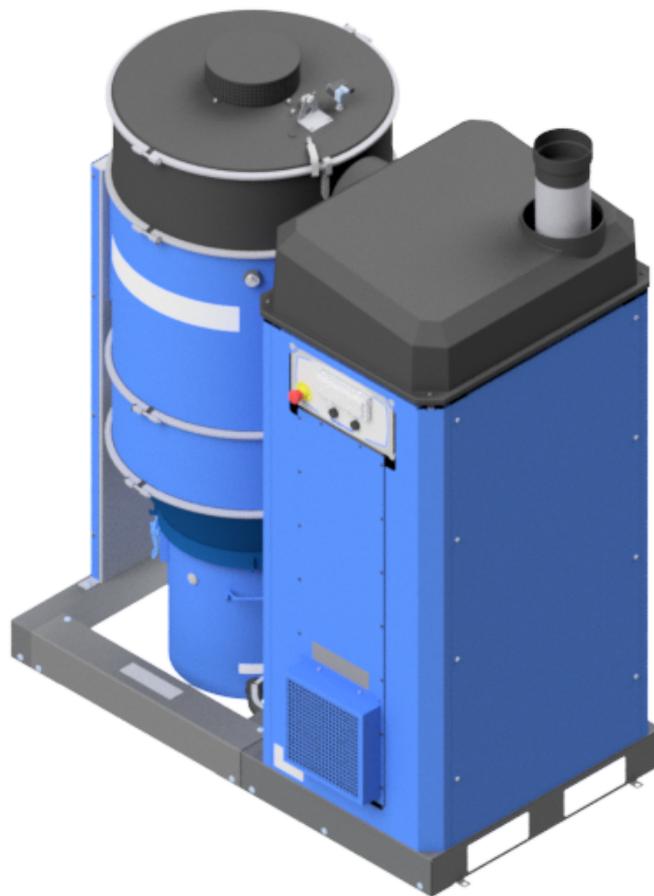


Compact dust collectors

FlexPAK

Standard Models



Original installation and service manual

EN INSTALLATION AND SERVICE MANUAL

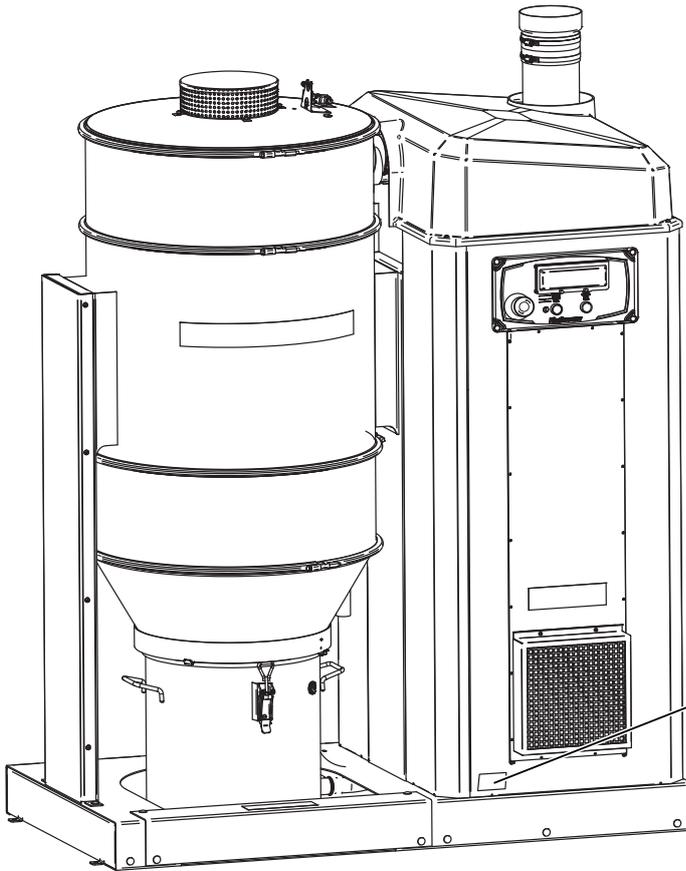
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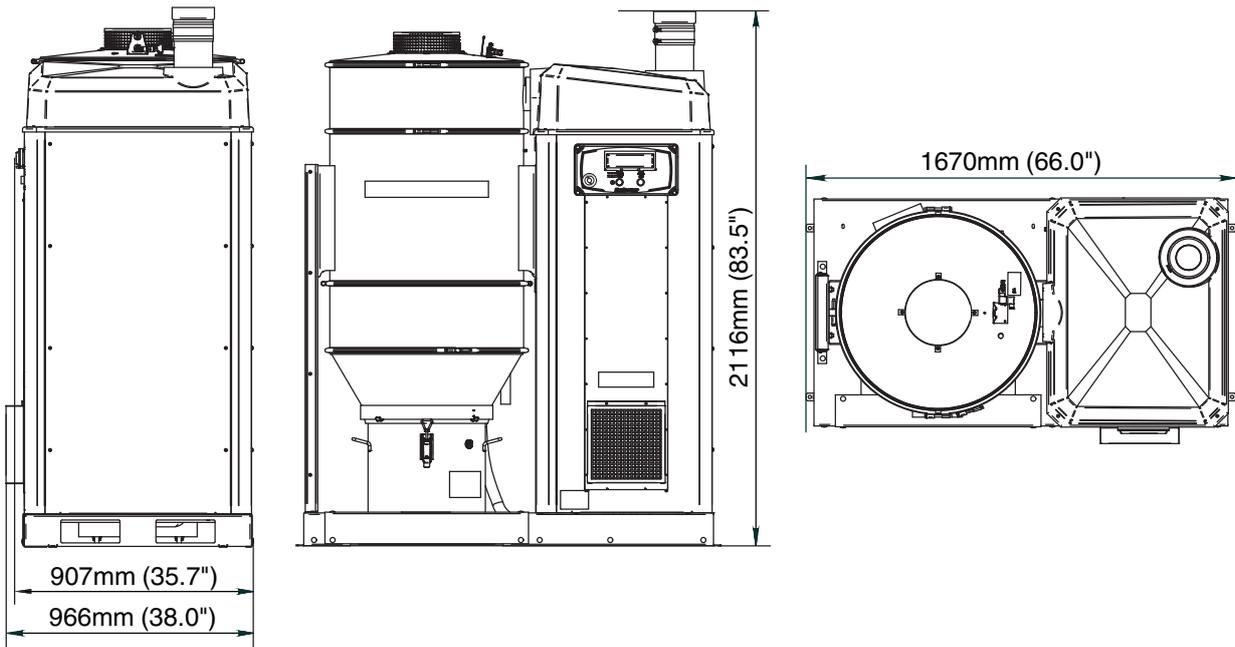


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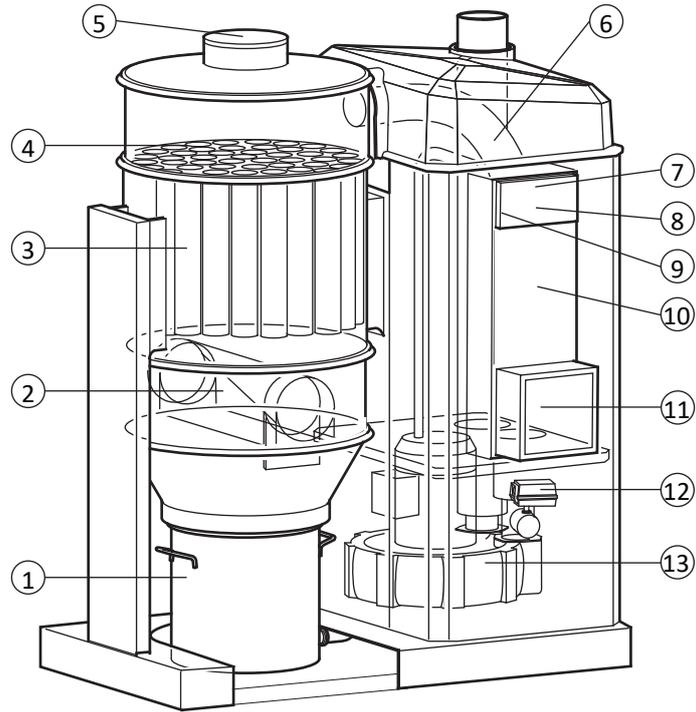

