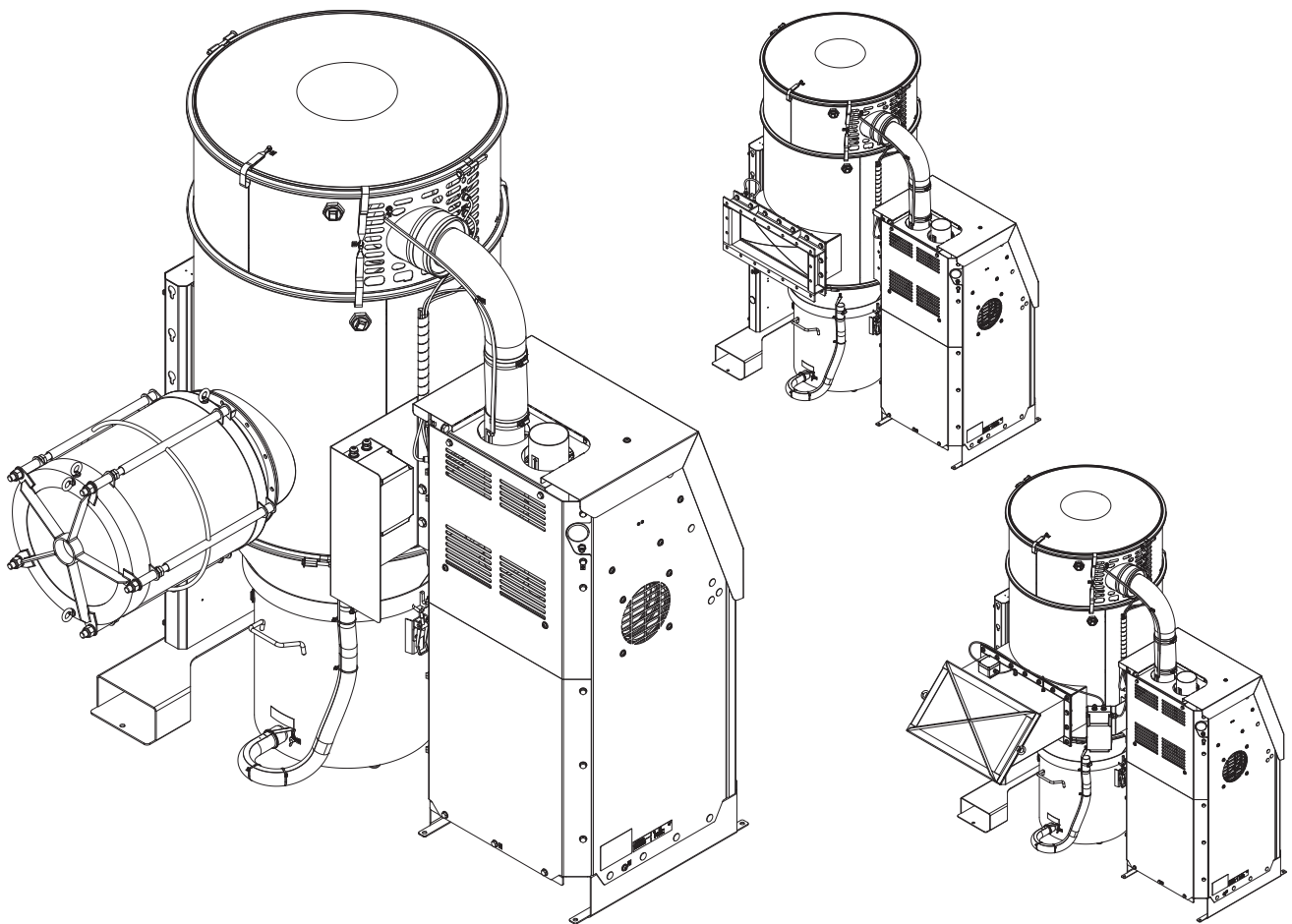


PAK-M DX

PAK-M



Original user manual

EN USER MANUAL

Table of contents

Declaration of Conformity	4
Figures	5
1 Preface	14
1.1 PAK-M specifics	14
2 Safety	15
2.1 Classification of important information	15
2.2 Overall PAK-M safety	15
3 PAK-M DX and ATEX	16
3.1 Product marking	16
3.2 Special Conditions for Safe Use "X"	16
3.3 Type of Protection constructional safety "c"	17
3.4 Area classification Dust Separator	17
3.5 Category limit	17
3.6 Permitted materials	17
3.7 ATEX components	17
4 Description	17
4.1 Main parts	18
4.2 Explosion protection system	18
4.2.1 Risk area	18
4.2.2 Explosion relief venting panel	18
4.2.3 Flameless explosion relief venting	18
4.2.4 Explosion suppression	19
4.3 Collecting bin	19
4.4 Feed out devices	19
4.5 Filters	19
4.6 Accessories	19
4.7 Pressure measuring points and connections	19
4.8 Technical data	20
5 Using PAK-M DX	22
5.1 Main filtration	22
6 Maintenance	22
6.1 Emptying the collecting bin	22
6.2 Maintenance schedule	23
6.3 Inspections	23
6.4 Changing the main filter package	23
6.5 Tilting the Dust Separator	24
6.6 Changing the secondary filter	24
6.7 Separating PAK-M DX modules	24
6.8 Earth control measuring	24
6.9 Servicing ATEX equipment	25
7 Spare Parts	25
7.1 Ordering spare parts	25
8 Recycling	25

Declaration of Conformity 24.HB01X

We, AB Ph. Nederman & Co., declare under our sole responsibility that the Nederman product: PAK-M Dust Separator DX (Part No. **, and stated versions of **) to which this declaration relates, is in conformity with all the relevant provisions of the following directives and standards:

Directives

2006/42/EC, 2014/30/EU, 2014/34/EU, 2011/65/EU

Standards

EN ISO 12100:2010, EN 60204-1:2006, EN 60204-1:2006/A1:2009, EN 1127-1:2011, EN 60079-0:2012, EN ISO 80079-36:2016, EN ISO 80079-37:2016, EN 60079-14:2014, EN ISO 20607:2019

The name and signature at the end of this document is the person responsible for both the declaration of conformity and the technical file.

