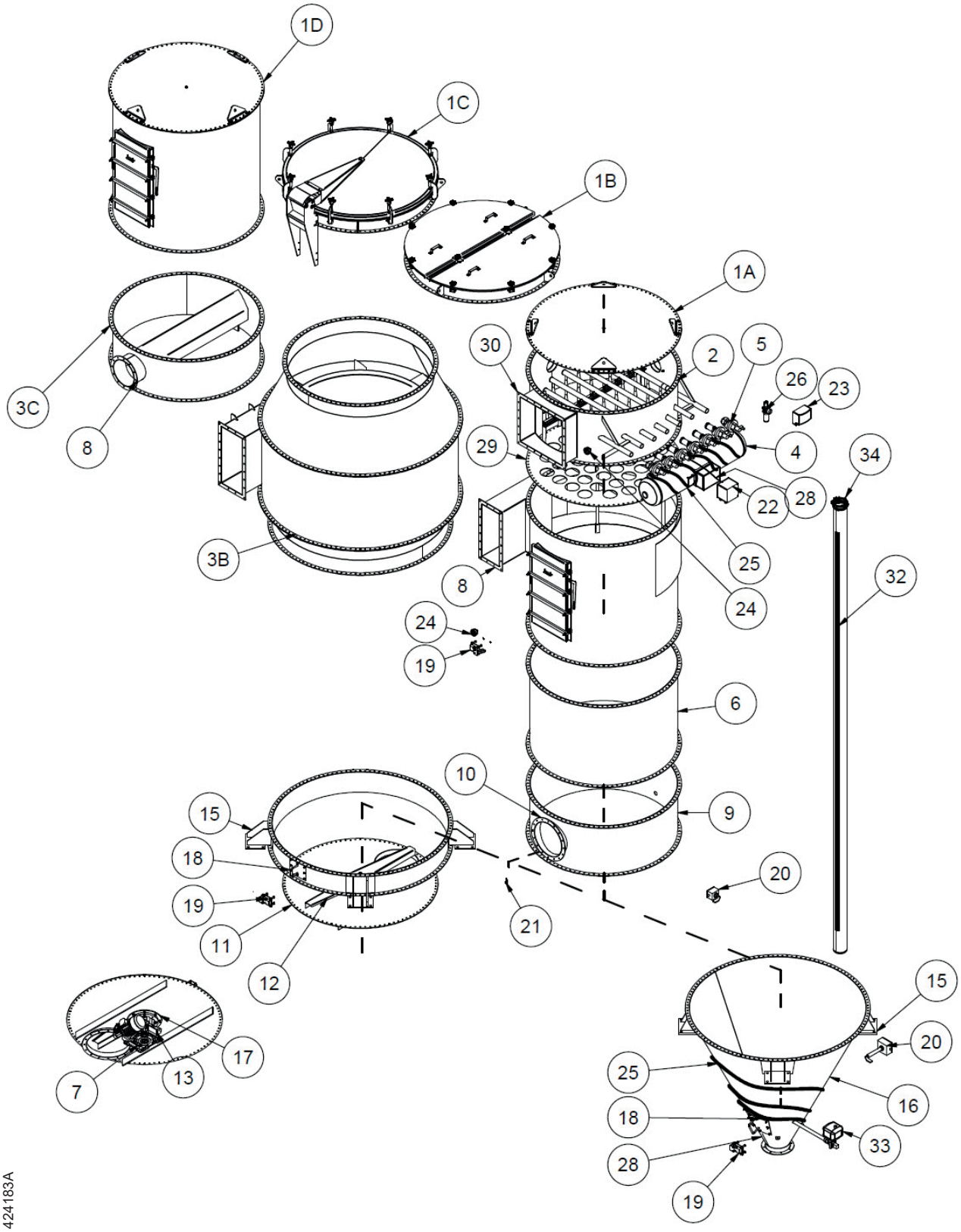
Top type 4T4-R

Component list

Item no.	Designation
1A	Top section – 4T-R Top – Fixed plate
1B	Top section – 4T1-R Top – Sectional top plate
1C	Top section – 4T2-R Top – Toggle fitting
1D	Top section – 4T3-R Top – Penthouse
2	Clean air chamber section
3A	04 Inlet, filter housing with inspection hatch
3B	12 Inlet, filter housing without inspection hatch
3C	17 Inlet, filter housing with circular inlet, no inspection hatch
4	Compressed air receiver
5	Solenoid valve
6	Filter housing
7	Rotation guard for scraper bottom
8	Inlet
9	Filter housing explosion relief
10	Explosion relief
11	Scraper bottom section
12	Scraper arm
13	Gear box for scraper bottom
14	Motor for scraper bottom
15	Supporting brackets
16	Cone section
17	Scraper bottom hub, including bearings
18	Cleaning hatch
19	Safety switch
20	Level limit switch
21	Rupture sensor on explosion relief
22	Solenoid junction box
23	Filter control unit
24	Differential pressure gauge
25	Heating cable
26	Filter regulator
27	
28	Solenoid cable
29	Hole plate
30	Clean air outlet
31	Transition piece
32	Filter bag
33	Jet gun
34	Filter cage

The filter construction shown is an example only, to include as many sections and options as possible.

Component list



Description of SimPact® 4T-R Pulse-Jet filter

Series 4T-R filters have modular top sections with discharge nozzle and cleaning system.

Recommended cleaning air pressure

1.0 – 2.0 metre bags: 2.5 bar
2.5 – 3.5 metre bags: 3.0 bar
4.0 – 5.0 metre bags: 4.0 bar

Bag change

4T-R From below through inspection door.
4T1-R From above by removing top cover or from below through inspection door.
4T2-R From above by tilting top cover to open or from below through inspection door.
4T3-R From above, with penthouse.

Classification			Cleaning bags with compressed air		
Filter type JMxx	No. of bags	Filter diameter (m)	Control type *	No. of valves	Air receiver volume (dm³)
7	7	0,6	TFC 8	3 x 1”	34
10	10	0,8	TFC 8	2 x 1” + 1 x 1½”	37
14	14	0,96	TFC 8	2 x 1” + 2 x 1½”	50
21	21	1,1	TFC 8	5 x 1½”	64
32	32	1,3	TFC 8	6 x 1½”	76
41	41	1,5	TFC 8	7 x 1½”	90
52	52	1,8	TFC 16	10 x 1½”	97
70	70	2,0	TFC 16	12 x 1½”	114
90	90	2,2	TFC 16	14 x 1½”	131
124	124	2,6	TFC 16	10 x 1½” + 6 x 2”	124
146	146	2,8	TFC 24	8 x 1½” + 10 x 2”	166
170	170	3,0	TFC 24	8 x 1½” + 12 x 2”	184
198	198	3,2	TFC 24	4 x 1½” + 16 x 2”	184

* See control unit manual.

Cleaning dust-filled air

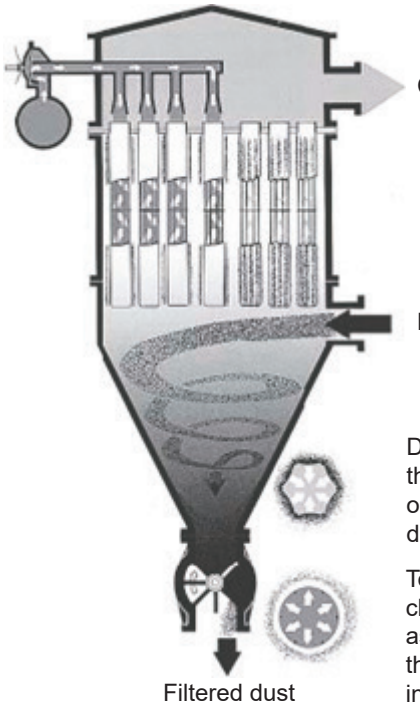
The dust-filled air is conducted into the filter chamber and through the filter bags from the outside. The filtered air passes through the filter bags/hole plate to the clean air outlet.

Cleaning the filter bags

During operation, the filter bags are cleaned by means of compressed air. The cleaning air system uses solenoid valves.
The solenoid valves are positioned on the air receiver, from which compressed air is aspirated and distributed into the filter bags via pipes.

Filter control unit

The filter control unit is set with an interval i.e. a pause in solenoid activation.
At the end of an interval, one of the solenoid valves is activated. It sends a pulse-jet of compressed air through the pipes and into a number of filter bags.
A new interval begins. When this interval is over, the next solenoid valve is activated like the first, and so on.



Dust-filled air enters the bags from the outside and deposits dust on the outside.

To remove dust, cleaning air is aspirated through the bags from the inside.

Description of scraper bottom

The scraper bottom is designed for continuous discharge. It is not designed to fill. The scraper bottom comprises a flat bottom plate and 2 or 4 scraper arms.
The scraper bottom is a compact alternative to collection of small amounts of dust in a cone under a filter. The scraper bottom is designed for continuous discharge. It is not designed to be filled.
The scraper bottom comprises a flat bottom plate, which is flanged under the filter chamber.
Two or four scraper arms rotate around a central axle. The scraper arms are offset relative to the axle and scrape collected material deposits out towards the outer edge. At the outer edge, the product falls out through a pipe nozzle. A connector flange is attached to the nozzle. A rotary valve or other suitable device is attached to the nozzle to prevent air intake.
To provide access to the pipe nozzle, scrapers, etc., a cleaning inspection hatch is normally fitted to the filter chamber, preferably close to the pipe nozzle. The hatch is secured against inadvertent opening during operation, which would entail a risk of personal injury due to contact with rotating parts.
The operating pressure values stated presuppose that there are no significant pulses which can create vibrations.
*At temperatures above 50ºC, the permitted max. operating pressure may be multiplied by a K-factor. See table 1 on the following page.
To meet specific customer requirements, Simatek designs scraper bottoms to operate at different operating pressures and temperature ranges.

Intended use and limits of application for the equipment

The properties are based on the worst case dust that may be collected in the bag filter and ending in the Scraper bottom MS-R.
Equipment designed for use in standard ambient temperature range of -40°C to +60°C.
The maximum temperature allowed for the dust laden air handled in the Scraper bottom MS-R would be 100°C.

Summary of ignition and combustion properties for worst case dusts that might be collected in the bag filter and ending in the Scraper bottom MS-R.

LEL	Lower Explosion Limit	10	g/m3
MITdc	Minimum Ignition Temperature of Dust Clouds	202	°C
MIE	Minimum Ignition Energy	3	mJ
LITdl	Minimum Layer Ignition Temperature of a 5mm dust layer	210	°C
Resistivity	Volume Resistivity	> $1x10^3$	Ω.m
Kst		<= 300	bar m/s
Pmax		13	bar

All dusts that might be collected in the bag filter and scraper bottom MS-R are chemically stable under normal conditions.

Safety measures applied to prevent the ignition source from becoming effective

- summary of the relevant ignition hazards identified, and the protective means implemented:

Hot surfaces:

Operating environment must be acc. to intended use and temp. must not exceed 100°C. Operating temperature is stated in actual Order Confirmation.
Frictional heat in bearings. Check instruction section 5 about regular servicing and the recommended frequency of inspection.
Electric currents can cause sparks. Check instruction section 5. The use of an anti-static lubricant will prevent erosion of the ball bearings. A regular check of the bearings is necessary to assure that no erosion occurs and replacement when the wear is unacceptable. Check instruction section 5 about regular servicing and the recommended frequency of inspection. Type of grease to be used: OKS 464.

Mechanically generated sparks:

Scraper arms and distance to bottom to be inspected before initial filter start up, if the filter inspection or cleaning hatch has been opened or if scraper motor has been tripped by overload.
Vertical clearance between scraper arms and filter bottom to be adjusted to a nominal distance of 20 mm according to instructions. Horizontal clearance between scraper arms and filter casing is in the range of 10-30mm.

Static electricity:

Electrostatic sparks may arise from isolated electrical conductive parts. The housing of the Scraper bottom MS-R is earthed together with bag filter chamber. The moving parts are earthed via the bearings provided with an anti-static lubricant and also via the geared motor connected to the shaft and housing. Check list 1110041 (point 4) to be used.

Exothermic reactions, including self-ignition of dusts:

Self-ignition of dust is prevented in the scraper bottom as it´s not an equipment for dust storage and is continuously emptied during operation.

General data:

Transmission	Twin wheel axle worm gear with standard motor.
Make of gear	See specification in Simatek's order confirmation.
Make of electrical motor	See specification in Simatek's order confirmation.
Power grid connection	230 V or 400V AC 50 Hz.
Ingress protection rating	IP 54.
Type FP-R (< 80°C)	Flange gear, packing gland.
Type MS-R (< 200°C)	Gear fitted with torque arm. With simmering seals.

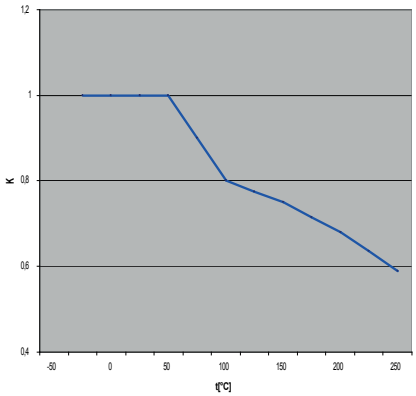


Table 1: Correction factor K for permitted operating pressure

Identification plate on the Scraper bottom

All safety marking is shown and specified in Section 1 – Safety. The system carries Simatek's identification plate.
The plate carries the relevant filter data.
Type: E.g. Scraper bottom MS-R, 2 arms, ø2000
Machine No.: xxxx(order specific filled in later)
Fabrication Year: E.g. 2021
ATEX marking if relevant.

If possible, quote the Machine No. (on identification plate) and Simatek's order no. when contacting us.

Contact details
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Website: www.simatek.com

After Sales contact details:
Hotline: +45 4046 7525
Mobile: +45 5884 1595
E-mail: after-sales@simatek.dk

Warranty
Refer to Simatek's order confirmation note or contract.

Dimensioning and load

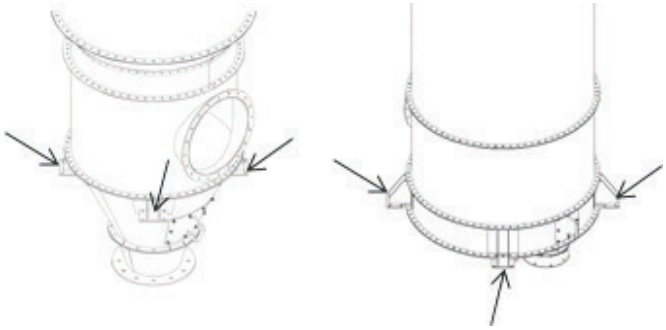
Dimensioning of support frame

The support frame and service platform supplied with this filter are designed and dimensioned in relation to the load they are expected to bear during normal use (and wind load if the filter unit is intended to be placed outdoors).

Max. load on filter supporting brackets

The calculations are based on the filter being erected on a firm surface.
The filter supporting brackets are designed for the following maximum safe working loads:

Cone ≤ Ø 1300/ Filter housing ≤ Ø 1500	**Cone ≥ Ø 1500 Filter housing ≤ Ø 1800**
Max. SWL: 845 kg per bracket	Max. SWL: 2733 kg per bracket



This calculation is based on the supporting brackets being positioned as shown here, i.e. on the cone and on the scraper bottom, respectively.
Positioning the brackets elsewhere will require new calculations for SWL.

Compressed air quality

Compressed air

Compressed air is generated by a compressor with cooler dryers.
Pressure is most often reduced to 2.5-4 bar in the filter regulator (item 26 on ”Components list” page).

Humidity

The requirements for humidity content in the compressed air are based on condensation from compressor to filter not being permitted.
With regard to the temperature of the air receiver, the acceptable pressure condensation point is reduced by 10° C to prevent the nozzle in the membrane valve from freezing.

The critical temperature $\mathbf{t_c}$ is the lowest of the following:
1) Ambient temperatures for pipe layout from compressor to filter.
2) Ambient temperature for air receiver minus 10° C (i.e. if the ambient temperature for the tank is 15° C, set $\mathbf{t_c}$ to 5° C).
3) Process air temperature. (The temperature of the air filtered into the 4T-R filter).

For hygroscopic dust types, it is also important that there is a good margin between process air temperature and compressed air pressure condensation point temperature. ($\mathbf{t_c}$ should be set even lower).

Moisture content must meet two of the following criteria:
1) If the compressor generates 6-10 bar and the air is cooled to a temperature corresponding to or lower than $\mathbf{t_c}$ before air is blown into the pipes, the compressed air will be sufficiently dry with regard to condensation in the pipes.

2) Moisture content for $\mathbf{t_c}$ > +10° C — ISO 8573 Class 6
   Moisture content for $\mathbf{t_c}$ > +7° C — ISO 8573 Class 5
   Moisture content for $\mathbf{t_c}$ > +3° C — ISO 8573 Class 4
   Moisture content for $\mathbf{t_c}$ > -20° C — ISO 8573 Class 3
   Moisture content for $\mathbf{t_c}$ > -40° C — ISO 8573 Class 2

Oil content

Oil content must be less than 1 mg of oil per m3, i.e. ISO 8573 Class 5 or better.

Particle content

Particle content in the compressed air should fulfil ISO 8573 Class 5 or better.

Always refer to the latest applicable version of the ISO 8573 series.

Pressure loss and efficiency

In this context, the bag filter consists of two parts: the filter bags and the housing containing them. The same regulations apply to the latter as to other air components: they must be dimensioned according to air volume and have a constant pressure loss that approximately follows the square root of the air volume. However, pressure loss through the housing represents only a modest amount of the whole. The filter bags normally account for the majority. Pressure loss through the filter bags in a bag filter is determined by a number of factors that make the use of uniform calculation or measurement methods impossible (the same applies, e.g. to ducting sections). When starting up a bag filter with new or washed bags, pressure loss will be quite low. After a short period of operation, the bag surface will be caked and pressure loss will stabilise. This is the point at which the bag reaches peak efficiency in terms of separation. In many instances, pressure loss will then gradually increase until it reaches an unacceptable level, at which the filter bags must be replaced. In other instances, pressure loss after running-in will be stable until the bags are worn out or replaced for hygienic reasons

Parameters

The filter bags can be sensitive to a number of factors, including:

- Air volume
- Dust type
- Dust fineness
- Dust agglomeration levels
- Dust electrostatic levels
- Moisture content in air/dust
- Temperature difference between filter and surroundings
- Bag wear-and-tear
- Frequency and intensity of filter bag cleaning

The above parameters primarily affect pressure loss through the filter bags and sometimes filtration efficiency, i.e. residual dust content in the air behind the filter. In most instances, pressure loss through the filter bags is the deciding factor for the suitability of the bags and when they have to be changed.

Air volume

Pressure loss through the filter bags increases in line with increased air volume (filter load). Emissions generally increase in line with filter load.
In principle, filter load cannot be too low. In some instances, pressure loss through the filter bags will rise steadily as the load is increased, but will rise suddenly when a given load is exceeded. Under certain conditions, excessive filter load and consequent pressure loss through the bags can cause the dust to penetrate deep into the filter material and block the air passage to such an extent that the filter cleaning system is unable to blow the particles away. If so, the bags must be washed or replaced.

Dust

Filtration efficiency and pressure loss through the filter bags depends only to a certain degree on the amount of dust. The proportion and properties of the very fine particles of dust are more important. However, large volumes of dust can cause heavy wear on the filter bags. Whether the dust tends to agglomerate is of major significance to filtration efficiency and pressure loss, as it improves conditions. Dust types that can easily be charged with static electricity can cause problems if they become suspended in the filter or stick to the filter bags.

Humidity

Work should always be performed at temperatures above condensation point, as humidity can cause problems with adhesion, especially with hygroscopic dust types. This can mean that the filter has to be insulated and perhaps heated, even when not in operation.

Cleaning the filter bags

Pressure loss will change if the cleaning frequency or pressure is changed. The degree of change will depend on dust type. Cleaning pressure has an effect on filtration efficiency and pressure loss. High cleaning pressure will cause extra wear on the filter bags and, in extreme cases, rupture them. In some instances, the filter bags can become caked in dust, which does not cause especially high pressure loss, but improves efficiency and protects the bags against wear and sticky particles. When working with certain (fine) dust types, it may be necessary to operate with a lower cleaning pressure to minimise emissions. In such cases, check whether the bags are still cleaned satisfactorily, If necessary, increase cleaning frequency.

Removing a filter

See Section 3 – Installation and assembly. Follow the instructions in reverse order.

Disposing of a filter

Personal safety

When dismantling or handling a used filter (or filter bags) that may not have been cleaned, see Section 1 – Safety, "Working with dust".

When disposing of filter bags, the filter housing, etc., always use suitable personal protective equipment, e.g.:

- Respirator
- Eye protection
- Gloves
- Dust-resistant work clothes
- Protective suits
- Ear protectors
- Safety footwear

Applicable (local) safety rules must always be observed.

Dust residue

Dust properties must be taken into account when deciding how and how thoroughly to clean and what to do with the dust collected. This applies to bags and the filter housing.

Filter bags

Filter bags can be manufactured from a number of materials. The bag material currently in use is not necessarily the same as the original
Determine existing bag material for correct disposal.

