Jet-Ventilatoren / Jet Fans

Montage- und Betriebsanleitung für Jet-Ventilatoren/ Installation and Operating Instructions for Jet Fans







The data stated in these operating instructions are merely for the purpose of describing the product. Information about a certain property or suitability for a certain purpose of use cannot be derived from our information. The information does not release the user from his own assessments and examinations.

Please consider the fact that our products are subject to a natural wear and ageing process.

All rights are with Systemair GmbH, also for the event of applications for protective rights.

Any powers of use, such as copying and forwarding rights, are with us.

An exemplary configuration has been shown on the title page. The product supplied can therefore deviate from the illustration. The original operating instructions have been written in the German language.



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General

1 General

1.1 Notes on the Use of this Documentation

For quick reference this document includes a table of contents. The page and version date are noted in the footer.

The following symbols are used to point out risks or to provide advice:



Danger!

Indicates a possibly life-threatening situation or severe risk to health.



Caution!

Indicates risk of injury and possible property damage.



Notice!

General notes.

2 Specifications

The nameplate indicates the model designation. It includes the following data:





2.1 Nameplate

The nameplate is affixed next to the terminal box.

Example:



2.2 Fan Specifications

The operating characteristics listed on the nameplate apply for an air density of $P=1.2 \text{ kg/m}^3$ and a maximum humidity of 80%.

Weight (kg) Type of protection Voltage/current Acoustic pressure Permissible ambient operating temperature range Permissible temperature range for airflow Impeller diameter (mm) Thrust (N)

AJ 78 – 95; IV 102-142 See data sheet See data sheet -20 °C to +55 °C (-4 °F to +131 °F) -20 °C to +55 °C (-4 °F to +131 °F) 315, 355 and 400 AJ 23-55; IV 14-85



Model AJ8



E B



Size	н	В	С	E	F	k	L	ts	tc
315	365	550	355	635	650	476	2200	1	2
355	395	550	355	635	650	476	2200	1	2
400	445	600	380	660	700	476	2200	1	2

All dim. in mm.

Model AJR





All dim. in mm.

General



General

Model AJR-TR



Ε

Size	□Da	Н	E	с	F	L
315	419	430	265	235	315	1660
355	459	497	305	255	355	1820
400	504	558	350	280	400	2000

All dim. in mm.

Model IV



All dim. in mm.



2.3 Motor Specifications

Please refer to the operating instructions supplied by the motor manufacturer.

2.4 Electrical Connections

Please refer to the data sheet.

3 Intended Use

Notice!

The model AJ8 and AJR jet fans are intended for installation in underground and above-ground parking structures, to facilitate ventilation and smoke extraction.

For optimum operation, the jet fan must be suspended horizontally from the ceiling in such a position that intake and outlet are unobstructed.

Optional deflectors for control of forced air are available as accessories. These can be used to deflect the flow of air around potential obstructions, such as pillars.

The jet fan must not be installed in hazardous areas (areas with a potentially explosive atmosphere). The fan is not suitable for intake of media containing dust, aggressive media or media with a dust content so high that dust deposits on the impeller or fan housing can affect the operation of the fan.

The operating characteristics listed on the nameplate apply for an air density of $p=1.2 \text{ kg/m}^3$ and a maximum humidity of 80%. The fans are suitable for use in an ambient operating temperature range of up to 55 °C (please note data on name-plate).

The temperature of the air transported through the fan must not be above 55 °C/131 °F nor below –20 °C/ –4 °F.

For the temperature resistance of the smoke extracting fans, which can also be used to extract CO, please refer to the nameplate (e.g., 300 °C/120 min).

The standard motors in these jet fans are suitable for operation with frequency converters. If a fan is controlled using a frequency converter, thermic protection must be provided by a PTC resistor in the motor. This is not included as standard equipment with the smoke-extracting fan (B). For smoke extraction, the motor-circuit switch must be bypassed (to be carried out on site).

Any use of the jet fan that deviates from the above descriptions constitutes use for other than the intended purpose. No liability can be accepted for personal injury or property damage resulting from such use.

4 Personnel

4.1 Qualifications

Electrical installation of the fan must be carried out by a qualified electrician.

4.2 Personal Protective Equipment

Protective gloves, protective shoes and protective goggles must be worn by all personnel performing assembly, installation, maintenance and inspection work on the fan.

5

General Safety Precautions Danger!



