

MANUAL

Verti-Fan

Vertical air circulation



Version: 2019-08

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Foreword

This user guide is intended for the user and technicians who install and maintain these fans. The manual and operating instructions are compiled together in a single document.

Each chapter has a number and, where necessary, chapters are divided into sections. The table of contents on page 3 gives an overview of the chapters and paragraphs, and references to pages.

1 IDENTIFICATION

This overview contains general information about the installation. The purpose of this part is to indicate the demarcation, overall operation and scope of the installation.

1.1 General

1.1.1 Description of the system

The Verti-Fan is a horizontal fan connected to a plastic hose. A stainless steel ring or oval can be optionally attached to the end of this hose. The Verti-Fan is fitted with a power cord and plug. The Verti-Fan has no operating controls.

1.1.2 Specifications

Type	Verti-Fan
Power	0,20 kW
Voltage	230V, 50 Hz
Current	0,90A
Capacity	3600 m ³ /hour
Size of fan	485 x 485 mm
Total weight	±15 kg

Table 1: Specifications

1.1.3 Diagram of the system

Diagram showing the main components and their names.

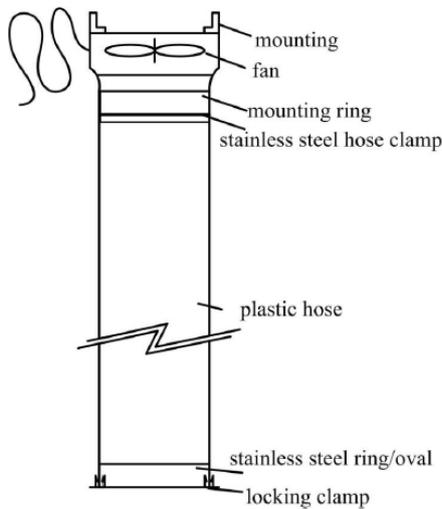


Figure 1: Diagram of the Verti-Fan

1.2 Users

In principle, the Verti-Fan is not controlled directly, but by a user/operator via a control cabinet. These users/operators must be at least 18 years old, employed by the company where the Verti-Fan is

installed, and designated by the management as competent and authorised to operate the Verti-Fan. Unintentional users are any users who do not meet the above definition. Unintentional users are all users who, by using the Verti-Fan, create unsafe situations or danger to themselves or others.

1.3 Use

The Verti-Fan is designed for vertical air circulation in greenhouses, to improve the homogeneity of temperatures at different heights.

The Verti-Fan is not intended to be used for any other purposes than that described above, and is not designed for the transport of gases other than low-temperature air (-10 °C to + 50 °C).

1.4 Authorised servicers

The Verti-Fan may be serviced by any maintenance company, but Van der Ende Groep is preferred because of this company's thorough knowledge of the Verti-Fan.

Periodic servicing can help avoid unnecessary costs or failures, and improve reliability.

1.5 Operating environment

The Verti-Fan should be installed on the lowest beam of the truss in the greenhouse. There must be at least 300 mm clearance on the suction side of the fan. If a shade screen is used, this may mean that the fan has to be installed lower than the lowest truss, and the mounting brackets adapted. It must not be possible to touch the ventilator without special equipment, and the beam must be in good enough condition to bear the weight of the fan.

The Verti-Fan is not intended to be used in any environment other than that described above. The Verti-Fan is not suitable for use in explosive environments..

1.6 Guarantee conditions

The warranty period is 6 months after commissioning.

If a claim is made under guarantee, the parts concerned must be presented to the manufacturer for assessment.

The guarantee shall be invalid in the event of any of the following;

- Improper use
- Repeatedly ignoring advice of the manufacturer or supplier
- Repair, maintenance or use by unauthorised persons
- Use of inappropriate power supply connections
- Use of the machine in an unsuitable environment
- Intentional damage or modification of the machine

1.7 Relevant directives

The Verti-Fan complies with the following directives;

- Machinery Directive 2006/42/EC
- Low Voltage Directive 2006/95/EC
- EMC Directive 2004/108/EC

In accordance with the Low Voltage Directive, the Verti-Fan is classified as a Class I device.

