

# Speed controller

For variable voltage 1~ fans

Installation and Wiring Instructions



Stock Ref. N°

103 14 120

220-240V~50Hz

**Vent-Axia®**

PLEASE READ INSTRUCTIONS IN CONJUNCTION WITH ILLUSTRATIONS.  
PLEASE SAVE THESE INSTRUCTIONS.

IP54



Software version: D1349A from Version 1.00

## Content

<b>1</b>	<b>General notes</b> .....	<b>3</b>
1.1	Structure of the operating instructions .....	3
1.2	Target group .....	3
1.3	Exclusion of liability .....	3
1.4	Copyright .....	3
<b>2</b>	<b>Safety information</b> .....	<b>3</b>
2.1	Use as intended .....	3
2.2	Explanations of symbols .....	3
2.3	Product safety .....	4
2.4	Requirements placed on the personnel / due diligence .....	4
2.5	Start-up and during operation .....	4
2.6	Work on the device .....	4
2.7	Modifications / interventions in the device .....	5
2.8	Operator's obligation of diligence .....	5
2.9	Employment of external personnel .....	5
<b>3</b>	<b>Product overview</b> .....	<b>5</b>
3.1	Operational area .....	5
3.2	Maintenance .....	5
3.3	Transport .....	5
3.4	Storage .....	5
3.5	Waste disposal / recycling .....	6
<b>4</b>	<b>Mounting</b> .....	<b>6</b>
4.1	General notes .....	6
4.2	Minimum space requirement .....	6
4.3	Outdoor installation .....	6
4.4	Installation location for agriculture .....	7
4.5	Temperature influences during commissioning .....	7
<b>5</b>	<b>Electrical installation</b> .....	<b>7</b>
5.1	Safety precautions .....	7
5.2	EMC-compatible installation .....	7
5.2.1	Motor feeder cable .....	7
5.2.2	Signal cable .....	7
5.3	Mains connection .....	7
5.4	Motor connection .....	8
5.4.1	Running noise .....	8
5.5	Motor protection .....	8
5.6	Signal connection for setting the output voltage .....	9
5.7	Output voltage 0 - 10 V (A1 = Analog Out 1) .....	9
5.8	Voltage supply for external devices (+24V, GND) .....	9
5.9	Enable, device ON / OFF (Digital In 1 = D1) .....	10
5.10	Relay outputs (K1) .....	10
5.11	Potential at control voltage connections .....	10
<b>6</b>	<b>Operating and display elements</b> .....	<b>11</b>
<b>7</b>	<b>Base setup</b> .....	<b>12</b>
7.1	Function of dipswitches for operation as Speed controller (DIP 1 = <input type="checkbox"/> OFF) .....	12
7.2	Minimum speed cut off DIP 5 .....	12
7.3	Hardstart function DIP 6 .....	12

<b>8</b>	<b>Start-up</b> .....	<b>13</b>
8.1	Prerequisites for commissioning .....	13
<b>9</b>	<b>Setting for operation</b> .....	<b>13</b>
9.1	Setting for operation as Speed controller .....	13
9.2	Diagram: setting signal and speed .....	14
9.3	Operation with two variable output voltages (two steps) .....	14
<b>10</b>	<b>Diagnostics / Faults</b> .....	<b>15</b>
10.1	If controller doesn't work correctly .....	15
<b>11</b>	<b>Enclosure</b> .....	<b>16</b>
11.1	Technical data .....	16
11.2	Connection diagram .....	17
11.3	Dimensions [mm] .....	17

## 1 General notes

### 1.1 Structure of the operating instructions

**Before installation and start-up, read this manual carefully to ensure correct use!  
We emphasize that these operating instructions apply to specific units only, and are in no way valid for the complete system!**

Use these operating instructions to work safely with and on the device. They contain safety instructions that must be complied with as well as information that is required for failure-free operation of the device.

Keep these operating instructions together with the device. It must be ensured that all persons that are to work on the device can refer to the operating instructions at any time. In addition to the operating instructions, directives in the sense of the ordinance on industrial safety and health and the work equipment ordinance are also to be provided.

Keep the operating instructions for continued use. They must be passed-on to all successive owners, users and final customers.

### 1.2 Target group

The operating instructions address persons entrusted with planning, installation, commissioning and maintenance and servicing and who have the corresponding qualifications and skills for their job.

### 1.3 Exclusion of liability

Concurrence between the contents of these operating instructions and the described hardware and software in the device has been examined. It is still possible that non-compliances exist; no guarantee is assumed for complete conformity. To allow for future developments, construction methods and technical data given are subject to alteration. We do not accept any liability for possible errors or omissions in the information contained in data, illustrations or drawings provided.

We accept no liability for damage caused by misuse, incorrect use, improper use or as a consequence of unauthorized repairs or modifications.

### 1.4 Copyright

These operating instructions contain copyright protected information. The operating instructions may be neither completely nor partially photocopied, reproduced, translated or put on data medium without previous explicit consent. Infringements are liable for damages. All rights reserved, including those that arise through patent issue or registration on a utility model.

## 2 Safety information

This chapter contains instructions to prevent personal injury and property damage. These instructions do not lay claim to completeness. In case of questions and problems, please consult our company technicians.

### 2.1 Use as intended

The equipment is to be used solely for the purposes specified and confirmed in the order. Other uses which do not coincide with, or which exceed those specified will be deemed unauthorised unless contractually agreed. Damages resulting from such unauthorised uses will not be the liability of the manufacturer. The user will assume sole liability.

Reading these operating instructions and complying with all contained instructions – especially the safety notifications contained therein – are considered part of intended use. To consider is also the manual of attached components. Not the manufacturer, rather the operator of the device is liable for any personal harm or material damage arising from non-intended use!