Filter housing

The remaining filter is largely made of steel with small quantities of aluminium, zinc (galvanising) and plastic. Residual dust should essentially be removed from the filter housing and the housing disposed of as scrap metal.

Electrical components

Electrical parts, such as wires, sensors, control units and junction boxes should be dismantled and disposed of according to local environmental rules.

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Section 3
Installation and assembly

Horizontal lift of filter

The term "horizontal lift" refers to a situation, in which the filter's central axis is horizontal, e.g. when the filter is unloaded from a goods vehicle or moved on site.

Lifting the filter
Use only straps, shackles and other lifting gear approved and suitable for the job.
If rigged using the two lifting points on the filter, the straps must be of equal length and the angle between them less than 90º.

Supports

Depending on filter size and design, filters are supplied lying horizontally on supports. Apart from protecting the filter from damage, the supports also prevent it from flattening (to an oval shape).
This is important for the filter's capacity to maintain a vacuum when in operation.
The supports provided should therefore always be used when the filter is to lie horizontally.

Lifting

Use one or both of the upper lifting eyes when lifting horizontally. See fig. 1. If the filter is lying down as shown and two straps are to be used,
The angle between the straps may not exceed 90° (shown in fig. 1). Certain types of filter inlet can cause imbalance in relation to the filter's central axis. Take care to prevent the filter from rolling when it is hoisted from the ground/underlay.

Lifting eye at base of filter

As the lower section of the filter varies in shape, the position of the lifting eye may also vary. Filters are delivered from Simatek with suitable lifting eye(s) on the lower section. Fig. 1 shows an example.

Certain types of filter inlet can cause imbalance in relation to the filter's central axis. Take care to prevent the filter from rolling when it is hoisted from the ground/underlay.

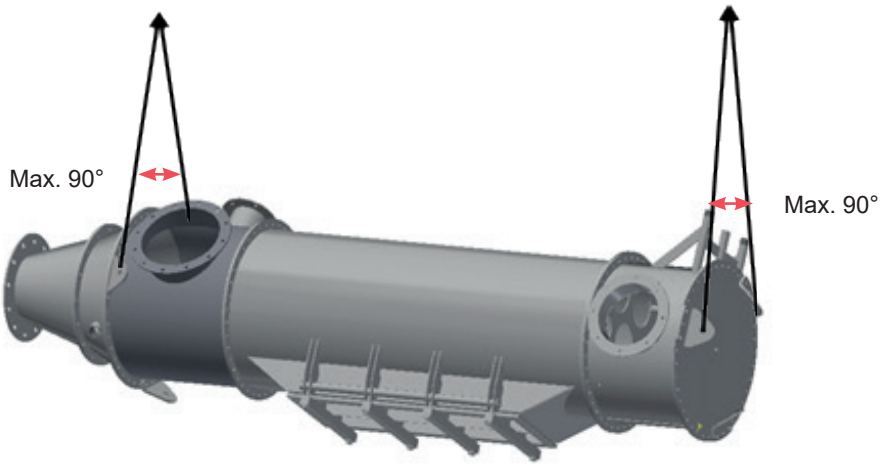


Fig. 3: Example of support attached to bottom of filter (used here as lifting eye).
Lifting bracket on top of filter. Two brackets are used here.

Erection and vertical lift 4T-R

These instructions concern erecting the filter from horizontal, the position normally used for transportation and handling prior to installation. The term "erection" here means that the centre axis changes from horizontal to vertical, i.e. the filter is lifted into its final vertical position. Horizontal lift and handling, see page: "Horizontal lift of filter"

Lifting the filter
Use only straps, shackles and other lifting gear approved and suitable for the job.
If rigged using the two lifting points on the filter, the straps must be of equal length and the angle between them less than 90º.

Lifting

When the filter is raised and lifted vertically, use the two upper lifting eyes shown in fig. 1 – with equal strap lengths.

Lifting eye at base of filter

As the design of the lower part of the filter varies, the design of thelifting eye will also vary. Filters are delivered from Simatek with suitable lifting eye(s) on the lower section. Fig. 2 shows an example.

Certain types of filter inlet can cause imbalance in relation to the filter's central axis. Take care to prevent the filter from rolling when it is hoisted from the ground/underlay.

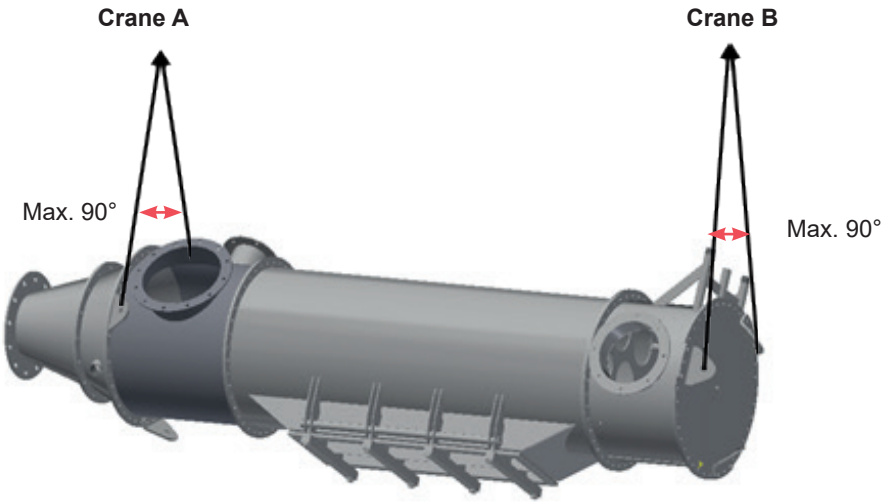


Fig. 1: Filter erection continued as vertical lift. Crane A: 2 straps attached as shown in fig. 1. Crane B: Slowly raise filter to vertical. Use the two upper lifting eyes for erection and vertical lift.

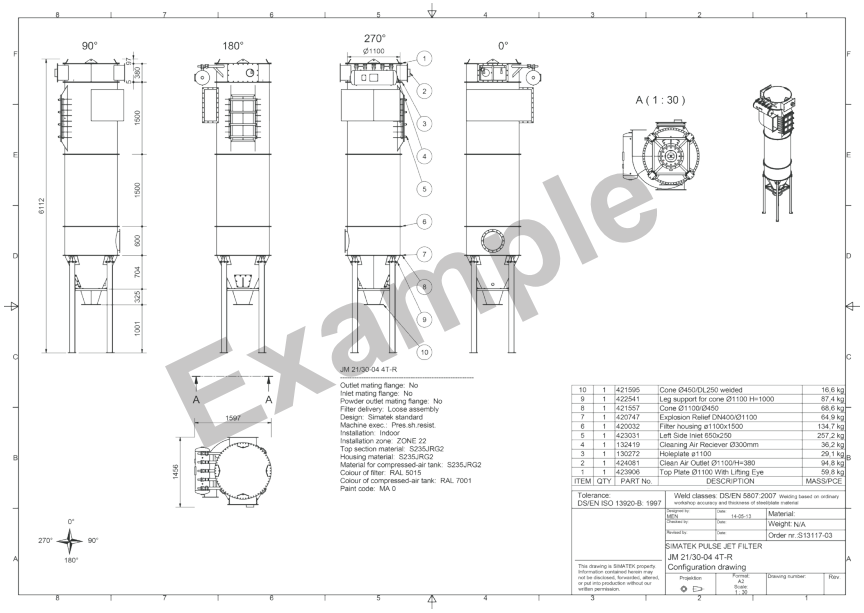
Horizontal lift and erection and vertical Lift of 4T2-R

The lifting eyes at the top of the filter vary depending on the type of top section on the filter in question.
The lifting eyes on the top of the filter may also vary depending on filter size.

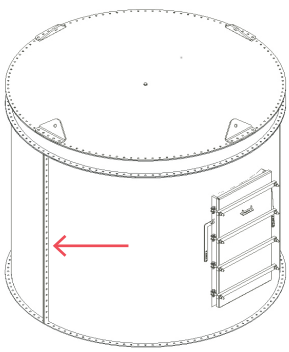
Follow the instructions for horizontal lift of filter and filter erection and vertical lift in these assembly instructions.
The only differences are the location and design of the lifting eyes.

Receiving the 4T-R filter on site

As a rule, the modular 4T-R filter is assembled before it is dispatched from Simatek.
If this is not the case, follow the instructions below.
If the filter has to be disassembled and then reassembled, the instructions below also apply for reassembly.
If the filter is not to be assembled while standing vertically, always make sure that the filter sections are not crushed when lying down.
Use the configuration drawing supplied. This shows how the filter sections should be assembled.



If the filter is delivered unassembled, there will be alignment markers on each filter module to indicate how the sections should be positioned in relation to each other.
The markers are placed opposite the bolt holes shown in pos. 0° on the drawing.

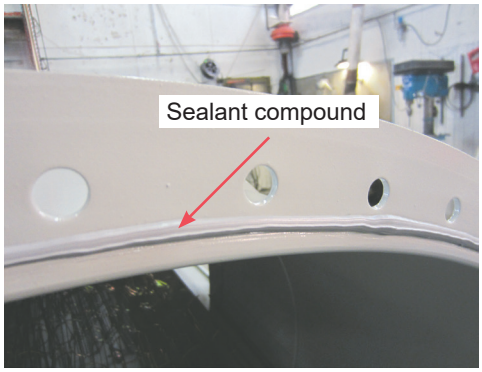


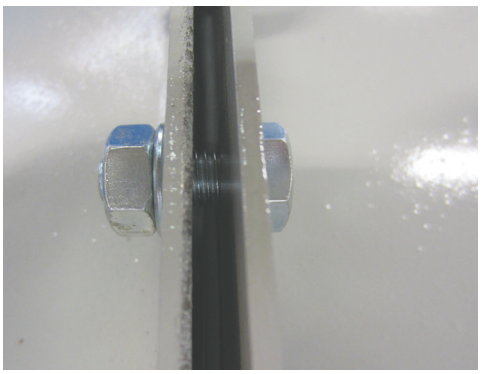
If parts of the filter are split vertically they must be joined together using M10 bolts with bevelled discs. Mounting torque: 47Nm.
The junction must be all-welded on the inside of the section according to the current version of EN 5817 quality level C.
Welding position PB must be used. The joint must be filled with weld and then ground smooth.
Surface treatment after welding:
According to paint code given on the configuration drawing.

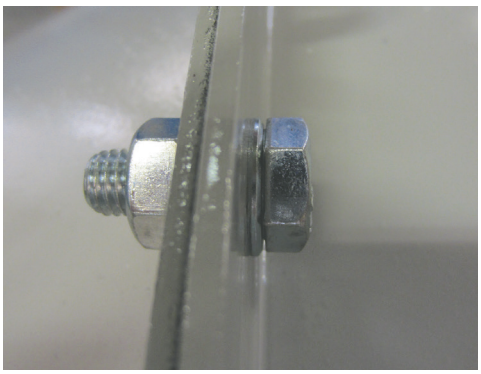
Welding of pressure shock resistant filters can only be performed by certified welders according to valid welding procedure (WPS).

NOTE: for pressure shock resistant filters with a diameter ≥ 2200 mm and a flange thickness < 5 mm see also the instruction regarding flange reinforcement on the following page.

A line of the sealant compound supplied should be applied to each flange assembly.
Apply sealant compound to the flange all the way round within the circle of bolts.
Assemble the filter sections and hold them in the correct position using a crane hook.
Fit bolts with nuts and bevelled washers. Torque setting for M10 bolts: 47 Nm.
2 x safety washers are used at four places per flange assembly instead of bevelled washers.
We recommend tightening bolts after a couple of hours.

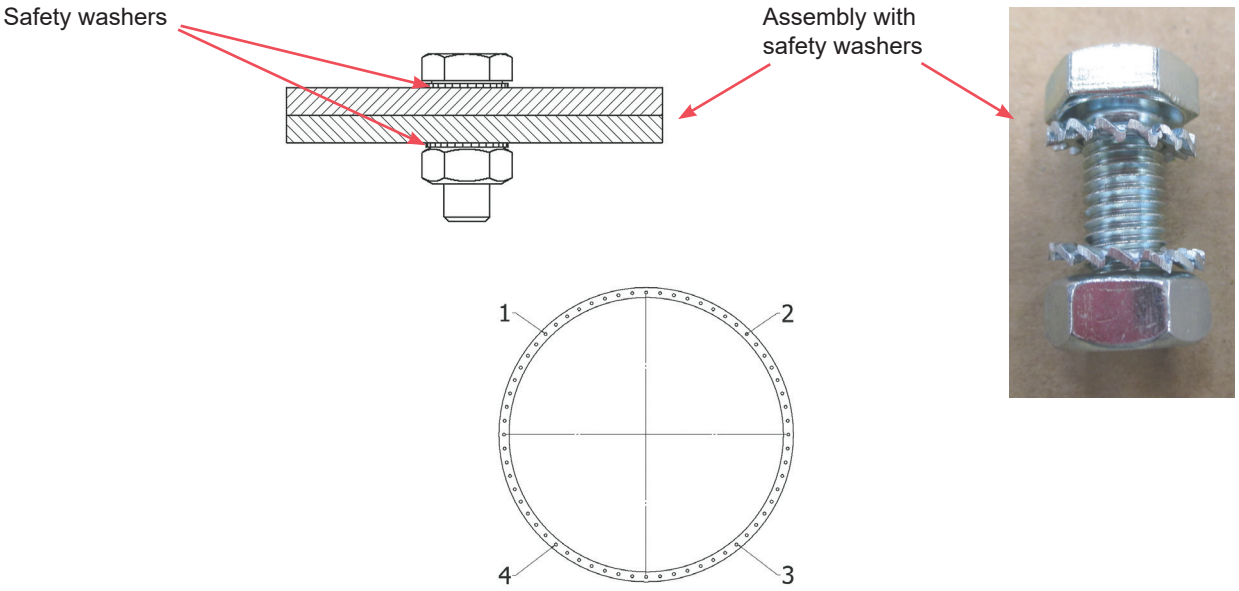






Earth connection/potential equalisation at flange joints

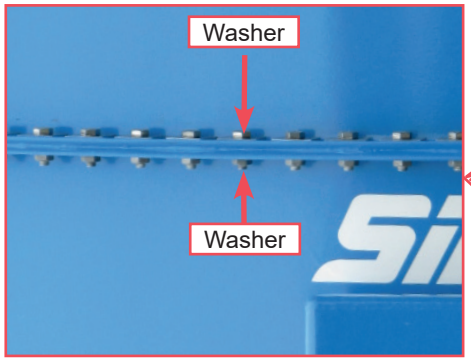
4 x bolt assemblies with safety washers are used to maintain an earth connection on each flange assembly



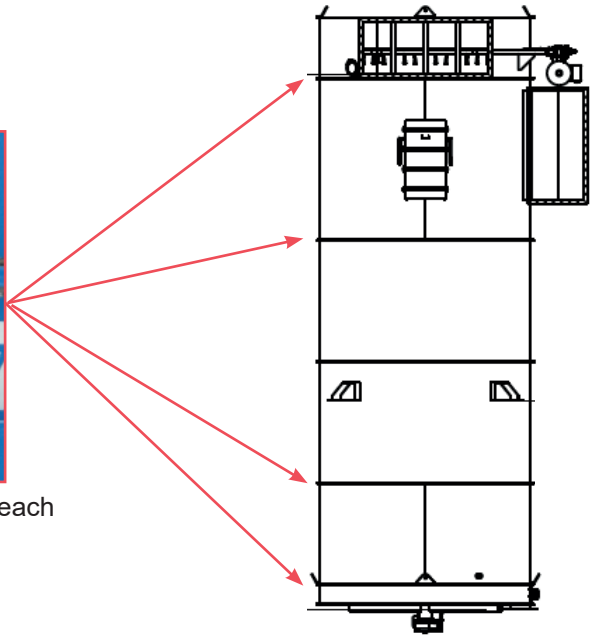
Washers for flange re-inforcement

This instruction applies to pressure shock resistant filters with a diameter ≥ 2200 mm and a flange thickness < 5 mm. Due to the pressure shock resistance each flange joint must be fitted with re-inforcement washers.

The illustration below is an example - please refer to the supplied configuration drawing for the filter in question.



Fit two washers at every bolt - one on each side of the flange joint.

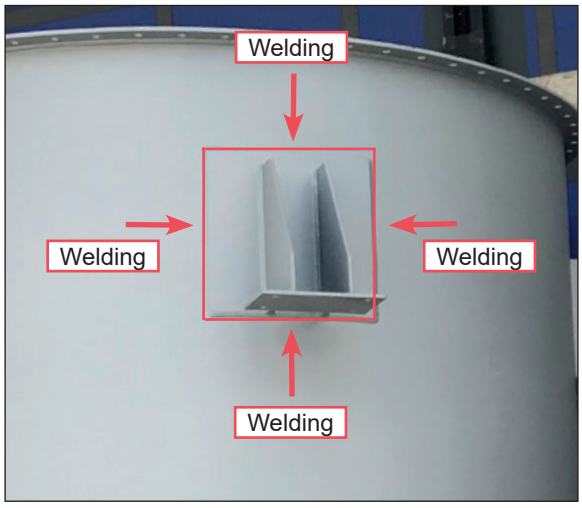


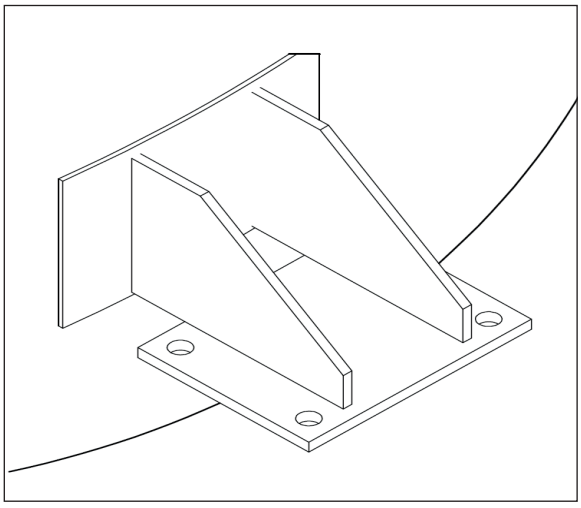
Welding of foot brackets

⚠	Welding can only be performed by certified welders and according to valid welding procedure (WPS).

Select welding position "PB" (standing horizontal) or "PF" (rising welding) for welding foot brackets, and use A-measurement 0.7 x sheet thickness. The thinnest sheet thickness applies here. If the sheet is 3 mm, then the A-measurement must be min. 2.1 mm. If welded rising, a much larger A-measurement will be attained.

Welding is to be performed according to the current version of **EN 5817 quality level C**.

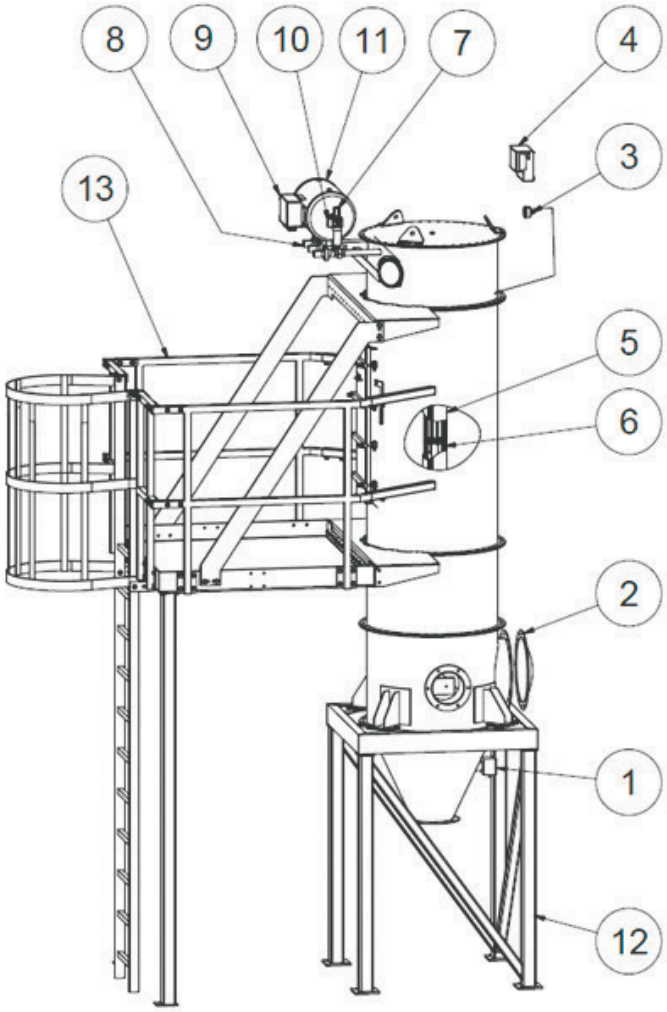




Positioning of each part

These assembly instructions may mention components that are not supplied with the Simatek delivery in question.