2 DESCRIPTION

2.1 General

The purpose and function of the Verti-Fan is to displace air vertically from above to below in modern greenhouses. Such displacements of air are often missing in modern, high greenhouses, with consequent variations in temperature at different heights. Displacing air from above to below has a favourable effect on growth, maturation and the susceptibility to fungal diseases.

The operation of the Verti-Fan is simple: a horizontal fan draws air in at the top of the greenhouse, and pushes it down through a plastic hose. The plastic hose is kept open at the bottom by a stainless steel ring or oval, and hangs 400 mm from the ground. The Verti-Fan therefore requires mounting to the beam at the top of the greenhouse with the included bracket or suspension cable.

The Verti-Fan can be used in all kinds of vegetable, fruit and ornamental crops.

2.2 Transportation and Storage

The Verti-Fan is delivered in parts; in other words, the various components are supplied in separate packages and assembled on site.

3 SAFETY INSTRUCTIONS

When working on the Verti-Fan, always make sure the plug is disconnected from the power supply! This prevents the fan starting unexpectedly or unintentionally.

Make sure the Verti-Fan is only connected to the power supply when mounted in place with the plastic hose attached!

If the Verti-Fan is used without connecting the plastic hose, there is a danger of the fan blades causing cuts. The Verti-Fan must not therefore be connected before the hose is attached correctly, and it must not be possible to touch the fan blades in any way.

When mounting the Verti-Fan, make sure that only self-locking nuts are used, otherwise there is a danger that parts may vibrate loose and fall off.

4 INSTALLATION

This chapter describes the installation of the Verti-Fan, namely assembling individual parts into a single unit, ready to be suspended.

There are two distinct ways of installing the Verti-Fan; support brackets or a steel cable. For more information on the brackets refer to 4.2, for the steel cable see 4.3.

4.1 Contents of basic installation package

Quantity	Description	Type
1	Fan	Axial fan 035 0,20 kW 230V, 50 Hz 0,90A 3600 m ³ /hr Insulation class IP 54
1	Mounting ring click system for rapid attachment of plastic hose to fan	Steel ring (white coated) Ø 390 mm, including locking pin
1	Hose clamp for mounting plastic hose – mounting ring	Stainless steel hose clamp 50 – 370 mm
1	Plastic hose	LDPE tube Ø 380 mm Anti-crack UV-resistant
Optional		
1	Stainless steel ring / oval	304 stainless steel 2 mm thick, 35 mm high ring Ø 385 mm Oval Ø 470x280 mm
3	Retaining clip for mounting plastic hose with stainless steel ring on the underside	Caddy chain tension clamp 3 – 8 mm

Table 2: Contents of the installation package



figure 2: Mounting ring + exploded view Verti-Fan

The suspension system is also supplied with the installation kit, with 3 versions:

- Cable installation
- Perpendicular installation
- Lowered installation

4.1.1 Contents of cable installation kit

Quantity	Description	Type
1	Basic package	See 4.1
1	Mounting of fan	2x eye bolt m6 x 80 4x bodywork washer m6 4x hexagonal nut m6
1	Mounting to truss beam	6m stainless steel cable 3 mm 4x wire clamp 3/16" m4 Piece of 3,2 mm shrink tubing

Table 3: Contents of cable installation kit



Figure 3: Verti-Fan with cable installation + schematic drawing

4.1.2 Contents of diagonal mounting kit

Quantity	Description	Type
1	Basic package	See 4.1
2	Mounting bracket	Stainless steel 4 mm diagonal 40x40 mm
1	Mounting of brackets to fan	4x stainless steel hex stud m8x20 4x stainless steel underlay-washer m8 4x stainless steel bodywork washer m8 4x stainless self-locking nut m8
1	Mounting of brackets to truss beam	2x U-clamp m8 U50x50 or U60x55 4x underlay washer m8 4x hexagonal nut m8

