

**SPECIFICATIONS**

EC Silent Tube Max. m <sup>3</sup> /h	280m <sup>3</sup> /h	500m <sup>3</sup> /h	750m <sup>3</sup> /h	1250m <sup>3</sup> /h	
Product code	ART-ST05	ART-ST06	ART-ST02	ART-ST04	
Fan manufacturer	ebm-papst K3G133-RA01-03	ebm-papst K3G160-RB31-03	ebm-papst K3G190-RC05-03	ebm-papst K3G220-RD53-03	
W / A / VAC	27/0.25/200-240	85/0.75/200-240	83/0.75/200-240	168/1.4/200-240	
Max. Pa	450	820	610	980	
Connection in mm	D1	Ø 125	Ø 200/160	Ø 200	Ø 250
Weight in kg	3.2	4	5.3	7.1	
Dimensions in mm	L1	460	470	580	580
	L2	380	390	500	500
Hanging points M6	L3	110	120	240	240
	D1	125	200/160	200	250
	D2	250	280	315	355
Impeller material	PA plastic	PA plastic	PA plastic	PA plastic	
Housing material	Steel	Steel	Steel	Steel	
Sound insulation	Melamin	Melamin	Melamin	Melamin	
<b>ErP directive overall efficiency:</b>					
Actual	ERP-Ready	ERP-Ready	ERP-Ready	56.6%	
Request 2015				43.1%	

**ENERGY EFFICIENCY**

Our motors with modern EC-technology reach excellent efficiencies and save up to 50% energy compared to conventional motor technology.

The slightly higher investment costs compared to conventional motors usually pay for themselves within a very short operating time thanks to lower energy consumption and lower installation costs.



### GENERAL INFORMATION

**The manufacturer assumes no liability for damage or breakdowns that are due to the non-observance of the operating instructions!**

**In case of unauthorized and unapproved modifications or alterations to the fan, the manufacturer's warranty shall expire immediately. No liability for consequential damages.**

**Installation of the fans must be made exclusively by trained and qualified personnel who are familiar with the mounting, repairs, maintenance of such as well as have the necessary tools to carry out the installation.**

**These installation instructions contain important information about installing, transporting, commissioning, servicing and dismantling the fans safe and properly.**

This device has been manufactured in accordance with the generally accepted rules of technology. Despite this, there is danger of personal injury or material damage if the following safety and warnings in this manual are not observed. The products may be only commissioned if the operating instructions and the safety rules have previously have been read and understood. Keep these instructions where they are accessible for all users at all times. Always give the device to third parties with the installation instructions. Our products are subject to continual quality controls and comply with the applicable provisions at the time of delivery. Because the products are being developed further continuously, we reserve the right to make changes to the products at any time and without prior notice. We assume no liability for the accuracy or completeness of these installation instructions. The warranty only applies to the supplied configuration! We exclude all guarantee, warranty and liability claims for personal injury and material damage due to incorrect installation, improper use or improper handling.

### SAFETY NOTES

The fan is a component in terms of the Machinery Directive 2006/42/EC (partial machine). The product is not a ready-for-use machine as defined by the Machinery Directive. It is intended exclusively for installation in a machine or in ventilation equipment and installations or for combination with other components to form a machine or installation. The product may be commissioned only if it is integrated into the machine/system for which it is intended, and if that machine/system fully complies with the EC Machinery Directive. Never use a fan if it is not in good technical order and condition! Check the product for visible defects, for example cracks in the housing, missing rivets, screws and covers, and any other application-relevant defects! Only use the product within the performance range specified in the technical data and on the typeplate! Protection against contact, protection against being sucked in, and safety distances must comply with DIN EN 294 and DIN 24167-1/13857 (by installing protective grids or sufficiently long tubes)! Generally prescribed electrical and mechanical protection devices are to be provided by the client! Electrical connections and repairs may only be carried out by qualified electricians! Before carrying out any installation or maintenance work, isolate unit from the mains supply! The product may only be operated by personnel with limited physical, sensory or mental capacities if they are supervised or have been instructed by a responsible person. Children must be kept away from the product.

### TRANSPORT AND STORAGE

Transport and storage may only be carried out by specialist personnel according to the Installation Instructions and the relevant, valid regulations. Check that the delivery is as specified on the delivery note; make sure it is complete and correct, and check for any damage. Any missing quantities or damage incurred during transport must be confirmed by the carrier in writing. No liability is accepted if this condition is not observed. Transport the equipment in the original packaging with suitable lifting gear, or on the transport equipment indicated. Avoid damage to or deformation of the housing. The product must be stored in a dry area and protected from the weather in the original packaging. Storage temperature range:  $-10^{\circ}\text{C}$  to  $+40^{\circ}\text{C}$ . Avoid severe temperature fluctuations. If the unit has been stored for over a year, check by hand that the fan turns freely.