1) Level limit switch
2) Explosion membrane
3) Differential pressure gauge – according to customer requirement
4) TFC control unit – according to customer requirement
5) Filter bags
6) Filter cages
7) Filter regulator
8) Solenoid valves
9) Solenoid valve junction box
10) Manometer
11) Compressed air receiver
12) Support frame
13) Service platform with ladder



Fitting accessories

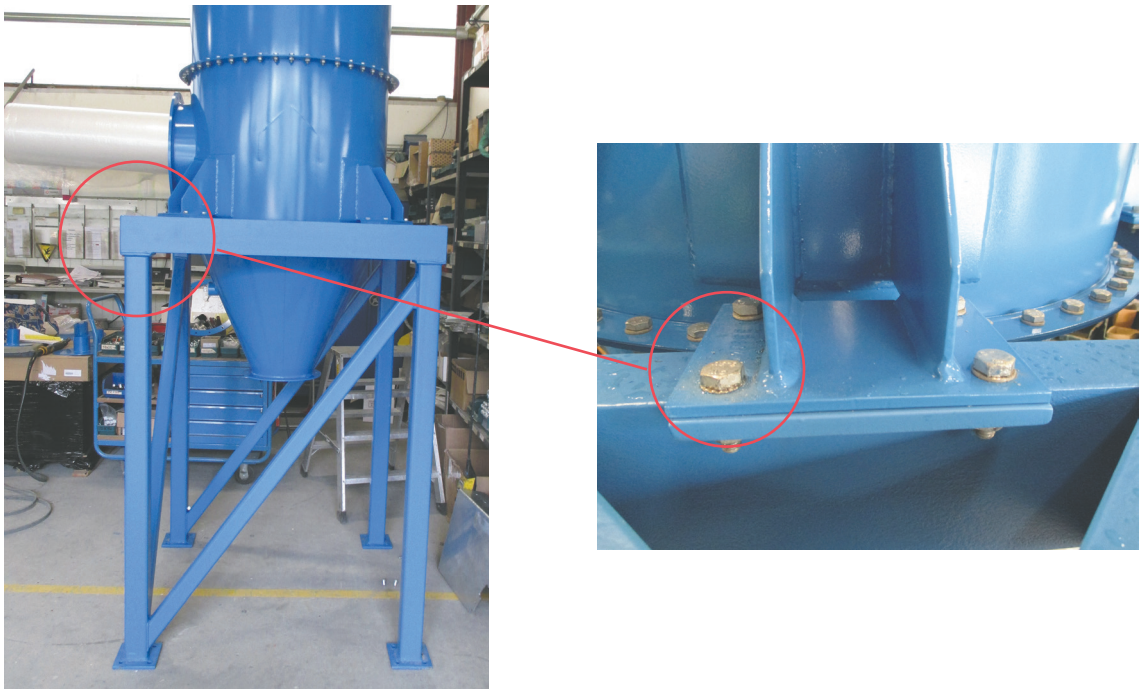
Fitting support frame on the filter

The filter is mounted on a support frame.

See fitting instructions for support frames in Section 8 of these assembly instructions.

Earth connection/potential equalisation

One bolt on each flange assembly between support frame and filter is used to maintain an earth connection, using safety washers.
See description of correct assembly in section "Earth connection/potential equalisation at flange joints" (above, in this section).



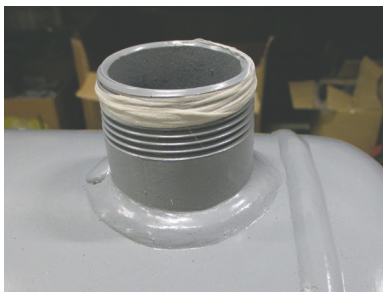
Fitting air receiver, solenoid valves, junction box, filter regulator and manometer

All threads on metal parts should be packed with a suitable pipe sealant.
Simatek recommends LocTite 55 pipe sealing cord.

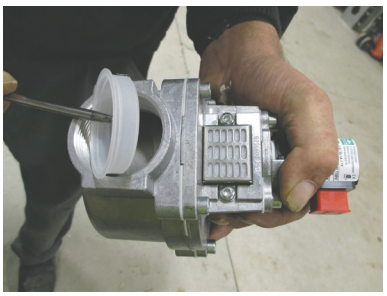
⚠	**NB!** When the filter is fully assembled, always check that there is unrestricted access to the air receiver, solenoid valves and filter regulator for service. Photographs and explanations in these assembly instructions can differ depending on the components supplied.

Fitting solenoid valves on the air receiver

Most air receivers are supplied by Simatek with solenoid valves fitted. If this is not the case, follow the instructions below.



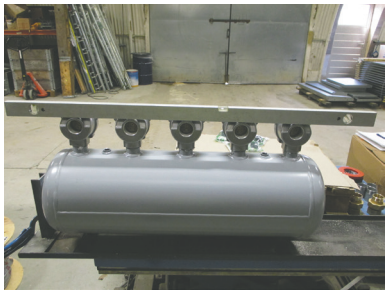
Pack the thread on the air receiver with a suitable pipe sealant.



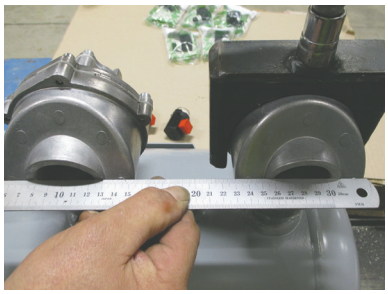
Remove the cover from the solenoid.

Remove the twist-on coil from the solenoid.

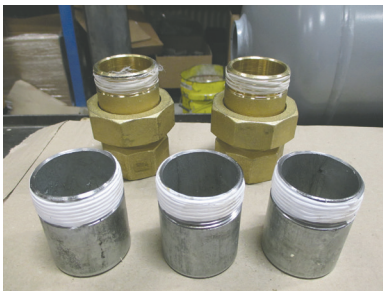
Fit the solenoid valves on the air receiver.
Tighten solenoid valves 4-5 turns.
The twist-on coil seat must face the same way as the fitting plate.



Check that all solenoid valves are level using a spirit gauge.



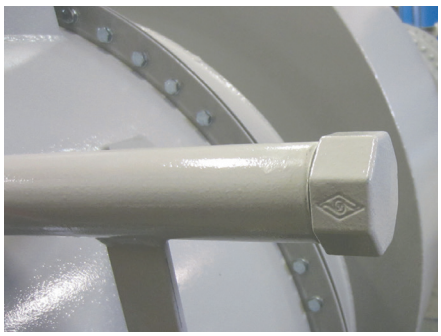
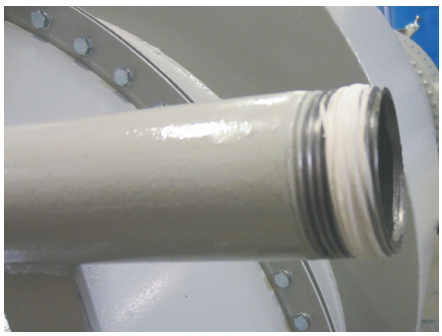
Check that all solenoid valves are in line with each other.



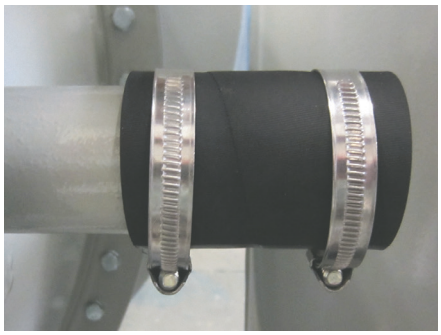
Pack all radiator unions and weld adapters with a suitable pipe sealant and screw them onto the air receiver.

Fit the twist-on coil on the solenoid. It should face right when looking at the air receiver from the fitting plate side..

Fitting air receiver on the filter

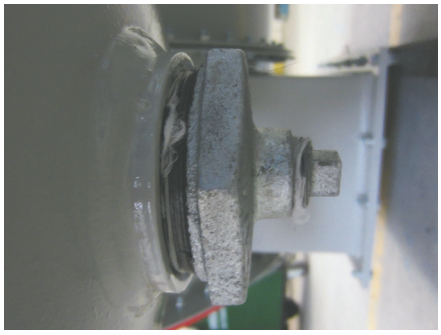
Unscrew the two caps from the pipes on the filter and pack the thread with a suitable pipe sealant.



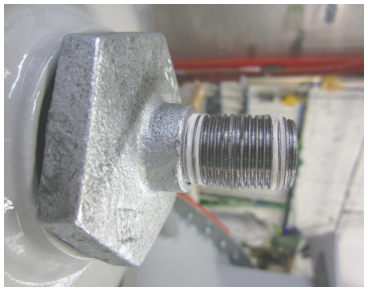

Slide 1 x rubber sleeve and 2 x clips over the pipes where there is no thread.


Fit the air receiver to the filter by screwing solenoid valves with unions onto the two threaded pipes projecting from the filter. Slide the rubber sleeves to a position where the clips can be tightened around the air receiver pipe and filter pipe respectively to form a seal.

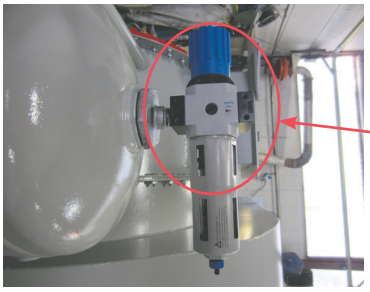
Fitting equipment to the air receiver

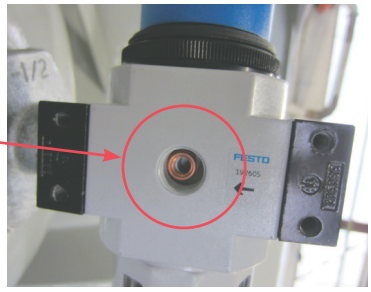


Fit nipple bushing and plug at one end of the air receiver.

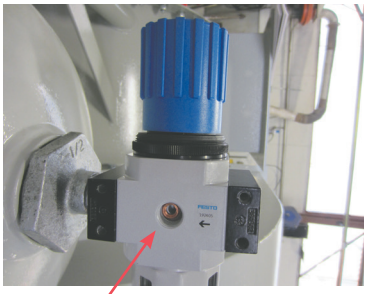


Fit nipple bushing, nipple pipe and filter regulator on the other end of the air receiver.

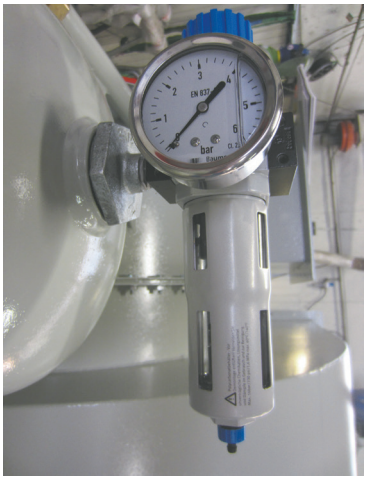




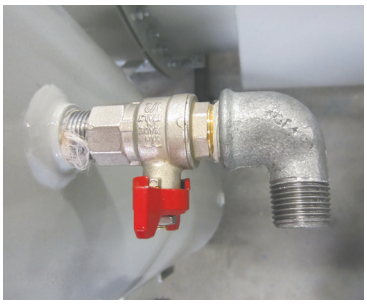
Remember to check flow direction to ensure correct fitting of the filter regulator



Remove the black plastic block from the filter regulator and fit the manometer.
Remember to fit a copper washer under the manometer.
The copper washer is in the plastic bag which the manometer comes in.



IMPORTANT! Before connecting the compressed air supply to the filter regulator, check that there is no dirt in the connection hoses etc.

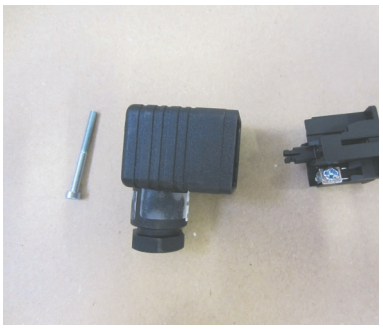


There are two nozzles on the bottom of the air receiver.
Fit a plug in one and nipple bushing, ball cock and elbow in the other.

Electrical work

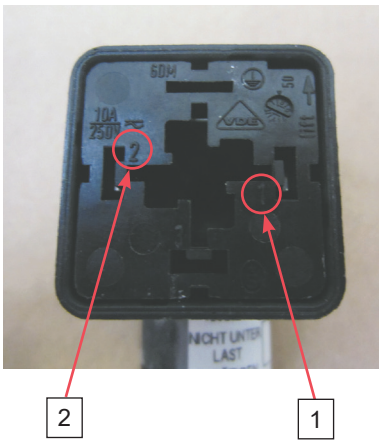
Electrical and ATEX-related work must be performed by qualified personnel and in accordance with applicable legislation.
Always use insulated grommets on all wires.

Attaching cables/solenoid valves

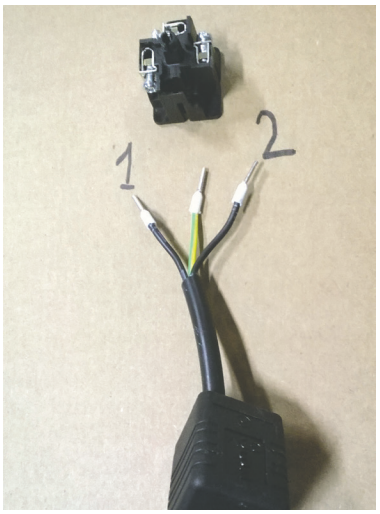


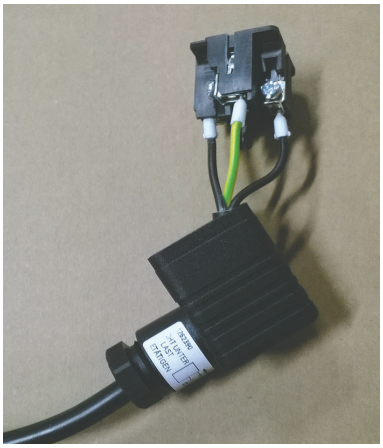
Each solenoid valve has 1 x cable and 1 x plug.
Remove screw from plug and remove the backing plate (use a screwdriver if necessary).

The cables have 3 wires: 2 x black marked no. 1 and no. 2 and 2 x green/yellow (earth).
Insert cable in plug.
Wire no. 1 to the left. Yellow/green in the middle. Wire no. 2 to the right.



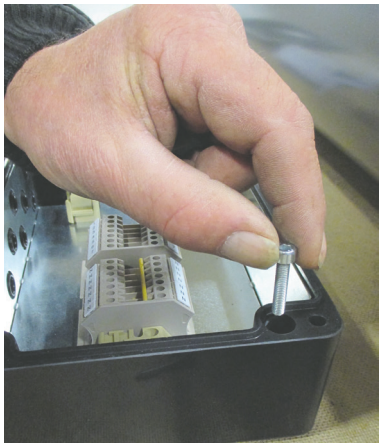
The backing plate is marked 1 and 2.
Ensure that wire no. 1 is attached to screw no. 1 and wire no. 2 to screw no. 2.





Assemble the plug and fit on the solenoid valve.
Remember to fit a gasket under the plug.

Attaching cables from solenoids in junction box

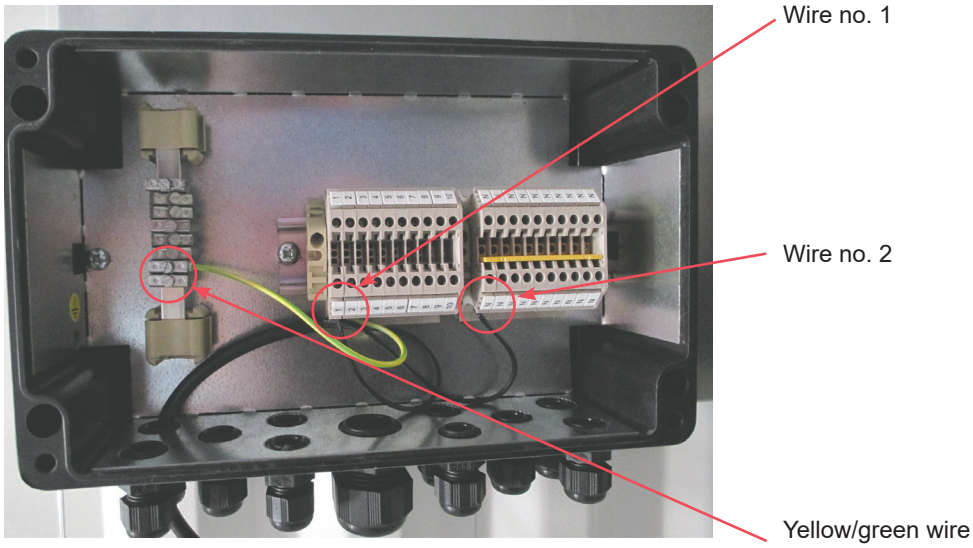


Attach the junction box to the plate on the air receiver.

⚠	Use insulated grommets on all wires.

Run wires from the solenoids into the junction box.
The cables from the solenoids have 3 wires. 2 x black marked no. 1 and no. 2. 1 green/yellow to earth.
Start with the solenoid to the far left.

Connect the wires from the solenoid mounted farthest to the left on the pipes as follows:
Wire no. 1 to terminal no. 1 in the junction box. No. 1 is the solenoid, which is activated first.
Wire no. 2 to the far left terminal N in the junction box.
Yellow/green to the first terminal.



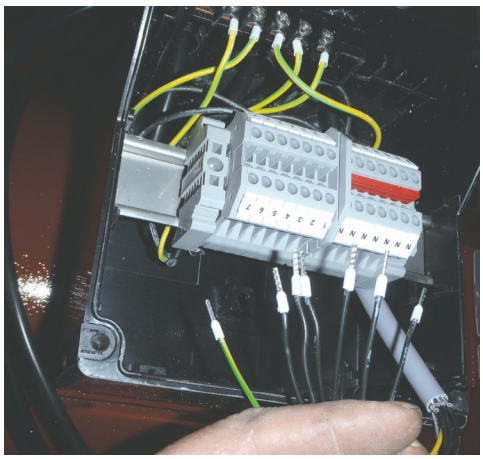
Connect the wires from the solenoid second from the left as follows:
Wire no. 1 to terminal no. 2 in the junction box.
Wire no. 2 to the second from left terminal N in the junction box.
Yellow/green to the second terminal.

Continue this sequence until all wires from the solenoids are connected in the junction box.

Attaching cable for control unit in junction box

This cable contains 12 wires.
11 wires are marked from no. 1 to 11.
1 yellow/green wire.

Wire no. 1 – x connected to the row numbered 1 – x (depending on how many valves there are on the air receiver).
Wire no. 11 is connected to the far left N.
Yellow/green wire connected to earth.
Cut off any surplus wire



Recommendations regarding pipe section to filter

Fig. x refers to ill. nos. on this page only.

Construction forms are shown in Section 2 – General information

4T-R filter, construction form 03

Air supply from beneath filter bags. No ducting to filter.

4T-R filter, construction form 04

A pipe, which is as long and horizontal as possible, must be placed in front of the inlet to ensure a laminar flow at the filter inlet.
If an elbow bend is to be fitted just before the filter inlet, the pipe section must be horizontal. The direction of the elbow must be as shown in fig. 1
The pipe section must NEVER be as shown in Fig. 2.

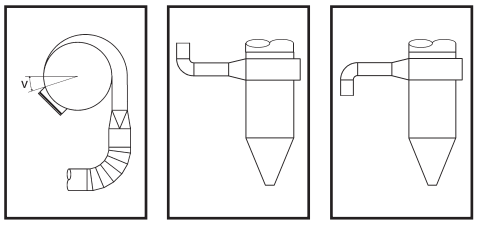


Fig. 1

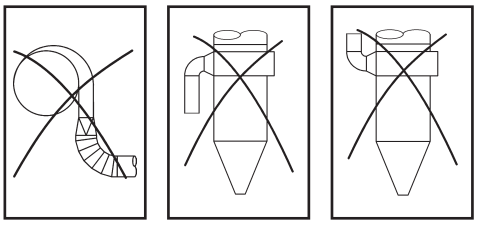


Fig. 2

4T-R filter, construction form 05

A pipe, which is as long and horizontal as possible, must be placed in front of the inlet to ensure a laminar flow at the filter inlet.
If an elbow bend is to be fitted just before the filter inlet, the pipe section must be horizontal. The direction of the elbow must be as shown in fig. 3
The pipe section must NEVER be as shown in Fig. 4.

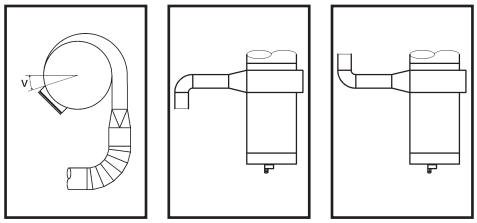


Fig. 3

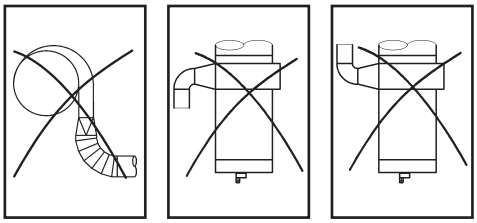


Fig. 4

4T-R filter, construction form 12

This construction form requires no special pipe section before the filter. However, a long, horizontal pipe section directly into the filter inlet is always an advantage.

4T-R filter, construction form 14

This construction form requires no special pipe section before the filter. However, a long, horizontal pipe section directly into the filter inlet is always an advantage.