### 2.2 Explanations of symbols

Safety instructions are highlighted with warning triangles and are depicted according to the degree of hazard as follows.



**Attention!**

Hazardous area. Death or severe injury or significant property damage can occur if the corresponding precautions are not taken!

	<b>Danger owing to electric current</b> Danger owing to electric current or voltage.
	<b>Information</b> Important information and advice for user.

### 2.3 Product safety

The device conforms to the state of the art at the time of delivery and is fundamentally considered to be reliable. The device and its accessories must only be used in a flawless condition and installed and operated in compliance with the assembly instructions and/or operating instructions. Operating outside the device's technical specifications (☞ rating plate and attachment / technical data) can lead to a defect in the device and additional damage!

**In the case of a malfunction or a failure of the equipment check all functions with alarms in order to prevent injury to persons or property. Note possibility of back-up operation. If used in intensive animal environments, any malfunctions in the air supply must be detected as soon as possible to prevent the development of a life-threatening situation for the animals. The design and installation of the system must comply with local regulations and directives. In Germany these include DIN VDE 0100, the animal protection and the keeping of working animals ordinance and the pig-keeping ordinance etc. Also note the instructions of AEL, DLG, VdS.**

### 2.4 Requirements placed on the personnel / due diligence

Persons entrusted with the planning, installation, commissioning and maintenance and servicing in connection with the frequency inverter must have the corresponding qualifications and skills for these jobs.

In addition, they must be knowledgeable about the safety regulations, EU directives, rules for the prevention of accidents and the corresponding national as well as regional and in-house regulations. Personnel to be trained or instructed and apprentices are only permitted to work on the device under the supervision of an experienced person. This also applies to personnel undergoing general training. Comply with the legal minimum age.

### 2.5 Start-up and during operation



#### Attention!

During commissioning, unexpected and hazardous conditions can arise in the entire installation due to defective adjustments, defective components or incorrect electrical connections. Remove all persons and objects from the hazardous area.

During operation, the device must be closed or installed in a control cabinet. Fuses may only be replaced by new ones and must not be repaired or bypassed. The data for the maximum line fuse are to be considered absolutely (☞ Technical data). Use only fuses specified in schematic diagrams.

Any faults detected in the electric system/modules/operating equipment must be corrected immediately. If these faults are not corrected, the device/system is potentially very dangerous. The device/system must therefore not be operated when it is faulty.

### 2.6 Work on the device



#### Information

**Installation, electrical connection, and start-up operation may only be carried out by an electrical specialist in accordance with electrotechnical regulations (e.g. DIN EN 50110 or DIN EN 60204).**



#### Danger owing to electric current

**It is forbidden to carry out work on electrically live parts. The enclosure rating of the device when open is IP 00! It is possible to inadvertently touch components carrying hazardous voltages!**

The safe isolation from the supply must be checked using a **two-pole** voltage detector.

**Attention!****Automatically restart after a power failure or mains disconnection!****2.7 Modifications / interventions in the device****Attention!**

For reasons of safety, no unauthorized interventions or modifications may be made on the device. All planned modifications must be authorized by the manufacturer in writing.

Only use the manufacturer's original spare parts / wearing parts / accessories. These parts are specially designed for this device. If parts from other sources are used, there is no guarantee that they are designed and produced for the proper loads and with the required level of safety. Parts and special equipment not supplied by the manufacturer are not approved for use.

**2.8 Operator's obligation of diligence**

- The contractor or owner must also ensure that the electric systems and equipment are operated and maintained in accordance with electro-technical regulations.
- The owner is obliged to ensure that the device are operated in perfect working order only.
- The device may only be used as intended (☞ "Application").
- You must periodically examine the safety equipment for their properly functioning condition.
- The assembly instructions and/or operating instructions are always readily available at the location where the device is being used, are complete and are in legible condition.
- These persons are regularly instructed in all applicable questions regarding occupational safety and environmental protection and are knowledgeable regarding the assembly instructions and/or operating instructions and, especially, are familiar with the safety instructions contained therein.
- All safety and warning notices attached to the frequency inverter are never removed and remain legible.

**2.9 Employment of external personnel**

Maintenance and service work are frequently carried out by external employees who often do not recognize the specific situations and the thus resulting dangers. These persons must be comprehensively informed about the hazards in their area of activity.

You must monitor their working methods in order to intervene in good time if necessary.

**3 Product overview****3.1 Operational area**

The controller described is used for continuous speed adjustment on variable voltage 1~ motors used to drive ventilators or pumps.

**3.2 Maintenance**

The device must be checked for soiling and, if necessary, cleaned in periodic intervals.

**3.3 Transport**

- The device is packed ex works to suit the transport method previously agreed.
- Always use the original packaging materials when transporting the device.
- Avoid shocks and impacts to the device during the transport.
- During manual handling the human lifting and carrying restrictions must be observed and adhered to.

**3.4 Storage**

- The device must be stored in its original packaging in a dry and weather-proof room.
- Avoid exposure to extreme heat and cold.
- Avoid over-long storage periods (we recommend a maximum of one year).

### 3.5 Waste disposal / recycling

Disposal must be carried out professionally and environmentally friendly in accordance with the legal stipulations.