During assembly, commissioning, maintenance and inspection, make sure all parts and any areas required for preparation are inaccessible to unauthorized persons

- In spite of all precautions, there will always be some element of risk that cannot be entirely excluded, whether due to human error, malfunction of the device, or force majeure. The system planner, operator or engineer must take all precautions deemed necessary, as outlined in EN 12100, to prevent a hazardous situation from arising.
- Make sure general rules and regulations for occupational safety are observed.
- Make sure the fan is accessible for servicing and maintenance.
- Assembly and electrical installation must be carried out by trained technicians working in accordance with all relevant regulations.
- All electrical connections must be made by a qualified electrician. Make sure the equipment is disconnected from power before any maintenance or repair work begins.
- Make sure the fan cannot be inadvertently switched on and the impeller cannot be inadvertently accessed while any work is being performed on the fan.
- The housing of the fan must not be damaged or deformed during assembly.
- Make sure there is no risk of contact with the impeller during operation of the fan.
- To prevent equipment failure and to protect the motor, the motor must be disconnected from the power supply (mains) by a built-in PTC resistor in the event of any operational disorder (for example, median temperature higher than permitted maximum) in accordance with Council Directive 94/9/EC.
- Maximum test voltage for the PTC resistor: 2.5 V.
- The motors contain triple PTC resistors. More than two PTC resistors must not be connected in series, because this can lead to undefined shutdown.
- Be sure to wear protective goggles when checking the rotation direction of the impeller.
- Parts that are relevant to safety, such as the safety guard in front of the impeller, must not be removed nor put out of operation. Furthermore, such parts must be checked for tight attachment.
- Compliance with EMC Council Directive 89/336/EEC applies to this product only if it is directly connected to the conventional electric power system (mains). If the product is integrated in a system or combined and operated with other components (such as controllers or process control modules), the manufacturer or operator of the overall system is responsible for ensuring compliance with EMC Council Directive 89/336/EEC.
- The nameplate indicates the electrical values for the optimally cooled motor approved by the notified body in the EC type examination (Declaration of Conformity).
- Prevent the intake of foreign bodies as these can damage the fan.
- Even inlet and unobstructed inlet and outlet must be ensured.

6 Safety Features

The standard motors are equipped with thermic protection provided by PTC resistors.

7 Structural Design

The AJR, AJ8, AJR-TR and IV fan is a directly operated axial fan, the motor of which is seated directly in the airstream. The direction of air intake is over the motor.

The external casing of the fan forms an elongated housing made of hot-dip galvanized sheet steel that has a pressed-on flange with bore holes. The fan has silencers on both the inlet and pressure sides. The silencers are equipped with retracted nozzles and safety guards and made of galvanized steel. The acoustic insulation around the entire fan unit is non-flammable in accordance with DIN 4102 as described in Council Directive 97/69 EC. The silencer mounted on the pressure side is equipped with a cross-shaped air baffle for stabilization of the air current. For optimal guidance of the air current, a deflector made of galvanized sheet steel (delivered separately) is available as an accessory for installation on the pressure side silencer.

Mounting brackets made of galvanized sheet steel are installed on the fan at the factory.

Model	AJ8	 octagonal version
	AJR/AJR-TR	- round version
	IV	 compact verison

With model AJR, the fan unit can be removed for maintenance purposes without disassembling the entire device. To do this, remove the two tensioning fasteners on the side of the fan.

• In the standard versions, the fans are equipped with three-phase motors (400 V, 50 Hz) with built-in PTC resistors. The electric motor has IP 55 protection and isolation class F, while the smoke extracting fans have IP 54 protection and isolation class H. The two-speed version is available with a motor with tapped winding (Dahlander motor).

• The motor with impeller is fastened to a rugged supporting structure made of electro-deposition-galvanized sheet steel.

• The axial fan is made of a cast aluminum alloy and is equipped with molded blades and an efficient hub ratio. The hub design permits infinite adjustment of the blade angle when the impeller is halted. The fan IV is equipped with an aerodynamic optimized impeller with riveted blades. The components are dynamically balanced in accordance with ISO 1940 T1, Class G 6.3.

• The electrical connection is made through a terminal box installed on the outside of the housing. Standard version: polypropylene; protection rating: IP 65. The smoke-extracting fan (B) is made of cast aluminum alloy with IP 65 protection.

Main Components of Jet Fan with Accessories



Pos. 01 Diffuser system Pos. 02 Safety guard

- Pos. 02 Inflow duct
- Pos. 04 Silencer, pressure side
- Pos. 05 Terminal box
- Pos. 06 Impeller

- Pos. 07 Motor
- Pos. 08 Motor base plate
- Pos. 09 Tensioning fasteners only AJR
- Pos. 10 Mounting fastener
- Pos. 11 Silencer, intake side



Operating Mode



8 Operating Mode

The fan can be operated continuously within an ambient temperature range of -20° C to 55 °C (-4 °F to 131 °F) and with a maximum airflow temperature of 55 °C (131 °F). Smoke extract fans F300 (300°/120 min.) and F400 (400°C/120 min.) can be operated with a maximum airflow temperature of 55°C. The maximum airflow temperature for 120 min. is 300°C or rather 400°C.

The standard frequency stamped on the motor must be maintained.

9 Acceptance

The fan is subjected to a test run at the place of manufacturer before being transferred to the customer. This acceptance test is documented and the test report supplied to the customer.

10 Transport, Storage, Assembly



Danger!

Danger of personal injury if the fan falls. Use suitable hoisting devices and fastening equipment. Do not stand under the load during transport.



Attention!

Risk of damage to the fan or fan parts.