4T-R filter, construction form 17

This construction form requires no special pipe section before the filter. However, a long, horizontal pipe section directly into the filter inlet is always an advantage.
We recommend that pipe Ø is adapted to filter inlet Ø using a slim (approx. 8°) cone.

Potential equalisation

General guidelines for potential equalisation in dusty EX environments.

Excerpt from EN 60079-14/Ed5: Explosive atmospheres – Part 14: Electrical installations design, selection and erection:

6.4 Potential equalization

6.4.1 General

Exposed conductive parts need not be separately connected to the equipotential bonding system if they are firmly secured to and are in conductive contact with structural parts or piping which are connected to the equipotential bonding system. Extraneous conductive parts which are not part of the structure or of the electrical installation, for example frames of doors or windows, need not be connected to the equipotential bonding system, if there is no danger of voltage displacement.

The minimum size for bonding conductors for the main connection to a protective rail shall be 6 mm2 and supplementary connections shall be a minimum of 4 mm2. Consideration should also be given to using larger conductors for mechanical strength.

Description of suggested test procedure:
Check that potential equalisation of the filter, associated components and any electrically conductive parts is correct.
Measure potential equalisation of the plant using a constant current generator 200 mA. Result must read ≤ 2Ω.
Measurement points compared to assembly/site drawing.

Excerpt from EN 60204-1: Safety of Machinery - Electrical equipment of machines – Part 1: General requirements:

18.2 Verification of the conditions for protection in the event of automatic disruption to the power supply

18.2.1 General points

The conditions for automatic disconnection of the power supply (see 6.3.3) shall be verified by testing.
The test methods for TN systems are described in 18.2.2, their use in the event of various supply scenarios is stipulated in 18.2.3.

See IEC 60364-6-61 for TT and IT systems.

18.2.2 Test methods on TN systems

Test 1 verifies continuity in the protective equalisation circuit. Test 2 verifies the conditions for protection in the event of automatic disruption to the power supply

Test 1 Verification continuity in the protective equalisation circuit.

Resistance in any protective equalisation circuit between the PE clamp (see 5.2 and figure 3) and relevant points that are part of each protective equalisation circuit shall be measured using a current of between at least 0.2 A and approx. 10 A, that comes from an electrically separated supply source (e.g. SELV, see 413.1 in IEC 60064-4-41), and that has maximum standby voltage of 24 V a.c. or d.c. The use of a PELV supply is not recommended, as such supplies can cause misleading results in this test. Measured resistance shall be within the expected range in relation to the length of, cross-section area of and the material in the equalisation strap(s) connected for protection.

NOTE 1: If higher currents are used for the continuity test, accuracy will be increased, especially for small resistance values, i.e. greater cross-section areas and/or shorter strap length.

Installation of lower level limit switch

See further instructions concerning installation and electrical connections in Section 7 - Accessories of these assembly instructions.

Pack the thread for the lower level limit switch with a suitable pipe sealant.
Simatek The filter manufacturer recommends LocTite 55 pipe sealing cord

The threaded nozzle for the lower level limit switch is usually placed under the explosion relief flange unless otherwise agreed.

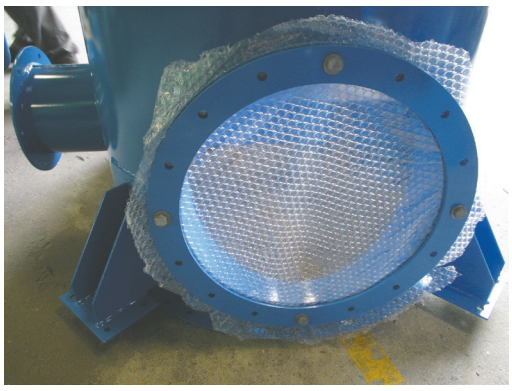
Fold the vanes on the switch together and insert into the filter.

Screw the switch securely into the threaded nozzle.

⚠	If the level limit switch under the explosion relief is activated, the fan stops and an alarm must be given. Call service. If the rupture indicator on the explosion relief breaks an alarm must be given. Fan, scraper bottom and rotary valve must be stopped. An explosion inside the filter might be the cause.

Counter flange for explosion relief device

A counter flange for the explosion relief device is often supplied by Simatek.
It is fitted loosely on the filter flange.
Remove the counter flange and refit it in accordance with the instructions supplied for the relevant make of explosion relief device.
The illustration shows a counter flange for FIKE.



Fitting explosion relief device and rupture sensor

See documentation for assembly instructions for the relevant make of explosion relief device in Section 8 – Specific documentation.

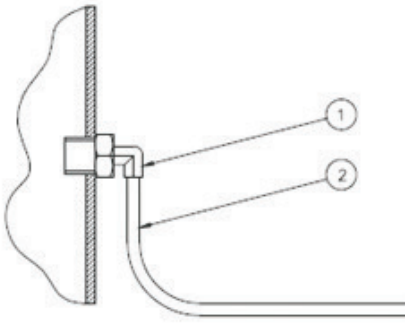
Installation and connection of differential pressure gauge Type N

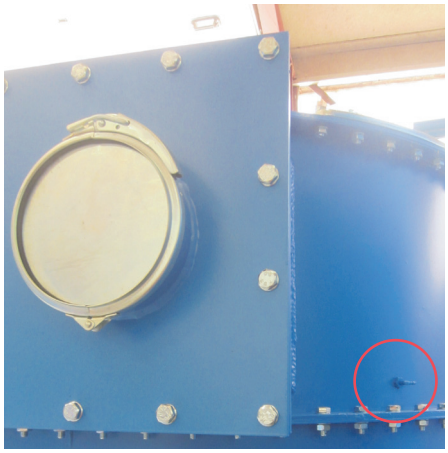
Figures in parentheses refer to the item nos. in illustrations on this page only.

Description

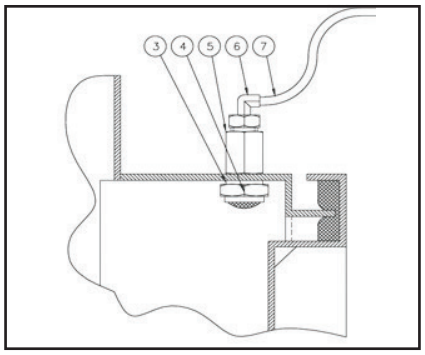
Connection type N developed for Simatek's standard filters. Filter element (4) prevents dust penetration into the TFCD control unit/differential pressure gauge.

Clean air chamber





Product side



Installation

Connection type N consists of two units: clean air nozzle (1) and filter holder (5), connected before commissioning:

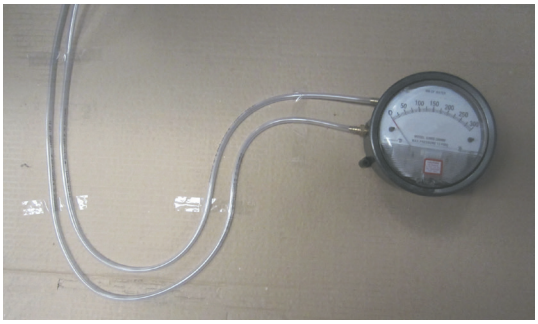
1) Fit hose (2) on hose nozzle (1).
2) Fit hose (7) on filter holder (6).

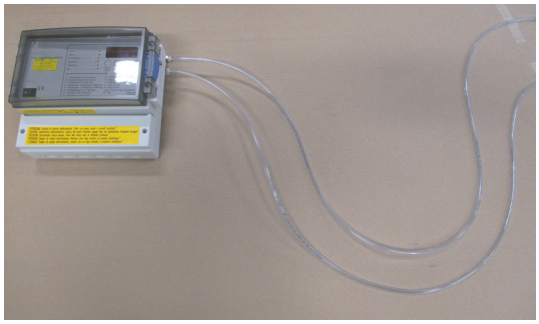
If the TFCD control unit or differential pressure gauge is fitted under the filter holder (5), the hoses must be fitted bending downwards so that condensate cannot run into the TFCD control unit/differential pressure gauge.

Product no. filter element (4): 5253

Connection

Fit the hose from the clean air chamber to nozzle (-) on the TFCD control unit/differential pressure gauge.
Fit the hose from the product side to nozzle (+) on the TFCD control unit/differential pressure gauge.
Check hoses are fitted correctly: Suction applied to the hose from the clean air chamber should give a positive reading on the gauge. If not, switch the hoses.
The hoses supplied from Simatek are Ø 4/6 mm PVC. They can therefore be connected directly to the TFCD control unit/differential pressure gauge.
PVC hose temperature limit: -15°C - +60°C.





Service and maintenance

Product side:

If the filter holder is located by the door, the filter element can be inspected through the door.
If the filter element requires replacement:
1) Detach the filter holder hose.
2) Remove the filter element (4) and blow clean or replace with a new element.
3) Refit filter element (4) and filter holder.

Heating of scraper bottom

The heating system comprises an amount of heating cable mounted on the underside of the bottom plate.
The geometry of the heating elements secures an optimum heat distribution.
The heating elements are fixed on a special bracket which is welded to the bottom. The specific element is led to a terminal box. The cable is a self-regulating and power limiting heating cable system. The resistance inside the cable secures that the cable reaches the temperature intended. There are no sensors or thermostats needed.

Warning

In case of product depositing, the heating system may develop high temperatures and therefore should only be applied in connection with tasks and products that involve no risk of ignition or explosion. Make sure to use only correctly marked ATEX approved products, if needed in the application, according to intended use and zone classification for the equipment.

Scope of Supply

The heating elements are mounted, with unconnected cable ends, however an end cap to close the loop is mounted in the correct calculated length to make sure the resistance inside the cable is as calculated to sustain the requested temperature.

Wiring

Before starting the insulation work, it is recommended to make sure that the cables have a suitable exit point out of the insulation into the junction box. As the heating elements are designed for an operating voltage of 230 V AC as a standard, the two conductors from each heating element are to be connected to phase and 0 (neutral) respectively. Do not forget to connect the ground terminal. In case of a higher power, it will usually prove an advantage to have the load distributed on more phases. If the voltage differs from the above, the power consumption is calculated according to the formula below:

$$P_2 = \frac{U_2 \times P_1}{230^2}$$

The heating system is often applied to keep the filter dry during standstill. Thus, the disconnection of the heating system should work independently of the operation of the filter.

Setting

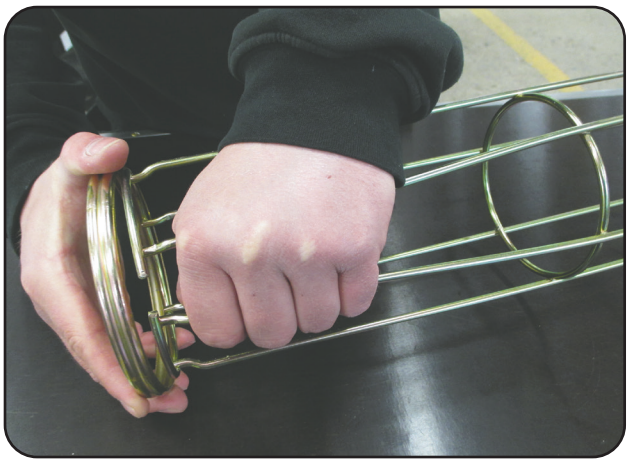
No settings are required, since the cables are self-regulating.

Technical Data

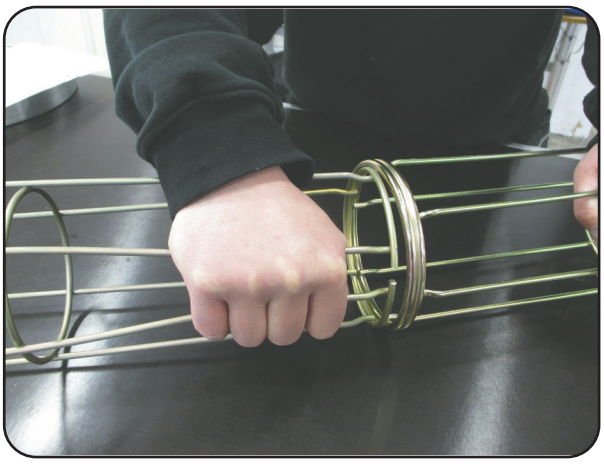
As described in the Raychem specific catalogue.

Make sure to use only correctly marked ATEX approved products, if needed in the application, according to intended use and zone classification for the equipment.

Connecting filter cage type HR



Squeeze the wire staves at the opening of the cage together and press on the collar.



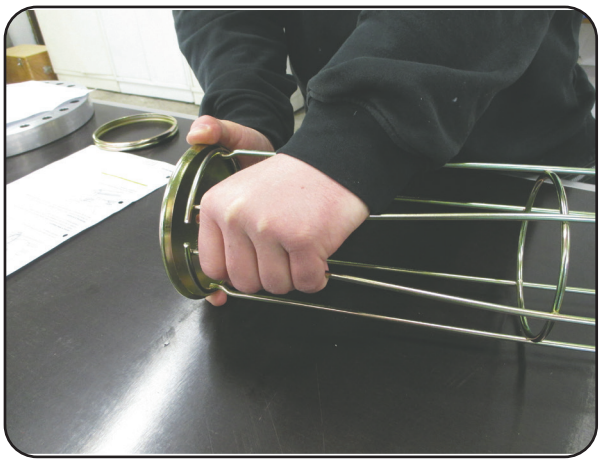
Insert the other half of the cage in the collar.

Joining split filter cages

If the filter cages are supplied in sections, join them as shown in the figures above.
Note that the upper section has two rings mounted on the top.
The extension has only one ring at either end.

Fitting the base plate

Before fitting cages in the filter, fit the base plates as shown on the right.
Correct fitting of the base on all cages is important for filter bag lifetime.

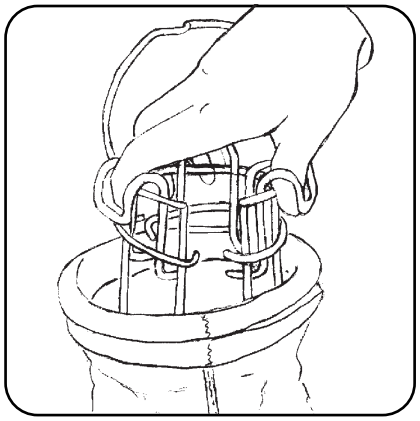


Squeeze the wire staves at the opening of the cage together and fit the base plate.

Bag change access is described in Section 5 – Service and maintenance

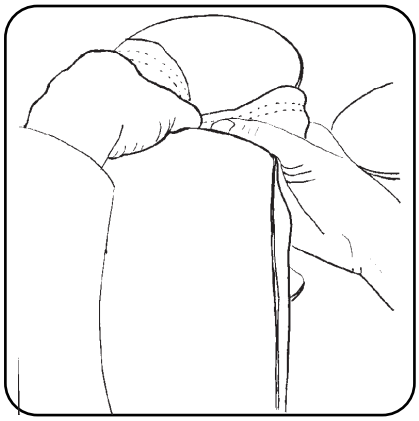
Fitting filter bags from below - cage type HR

IMPORTANT! To be able to fit the last cage and bag, the bag must be prepared by fitting it in one of the holes in the hole plate until the collar easily slips into place by itself. This must be done before the next bag and cage are fitted. The lock arm also has to be removed from the last cage using pliers or a screwdriver.

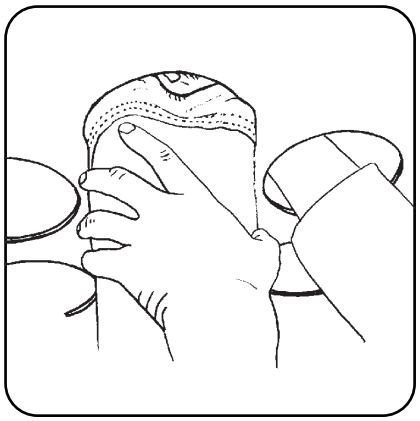


Squeeze the cage opening together to insert it into the bag.

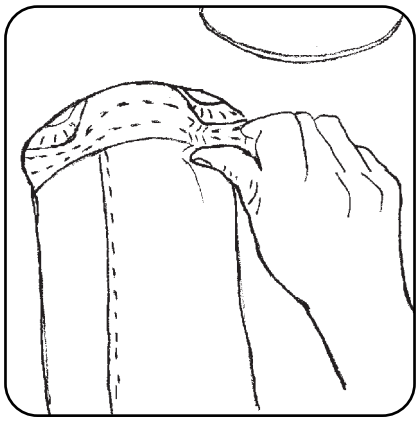
Slide the cage all the way down into the bag whilst holding the top together.



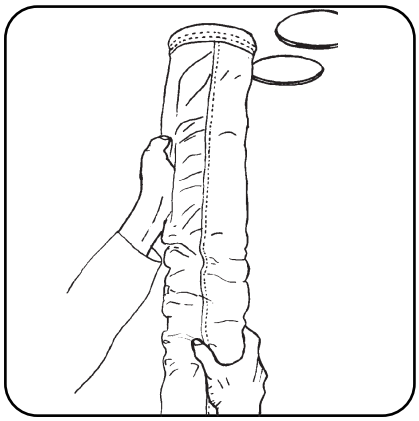
Squeeze the collar together and fit the groove around it into the hole. Press the collar hard around the edge of the hole.



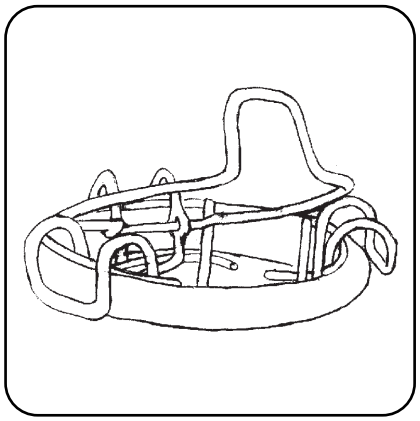
Lightly press the collar outwards until it pops into place and the bag forms a seal all the way around the edge of the hole. The easiest way to do this is to insert your hand through the neighbouring hole. (See "IMPORTANT" above, re. last bag).



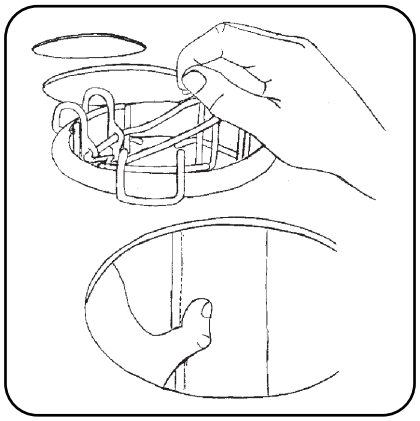
If the collar does not pop into place when pressed lightly, press it in elsewhere, and the first depression will pop out. Repeat until the ring pops into place easily.



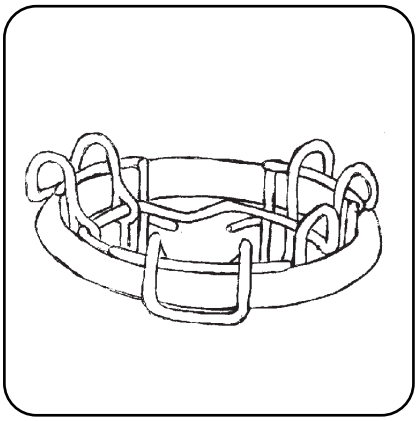
Pull the upper part of the bag downwards with one hand while pushing the cage upwards with the other.



Push the cage up until the 'feet' project above the top of the bag. Check that all feet are exposed and resting on the hole plate.



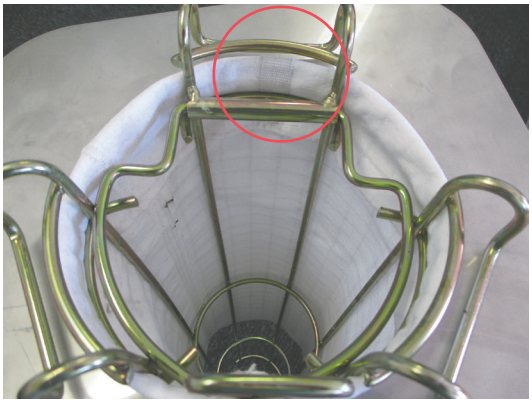
Insert your hand through the nearest bag hole and press the lock arm into place. (See "IMPORTANT" above, ref. last bag). Grip the cage below the plate and move from side to side if necessary while pressing the lock arm down.

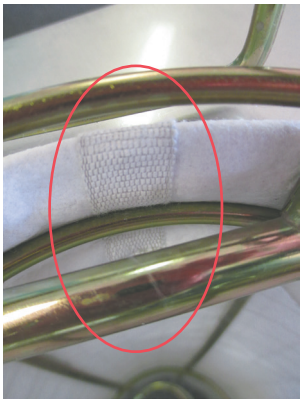


Correctly fitted cage. All feet resting on the hole plate and lock arm pressed fully down.
Insert the last cage with no lock arm in the "prepared" bag (see "IMPORTANT" above) and fit loosely in the hole plate.

