

ECblue

Basic version, motor sizes: D (116), G (152)

Quick Start Guide

Detailed Assembly instructions on www.ziehl-abegg.com

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1 General notes

1.1 Validity

This document is valid for motors and fans of the ECblue Basic series. Motor sizes: D (116) and G (152).

The used motor size is recognisable from the type designation (☞ rating plate).

Examples for type designations with motor size D = 116		
Motors Type	Axial fans type	Centrifugal fans type
MK116- _ _	F _ _ _ - _ . D _ _ _ _ D _ _ _ - _ . D _ _ _ _ Z _ _ _ - _ . D _ _ _ _	RH _ _ - _ . D _ _ _ GR _ _ - _ . D _ _ _ ER _ _ - _ . D _ _ _ WR _ _ - _ . D _ _ _



Information

In the case of fans with the quality mark (☞ rating plate), please note the related specifications depending on the application location.

1.2 Structure of the short operating instructions



Attention!

This Quick Start Guide contains basic information on safety, use, installation and commissioning.

This document does not supersede the detailed assembly instructions available for downloading on our homepage. The further information contained therein must be observed!

To download the Assembly Instructions, go to www.ziehl-abegg.com and enter the drawing number of the download version.

search key

L-BAL-F052D



1.3 Exclusion of liability

Concurrence between the contents of these assembly 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.

ZIEHL-ABEGG SE is not liable for damage due to misuse, incorrect use, improper use or as a consequence of unauthorized repairs or modifications.

2 Safety instructions

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.



Information

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



Danger due to electric current

- It is generally forbidden to carry out work on electrical live parts. Protection class of the device when open is IP00! It is possible to touch hazardous voltages directly.
- The safe isolation from the supply must be checked using a **two-pole** voltage detector.
- The rotor is not protected against indirect contact neither by supplementary or reinforced insulation nor by connection to safety-earth in accordance with EN 60204-1, therefore the system constructor must provide protection by enclosure in accordance with EN 61140 before the motor is connected to a power source. This protection can be achieved for example by a guard grille (☞ Product overview: Application operational area and Mounting: General notes).
- When the motor runs independently due to air flowing through or if it continues to run down after being turned off, dangerous voltages of over 50 V can arise on the motor internal connections through operation of the generator.
- Even after disconnecting the mains voltage, life-threatening charges can appear between the protective ground "PE" and the mains connection.
- The protective earth is conducting high discharge currents (dependent on the switching frequency, current-source voltage and motor capacity). Earthing in compliance with EN specifications shall therefore be observed even for testing and trial conditions (EN 50 178, Art. 5.2.11). Without earthing, dangerous voltages can be present on the motor housing.

Waiting period at least 3 minutes!

- Through use of capacitors, danger of death exists even after switching off the device through directly touching the energized parts or due to parts that have become energized due to faults.
- The controller housing may only be removed or opened when the power line has been switched off and a period of three minutes has elapsed since switching it off.



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.
- Check before commissioning:
 1. Installation and electrical connection have been properly completed?
 2. Has any leftover installation material and other foreign material been removed from the fan area?
 3. That safety devices -if necessary- are mounted (EN ISO 13857)?

4. The impeller is out of reach?
 5. Are the condensation water drains holes open or respectively closed according to the suitable installation position?
 6. Connection data complies with the specifications on the rating plate?
- Commissioning may only take place if all safety instructions have been checked and danger can be excluded.
 - 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.
 - A-rated sound power levels of over 80 dB(A) are possible, see product catalogue.
 - Check for mechanical vibrations after installation into the system. If the tolerances according to ISO 10816-1 are exceeded, it is possible to exclude certain speed ranges (☞ Motor Setup or add-on module).
 - Check the direction of rotation (☞ rotation direction arrow on the fan blade, impeller base plate or on the fan housing).
 - Maintenance work may only be carried out by suitably qualified personnel.
 - ▷ Before working on the fan, this must be disconnected from the power supply and secured against switching back on!
 - ▷ No maintenance work at running fan!
 - ▷ Wear safety shoes and gloves for handling!
 - ▷ Please observe the safety regulations and the worker's protection rules by all maintenance and service work (EN 50 110, IEC 364).

