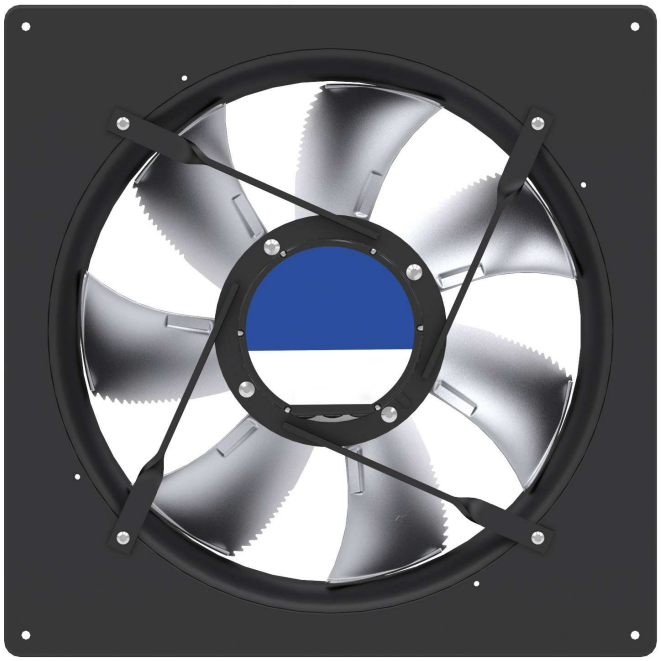
AW EC

Fan size: AW 500 EC, AW 500D EC, AW 560D EC, AW 630D EC, AW 710D EC, AW 800D EC, AW 1000D EC

EC-fans with top efficiency

Operating Instructions



Keep for reference!

L-BAL-F102-GB 2023/26 Index 000 Part.-No. 00712750-GB

systemair

Content

1 General notes

Compliance with the following instructions is mandatory to ensure the functionality and safety of the product. If the following instructions given especially but not limited for general safety, transport, storage, mounting, operating conditions, start-up, maintenance, repair, cleaning and disposal / recycling are not observed, the product may not operate safely and may cause a hazard to the life and limb of users and third parties.
Deviations from the following requirements may therefore lead both to the loss of the statutory material defect liability rights and to the liability of the buyer for the product that has become unsafe due to the deviation from the specifications.

1.1 Validity

This document is valid for fans of AW 500 EC, AW 500D EC, AW 560D EC, AW 630D EC, AW 710D EC, AW 800D EC, AW 1000DAW EC series.
The used fan size is recognisable from the type designation (see rating plate).

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

1.2 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.
Systemair GmbH is not liable for damage due to misuse, incorrect use, improper use or as a consequence of unauthorized repairs or modifications.

2 Safety instructions

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 forbidden to carry out work on live device parts. The degree of protection for the open device is IP00! Potentially fatal voltages can be touched 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 DIN EN 60204-1, therefore the motor/fan must be installed so that it is not touchable.
- 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.
- Systems with residual current protective devices
  - The assessment whether or which residual current protective device should be used is the responsibility of the system operator or electrician commissioned by it.
  - When selecting the tripping characteristics of the residual current protective device, the possible residual current form of the power electronics (system with semiconductors) must be observed in conjunction with the standards and regulations applicable at the place of use.

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.

Warning

- 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.
- Before first-time start-up, check the following:
  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?
- Start-up may only begin when all safety instructions have been verified and any hazards have been ruled out.
  - – 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 14694 are exceeded, it is possible to exclude certain speed ranges.
  - – Check the direction of rotation (see 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 can 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

Warning

- 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.
- 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 impellers.
- Conveyance of abrasive or adhesive media.
- Conveyance of liquid media.
- Operation of plug fans outside devices.
- Connect built-in fans to open flue pipes of gas and other firing devices.
- Use of the fan and add-on parts (e.g. guard 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.
- Use with direct contact with foodstuffs or cosmetic and pharmaceutical products.
- Use of the fan as an independent household appliance.
- Use as a fire gas or smoke extraction fan (special application according to DIN EN 12101-3).
- Use with vibration loading by customer device. Resonant operation and operation with severe vibrations or oscillation.
- Loosening of fan blade, impeller, motor suspension and balancing weight.
- All applications not listed in the intended use.

Warning

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.