Potential equalisation between hole plate and cage/bag

All bags have potential equalisation tape.
When fitting cages/bags onto the hole plate, the tape ensures that there is an earth connection

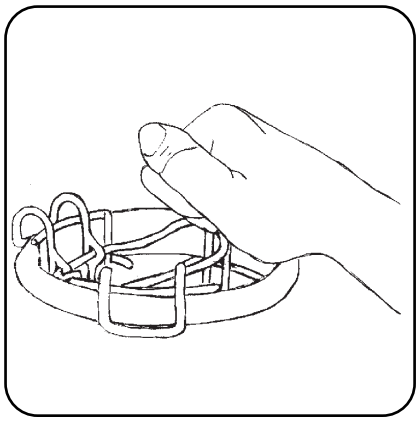




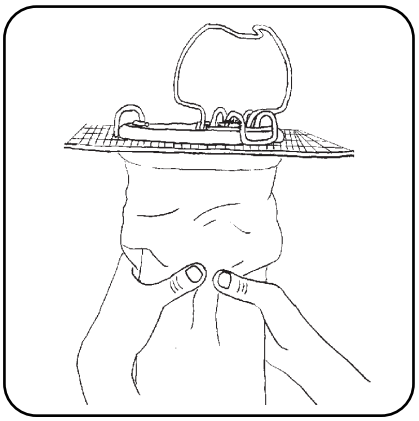
Removing filter bags from below - cage type HR

Study this guide before fitting filter bags from below if you are unfamiliar with the procedure.

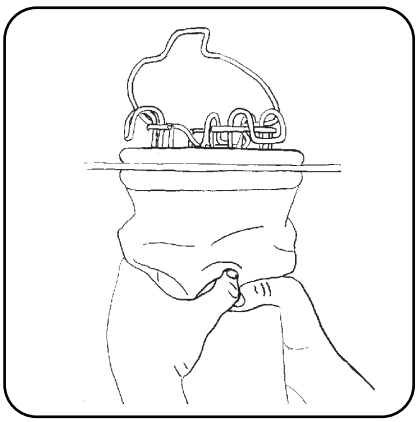
Note:
One of the cages nearest the door has no lock arm, and is therefore loosely mounted in the hole plate. Follow the instructions in figure 2 on this page to remove this cage. Follow the instructions in figure 1 for the other cages.



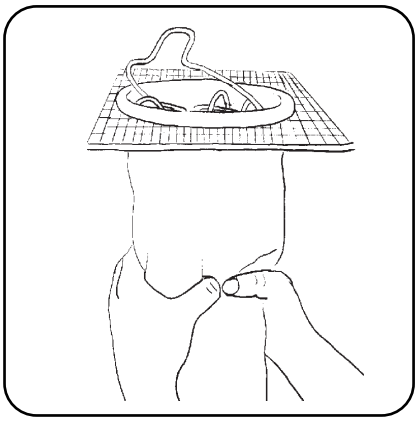
Insert your hand through the next bag hole and raise the lock arm to the vertical.



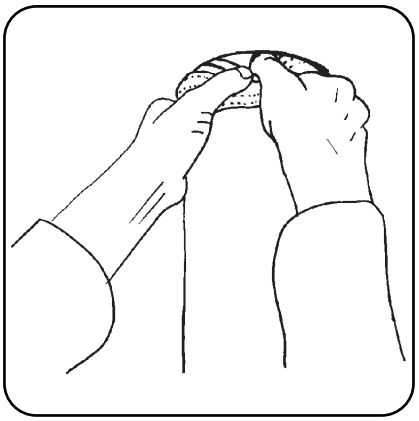
Hold the bag about 15-20 cm below the hole plate, pushing it loosely up around the cage approx. 10-15 cm. You will now be holding the bag about 10 cm below the hole plate.
If the last cage is not locked, start removing here.



Squeeze the cage and push it up a little to free the feet from bag.



Continue to squeeze the cage while pulling it downwards until the upper part of the bag is smooth again. Release the cage, which will now hang loosely in the bag.



Release the filter bag from the hole plate by squeezing the collar at the top of the bag.

Fitting/removing filter bags from above - cage type HR

General information

Fig. x refers to ill. nos. on this page only. When using filter bags with a membrane, use the collar to avoid damaging the membrane (i.e. follow instructions in fig. 1.).
For bags without membrane, follow instructions in fig. 2.
Before fitting, assemble the cage according to the page "Filter cage assembly types G, S, H and HR".

Filter cages are supplied with a base plate.

Fig. 1. Fit the collar into the hole and then push the bag through the collar. Do not remove the collar until the bag is all the way through.

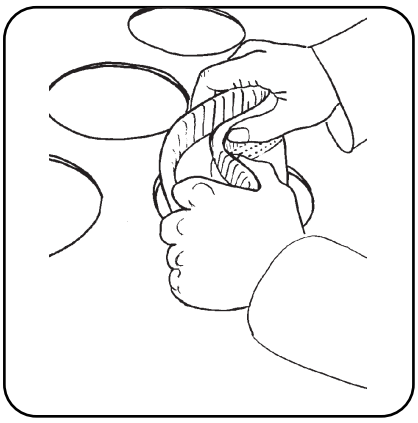


Fig. 2. Push bag through hole. Squeeze the collar and fit the groove around it into the hole.

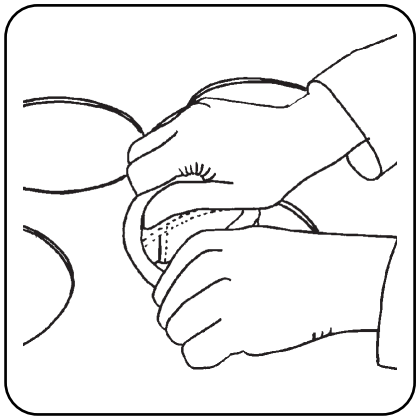


Fig. 3. Press the collar in over the edge of the hole.

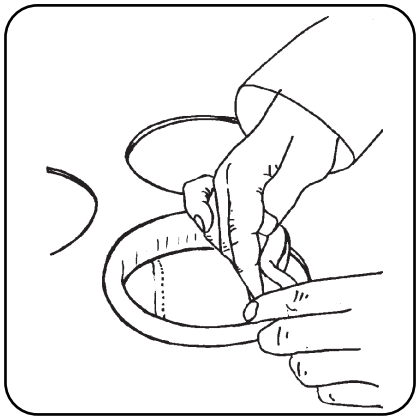


Fig. 4. Lightly press the collar outwards until it pops into place and the bag forms a seal all the way around the edge of the hole.

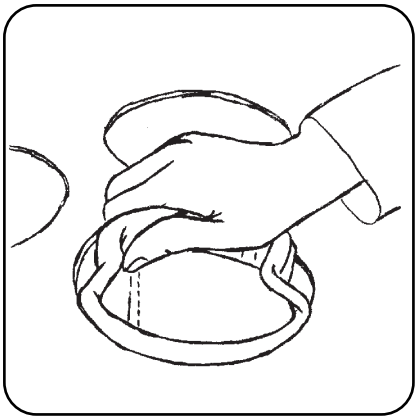


Fig. 5. If the collar does not pop into place when pressed lightly, press it in elsewhere, and the first depression will pop out. Repeat
until the ring pops into place easily.

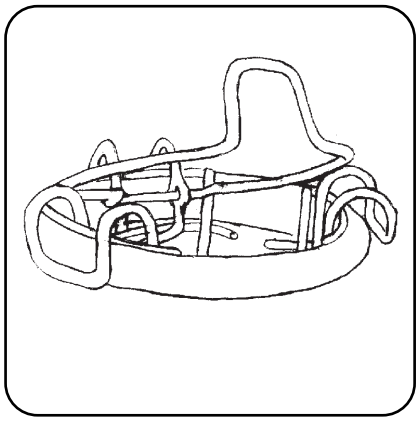


Fig. 6. Push the filter cage down into the bag. Place the cage "feet" over the edge of the bag so that they rest on the hole plate.

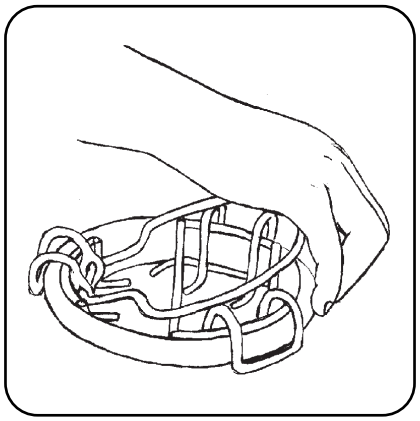


Fig. 7. Press the lock arm down into place. In some cases, it may be necessary to work the lock arm sideways until it falls into place.

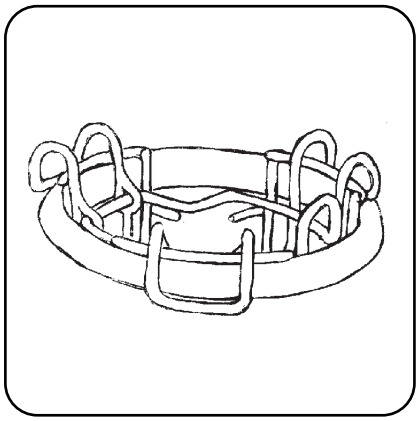


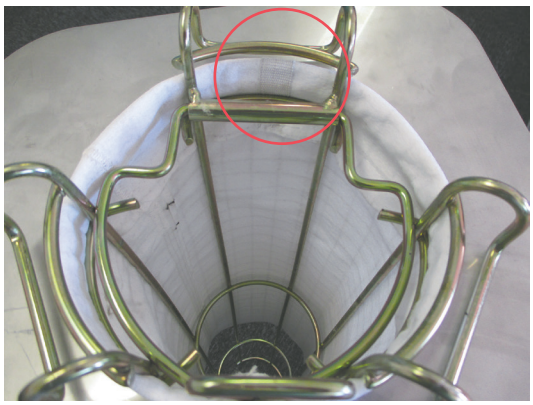
Fig. 8. Correctly fitted cage. All feet resting on the hole plate and lock arm pressed fully down.

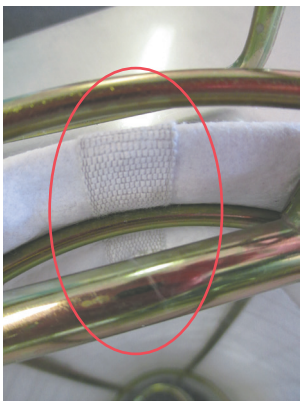
Removal

To remove, repeat procedure in reverse.

Potential equalisation between hole plate and cage/bag

All bags have potential equalisation tape.
When fitting cages/bags into the hole plate, the tape ensures that there is an earth connection.





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Section 4 Commissioning and operation

Commissioning guide

Electricity and ATEX work must be performed by qualified personnel and in accordance with applicable legislation.
All electrical components supplied by Simatek and included in Simatek's Annex II B declaration of incorporation/ATEX declaration of conformity are purchased with marking/declarations/ certificates in accordance with applicable legislation.
These components must be installed and used in accordance with the manufacturers' documentation (supplied).

Mechanical connection

Check that the following components are correctly fitted before commissioning.

1. Flange assemblies secure on filter.
2. Clip and unions secure on compressed air receiver.
3. Solenoid coils are correctly fitted.
4. Inspection and cleaning doors/hatches are closed and bolts tightened.
5. Check that accessories, such as rotary valve/worm drive, are clear of foreign objects.
6. If the filter is supplied with a scraper bottom, check that there is oil in the gearing and, if relevant, remove stop screw and fit aeration screw instead.

Refer to the relevant documents for connection of the above. Any additional accessories have their own documentation. If this equipment is supplied by Simatek, the documentation is available in Section 7 – Accessories or Section 8 – Specific documentation.

Electrical connection

Before commissioning, check that the following components are connected:
- Filter control unit and solenoids with cable-mounted plugs.
- Differential pressure gauge (may be built into the control unit).
- Safety switch on cleaning and inspection hatches (if safety switch is fitted).
- Explosion relief and rupture sensor (if explosion relief device is fitted).
- Level limit switch under the explosion relief (if limit switch is fitted).
- Fan.
- Motor/gear on scraper bottom (if scraper bottom is fitted).
- Rotation guard on scraper bottom (if rotation guard is fitted).
- Extra equipment: Vacuum pump, rotary valve, dust removal equipment in filter. Accessories (if fitted).

Refer to the relevant documents for connection of the above. Accessories have their own documentation. If this equipment is supplied by Simatek, the documentation is available in Section 7 – Accessories or Section 8 – Specific documentation.

Safety

If the cleaning and inspection hatches are fitted with a safety switch, the switch should automatically disconnect the scraper bottom and rotary valve when one of the hatches is opened. Before commissioning, always check that the entire installation is safe according to applicable legislation and Directive 2006/42/EC and that everything has CE approval.

Commissioning procedure

Simatek recommends setting up the filter control unit to run the scraper bottom (if any) and rotary valve before starting the filter cleaning process. The filter control unit should also be running before the fan is started.

- Start the rotary valve and dust removal equipment.
- Open the compressed air supply and set the filter regulator to the correct pressure (see table 1 on next page).
- Start filter control system.
- Start fan.

To shut down, follow the commissioning procedure in reverse.

Operation

Do not open filter inspection hatches while the filter is operating.
Similarly, if an explosion relief duct is fitted with an inspection hatch, this hatch must not be opened while the filter is operating.

Pause and compressed air consumption

A filter control system not connected to a pressostat module cleans the filter bags continuously at fixed intervals.
A preprogrammed pulse and pause cycle is set in the control system (see Simatek filter control unit manual for settings and recommended values). Compressed air consumption figures are available on the machine data and compressed air consumption pages.
Compressed air consumption should be compared with the compressed air volume available.

Filter bag length	Recommended cleaning air pressure
Up to 2 m	2,5 bar
2,5 – 3,5 m	3,0 bar
4 – 5 m	4,0 bar

Table 1. Recommended cleaning pressure for filter range 4T-R.
Simatek recommends starting a new filter with the recommended pauses (see Simatek filter control unit)

Please note that the type of dust and filter load can mean that other settings may give a satisfactory result.

If the filter runs at constant low pressure loss after 1-2 weeks, the pause time can be extended to save compressed air.
The pause time should be curtailed if pressure loss gradually increases.

We recommend allowing the filter cleaning system to continue running for 2-3 cycles once the fan has stopped.
Any equipment to remove filtered dust from the filter should also remain running for the same period of time.
Simatek's type TFC/TFCD filter control unit has a special "shut-down cleaning" function for this purpose.

Operation
In principle, the filter is maintenance-free, although solenoid valves and pressure loss should be regularly checked.
See also Section 5 – Service and Maintenance, which is part of these assembly instructions.

Troubleshooting
See Section 5 – Service and maintenance. If you cannot find the cause of a fault there, contact Simatek Service Department.

Filter adjustment

Conditions in a filter system

Air volume in the filter

A filter is dimensioned for a certain volume of air or gas.
If the filter has to deal with a larger volume, problems can occur, e.g. accelerated wear and tear, increased pressure loss through the filter or blocked filter bags. See the Pressure loss and efficiency page, which is part of these assembly instructions.

If the filter handles a lower air volume than it was designed for, this will not usually cause difficulties. Pressure loss and wear and tear will be lower. Certain dust types can reduce the air velocity at the filter inlet, which can cause the dust to accumulate and in time block the inlet.

Checking air volume

Description

Before using the filter, check that the actual air volume corresponds to dimensioned air volume.

Regulating air volume

In most instances, it will be necessary to adjust the air volume to correspond roughly to the dimensioned volume.

Filter operation

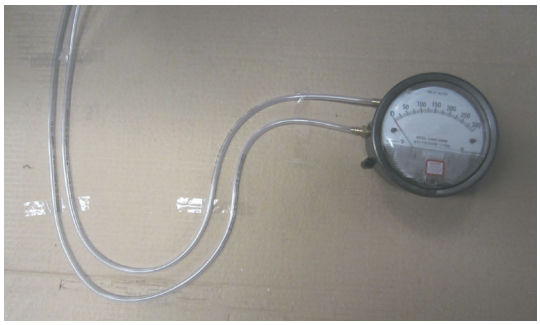
Logging filter operation on a regular basis is to be recommended. Systematic logging helps to identify and resolve any problems.
If the filter is fitted with different types of filter bags at some point, the data will illustrate the pros and cons of bag types, etc. The forms in these assembly instructions can be copied and used for logging.

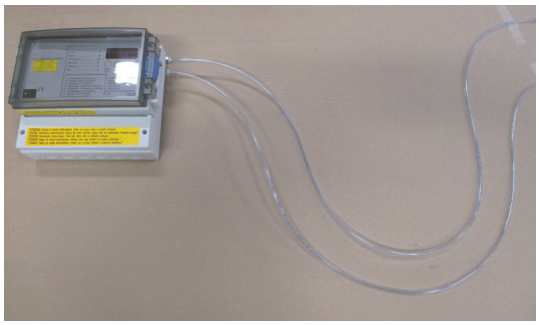
Parameters for filter operation

A list of parameters is provided under "Pressure Loss and efficiency" in Section 2 – General information. This states that pressure loss through the filter bags is one of the basic values to log.
Pressure loss is closely related to the volume of air passed through the filter, which is another important value to log.
The type of dust, air temperature and humidity are only of real interest if conditions change.

Measuring pressure loss through the filter bags

Pressure loss through the filter bags is measured by a differential pressure gauge or type TFCD filter control system.





Pressure loss through the filter bags is represented below by ΔP.

Cleaning the filter bags

Any changes in pause settings on the filter control system or pressure of cleaning air should be logged.

Log frequency

If the filter runs for an extended period without ΔP (pressure loss through the filter bags) changing, frequent logging is not necessary.
When the filter bags are new, ΔP will normally rise gradually for the first 100 hours or more.
If a period of stable ΔP is followed by another increase, keeping a log of all the above factors is recommended.

Emission control

If there is no automatic monitoring equipment on the system, filtration should be regularly assessed.
This can be achieved by checking whether there is dust in the air exhaust (chimney) from the filter, or whether dust accumulates in the filter clean air chamber or ducting. A fine layer of dust is quite normal, but regular inspection makes it possible to determine whether there is a sudden increase or a thicker type of dust deposit.

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Section 5
Service and maintenance

Service and maintenance

Read Section 1 – Safety before starting service and maintenance work.
Section 1 – Safety also describes the residual risks in connection with risk assessment of 4T-R filters and the end user's responsibilities.
Section 1 – Safety also lists safety marking on the filter and the symbols used in these assembly instructions.
Furthermore, Section 1 – Safety describes "PPE (Personal Protection Equipment)" and "Working with dust".

Do not perform service and maintenance of 4T-R filters during operation.
Always ensure that the filter is disconnected from the mains and cannot be restarted during service and maintenance work.

Supply separators on compressed air to the air receiver and other parts should be activated and locked before starting service and maintenance work.
The main switch on the electrical panel should be activated and locked before starting service and maintenance work.
Only trained personnel qualified to perform the relevant tasks safely and appropriately may work on the filter.

We recommend that the filter bags are cleaned before opening the filter chamber.
The filter bags will be automatically cleaned when the main switch is activated. Refer to the assembly instructions for the electrical cabinet and TFC control systems, respectively.

Checking cleaning pressure

Check that the filter is supplied with compressed air at the correct pressure using the filter regulator manometer.

Discharging the air receiver

A ball cock is fitted on the base of the filter air receiver. Open briefly once a month to discharge condensate in the tank.

Checking the cleaning system

Check once a month that the solenoids on the filter air receiver emit a cleaning impulse. The easiest way to check is to listen to the solenoids. The solenoids click when activated and, when supplied with compressed air, the cleaning impulse is clearly heard.
Each pulse is indicated on the filter control unit, making the sequence easy to monitor.
If several solenoids are activated simultaneously, a puff of air can be felt emitted from the solenoid "pilot nozzle" (an opening in the valve just in front of the coil).

Solenoid valves

We recommend regular inspection and cleaning of solenoids. If there is a noticeable change in the frequency or sound when the coil is activated, it should be replaced.

If no solenoids are activated

Check for correct voltage to the filter control unit.
Check whether a fuse has blown.
The following applies to type TFC control units: Check that LED REMOTE is lit.
The following applies to type TFC control units: Check that number of valves is correctly set in the control unit.
Check that the solenoids and cable plugs are correctly connected.
The following applies to type TFC control units: Check that the solenoid coils are rated for the control unit's outlet current.

NB: Continuous current can often be measured on the control unit outlets even when there is no fault. To check the outlet, we recommend application of a suitable load, i.e. a solenoid or relay.

If a solenoid stays open, hums or fails to activate

If a solenoid fails to activate, check that valve setting (no. of valves) on the control unit is correct (use the buttons).

Filter bag condition

Filter bags should be inspected at least once a year for wear, dust adhesion and the nature of any residue (damp, sticky, greasy, etc.).

Filter cages

Filter cages do not generally require maintenance. We recommend a visual inspection once a year (when checking the bags). Replace if damaged or if there is any sign of corrosion.

Seals

Check seals around hatches and connections on the filter at least once a year, as leaks can cause problems.

Checking the differential pressure gauge

Check the hose connections to the gauge at least once a year, as even a minor leak will cause incorrect readings.
To prevent dust blockages in the hose and manometer, a filter is fitted to the connection to the filter chamber.
Check that the filter is not blocked (modest air flow is sufficient). See also separate page on replacing the filter element.