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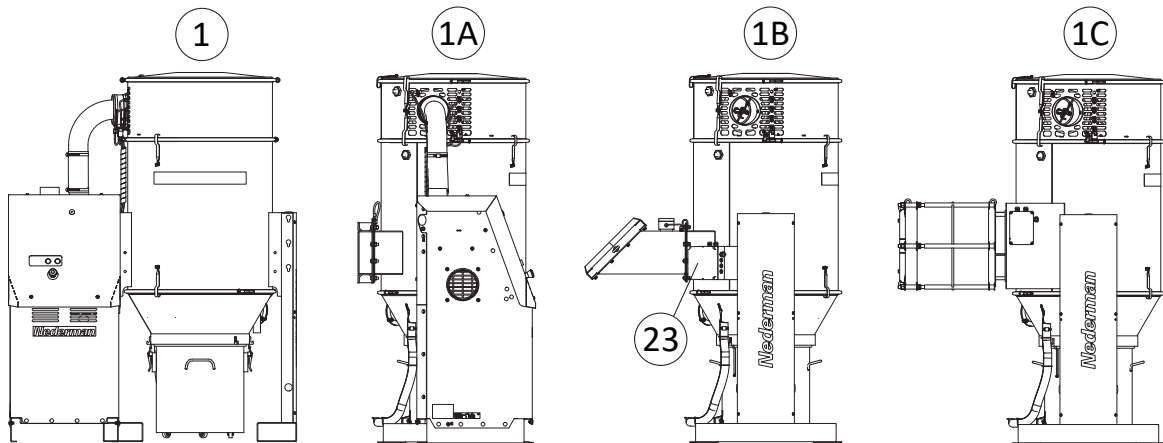
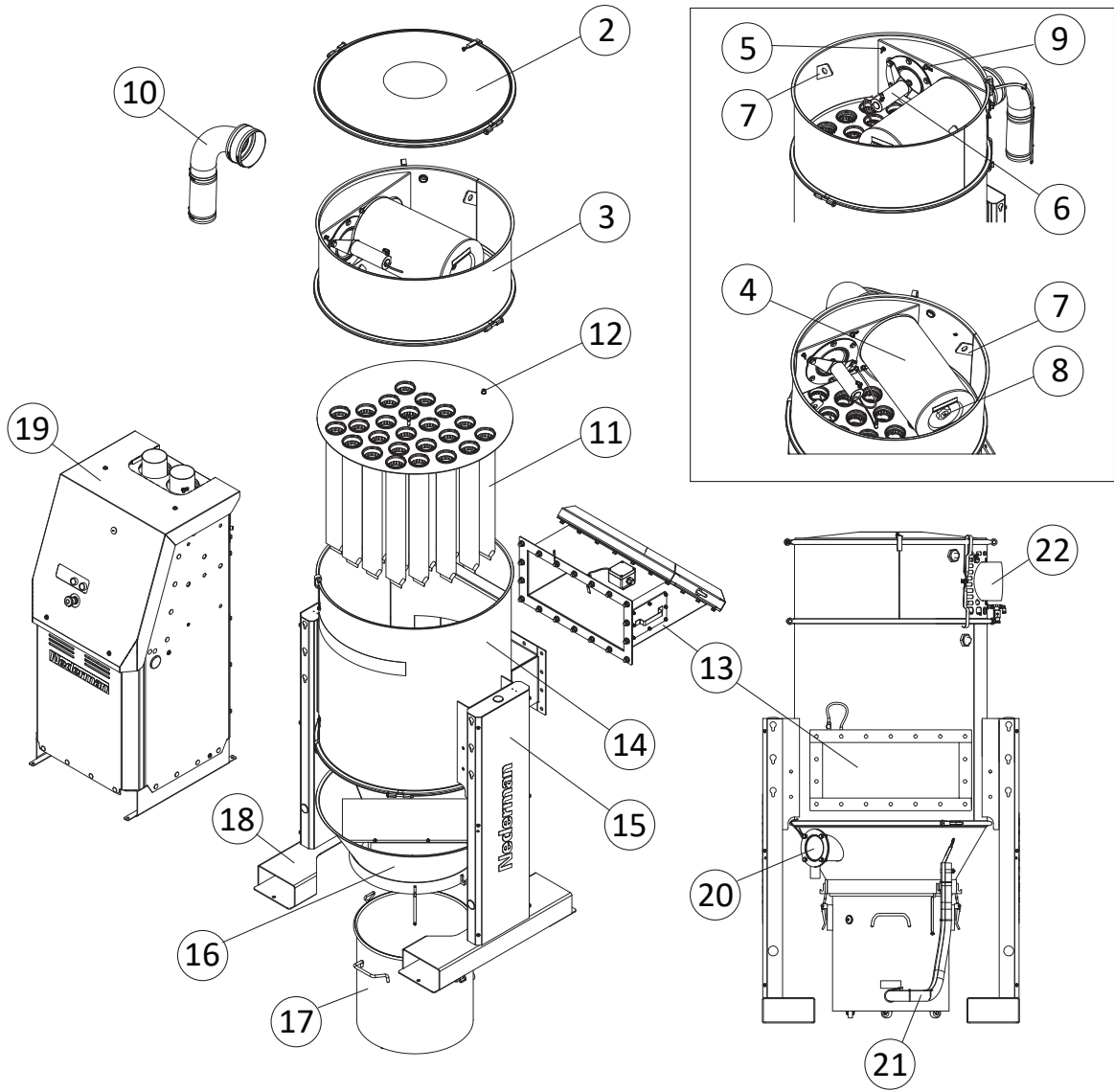
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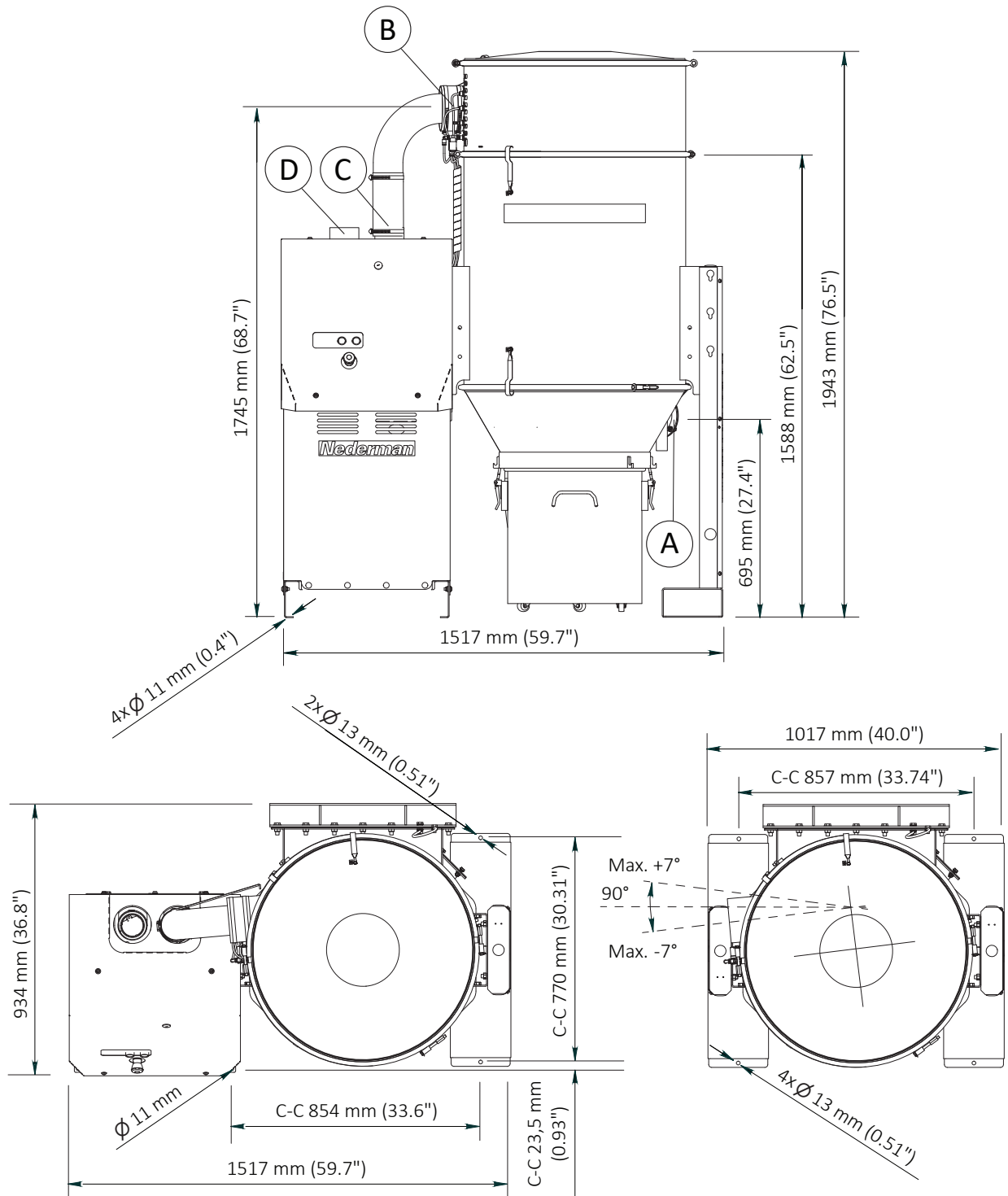
Anna Cederlund
Product Center Manager
Technical Product Management
2024-04-17 (Working)



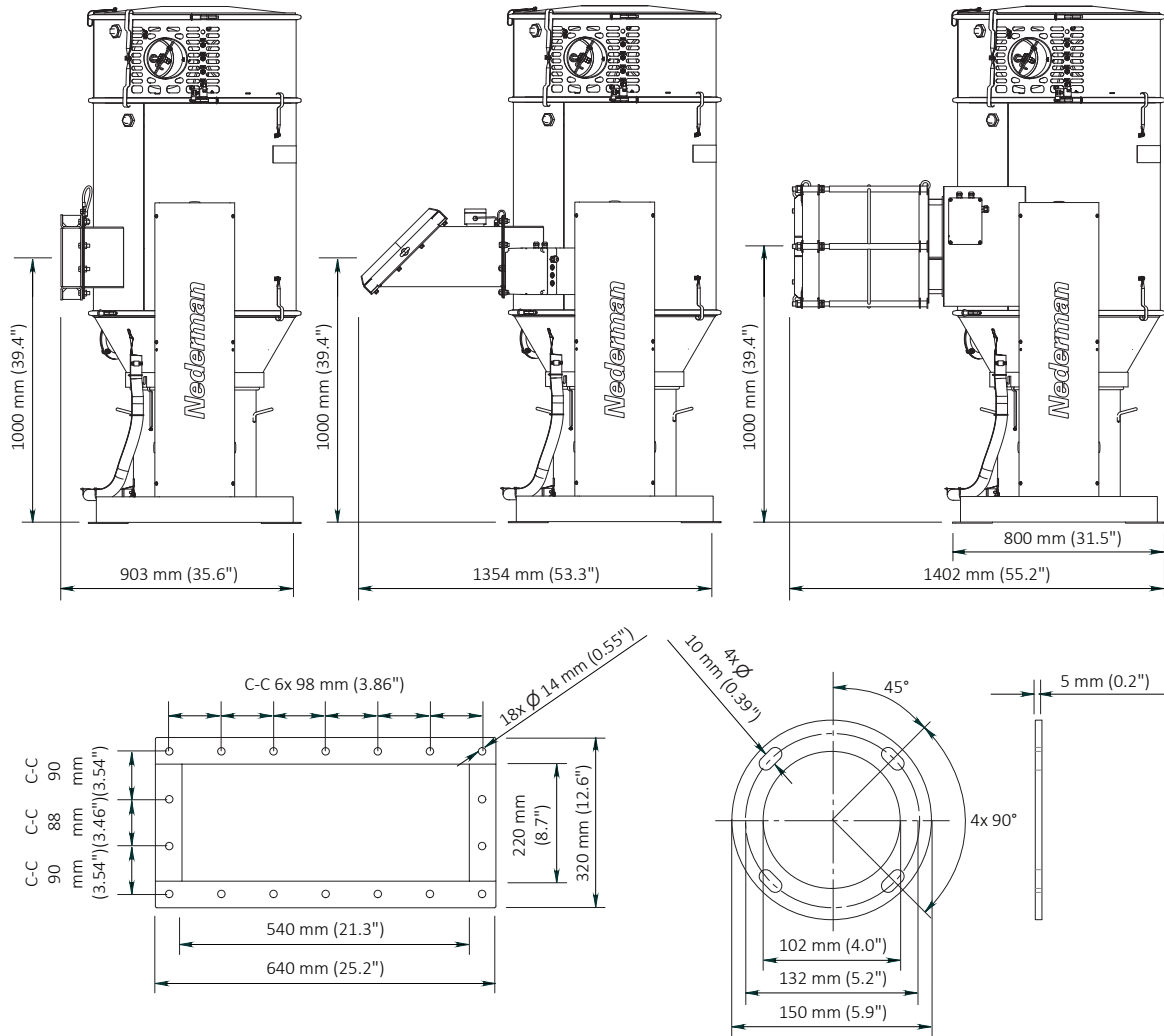
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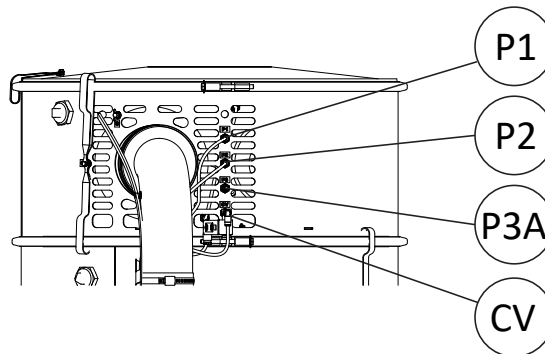