	**Warning** General hazardous area. Death or severe injury or significant property damage can occur if the corresponding precautions are not taken!
	**Danger due to electric current** Danger by dangerous, electric voltage! Death or severe injury can occur if the corresponding precautions are not taken!

Information
Important additional information and advice for user.

3 Product overview

3.1 Area of application/Notes on use

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 Systemair GmbHfans 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.

- Any use below -10 °C is dependent on not being subjected to unusual, sudden or mechanical loads or stresses on the material (see minimal permissible ambient temperature).
- Corrosion is possible at the cutting edges on sendzimir galvanised parts.

Warning
If the motor/fan is used in applications where a ignitable atmosphere can form in the event of a fault, e.g. due to leakage, the user must assess the risks of ignition and take appropriate precautions to prevent ignition.

3.2 Functional description

AW EC stands for EC fans with maximum efficiency. Highly efficient, electronically switched external rotor motors with permanent magnets are used the speed of which is controlled by the integrated controller.
The devices are constructed in accordance with the general requirement in EN 61800-2 for adjustable speed electrical power systems and is intended for one-quadrant drives.

3.3 Transport, storage

Warning
- Observe the weight specifications (see rating plate) and the permissible carrying loads of the means of transport.
- Wear safety clothing / shoes and cut-resistant safety gloves when 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.
- Secure 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
- The fan must be fastened to 4 points during transport so the flanges do not warp.

3.4 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

Warning
- 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 ISO12100 / 13857).
- 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!
- Wear safety clothing / shoes and cut-resistant safety gloves when handling!
- At a weight greater than 25 kg for men / 10 kg for women, the fan should be lifted out by two persons (according to REFA). The values may differ from country to country.
- 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.
- The custom designs must suit the prevailing conditions.
- Take into account easy access for cleaning and maintaining the fan.
- Before installing the fan, make sure the safety distances are maintained compliant with EN ISO 13857 or in household equipment according to EN 60335
  – If the mounting height (danger area) above the reference plane is greater than or equal to 2700 mm and is not reduced by auxiliary means such as chairs, ladders, working platforms or floor space on vehicles, a guard grille is not necessary on the fan.
  – If the fan is located in danger zone, then the manufacturer or operator shall ensure that hazards shall be prevented by appropriare protective constuctions which meet the requirements to EN ISO 13857.
- Tighten the fastenings with the specified torques.
- Drilling chips, screws and other foreign bodies must not be located inside the device! Before the first switch-on, remove any items that may be present (drilling chips, screws and other foreign objects) from the intake area - risk of injury from any objects that may fly out!
- For fans, the alignment must be adhered to during operation, e.g. if this is indicated by “Oben/Top”.

⚠ WARNING

Parts of the rotor or the entire rotor coming loose in case of a fault (e.g. excessive vibrations) can result in personal injury and material damage.

▷ Use guard grilles or suitable design measures for critical applications (e.g. refrigerating systems with refrigerant subject to the ordinance on hazardous substances).

4.2 Installation of axial fans

Information
The axial supply from the unit/system structure must be as twist-free as possible and should have no additional air resistance.
Disturbances in the inflow can impair the function of the fan.

4.2.1 Mounting

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:

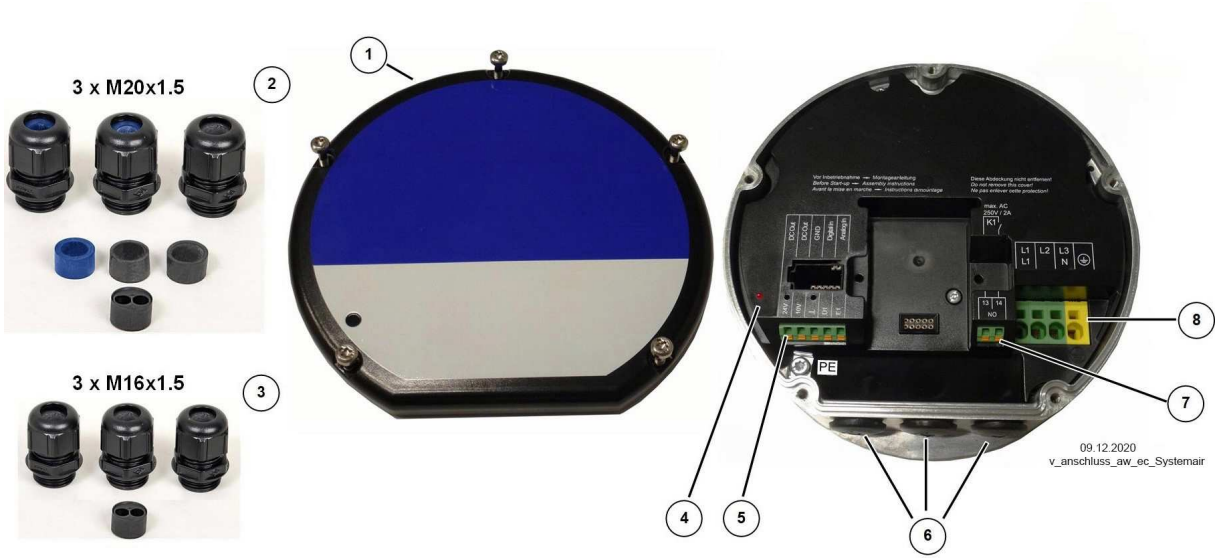
Tightening torques M_A				
Thread size	M6 (Special application with 5-pitch)	M8	M10	M12
Property class 8.8, friction coefcient µges = 0.12	9.5 Nm	23 Nm	46 Nm	79 Nm
Stainless steel A2-70, friction coefcient µges = 0.12	6.4 Nm	15.3 Nm	31 Nm	52 Nm
Screw penetration	≥ 1.5 x d	≥ 1.5 x d	≥ 1.5 x d	≥ 1.5 x d

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

5 Electrical installation

5.1 Version without connection cables

AW EC connection version example

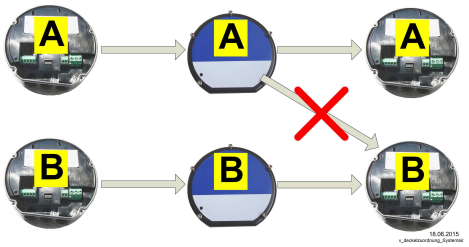


1 Cover of controller housing
2 Version with cable glands 3 x M20x1.5
inserted: 1 x Black seal insert for cables with 8...12 mm outer diameter
inserted: 2 x Blue seal insert for cables with 6...7.9 mm outer diameter
optional: 2 x Black seal insert for cables with 8...12 mm outer diameter
optional: 1 x Blue seal insert for cables with 6...7.9 mm outer diameter
optional: 1x Seal insert with 2 boreholes (6 mm) for two cables
3 Version with cable glands 3 x M16x1.5
inserted: 3 x Seal insert for cables with 4...10 mm outer diameter
optional: 1 x Seal insert with 2 boreholes (5 mm) for two cables
4 Status LED
5 Connection control system
6 Cable entry points with plastic fastener
7 Connection Relays
8 Voltage supply

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 (note the respective connection diagram).
4. Attach cover of controller housing again carefully in correct position before start-up.

Warning
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!

Warning
- 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!
- Make absolutely sure that different connections do not come into contact (e.g. by splaying or loose connecting wires).
- Remants from installation and foreign object may not remain on the inside!
  Remants from installation, foreign objects and dirt has to be removed from the sealing area between cover and controller housing!

Tightening torques M_A

	Thread size	Tightening torques M_A		Remarks
		[Nm]	[Lb In]	
Plastic cable gland	M16x1.5	2.5	22	Sealing area for cables with outer diameter 4…10 mm
Plastic cable gland	M20x1.5	4	35	Sealing area with black seal insert for cables with outer diameter 8…12 mm Sealing area with blue seal insert for cables with outer diameter 6…7.9 mm
Brass cable gland	M16x1.5	5	44	Sealing area for cables with outer diameter 5.5…10 mm
Brass cable gland	M20x1.5	6.5	58	Sealing area for cables with outer diameter 6…12 mm
Locking screw	M16x1.5 M20x1.5	2.5	22	Slotted screwdriver
Cover of controller housing *	M4	2.5	22	TX20
Protective earth connection *	M4	2.5	22	TX20
Fastening add-on module *	M4	1.3	11	
Terminals add-on module *	M2	0.24	2.2	