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SWEDEN

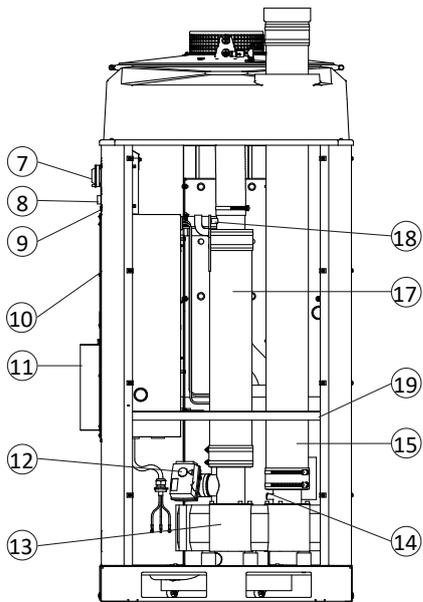
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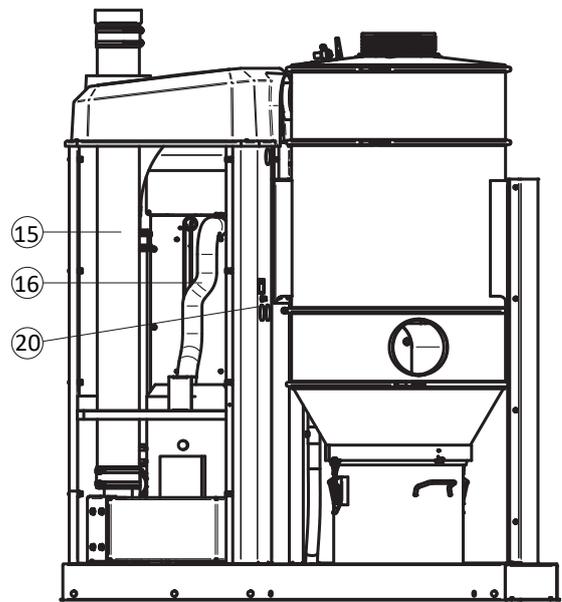
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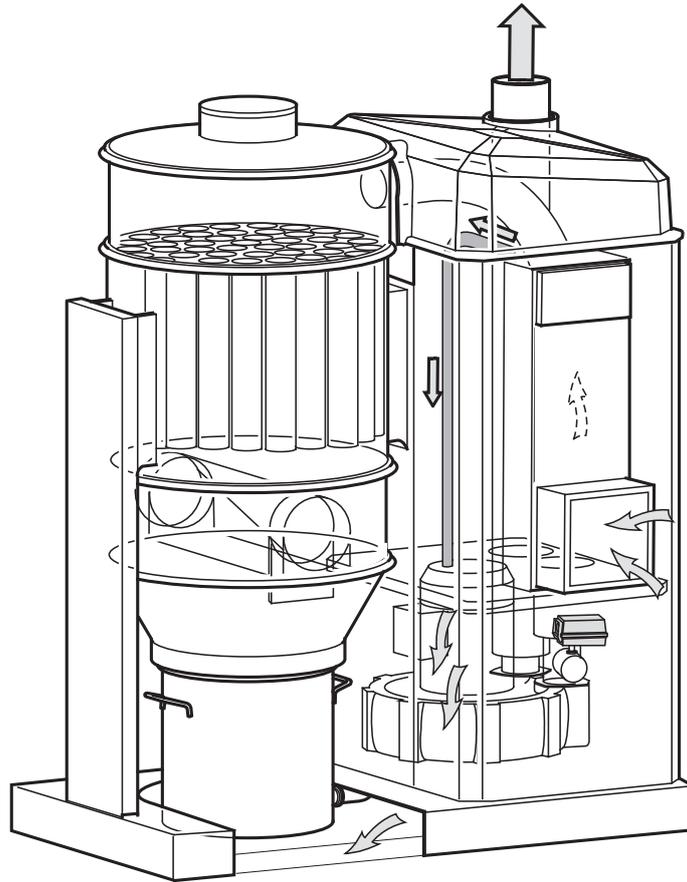
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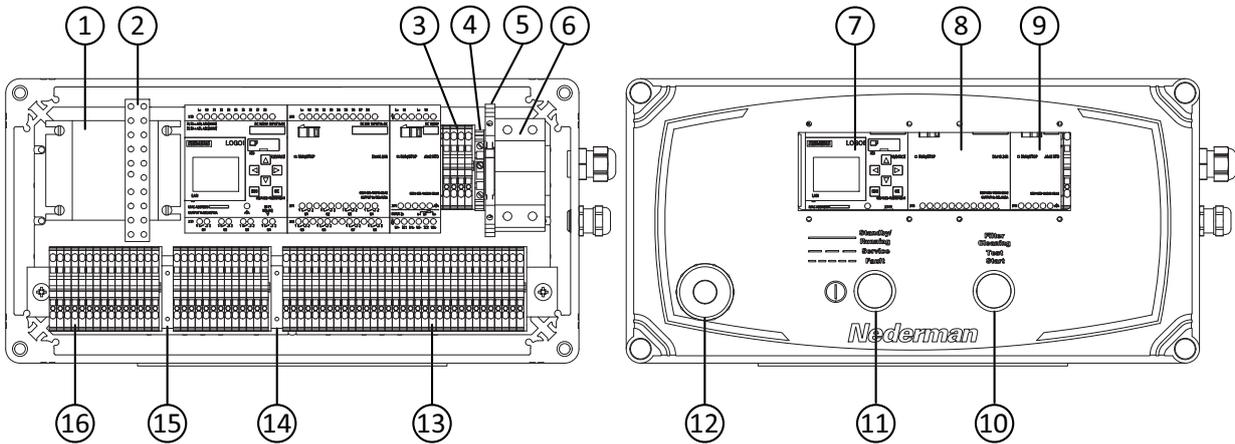
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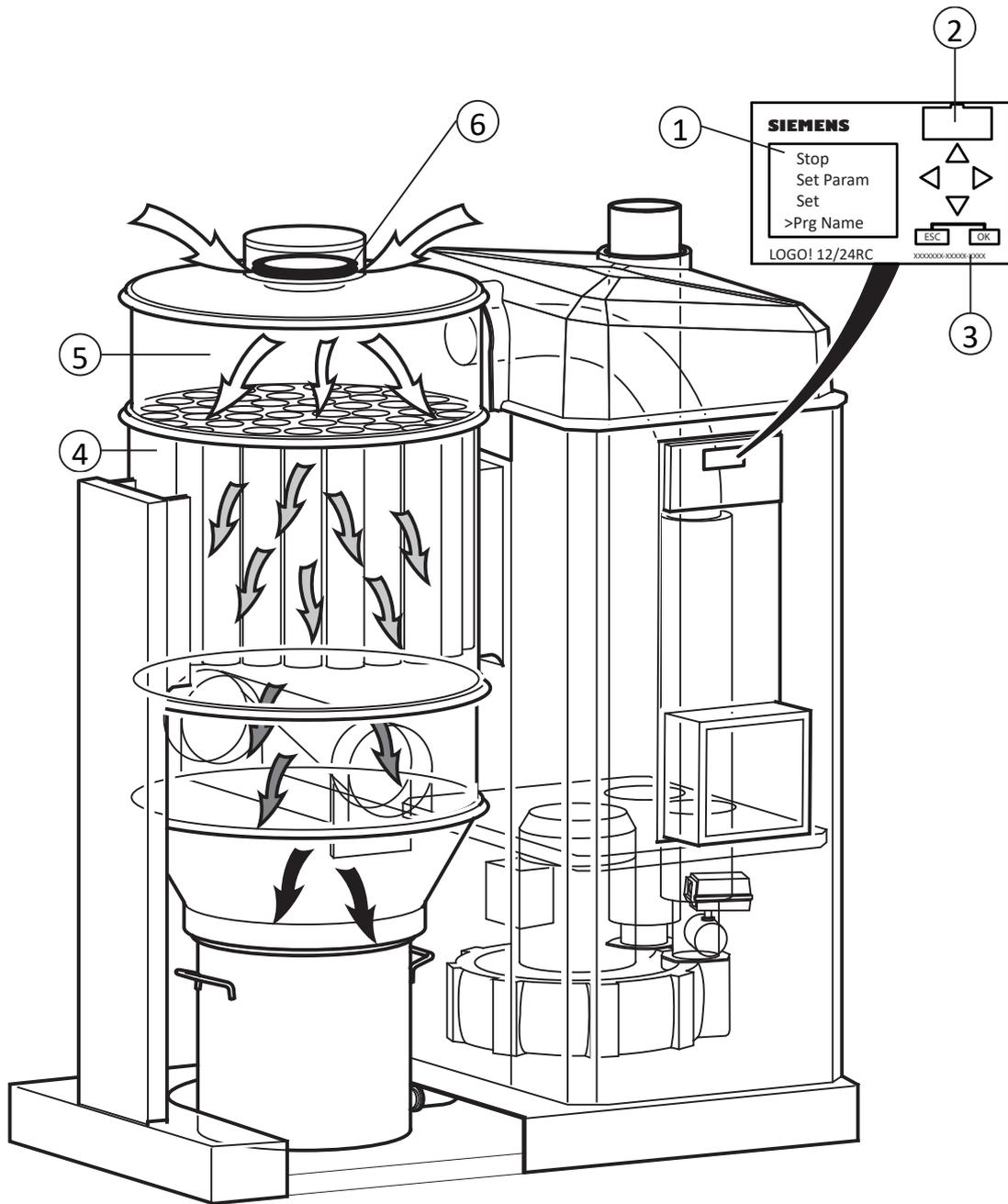
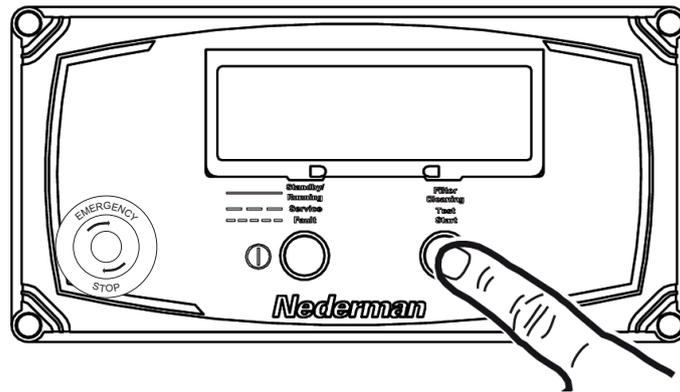


