MANUAL

Verti-Fan EC

Vertical air circulation

Version: 2023-05

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 that are divided into sections. The table of contents on page 3 gives an overview of the chapters and paragraphs, and references to pages.

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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 optionally fitted with a power cord and plug.

The Verti-Fan has no operating controls.

1.1.2 Specifications

General	
Type	Verti-Fan FG035 EC fan
Size of fan	468 x 468 x 125 mm
Max. fan speed	1710 rpm
Capacity	3600 m^3/h*
Max. ambient temperature	50 °C
Isolation class	IP54
Total weight	± 5 kg
Connections	
Power	160 W
Voltage	~1, 200 -240 V, 50 Hz / 60 Hz
Current	1.35 – 1.65 A

Table 1 Specifications

* The capacity depends on the length of the hose.

1.1.3 Diagram of the system

In the figure below, a schematic diagram of the Verti-Fan system with the main components.

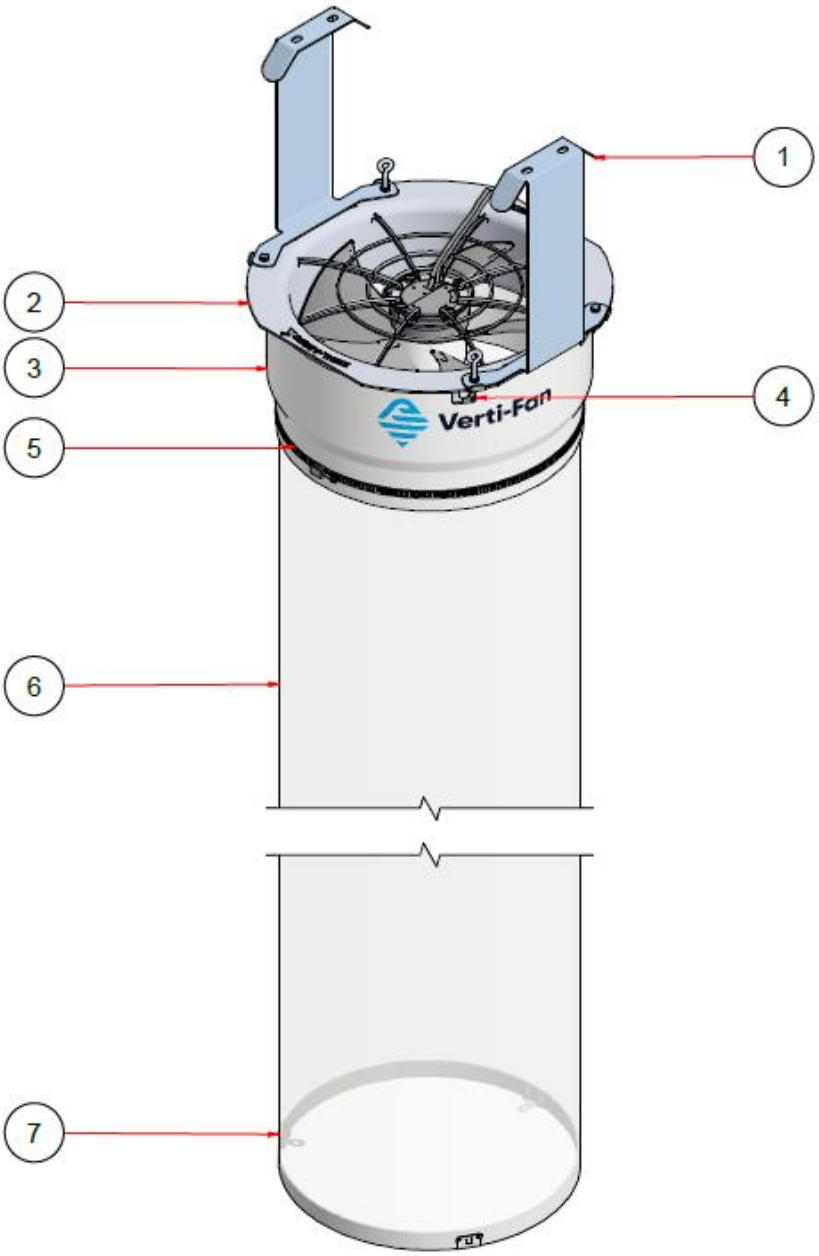


Figure 1 Diagram of the Verti-Fan showing the main components and their names

Nr.	Part name
1	Mounting brackets (optionally replacable with cable mounting)
2	Fan
3	Mounting ring
4	Mounting brackets and spacers
5	Stainless steel hose clamp
6	Plastic hose
7	Stainless steel ring or oval including retaining clips (optionally)

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 authorized 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 air within a temperature range of -10 °C to + 50 °C.

1.4 Authorized servicers

The Verti-Fan may be serviced by any maintenance company, but Van der Ende Group 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 means 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 invalidated in the event of any of the following;

- Improper use
- Repeatedly ignoring advice of the manufacturer or supplier
- Repair, maintenance or use by unauthorized 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
- Supply of Machinery (Safety) Regulations 2008:1597
- Electrical Equipment (Safety) Regulations 2016:1101
- Electro Magnetic Compatibility Regulations 2016:1091

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 favorable effect on growth, maturation and reduces the susceptibility to fungal diseases.
The operation of the Verti-Fan is simple: a horizontally placed fan draws air in at the top of the greenhouse, and blows 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 above 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 the cultivation of all sorts 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.