* *Recommended tightening speed maximum 400 min^{-1}*

Connection data of terminals

Terminal	Voltage supply	modulation	Add-on module AM-
Stripping length	15 mm	10 mm	4 mm
Conductorcross-section rigid min.	0.2 mm^2	0.2 mm^2	0.2 mm^2
Conductor cross-section rigid max.	10 mm^2	1.5 mm^2	1.5 mm^2
Conductor cross-section flexible min.	0.2 mm^2	0.25 mm^2	0.2 mm^2
Conductor cross-section flexible max.	6 mm^2	1.5 mm^2	1.5 mm^2
Conductor cross section flexible with wire end ferrule without plastic sleeve min.	0.25 mm^2	0.25 mm^2	0.25 mm^2
Conductor cross section flexible with wire end ferrule without plastic sleeve max.	6 mm^2	1.5 mm^2	0.75 mm^2
Conductor cross section flexible with wire end ferrule with plastic sleeve min.	0.25 mm^2	0.25 mm^2	0.25 mm^2
Conductor cross section flexible with wire end ferrule with plastic sleeve max.	4 mm^2	1.5 mm^2	0.75 mm^2
Conductor cross-section AWG/kcmil min.	24	24	28
Conductor cross-section AWG/kcmil max.	8	16	16
The data refer to the connection possibilities of the terminals. The necessary conductor cross section must be dimensioned according to the respective prevailing conditions.			

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**.

5.1.1 Assembly notes for cable glands

Correct use of the cable glands is of crucial importance for high operational reliability; note the following instructions.

Construction of a cable gland

1. O-ring
2. Collar with connecting thread
3. seal insert
4. Union nut

Warning
If the tightening torque of the cable gland is too low or too high, this prevents the O-ring from having sufficient contact with the housing and the seal insert on the cable. This results in leaks and/or poor strain relief on the cables.

Fitting cable glands

- ▷ Select the size of the cable gland and the seal insert to match the outer diameter of the cable.
- ▷ Check the housing for damage in the area of the sealing surface before installing the cable gland.
- ▷ Ensure that the O-ring and seal insert are fitted.
- ▷ Place the cable gland at a right angle on the housing and screw in.

Seal insert for 2 cables

Inserting the cable, tightening method

- ▷ Tighten the collar to the specified torque with a suitable torque wrench.
- ▷ Insert the cable through the cable gland into the housing.
- ▷ Fit the union nut by hand and tighten slightly.
- ▷ Tighten the union nut to the specified torque of the cable gland using the torque wrench.
- ▷ To insert two cables through one cable gland, use a seal insert with 2 boreholes.
- ▷ The seal insert supplied can only be used for a limited range of cable diameters. It is also possible to use seal inserts with a different inner diameter.

2 x black
Sealing area 8…12 mm

1 x blue
Sealing area 6…7.9 mm

Version with cable glands 3 x M20x1.5

- ▷ As delivered, the 3 enclosed cable glands are fitted with one black seal insert and two blue seal inserts.
- ▷ In addition, two black and one blue seal inserts are included separately, and can be used if required.

Sealing areas

Black seal insert: For cables with 8…12 mm outer diameterBlue seal insert: For cables with 6…7.9 mm outer diameter

Cables and installation position

- ▷ Depending on the installation position and load, run the connecting cables to the cable gland from below or fit a water draining pipe elbow.