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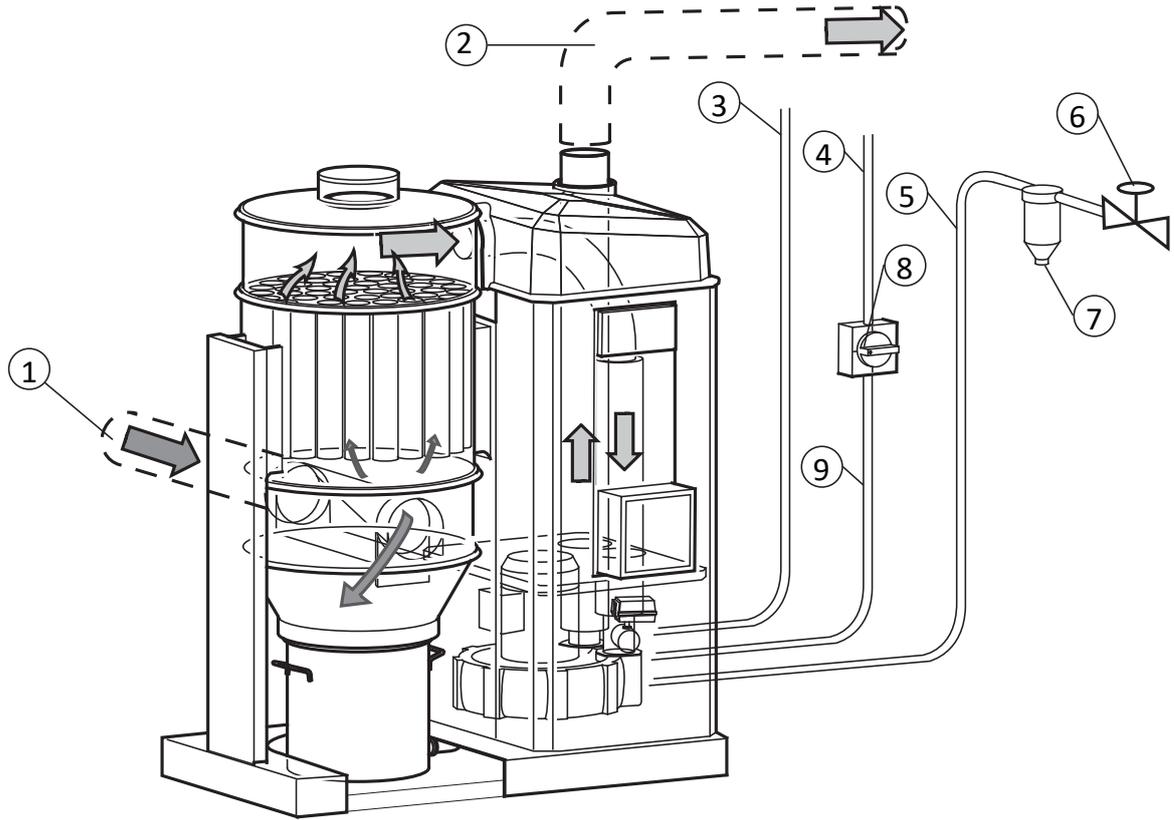


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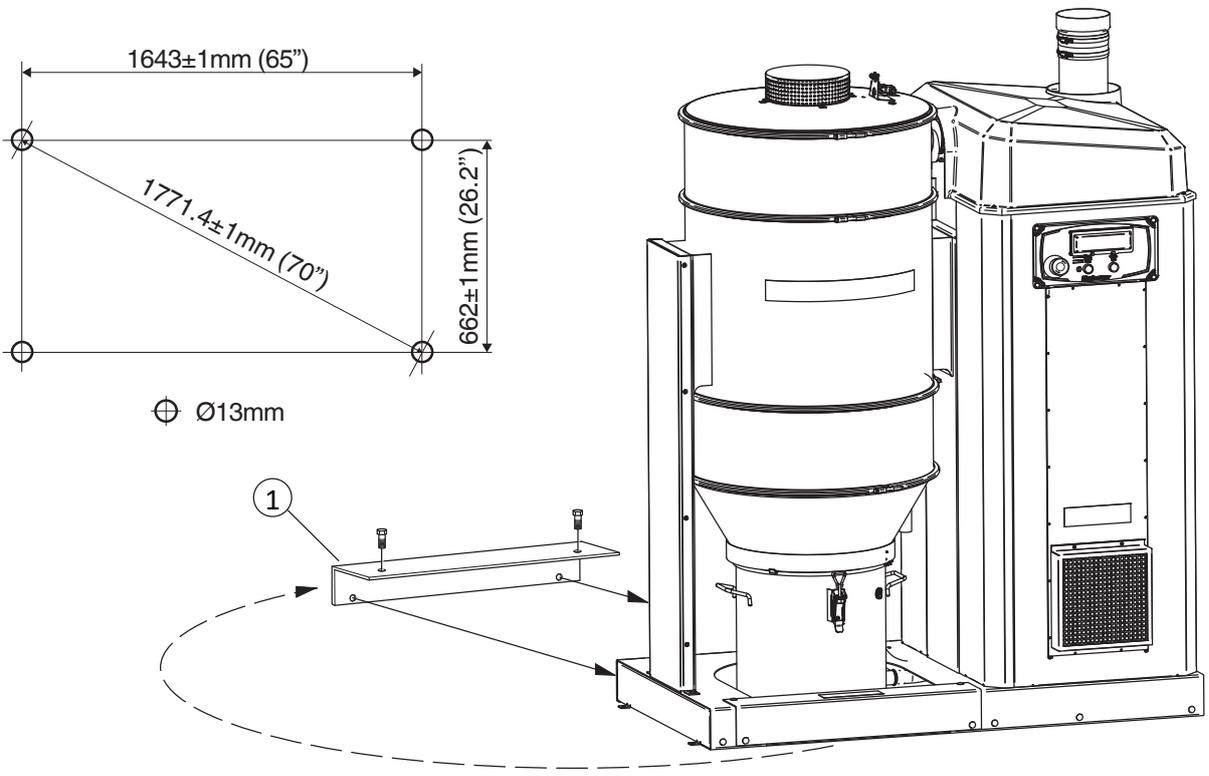