The Verti-Fan may never be connected to the power without the mounting ring and plastic hose. This prevents a danger of cutting parts of the open fan blades.

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.

Mind the fact that it takes a couple of seconds for the fan to start working when it has been turned on.

In compliance with EN ISO 13857, a protective construction has been fitted to the fan to prevent direct contact. The protective construction consists of the plastic hose, the mounting ring and the hose clamp. It is for this reason, that the Verti-Fan is not allowed to be operated without these components being attached to the fan.

Safety symbol	Description
	Automatic starting machine!
	Electric power present!
	Danger of falling!
	Rotating parts!
	Reading instructions obligated!

4 INSTALLATION

This chapter describes the installation of the Verti-Fan, namely assembling individual parts into a single unit, ready to be installed.
There are two distinct ways of installing the Verti-Fan:

- Mounting brackets
- 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

The content of the basic installation package is everything what will be delivered for one Verti-Fan regardless the type of mounting. In the table below is described what the basic installation contains. The numbers behind the description are referring to Figure 1 on page 5.

Quantity	Description	Type
1	Fan (2)	axial fan FG035-ZIL
4	Mounting bracket + spacer (4)	connection of mounting ring to fan
1	Mounting ring click system for rapid attachment of plastic hose to fan (3)	plastic ring (white coated)
1	Hose clamp for mounting plastic hose to mounting ring (5)	stainless steel hose clamp 50-370 mm
1	Plastic hose (6)	LDPE tube Ø 380 mm Anti-crack UV-resistant
Optional		
1	Stainless steel ring/oval (7)	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 (7)	caddy chain tension clamp 3 – 8 mm

Table 2 Contents of the installation package

Figure 2 Mounting ring Verti-Fan with lowered installation (left) and cable installation (right)

4.2 Method using lowered brackets

4.2.1 Contents of lowered installation package

In the table below and in the installation description is referred to parts in Figure 3.

Quantity	Description	Type
1	Basis installation package	See 4.1
2	Lowered bracket	4 mm lowering brackets (H) 40x300x40 mm
1	Mounting of brackets to fan	4x stainless steel hex bolts M6x20 (I) 8x stainless steel bodywork washer M6 (J) 4x stainless nut M6 (K)
1	Mounting of brackets to the trellis	2x U-clamp M8 U50x50 or U60x55 (L) 4x underlay washer M8 (M) 4x hexagonal self-locking nut M8 (N)

Table 3 Contents of lowered installation package

4.2.2 Mounting of brackets to fan

- Attach the two stainless steel lowering brackets (H) and mounting brackets and spacers (B);
    - Using four stainless steel M6 x 20 bolts (I), eight stainless steel M8 bodywork washers (J) four and stainless steel M6 nuts (K) on the suction side of the fan (A);
        - See Figure 3.
- Make sure that the power cord is on the correct side.

4.2.3 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.
- Before the fan can be attached to the trellis, the lowered- and mounting brackets and spacer must be fixed to the fan. This has to be done as prescribed in chapter 4.2.2 and figure 3.
- 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 (L), keep the washers and nuts;
- Mount the Verti-Fan on the lowest beam of the truss in the greenhouse.
- Place the U-clamps (L) over the truss, and through the holes in the lowered brackets;
- Put the washers (M) in place, and tighten the two self-locking nuts (N) hand tight;
- Tighten the self-locking nuts (N) until the Verti-Fan is in a firm horizontal position;

Figure 3 Lowered installation of the Verti-Fan using lowered brackets

4.3 Method with the aid of a steel cable

4.3.1 Content of cable installation kit

In the table below and in the installation description is referred to parts in Figure 4.

Quantity	Description	Type
1	Basic package	See 4.1
1	Mounting of fan	2x eye bolt M6 x 80 (N) 2x bolt M6x20 (O) 8x bodywork washer M6 (P) 6x hexagonal nut M6 (Q)
1	Mounting to truss beam	8 m stainless steel 3 mm cable (R) 4x wire clamp 3/16” M4 (S) Piece of 3.2 mm shrink tubing (T)

Table 4 Contents of cable installation kit

4.3.2 Cable installation

- Choose a suitable location;
    - If possible, follow the included drawings of the installer or manufacturer;
    - Make sure the hose (E) is able to hang down vertically;
    - Ensure that no objects can fall/hang through the grid on the suction side of the fan (A);
    - Make sure that the distance between the fan (A) 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;
- Before the fan can be attached to the truss, the 4 mounting brackets and spacers (B) need to be attached to the fan (A);
    - Fixate two of the mounting brackets and spacers (B) by means of 2x eye bolt M6 (N), 4x bodywork washer M6 (P) and 4x hexagonal nut M6 (Q). (see figure 5: right side);
    - Fixate two of the mounting brackets and spacers (B) by means of 2x bolt M6x20 (O), 4x bodywork washer M6 (P) and 2x hexagonal nut M6 (Q). (see figure 5: left side);
- 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 (R);
    - 2x wire clamp (S);
    - 2x shrink sleeve (T);
- Cut the cable (R) to size if necessary, and place some shrink tubing over the ends. Then use heat to shrink them around the cable ends with the help of e.g. a lighter;
- Loop the steel cable (R) around or through the truss, and secure with a wire clamp (S). Do this according to detail view D figure 6;
- Hang the Verti-Fan to the steel cable (R) such that it hangs on the eye bolts (N) (see figure 4).
- The positioning of the Verti-Fan is flexible; it can be moved freely along the length of the steel cable as desired.
- Finally secure the fan with two wire clamps (B) to hold it in position (see figure 4 t/m 6)