**Attention, automatic restart!**

- The fan / motor may switch on and off automatically for functional reasons.
- After power failure or mains disconnection an automatic restart of the fan takes place after voltage return!
- Wait for the fan to come to a complete standstill before approaching it!
- The exterior rotor turns during operation of the external rotor motor!

**Danger of being sucked in!**

Do not wear loose or hanging clothing, jewellery, etc., tie together long hair and cover it.

**Attention, hot surface!**

Temperatures of above 85 °C can occur on the motor surfaces, especially on the controller housing!

2.1 Intended use



Attention!

- The fans are only intended for the conveyance of air or mixtures similar to air.
- Any other use above and beyond this is considered not for the intended purpose unless agreed otherwise by contract. The manufacturer will not be liable for any damage resulting from this. The individual or company using it bears the sole risk.
- Do not connect built-in fans to open flue pipes of gas and other firing devices.
- Built-in fans with VDE approval (see rating plate) are designed to be installed inside devices and are not suitable for the direct mains connection.
- Reading these document and complying with all contained instructions -especially the safety notifications contained therein -are considered part of intended use.
- To consider is also the documentation of attached components.

2.2 Improper use




Improper use / reasonably foreseeable misuse

- Conveyance of aggressive and explosive gaseous media.
- Use in areas at risk of explosion for conveying gas, mist, vapours or mixtures of the above.
- Transfer of solids or solids content in the transfer medium.
- Operation with iced up fan impellers.
- Conveyance of abrasive or adhesive media.
- Conveyance of liquid media.
- Use of the fan and add-on parts (e.g. safety grille) as a resting surface or climbing aid.
- Fans are not designed for walking on even with an additive diffusor attachment (retrofit kit)! Do not climb onto fans without suitable aids.
- Unauthorised constructional modifications to the fan.
- Operation of the fan as a safety component or for the performance of safety-relevant functions in the sense of EN ISO 13849-1.
- Blocking or braking of the fan by inserting objects.
- Loosening of fan blade, impeller and balancing weight.
- All applications not listed in the intended use.

Not the manufacturer, rather the operator of the device is liable for any personal harm or material damage arising from non-intended use.

2.3 Explanations of symbols

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

	<p>Attention! General hazardous area. Death or severe injury or significant property damage can occur if the corresponding precautions are not taken!</p>
	<p>Danger due to electric current Danger by dangerous, electric voltage! Death or severe injury can occur if the corresponding precautions are not taken!</p>
	<p>Information Important additional information and advice for user.</p>

3 Product overview

3.1 Application operational area

The fans / motors are not ready-for-use products, but conceived as components for ventilation systems (type designation see rating plate).

The fans may not be operated until they are installed in line with their intended use. The supplied and certified guard grille of ZIEHL-ABEGG SE fans is designed in accordance with DIN EN ISO 13857 Table 4 (from the age of 14 up). In the event of deviations, further structural protective measures must be taken for safe operation.

3.2 Transport, storage



Attention!

- Observe the weight specifications (see rating plate) and the permissible carrying loads of the means of transport.
- Wear safety shoes and gloves for handling!
- Do not transport the fan by the connecting cable!
- Avoid shocks and impacts to the device during the transport.
- Avoid extreme humidity, heat or exposure to cold (see Technical Data).
- Watch out for possible damage to the packaging or fan.
- Fix pallets during transport.
- Do not stack pallets.
- Only handle with suitable hoisting gear.
- Position the lifting beam transversely to the motor axis. Pay attention to adequate width of the lifting beam.
- Never stand underneath the suspended fan because defective transport equipment could cause death.