## 4 Mounting

### 4.1 General notes



#### Attention!

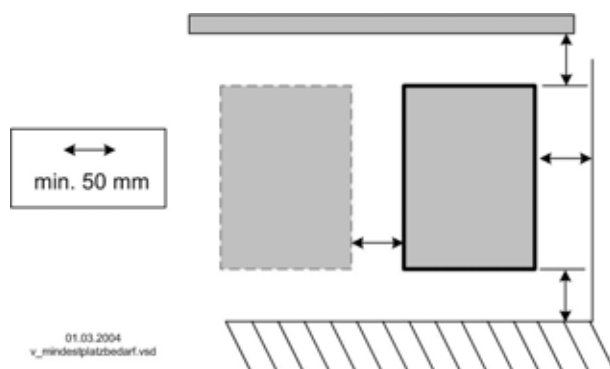
The following points must be complied with during the mechanical installation to avoid causing a defect in the device due to assembly errors or environmental influences:

- Before installation remove the device from the packing and check for any possible shipping damage!
- Assemble the device on a clean and stable base. Do not distort during assembly! Use the appropriate mounting devices for proper installation of the unit!
- Do not mount equipment on vibrating base!
- When mounted onto lightweight walls, there must be no impermissibly high vibrations or shock loads. Any banging shut of doors that are integrated into these lightweight walls, can result in extremely high shock loads. Therefore, we advise you to decouple the devices from the wall.
- Do not allow drilling chips, screws and other foreign bodies to reach the device interior!
- The plastic washers must be installed between the screw heads and the housing for models with mounting holes on the inside of the housing!
- The device should be installed in a location where it will not be disturbed, but at the same time can be easily accessed!
- Depending on the housing model use supplied stoppers for cable inlets, cut off necessary cable inlets respectively to the cable diameter. Or alternative use cable inlet for cable glands. Any cable ducts openings not used must be sealed!
- Care must be taken to avoid direct radiation from the sun!
- The device is designed for vertical installation (cable inlet down). A horizontal or reclined installation is only permissible after technical release of the manufacturer!
- Be sure to observe proper heat dissipation (☞ Technical data, heat dissipation).

### 4.2 Minimum space requirement

In order to ensure sufficient ventilation of the device, clearance on all sides of at least 50 mm has to be maintained to the housing walls, switch cabinet doors, wiring ducts, etc. The same clearance applies to the installation of several devices next to each other.

When installing several devices on top of each other, the danger of reciprocal heating exists. This layout is only then permissible when the air suctioned from the upper unit does not become warmer than the permissible ambient temperature (☞ Technical data). I.e., a correspondingly larger clearance or thermal shielding is required.



### 4.3 Outdoor installation

Outdoor installation is possible up to  $-20\text{ }^{\circ}\text{C}$  when the controller supply is not switched off. Installation must be protected from the effects of weather as much as possible, including protection from direct sunlight!

#### 4.4 Installation location for agriculture

In order to avoid damage caused by ammoniac vapours, the controller shall not be installed in the stable, but rather in an outhouse wherever possible.

#### 4.5 Temperature influences during commissioning

Avoid condensation in the controller and hence functional faults attributable to condensation by storing the controller at room temperature!

## 5 Electrical installation

### 5.1 Safety precautions



#### Danger owing to electric current

- Work on electric components may only be carried out by trained electricians or by persons instructed in electricity under the supervision of an electrician in accordance with electrical engineering regulations.
- It is forbidden to carry out work on electrically live parts.
- A second person must always be present when working on energized parts or lines who disconnects in case of emergency.
- Inspect electrical equipment periodically: retighten loose connections – immediately replace damaged lines and cables.
- Always keep switch cabinets and all electrical supply facilities locked. Access is only allowed for authorized persons using a key or special tool.
- Operating the device with the housing cover removed is prohibited because energized, exposed parts are present inside the device. Disregarding this regulation can lead to severe personal injury.
- The required protective earth connection is established using screws between the housing parts in metal terminal space covers and housing casings. Commissioning is only permissible after these screws have been properly attached!
- Metal screwed-connections are not permitted in plastic housing parts because there is no potential equalization.
- Never clean electrical equipment with water or similar liquids.



#### Information

The respective connections are represented in the enclosure of this manual (☞ Connection diagram)!

### 5.2 EMC-compatible installation

#### 5.2.1 Motor feeder cable

The applicable standard for interference emissions is EN 61000-6-3. Compliance with this standard is achieved through the use of an unscreened motor feed cable.

#### 5.2.2 Signal cable

Pay attention to sufficient distance from powerlines and motor wires to prevent interferences. The control cable may not be longer than 30 m. Screened control cables must be used when the cable length is longer than 20 m. When using a shielded cable connect the shielding to one side only, i.e. only to the control unit with the protective ground (keep cable short and with as little inductance as possible!).

### 5.3 Mains connection

Power from the mains is connected to terminals: PE, L1 and N. Here, it must be strictly observed that the mains voltage lies within the allowable tolerance specifications (☞ Technical data and nameplate affixed to the side).



#### Danger owing to electric current

The mains voltage must comply with the DIN EN 50160 quality characteristics and the defined standard voltages in IEC 60038!

## 5.4 Motor connection

The motor is connected at terminals U1 and U2. Several motors can be connected to the device.



### Attention

**The maximum total control current (specified for electronic voltage regulation) for all motors may not exceed the device's rated current.**  
**If the maximum control current for electronic voltage regulation is not known, a supplementary 20% of the rated motor current must be allowed for.**  
**When controlling motors from other manufacturers, the controllability and the maximum current for electronic voltage regulation should be requested from the manufacturer.**



### Information

It is recommended that a separate motor protection unit be foreseen for each fan.

5.4.1

### Running noise

When controlling ventilators using electronic voltage regulators, motor noise can occur (due to the system), which can be troublesome.

On fast running ventilators with a high level of air noise, this noise is relatively low. On slow running ventilators with a low level of air noise, this noise may be dominant in the lower speed range due to the occurrence of resonance.

## 5.5 Motor protection

The motor can be protected by connecting thermostats "TB".

When multiple motors are connected, it is essential to ensure that thermostats "TB" are always connected in series.

If a connected thermostat is tripped (break between the two terminals "TB"), the device is switched off and is not switched back on.