Notes

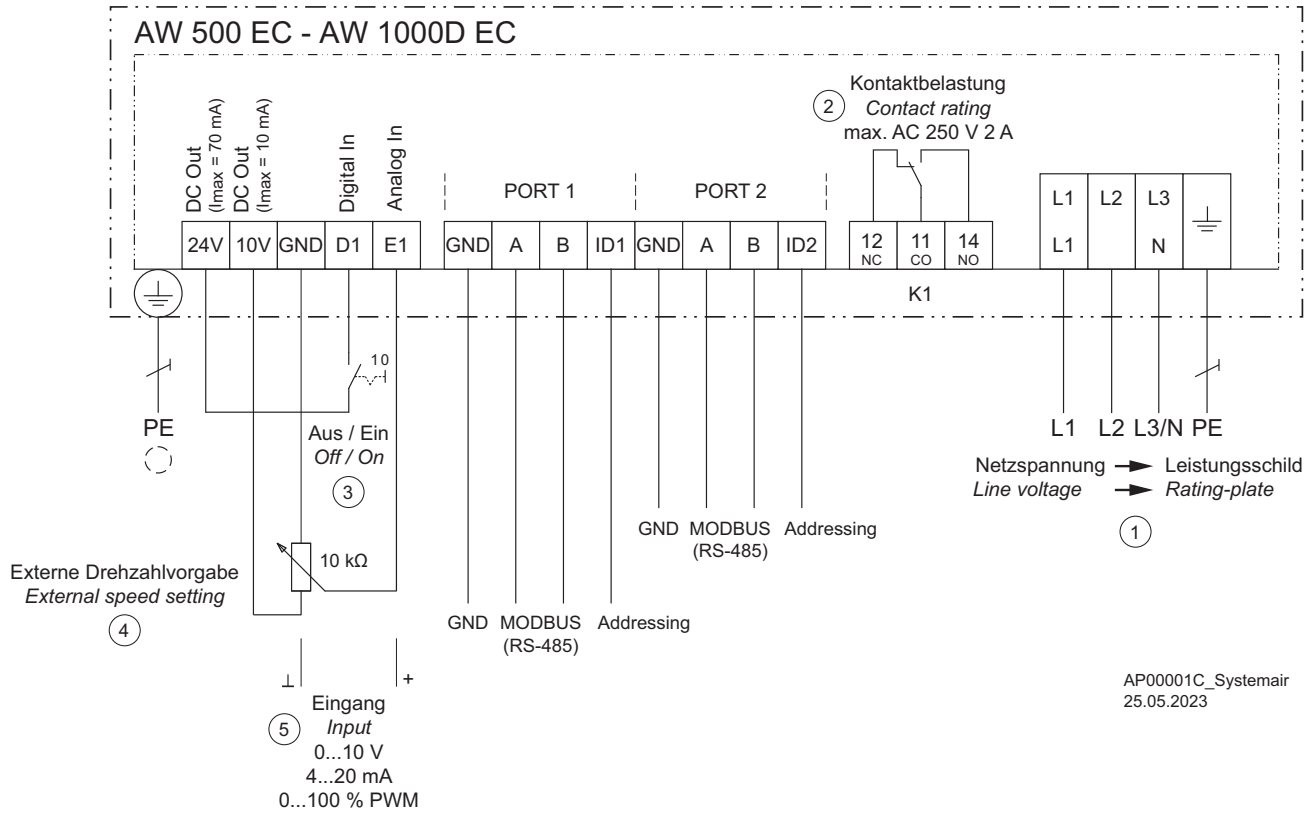
- ▷ Do not use any additional cable sheathing (e.g. with insulating tape or shrink hose) in the area of the sealing ring.
- ▷ The cable must be dry and free of contamination (grease, dust or other impurities).
- ▷ Use of a damaged cable is not allowed.
- ▷ Two lines may only be fed through one cable gland with a 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.
- ▷ Only use cables with a cylindrical cross-section. For other cross-sections (e.g. ribbon cables), special seal inserts are required.

5.2 Connection diagram

Be aware of the following Points.

UL: Input (Line)
Copper connecting leads with an insulation temperature of at least 80 °C must be used!

Initialisation time for relay
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.



1 Line voltage see rating plate
2 Relay output K1 for fault reporting = factory function, max. contact load AC 250 V 2 A
- During operation the relay is energised, i.e. the connections 11 and 14 are bridged
- In case of a fault, the relay is de-energised, i.e. the connections 11 and 12 are bridged
- In case of a shutdown using the enable (D1 = Digital In 1) the relay remains energised
3 Digital enable input = factory function
Device ON when contact closed
- Device Off when contact open
4 External speed setting
5 Input 0...10 V, 4...20 mA, 0...100 % PWM

6 Commissioning

Warning
- 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.
- Do not start the fan until all safety instructions (EN 50110, IEC 60364-1)have been checked, the fan is out of range (EN ISO 13857)and danger can be ruled out.
- A-weighted sound power levels of over 80 dB(A) possible.

6.1 Before first-time start-up

Observe the following points before the initial start-up:

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 drain holes (as far as available) open or respectively closed according to the suitable installation position?
6. Connection data complies with the specifications on the rating plate?