- Store the fan / motor in the original packaging in a dry area protected from the weather and protect it from dirt and weather until final installation.
- Avoid prolonged storage; we recommend a maximum of one year (consult the manufacturer before starting if stored for longer).
- Inspect the bearing for proper operation prior to installation.
 - Recommendation: Turn the impeller evenly by hand to avoid jamming and damaging the bearing.
- Transport the fan(s) either in the original packaging or, in the case of larger fans, on the dedicated transportation fixtures.
 - axial fans: holes drilled in support arms, wall ring plates and motor block
 - centrifugal fans depending on type: holes drilled in the housing flange, motor block, fastening brackets and support plates,
- Radial impellers, fans with scroll RG.., RD.. or built-in fans type ER../GR.., WR.. are generally delivered on europallets, and can be transported using lift trucks.
- **Design RG.. / RD.. / ER.. / GR../WR..** : Fan unit may only be lifted and transported when using a suitable hoisting device (load spreader). Ensure sufficient cable or chain length.
- **Design FV.. / DN..** : The fan must be fastened to 4 points during transport so the flanges do not warp.
- Design WR: maximum permissible number for lifting fan units mounted on top of one another

Size	External dimensions [mm]	Permissible number
1	607 x 607	5
2	760 x 760	4
3	912 x 912	3

Attention!

Lifting several fan units next to one another is prohibited!

3.3 Disposal / recycling



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


- ▷ Separate the materials by type and in an environmentally friendly way.
- ▷ If necessary, commission a specialist company with the waste disposal.

4 Mounting

4.1 General notes



Attention!

- Check the fan for damage, e.g. cracks, dents or damage to the electric cables, before assembly. Start-up is not allowed in the case of transport damage!
- Mounting is only to be undertaken by trained service personnel. The system manufacturer or the machine builder and/or the user is responsible that the inherent installation and security information are harmonized with the valid standard and guidelines (EN ISO 12100 / 13857).
- Wear safety shoes and gloves for handling!
- Lift the fan out of the packaging with a lifting gear (lifting beam). Attachment points are solely the holes on the housing flange, motor bed, support plate, motor suspensions, fastening brackets and any crane eyes of the fan (depending on the shape of the fan).
- The chain/rope may not touch the impeller and the possibly mounted frequency inverter when lifting with the lifting beam, otherwise damage is possible.
- At a weight greater than 25 kg for men / 10 kg for women, the device should be lifted out by two persons (according to REFA). The values may differ from country to country.
- Prior to installing the fan, it is to be checked whether the safety zone as per EN ISO 13857 and in household appliances as per EN 60335 are met. If the installation height (danger zone) above the reference level is greater than or equal to 2700 mm and is not reduced by auxiliary means such as chairs, ladders, work platforms or bases on vehicles, a guard grille against accidental contact is not necessary at the fan.
- If the fan is located in danger zone, then the manufacturer or operator shall ensure that hazards shall be prevented by appropriate protective constructions which meet the requirements to EN ISO 13857.
- Protective measures must be taken against falling parts when mounting with a hanging rotor.
- The custom designs must suit the prevailing conditions.
- Tighten the fastenings with the specified torques.
- Do not allow drilling chips, screws and other foreign bodies to reach the device interior!
- Any use below -10 °C is dependent on not being subjected to unusual, sudden or mechanical loads or stresses on the material (min. ambient temperature  Technical data).
- Corrosion is possible at the cutting edges on sendzimir galvanised parts.
- Before the first switch-on, remove any items that may be present (borings, screws and other foreign objects) from the intake area - risk of injury from any objects that may fly out!

4.2 Installation of axial fans

4.2.1 Fans design A, D, K, S and W (without nozzles)

For attachment to fixed motor flange use screws with property class 8.8 or A2-70 (stainless steel) to EN ISO 4014 and provide with suitable screw locking.

Permissible tightening torques M_A			
Motor size	D	D	G
Thread size	M6 (Special application with 5-pitch)	M8	M10
Property class 8.8, friction coefficient $\mu_{ges} = 0.12$	9.5 Nm	23 Nm	40 Nm
Stainless steel A2-70, friction coefficient $\mu_{ges} = 0.12$	7 Nm	17 Nm	33 Nm
Screw penetration	$\geq 1.5 \times d$	$\geq 1.5 \times d$	$\geq 1.5 \times d$

When using screws with different friction values or strength classes, different tightening torques may be necessary.

4.2.2 ZAplus fans

ZAplus fans Type ZN: When mounting ZAplus, ensure plastic-compliant connectors. If flat washers as per DIN EN ISO 7089 or DIN125 are used for fastening, a permissible torque for Strength class 8.8 and a frictional value $\mu_{tot}=0.12$ of M10 (for ZAplus size 500) =24Nm / M12 (for ZAplus size 800) =40Nm is recommended.