Relais "K1" is de-energized, terminals "11" - "12" bridged. The signal lamp flashes in code 2 (☞ Diagnostics / faults).

### Possibilities for re-starting after the drive has cooled down (terminals "TB" bridged) by:

- By switching the mains voltage off and then on again.
- Via a digital input for remote control (ON / OFF enable).



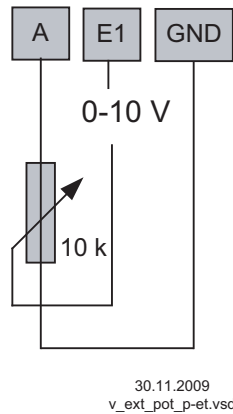
### Attention!

- **An outside voltage may never be connected to the terminals "TB" and/or!**
- If a bypass circuit is installed, or in the "100 %" position on devices with a main switch, the motor protection inside the controller has no function. In this case, additional motor monitoring may be required.

### 5.6 Signal connection for setting the output voltage

The unit has one-analog input: terminals “E1” / “GND” (Analog In 1). At this input the potentiometer mounted in the cover for setting the output voltage is connected (potentiometer outside). Voltage supply is made by terminal A1 (+10 V). Alternatively the setting of the output voltage can be made by an external signal (0...10 V). For this disconnect the potentiometer and isolate the connecting cables.

**Operation with built-in potentiometer**  
(at delivery)



30.11.2009  
v\_ext\_pot\_p-et.vsd

**Operation with external setting signal**  
(0...10 V)



30.11.2009  
v\_ext\_0\_10V\_p-et.vsd



**Attention!**  
**Never apply line voltage to analog inputs!**

### 5.7 Output voltage 0 - 10 V (A1 = Analog Out 1)

Connection to terminals “A1” - “GND” = “Analog Out 1” ( $I_{max}$  10 mA).

It is not permissible to connect outputs of several devices to each other!

The function of the signal output A1 (Analog Out 1) can be determined by DIP8.

DIP 8 = <input type="checkbox"/> OFF	<b>Constant voltage + 10 V for external potentiometer (factory setting)</b>
DIP 8 = <input type="checkbox"/> ON	<b>0 - 10 V <math>\Delta</math> modulation 0 - 100 %</b> <ul style="list-style-type: none"> <li>• Proportional the internal control of modulation with consideration “n-min” and “n-max” setting.</li> <li>• For enable “OFF” it goes <b>not back to “0 V”</b>.</li> <li>• For motor fault the output signal remains for a slave controller (“Master-Slave” combination).</li> </ul>

### 5.8 Voltage supply for external devices (+24V, GND)

There is an integrated power supply for external devices, e.g. a sensor. Terminal +24 V, output voltage tolerance +/- 20%. max. load current  $\varphi$  Technical data.

It is not permissible to connect outputs of several devices to each other!

In case of overload or short circuit (24 V – GND), the external power supply is shut down (multi-fuse). The device performs a “Reset” and continues operation.

### 5.9 Enable, device ON / OFF (Digital In 1 = D1)

**Electronic disconnection and Reset after motor fault via floating contact at terminals “D1” - “D1”**

- Device “ON” for closed contact.
- Controller “OFF” with opened contact.
- Relais “K1” remains energized, terminals 11 - 14 bridged. The signal lamp flashes in code 1 (☞ Diagnostics / faults)

Activation via floating contacts, a low voltage of approx. 24 V DC is connected.



#### **Attention!**

**Never apply line voltage to the digital input!**

### 5.10 Relay outputs (K1)

An external fault indicator is available over the potential-free contacts of the built-in relay (max. contact rating ☞ Technical data and connection diagram).

For operation the relay is energized, terminals “12” and “14” are bridged. For fault the relay is de-energized, terminals “11” and “12” are bridged (☞ Diagnostics / faults).

- Fault indicated for: line fault, blown internal semiconductor fuse, broken controller-internal voltage supply, overheating by the motor (thermostats “TB” connected).
- When switching off via enable (D1 = Digital In 1), the relay remains energized.

### 5.11 Potential at control voltage connections

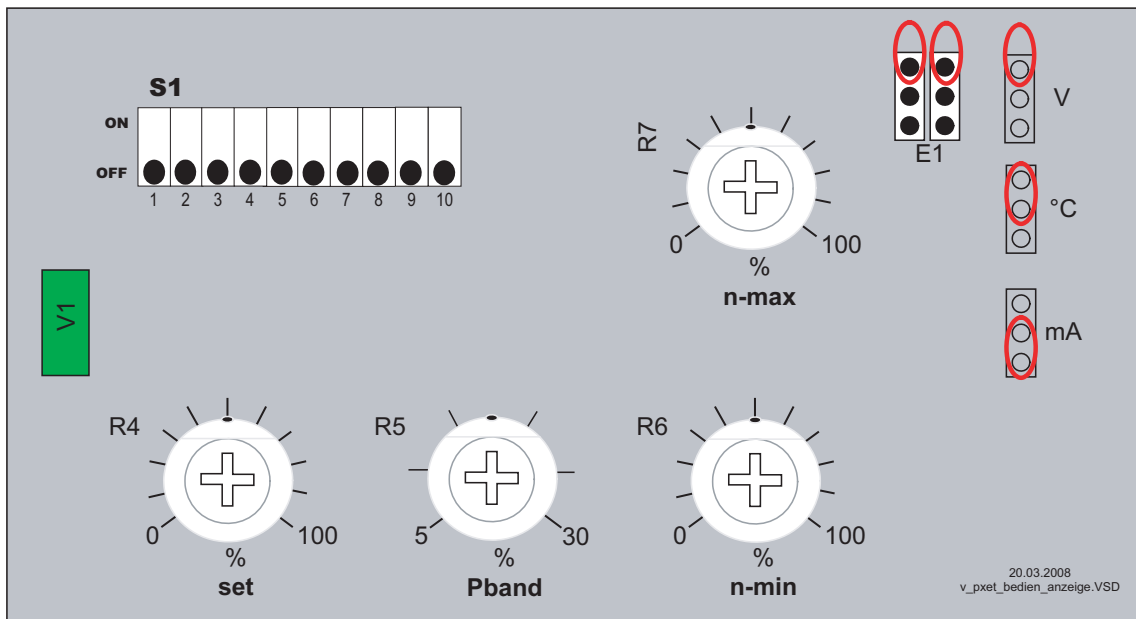
The control voltage connections (< 50 V) relate to the joint GND potential (Exception: Relay contacts are potential free). There is a potential separation between the control voltage connections and the earthed conductor. It must be ensured that the maximum external voltage at the control voltage connections cannot exceed 50V (between “GND” terminals and “PE” earthed conductor). If necessary, a connection to the earthed conductor potential can be established, install bridge between “GND” terminal and the “PE” connection (terminal for screening).