Table 4: Contents of perpendicular mounting kit

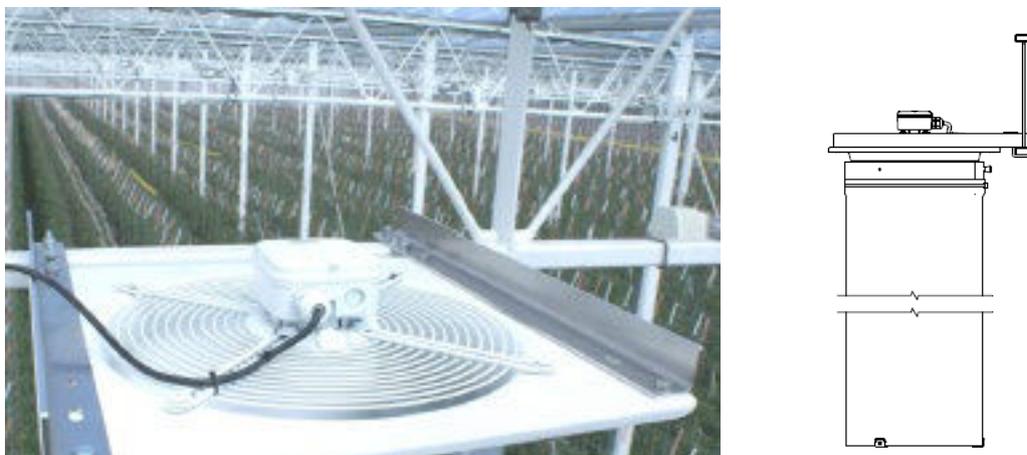


Figure 4: Verti-Fan with perpendicular mounting + schematic drawing

4.1.3 Contents of lowered installation package

Quantity	Description	Type
1	Basic package	See 4.1
2	Mounting bracket	Stainless steel 4 mm lowered bracket 40x300x40 mm
1	Mounting of brackets to fan	4x stainless steel hex stud m8x20 4x stainless steel underlay washer m8 4x stainless steel bodywork washer m8 4x stainless self-locking nut m8
1	Mounting of brackets to truss beam	2x U-clamp m8 U50x50 or U60x55 4x underlay washer m8 4x hexagonal nut m8

Table 5: Contents of lowered installation package

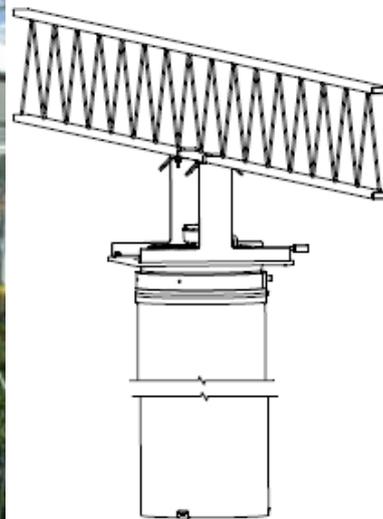


Figure 5: Verti-Fan with lowered installation + schematic drawing

4.2 Method using suspension bracket

4.2.1 Mounting of bracket to fan

- Attach the two stainless steel angle profiles or lowering brackets (3);
 - Use four stainless steel m8x20 screws (1), m8 stainless steel washers (2), m8 stainless steel bodywork washers (5) and stainless steel m8 self-locking nuts (6) on the suction side of the fan (4);
 - See figure 6
 - It makes no difference whether the angle profiles are mounted facing inwards or outwards, the installer can determine this. Place both brackets facing either inwards or outwards.
- Make sure that the power cord is on the correct side;
- Insert the U-clamps through the angle profiles;
- Tighten the washers and nuts loosely on the clamps.