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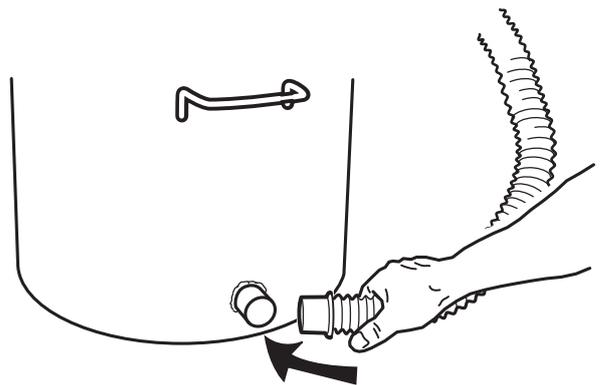
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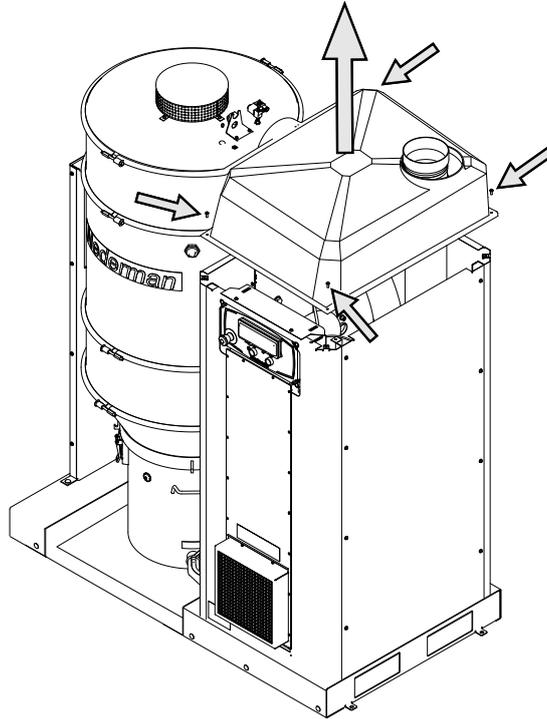
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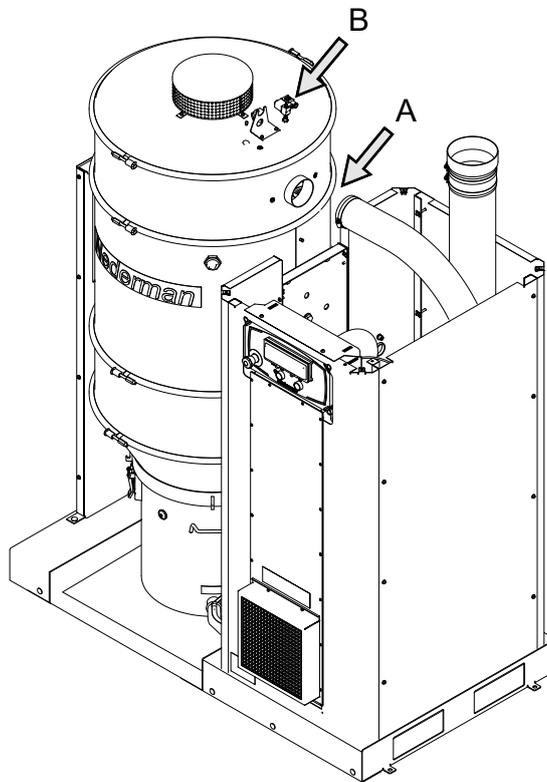
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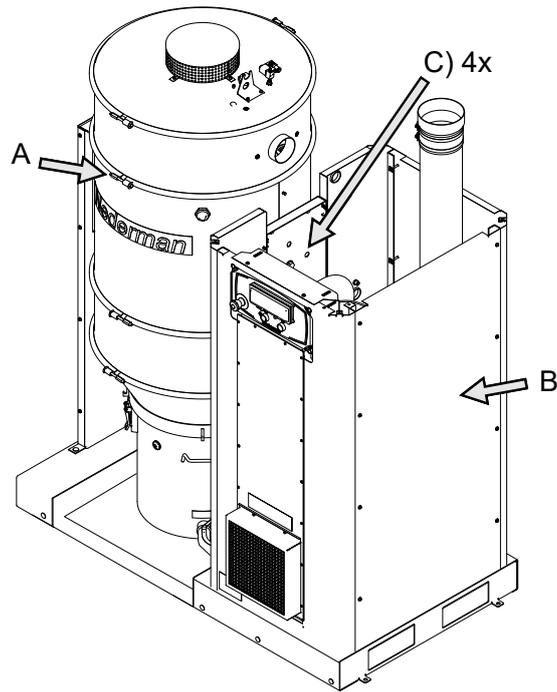
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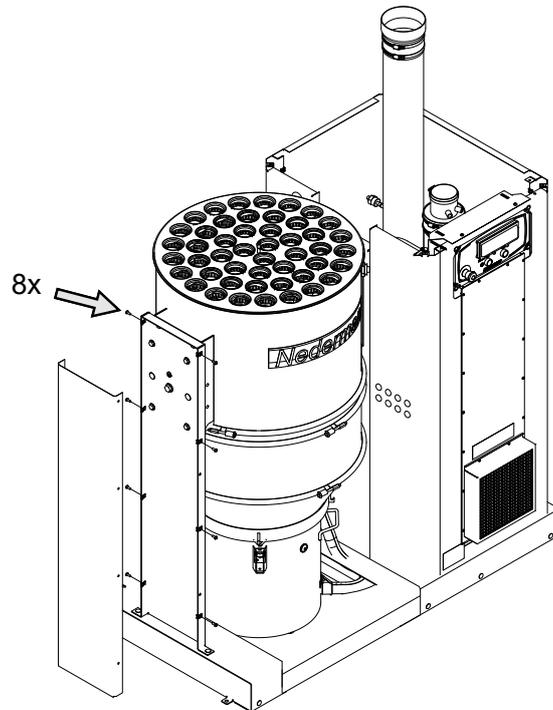
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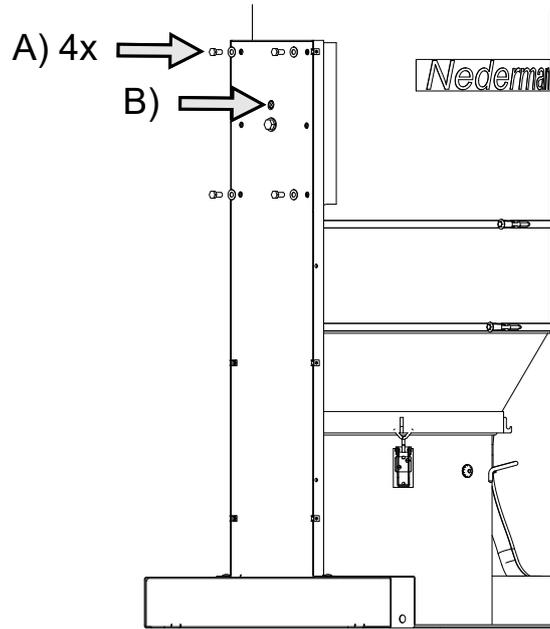
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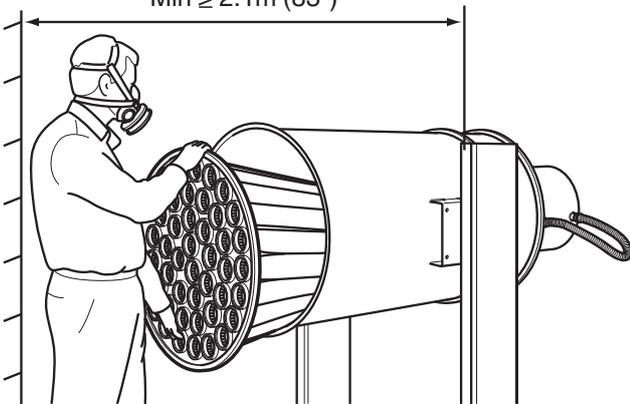
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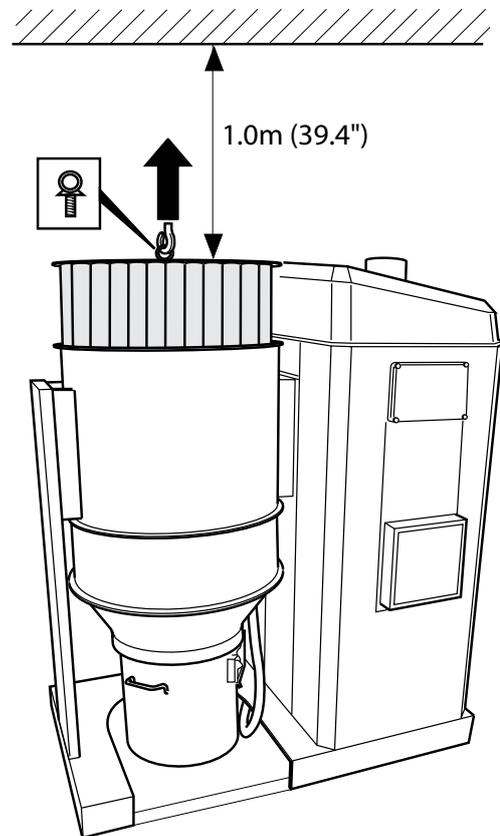
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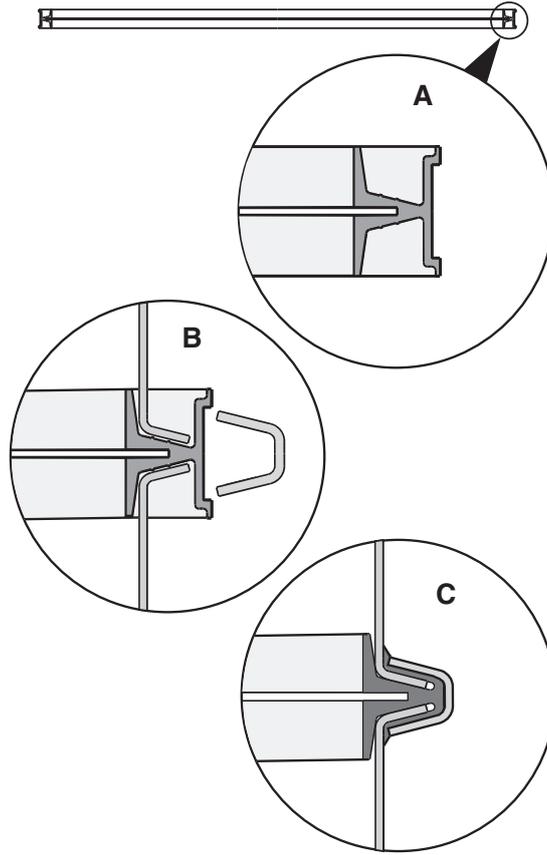
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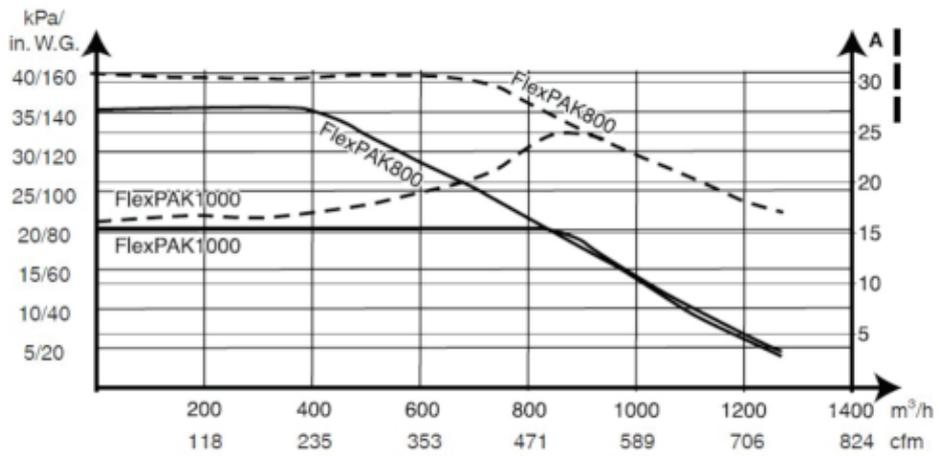
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1 Preface

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.

This manual is supplemented by:

- User Manual
- PLC Settings Manual
- Electrical wiring diagrams

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.

3 Description

3.1 Function

FlexPAK is a complete vacuum unit with a direct driven side channel fan fitted as one unit on a steel frame and a start and control unit with an integrated 24 V transformer. The unit is controlled by a frequency converter, has automatic start/stop, and automatic filter cleaning. The standard models are not intended for use with combustible dust. For these environments, the DX models are the best choice.