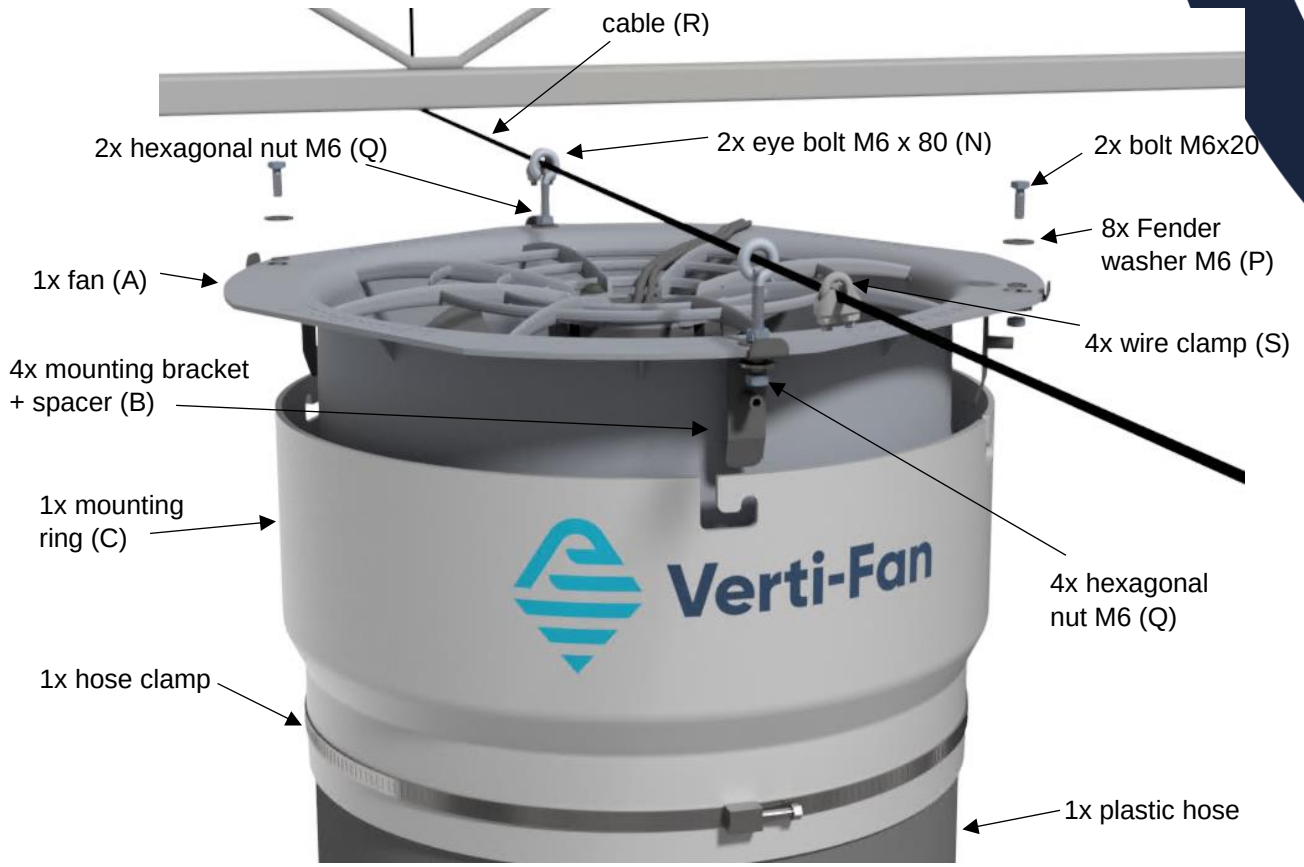


Figure 4 Verti-Fan suspended with aid of a steel cable

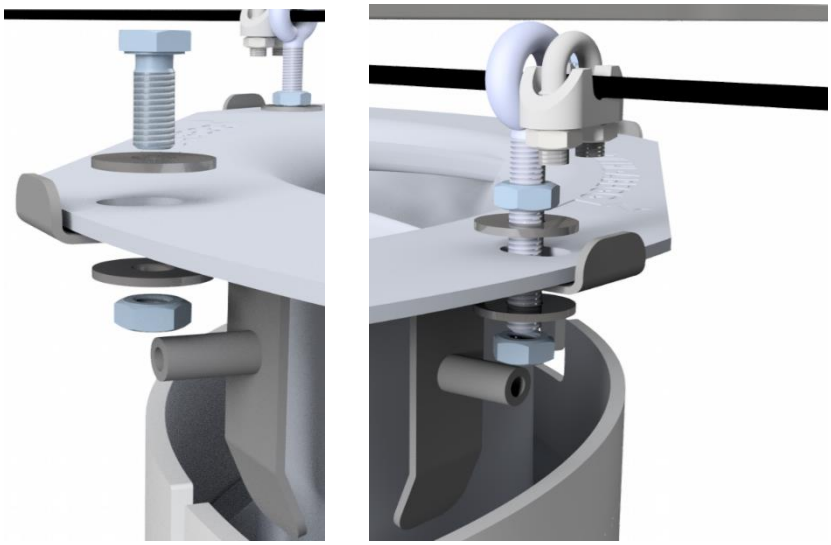


Figure 5 Installing the mounting brackets + spacers to the fan by means of bolts (left) and eye bolts (right)