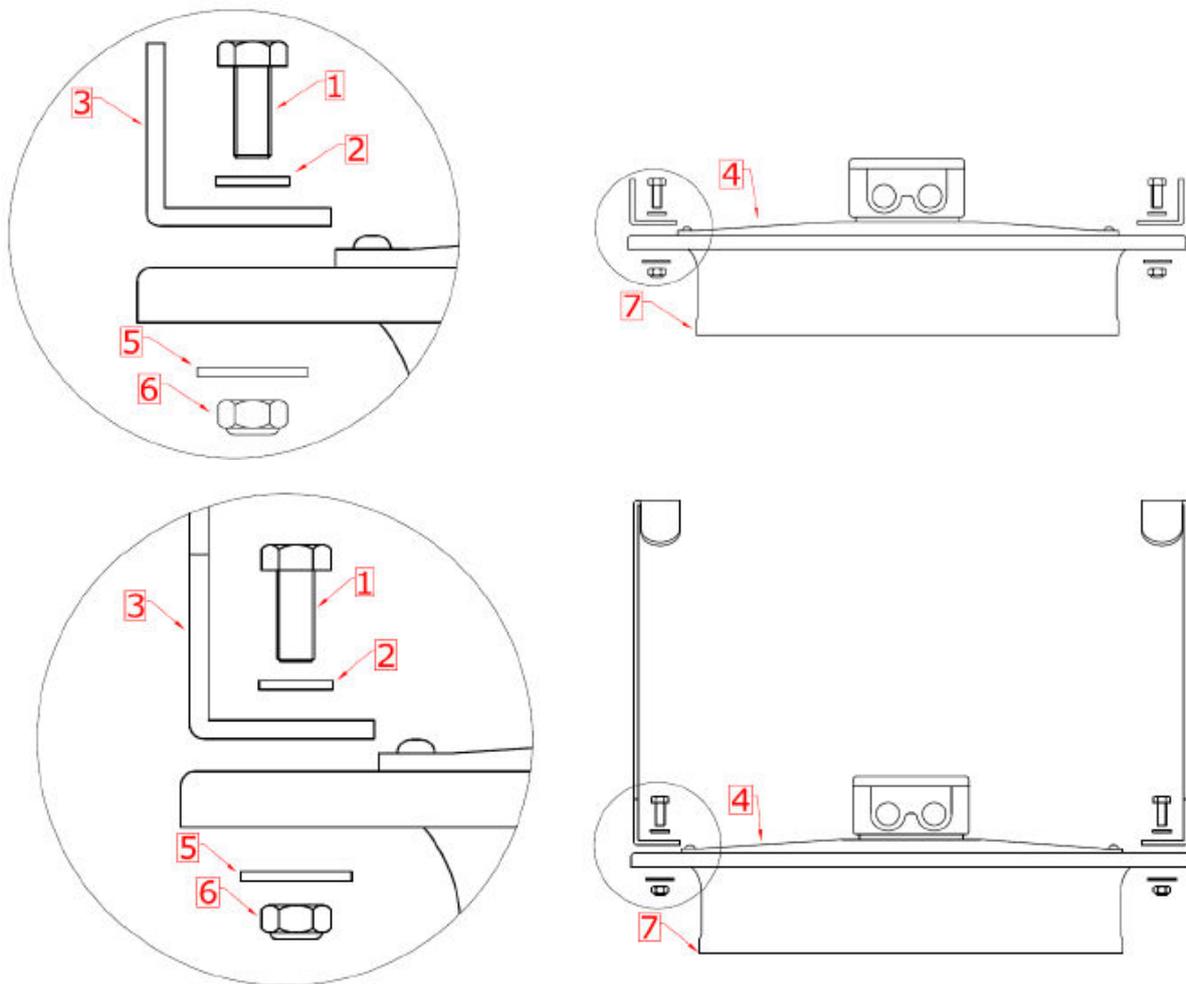


Figure 6: Mounting of the angle profiles to the lowering bracket

4.2.2 Mounting bracket to truss

- Choose a suitable location;
 - Follow, if possible, the drawings supplied by the installer or manufacturer;
 - Make sure the hose hangs down vertically;
 - Make sure that no objects can fall / hang through the grid on the suction side;
 - Make sure that people cannot touch the fan without aids (such as a stepladder);
 - Check that the truss is in good condition;
 - Check for an electrical connection which is sufficiently close.
- Make sure you have the proper tools and equipment;
- Make sure the Verti-Fan can be installed safely, get somebody to help if necessary;
- Loosen the U-clamps (d), keep the washers and nuts;
- Mount the Verti-Fan on the lowest beam of the truss (c) in the greenhouse;
- Place the U-clamps over the truss (c) and through the holes in the mounting brackets;
- Put the rings (b) in place, and tighten the two self-locking nuts (a) hand tight;
- Tighten the self-locking nuts until the Verti-Fan is in a firm horizontal position.