3.1.1 Filtration in two stages

FlexPAK filters out pollutants such as fumes and dust. The particles are filtered in two stages. In the first stage, coarse particles are separated away in the inlet. In the second stage, fine particles are separated away by filter bags, see [Figure 9](#).

FlexPAK can be a part of a local exhaust ventilation system for separating welding fumes containing CMR (carcinogenic mutagenic reprotoxic) substances, where the complete system must be in compliance with required legislations, see www.who.int for classification of welding fumes.

3.1.2 Automatic filter cleaning

FlexPAK uses filter cleaning by a short blast of reversed airflow with atmospheric pressure. By the rapid opening of the Filter Cleaning Valve (FCV) located on top of the filter, a powerful blast of reversed airflow is created, efficiently dislodging dust from the filter bags, see [Figure 8](#).

3.2 Dimensions

For the dimensions of FlexPAK, see [Figure 2](#), [Section 3.3 Technical data](#) and [Section 3.6 Connections](#).

3.3 Technical data


NOTE!

Filter data is for standard main filter. Other filters may be equipped.

FlexPAK		
Power	18,5 kW (25 hp)	21,5 kW (29 hp)
Mains voltage/frequency	400 V \pm 10%/50-60 Hz	460 V \pm 10%/50-60 Hz
Maximum flow	1300 m ³ /h (765 cfm)	1300 m ³ /h (765 cfm)
Flow at -15 kPa	1000 m ³ /h (588 cfm)	1000 m ³ /h (588 cfm)
Flow at -20 kPa	800 m ³ /h (470 cfm)	800 m ³ /h (470 cfm)
Maximum vacuum	-35 kPa (-5,1 psi)	-35 kPa (-5,1 psi)
Filter area	6 m ² (64,5 sqft)	6 m ² (64,5 sqft)
Filtration efficiency	Class M according to EN 60335-2-69	Class M according to EN 60335-2-69
Weight	439 kg (968 lb)	439 kg (968 lb)
Inlet/outlet diameter	150/160 mm (7,87/6,29")	150/160 mm (7,87/6,29")
Sound level	70 dB(A)	70 dB(A)
Ambient temperature range	0 - +40 °C (32-104 °F)	0 - +40 °C (32-104 °F)
Process air temperature	0 - +60 °C (32-140 °F)	0 - +60 °C (32-140 °F)
Relative humidity	Max. 85%	Max. 85%
Compressed air quality	Clean dry, ISO 8573-1 class 5	Clean dry, ISO 8573-1 class 5
Required air pressure	6-10 bar (87-145 psi)	6-10 bar (87-145 psi)
Max air consumption (intermittent)	700 NI/min (25 cfm)	700 NI/min (25 cfm)
Material recycling	93,6% per weight	93,6% per weight
Maximum installation altitude	1000 m above sea level	1000 m above sea level
Corrosion class according to ISO 12944-2	C2 according to ISO 12944-2	C2 according to ISO 12944-2
Supply voltage to external equipment	24 VDC \pm 15%	24 VDC \pm 15%
Protection class	IP42	IP42

3.3.1 Pressure drop diagram

 See [Figure 23](#).

3.4 Fuses

Fuse	Size	Type
Main fuse F1, 400 V	35 A	Slow mains fuses
Main fuse F1, 460 V	40 A	Slow mains fuses
Transformer, primary fuse F2 and F3	0,8 A *	Slow fuses, 10,3×38
Transformer, secondary protection		PTC resistor
F4	50 mA *	Fast, 5×20
F5	1 A *	Slow, 5×20

* General size, see also included electrical diagrams.

3.5 Main components

 WARNING! Explosion risk Never use the unit without a plastic bag.
 CAUTION! Risk of equipment damage <ul style="list-style-type: none"> • Use only Nederman original spare parts and accessories. • Use Nederman original bags only.

Figure 3, Figure 4 and Figure 5 show the main components of the unit:

- 1 Collector bin, see [Figure 3](#).
- 2 Dust extractor, see [Figure 3](#).
- 3 Textile filter bags, see [Figure 3](#).
- 4 Filter holder, see [Figure 3](#).
- 5 Filter Cleaning Valve (FCV), see [Figure 3](#).
- 6 Connection duct from the dust extractor to the inlet silencer, see [Figure 3](#)
- 7 Start and control unit, see [Figure 3](#) and [Figure 4](#).
- 8 Control panel, see [Figure 3](#) and [Figure 4](#).
- 9 Emergency switch, see [Figure 3](#) and [Figure 4](#).
- 10 Frequency converter, see [Figure 3](#) and [Figure 4](#).
- 11 Frequency converter cooling air filter, see [Figure 3](#) and [Figure 4](#).
- 12 Cooling valve, see [Figure 3](#) and [Figure 4](#).
- 13 High-pressure side channel fan, with pump characteristic, see [Figure 3](#) and [Figure 4](#).
- 14 PT100 sensor, see [Figure 4](#).
- 15 Outlet silencer after fan, see [Figure 4](#) and [Figure 5](#).
- 16 Cooling air hose from the frequency converter cabinet, see [Figure 5](#).
- 17 Inlet silencer before the fan, see [Figure 4](#).
- 18 Pressure sensor, see [Figure 4](#).
- 19 Acoustic enclosure, see [Figure 4](#).

20 Compressed air supply, see [Figure 5](#).

3.6 Connections

 NOTE! <ul style="list-style-type: none"> • The exhaust air duct is to be routed straight and as short a distance as possible. • The unit is CE-marked. Connections to the unit, initial start-up and maintenance are to be carried out according to the product manuals. Pressure drop for complete system shall be considered by the installation designer or the user.

Equipment such as cables and hoses are not supplied and are to be obtained locally.

Figure 9 shows the normal connections to the unit. They are as follows:

- 1 Inlet duct, Ø 150 mm.
- 2 Exhaust air duct, Ø 160 mm (for lengths <12 m).
- 3 PS cable from valves at workstations.
- 4 Incoming 3-phase power supply with a Protective Earth (PE) cable.
- 5 Compressed air supply, Ø 6 mm nylon hose.
- 6 Compressed air valve, size G1/4" or G1/2".
- 7 Water and dirt-trap. The compressed air supply is to be clean and dry.
- 8 Maintenance switch according to standard.
- 9 Power cable to the unit.

3.7 Start and control unit

The unit has a start and control unit, see [Figure 7](#). The start and control unit has the following components:

- 1 Transformer TR1, 60 W.
- 2 Connection block for the transformer TR1.
- 3 Terminals for external emergency stop.
- 4 Vacuum setpoint switch.
- 5 Safety relay.

- 6 Transformer primary fuses F2 and F3.
- 7 Programmable Logic Controller (PLC).
- 8 Data Unit 2 (DU2), I/O module.
- 9 AM 2 PT100, temperature sensor input expansion module.
- 10 Filter cleaning/test start button.
- 11 Standby/Running button, which is the On/Off button.
- 12 Emergency switch.
- 13 Terminals: X1: 1-80.
- 14 Fuse for 24 V DC accessory supply. Fuse F5.
- 15 Fuse for Pilot Signal (PS) cable. Fuse F4.
Fuse for Pilot Signal (PS) cable. Fuse F4, 1 A fast.
- 16 Terminals Protective Earth (PE).

3.8 Frequency converter

⚠ WARNING! Risk of electric shock
The frequency converter is not to be opened until 5 minutes after the supply voltage has been disconnected. The capacitors inside the converter hold a very dangerous voltage until they have discharged themselves.

⚠ CAUTION! Risk of equipment damage

- Do not adjust any parameters in the frequency converter without written authorisation from the person responsible for this product. See the Declaration of Conformity. Any unauthorised adjustment may void the warranty.
- The unit is not to be started if the cooling hose has been removed.

i NOTE!
[Figure 4](#) shows the cooling air hose that improves the cooling of the frequency converter.

The frequency converter controls the unit's motor so that it operates efficiently and maintains the unit's vacuum level to help prevent dangerous negative pressure from developing and the unit overheating. The manual for the frequency converter is enclosed.

i NOTE!
For parameter settings in the frequency converter, see the 'FlexPAK Frequency Converter Parameter Table' that is a separate document included with the unit.

4 Accessories

The FlexPAK start and control unit is prepared for the connection of Nederman accessories and customer connections.

The installation of accessories, extra equipment, and functions is described in the manual for each product and according to the electrical diagrams that came

with the unit. Consult your local Nederman representative for available accessories.

The most common accessory is a PS cable, which allows remote start/stop signalling from the valves on the duct system. See the PLC Settings Manual for more information about messages and settings for accessories, and customer connections.

5 Installation

⚠ WARNING! Explosion risk

- Some types of dust may cause a dust explosion and/or fire. Before installation, investigate whether the dust to be collected by the system constitutes a risk.

⚠ WARNING! Risk of personal injury

- Use proper lifting and protective equipment.
- Be careful not to let the unit tip over to avoid a crushing risk.
- The unit is to be anchored to the floor, particularly if it is located at a high level, to ensure that it does not move and fall down. The frame has four holes for anchoring. Take care during relocation and transport of the unit to avoid tipping. If the unit is to be moved, the frame is to be attached to the front of the bottom frame, see [Figure 10](#), item 1.

i NOTE!