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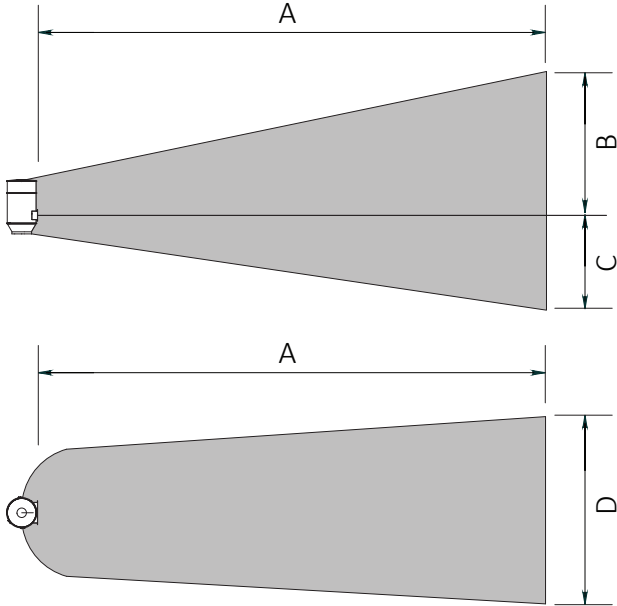


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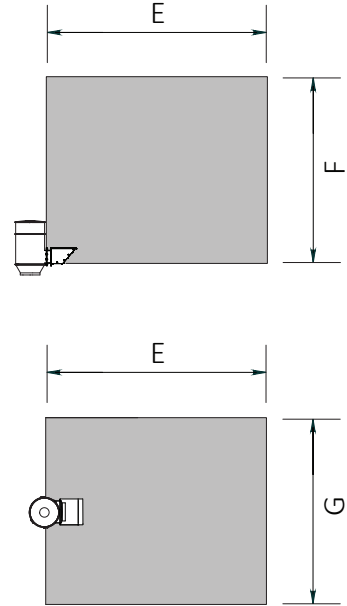