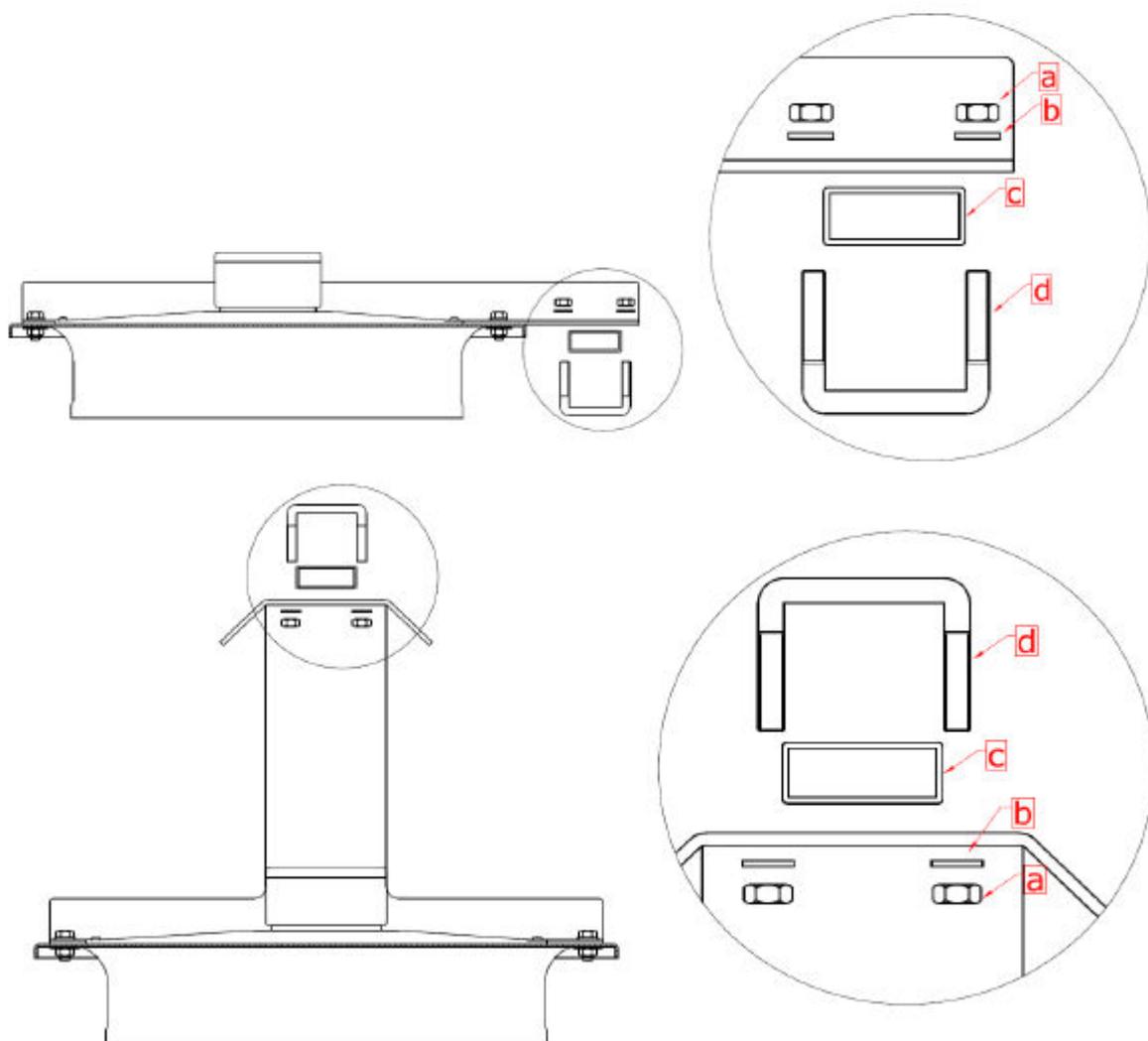


Figure 7: Mounting details

4.3 Method with the aid of a steel cable

- Choose a suitable location;
 - Follow, if possible, the included drawings of the installer or manufacturer;
 - Make sure the hose hangs down vertically;
 - Ensure that no objects can fall / hang through the grid on the suction side;
 - Make sure that the distance between the fan and any overhead obstacles (e.g. shade screen) is at least 300 mm;
 - It must not be possible to touch the ventilator without special equipment, such as a stepladder;
 - Check that the truss is in good condition;
 - Check if there is a socket sufficiently close by.
- Use proper tools and equipment;
- Make sure the Verti-Fan can be installed safely, if necessary get help from others;
- What you will need:
 - Steel cable;
 - 2x wire clamp;
 - 2x shrink sleeve.
- Cut the cable (A) to size if necessary, and place some shrink tubing over the ends with the help of something such as a lighter;
- Loop the steel cable (A) around or through the truss, and secure with a wire clamp (B);
- Using 4 nuts (C) and 4 washers (D), attach a screw eye (E) with an open bent eye on two corners of the Verti-Fan;
- Hang the Verti-Fan to the steel cable (A) with the open bent eyes;
- The positioning of the Verti-Fan is flexible; it can be moved freely along the length of the steel cable as desired;
- Then secure the fan with two wire clamps (B) to hold it in position;