Since the concrete bolt or screw varies by customer unit, these recommendations must be checked for each respective situation.

Tighten the grate connector with 6Nm torque.

Secure the cable covering against loss after connecting the motor by securing with 2 cable ties.

For a version with a square rear wall (design Q), removal of this square plastic plate is prohibited.

4.2.3 Assembly MAXvent fan

For attachment to fixed motor flange use screws with property class 8.8 or A2-70 (stainless steel) to EN ISO 4014 and provide with suitable screw locking.

Observe the following points for all types of fans:

- Do not install without suitable supports/brackets.
- Fasten the fan with suitable bolts using all the fastening points of the flanges.
- Fasten the accessories with suitable bolts.

Tightening torques for fastening the fan and accessories:

Tightening torques M_A				
Thread size	M6 (Special application with 5-pitch)	M8	M10	M12
Property class 8.8, friction coefficient $\mu_{ges} = 0.12$	9.5 Nm	23 Nm	46 Nm	79 Nm
Stainless steel A2-70, friction coefficient $\mu_{ges} = 0.12$	6.4 Nm	15.3 Nm	31 Nm	52 Nm
Screw penetration	$\geq 1.5 \times d$	$\geq 1.5 \times d$	$\geq 1.5 \times d$	$\geq 1.5 \times d$

When using screws with different friction values or strength classes, different tightening torques may be necessary.

4.3 Mounting of centrifugal fans

Design RE, RH, RM, RZ


For attachment to fixed motor flange use screws with property class 8.8 to EN ISO 4014 and provide with suitable screw locking.

Permissible tightening torques M_A		
Motor size	D	G
Thread size	M8	M10
Property class 8.8, friction coefficient $\mu_{ges} = 0.12$	23 Nm	40 Nm
Screw penetration	$\geq 1.5 \times d$	$\geq 1.5 \times d$

When using screws with different friction values or strength classes, different tightening torques may be necessary.

4.4 Mounting the motor

Motors design MK

Fastening to fixed motor flange  assembly of axial fans / fans of design A, D .. and assembly of radial fans of design RH

- If the motor is used to drive fan impellers or other components, please note the maximum permissible speeds of the impeller or the component to be driven.
- The max. permissible mass of the impeller or the component to be driven must be inquired from and confirmed in writing by ZIEHL-ABEGG.

Design K (with rotor flange) or D (with offset rotor flange) as a drive for fans:

- During assembly of the fan impellers or other components, no inadmissible force may be applied to the motor bearing.
- Centre the fan impeller accurately and mount without tension on the rotor flange, the fan wheel must lie flat.
- Use suitable screws for fastening the fan impeller on the rotor flange and fit as suitable screw lock.
- Every screwing case must be tested for suitability.
- The permissible area pressing of the steel flange may never be exceeded (depending on the contact surface).
- Too great a screw overhang is not permitted and can lead to scraping or blocking of the rotor on the fixed motor flange.
- Motors are not balanced as standard, a complete balancing with mounted fan impeller is necessary. The balancing must be done on the fan impeller. The pertinent regulations must be observed.

Permissible tightening torques M_A		
Motor size	D	G
Thread size	M6	M8
Property class 8.8, friction coefficient $\mu_{ges} = 0.12$	9.5 Nm	23 Nm
Screw penetration	$\geq 0.83 \times d$	$\geq 0.83 \times d$
Max. permissible screw overhang	1.0 mm	1.5 mm

5 Electrical installation

5.1 Version with connection cables



Information

- In versions with connecting leads the connection is made to the colour coded wires. Note the cable bands on the connecting leads and the connection plan in the enclosure to the assembly instructions.
- The type, length, colour coding and connection assignment of the connecting leads may vary depending on the version.
- Read the following chapter “Connection to terminals in the terminal compartment” for a new connection to the terminals in the terminal compartment.