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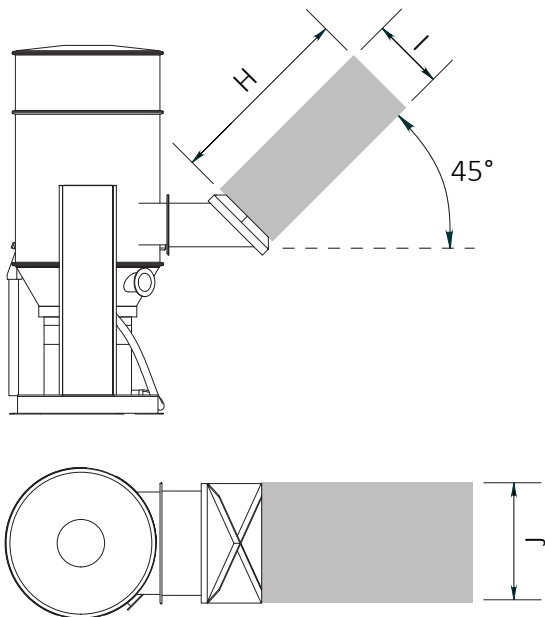
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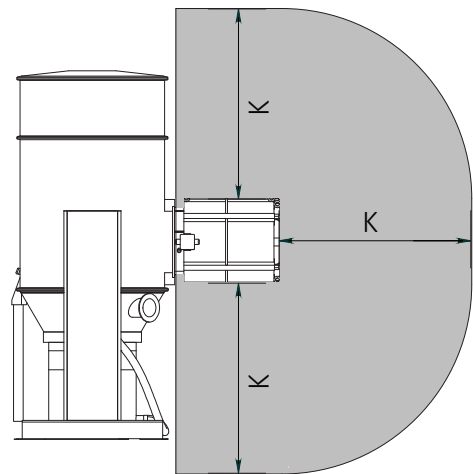
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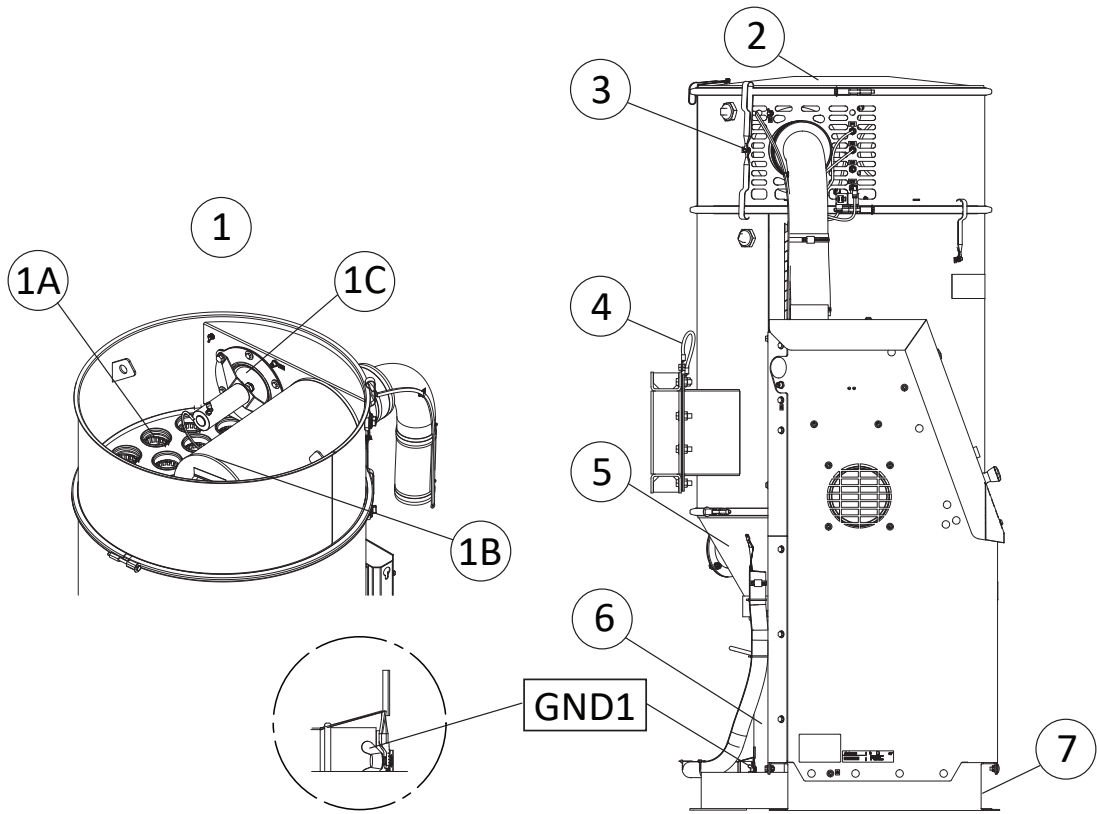
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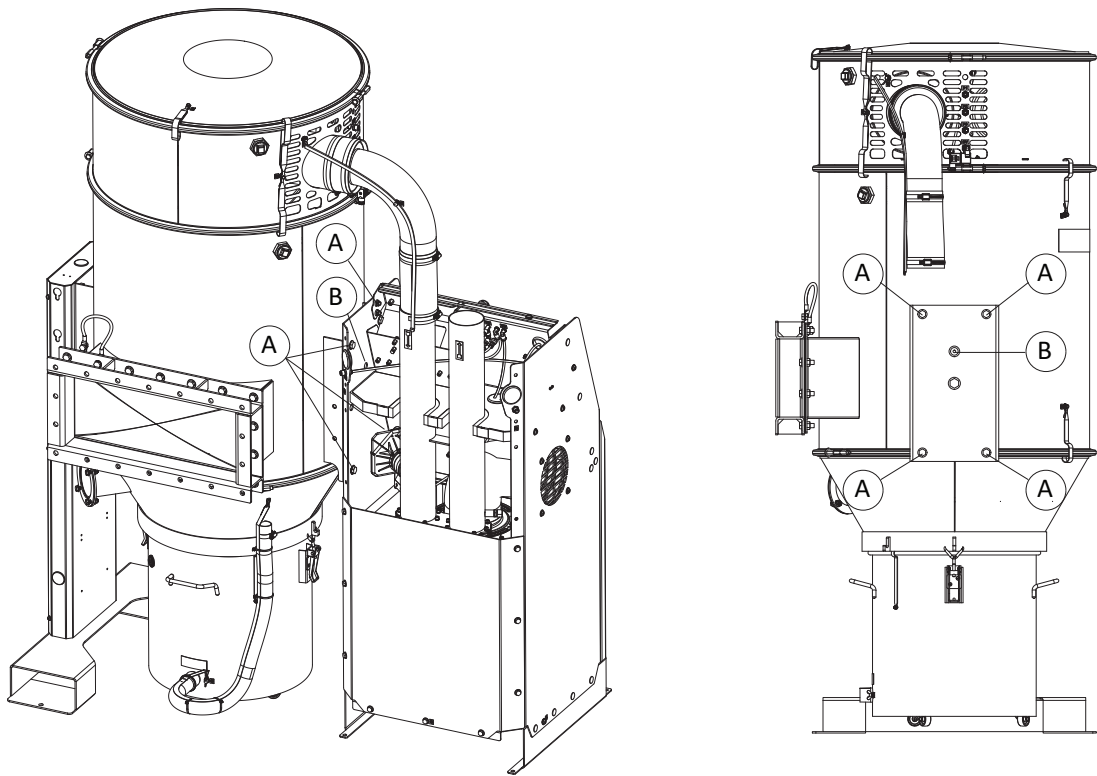
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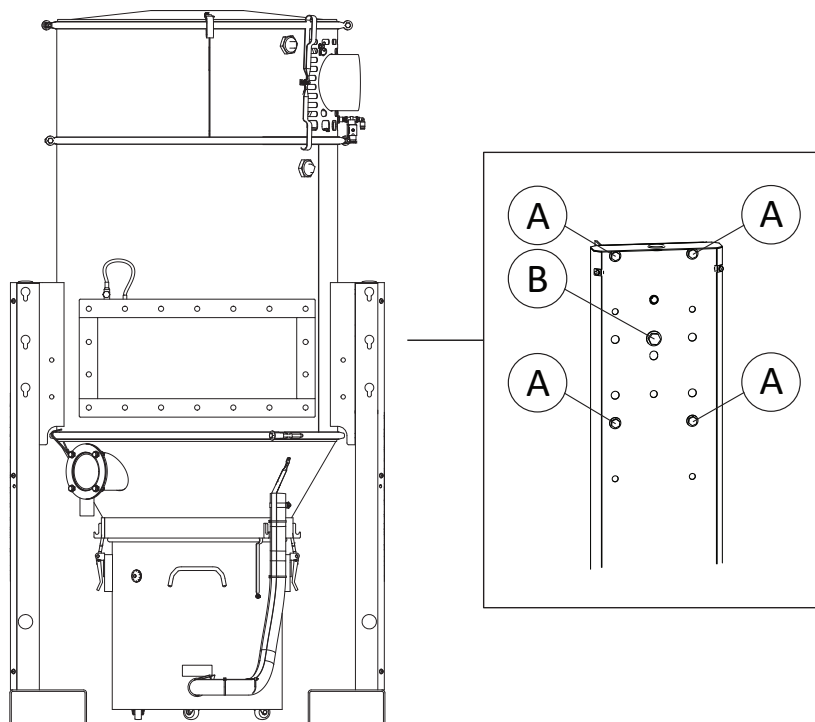
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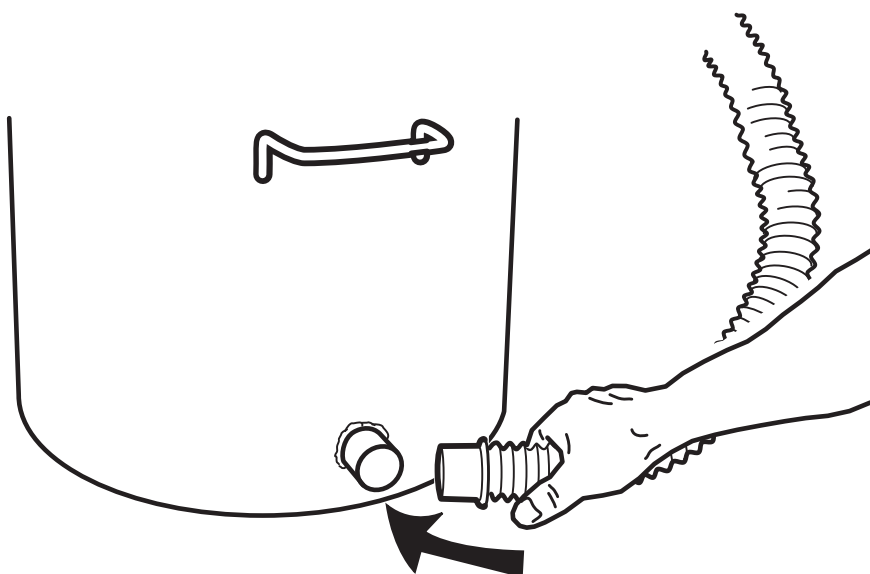
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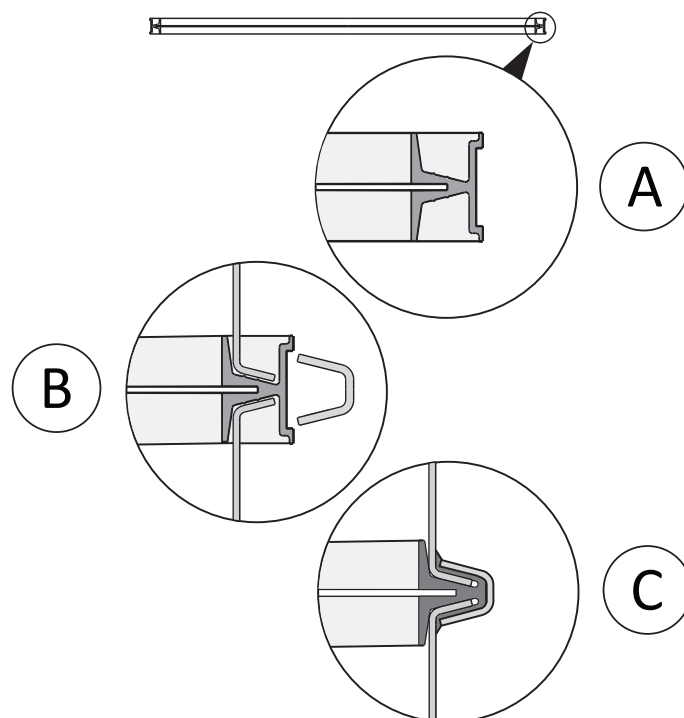
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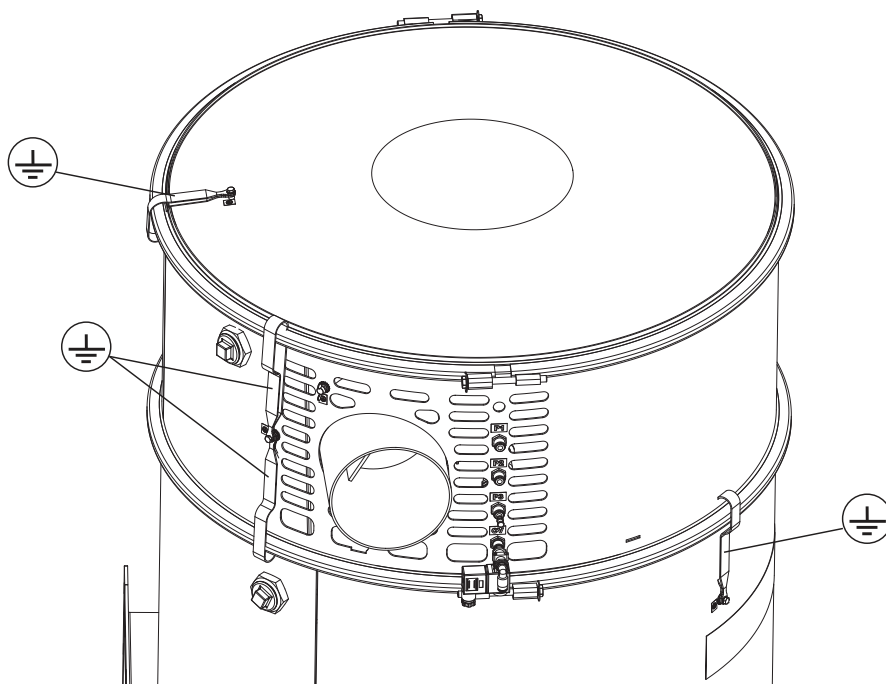
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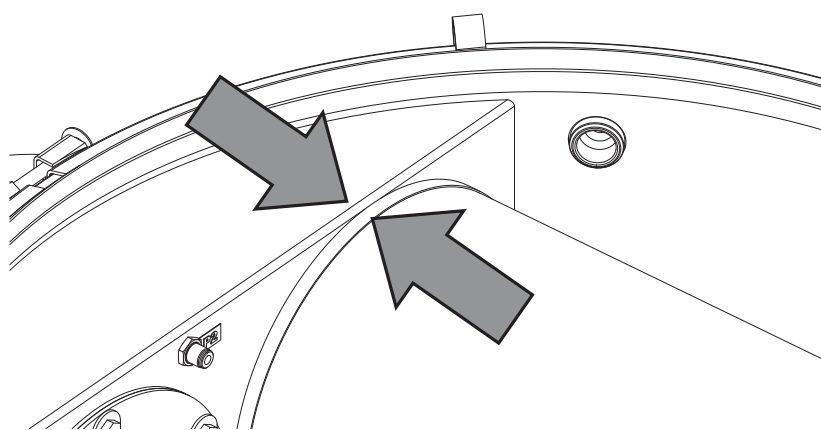
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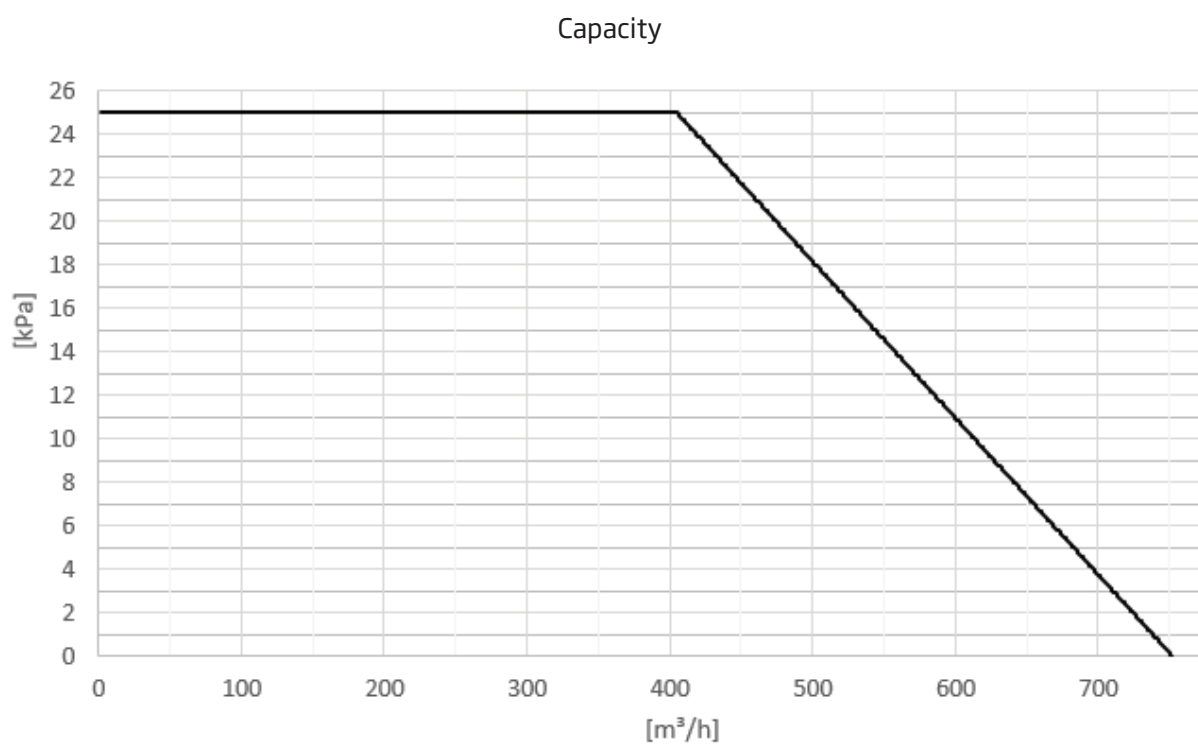
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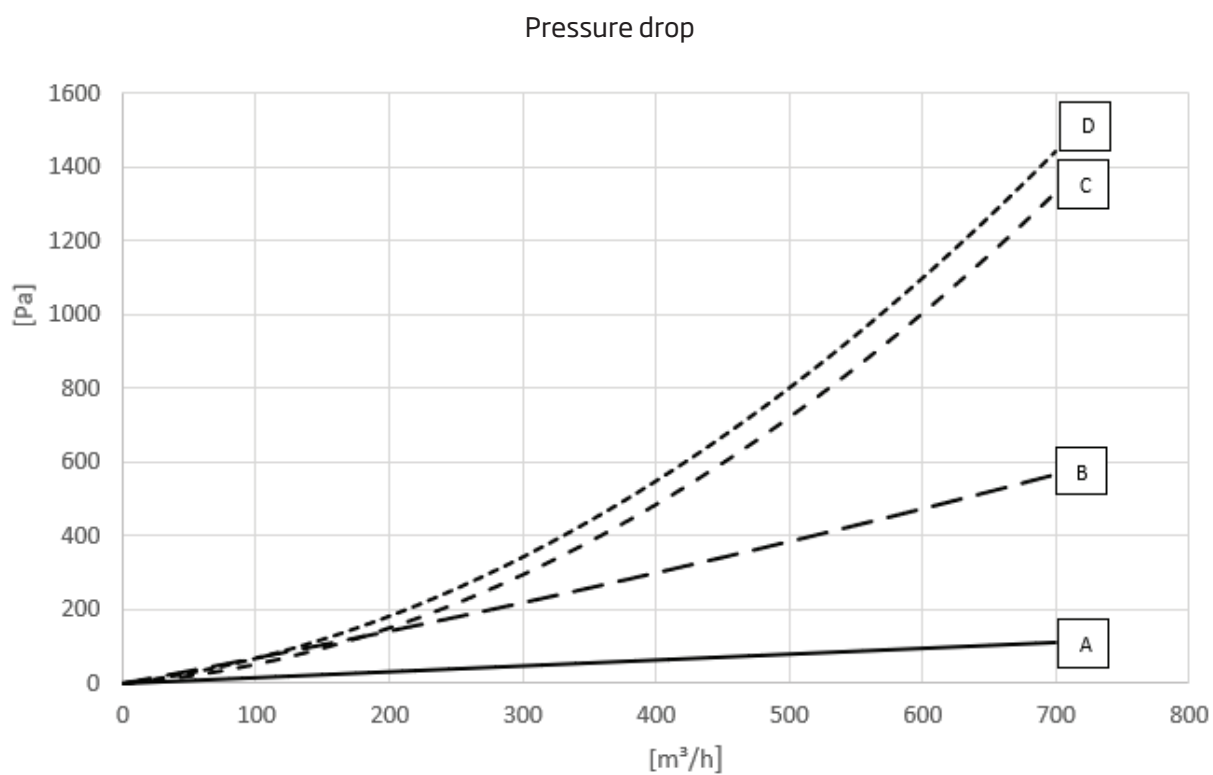
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1 Preface