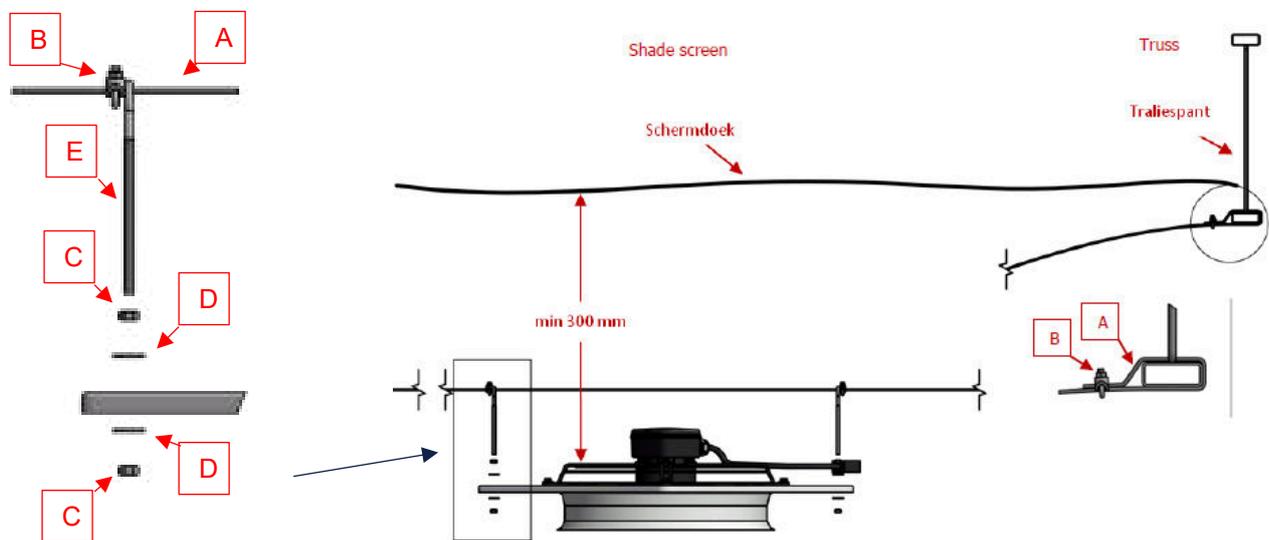


Figure 8: Front view of installation

4.4 Installation of hose

The Verti-Fan is installed as follows:

- Cut the plastic hose (III) to size; the ideal height of the hose from the ground is about 400 mm (optional: the stainless steel ring extends the hose by 250 mm);
- Schuif de slurf over de onderzijde van de montagering (I);
- Plaats de slangklem (II) om de montagering en slurf en draai hem vast;
- Nu kun je de montagering om de windtunnel van de ventilator klikken met behulp van de vergrendelpen;
- Steek de stekker in het stopcontact;
 - Houd hierbij in de gaten dat de Verti-Fan in het zichtveld van de aansluiting (het stopcontact) moet liggen.
- When using stainless steel ring (IV):
 - Slide the ring over the hose;
 - Fold 250 mm of the hose over the ring;
 - Fit the three retaining clips (F), so that the stainless steel ring is secured to the hose;
 - Place the mounting strip of the retainer facing towards the inside of the hose;