Example for possible version

1 ~ ECblue, for line and relay: hose cable 5 x 1.5 mm ² (LiF9Y11Y-JB)			
	brown	L1	Line
	blue	N	
	green-yellow	PE	
	white	11	Relay
	white	14	K1

3 ~ ECblue, for line and relay: hose cable 6 x 1.5 mm ² (LiF9Y11Y-JB)			
	brown	L1	Line
	blue or grey	L2	
	black	L3	
	green-yellow	PE	
	white	11	Relay
	white	14	K1

1 ~ and 3 ~ ECblue, for control: hose cable 5 x 0.5 mm ² (LiF9Y11Y-0B)			
	yellow	E1	Analog In 1
	blue	GND	
	green	D1	Digital In 1
	red	10V	DC Out
	brown	24V	DC Out

5.2 Version without connection cables



- 1 Cover of controller housing
- 2 Cable glands + seal insert for two cables (applicable only if necessary)
 - motor size "D": 3 x M16 + 1 x seal insert with two holes 5 mm
 - motor size "G": 3 x M20 + 1 x seal insert with two holes 6 mm
- 3 Cable entry points with plastic fastener
- 4 Mains connection
- 5 Connection alarm relay
- 6 Connection control system
- 7 Slot for add-on module

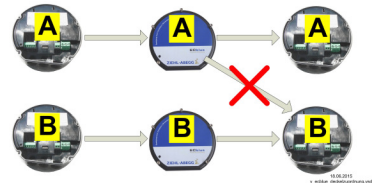
Procedure:

1. Remove the cover from the controller housing for the connection.
2. All 3 cable entry points are in a sealed condition at delivery. Remove plastic fastener if necessary, and insert enclosed cable glands, entry points that are not used must remain sealed!
3. Insert and connect lines correctly.
4. Attach cover of controller housing again carefully in correct position before start-up.

Attention!

The seal of the end cap can adopt the contour of the stator bushing in time.

Therefore mount the cover on the same motor that it was removed from to achieve maximum tightness.



Do not mix the covers!

**Attention!**

- Temperatures up to 80 °C can be present on the controller housing.
- To connect, always use heat resistant wires or, as an alternative, silicon tubes.
- Only use lines which can guarantee a permanent seal around the cable glands (pressure-resistant, dimensionally-stable, round-centred jacket; e.g. by means of gusset filling)! Lines with filling fleece are not permissible because moisture can penetrate due to the capillary effect!
- Two lines may only be fed through one cable screw-type gland with the sealing insert for two lines.
- When using the seal insert for two cables it is not permissible to use the corresponding cable gland with only one cable.
- Make absolutely sure that different connections do not come into contact (e.g. by splaying or loose connecting wires).
- Remnants from installation and foreign object may not remain on the inside!
Remnants from installation, foreign objects and dirt has to be removed from the sealing area between cover and controller housing!

**Information**

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

Tightening torques M_A

	Thread size	Tightening torque M_A		Remarks
		[Nm]	[Lb In]	
Cable gland	M16	2.5	22	Sealing area cable diameter 4... 10 mm
Cable gland	M20	4	35	Sealing area for cable diameter 6... 12 mm
Locking screw	M16 + M20	2.5	22	Slotted screwdriver
Cover of controller housing	M4	2.5	22	
Protective earth connection	M4	2.5	22	
Mains supply terminals *	M3	0.6	5	
Terminals relays and control	M3	0.6	5	
Fastening add-on module	M4	1.3	11	
Terminals add-on module	M2	0.24	2.2	