## 6 Operating and display elements

Potentiometer outside (0 - 100 %)



Internal possibilities for settings and status LED



Potentiometer <b>set</b>	For control by potentiometer outside or by external signal without function (factory setting).
Potentiometer <b>Pband</b>	without function
Potentiometer <b>n-min</b>	<b>Minimal output voltage (basic speed)</b> Setting range: 0 - 100 % ("n-min" takes priority if over "n-max")
Potentiometer <b>n-max</b>	<b>Maximal output voltage (speed limiter)</b> Setting range: 100 % - "n-min"
Jumper <b>E1</b>	<b>Basic setting for kind of signal at analog input "E1 = Analog In 1"</b>
Dipswitch <b>S1</b>	<b>Basic setting for device function</b>
Status LED <b>V1</b>	<b>Indicate the operating conditions over flashing code</b>

## 7 Base setup

### 7.1 Function of dipswitches for operation as Speed controller (DIP **1** = **OFF**)

For operation as a speed controller, the output voltage is set manually by adjusting the built-in potentiometer, by an external potentiometer or external signal.

The desired function is determined with dipswitch **S1**.

Position factory setting for all dipswitches = **OFF**

DIP	Function	OFF	ON
<b>1</b>	Selection:	<b>Speed controller</b>	prohibited
<b>2</b>	Signal source of control	Setting of the output voltage by the potentiometer mounted in the cover. <b>alternatively</b> Setting of output voltage by external signal to "E1". (internal potentiometer "set" without function)	Setting the output voltage by internal potentiometer "set"
<b>3</b>	Type of Signal	0 - 10 V, 0 - 20 mA	2 - 10 V, 4 - 20 mA
<b>4</b>	Inverting signal input	0 - 10 V, 2 - 10 V, 0 - 20 mA, 4 - 20 mA	10 - 0 V, 10 - 2 V, 20 - 0 mA, 20 - 4 mA
<b>5</b>	Minimum speed cut off	OFF	ON
<b>6</b>	Hardstart function	OFF	ON
<b>7</b>	without function	-	-
<b>8</b>	Function signal output "Analog Out 1"	Constant voltage "+ 10 V" for external potentiometer	0 - 10 V $\pm$ modulation 0 - 100 %
<b>9</b>	without function	-	-
<b>10</b>	without function	-	-

### 7.2 Minimum speed cut off DIP 5


If no "n-min" is adjusted, output voltage goes continuously with reduction of the regulating variable down to "0" (cutoff below approx. 2 % regulating variable).

**Without minimum speed cut OFF (DIP 5 = **OFF**) = factory setting)**

- If minimal speed "n-min" is adjusted (e.g. 20%), then no disconnection of the fan takes place. I.e. always a minimum ventilation is ensured (fan does not go under setting "n-min").

**With minimum speed cut off (DIP 5 = **ON**)**

- Cutoff below approx. 2 % regulating variable from setting "n-min" to "0".
- Switch on again for a regulating variable above 5 % (to setting "n-min").

Functional diagram  setting for operation as Speed controller

### 7.3 Hardstart function DIP 6

Special function for motorstart with maximum output voltage.

DIP 6 = <b>OFF</b>	<b>"Hardstart" function = OFF (factory setting).</b> After switching the mains voltage on the output voltage rises during the firmly programmed run-up time to the given value.
DIP 6 = <b>ON</b>	<b>"Hardstart" function = ON.</b> For a safe starting of the connected fans the function "Hard start" can be activated. After switching the mains voltage on the controller generates for approx. 10 seconds max. voltage "100 %" ignoring any control or sensor signal. Afterwards the output voltage adjusts itself to the given or over the control amplifier calculated value.

## 8 Start-up

### 8.1 Prerequisites for commissioning


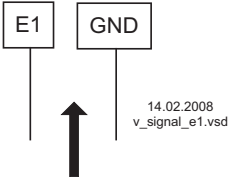
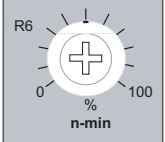
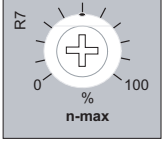