Thank you for using a Nederman product!

The Nederman Group is a world-leading supplier and developer of products and solutions for the environmental technology sector. Our innovative products will filter, clean and recycle in the most demanding of environments. Nederman's products and solutions will help you improve your productivity, reduce costs and also reduce the impact on the environment from industrial processes.

Read all product documentation and the product identification plate carefully before installation, use, and service of this product. Replace documentation immediately if lost. Nederman reserves the right, without previous notice, to modify and improve its products including documentation.

This product is designed to meet the requirements of relevant EC directives. To maintain this status, all installation, maintenance, and repair is to be done by qualified personnel using only Nederman original spare parts and accessories. Contact the nearest authorized distributor or Nederman for advice on technical service and obtaining spare parts. If there are any damaged or missing parts when the product is delivered, notify the carrier and the local Nederman representative immediately.

1.1 PAK-M specifics

The Vacuum and Control unit can be used as a standalone vacuum source or be part of a complete PAK-M fitted with different dust separators, filters and accessories.

PAK-M comes in three main configurations:

- 1 A stand alone Vacuum and Control unit.
- 2 A Vacuum and Control unit with a Standard Dust Separator.
- 3 A Vacuum and Control unit with a Dust Separator in a DX/EX configuration.

The main manual is the User Manual for the stand alone Vacuum and Control unit. Other manuals are extensions of this manual. Please consider these notes:

NOTE!

- For each variant of PAK-M: Manuals are separated into User Manuals, Installation and Service Manuals, a Program Manual and accessory manuals.
- Refer to the correct manual in case of missing information. A manual generally describe the specific configuration; Dust Separator, ATEX, accessory, and so on.
- All manuals must be kept with care and made available to all persons involved in operating the equipment.
- Images in this User Manual may differ slightly from your model.

2 Safety

2.1 Classification of important information

This document contains important information that is presented either as a warning, caution or note, according to the following examples:



WARNING! Risk of personal injury

Warnings indicate a potential hazard to the health and safety of personnel, and how that hazard may be avoided.



CAUTION! Risk of equipment damage

Cautions indicate a potential hazard to the product but not to personnel, and how that hazard may be avoided.



NOTE!

Notes contain other information that is important for personnel.

2.2 Overall PAK-M safety

- PAK-M, including its configurations must be installed, used and maintained according to all related manuals in such a way that safety not will be neglected.
- All related manuals must be easily available, otherwise, the product will lack one of its fundamental safety requisites.



WARNING! Risk of personal injury

- Any functional disorders, especially those affecting the safety of the machine, must be rectified immediately. If improperly used, poorly connected, or altered, no matter how minor, the safety and reliability could be jeopardized.
- Grinding, welding or other hot works on PAK-M or the duct system should not be done without first stopping and cleaning the system.
- Do not collect items that may cause ignition or blocking. It is strictly prohibited to collect material that can undergo dangerous chemical or thermal reactions and/or self-ignite.
- Each PAK-M system must be dimensioned individually. To ensure that your system will be safe, a risk analysis must be performed for each installation and intended use.
- Do not make any changes to this product without consulting Nederman.
- PAK-M DX is specially designed to comply with official regulations concerning the risk of explosion. If improperly used, badly connected, or altered, no matter how minor, the safety and reliability could be jeopardized.
- Place fire alarms and an appropriate extinguishing system in all locations where collected dust is stored.



NOTE!

Some materials may undergo chemical reactions in combination with humidity/water. Such humidity may, for example, form if the humidity in the extracted air is condensed in the filters.