6.2 During start-up

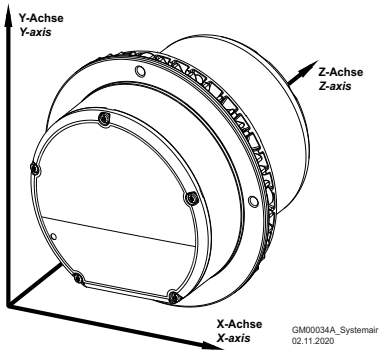
Observe the following points during start-up:

1. Check the direction of rotation, see rotation direction arrow on the fan blade, impeller base plate, support plates on suction side or rating plate.
2. Ensure even, low-vibration running. Significant vibrations due to uneven running, e.g. due to transport damage or improper handling, can lead to damage and subsequently to failure.
3. Fans are Systemair GmbH delivered balanced in compliance with DIN ISO 21940-11 for the corresponding fan category as set out in ISO 14694. After installation, check the fan for mechanical vibrations and resonances in accordance with ISO 14694. If the limit values for the corresponding fan category are exceeded during start-up, see section **f**, the entire system must be checked and the vibrations reduced. System start-up is not allowed until the limit values are observed.

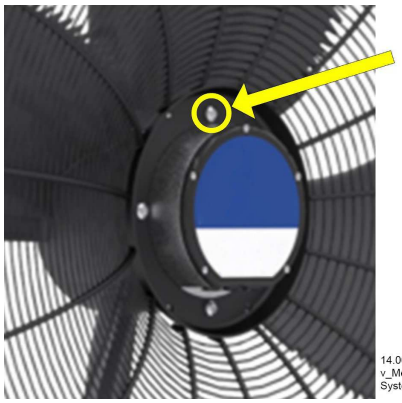
   a. Time frame for checking the vibration values:
   - On a new system or a new device
     - If necessary in the event of factory acceptance.
     - At the installation site at the time of proper start-up of the system or device at the latest.

   b. Measuring device and sensors:
   - It is recommended that measurement is performed with a resolution based on the r.m.s. (root-mean-square value), a measurement interval of 1 s and a ramp-up time of 180 s.
   - At the same time, precisely timed measurement of the speeds is necessary so that the vibration values can be assigned to the speed.
   - Perform the measurement over the entire fan speed range.
   - Perform the measurement in all 3 axes, see Point c.

   c. Direction of vibration amplitude



d. Measuring point on fan
- Bei AW EC fans mit external rotor motors
  – At the stator fixing screw opposite the cable inlet, see arrow.



e. The fans are classified in the following categories in accordance with the standard and the power consumption:
- ≤ 3,7 kW in BV-2
- > 3,7 kW in BV-3

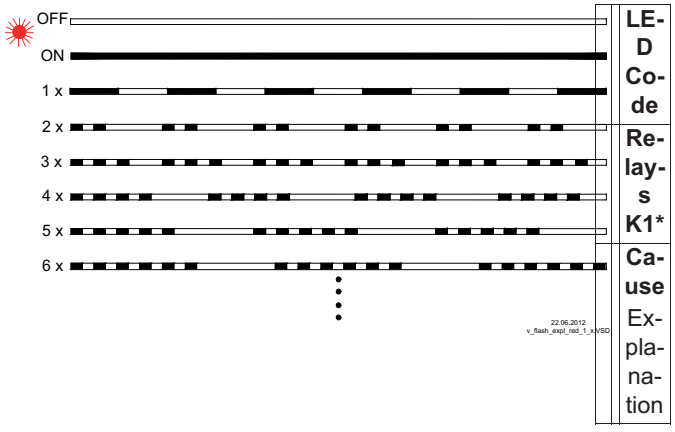
f. Limit value r.m.s. for vibration amplitude during start-up within the customer operating speeds:
- Max. 5.6 mm/s, in compliance with ISO 14694 Table 5 Start-up / BV-2.
- Max. 4.5 mm/s, in compliance with ISO 14694 Table 5 Start-up / BV-3.

4. For example, vibrations in the system may have the following causes:
   - Transport and handling of the fans can lead to a change in the balance of the fan.
   - The air feed and resulting turbulence, e.g. obstructions, deflections, branches, flaps.
   - Operation at a prohibited fan operating point, e.g. demolition operation in a flat characteristic curve range.
   - Insufficiently rigid fan mounting surfaces, e.g. mounting walls.
   - Vibration transmitted by adjacent components, e.g. compressors, adjacent fans.
   - Flow-related influences from adjacent fans.
5. If resonance vibrations occur that cannot be prevented by the design, it is possible to mask out certain speed ranges for the operation area of the fan, see Motor setup. Passing through this resonant range as quickly as possible is allowed. Operation of the fan in the resonant range is not allowed.