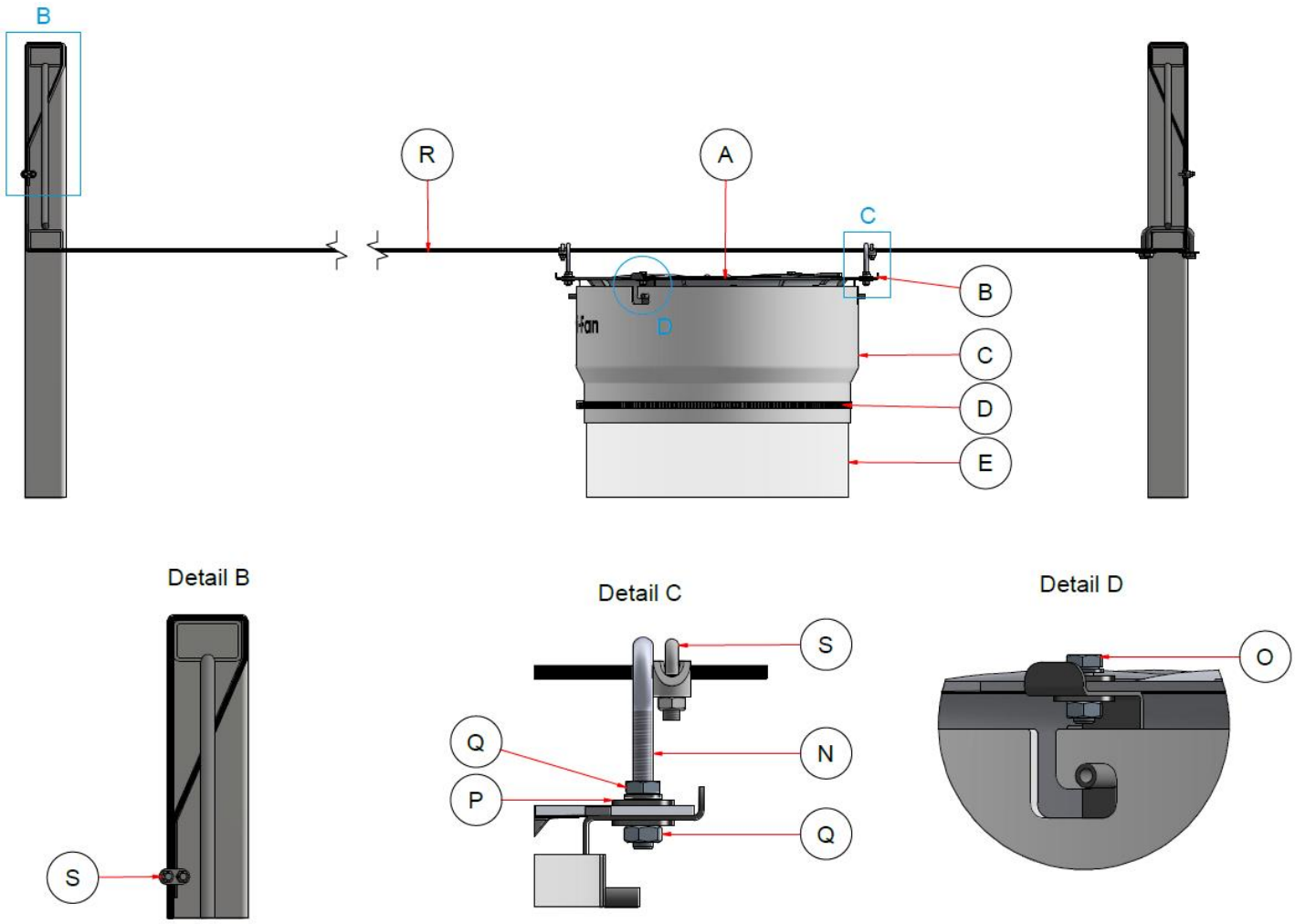


Figure 6 Schematic drawing of a Verti-Fan suspended with the aid of a steel cable

4.4 Installation of hose

The Verti-Fan is installed as follows; use Figure 7:

- Cut the plastic hose (E) to size; the ideal height of the hose from the ground is about 400 mm **(When the option: the stainless steel ring (F) is used, the hose (E) needs to be cut 250 mm)**;
- When using stainless steel ring (F):
    - Slide the ring (F) over the hose (E);
    - Fold 250 mm of the hose over the ring:
    - Fit the three retaining clips (G), so that the stainless steel ring (F) is secured to the hose (E);
    - Place the mounting strip of the retainer (G) facing towards the inside of the hose;
- Slide the other end of the hose over the underside of the mounting ring (I):
- Place the hose clamp (D) around the mounting ring (C) and hose (E), and tighten;
- The mounting ring (C) can now be clicked around the wind tunnel of the fan (A) by placing it over the spacers which are attached to the mounting brackets (B);
- Insert the plug into the power supply socket;
- Bear in mind at this stage that the Verti-Fan must be visible from the connection point (the socket).