### INSTALLATION

Installation work may be carried out only by qualified personnel under observance of the installation instructions and the applicable regulations and standards. Always disconnect all poles from the power supply before you install the product or connect or pull out a plug. Route the cables and wires so that they are not damaged and nobody can trip over them. After the installation, no moving different parts may be accessible anymore! Electrical connections on the device must be connected according to the wiring diagram! Before commissioning, make sure that all seals and closures of the plug connections are correctly installed and undamaged to prevent liquids and foreign matter from penetrating into the product. Signs may not be modified or removed. Always operate the fan in the right direction of air flow (see marking on the device)! The installation is easily accessible for maintenance and cleaning, which are to be performed after removal!

### OPERATING CONDITIONS

Do not operate the fans not in an explosive atmosphere. Do not operate a fan with a frequency converter! Check whether the connection voltage corresponds to that indicated on the typeplate! At operation of the product on an extractor hood: At simultaneous operation of the extractor hood in air extraction mode or boilers, the negative pressure in the installation room of the boiler cannot be greater than 4 Pa ( $4 \times 10^{-5}$  bar). Adequate ventilation of the room must be provided when the extractor hood is operated simultaneously with devices that burn gas or other fuels.

### MAINTENANCE

The fans are maintenance free except for cleaning at the recommended intervals. Make sure that no connections or components are loosened unless the device is disconnected from the mains. Secure the plant so that it cannot be switched on again unintentionally! Deposits from dust laden air will in time accumulate on the impeller and housing. This leads to lower performance, imbalance in the unit, and reduced lifespan. Clean the impeller with a brush or cloth.

Attention!

Do not remove or shift balance weights. Under no circumstances should the interior be cleaned with water or a high pressure cleaner! By installing an air filter the cleaning interval can be considerably extended or avoided!

### DISPOSAL

Careless disposal of the unit may cause pollution. Please dispose of the unit in accordance with the national requirements that apply in your country.



## 1. SAFETY AND PROTECTIVE FUNCTIONS

### **DANGER: Missing safety device and non-functioning protective features**

If there is no safety device, you could be seriously injured, for example by reaching into the running device with your hands.

- ▶ Operate the device only with a fixed guard and guard grille. The guard must withstand the kinetic energy of a fan blade.
- ▶ The device is a built-in component that has no function on its own. As the operator, you are responsible for ensuring that the device is adequately secured.
- ▶ Shut down the device immediately if you detect a missing or ineffective protective feature.

## 2. MECHANICAL MOVEMENT

### **DANGER: Rotating device**

Body parts that come into contact with the rotor and impeller can be injured.

- ▶ Secure the unit to prevent contact. Before working on the installation/machine.
- ▶ Wait until all parts have come to a standstill.

### **DANGER: Rotating device**

Long hair, loose items of clothing and jewellery could become entangled and pulled into the device. You could be injured.

- ▶ Do not wear any loose clothing or jewellery while working on moving parts.
- ▶ Protect long hair with a hood.

## 3. EMISSION

### **WARNING: Depending on the installation and operating conditions, a sound pressure level greater than 70 dB(A) can arise.**

Danger of noise-induced hearing loss

- ▶ Take appropriate technical safety measures.
- ▶ Safeguard the operating personnel with appropriate protection measures, e.g. ear protectors.
- ▶ Also observe the requirements of local agencies.

## 4. ELECTRICAL VOLTAGE AND CURRENT

- ▶ Check the electrical equipment of the device at regular intervals:

### **High-voltage test**

The integrated EMC filter has Y capacitors. The tripping current is exceeded when AC testing voltage is applied.

- ▶ Test the device with DC voltage when you perform the legally required high-voltage test. The voltage to be used corresponds to the peak value of the AC voltage required by the standard.

### **Replace loose connections and defective cables immediately.**

### **DANGER: Electrical load on the device**

Electric shock

- ▶ Stand on a rubber mat if you are working on an electrically loaded device.

### **WARNING:**

#### **Terminals and connections have voltage even in a unit that is shut off**

Electric shock

- ▶ Wait five minutes after disconnecting the voltage at all poles before touching the unit.

### **CAUTION: In the event of fault, electric voltage is present at the rotor and impeller**

The rotor and impeller are base insulated.

- ▶ Do not touch the rotor and impeller when they are installed.