* Specification for versions without spring force terminals

Max. cross section of terminals

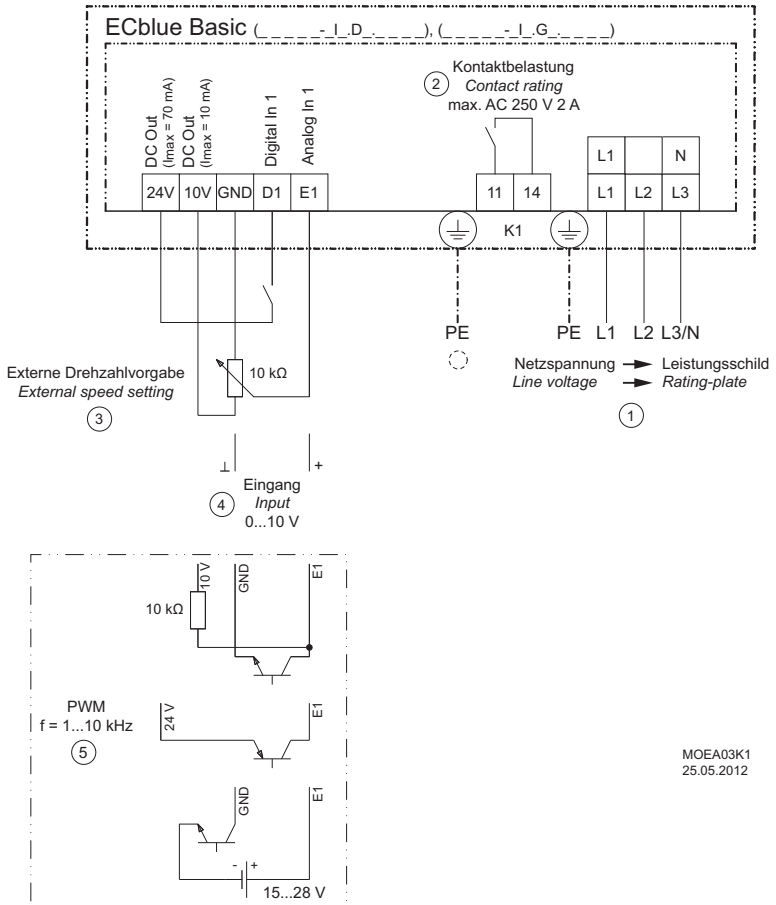
Mains connection: PE, L1, N or PE, L1, L2, L3	max. 2.5 mm ² and/or AWG12
Connection control: +24 V, +10 V, GND, D1, E1, K1	max. 1.5 mm ² and/or AWG16
Add-on modules:	1.5 mm ² (0.75 mm ² with wire end sleeve) and/or AWG16

i**UL: note for cable entrances**

According to UL the attached locking screws (made of plastic) are acceptable for transport.

According to UL the supplied cable glands can be used without conduit when they are being used in an installation according to **NFPA79**.

5.3 Connection diagram






- 1 Line voltage rating plate
- 2 Contact rating max. AC 250 V 2 A
- 3 External speed setting
- 4 Input 0...10 V
- 5 PWM input, f = 1...10 kHz



Residual-current-operated protective devices

For ECblue 3 ~ types and when connecting 1 ~ types between two outer conductors, only all-current sensitive fault current circuit breakers (type B) are allowed (EN 50 178, Art. 5.2).

Terminal	Function / connection
L1, N, PE	Mains connection for 1 ~ types (observe the line voltage indicated  rating plate).
L1, L2, L3, PE	Mains connection for 3 ~ types (observe the line voltage indicated  rating plate).
11, 14	<p>Relay output "K1" for fault indication.*</p> <ul style="list-style-type: none"> • For operation the relay is energized, connections "11" and "14" are bridged. For fault the relay is de-energized (Diagnostics / faults). • When switching off via enable (D1 = Digital In 1), the relay remains energized. <p>Information</p> <p>After switching on the line voltage, an initialisation time of a maximum 7.5 seconds is required for the device's electronics to be operational. Subsequently, a reliable status message will be possible. If no malfunction is detected, the relay will be energised after the initialisation time.</p>
E1, GND	Analog input for setting speed via 0 - 10 V or PWM signal*
10V	Voltage supply for speed setting by 10 kΩ potentiometer.
24V	Voltage supply for external devices.
D1, +24V	<p>Digital input for enable.*</p> <ul style="list-style-type: none"> • Device "ON" for closed contact. • Controller "OFF" with opened contact.

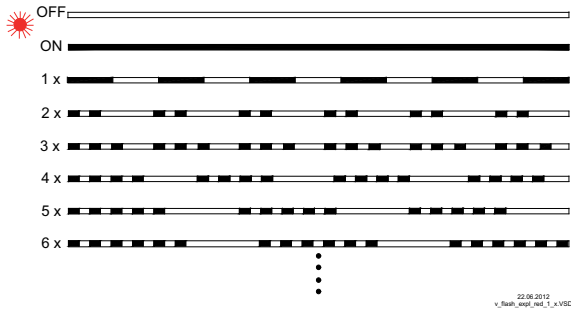
* Function for standard factory setting, different presetting possible.