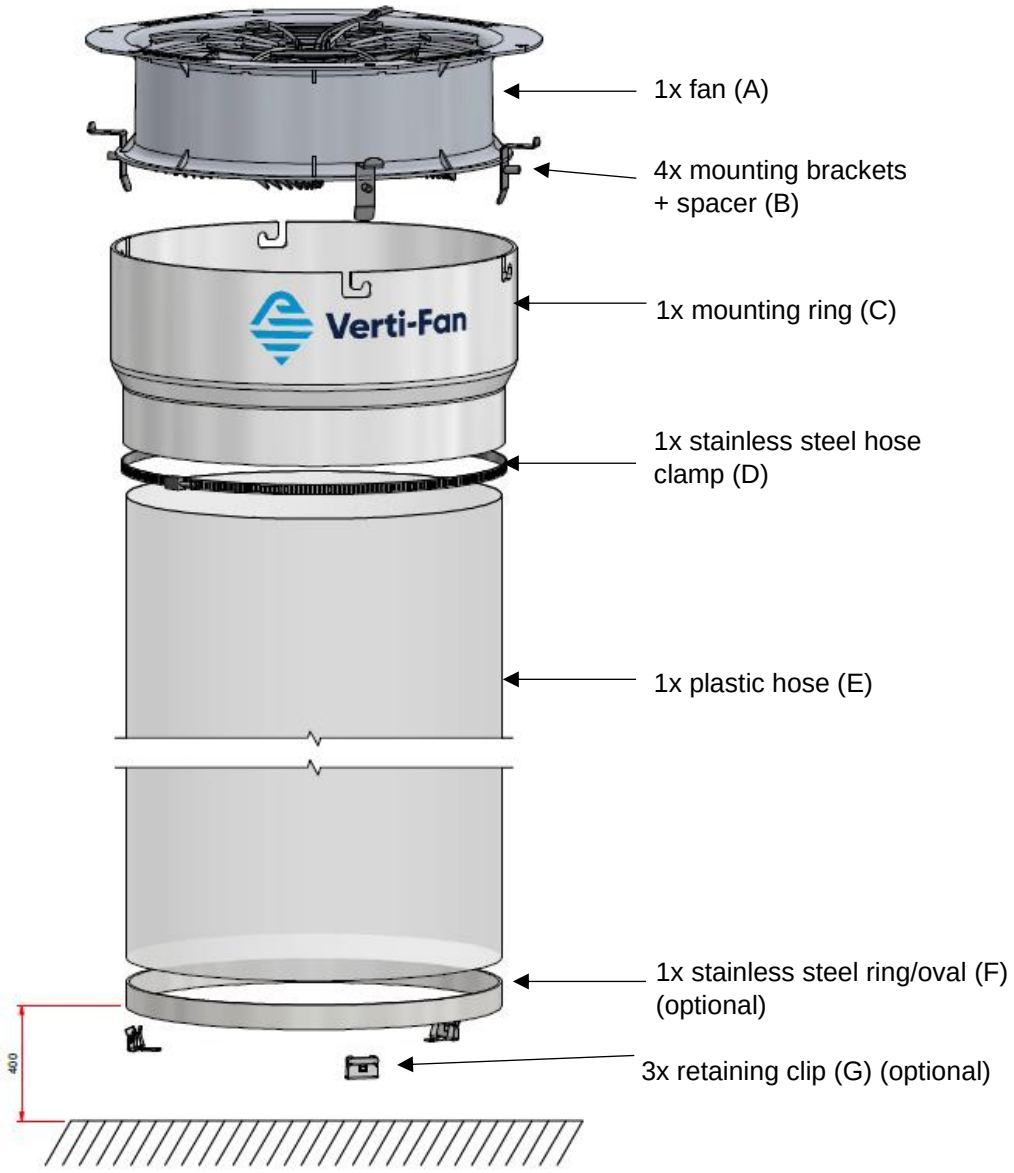


Figure 7 Mounting the plastic hose

5 COMMISSIONING

This chapter describes the different electrical wirings that can be used to operate the FG035 fan. The chosen connection determines the functionality of the Verti-Fan.
Annex B depicts a more comprehensive wiring scheme of the FG035 fan, including the connection diagram for the 0-10 V control option.

5.1 Operating on basis of supply voltage

The FG035 is delivered with an extra cable. When this cable is connected (as shown by the red line in Figure 8) in between the E1 socket and 10V socket, the fan will be turned off/on when it receives a supply voltage. This cable needs to be connected before installation by the installer.
Connect the line voltage to: PE, L1, and N. Here, it must be strictly observed that the line voltage lies within the allowable tolerance specifications (see technical data).

Screw terminals

- Nominal torque: 0,8 Nm
- Stripping length: 7 mm +/-0,5mm
- Clamping range
  - rigid: 0,75…6mm^2
  - flexiblel: 0,75…4mm^2
  - 18...12AWG

Figure 8 Wiring scheme FG035 fan

Proceed as follows:

- Remove terminal box cover;
- Insert and connect cables properly and ensure tightness of the cable glands;
- Connect the supplied cable between the E1 and 10 V sockets (see figure 8);
- Close the lid again carefully before start-up (tightening torque for lid screws 1.7 Nm);

5.2 Operating on 0-10V external setting signal

When the cable between 10V and E1 has not been connected, the fan needs to be controlled through an external setting signal (0-10V).

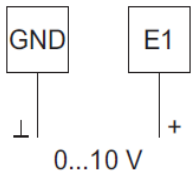
	• Control via external setting signal **0...10 V**. • By external wiring with a resistor (499 Ω / 0,25 W) between the terminals "E1" and "GND" parallel to the input signal, activation with a **0...20 mA** signal is possible.