- Standards relating to the connection and use of filters in hazardous areas are to be taken into consideration, especially national standards for installation. Only trained personnel familiar with these standards is allowed to handle this type of filter.
- The designer of the system as a whole has to guarantee the correct function of all interacting products or components and ensure that the complete system meets all necessary safety requirements.
- Make a layout for the entire system before installing the unit.
- Fill in the installation protocol during installation, see [Chapter 11 Appendix A: Installation protocol](#).

5.1 Delivery check

Check the unit for any transport damage. In case of damage or missing parts, notify the carrier and your local Nederman representative immediately.

5.2 Installation requirements

Prepare the location where FlexPAK is to be placed before installation. Consider the following when installing the unit:

- The unit is to be anchored to a hard, level and firm foundation. There are four fastening brackets on the bottom frame to be used to fasten the unit to the raised foundation.
- The total weight of the unit with accessories.
- Maximum weight of the collected material.
- Do not install the unit close to heat sources or hot surfaces.
- Beware of hot air from the outlet.
- Ensure that handling is convenient.
- Ensure that emptying collected dust is convenient.
- Ensure that service and maintenance are convenient.
- In case of high relative humidity, do not expose the unit to freezing temperatures.
- Do not place the unit in direct sunlight.
- Ensure that reverse airflow into the outlet is prevented.

5.3 Duct dimensions and installation

Figure 9 shows the unit installed in a typical vacuum duct system.

5.3.1 Requirements

Place a sign with the intended use of the vacuum system on every user interface (workstation). Inform all personnel of the intended use of the system. Ensure that personnel using the equipment do not collect items that may cause ignition or blocking.



WARNING! Explosion risk

- Do not collect material that may cause ignition or blocking. It is strictly prohibited to collect material that may undergo dangerous chemical or thermal reactions and/or self-ignite.
- Some types of dust may cause a dust explosion and/or fire. Before installation, investigate whether the dust to be collected by the system constitutes a risk.
- The silencer outlet for exhaust air is to be directed upwards. Fit a Spiro duct to direct the exhaust into the atmosphere. The duct is to be routed to prevent any particles from falling into the unit, which could cause serious damage
- Self-ignition can occur with some types of dust. Under no circumstances may magnesium and titanium dust be sucked into the system.



NOTE!

All connected ducts are to be conductive and grounded.

5.3.2 Recommendations

Transport velocity

It is important to use the correct duct diameter to avoid pressure losses and dust deposits in the duct system. Ensure that the correct transport velocity is achieved. Correct velocity depends on the properties of the transported material. Some applications may require velocities up to 25 m/s (82 ft/s). Take velocity into account when choosing duct diameters. The velocity is never to decrease on the way to the unit. The transport velocity in the ducts may vary depending on how much of the vacuum system is used.

Flushing

Depending on the type of dust and fumes to be filtered by the unit, a principle called flushing may be used to keep the vacuum ducts clean. Flushing may be applied by fitting a valve at the end of the duct system. By not using the rest of the system, and opening the so-called flush valve, a high amount of air will flush the ducts clean. By flushing each branch of the vacuum system separately, the risk of dust deposits is minimized.

In larger vacuum systems with multiple units installed, the installation of Duct Isolation Valves (DIV) is recommended in order to isolate one unit for maintenance while the others remain in normal operation.

If the dust is abrasive, it may be necessary to use thick-walled (or rubber-coated) material in bends and other exposed areas.

To avoid pressure losses, the duct system is to be as short as possible and designed with two or more branches. Use larger diameters on the clean side to reduce pressure losses.

5.4 Installing the unit



WARNING! Risk of personal injury

Always stop the unit before looking into the outlet. The fan rotates at high speed and debris and particles coming out of the outlet may cause eye injury.

5.4.1 Indoor installation



CAUTION! Risk of equipment damage

If the exhaust air duct is blocked, the unit may create an overpressure, that may cause major damage to the heat exchanger.



NOTE!

- Never completely seal a small room with the unit installed.
- Ensure that the room where the unit is installed is well ventilated.

It is recommended that the unit is positioned indoors.

Under some conditions, the unit may draw air directly into the high-pressure fan. This may cause a dangerous underpressure in the room if air cannot enter freely. There are to be two openings for ventilation, at least 250×250 mm (10"×10") in size. One is to be placed up high and the other one down low.

The warm exhaust air is to be directed from the unit and out of the premises, see [Figure 9](#), item 4. Connect a duct that directs the exhaust air outdoors.

The air can be directed to a heat exchanger, but there are not to be any dampers that may obstruct the air-flow.

5.4.2 Outdoor installation

If installed outdoors, consider the following:

- The area needs to be protected from the weather. Cover the top of the unit to protect it from snow, rain or falling debris.
- Environmental and ambient conditions. See [Section 3.3 Technical data](#).

5.4.3 Moving the unit



WARNING! Risk of personal injury

- Use proper lifting and protective equipment.
- Be careful not to let the unit tip over to avoid a crushing risk.
- The unit is to be anchored to the floor, particularly if it is located at a high level, to ensure that it does not move and fall down. The frame has four holes for anchoring. Take care during relocation and transport of the unit to avoid tipping. If the unit is to be moved, the frame is to be attached to the front of the bottom frame, see [Figure 10](#), item 1. Before moving the unit ensure that it is emptied of extracted materials.

5.5 Electrical installation



WARNING! Risk of electric shock

- Work with electric equipment is to be carried out by a qualified electrician.
- The connected wiring system is to be electrically connected to the Potential Equalizing System (PES) on the premises.



NOTE!

- The electrical connection is NOT to be equipped with an earth leakage circuit breaker when the frequency converter is provided with an EMC filter. The EMC filter function will make the earth leakage circuit breaker shut off the power.
- Following the European standard, the incoming 3-phase supply is to be fitted with a hand-operated disconnecting device that conforms to the demands of disconnectors. The disconnecting device is to be fitted within 2-3 m from FlexPAK and be clearly visible from the unit. Refer to local and national standards when located outside of Europe.
- Check the continuity of the protective current circuit before the unit is used.
- Always replace worn, faulty or defective electrical components with new original parts.



NOTE!

Check that the supply voltage corresponds to the data on the machine plate of the unit, see [Figure 1](#), before connecting the unit to the mains supply.

For the power circuit, control circuit and terminal connection diagrams, see the electrical diagrams that came with the unit. The unit is not to be connected to the supply voltage via plug and socket but shall be permanently connected. Ensure that all electrical connections are secured properly.

5.6 General requirements

The following items are minimum requirements to ensure the proper function and required level of protection with regards to equipment category, the EC directives and standards listed in the Declaration of Conformity:

- Take proper measures to avoid all types of electrical stray currents to and from the duct system and electrical wiring.
- Check that the input voltage and frequency to the unit are correct.
- Operator controls shall be easily accessible.
- The need for additional emergency stop buttons and their placement shall be analyzed according to EN ISO 13850.

5.7 Ground check measurement

Check that the unit is properly grounded after both the main installation and regular maintenance work. If a component is removed and refitted, the ground connection is to be verified.

5.8 Automatic bin emptying function

See the PLC Settings Manual.

5.9 Machining chips and swarf extraction

See the PLC Settings Manual.

5.10 Pneumatic filter cleaning valve

See the PLC Settings Manual.

5.11 Vacuum setpoint

Performance settings with two typical running modes:

1000 m³/h at -15 kPa, max vacuum 20kPa or 800 m³/h at -20 kPa, max vacuum 35 kPa. The vacuum setpoint can be switched between -20kPa and -35kPa by altering a terminal X2:1 in the control box. The default setting is -20kPa.

See [Figure 7](#) item 4 and the wiring diagram.

5.12 Rotary valve

See the PLC Settings Manual.

5.13 Compressed air installation



WARNING! Risk of personal injury

- Use ear protection and safety goggles.
- The compressed air valve is to be locked in the closed position during maintenance.

5.13.1 Requirements



NOTE!

- The specified air consumption of the unit is limited to the short operation of the cleaning valve.
- Take measures necessary to avoid water or humidity in the compressed air when the unit is installed in cold environments.
- If antifreeze additives are used, use them continuously. Once added, the removal of the antifreeze additive may cause the pneumatic components to malfunction.

For air consumption, quality and maximum and minimum pressure, see [Section 3.3 Technical data](#).

As new ducts may contain dirt, particles or debris, the compressed air pipe is to be blown clean before connecting the unit. A compressed air filter, see [Figure 9](#), item 7, is to be installed to ensure the reliable and safe operation of the unit. A compressed air valve, that vents the remaining pressure of the unit, is to be installed, see [Figure 9](#), item 6.

5.13.2 Installation



NOTE!

Secure the compressed air line properly.

Connect a compressed air supply to the inlet, see [Figure 5](#), item 20, and [Figure 9](#), items 6 and 7.

Air pressure hoses are to be fitted together with electrical cables with straps, alternatively in a common protective hose. Air pressure hoses are to be anchored mechanically.

6 Maintenance

Read [Chapter 3 Description](#) before carrying out any maintenance work.

Maintenance work means that the equipment will have to be opened and possibly dismantled. This may constitute a risk and the maintenance personnel need to know about the risks that may occur when acting incorrectly.



WARNING! Explosion risk

Stop operation and clean the entire filter thoroughly from dust before any grinding, welding or other hot works are performed on the filter exterior or inlet.