7 Diagnostics / Faults

Status Out with flash code

Vision panel for status LED in the case of plastic cover design



7 Diagnostics / Faults

Status Out with flash code

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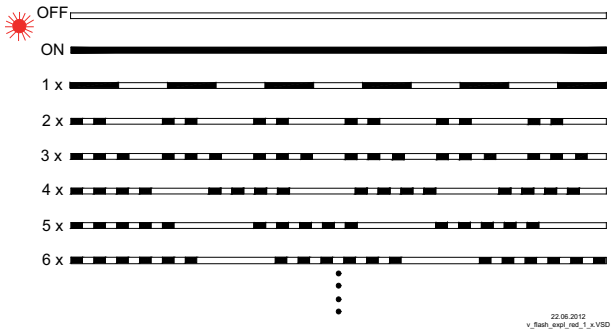
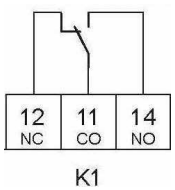


LED Code	Relays K1*	Cause Explanation
OFF	**0**	No voltage supply.
ON	**1**	Normal operation without fault
1 x ——	**1**	No enable = OFF
2 x –	**1**	Temperature management active
3 x –	**0**	Error rotor position
4 x –	**0**	Line failure (only for 3 ~ types)
5 x –	**0**	Motor blocked
6 x –	**0**	Failure power module
7 x –	**0**	DC link undervoltage
8 x –	**0**	DC link undervoltage
9 x –	**1**	Cooling down period power module
10 x –	**0**	Communication fault
11 x –	**0**	Error motor start
12 x –	**0**	Line voltage too low
13 x –	**0**	Line voltage too high
14 x –	**0**	Error peak current
17 x –	**0**	Temperature alarm
18 x –	**0**	System error
20 x –	**0**	Vibration values/Lifetime
21 x –	**0**	Error PFC-Control (only for version with 3 ~ PFC)
∞ x –	**0**	Internal communication error
1 x —— 2 x –	**1**	MODBUS Recovery Function

* *Relays K1 programmed function at factory (Fault indication not inverted)*
0 Relays de-energized
1 Relays pulled up

Display for relay K1 de-energised = “0”
Changeover contact



K1

8 Enclosure

8.1 Technical data

Line voltage* (see rating plate)	1 ~ 200...277 V, 50/60 Hz 3 ~ 200...240 V, 50/60 Hz 3 ~ 380...480 V, 50/60 Hz 3 ~ 200...480 V, 50/60 Hz (Versions for DC power supply on request)
Maximal line fuse**	16 A for all types 1 ~ and 3 ~
Max. load limit integral of cut-in current approx.	2.0 A^2s
Switching Freq.	16 kHz
Input resistance for signal set for the rotational speed	@ 0...10 V: R_i = 300 kΩ @ 4...20 mA: R_i = 350 Ω @ PWM: R_i = 3 kΩ
Specification speed setting signal PWM	Switching frequency: 1...10 kHz On-off ratio: 0...100 % U_{in} high level: 15...28 V U_{in} low level: 0...10 V
Voltage supply for external devices	+ 10 V, I_{max} 10 mA (short-circuit-proof)
	+24 V ±20 %, I_{max} 70 mA (short-circuit-proof)
Digital input “D1”	Input resistance: R_i approx. 4 kΩ @ 24 V U_{in} high level: 7...30 V U_{in} low level: 0...2 V
Duty type of motor/fan	Continuous operation with occasional starts (S1) according to DIN EN 60034-1:2011-02. Occasional starting between -40 °C and -25 °C is permissible. Continuous operation below -25 °C only with special bearings for refrigeration applications on request.
Permissible minimum and maximum ambient temperature for operation	Please refer to the technical documentation of the product for the minimum and maximum ambient temperature valid for the respective fan. Operation below -25 °C as well as partial load operation for refrigeration applications is only possible with special bearings for refrigeration applications on request. If special bearings for refrigeration applications are installed in the fan, please observe the permissible maximum temperatures in the technical documentation of the product. 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 temperature range for storage and transport	-40...+80 °C
Permissible installation height	In Constant speed mode 0...4000 m amsl ≤ 1000 m: no limitation > 1000 m: max. permissible input current = current indication rating plate minus 5 % / 1000 m > 2000 m: max. permissible line voltage = max. voltage indication name plate minus 1.29 % / 100 m
	In Constant torque mode 0...4000 m amsl Max. permitted specification signal = 10 V (100 % PWM, 20 mA, MODBUS) minus 2.3 % / 1000 m > 2000 m: max. permissible line voltage = max. voltage indication name plate minus 1.29 % / 100 m
Permissible rel. humidity	The motor is released for a relative humidity of 100 % at continental climate without other ambient influences. Other ambient conditions on request.