Figure 9 depicts the characteristic curve of the fan's motor torque to the specifications of the external setting signal.

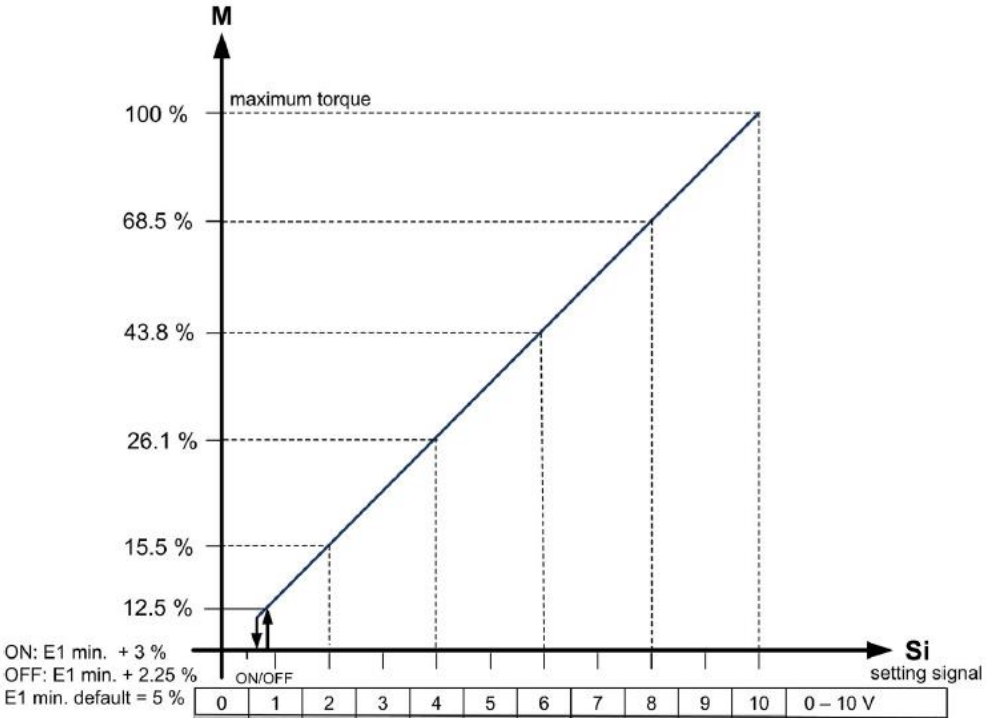


Figure 9 FG035 motor characteristic curve (0 - 10 V setting signal)

5.3 Prerequisites for commissioning

Before first-time start-up of the Verti-Fan, check the following:

- Has any leftover installation material and other foreign material been removed from the fan area?
- Are the plastic hose, mounting ring and hose clamp correctly mounted to the fan, safety devices according to (EN ISO 13857)?
- Check the rotat. direction (see the rotat. direction arrow on the fan blade, impeller base plate or intake-side support plate).
- Check for quiet, low vibration operation. Strong vibrations due to erratic operation (unbalanced), e.g. caused by transportation damage or improper use, can lead to failure.

For more information concerning the fan consult the FG035 user manual

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 advice is to do maintenance periodical (± half a year) to the Verti-Fan:

- 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.
- Check if the wire clamps are still tight in the case of cable mounting.

Other maintenance that must be taken into account at all times:

- Replace the plastic hose when damaged or soiled;
- If the device is not in use for longer periods in a humid atmosphere, it is recommended to operate the motor/fan for at least two hours every month at 80 - 100 % of maximum speed to remove any moisture that has penetrated inside.
- Check if all the bolt and nuts with which the fan is mounted are still tight. This prevents the danger of unexpected falling objects.

8 FAILURES AND REPAIRS

Failure	Possible cause	Solution
Fan does not run (anymore)	No mains voltage Failure of a phase Under- over over voltage	Check line voltage
	Ground fault	Check motor connection and line voltage
	Short circuit winding	Replace fan
	Motor thermal protection has tripped (motor overheated)	– Check free airways, if necessary. remove foreign bodies – Check supply air temperature – Check voltage
	Impeller is blocked or dirty	– Disconnect the motor from the power supply and secure it against being switched on again – Check the voltage is disconnected – Remove the protective grille – Remove foreign bodies or dirt – Refit the protective grille – Further procedure as in chapter "Commissioning"
Fan won't start	Temperature too low for bearing grease	Use bearing with cold grease
	Airflow in wrong direction (motor reverses at high speed)	Check airflow (see airflow reverse rotation behavior)
	See 'Fan does not run'	
Fan runs to slow	Impeller / wing rubs	remove foreign objects / dirt in the fan
	Active temperature management is activated (motor or electronics overheated)	Check whether the airways are free, if necessary. remove foreign objects See 'Impeller is blocked or dirty' Check the temperature of the supply air Check the installation space (air velocity over the cooling elements)
Air flow to low	Fan runs too slowly	See 'Fan runs to slow'
	Airways blocked	Check whether airways are free (air supply / exhaust valves, filters) See 'Impeller is blocked or contaminated'
	Pressure loss different than projected	Check fan selection
Vibrations	unbalance	Check wings / shovels for damage, contamination or icing See "Impeller is blocked or contaminated"
	No or wrong vibration dampers (only with radial)	Fit correct vibration dampers
Unusual sound	Bearing damaged / worn	Replace bearing For motor size 055 ("z" / "b" with cross flow) and 072 (o) replace fans
	Impeller / wing rubs	Remove foreign objects / dirt in the fan See 'Impeller is blocked or dirty'
	Operation over the tear-off point (for axial fans)	Check that airways are clear (air supply/exhaust valves, filters)
	Incorrect cover on nozzle (with radial fans)	Observe assembly instructions