What to do if the filter stops:

Alarm on low level limit switch:

- Check filter outlet for blockage and function.

Alarm on safety filter:

- Check bags for leaks
- Clean/replace safety filter

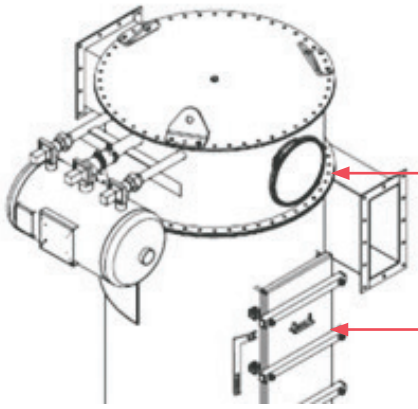
Fitting and removing filter bags and cages

See instructions in Section 3 – Installation and assembly.

Access to bag change

Access depends on the type of top section used on the filter.

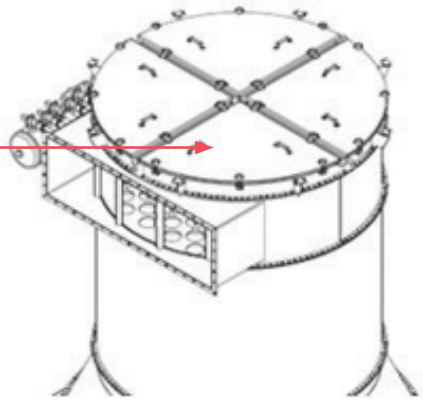
4T-R



HR hatch

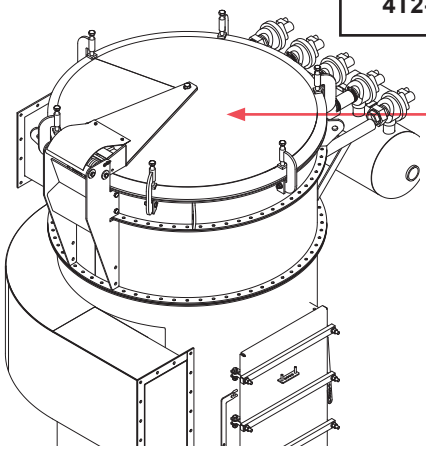
Inspection door

4T1-R



Cover

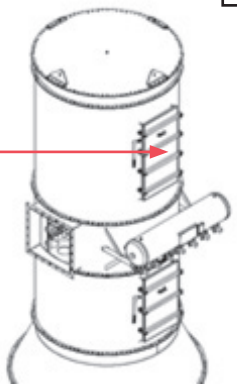
4T2-R



Cover

4T3-R

Bag change door



Access to filter/opening inspection door in 4T-R or bag change door in 4T3-R

⚠	Safety during work inside the filter: A safety harness and line must be worn when working inside the filter. The safety line must be attached to an approved anchor point. Personal protective equipment must be worn in accordance with the guidelines pertaining to the area.

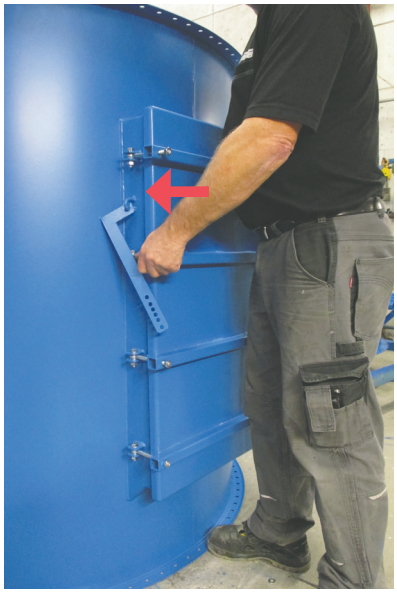
The door can be opened and hinged on either the right or the left.

Completely remove the bolts on the side of the door to be opened.

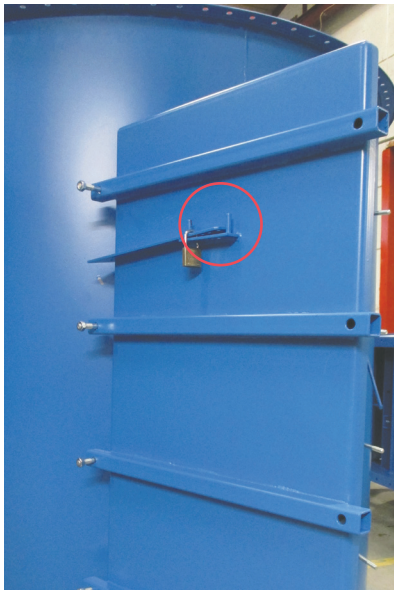
Slacken (but do not remove) the bolts on the side to be used as hinge.

Pull door outwards.

Open door to an angle of 45º



Push door back towards the frame. Attach restraining arm to bracket on door.



Attach a padlock to the bracket.
The door is now secured against accidental closure.

Remove padlock when work in the filter is completed.
Remove restraining arm.
Pull door out and close.
Check that all four threaded studs engage.
Push door in. Tighten all eight nuts. Recommended torque: 40 Nm.

Once service work in and around the filter is completed,
the supply separator for compressed air and the main switch on the electrical panel can be switched on again.

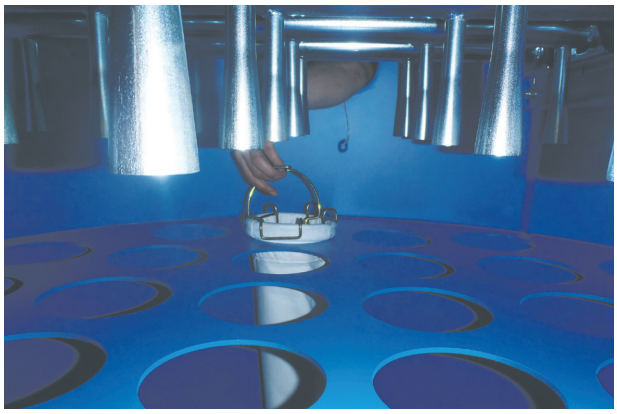
Inspection hole for fitting/removing the last type HR cage in 4T-R

Description

Filters with type HR filter cage for fitting from below are fitted with an inspection hole.
The hole is close to the inspection door, either on the clean air chamber or top cover.
The hole gives access to the clean air chamber for fitting the last cage/bag or removing the first cage.

The inspection hole cover is secured by a clip. The clip has a snap lock for ease of use.

The inspection hole cover is secured by wire for safety. The cover hangs on the wire while cages and bags are fitted.



Use the inspection hole when fitting the last or removing the first cage/bag.
The last cage/bag should be fitted closest to the inspection hole.
(For illustration purposes only. Not all cages/bags are fitted in this filter).

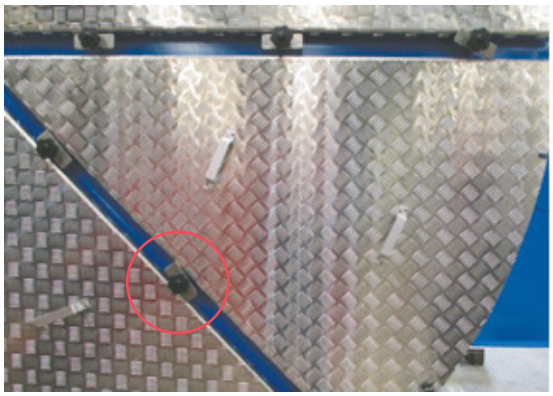
Check that the seal is intact before fitting the cover.
If not, replace. The clip handle should offer resistance when locking it.

If the inspection hole cannot be used for fitting the last cage/bag, remove the lock arm on the cage before attempting to fit it.
Press the cage up through the hole plate and allow the lock arms to fall out. The cage will now be fixed without the lock ring.

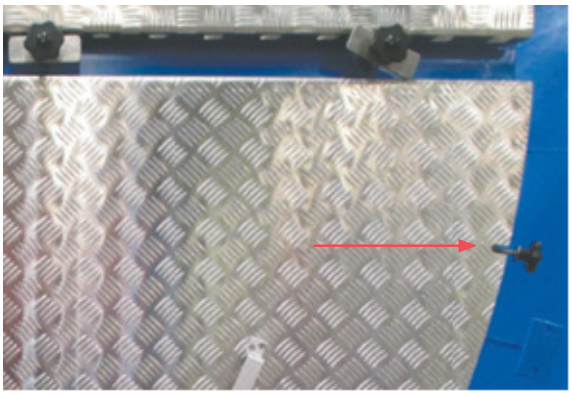
Access to bag change in 4T1-R top

Description

The number of covers depends on filter size.
Filter bags and cages are changed from the clean air chamber. To gain access to the clean air chamber:



Slacken the knurled knob and turn the cover holders to an angle of 90º.



Loosen the tiltable knurled knobs (two on each plate) and turn them outwards to an angle of 45º.

If a cover weighs more than 15 kg, this sign is fitted to the knob.
It takes two operators to lift one plate.

Lift the plate. For easy access to the retractable jet pipes and bags, we recommend removing all plates.

The plates are removed to the service platform (if any) or lowered on a hoist so that they are not in the way while changing bags in the open part of the filter.

Access to bag change in 4T2-R top

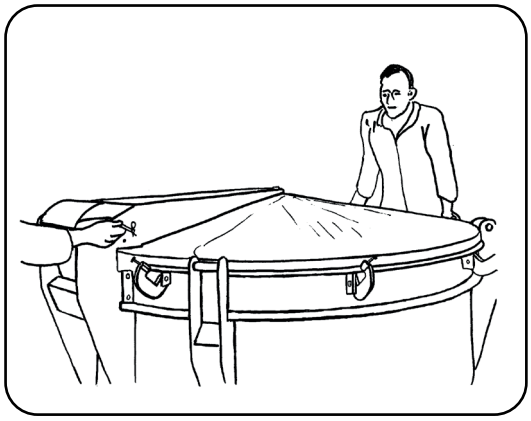
⚠	Safety during work inside the filter: A safety harness and line must be worn when working inside the filter. The safety line must be attached to an approved anchor point. Personal protective equipment must be worn according to the guidelines pertaining to the area. To make opening the filter top easier, a strong spring mechanism is fitted to hold the top cover in the open position. Due to the risk of personal injury, the top cover must not be opened until the filter is vertical. The top cover must be opened as described in these instructions. If the filter is outdoors, the top cover must not be opened in high winds.

Description

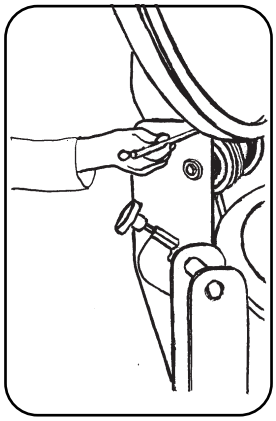
Filter bags and cages are changed from the clean air chamber. To gain access to the clean air chamber, tilt the circular top cover from horizontal to vertical. When the top cover is tilted, it turns on a heavy duty axle fitted inside the tilt console. As the cover is very heavy, a strong spring mechanism is fitted around the axle. The springs are preloaded to ease tilting. However, strong spring forces require extra care when the lock pin (a) is detached.

Fitting and removing filter bags

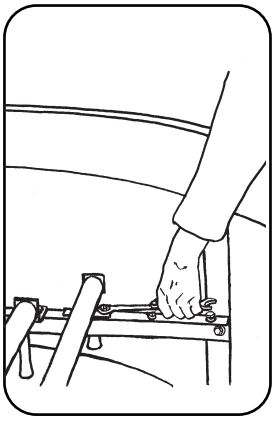
Open top cover as described.
Remove jet pipes as described.
Filter bags must be replaced in accordance with the description in "Assembly/Disassembly of filter bags from above – cage type HR" in Section 3 – Installation and assembly.
Closing and locking the top cover – same procedure in reverse.



Lock pin (a) must be in placed in the tilt console before loosening the fittings (b). When the fittings are loosened, press down on the top cover (opposite the tilt console). You can now remove the lock pin.



When the top cover is fully open, reinsert the lock pin to lock the cover in its vertical position.



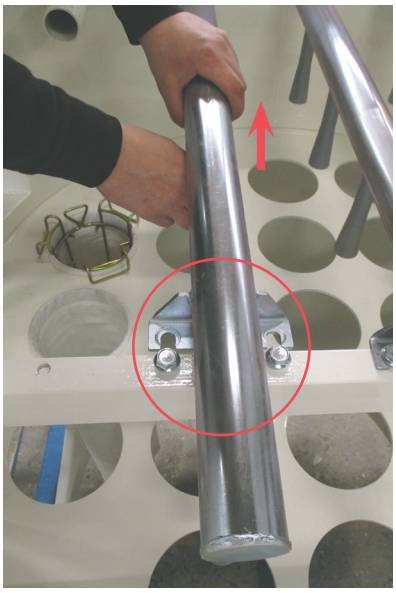
Loosen the bolts. To remove jet pipes, push to one side and pull free.

Simatek's recommended procedure for disassembly of bags type HR from above on filter types 4T1-R and 4T2-R

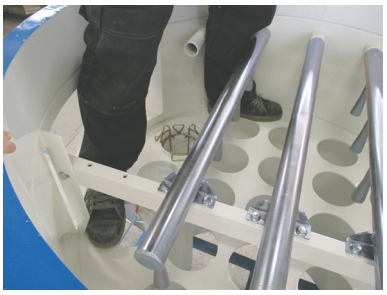
Remove all jet pipes.
Jet pipes may be laid on the on the air receiver pipe while working with cages/bags.

⚠	Take care not to drop bolts/other loose parts down into bags/cages

Remove bolts in the outermost jet pipes before pushing the jet pipe all the way back. Turn/twist jet pipes to free.



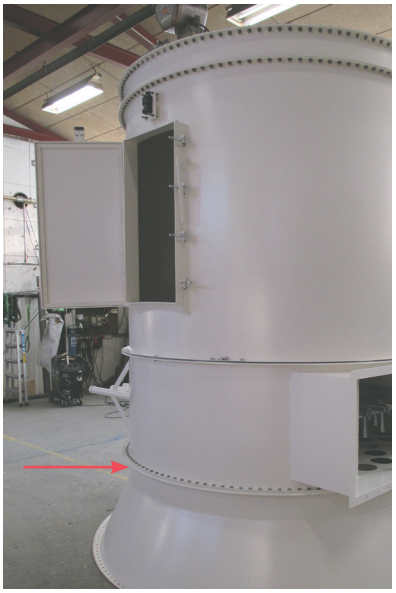
Loosen the bolts on the other jet pipes before pushing the jet pipes all the way back. Turn/twist jet pipes to free.

⚠	Take care when standing on the hole plate. If possible, avoid standing/stepping on bags and cages. Bring a board to stand on. If possible, dismantle 2-3 bags/cages before stepping onto the hole plate.	

Simatek's recommended procedure for disassembly of bags type HR, from above on filter type 4T3-R

Two operators are required for this procedure.
Remove all jet pipes.

⚠	Take care not to drop bolts/other loose parts down into bags/cages

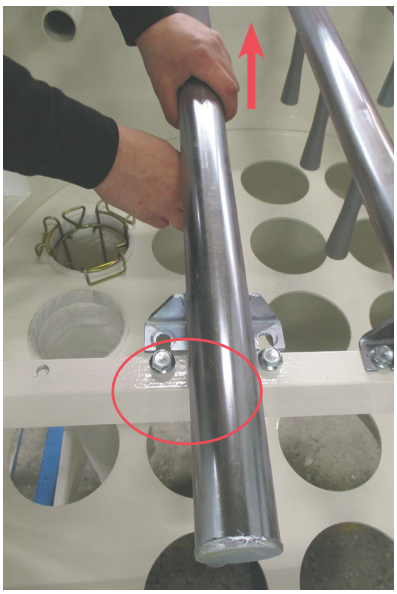


The service platform is normally located close to this section.

Place a step ladder on the service platform. This makes access to the filter easier.

Lay planks or a board in across the jet pipes. Crawl into the filter and stand on the planks/board.

Remove bolts in the outermost jet pipes before pushing the jet pipe all the way back. Turn/twist jet pipes to free. Hand the jet pipes to the person outside the filter.



Loosen the bolts on the other jet pipes before pushing the jet pipes all the way back. Turn/twist jet pipes to free. Hand the jet pipes to the person outside the filter.

Servicing the scraper bottom

Fig. x refer to ill. nos. in this section only.

As the design of the scraper bottom on Simatek 4T-R filters varies, this section describes a general assembly method.

Assembly FP-R

See Fig. 01. Assemble the hub first: Attach seals (2) to the hub (1). Slide the axle (3) through the hub and align with the seals. Then slide on the gasket bolts and brackets (4). Do not adjust the assembly until the entire hub is attached to the base (20). You can attach the lock pin (5 and 6) now – or you can attach it while assembling the internal part of the hub (9) and gear motor (15).
Fit the entire hub to the base plate (20) using suitable nuts and bolts (7) with washers (8). Now attach the hub part for the

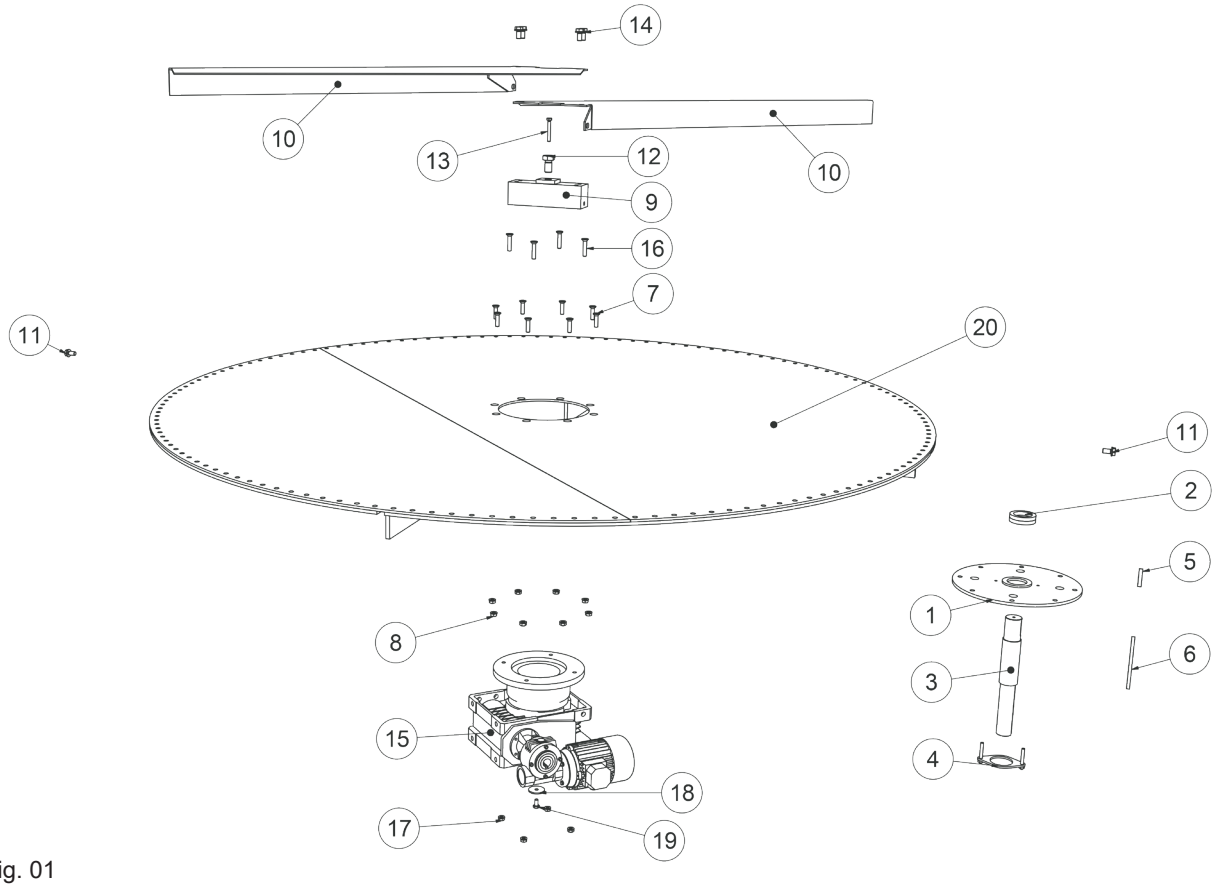


Fig. 01

scraper (9) to the secured hub with the lock pin (5). To adjust height, attach positioning bolts (12) – the scrapers (10) can be fitted with bolts (14) before checking the correct height above the base.
Fit the scrapers and then secure them with one bolt on each scraper (11).
To lock height above scraper bottom, insert safety bolt (13). Do not forget to tighten the gland (4) to ensure that all the seals are secure on the axle before fitting the gears. The gland must subsequently be tightened at regular intervals.
Once the scrapers are fitted, attach motor and gears (15) to the axle. Do not forget to fit the lock pin (6) if this was not fitted earlier. Assemble motor and gears before fitting them to the scraper base. Fit the gear section directly to the base using nuts and bolts (16) with washers (17).
Finally, secure the hub construction around the axle with a disc (18) and bolt (19).
Check to ensure that everything is correctly assembled before tightening the assembly.