**Attention!**

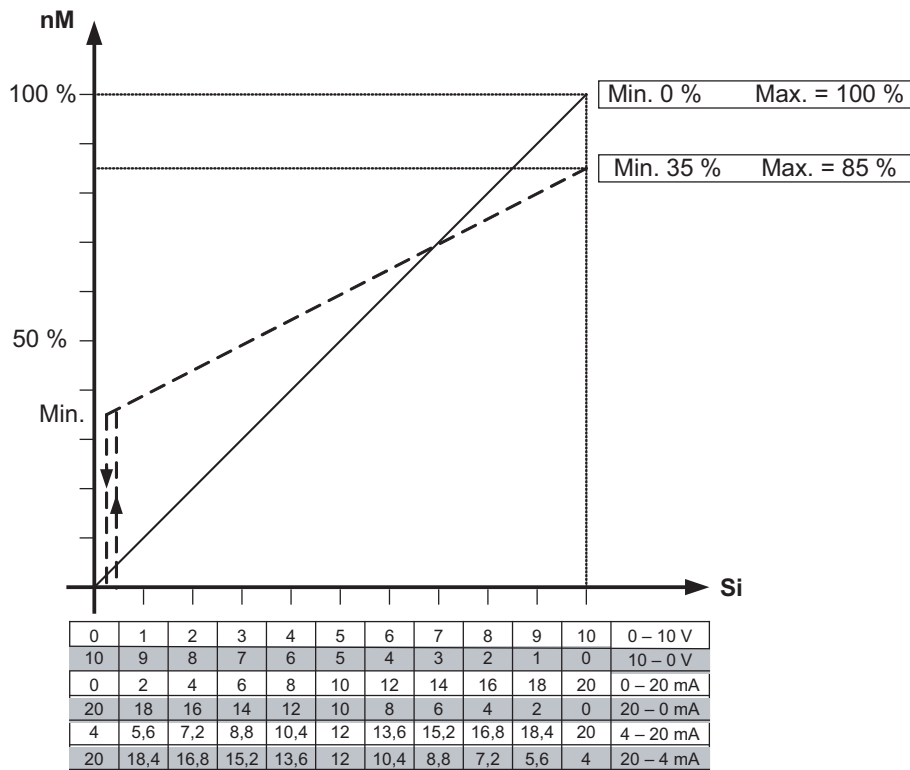
1. You must mount and connect the device in accordance with the operating instructions.
2. Check all connections for correctness once more.
3. The mains voltage must match the information on the rating plate.
4. The rated current on the rating plate will not be exceeded.
5. Make sure that no persons or objects are in the fan's hazardous area.

## 9 Setting for operation

### 9.1 Setting for operation as Speed controller

<p><b>Potenziometer Außen</b></p> 	<p><b>Control by "potentiometer outside"</b>                  Setting range: Output voltage from approx. 0 - 100 % of connected line voltage or in range of settings "n-min" up to "n-max".</p>
<p>Signal to: <b>E1</b></p>  <p>14.02.2008 v_signal_e1.vsd</p>	<p><b>alternatively</b>                  Control by external signal ("potentiometer outside" disconnected).                  Setting range: Output voltage from approx. 0 - 100 % of connected line voltage or in range of settings "n-min" up to "n-max".</p>
 <p>08.02.2008 v_rmin_pset.VSD</p>	<p><b>n-min</b>  <b>Minimum output voltage (basic speed)</b>                  Setting range: 0 - 100 % ("n-min" takes priority if over "n-max").</p>
 <p>08.02.2008 v_rmax_pset.VSD</p>	<p><b>n-max</b>  <b>Maximal output voltage (speed limiter)</b>                  Setting range: 100 % - "n-min".</p>

### 9.2 Diagram: setting signal and speed



05.02.2008  
v\_nmotor\_101\_milub.vsd

Idealized principle diagram

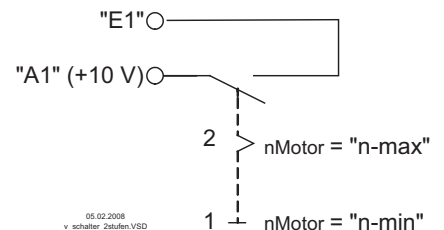
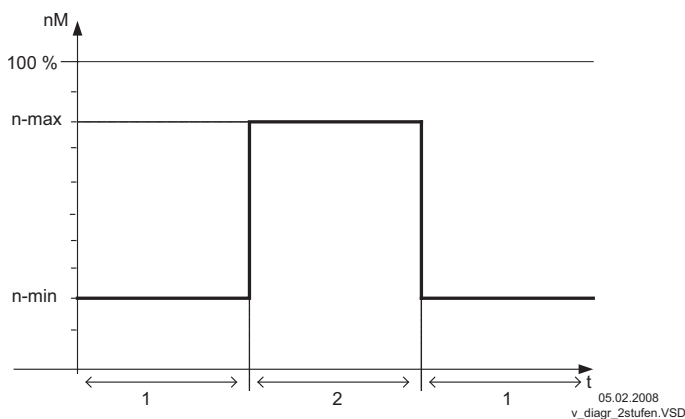
*nM* Motor speed  
*Si* Signal

### 9.3 Operation with two variable output voltages (two steps)

DIP2 =  OFF for setting via external signal.

**Switchover between two steps via external potential-free contact possible.**

- **Step 1** (low speed). When there is no input signal connected to the input terminal "E1", then the unit supplies the output voltage set by "n-min".
- **Step 2** (high speed). When the terminal "A1" (+10 V) is connected with the input terminal "E1" then the units supplies the output voltage set by "n-max".