Ball bearing life	The bearing service life of the motor-integrated ball bearings determined in accordance with the standard calculation method is largely determined by the grease service life F10h and is approx. 30,000 to 40,000 operating hours in standard use, taking into account a temperature and load spectrum. The fan or motor is maintenance-free due to the use of ball bearings with life-time lubrication. Once the grease service life F10h has been reached, it may be necessary to change the bearing. The bearing service life may change compared to the specified value if operating conditions such as increased vibrations, increased shocks, increased or excessively low temperatures, humidity, dirt in the ball bearing or unfavourable control modes are present. A service life calculation for special applications can be created on request.
Electromagnetic compatibility for the standard voltage 230 / 400 V according to IEC 60038	Interference emission EN IEC 61000-6-3 (domestic household applications)
	Interference immunity EN IEC 61000-6-2 (industrial applications)
Harmonics current	**For 1 ~ types and 3 ~ types with PFC** Active power factor adjustment for sinusoidal input current (PFC = Power - Factor - Correction), harmonic current in accordance with EN 61000-3-2 are guaranteed.
	For 3 ~ types without PFC According to EN 61000-3-2 (see Assembly instructions / Electrical installation / EMC-compatible installation / Harmonics current for 3 ~ types without PFC).
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	see product catalogue
Protection class of motor according to EN 60529	IP55
Weight	see rating plate

* *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 / Voltage supply / Line protection fuse).*

For motors/fans with the corresponding quality mark (see rating plate)		
Authorization:	FILE No. E213826	UL 61800-5-1 CAN/CSA C22.2 No. 274
	c UL us LISTED	Power Conversion Equipment 62BN
Environmental type rating: 3		

For motors/fans with the corresponding quality mark (see rating plate)		
Authorization:	FILE No. E213826	UL 61800-5-1 CAN/CSA C22.2 No. 274
	c UL us	Power Conversion Equipment 62BN
Environmental type rating: 3		

8.2 EU declaration of conformity

8.3 UKCA Declaration of Conformity

systemair **UKCA Declaration of conformity** 1 (1)

We, the manufacturer

Company	Systemair GmbH
Address	Seehöfer Straße 45 97944 Boxberg Germany

declare under our sole responsibility that the product

Product designation	Axial wall fan – AW Axial duct fan – AR
Type/Model	AW 350E4–560E4, AW 350DV-710DV, AW 630DS-910DS, AW 630E6–710E6, AW 450EC-500EC AR 350E4–560E4, AR 350DV-710DV, AR 630DS-1000DS, AR 630E6–710E6, AW 500D EC-1000D EC
Identification	Serial numbers dating from 2023 and onwards

fulfils all relevant provisions of the

Supply of Machinery (Safety) Regulations 2008	**2014/42/EC** **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 hazard zones being reached by upper and lower limbs
Electromagnetic Compatibility Regulations 2016	**2014/30/EU** **EN IEC 61000–6–2:2019** Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity standard for industrial environments **EN IEC 61000–6–3:2021** Electromagnetic compatibility (EMC) - Part 6-3: Generic standards - Emission standard for equipment in residential environments.
The Ecodesign for Energy Related Products Regulations 2010	**2009/125/EU** **327/2011** Requirements for fans above 125W

Person authorized to compile the technical file:

i.V. Matthias Hennegriff
Technical Director

This declaration relates exclusively to the machinery in the state in which it was placed on the market and excludes components which are added and/or operations carried out subsequently by the final user.
Boxberg, Germany 2023–06–15

Stefan Fischer
Managing Director

Systemair·GmbH,·Seehöfer·Straße·45,·97944·Boxberg,·Germany
Phone: +49 (0) 7930 9272 0 Fax: +49 (0) 7930 9272 92

-en_GB-

8.4 Manufacturer reference CE

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:

Systemair GmbH
Seehöfer Straße 45
97944 Boxberg
Tel. +49 (0) 7930/9272-0
Fax +49 (0) 7930/9272-92
info@systemair.de

8.5 Service note

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