UL: Input (Line)

- Cu connection leads with the following specifications must be employed:
 - Minimum insulation temperature of 80 °C
 - Terminal tightening torque for field block (L1, N, and/or L1, L2, L3) of 5 - 7 Lb In. (Exception: spring-cage terminal for motor size "G" @ line voltage 3 ~ 200...240 V)
 - Terminal tightening torque of 4.5 Lb In for field block (K1).
 - Terminal tightening torque of 4.5 Lb In for all other field blocks.
 - Terminal tightening torque of 2.2 Lb In for add-on modules.

6 Diagnostics / Faults

Status output with flashing code





LED Code	Relays K1*	Cause
OFF	de-energized, 11 - 14 interrupted	No line voltage
ON	energized, 11 - 14 bridged	Normal operation without fault
1 x	energized, 11 - 14 bridged	No enable = OFF
2 x	energized, 11 - 14 bridged	Temperature management active
3 x	de-energized, 11 - 14 interrupted	HALL-IC error
4 x	de-energized, 11 - 14 interrupted	Line failure (only for 3 ~ types)
5 x	de-energized, 11 - 14 interrupted	Motor blocked
6 x	de-energized, 11 - 14 interrupted	IGBT Fault
7 x	de-energized, 11 - 14 interrupted	Intermediate undervoltage
8 x	de-energized, 11 - 14 interrupted	Intermediate circuit overvoltage
9 x	energized, 11 - 14 bridged	IGBT cooling down period
11 x	de-energized, 11 - 14 interrupted	Error motor start
12 x	de-energized, 11 - 14 interrupted	Line voltage too low
13 x	de-energized, 11 - 14 interrupted	Line voltage too high
14 x	de-energized, 11 - 14 interrupted	Error Peak current
17 x	de-energized, 11 - 14 interrupted	Temperature alarm

* K1: programmed function at factory: Fault indication not inverted


7 Enclosure


7.1 Technical data

Line voltage* ( rating plate)	AC: 1 ~ 200...277 V (+/- 10 %), 50/60 Hz	DC: 280...400 V (+/- 10 %)
	AC: 3 ~ 200...240 V (+/- 10 %), 50/60 Hz	DC: 280...340 V (+/- 10 %)
	AC: 3 ~ 380...480 V (+/- 10 %), 50/60 Hz	DC: 500...680 V (+/- 10 %)
	AC: 3 ~ 200...480 V (+/- 10 %), 50/60 Hz	DC: 280...680 V (+/- 10 %)
		DC supply not UL approved!
Maximal line fuse**	16 A for all types 1 ~ and 3 ~	
Max. load limit integral of cut-in current approx.	1.22 A ² s	
Switching Freq.	16 kHz	
Input resistance for signal set for the rotational speed	R _i > 100 kΩ	
Specification speed setting signal PWM	Voltage: 15...28 VDC Switching Frequency: 1...10 kHz On-off ratio: 0...100 %	
Voltage supply for external devices	+10 V, I _{max} 10 mA (short-circuit-proof)	
	+24 V ±20 %, I _{max} 70 mA	
Digital input "D1"	Input resistance: R _i approx. 4 kΩ Voltage range high level: 10...30 V DC Voltage range low level: 0...4 V DC	
Permissible minimal and maximal ambient temperature for operation	-35...60 °C  rating plate (up to 70 °C ***)	
	Please see the technical documentation of the product for the minimum and maximum ambient temperature valid for the respective fan ; these may deviate from the specified permissible ambient temperatures. To avoid condensation the drive must be continuously energized due to the application of heat, with interruptions such that cooling to the point of condensation does not occur.	
Permissible installation height	0...4000 m amsl	
	≤ 1000 m: no limitation	
	> 1000 m: max. permissible input current = current indication rating plate minus 5 % / 1000 m	
Permissible rel. humidity	> 2000 m: max. permissible line voltage = max. voltage indication rating plate minus 1.29 % / 100 m	
	The motor is released for a relative humidity of 100 % at continental climate without other ambient influences. Other ambient conditions on request.	
Permissible temperature range for storage and transport	-40...+80 °C	