3 PAK-M DX and ATEX

ATEX is the name commonly given to the two European Directives for controlling explosive atmospheres: directive 1999/92/EC and 2014/34/EU.

3.1 Product marking

PAK-M DX is ATEX-classified and marked according to the description:

II 3D Ex h IIIC T130°C Dc

-10°C ≤ Ta ≤ 40°C

Nederman 24.HB01X

Part	Explanation
II:	From ATEX directive, Equipment group non-mining equipment.
3D:	From ATEX directive, Equipment category 3D intended for use with combustible dust in zone 22.
h:	The letter "h" as specified in EN ISO 80079-36.
IIIC:	Equipment of Group III is intended for use in places with an explosive dust atmosphere other than mines susceptible to firedamp. Equipment of Group III is subdivided according to the nature of the explosive dust atmosphere for which it is intended. Group III subdivisions: <ul style="list-style-type: none"> • IIIA : suitable for combustible flyings; • IIIB : suitable for combustible flyings and non-conductive dust; • IIIC : suitable for combustible flyings, non-conductive dust, and conductive dust.
T130°C	The maximum surface temperature in degrees Celsius.
Dc:	Equipment protection level Dc. Same as ATEX directive Equipment category 3D. For explosive atmospheres, caused by mixtures of air and combustible dust, the equipment does not contain any effective ignition sources in normal operation.
-10°C ≤ Ta ≤ 40°C	Ambient temperature range.
Nederman 24.HB01X	The certificate number is the ID number of the Declaration of Conformity for the product as required by EN ISO 80079-36:2016. If the sign "X" is placed after the certificate number, it indicates that the equipment is subject to specific conditions for safe use.



NOTE!

This approval only applies to the Dust Separator part of PAK-M DX.

3.2 Special Conditions for Safe Use "X"

PAK-M DX is designed to be a part of a complete extraction system; it usually includes a vacuum unit, connected piping and a control system.

For the unit to function properly and fulfil necessary safety requirements as stated in the Declaration of Conformity, the complete system must be assessed regarding applicable safety standards and directives

and comply with all requirements described in this manual. The designer of the system as a whole, must guarantee correct function of all interacting products or components and ensure that the complete system meets all necessary safety requirements.

When PAK-M DX is connected to its corresponding Vacuum and Control unit it fulfils the requirements for the Vacuum and Control unit and control system as described in their respective PAK-M manuals.

**WARNING! Risk of personal injury**

- The intrinsic safety box shall be placed outside an ATEX classified zone. See [Figure 1](#) item 23.
- Only the Dust Separator may be placed in a ATEX classified zone. Not the complete PAK-M with its Vacuum and Control unit.

3.3 Type of Protection constructional safety "c"

Technical documentation contains the information required to maintain product safety.

3.4 Area classification Dust Separator

The Dust Separator of PAK-M DX is marked with the EX symbol and classified as 3D equipment according to directive 2014/34/EU. Models with the EX symbol may be placed in areas classified as zone 22 according to directive 1999/92/EC.

**NOTE!**

This does not apply to the intrinsic safety box included in flameless explosion relief venting versions. That must be placed outside zone 22.

3.5 Category limit

Even if Dust Separator is classified for use in zone 22, the internal side is generally classified as zone 20 or 21. As there is no internal ignition source inside the dust separator, the inside is to be considered a simple filter/silo and does not fall under the scope of the directive 2014/34/EU¹

3.6 Permitted materials

It is of outmost importance to know the properties, limitations of the extracted material. The material limitations for dust properties such as Kst, Pmax, MIE, MIT can be found in "Data Sheet for Protection Systems, Sweden Manufacturing" delivered with your PAK-M DX.

- Never use PAK-M DX before confirming that the collected material is within material limitations.
- Materials with properties outside the stated values must be investigated prior to use.
- Contact Nederman for technical support and dust investigation.

**WARNING!**

- Do not collect items that may cause ignition or blocking. It is strictly prohibited to collect material that can undergo dangerous chemical or thermal reactions and/or self-ignite.
- Do not make any changes to this product without consulting Nederman. Adding a relief duct or changing the spacing or length of filter elements affects the calculations according to EN 14491.

3.7 ATEX components

PAK-M DX comes equipped with several electrical and mechanical components which fall under the scope of directive 2014/34/EU.

**WARNING!**

To maintain the high level of safety regarding the product classification: never alter or tampered with individual ATEX components, such as solenoids, magnetic sensors and protection systems, they must be maintained according to their respective component manual.

4 Description

PAK-M DX filters and collect potentially combustible dusts in a high vacuum system. It complies with the ATEX directives. Different filter solutions exist.

**WARNING! Risk of personal injury**

- PAK-M DX is designed for collecting and filtering combustible dry dust. It is not to be used for extraction of combustible or hybrid mixtures of gas and dust in explosive concentrations. Do not combine extraction of combustible dust with processes that can generate sparks and/or hot particles, such as welding fume extraction.
- Even though neither the concentration of dust nor gas is combustible, the combination may be. PAK-M DX is not intended for use in these conditions.

PAK-M DX is modular in its design, meaning that the Dust Separator can be placed in an ATEX classified zone while the Vacuum and Control unit is outside the classified zone.

There are several versions of PAK-M DX. They mainly differ regarding their explosion protection system that limits the effects of an explosion inside the main filter.

¹ Source: ATEX 2014/34/EU Guidelines § 243 Filter units and vented silo bins.

4.1 Main parts

Figure 1 shows the different parts/modules of PAK-M DX.

- 1 PAK-M DX
- 2 Lid
- 3 Outlet module
- 4 Secondary filter (control filter)
- 5 Earth connection for main filter
- 6 Cleaning valve
- 7 Lifting lug (2x)
- 8 Knob holding the secondary filter on a threaded rod
- 9 Internal measuring point for P2
- 10 Ducting to Vacuum and Control unit
- 11 Main filter
- 12 Small filter on main filter, internal measuring point for P1
- 13 Explosion protection system, see items 1A, 1B and 1C for options.
- 14 Main filter housing
- 15 Leg
- 16 Inlet module
- 17 Collecting bin
- 18 Leg (accessory for a Dust Separator used in an ATEX classified zone)
- 19 Vacuum and Control unit
- 20 Inlet, flanged
- 21 Vacuum equalization hose
- 22 Outlet
- 23 Intrinsic safety box (flameless explosion relief venting only)

4.2 Explosion protection system



WARNING! Risk of personal injury

The explosion protection system requires training. Only trained personnel should handle it.

The CE and ATEX marking on PAK-M DX ensure both a high level of safety and protection against ignition of possible explosive atmospheres. However, if an explosion occurs due to misuse, insufficient maintenance or faulty installation, PAK-M DX is equipped with additional explosion protection system to avoid that dangerous pressure build up in the main filter.

See Figure 1, item 1. The explosion protection systems are:

- Explosion relief venting panel, item 1A.
- Flameless explosion relief venting (F2 - organic), item 1B.
- Flameless explosion relief venting (C1 - metal), item 1C.



NOTE!

- It is recommended that the Dust Separator is placed outdoors if fitted with explosion relief venting panel.
- Installation indoors with flameless explosion relief venting requires a room size that is sufficient to handle the release of the internal pressure.
- Data and limitations for the different protection systems can be found in "Data Sheet for Protection Systems, Sweden Manufacturing" delivered with your PAK-M DX.

4.2.1 Risk area

In case of an explosion, the resulting flame and pressure must be directed to a safe, unmanned area. This area is referred to as the "risk area".

The risk area must be clearly marked, for example with a fence, warning lines and signs, and is to be off limits during the time PAK-M is in operation. The area shall be free of any flammable or combustible material or other things in danger of being damaged by the flames and explosion pressure.

The general sizes of the risk areas are shown in Figure 5. Item 1A shows a relief venting panel, item 1A/D a mounted deflector (accessory):

- A 10 m (33 ft)
- B 4 m (13 ft)
- C 2,5 m (8 ft)
- D 5 m (16 ft)
- E 5 m (16 ft)
- F 5 m (16 ft)
- G 5 m (16 ft)
- H 1 m (3.3 ft)
- I 0,5 m (1.7 ft)
- J 0,7 m (2.3 ft)
- K 1 m (3.3 ft)



NOTE!

The risk area can extend beyond given values. Final risk area must be evaluated regarding affecting factors found in standard EN 14491.

4.2.2 Explosion relief venting panel

The harmful effects of an explosion are minimized by venting the pressure and flame of the explosion via a relief panel.

4.2.3 Flameless explosion relief venting

The method of flameless venting is similar to "explosion venting". However, a device attached to the outside of the vent will stop flames from exiting the main filter housing. Such a device is sometimes referred to as a "quench-device" or "flameless-device".

Common for all types of flameless devices is that the explosion is released through a specially designed grid or mesh that allow pressure from an explosion to be released but prevent the explosion's flames from exiting outside the filter. The benefit of using a flameless vent device is that it reduces the size of the risk area. This increases the possibility of positioning PAK-M DX closer to manned areas or equipment.

Please refer to the manual for the flameless device supplied with PAK-M DX to find other information regarding safe use and service.

i NOTE!

- Flameless venting might cause high over-pressure if in a small room. There is a limit on minimum room volume when placed inside.
- Use of a flameless device does not eliminate the risk area. The high pressure and hot gases are still released into the surroundings, and this must be taken into consideration when positioning PAK-M DX. Please consult your local fire authority when determining a suitable position.