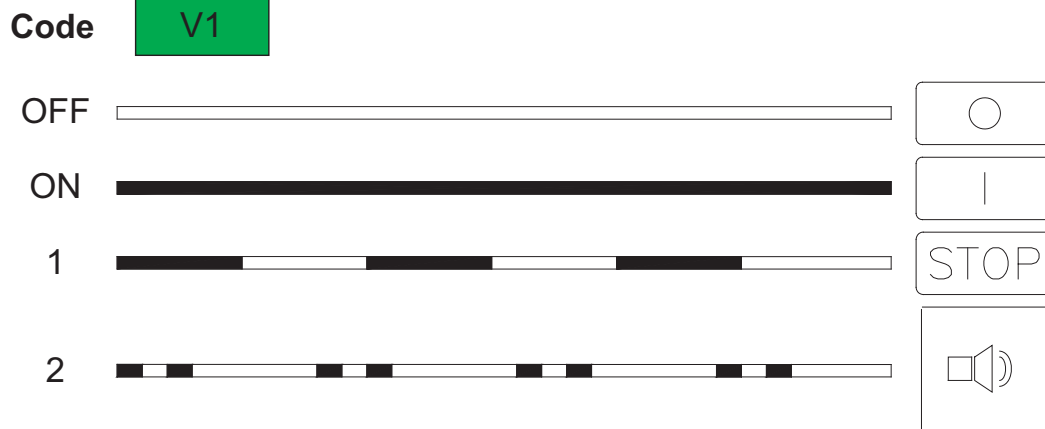


05.02.2008  
v\_schalter\_2stufen.VSD

## 10 Diagnostics / Faults

Operating conditions are indicated by the internal status LED **V1** with flashing code.

Code	Relay K1	Explanation	Reaction of Controller Adjustment
<b>OFF</b>	de-energized terminals 11 - 12 bridged	no line voltage	In the event of a mains interruption the unit switches "OFF" and automatically "ON" when the voltage has been restored. Check line and internal controller fuse.
<b>ON</b>	energized Terminals 12 - 14 bridged	Normal operation without fault	
<b>1</b>	energized Terminals 12 - 14 bridged	<b>no enable</b> Terminals "D1" - "D1" (Digital In 1) not bridged.	Switch OFF by external contact (☞ digital input).
<b>2</b>	de-energized terminals 11 - 12 bridged	<b>Motor fault</b> Tripping of connected thermostat or break between terminals "TB".	The unit cuts out and does not switch on again. Check motor and connection then reset (☞ Motor protection).



30.11.2009  
v\_flash\_code\_p-et.VSD

### 10.1 If controller doesn't work correctly



**Information**

Setting of dip switches in principle only when device is not under voltage!  
If the device is on mains supply modifications will partly not be identified and realized.



**Attention!**

It is forbidden to carry out work on electrically live parts. The enclosure rating of the device when open is IP 00! It is possible to inadvertently touch components carrying hazardous voltages!

# 11 Enclosure

## 11.1 Technical data

Type	Part.-No.	Rated current {1}	Max. line fuse {2}	Integrated semicon- ductor fuse {3}	Max. heat dissi- pation approx. {1}	Weight
		[A]	[A]	[Part.-No.]	[W]	[kg]
P-ET20	REF: 103 14 120 (303629-30)	20	25	30 A 10 x 38 mm gRL (single fuse 00155984)	30	2.3

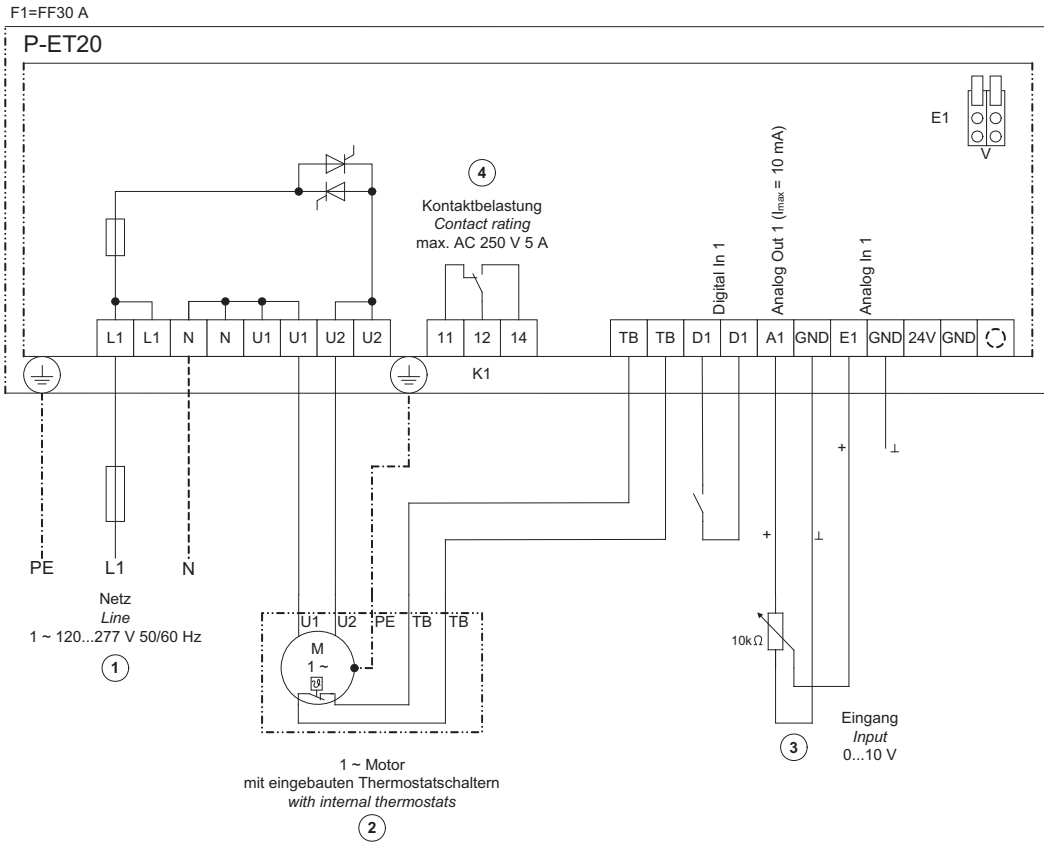
{1} with supply voltage of 230 V / 50 Hz, values for other specifications available on request