WARNING! Risk of personal injury

- Always use an approved breathing mask, goggles and gloves when replacing the dust sack and other work that involves exposure to dust.
- The motor, fan and air duct may become very hot during operation.
- Use ear protection when the unit is in operation and work is carried out in the vicinity of the upper section of the dust collector.
- Always disconnect the supply voltage with the maintenance switch before any service, whether mechanical or electrical.
- Always lock the maintenance switch in the off position and, if possible, secure it with a padlock.
- Always disconnect the compressed air supply before any service, whether mechanical or electrical.
- Parts may be very heavy. Always use adequate lifting equipment when handling parts and consumables.
- Always use adequate safety measures when performing work in an elevated position.



CAUTION! Risk of equipment damage

During maintenance, it may be necessary to remove the acoustic enclosure over the motor while the motor is in operation. Take care to prevent objects from falling down into the motor cooling fan.

NOTE!

- Contact Nederman if the frequency converter needs service.
- The unit is CE-marked. Connections to the unit, initial start-up and maintenance are to be carried out according to the product manuals.
- If antifreeze additives are used, use them continuously. Once added, the removal of the antifreeze additive may cause the pneumatic components to malfunction. For air consumption, quality and maximum and minimum pressure, see [Section 3.3 Technical data](#).

6.1 Checks one month after installation and every year**WARNING! Risk of electric shock**

Always disconnect the supply voltage with the maintenance switch before any service, whether mechanical or electrical. Always lock the maintenance switch in the off position. Do not use the emergency stop button as a substitute.

**WARNING! Risk of personal injury**

- Ensure that there is no vacuum present in the system during service.
- Always disconnect the compressed air supply before any service.

**NOTE!**

Check all power conductors and protective conductors one month after installation and tighten, if required, to ensure good contact. Service to the electrical equipment may only be carried out by a qualified electrician.

One month after installation, and then every year, perform the following checks:

- Check all power and protective conductors and ground wire connections. Tighten, if required, to ensure good contact.
- Inspect the integrity of the dust separator.
- Ensure that the inside of the unit and the connection ducts are free from deposits. A build-up of deposits inside the duct system may cause the discharge of static electricity.
- Inspect valves, hoses and seals for leakage.
- Clean the area around the unit and all areas where the collected material is stored to ensure that there are no dust deposits.
- Check that all signs/markings regarding safe operation are in place and that the personnel knows about them.
- Verify the function of all emergency stop buttons, alarms and signalling devices.

6.2 Empty the collector bin**WARNING! Explosion risk**

Never use the unit without a bag.

**WARNING! Risk of personal injury**

- Ensure that there is no vacuum in the dust separator before removing the collector bin.
- Crush hazard. Be careful when lowering and refitting the collector bin. Use proper protective equipment.
- Wear goggles, a dust mask and gloves when emptying the collector bin.

**CAUTION! Risk of equipment damage**

Use only Nederman original spare parts and accessories.

**NOTE!**

The plastic bag is to be replaced when filled up to 2/3, see [Figure 11](#).

6.3 Replace the plastic bag

- 1 Check that the risk area is clear.
- 2 Ensure that there is no vacuum in the dust separator.
- 3 Remove the collector bin.
- 4 Seal and remove the plastic bag. Use a cable tie or equivalent, see [Figure 12](#).
- 5 Fit a new plastic bag in the collector bin, see [Figure 13](#).
- 6 Refit the collector bin onto the dust separator.
- 7 Check that the pressure equalizer hose is attached to the collector bin, see [Figure 14](#).
- 8 Check that the collector bin seals properly once the vacuum is re-applied to the dust separator.

6.4 Replace the main filter



WARNING! Risk of personal injury

- The electricity, vacuum and compressed air to the unit must be turned off before commencing filter change.
- This is a two person job. Use proper protective equipment.
- Don't move under suspended tilted filter and housing.
- Waste material collected in FlexPAK can constitute a health risk. Always check the safety requirements related to the specific waste when handled.
- Perform a filter cleaning and wait for the dust to settle, then empty and refit the collector bin before replacing the filter.
- The used filter should be extracted into- and stored in a plastic bag to minimize the spread of filter contents.



NOTE!

- Filter replacement is to be noted in the service protocol of the unit.
- Replacing individual filter bags is possible, but it is recommended that the whole filter package is replaced since it is quicker and causes less spreading of dust. If the filter bags are replaced separately, the plastic holders will also have to be replaced.

- 1 Unscrew the four screws holding the lid, lift it a bit for access to the hose connection. If necessary disconnect the outlet to remove the lid. See [Figure 15](#).
- 2 Detach the hose from the filter, see [Figure 16](#), item A.
- 3 Remove the hose and cable to the cleaning valve, alternatively the entire valve, see [Figure 16](#), item B
- 4 Loosen the screw for the lower sealing ring holding the filter top, see [Figure 17](#), item A.
- 5 Lift off and put the filter top away.
- 6 Select one of two methods to remove the filter - tilting the filter or using a lifting device - and continue with the steps accordingly.
- 7 **Lifting device:** Lift the filter straight up with a crane or other lifting device, see [Figure 21](#).
- 8 **Tilt:** Unscrew the eight screws for the protection plate and remove it, see [Figure 18](#).
- 9 **Tilt:** Unscrew the eight screws (four on each side) attaching the filter to the frame legs according to item A in [Figure 19](#) and item C in [Figure 17](#).



NOTE!

If you cannot reach the four screws on the other side, remove the side marked as item B in [Figure 17](#).

- 10 **Tilt:** Press the spring in the center with an appropriate tool according to item B, tilt the filter horizontally and remove the filter, see [Figure 19](#) and [Figure 20](#).
- 11 Insert the new filter and note the fitting of the rubber sealing rings. See [Figure 22](#). Items A-C, shows how the rubber sealing rings are to be fitted. When a used sealing ring is to be re-used, the form when open may differ from the original form as shown in item A. Use a screwdriver to bring the edge of the module between the rubber lips to obtain the result shown in item C.



NOTE!

Fitting the steel ring correctly is important to maintain the tightness and durability of the unit.

- 12 Assemble the unit in reversed order.

6.5 Check the filter cleaning function



WARNING! Risk of personal injury

Crush hazard. Pay attention when the compressed air pressure cylinder and valve disc move. Make sure that the protection hood over the filter cleaning unit is fitted after the check.

Check the automatic filter cleaning as follows:

- 1 Check the automatic cleaning equipment once a year.
- 2 Remove the top cover from the filter and inspect the valve disc.
- 3 Start the unit and press the filter cleaning button, see [Figure 8](#). The compressed air cylinder should lift the valve disc. Loud noise can be heard as air rushes into the filter bin to blow off the dust from the outside of the filter package. This will be repeated 3 times for each filter cleaning cycle.
- 4 Stop the vacuum unit and shut off the air supply.
- 5 Check the valve disc fastening, damage and wear. Replace if required.
- 6 Replace the protecting top cover.

6.6 The motor and the fan unit

Inspect and clean the motor compartment regularly.

The motor has 2 ball bearings. The bearings are to be replaced after approximately 15,000 hours of operation. If the ambient temperature often reaches 35°C (95°F), the time between replacements is to be reduced. In any case, the bearings are to be replaced every fifth year.

The bearings are a standard type. Contact Nederman or an authorized Nederman distributor for replacement of the bearings.

Old grease is to be removed and new grease used. The grease is to meet the DIN 51825-K2N 40, SKF LGHP 2 or FAG Arcanol Multitop standards.

6.7 Cooling filter for the frequency converter

The service life of the cooling filter for the frequency converter depends on the air-bound dust surrounding the vacuum unit. The expected service life is 6-48 months. Check the filter regularly through the filter holder grid. If the filter is clogged, the frequency converter will shut off due to overheating.

Ensure that the cooling filter is not exposed to any combustible materials. Running the unit without the cooling filter may cause serious damage. When changing the filter, see the label placed over the filter intake.

The unit may never be run without a cooling filter for the frequency converter.

6.8 Loading new software

NOTE!

- This section is only for Nederman qualified service technicians. Only Nederman qualified service technicians may make changes to, or install new software.
- Make notes of actual parameter settings.

6.8.1 Frequency converter control panel

To change the software or install new software for the unit, the parameters in the frequency converter have to be changed by means of the frequency converter control panel available from Nederman.

6.8.2 Firmware and software labelling

NOTE!

- The software version is found on a label taped to the front of the PLC. LOGO 8 software is updated using an SD Card. Follow the included instructions when the software needs to be updated.
- To find the firmware and software revision number in the PLC display, see [Figure 8](#), item 1. Pressing 'OK' when the PLC displays this menu will show this information. See also the PLC Settings Manual.

The firmware and software revision can be read in the PLC and also on the label on the PLC.

The number, 2155264-2-EN for example, consists of the following parts:

- 2155624 = The software number.
- 2 = The revision.
- EN = The language of the display text.

6.8.3 Upgrading the system

LOGO 8 software is updated using an SD Card. Carefully follow the included instructions when the software needs to be updated.

7 Troubleshooting

For information on fuses, see [Section 3.4 Fuses](#) and the included electrical diagrams.

There is no overcurrent relay. The frequency converter parameter for maximum current is adjusted from the factory and is not to be adjusted.

If a fault occurs which cannot be adjusted according to the following descriptions, a Nederman service technician is to be called.

7.1 Tools

To carry out troubleshooting, it is necessary to have a multimeter with V DC and ohm measuring capabilities.

7.2 Remove the lid of the start and control unit

Remove the lid as follows:

- 1 Unscrew the four plastics screws in the corner of the control cabinet.
- 2 Lift of the lid.
- 3 Identify the PLC and the terminals at the bottom of the cabinet.