⚠	The scrapers must have at least 40 mm free passage above the scraper base.

Fitting MS-R 4 scrapers – with flange (< Ø 2200)

There is a description of how to assemble a motor with hub (1) at the end of this section.

See Fig. 02. Fit the motor/hub unit (1) to the base plate (2) and secure with nuts and bolts (3). Place the hub part (5) on the axle from the motor (1). (Do not forget to adjust the lock pin on the motor assembly – it uses the tongue and groove principle). Fit the hub part onto the outside of the hub (6) using 4 bolts (7).
Adjust the distance between the base plate (2) and hub (5, 6) using the height-adjusting screws (8, 9).
Secure the structure with the long bolt (9).

	Check the scrapers can turn freely by checking horizontal clearance between scrapers and filter casing is in the range of 10-30mm and make sure that there is a nominal gap of 20 mm between the scraper arm and the scraper bottom.

Fit the scrapers (10) to the hub part (5) on the hub itself (6) using bolts (11). To secure the scrapers, tighten the bolts (11) on the side of the scrapers.
Tighten all assemblies and check that there is a gap of at least 20 mm between the base and the scrapers.
Finally put on lid and secure with a nut (13).

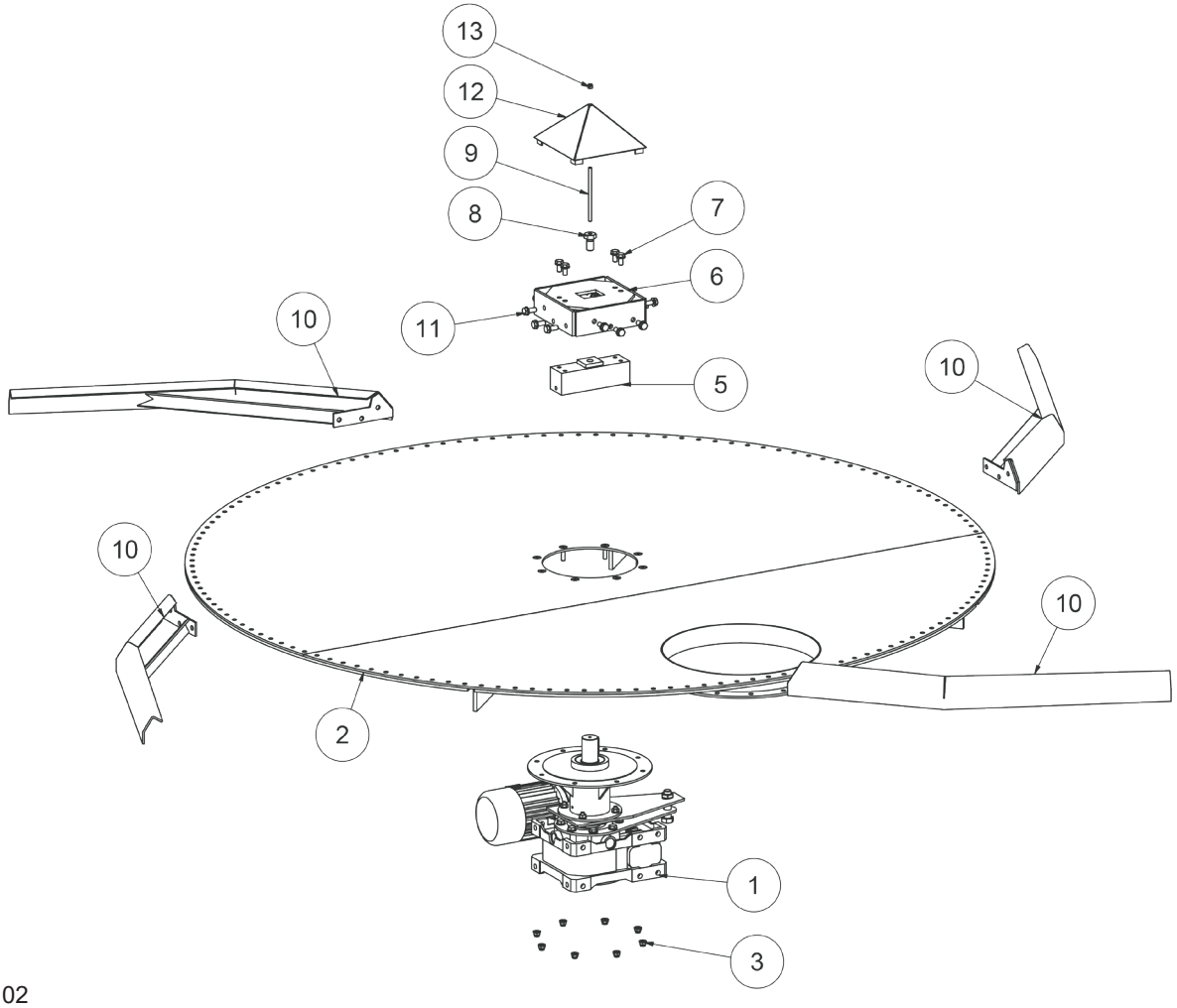


Fig. 02

Fitting MS-R 4 scrapers – without flange (> Ø 2400)

See Fig. 03. Assemble the axle (2) with the bearing (3) and Seeger ring (5a). Fit the complete axle in the hub on the base plate (1). Then slide the scraper rings (4) onto the axle, ending with a Seeger ring (5). To secure the axle, fit the lower ball bearing (8) with its Seeger ring (9) and scraper ring (10).
Fit the hub part (11) onto the axle with the bolt connection (12). At this point, you can roughly adjust the height before fitting the scrapers onto the hub. Slide the hub (13) down over the hub part (11) and then secure the hub (13) with bolts (14). Fit the scrapers (15) onto the hub using the designated bolts (16).
Before attaching the lid (17) to the hub, tighten the bolts and make sure that there is a gap of at least 20 mm between the scrapers (15) and the base plate (1).

⚠	Check the scrapers can turn freely by checking horizontal clearance between scrapers and filter casing is in the range of 10-30mm and make sure that there is a nominal gap of 20 mm between the scraper arm and the scraper bottom.
⚠	Before securing the motor and lid to the axle, fill the hub housing with grease. To ensure that all the rotating parts are lubricated, the grease must seep slowly through the simmering seals. Type of grease to be used: OKS 464.

Attach the cover (17) with the designated nut (18).
Fit the torque flange (20) onto the motor (21) using the designated bolts (19). The motor flange must be positioned so that the pawl on the scraper base slots into place. The pawl prevents the motor from rotating in operation – see Fig. 04 (on next page).

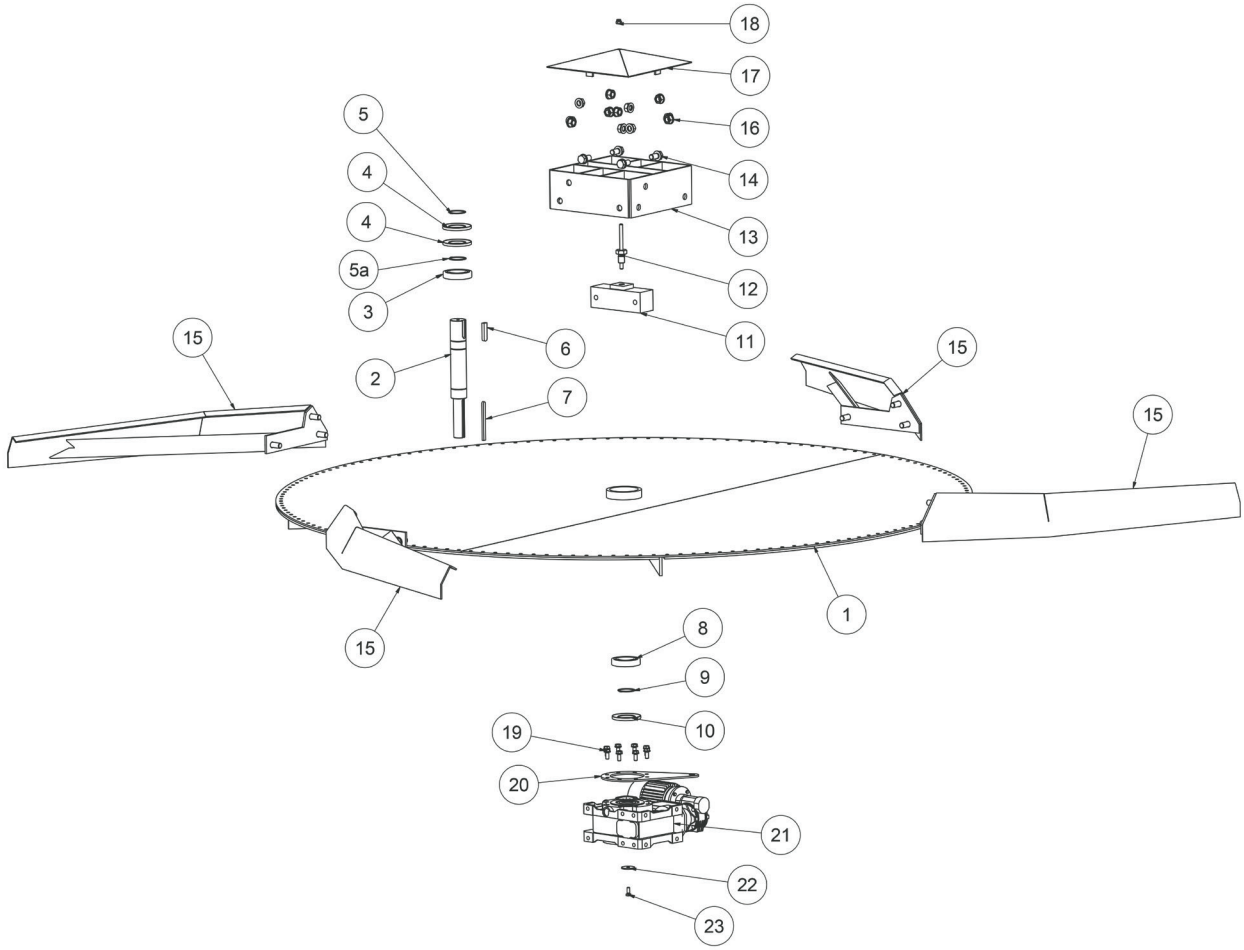


Fig. 03

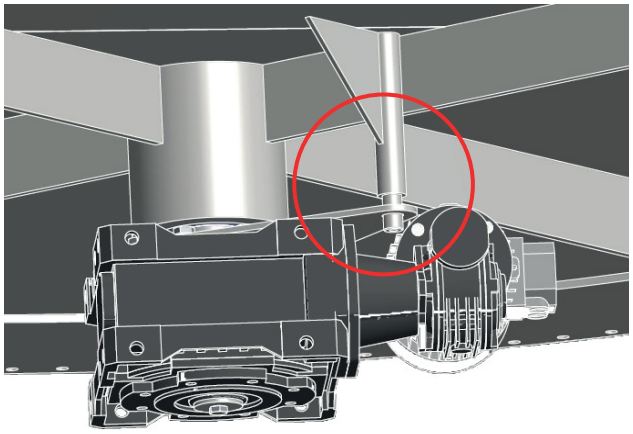


Fig. 04

Finally, secure the motor/axle structure with a disc (22) and bolt (23). Tighten disc and bolt against the axle.

Fitting MS-R 2 scrapers – with flange (< Ø 2200)

There is a description of how to assemble a motor with hub (1) at the end of this section.

See Fig. 05. Fit the motor/hub unit (1) to the base plate (2) and secure with nuts and bolts (3). Fit the hub part (4) onto the motor axle (1). (Do not forget that the motor joint lock pin uses the tongue and groove principle). Adjust the distance between the base plate (2) and the hub part (4) using the height-adjusting screws (5).

⚠	Check the scrapers can turn freely by checking horizontal clearance between scrapers and filter casing is in the range of 10-30mm and make sure that there is a nominal gap of 20 mm between the scraper arm and the scraper bottom.

Fit the scrapers (6) onto the hub part (4) using the bolts (7). To secure the scrapers, tighten the bolts (8) on the side of the scrapers. Tighten the assembly and check that there is 20 mm free passage to the base.

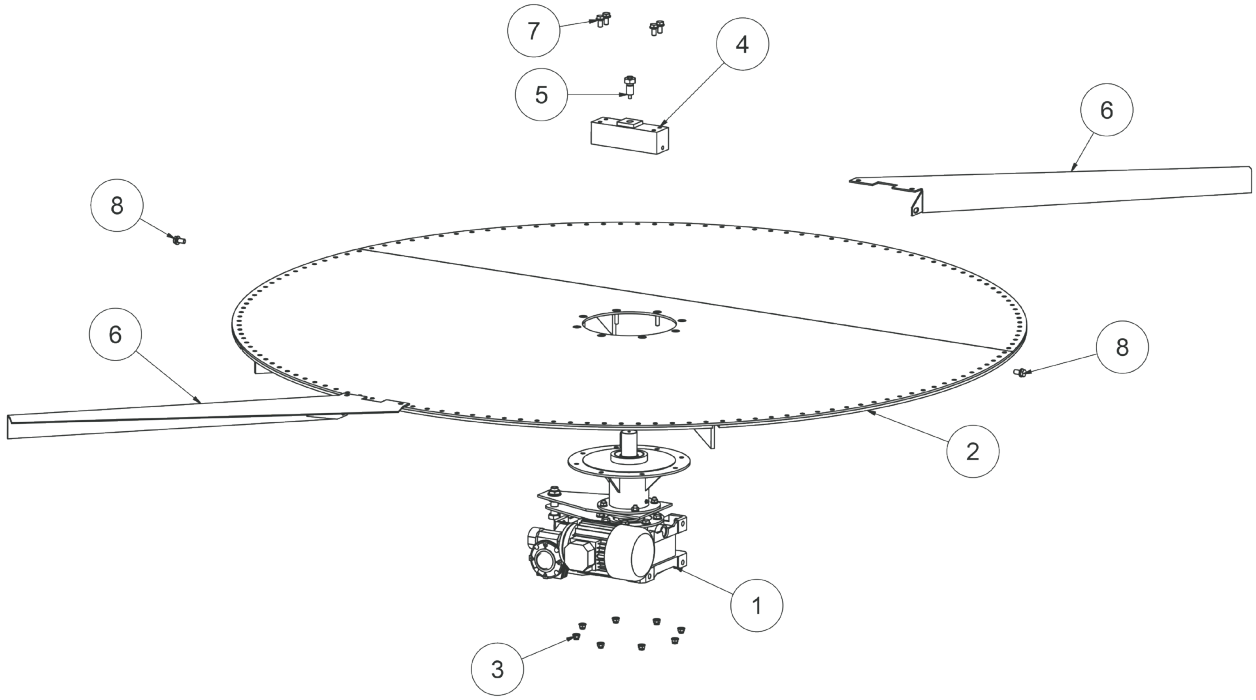


Fig. 05

Fitting MS-R 2 scrapers – without flange (> Ø 2400)

See Fig. 06. Assemble the axle (2) with the bearing (3). Secure with the C-ring (5). Fit the complete axle in the hub on the base plate (1). Then slot the scraper rings (4) over the axle, ending with a Seeger ring (5). To secure the axle, fit the lower ball bearing (8) with its Seeger ring (9) and scraper ring (10).
Fit the hub part (11) to the axle with the bolt connection (12). Roughly adjust the height before fitting the scrapers (15). Secure the scrapers with bolts (14).

⚠	Check the scrapers can turn freely by checking horizontal clearance between scrapers and filter casing is in the range of 10-30mm and make sure that there is a nominal gap of 20 mm between the scraper arm and the scraper bottom.

The scrapers must be adjusted with 20 mm free passage above the base plate. Tighten bolts.

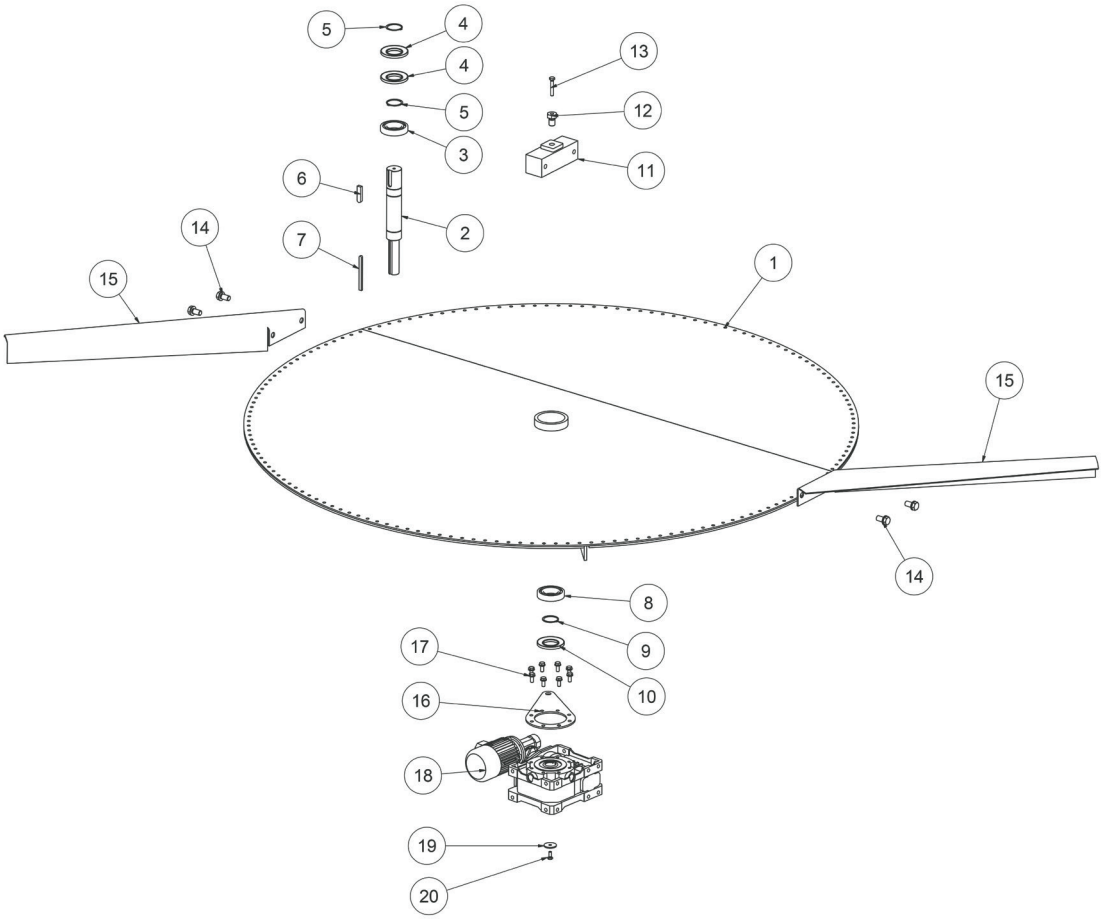


Fig. 06

⚠	Before securing the motor and lid to the axle, fill the hub housing with grease. To ensure that all the rotating parts are lubricated, the grease must seep slowly through the simmering seals. Type of grease to be used: OKS 464.

Fit the torque flange (16) onto the motor (18) using the designated bolts (17). The motor flange must be positioned so that the pawl on the scraper base slots into place preventing the motor from rotating in operation – see Fig. 04. Finally, secure the motor/axle structure with a disc (19) and bolt (20). Tighten disc and bolt against the axle.

Fitting motor with gears

See Fig. 07. The motor and gears structure for MS-R (less than Ø 2200) is identical for models with 2 and 4 scrapers. As the design is standard, fitting the hub and gear motor is a standard procedure. This work process may be performed as the technician sees fit.
Grease the bearings before assembly as this ensures good even lubrication when the hub is filled with grease after assembly. **Type of grease to be used: OKS 464.**
Fit the torque arm plate (2) to the hub (1). Secure with nuts (4) and bolts (3). Slide the bearing (6), Seeger ring (7) and finally the scraper ring (8) over the axle (5). Assemble in the hub housing (1). Place the bearing (9) with its Seeger ring (10) and scraper rings (11, 12) over the axle (5) from above and into the hub housing (1).
Fit the opposite torque arm (13) onto the motor (14) using the designated bolts (23). Place the axle (5) with hub (1) into the motor (14) and adjust position using the lock pin (22). Adjust both torque arms (2, 13) opposite each other and secure with nuts (17, 18) and bolt (16) on the top and bottom of the uppermost torque arm (2).
Do not forget to adjust the distance between the gear and hub so that these are aligned. After assembly, secure the entire structure with a disc (19) and designated bolt (20).

⚠	Fill the hub housing with grease until the grease seeps slowly between the scraper rings. Type of grease to be used: OKS 464.

The lock pin (21) can be fitted at the joint between the hub and the hub part on the scraper base.