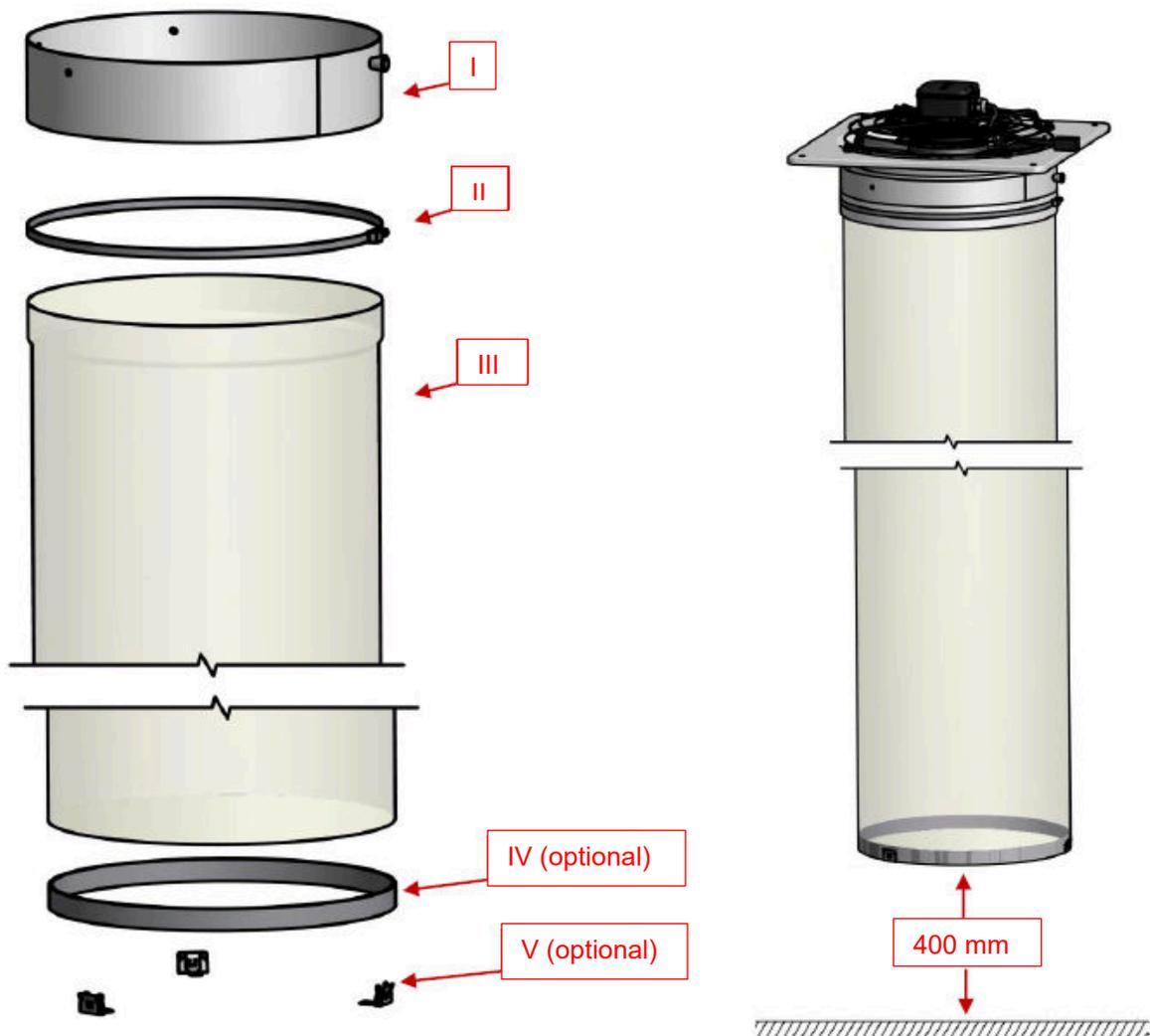


Figure 9: Structure of hose

5 COMMISSIONING

Every fan has a thermal contact built-in in the windings of its motor. When the contact is connected, the motor will shut down when there is an overvoltage or an internal temperature above 100°C. High temperatures can be caused by a blocked fan or something similar.

By connecting the fan in the proper way, the lifespan will be longer. How to connect the fan in the proper way is shown in figure 10 and picture 5. The thermal contact is mounted in series with the phase. The red wire in picture 5 is de bridge between TB and U1.

The thermal contact of the FN035 fan is NOT connected by the factory. This needs to be done by the installer.

CAUTION; The thermal contact doesn't have a reset button. This means that when the motor cools down, it will restart by itself. When servicing the Verti-Fan, the plug must be removed from the socket, to prevent unexpected and unwanted starting!