9 DISASSEMBLY

Make sure the plug is disconnected to prevents 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 CE 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

11 UKCA DECLARATION OF CONFORMITY

UKCA DECLARATION OF CONFORMITY

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 and their admendments;

Supply of Machinery (Safety) Regulations 2008:1597
Electrical Equipment (Safety) Regulations 2016:1101
Electro Magnetic Compatibility Regulations
2016:1091

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

n/a

The Netherlands
Maasdijk
December 2022

L. van der Ende

ATTACHMENTS

A. **CE declaration concerning fan**
B. **UKCA declaration concerning fan**
C. **Wiring scheme FG035 Fan**

CE declaration concerning fan

EG-inbouwverklaring

- Vertaling -
(nederlandse)

ZA87-NL 1836 Index 008

in het kader van de EG-richtlijn voor machines 2006/42/EG, bijlage II B

Het type van de onvolledige machine:

- Axiaalventilatoren FA.., FB.., FC.., FE.., FF.., FG.., FS.., FT.., FH.., FL.., FN.., FV.., DN.., VR.., VN.., ZC.., ZF.., ZG.., ZN..
- Radiaalventilatoren RA.., RD.., RE.., RF.., RG.., RH.., RK.., RM.., RR.., RZ.., GR.., ER.., WR..
- Dwarsstroomventilatoren QK.., QR.., QT.., QD.., QG..

Type motor:

- Asynchrone interne of externe rotormotor (ook met geïntegreerde frequentieomvormer)
- Elektronisch gecommuteerde interne of externe rotormotor (ook met geïntegreerde EC-controller)

in overeenstemming is met de eisen van bijlage I artikel 1.1.2, 1.1.5, 1.4.1, 1.5.1 van de EG-richtlijn voor machines 2006/42/EG.

De fabrikant is

ZIEHL-ABEGG SE
Heinz-Ziehl-Strasse
D-74653 Kuenzelsau

De volgende geharmoniseerde normen zijn toegepast:

EN 60204-1:2006+A1:2009+AC:2010	Veiligheid van machines; elektrische uitrusting van machines; deel 1: Algemene eisen
EN ISO 12100:2010	Veiligheid van machines - Algemene principes voor het ontwerp - Risicobeoordeling en risicoreductie
EN ISO 13857:2008	Veiligheid van machines; Veiligheidsafstanden ter voorkoming van het bereiken van gevaarlijke zones door bovenste en onderste ledematen
Aanwijzing:	Het aanhouden van de EN ISO 13857:2008 heeft alleen dan betrekking tot de gemonteerde aanraakbeveiliging wanneer deze tot de omvang van de levering behoort.

De speciale technische documenten overeenkomstig bijlage VII B zijn opgesteld en volledig aanwezig.

Gemachtigde persoon voor het samenstellen van de speciale technische documenten is: De heer Dr. W. Angelis, adres zie boven.

Op gegrond verlangen worden de speciale documenten aan de overheidsinstantie overgedragen. De overdracht kan elektronisch, op datadrager of op papier plaatsvinden. Alle auteursrechten blijven bij de bovengenoemde fabrikant.

De inbedrijfstelling van deze onvolledige machine is zo lang verboden tot gewaarborgd is dat de machine waarin deze werd ingebouwd in overeenstemming is met de bepalingen van de EG-richtlijn inzake machines.

Künzelsau, 03.09.2018
(Plaats, datum van afgifte)

ZIEHL-ABEGG SE	ZIEHL-ABEGG SE
Dr. W. Angelis	Dr. D. Kappel
Technische leider luchttechniek	Plaatsvervangend hoofd elektrische systemen
(Naam, functie)	(Naam, functie)
i.V. W. Angelis	i. V. Daniel Kappel
(handtekening)	(handtekening)

L-BAL-F067-NL 2022 Index 006 Art-nr. 00703087-NL 32/33 ZIEHL-ABEGG

UKCA declaration concerning fan

UKCA Declaration of Incorporation

- Original -
(english)

ZA87_UK-GB
2022/17 Index 002

as defined by the Supply of Machinery (Safety) Regulations 2008 No. 1597, PART 2 / Annex II B

The design of the incomplete machine:

- Axial fan DN.., FA.., FB.., FC.., FE.., FF.., FG.., FH.., FL.., FN.., FP.., FS.., FT.., FV.., VN.., VR.., ZC.., ZF.., ZG.., ZN..
- Centrifugal fan ER.., GR.., HR.., RA.., RD.., RE.., RF.., RG.., RH.., RK.., RM.., RR.., RZ.., WR..
- Cross-flow fan QD.., QG.., QK.., QR.., QT..,

The motor type:

- Asynchronous internal or external rotor motor (also with integrated frequency inverter)
- Electronically commutated internal or external rotor motor (also with integrated EC controller)

complies with the requirements in Annex I, Articles 1.1.2, 1.1.5, 1.4.1, 1.5.1 in Supply of Machinery (Safety) Regulations 2008 No. 1597.