7.3 Troubleshooting guide

Error	Possible cause	Solution										
The unit unexpectedly goes directly into Running mode when the Standby/Running button is pressed.	<ul style="list-style-type: none"> • A valve at a workstation is open and its micro switch is activated • The PS cable is damaged with its wires short-circuited 	<p>If the PS cable is damaged, press the Standby/Running button to put the unit into Off mode and investigate the fault. If necessary, loosen the PS cable from the control unit, see the electrical diagrams, and use an ohmmeter across the leads in turn to locate the fault.</p>										
Defect PT100 temperature sensor.		<p>Check whether the PT100 sensor is defective as follows:</p> <ol style="list-style-type: none"> 1 Disconnect the PT100 sensor wire from terminal 77 and measure the resistance between terminal 78 and the disconnected sensor wire. 2 Measure the resistance in the sensor using an ohmmeter. The values in the table below are standard values, so a deviation from the measured value is normal. If the averaged output (in ohm) deviates more than $\pm 2\%$ from these values, the sensor will need to be replaced. <table border="1" data-bbox="810 1509 1465 1823"> <thead> <tr> <th>Temperature (°C)</th> <th>Averaged output (ohm)</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>100</td> </tr> <tr> <td>20</td> <td>110</td> </tr> <tr> <td>80</td> <td>131</td> </tr> <tr> <td>135</td> <td>150</td> </tr> </tbody> </table> <p>If the sensor has a resistance >150 ohms, there will be a high-temperature alarm. To check whether the sensor input is working correctly, disconnect the PT100 wire at terminal 77 and connect a jumper between terminals 77 and 78. Press the OK button on the PLC to reset the alert.</p> <p>If the alert disappears, the PT100 sensor input is working, and the PT100 sensor will need to be replaced.</p>	Temperature (°C)	Averaged output (ohm)	0	100	20	110	80	131	135	150
Temperature (°C)	Averaged output (ohm)											
0	100											
20	110											
80	131											
135	150											

Error	Possible cause	Solution
Defect pressure sensor.		<p>The pressure sensor is connected to PLC input 8 and an inverter input +AI1 terminal (2). The sensors measurement range is 0 to -40 kPa. The signal goes from 10 to 0 V and 0 to -40 kPa, which gives 10 V at 0 kPa and 0 V at -40 kPa.</p> <p>Measure the voltage signal at the inverter, between terminals 2 (+) and 7 (-). When the motor is off, the input signal at terminal 2 has to be 10 V, and when the motor is running, the signal is 0 to 10 V depending on the pressure level in the system.</p> <p>To check whether the sensor input is working, disconnect the pressure sensor wire at terminal 2 and connect a jumper between terminals 2 and 1. Press the OK button on the PLC to reset the alert.</p> <p>If the alert disappears, the pressure sensor input is working and you will have to replace the pressure sensor.</p>
Low vacuum or air flow.	Deposits or blockage in ducts on the way to the unit.	<ul style="list-style-type: none"> • Clean the ducts. • Check the transport velocity.
	The duct system is not properly dimensioned.	Re-dimension the duct system or add an extra suction source.
	Valves in the duct system are not working.	Check the duct system valves.
	The filter cleaning does not work or is insufficient.	Check the function of the filter cleaning.

Error	Possible cause	Solution
Filter cleaning does not work.	<ul style="list-style-type: none"> • Problem with (PS) cable • DIR_time settings 	If the unit does not go into Idling mode and filter cleaning does not take place after 10 seconds, break the PS cable manually by opening fuse holder F4. Wait at least 10 seconds. If switching to Idling mode occurs this time, troubleshoot the PS cable. If switching does not occur, check the time set on the display (DIR_time function).
	The compressed air pressure or flow is too low.	<ul style="list-style-type: none"> • Adjust the pressure. • Check the hose dimension
	The solenoid valve is not connected properly.	Check the valve and air pressure.
	The air lines, valve and/or cylinder are blocked.	<ul style="list-style-type: none"> • Clean or replace the air lines, valve and/or cylinder. • Filter incoming compressed air.
	The cylinder and/or valve does not work.	Replace the cylinder and/or valve.
	Dust is hard to clean, normal cleaning does not work.	Contact your nearest authorized distributor or Nederman for technical advice.
	The cleaning interval is too short.	Extend the cleaning interval.
Compressed air, (Pr/t) is <1 bar.		See Section 3.3 Technical data . Too low compressed air pressure can result in premature filter clogging. If the pressure is lacking or too low, the piston cannot open the FCV and lid properly. This results in insufficient cleaning and premature filter clogging. The CAS is connected to terminals X1:15 and X1:16. If no CAS is installed, a jumper is linking the terminals to ensure that the CAS message is not displayed in PLC Logo!
No dust is collected in the collector bin.	Filter cleaning does not work.	See Chapter 6 Maintenance .
	Insignificant flow to the unit.	See 'Low vacuum or air flow'.

8 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.

8.1 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.

9 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.

9.1 Environmental information

The following environmental information is valid for FlexPAK:

- Cadmium-free and halogen-free relays in the control equipment.
- Solvent-free washing and lacquer.
- 93,6% recyclable.

10 Acronyms and abbreviations

AEB	Automatic emptying of the bin
AUX	Auxiliary
BLI	Bin level indicator
BLI-Wr	Bin Level Warning indicator
CAS	Compressed air switch
CFDPS-AI	Control Filter Differential Pressure Sensor Alarm
DIR	Duty/idle relay
DIV	Duct isolation valve
DU	Data Unit
EMC	Electromagnetic compatibility
EPROM	Electrically erasable programmable read-only memory
FC	Filter cleaning
FCR	Filter cleaning relay
FCV	Filter cleaning valve
MFDPS	Main Filter Differential Pressure Sensor
MFDPS-FC	Main Filter Differential Pressure Sensor Filter Cleaning
MFDPS-Wr	Main Filter Differential Pressure Sensor-Warning
MI	Maintenance interval
OT	Operating total
PE	Protective earth
PLC	Programmable logic controller
PS	Pilot signal
PSIFC	Pilot signal interlock filter cleaning
PTC	Positive temperature coefficient
PES	Potential equalization system
PVC	Polyvinyl chloride
RPS	Relief Panel Sensor
SLV	Solenoid lower valve
SSR	Start/stop relay

SUV	Solenoid upper valve
TVFD	Twin valve feed-out device

11 Appendix A: Installation protocol

Copy the installation protocol, fill it in and save it as a service record.

For values, note the value in the result column, otherwise, a tick will suffice if the item has been performed or considered.



NOTE!

If a value is outside the limit or a result is incorrect or missing, this is to be rectified before the initial start-up and normal operation.

Correct limits or results are given within brackets.

Unit No.	Date:	
	Performed by:	

Control items	Result
Application requirements (limits)	
Material chemical/thermal reaction risk	
Radiation heat from surroundings	
Delivery checks	
Missing components	
Transport damage	
Before installation	
Foundation	
Total weight (product, accessories, and collected material)	
Anchor bolts	
Access for maintenance/filter replacement (1 m above the unit)	
Mounting (check availability)	
Maintenance switch	
Installation room, ventilation openings	
Plastic bag	
Duct system	
PS cable (optional)	
Start and control unit, terminals 3-4	
Duct system	
Duct dimensioning/transport velocity, check the performance	
Electrical installation	

Control items	Result
Application requirements (limits)	
Connections - Start and control unit	
Connection - power cable, check tightness	
Compressed air	
Air lines cleaned	
Air pressure	
Clean and dry air	
Compressed air valve	
Compressed air connected to the unit	
Incoming duct - Incoming mains ground	
Accessories (if applicable)	
Signs and warnings	
Intended use marked or indicated	
Safe bag replacement described or indicated	
Initial start-up (function test)	
Maintenance switch	
Motor, the direction of rotation	
Automatic filter cleaning	
Manual filter cleaning	
Cover on the start and control unit fitted	

12 Appendix B: Service protocol

Copy the service protocol, fill it in and save it as a service record.



NOTE!

If the results of the checks (for example, measured values) differ significantly from previous results, investigate more carefully.

Unit No.	Date:	
	Operating hours:	
	Performed by:	

Control items	Result	Result	Result	Result
Previous service record				
Inspect/clean outside the unit				
Remove dust deposits, clean work area				
Remove corrosion by grinding, apply primer and touch up paint				
Vacuum, measure negative pressure				
Cooling valve				
Motor bearings				
Fan				
Cooling fan, motor				
Bearing motor/fan				
Safety switch				
Box/housing				
Main switch				
Cable harness				
Electrical connection points				
Ground (earth) connection				
Indicator lamps				
Inverter				
Cooling air filter, functional control, frequency inverter				
Cooling air filter, exchange				
Rated current				

Control items	Result	Result	Result	Result
Seals				
The clean side of the filter				
Connecting hose vacuum				
Cylinder				
Valve plate				
Automatic filter cleaning, check				
Manual filter cleaning, check				
Power conductor connections and ground wires, check				
Vacuum limiting, check				
Cleaning valve, check				
Filter bags, visual check				
Filter bags, check pressure drop/performance				
The main filter, replace				
Clean and dry air, check				
GND1 - Fan				
Incoming duct - Incoming mains ground				
GND1 - External mains ground				
Gaskets, check for leakage and replace, if necessary				
Plastic bag, replace				
Bearings, motor, replace				
Bearings, fan, replace				
Check that the ventilation of the room is clear (if placed indoors)				
Start and control unit cover, check				
Signs and warnings, present and legible				

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