{2} Max. supply side **line fuse** according to DIN EN 60204-1 classification VDE0113 chapter 1

{3} Integrated semiconductor fuse in device (no line safety switch)

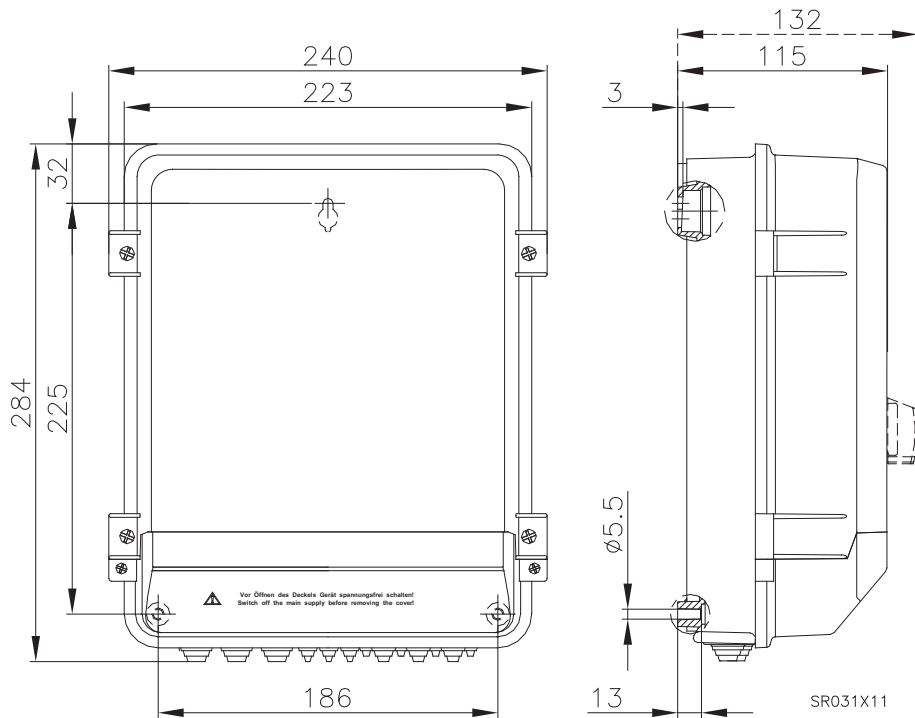
Line voltage	1 ~ 120...277 V (-15...+10 %), 50/60 Hz
Input resistance for sensor or signal set for the rotational speed	for 0 - 10 V input: $R_i > 100 \text{ k}\Omega$
output voltage	approx. 0 - 100 % of applied mains voltage
Min. motor current	approx. 0.2 A
Voltage supply e.g. for sensors	+24 V $\pm 20 \%$ , $I_{\max} 80 \text{ mA}$
Output (0 - 10 V)	$I_{\max} 10 \text{ mA}$ (short-circuit-proof)
Max. permissible ambient temperature	55 °C
Min. permissible ambient temperature	0 °C (if mains voltage is not switched off up to -20 °C)
Max. permissible installation height	0...4000 m amsl Above 1000 m amsl the rated current is to be reduced by 5 % / 1000 m.
Permissible rel. humidity	85 % no condensation
Electromagnetic compatibility for the standard voltage 230 / 400 V according to DIN IEC 60038	Interference emission EN 61000-6-3 (domestic household applications)
	Interference immunity EN 61000-6-2 (industrial applications)
Harmonics current according	In accordance with EN 61000-3-2 Up to a maximum current of 4 A, the limits are adhered to with no restrictions.
Housing protection	IP54

### 11.2 Connection diagram



- 1 Line 1 ~ 120...277 V, 50/60 Hz
- 2 1 ~ Motor with internal thermostats
- 3 Input: 0...10 V (potentiometer outside connected at factory, alternatively for external signal 0 - 10 V)
- 4 Contact rating max. AC 250 V 5 A

### 11.3 Dimensions [mm]



### The **Vent-Axia** Guarantee

Applicable only to products installed and used in the United Kingdom. For details of guarantee outside the United Kingdom contact your local supplier.

Vent-Axia guarantees its products for two years from date of purchase against faulty material or workmanship. In the event of any part being found to be defective, the product will be repaired, or at the Company's option replaced, without charge, provided that the product:-

- Has been installed and used in accordance with the instructions given with each unit.
- Has not been connected to an unsuitable electricity supply. (The correct electricity supply voltage is shown on the product rating label attached to the unit).
- Has not been subjected to misuse, neglect or damage.
- Has not been modified or repaired by any person not authorised by the company.

#### IF CLAIMING UNDER TERMS OF GUARANTEE

Please return the complete product, carriage paid to your original supplier or nearest Vent-Axia Centre, by post or personal visit. Please ensure that it is adequately packed and accompanied by a letter clearly marked "Guarantee Claim" stating the nature of the fault and providing evidence of date and source of purchase.

The guarantee is offered to you as an extra benefit, and does not effect your legal rights

## **Vent-Axia**

Head Office: Fleming Way, Crawley, West Sussex, RH10 9YX. Tel: 01293 526062 Fax: 01293 551188

SALES ENQUIRIES:  
TECHNICAL SUPPORT:  
Web:-[www.vent-axia.com](http://www.vent-axia.com)

**UK NATIONAL CALL CENTRE**, Newton Road, Crawley, West Sussex, RH10 9JA  
Tel: 0844 8560590 Fax: 01293 565169  
Tel: 0844 8560594 Fax: 01293 539209  
Email:- [info@vent-axia.com](mailto:info@vent-axia.com)

As part of the policy of continuous product improvement Vent-Axia reserves the right to alter specifications without notice.

443463A

1109