The manufacturer is **ZIEHL-ABEGG SE**
Heinz-Ziehl-Straße
D-74653 Künzelsau

The following harmonised standards have been used:

EN 60204-1:2018	Safety of machinery; electrical equipment of machines; Part 1: General requirements
EN ISO 12100:2010	Safety of machinery - General principles for design - Risk assessment and risk reduction
EN ISO 13857:2019	Safety of machinery; safety distances to prevent danger zones being reached by the upper limbs
Note:	The maintenance of the EN ISO 13857:2019 relates only to the installed accidental contact protection, provided that it is part of the scope of delivery.

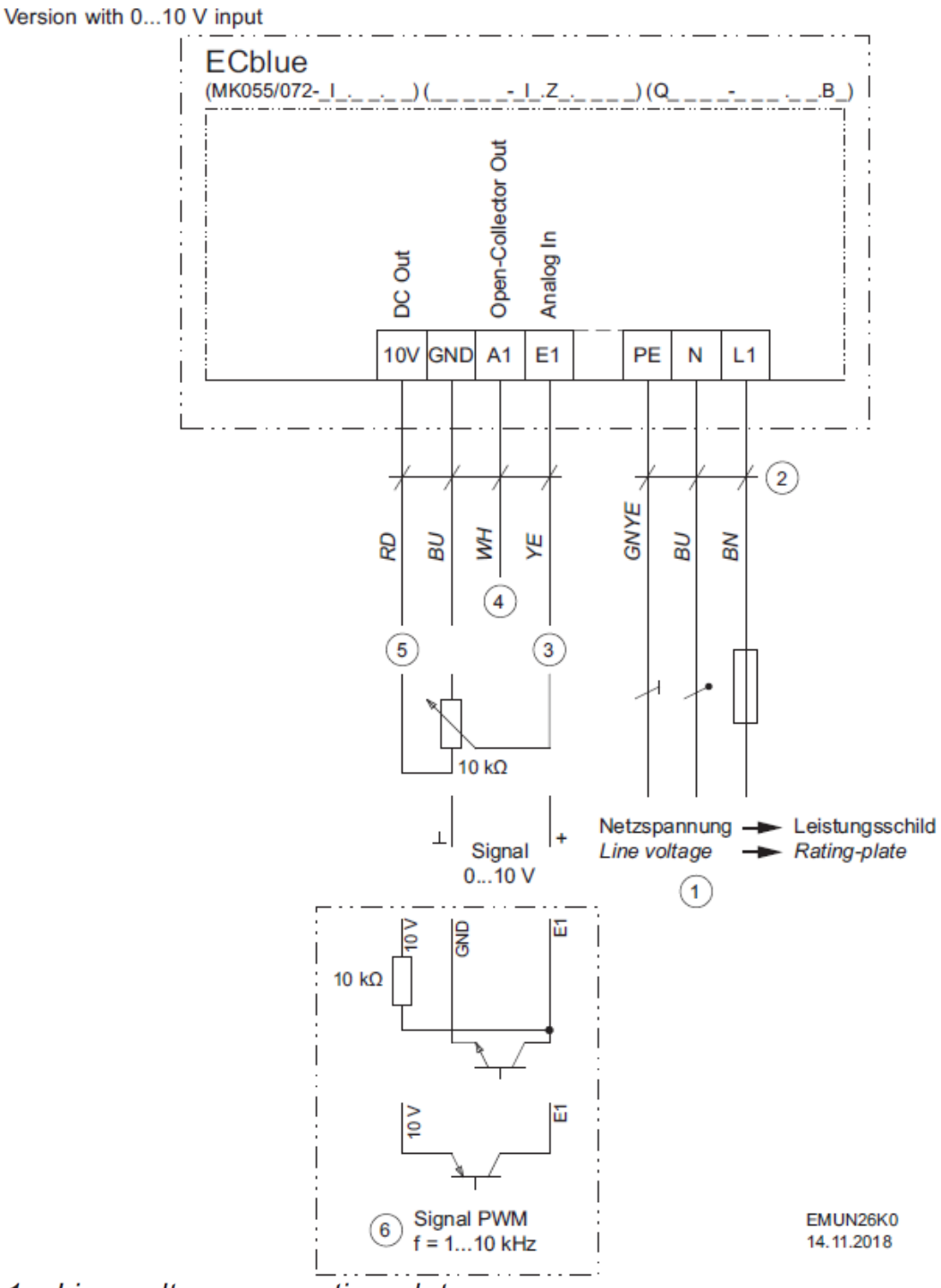
The specific technical documentation in accordance with Annex VII B has been written and is available in its entirety.

The following persons are authorized to compile the technical documents, address see above.

The specific documentation will be transmitted to the official authorities on justified request. The transmission can be electronic, on data carriers or on paper. All industrial property rights remain with the above-mentioned manufacturer.

Wiring scheme FG035 Fan

Version with 0...10 V input



1 *Line voltage see rating plate*
2 *Version with connection cables*
3 *Input for speed setting by 0...10 V signal / potentiometer (R_i > 150 kΩ)*
4 *Tacho output Open-Collector (I_{max} 10 mA)*
5 *Voltage supply 10 V DC (I_{max} 10 mA)*
6 *Speed setting by PWM signal (f = 1...10 kHz)*

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