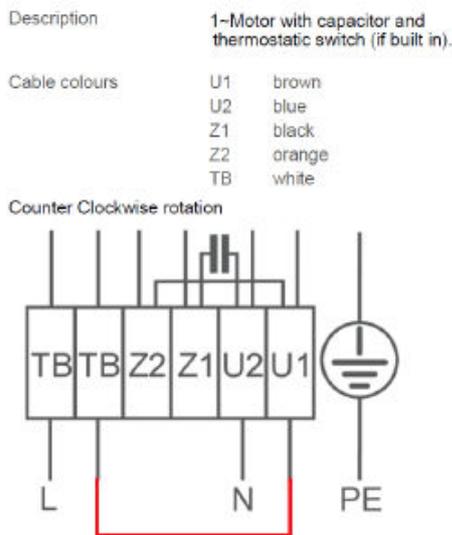


Figure 10: Connection diagram

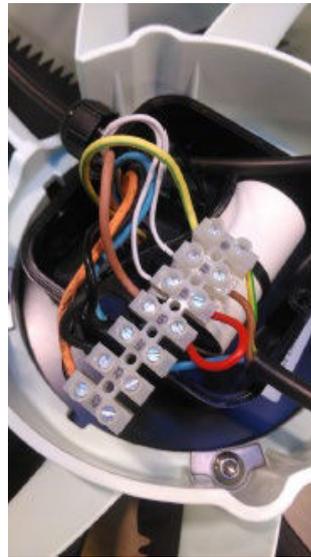


Figure 11: Connected thermal contact

External safety switches with reset buttons are available on request.

For every type of fan there are external safety switches available. These safety switches in combination with the thermal contact can shut down the installation with an alert and reset.

Connection diagram S-ET

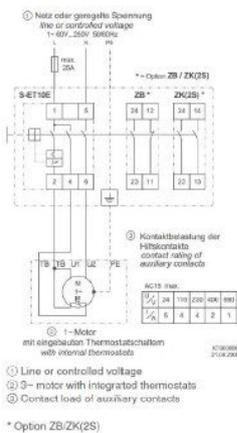


Figure 12: Connection diagram for external safety switch



Figure 13: External safety switch

Caution; a 400V 3-phase fan always needs to be secured by an external thermal safety switch! The 3-phase fan also has an built-in thermal contact that can be connected to an external safety switch.

6 OPERATION

Operating the Verti-Fan is simple: if it is connected to the power supply it will start working, when it is disconnected it will stop working. It is possible to set the speed by adjusting the voltage at the plug with something like a control transformer, but this is not part of the Verti-Fan.

7 MAINTENANCE

When servicing the Verti-Fan, the plug must be removed from the socket, to prevent unexpected and unwanted starting.

The Verti-Fan only requires the minimum of maintenance:

- Replace the plastic hose when damaged or soiled;
- Keep the top side (suction side) of the fan free of foreign objects and dirt.
- If the air intake grille is dirty, clean it with a dry brush and then wipe down with a damp cloth.
- If the fan blades or fan housing are dirty, wipe down with a damp cloth.
- Replace the capacitor after 10,000 operating hours. This will help maintain the correct speed and avoid excessive power consumption.

8 FAILURES AND REPAIRS

Experience has shown failures to be virtually inexistent. The only thing that can happen in practice is that the thermal protection of the fan engages because of an internal defect. If this happens, the Verti-Fan is at the end of its technical life anyway, and needs to be replaced.

9 DISASSEMBLY

Make sure the plug is disconnected to prevent unintended and unwanted starting of the fan. Make sure the workplace is safe, then remove the self-locking nuts of the U-clamps, or if using cables unhook the Verti-Fan from the cables. The Verti-Fan can now be removed.

10 DECLARATION OF CONFORMITY

EC DECLARATION OF CONFORMITY

(In accordance with Annex IIA of the Machinery Directive 2006/42/EC)

We, Van der Ende Pompen
Aartsdijkweg 23
2676 LE Maasdijk
The Netherlands

declare, under sole responsibility, that the machine

Verti-Fan®

to which this declaration relates is in conformity with the following directives;

Machinery Directive	2006/42/EC
Low Voltage Directive	2006/95/EC
EMC Directive	2004/108/EC

It is also, where appropriate, in conformity with the following standards or other normative documents;

n/a

The Netherlands
Maasdijk
12 February 2020

L. van der Ende



Attachments

- **CE declaration concerning fan**



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