### **CAUTION: If control voltage is applied or a speed setpoint is stored, the motor automatically restarts, e.g. after a power failure.**

Danger of injury

- ▶ Keep out of the danger zone of the device.
- ▶ When working on the device, switch off the mains supply voltage and secure the latter from being switched on again.
- ▶ Wait until the device stops.

## 5. IMPROPER USE

In particular, the following uses of the fan are prohibited and can lead to dangerous situations:

- ▶ Operating the device in an unbalanced state, e.g. due to dirt deposits or ice formation.
- ▶ Moving air that contains abrasive particles.
- ▶ Moving highly corrosive air, e.g. salt spray mist. Exceptions are devices that are intended for salt spray mist and protected accordingly.
- ▶ Moving air that contains dust pollution, e.g. suctioning off saw shavings.
- ▶ Operating the fan in the vicinity of flammable materials or components.
- ▶ Operating the fan in an explosive atmosphere.
- ▶ Using the fan as a safety component or for taking on safety-related functions.
- ▶ Operation with completely or partially disassembled or manipulated protective devices.
- ▶ In addition, all application options that are not listed under proper use.

## 6. CONNECTING THE MECHANICAL SYSTEM

### **CAUTION: Cutting and crushing hazard when removing the device from the packaging**

- ▶ Carefully lift the device out of the packaging; be sure to avoid any shock.
- ▶ Wear safety shoes and cut-resistant safety gloves.
- ▶ The fan may not be handled in the area around the inlet nozzle during transport and installation. There is a risk of damage to the impeller.
- ▶ Check the device for transport damage. Damaged devices are not to be installed.
- ▶ Install the undamaged device in accordance with your application.

## 7. CONNECTING THE ELECTRICAL SYSTEM

### **NOTE: Water ingress into wires or cables**

Water ingress at the customer end of the cable can damage the device.

- ▶ Make sure the end of the cable is connected in a dry environment.
- ▶ Only connect the device to circuits that can be switched off with an all-pole disconnection switch.

### **PREREQUISITES:**

- ▶ Check whether the data on the type plate agree with the connection data.
- ▶ Before connecting the device, ensure that the mains supply voltage matches the fan voltage.
- ▶ Only use cables that are configured for current according to the type plate. Only use cables designed for the current level indicated on the nameplate. For determining the cross-section, note the sizing criteria according to EN 61800-5-1. The protective earth must have a cross-section equal to or greater than that of the phase conductor. We recommend the use of 105 °C cables. Ensure that the minimum cable cross-section is at least AWG 26 / 0.13 mm<sup>2</sup>.

**REACTIVE CURRENTS:** Because of the EMC filter integrated for compliance with EMC limits (interference emission and immunity to interference), reactive currents can be measured in the supply line even when the motor is at a standstill and the line voltage is switched on.

- ▶ The values are typically less than 50 mA.
- ▶ At the same time, the effective power in this operating state (operational readiness) is typically < 2 W.

**RESIDUAL CURRENT CIRCUIT BREAKER (RCCB):** Only pulse-current sensitive and/or universal residual current devices (type A or B) are permitted. As with variable frequency drives, residual current devices cannot provide personal safety while operating the device. When the device's power supply is switched on, pulsed charging currents from the capacitors in the integrated EMC filter can lead to the residual current devices tripping without delay. We recommend the use of residual current circuit breakers with a trip threshold of 300mA and delayed tripping (super-resistant, characteristic K).

**LOCKED-ROTOR PROTECTION:** Due to the locked-rotor protection, the starting current (LRA) is equal to or less than the nominal current (FLA).

### **IMPORTANT INFORMATION!**

#### **EMC issues:**

Electromagnetic interference on control cables or excessive voltage fluctuations can harm the electronics and lead to failure of the products.

The **ground fault circuit interrupter** must be fused for 300mA.

## 8. SWITCHING ON THE DEVICE

The device may only be switched on if it has been installed properly and in accordance with its intended use, including the required safety mechanisms and professional electrical hookup. This also applies for devices which have already been equipped with plugs and terminals or similar connectors by the customer.

### WARNING: Hot motor housing

Fire hazard

- ▶ Ensure that no combustible or flammable materials are located in the vicinity of the fan.
- ▶ Inspect the device for visible external damage and the proper function of the protective features before switching it on.
- ▶ Check the ventilating passages of the fan for foreign objects and remove them.
- ▶ Apply nominal voltage to the voltage supply.
- ▶ Start the device by changing the input signal.

## 9. SWITCHING OFF THE DEVICE

Switch off the device during operation:

- ▶ Switch the device off using the control input in order to protect the device.
- ▶ Do not switch the motor (e.g. in cyclic operation) on and off by means of the power supply.