4.2.4 Explosion suppression

With an explosion suppression system, the early stage of an explosion is detected with optical and/or pressure devices, and an extinguishing agent is quickly dispersed into the main filter. The suppression occurs in an extremely short time after an explosion is detected (milliseconds), and stops the pressure rise and extinguishes (suppresses) the flame/flames of the explosion. This ensures that the filter is not stressed to a dangerous level by the explosion.

The key components of the explosion suppression system are:

- An explosion detection device (pressure/optical)
- A computer operated control unit
- Action elements such as pressure cylinders with extinguish agent contained with an extra fast opening valve

Detailed information regarding system operation and maintenance can be found in the manual for the explosion protection system.

4.3 Collecting bin

The Dust Separator is equipped with a pressure equalized bin that collects the dust material in a plastic bag.

i NOTE!

- Other collection methods may be used if found to be safe in the system risk analysis.
- Only use Nederman conductive bags when collecting combustible material.

4.4 Feed out devices

If a different feed out device is used, like TVFD, butterfly, or rotary valves, see the respective manual for the feed out device.

4.5 Filters

Different main filters and secondary filters are available, also with HEPA efficiency.

PAK-M DX is equipped with a secondary filter that functions as an internal control filter. It filters the air after the main filter to ensure that no material continues to the suction source. This is a safety feature in case of a main filter breakage. The secondary filter does not normally increase the filtration efficiency.

i NOTE!

- Only use Nederman conductive main filters when collecting combustible material.
- The pressure drop over the secondary filter is monitored from a manually set value. A signal is sent to the control unit if it reaches above the set value. See the Program Manual and the Installation and Service Manual for the Vacuum and Control unit.

4.6 Accessories

PAK-M is prepared for Nederman accessories and customer connections.

The installation of accessories, extra equipment, and functions are described in the manual for each product and according to the electrical diagrams that came with it. Consult your local Nederman representative for available accessories.

4.7 Pressure measuring points and connections

[Figure 4](#) shows the pressure measuring points and connections.

P1: Pressure sensing tube. Pressure measuring point for pressure upstream main filter, Ø 6 mm (0.24")

P2: Pressure sensing tube. Pressure measuring point for pressure downstream main filter, Ø 6 mm (0.24")

P3A: Pressure sensing tube. Pressure measuring point for pressure downstream secondary filter, Ø 6 mm (0.24")

i NOTE!

- P3A is disconnected at delivery. Use P3B on the Vacuum and Control unit instead. See the User Manual for the Vacuum and Control unit.

CV: Cleaning Valve, Ø 6 mm (0.24")

**CAUTION! Risk of equipment damage**

- Do not switch connections for pressure measuring points.
- Blue tubes are used for measuring and black for compressed air.

4.8 Technical data

PAK-M DX	
Capacity and pressure drop* :	Flow is shown in m ³ /h and pressure/pressure drop in kPa/Pa
- Capacity	See Figure 14
- Pressure drop P1-P2 (main filter)	See Figure 15 , item A
- Pressure drop P2-P3 (secondary filter)	See Figure 15 , item B
- Pressure drop P2-P3 (secondary filter and outlet)	See Figure 15 , item C
- Pressure drop Dust Separator	See Figure 15 , item D
Max operating air flow Dust Separator	600 m ³ /h
Max vacuum Dust Separator	-50 kPa (-7.25 PSI)
Process air (dry) temperature	0 - 60°C (32 - 140°F)
Operating temperature	-10 - +40°C (14 - 104°F)
Main filter, area	3 m ² (1x129 sqft)
Main filter, material	Conductive (<10 ⁶ Ω) polyester
Main filter, material PTFE	Dissipative (<10 ⁹ Ω) polyester PTFE coating
Main filter, material efficiency	Class M according to EN 60335-2-69
Secondary filter (optional):	See Figure 1 , item 4
- Area	5,4 m ²
- Material	Polyester
- Material efficiency	Class M according to EN 60335-2-69
- Area H14	5,18 m ²
- Material H14	3 layers, polyester/glass fibre/polyester
- Efficiency H14	HEPA H14 (99.995% MPPS)
Protection class Dust Separator	IP65
Protection class PAK-M DX	IP54
Weight, approx:	Depends on explosion protection system

PAK-M DX	
- PAK-M DX	378-393 kg (833-866 lb)
- Dust Separator only	195-210 kg (430-463 lb)
- Deflector (optional)	11 kg (24,25 lb)
Dimensions:	See Figure 2 and Figure 3
- Inlet, Dust Separator (A)	Flanged Ø 100 mm (3.94 ")
- Outlet, Dust Separator (B)	Ø 150 (5.90 ") / Ø 100 mm (3.94 ")
- Inlet, Vacuum and Control unit (C)	Ø 100 mm (3.94 ")
- Outlet, Vacuum and Control unit (D)	Ø 100 mm (3.94 ")
Secondary filter, pressure warning recommendation	4 kPa (1.16 PSI)
Compressed air connection	Ø6 mm (0.24 ")
Compressed air quality	Clean dry, ISO 8573-1 class 5
Compressed air pressure	6 - 10 bar (87 - 145 PSI)
Max air consumption (intermittent)	700 N-Litres/min (25 cfm)
Control voltage Dust Separator	24 V DC ± 10%
Explosion relief venting panel: area	0,096 m ² (1,03 sqft)
Explosion relief venting panel: burst pressure	0,1 bar (1.45 PSI)
Flameless venting: minimum room volume	>115 m ³
Material Dust Separator	Powder coated steel + Primer, rubber (EPDM)
Corrosion protection level Dust Separator	Powder coat C3, other C2. According to ISO 12944-2.
Material recycling Dust Separator, approx	96 weight-%
Collecting bin volume	70l
Protection system limitations and dust data	See "Data Sheet for Protection Systems, Sweden Manufacturing" delivered with your PAK-M DX.

* New clean filters. See the Vacuum and Control unit User Manual for max pressure set point.

5 Using PAK-M DX



WARNING! Risk of personal injury

- PAK-M DX is intended to be used by experienced adult operators who are properly trained and understand how to use it.
- Use ear protection when appropriate.
- Use proper protective equipment where there is a risk for exposure to the dust.
- Never run PAK-M DX without a main filter or a bin bag inserted.
- The outlet of the Dust Separator may reach high temperatures during normal operation.
- Personnel operating PAK-M DX must pay special attention to avoid discharge of static electricity.
- The requirements for safe use and handling of combustible dust should be described in the explosion protection document and to all personnel.

5.1 Main filtration

Dust have widely different properties. Some kinds are easily cleaned off the main filter bags while others require more powerful cleaning.

Main filtration process:

- 1 The inlet module separates coarse particles.
- 2 The coarse particles fall down into the collecting bin.
- 3 Fine dust particles follow the up-going air flow through the filter unit. These particles are separated on the outside surface of the main filter. A long spiral spring in each filter bag keeps it from flattening as air passes through it from outside to inside.
- 4 The filtered air is continuous through the secondary filter.
- 5 The filtered air leaves the Dust Separator.

The pressure drop increases as more fine dust settles on the main filter bags. During filter cleaning, part of the dust is dislodged and falls down into the collecting bin.

PAK-M with standard filter cleaning uses its own vacuum to generate a short blast of air backwards through the main filter bags. A compressed air cylinder in the top module opens a disc valve so that atmospheric air can rush into the housing to neutralize the vacuum stored inside it.

The higher the vacuum and the larger the connected duct system, the more air will flush backwards through the main filter and the cleaning will be more effective.



NOTE!

- It is not desirable to dislodge all dust from the main filter bags. A certain quantity of fine particles on them improves particle separation compared to using clean bin bags.
- Extracted materials are to be considered waste and are to be discarded.

6 Maintenance



WARNING! Risk of personal injury

- The explosion protection system must be handled by qualified personnel according to the manual for the protection system supplied with your PAK-M DX.
- Use proper protective equipment where there is a risk of exposure to dust.
- Use proper lifting equipment and protective gear.
- Wear ear protection when work is carried out near the upper section of the Dust Separator.
- The compressed air supply needs to be securely disconnected during maintenance.
- Avoid spilling materials.
- After all installation and maintenance work: verify the earth connection. See [Section 6.8 Earth control measuring](#).



WARNING! Risk of explosion

- Before performing any grinding, welding or other hot works on PAK-M, stop operation and clean all parts in contact with dust: filter housing, filters, collecting bin and so on.
- Do not open the connection box when there is an explosive atmosphere present.

6.1 Emptying the collecting bin

The collecting bag/bin bag should be replaced when filled up to 2/3. Regular checks, or the use of an Nederman BLI (Bin Level Indicator) is recommended.



NOTE!

- Ensure that no vacuum is present before removing the collecting bin.
- The bin bag may be heavy.
- Use Nederman conductive plastic bags.

Empty the collecting bin as follows:

- 1 Disconnect the vacuum equalization hose and remove the collecting bin.
- 2 Seal and remove the bin bag. Use a cable tie or equivalent, see [Figure 9](#).
- 3 Fit a new bag into the bin.
- 4 Refit the bin to the Dust Separator.

- 5 Inspect the vacuum equalization hose and secure that it is firmly attached to the bin, see [Figure 10](#).
- 6 Check that the bin seals properly once the vacuum returns.