Electromagnetic compatibility for the standard voltage 230 / 400 V according to IEC 60038	Interference emission EN 61000-6-3 (domestic household applications)
	Interference immunity EN 61000-6-2 (industrial applications)
Harmonics current	For 1 ~ types Active power factor adjustment for sinusoidal input current (PFC = Power - Factor - controller), harmonic current in accordance with EN 61000-3-2 are guaranteed.
	For 3 ~ types According to EN 61000-3-2 (☞ Assembly instructions / Electrical installation / EMC-compatible installation / Harmonics current for 3 ~ types).
Contact rating of the internal relay	AC 250 V 2 A
Max. leakage current according to the defined networks of EN 60990	< 3.5 mA
dB(A) values	☞ product catalog
Ball bearings grease service-life (F _{10h})	during standard usage ca. 30 - 40,000 h
Protection class of motor according to EN 60529	IP54

- * Regarding the mains connection, these devices are to be classified as category “C2” devices according to the relevant EN 61800-3. The increased requirements placed on electrical interference > 2 kHz for category “C1” devices are complied with in addition.
- ** Max. line fuse on site (line protection fuse) according to EN 60204-1 Classification VDE0113 Part 1 (see also Assembly instructions / Electrical installation / Mains connection / Line protection fuse).
- *** In case of a temperature increase above the predetermined threshold values modulation is linearly reduced by active temperature management.

For motors/fans with the corresponding quality mark (☞ rating plate)		
Authorization:	FILE No. E213826	UL 508c
		Power Conversion Equipment 62BN
Environment type rating: 3		

For motors/fans with the corresponding quality mark (☞ rating plate)		
Authorization:	FILE No. E213826	UL 508c
		Power Conversion Equipment 62BN
Environment type rating: 3		

7.2 EC Declaration of Incorporation

- Translation -
(english)

ZA87 1750 Index 007

00296702-GB

**as defined by the EC Machinery Directive
2006/42/EC, Annex II B**

The design of the incomplete machine:

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

Motor type:

- Induction 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 Appendix I, Articles 1.1.2, 1.1.5, 1.4.1, 1.5.1 in
EG Machinery Directive 2006/42/EG.**

Manufacturer

**ZIEHL-ABEGG SE
Heinz-Ziehl-Strasse
D-74653 Künzelsau**

The following harmonised standards have been used:

EN 60204-1:2006+A1:2009	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 13857:2008	Safety of machinery; safety distances to prevent danger zones being reached by the upper limbs
Note:	The maintenance of the EN ISO 13857:2008 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 Appendix VII B has been written and is available in its entirety.

The person authorised for compiling the specific technical documentation is: Dr. W. Angelis, 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.

It is prohibited to commission this incomplete machine until it has been secured that the machine into which it was incorporated complies with the stipulations of the EC Machinery Directive.

Künzelsau, 12.12.2017

ZIEHL-ABEGG SE
Dr. W. Angelis
Technical Director Ventilation Division

i.v. W. Angelis

7.3 **Manufacturer reference**

Our products are manufactured in accordance with the relevant international regulations. If you have any questions concerning the use of our products or plan special uses, please contact:

ZIEHL-ABEGG SE
Heinz-Ziehl-Straße
74653 Künzelsau
Telephone: +49 (0) 7940 16-0
Telefax: +49 (0) 7940 16-504
info@ziehl-abegg.de
http://www.ziehl-abegg.de

7.4 **Service information**

If you have any technical questions while commissioning or regarding malfunctions, please contact our technical support for control systems - ventilation technology.

phone: +49 (0) 7940 16-800

Email: fan-controls-service@ziehl-abegg.de

Our worldwide contacts are available in our subsidiaries for deliveries outside of Germany, see www.ziehl-abegg.com.

If you make returns for inspections or repairs we need certain information in order to facilitate focused trouble shooting and fast repair. Please use our repair ticket for this. It is provided to you after you have consulted our support department.

In addition, you can download it from our homepage. Support - Downloads - General documents.