Switching off the device for maintenance:

- ▶ Switch off the device via the control input.
- ▶ Do not switch the motor (e.g. in cyclic operation) on and off via power supply.
- ▶ Disconnect the device from the power supply.
- ▶ When disconnecting, be sure to disconnect the ground connection last.

## 10. INTEGRATED PROTECTIVE FEATURES

The integrated protective functions cause the motor to switch off automatically in the event of faults described in the table.

Fault	Safety feature description/function
Rotor position detection error	An automatic restart follows.
Blocked rotor	After the blockage is removed, the motor restarts automatically.
Line undervoltage (line voltage outside of permitted nominal voltage range)	If the line voltage returns to permitted values, the motor restarts automatically.

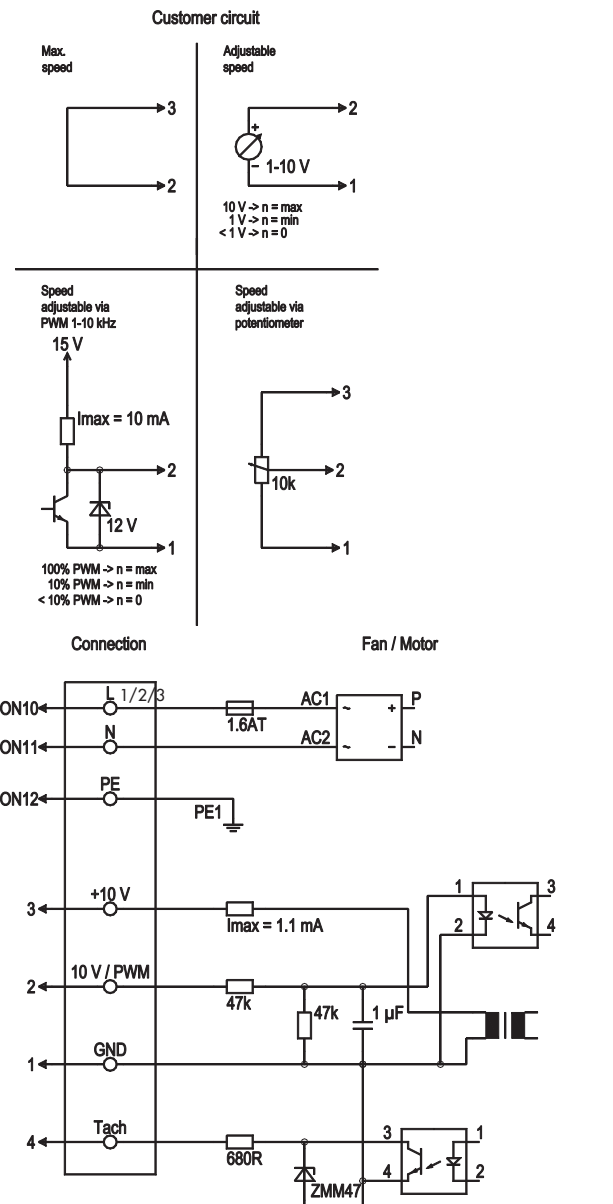
## 11. CONNECTION FOR EXTERNAL INSTALLATION

Conn.	Color	Designation	Function/assignment
CON10	black	L1	Supply voltage 1~ 200-277 VAC, 50/60 Hz Supply voltage 3~ 380-480 VAC, 50/60 Hz
CON10	black	L2	Supply voltage 3~ 380-480 VAC, 50/60 Hz
CON10	black	L3	Supply voltage 3~ 380-480 VAC, 50/60 Hz
CON11	blue	N	Neutral conductor
CON12	green/yellow	PE	Protective earth

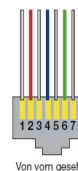
  

Connection Diagramm	Color Code EC Motor	Designation	Function/assignment	RJ45 Pin-assignment	Jack assignment
		Bus 1	Modbus A	1	
		Bus 2	Modbus B	2	
3	Rot / red	10V/max. 1.1 mA	Voltage output 10V/1.1 mA, electrically isolated, not short-circuit-proof	3	1
2	Gelb / yellow	0-10V PWM	Control input 0-10V or PWM, electrically isolated	4	2
1	Blau / blue	GND	GND - connection for control interface	5	3
4	Weiss / white	Tach	Tach output: Open collector, 1 pulse per revolution, electrically isolated	6	
				7	
				8	

## 12. CONNECTION DIAGRAM



RJ45-Buchse



RJ45-Stecker  
1 2 3 4 5 6 7 8