6.2 Maintenance schedule

Type of maintenance	Frequency
Regular inspection	Regularly and after changed operating conditions
Yearly inspection	One month after installation and every year
Main filter change	6000 hours
Secondary filter change	6000 hours
Explosion relief venting panel inspection	3 months

6.3 Inspections

At least yearly:

- 1 Inspect all parts of PAK-M and pay special attention to the seals for the collecting bin and main filter. Also inspect the steel clamping rings holding together the housing/inlet/cone-modules. Replace damaged parts.
- 2 Check all parts of all attachments. Tighten bolts if necessary.
- 3 Make sure the outside, particularly the solenoids, sensors and connection box, are free from dust layers.
- 4 Make sure the inside of PAK-M and the connection pipes are free from deposits. Build up of deposits inside the piping system may cause discharge of static electricity.
- 5 Clean the area around PAK-M, including all areas where the collected material is stored to ensure that there are no dust deposits. Ensure that no combustible material is placed in the risk area.
- 6 Check that all signs/markings regarding safe operation are in place and that personnel know about them.

6.4 Changing the main filter package

The main filter should normally be replaced after 6000 hours of operation or when damaged. It should also be replaced if the filter function is insufficient.

The Dust Separator can be tilted if there is no clearance above to remove the filter. See [Section 6.5 Tilt-
ing the Dust Separator](#).

NOTE!

- Replacement of filters should be registered in the Service protocol. It can be found in the Installation and Service Manual.
- It is recommended that the secondary filter is replaced when changing the main filter.

WARNING! Risk of personal injury

- Never run PAK-M without the required filters inserted.
- The vacuum and compressed air must be turned off before commencing a filter change.
- Use proper lifting equipment and protective gear.

- 1 Disconnect the outlet hose from the outlet.
- 2 Disconnect the pneumatic 3/2 cleaning valve from CV.
- 3 Remove the pressure sensing tubes, see [Figure 4](#), items P1, P2 and P3A (if used). Continue with other added connections.
- 4 Remove the lid from the outlet module.
- 5 Disconnect the earth connection and pressure sensing tube from the filter.
- 6 Separate the outlet module from the housing and lift it down using the lifting lugs. See item 7 in [Figure 1](#).
- 7 Take out the main filter package and put it in a large plastic bag, or wrap it in plastic foil to avoid dust spreading.
- 8 Fit the new main filter package.

NOTE!

The bar in the main filter housing only lets you put the main filter in one position so that it is not blocking the explosion relief venting panel on the inside.

- 9 It is recommended to change the secondary filter. See [Section 6.6 Changing the secondary filter](#).
- 10 Refit the outlet module.
- 11 Refit the earth connection and pressure sensing tube to the filter.
- 12 Do earth control measuring for the filters and fit the lid on the outlet module.
- 13 Reconnect the pressure sensing tubes, pneumatic valve and outlet hose.

6.5 Tilting the Dust Separator



WARNING! Risk of personal injury

- Avoid placing PAK-M in an area that requires the Dust Separator to be tilted to access the main filter, consider it a last resort. Do a risk assessment before tilting.
- Use proper lifting equipment and protective gear.
- PAK-M must be firmly anchored to the floor.
- Units with heavy flameless devices should not be tilted due to safety concerns. See [Figure 1](#) items 1B and 1C.



NOTE!

- Tilting is easier when the Dust Separator is used as a stand alone with two legs.
- When the Dust Separator is fitted to the Vacuum and Control unit you need to make a gap of around 4 mm between the leg and the Vacuum and Control unit in order to tilt the filter.
- How to remove the Vacuum and Control unit panels is described in the Installation and Service Manual for the Vacuum and Control unit.

The Dust Separator tilts and swivels around two M16 bolts.

- 1 Remove ducting from the inlet.
- 2 Follow steps 1-3 in [Section 6.4 Changing the main filter package](#).
- 3 Remove the required Vacuum and Control unit panels and remove the protective sheet metal from the leg.
- 4 Ensure that the M16 bolts are not tightened so the Dust Separator can pivot around them. Loosen to a gap of around 4 mm.
- 5 Remove the four M12 bolts in the brackets. See items A in [Figure 7](#) and [Figure 8](#).
- 6 Turn the filter housing by releasing the push-in lock pin. See item B in [Figure 7](#).
- 7 Rotate the filter housing 90°. The lock pin will automatically lock the position.
- 8 Follow steps 4-8 in [Section 6.4 Changing the main filter package](#).
- 9 Tilt the Dust Separator back into an upright position and fit the four M12 bolts on each side. See items A in [Figure 7](#).
- 10 Reconnect the ducting to the inlet.

6.6 Changing the secondary filter

The secondary filter should normally be replaced after 6000 hours of operation. It must also be replaced if damaged or if there is a high pressure drop over the secondary filter.



NOTE!

Always check the main filter for damage when replacing the secondary filter.

- 1 Remove the lid from the outlet module.
- 2 Remove the knob on the back of the secondary filter.
- 3 Put a plastic bag over the filter to avoid exposure and spreading of dust.
- 4 Remove the old secondary filter. The threaded rod can tilt at an angle, so the filter can be removed.
- 5 Fit a new filter cartridge on the threaded rod. It helps by holding a finger in the hole of the bottom of the filter, so you can feel and guide the rod (or look through the hole).
- 6 Put the knob back on and try to get it as straight as possible when tightening. The top of the filter should be in line with the edge of the plate. See [Figure 13](#).
- 7 After tightening, shake the filter by holding the back of the filter. It is normal that it loosens, and the knob can be tightened more. Tighten it by hand as hard as you can: > 5Nm (> 3.7 ft-lb) and repeat this procedure until you can not tighten the knob more after shaking the filter.



NOTE!

This is very important to avoid that the filter loosens during operation.

- 8 Continue with steps 10-13 in [Section 6.4 Changing the main filter package](#).

6.7 Separating PAK-M DX modules

The Dust Separator modules can easily be separated for service and maintenance.

[Figure 11](#) items A-C show how the rubber sealing rings, the steel retainer rings and the earth connections should be assembled. [Figure 12](#) shows how the steel retainer rings, keeping the modules together, are correctly reassembled with the earth connection intact.



NOTE!

When a used sealing ring is refitted, it no longer has the flat shape as shown in [Figure 11](#) item A. The rubber ring has a curved shape.

- Use, for example a screwdriver to fit the edge of the module between the rubber lips. The steel ring is correctly fitted as shown in [Figure 11](#) item C.

6.8 Earth control measuring

Proper earth connection shall be checked after both main installation and regular maintenance work. If a component, such as for example the top module, is removed and refitted, earth connection must be verified.

A suitable measuring instrument must be used. $R \leq 10 \Omega$ unless otherwise stated.

**NOTE!**

Make sure there is contact between the measuring point and the instrument.

- 1 Disconnect the duct system (in- and outlet).
- 2 Disconnect the net earth from GND1. See [Figure 6](#).
- 3 Measure between all components according to the component measuring list and GND1. Measure and verify contact between incoming duct system and the free coupled incoming net earth ($\leq 10^5 \Omega$).
- 4 Reconnect the incoming duct system. Make sure that there is a 2nd earth connection between the duct system and PAK-M and that it is properly earthed. Measure and verify contact between GND1 and external net earth ($\leq 10^5 \Omega$).
- 5 Reconnect net earth to GND1.
- 6 Reconnect the outgoing duct system. Make sure that there is an earth connection between the duct system and the bottom frame of the Vacuum and Control unit.

Component measuring list

- See [Figure 6](#). Measure the earth connection between GND1 and the following:
 - 1 Filters and cleaning valve, item 1. With the top lid removed:
 - A Spring in main filter bags (test 3). $R < 1M \Omega$ (for PTFE coated filters $R < 10M \Omega$).
 - B Metal mesh on secondary filter. $R < 10 \Omega$.
 - C Plate on cleaning valve. $R < 10 \Omega$.
 - 2 Lid. $R < 10 \Omega$.
 - 3 Outlet module. $R < 10 \Omega$.
 - 4 Relief panel / Flameless venting device. $R < 10 \Omega$.
 - 5 Inlet module. $R < 10 \Omega$.
 - 6 Collecting bin. $R < 10 \Omega$.
 - 7 Bottom frame of the Vacuum and Control unit. $R < 10 \Omega$.

6.9 Servicing ATEX equipment

To ensure the required level of protection regarding the equipment category, check the following points:

- Regularly inspect PAK-M DX for damage or malfunction. If damaged, shut down and remove possible explosive conditions.
- Ensure that no explosive atmosphere and/or dust layers are present when cleaning, servicing or inspecting PAK-M DX. Prevent dust accumulation by setting up routines for regular cleaning and include these in the explosion protection document.

**WARNING! Risk of personal injury**

- Check that the risk area is clearly marked and kept clear of obstacles.
- The explosion relief venting panel must be kept free from debris such as snow, ice, leaves and other items that might block or prevent the panel from opening.
- The explosion relief venting panel is designed to rupture and open at very low over pressures and must be handled with great care. Never poke/press or lean against the panel and do not bend the frame securing it.
- Inspect the explosion relief venting panel with the Vacuum and Control unit switched off. Replace it at the first sign of corrosion or other damage. No other preventive maintenance is required.
- For other protection methods follow the maintenance procedure in the manual for the protection device.

7 Spare Parts**CAUTION! Risk of equipment damage**

Use only Nederman original spare parts and accessories.

Contact your nearest authorized distributor or Nederman for advice on technical service or if you require help with spare parts. See also www.nederman.com.

7.1 Ordering spare parts

When ordering spare parts always state the following:

- The part number and control number (see the product identification plate).
- Detail number and name of the spare part (see www.nederman.com/en/service/spare-part-search).
- Quantity of the parts required.

8 Recycling

The product has been designed for component materials to be recycled. Different material types must be handled according to relevant local regulations. Contact the distributor or Nederman if uncertainties arise when scrapping the product at the end of its service life.

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