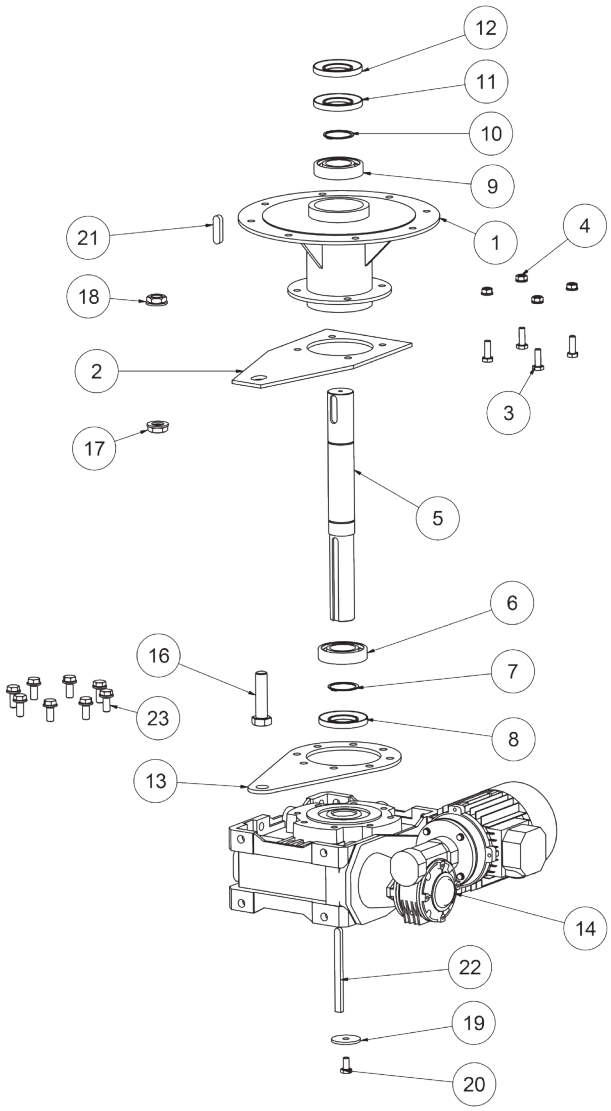


Fig. 07

Service- and maintenance schedule

Component	Work to be performed	Remarks	Component described in section	Recommended service interval																				User-defined
				Daily	Week			Month										Year						
					1	2	3	1	2	3	4	5	6	1	2	3	4							
Simpact® Filter 4T-R including filter accessories																								
Simpact® Filter 4T-R	Visual check of inspection door seals/ bag change door (4T3-R top). Visual check of cleaning hatch seals. Visual check of plate parts. All plate parts must be intact.	If seals are leaking, they must be replaced.	Complete assembly instructions											X									
Simpact® Filter 4T-R	Check that potential equalisation is correct.	Entire filter and accessories must be measured and checked.	Simatek's proposals for correct inspection of potential equalisation are described in Section 3 – Installation and assembly.											X									
Simpact® filter 4T-R, for use in an ATEX zone	All dusty surfaces must be vacuum cleaned at intervals to avoid a build-up of more than 5 mm of dust or a layer of dust in excess of the permitted level.	See specifications for relevant components.	Section 7 – Accessories and Section 8 – Specific documentation.																				X
Simpact® Filter 4T-R – top section	Visual check of top cover seal. Check that jet pipes and fittings are intact. Check fittings Check moving parts of tilt system (4T2-R top).	If seal is damaged, it must be replaced. Grease bolts. Grease threads. Grease moving parts of tilt system. If the filter is outdoors, the tilt system must be corrosion-protected.	Section 3 – Installation and assembly																				X
Simpact® Filter 4T-R incl. pipe system and accessories	Potential equalisation of entire system should be checked.		Section 5 – Service and maintenance											X									
Filter bags	Visual check for wear and tear, residues, etc.	Simatek's general re-commendation is to check at least once a year or as required. Depending on type of material passing through filter.	Section 8 – Specific documentation											X									
Filter cages	Visual check.		Section 3 – Installation and assembly											X									

Service- and maintenance schedule				Recommended service interval																
Component	Work to be performed	Remarks	Component described in section	Daily	Week			Month						Year				User-defined		
					1	2	3	1	2	3	4	5	6	1	2	3	4			
SimPact® Filter 4T-R inklusiv filter-tilbehør																				
Air receiver	Surface treatment maintained as required. External and internal inspection in accordance with national legislation.	Corrosion build-up max. 1%. Tanks smaller than Ø 800 mm can be inspected using endoscopy.	Certificate for inspection by this method, see section 8 – Specific documentation															X		
Air receiver	Drain condensate from air receiver.	See instructions in this section.	Section 8 – Specific documentation				X													
Solenoids including plugs	Visual inspection for cracks, dirt, etc. Replace if any cracks are detected around the magnet. Dust and dirt should be regularly removed for safe operation.	The user is responsible for specifying test and service intervals in accordance with the operating conditions, under which solenoids and plugs are used.	Section 7 - Accessories															X		
Solenoid valve junction box	Service and maintenance of junction box performed in accordance with guidelines in the manual.		Section 7 - Accessories															X		
Filter control unit TFC/TFCD	Visual inspection, clean with a dry cloth.	Service interval depends on ambient dust concentration.	Section 8 – Specific documentation															X		
Filter regulator	Visual check for dirt in bowl.		Section 7 - Accessories					X												
Differential pressure gauge	Service and maintenance not usually required.		Section 7 - Accessories																	
Differential pressure gauge filter Type N	Check and clean filter on product side. Check that air can pass through the filter, e.g. by suction in the hose. Replace filter element if leaking or worn.	At least once a year or as required	Section 7 - Accessories											X						
Hoses connected to differential pressure gauge Type N	Check hoses for condensate. Check hoses for kinks or leaks.	At least once a year or as required	Section 7 - Accessories											X						
Differential pressure nozzle (inspection door)	Check that the nozzle is free of dust	At least once a year or as required	Section 3 – Installation and assembly											X						
Level limit switch	Maintenance not usually required		Section 7 - Accessories																	

Service- and maintenance schedule				Recommended service interval																		
Component	**Work to be performed**	**Remarks**	**Component described in section**	**Daily**	**Week**			**Month**										**Year**				**User-defined**
					1	2	3	1	2	3	4	5	6	1	2	3	4					
SimPact® Filter 4T-R inklusiv filter-tilbehør																						
Explosion relief device –	Visual inspection Check for obstructions in duct cross-section. Check that no buildings, walkways or other structures have been erected in the marked hazardous area (since the last inspection).	3 x p.a.	Section 8 – Specific documentation								X											
Manometer	Check precision	As required	Section 7 - Accessories																			X
Support frame	Visual inspection, check all surfaces and bolt assemblies. Check that potential equalisation is intact.	At least once a year or as required	Section 8 – Specific documentation											X								
Service platform and ladder	Visual inspection, check all surfaces and bolt assemblies. Check that potential equalisation is intact.	At least once a year or as required	Section 8 – Specific documentation											X								
Scraper bottom type MS-R	Visual inspection: - Clearance - lubrication	As required	Section 5				X															
Scraper	Replacement	As required	Section 5																			10 years

Some of the equipment mentioned in Section 5 – Service and maintenance may not be included in the Simatek delivery in question. Equipment may have been supplied with a filter that is not mentioned in the Service and maintenance table. For this equipment, refer to the supplier's documentation in Section 8 – Specific documentation

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Section 6
Spare parts

How to order spare parts

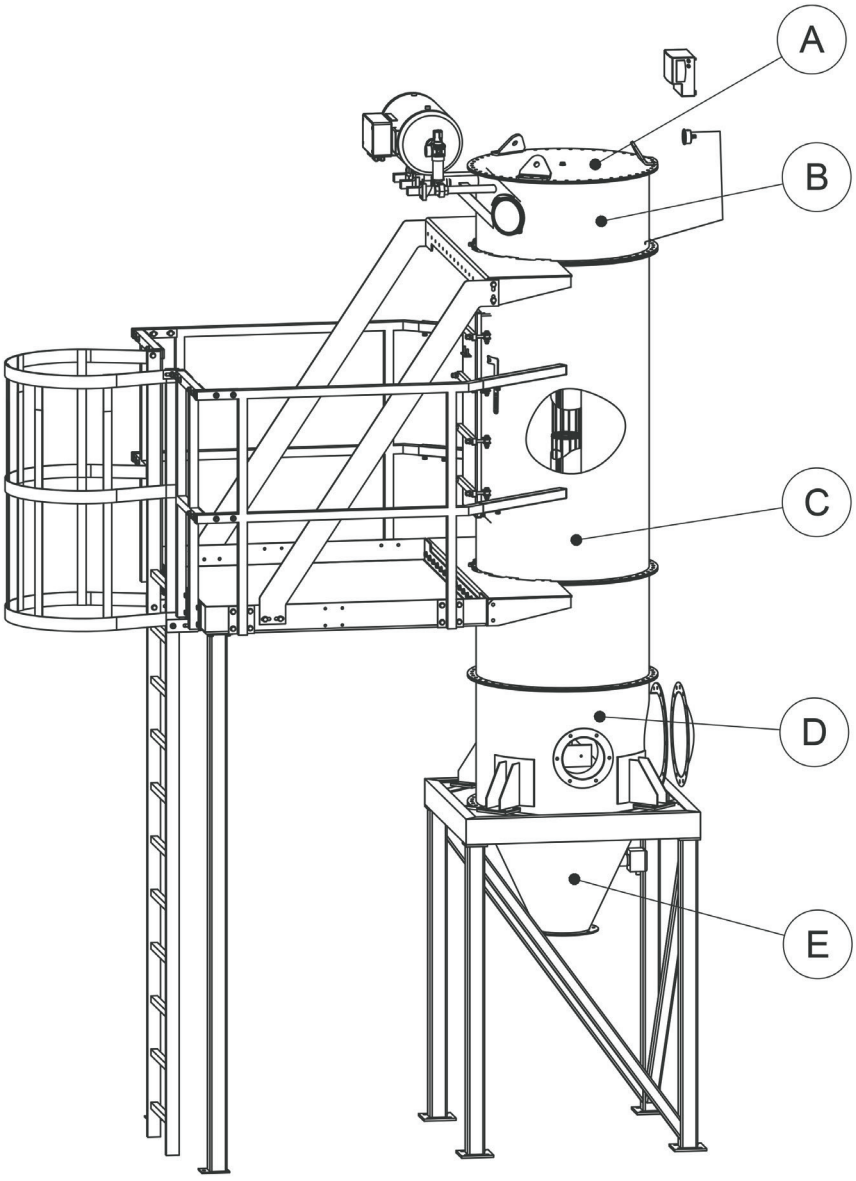
Only original spare parts may be used.
Failure to comply with this recommendation could mean that the filter fails to conform with its stated material group and category on the ”Machine data” page in Section 8 – Specific documentation.

If you wish to purchase the correct components and parts, contact After Sales Services. Our staff provides the base possible advice and guidance. Always quote the machine serial number, order number or another number to identify the machine.

The structure of all 4T-R filters is essentially identical. However, filters differ in size, function and design depending on their use/ specifications.

To make identification of the plant in question easier, the general terms used in the design of a Simatek 4T-R filter are listed below:

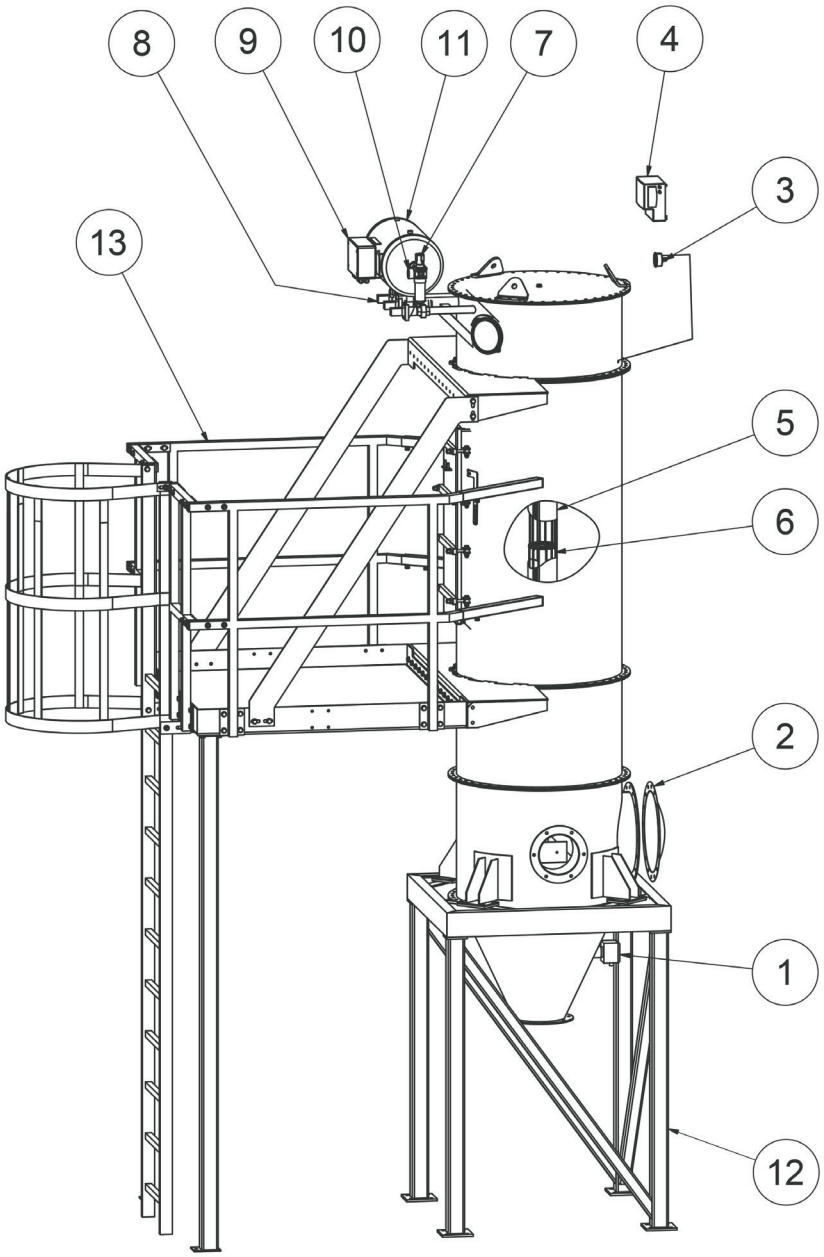
A) Top cover, may also be designed as a lid.
B) Clean air chamber with compressed air receiver.
C) Filter chamber with bags – with or without access door.
D) Explosion relief device.
E) Outlet cone or scraper bottom (re scraper bottom, see Section 5: Service and maintenance, and illustration below)



The illustration below shows the typical wearing parts in a 4T-R filter. Remember that filters vary in size.

Always quote the machine serial number, order number or another number to identify the machine.

1) Level limit switch
2) Explosion membrane (relief device)
3) Differential pressure gauge
4) TFC-/TFCD control unit
5) Filter bags
6) Filter cages
7) Filter regulator
8) Solenoid valves
9) Solenoid junction box
10) Compressed air receiver



For 4T-R filters with scraper bottom, the following illustration can be used to identify components.

1) Motor with gears (for details, see below)
2) Scraper base
3) Scrapers (set of 2 or 4 scrapers, depending on size)
4) Hub for assembly housing or scrapers
5) Assembly housing
6) Top (only for 4 scrapers)

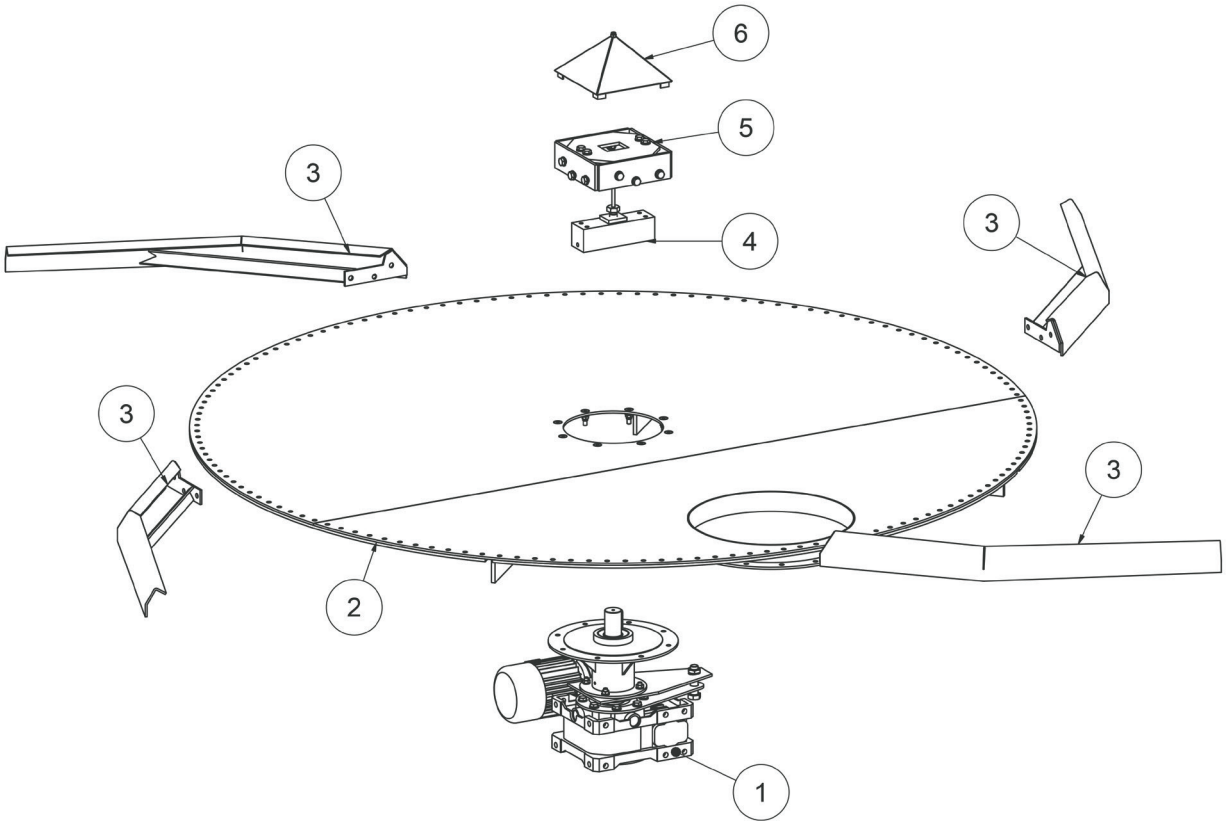
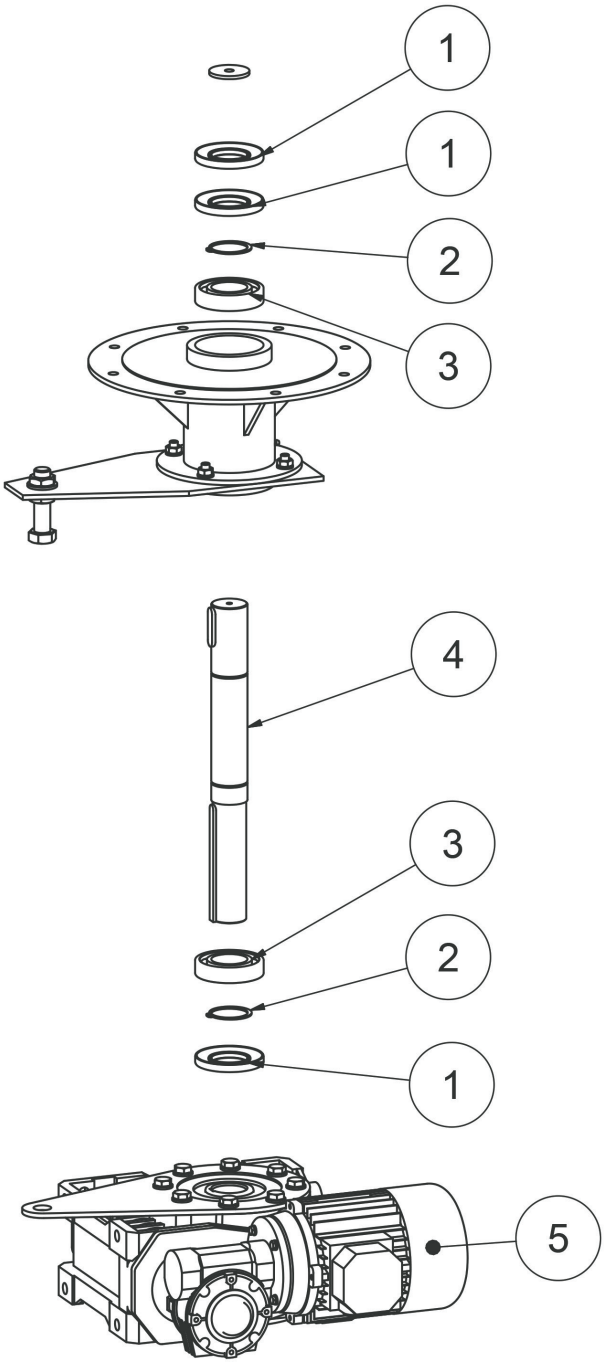


Illustration of typical model of motor with gears (below) Models vary depending on size and specific design.

Always quote the machine serial number, order number or another number to identify the machine.

1) Scraper ring at bearing
2) Seeger ring
3) Ball bearing
4) Axle
5) Motor with gear



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