Do not move the device by pulling on the power cord, terminal box, impeller, safety guard or inflow duct. Use suitable hoisting devices and fastening equipment.



Attention!

Risk of deformation of the fan. Exercise caution when loading and unloading the fan for transport. Observe the arrows on the package indicating the correct positioning for transport.

Transport

The fan is shipped in a cardboard package. Transport the fan to the place of installation in the original packaging. Do not move the device by pulling on the power cord, terminal box, impeller, safety guard or inflow duct. Exercise caution when loading and unloading the fan for transport to prevent damage. Use suitable hoisting devices: When using a crane, fasten the load with straps and ensure 4-point suspension.

Keep in mind during transport and loading/unloading that the fan weighs at least 80, 86 or 95 kg. The following table shows values for orientation (weights without accessories):

Size	Weight AJR	Weight AJR-TR	Weight AJ8
315-2/4	80 kg	52 kg	84 kg
355-2/4	86 kg	67 kg	90 kg
400-2/4	95 kg	85 kg	99 kg

Size	50-4	50-4/6	50-4/8	85-4	85-4/6	85-4/8
Weight IV in kg	105	102	105	140	141	142

Notice!

Attachment points:

mounting rail, silencers on intake and pressure sides

When taking delivery on the fan, perform a visual inspection and check the equipment supplied for completeness.

Storage

Provided the original packaging is intact and there is no build-up of condensation, the jet fan can be stored in the original packaging (polythene sheet with ground clearance) out of doors for up to one month. The unpacked fan must not be stored out of doors. In a dry, well ventilated room without risk of condensation build-up, the jet fan can be stored indoors for up to 6 months.

Storage temperatures: -20 °C (-4 °F) to 60 °C (+140 °F).



Achtung!

Risk of damage to the fan.

If the fan is stored longer than three months, turn the impeller by hand regularly.

Assembly

All fans are tested at the factory before shipping.

- Proceed as follows after removing the packaging:
 - Check for damage sustained during transport,
 - Manually check whether the impeller turns without obstruction, and
 - Make sure no condensation has formed.



Danger!

Danger of personal injury if safety instructions are not observed. Make sure general rules and regulations for occupational safety are observed when installing the fan.



Danger!

Danger of personal injury if the fan falls.

Make sure all parts and any areas required for preparation are inaccessible to unauthorized persons during installation.



Danger!

Danger of personal injury from electrical current.

Make sure the fan is disconnected from the power supply before making any electrical connections in the fan. Make sure the electrical power supply cannot be inadvertently switched on while working on the fan.





All electrical connections in the fan must be made by a qualified electrician.

Danger!

Danger of personal injury from rotating parts.

Make sure the fan cannot be inadvertently switched on and the impeller cannot be inadvertently accessed while installation work is being performed on the fan.



Attention!

Risk of damage to the fan. The housing of the fan must not be deformed during installation. Exercise caution when installing the fan.



Attention!

Risk of damage to the fan.

Turn the impeller manually to make sure it is unobstructed. Do not install the fan if the impeller does not turn easily and without obstruction. Notify the manufacturer.



Attention!

Risk of damage to the fan. Make sure the fan cannot take in foreign bodies.

Notice!

Risk of damage to the fan. If the flow of air is impeded, the fan may overheat.

Ensure unobstructed and even intake and unobstructed outlet.

Notice!

Risk of damage to the fan.

If the fan is installed and secured without observing the required fire rating, the fan might work loose of its ceiling attachment in the event of a fire.

Make sure the smoke extracting fan is affixed in accordance with the fire rating for the case of operation.

- Install the fan in such a manner that it is accessible for service and maintenance at all times.
- Use both mounting rails, or mounting feet and required safety anchors, to fasten the fan to the ceiling. Make sure to observe the direction of airflow as indicated by the arrows, and the information provided by the manufacturer of the fastening devices with regard to the size and type of rawl plugs and safety anchors to use. Use steel fasteners of at least size M8.
- When installing a smoke extracting fan, make sure it cannot fall from the ceiling in the event of a fire. Use only tested fastening materials.
- Make sure during installation that all components cushioned against vibration carry an equal load.
- For optimum operation, install the jet fan in such a position that intake and outlet are unobstructed.
- Prior to installation, check the clearance between impeller blade tips and fan housing against the values in the following table:

Size	Min. clearance in mm	Size	Min. clearance in mm
AJ 315	2,5	IV50	3,0
AJ 355/400	3,0	IV85	4,0

Do not install the fan if this clearance is not given.

Notify the manufacturer with regard to the correct setting of the clearance.

The diffuser is not standard equipment and must be ordered separately. It is shipped in a separate package.

• Before the complete installation of the jet fan, fasten the diffuser on the pressure side (see arrow) of the outlet jet with

4 self-locking screws, size M5 x 12 (torque: 4.5 N).

• Position the diffuser fins so that after fastening the jet fan to the ceiling the airflow is directed downward at a 10° angle. Whether the fins can be readjusted later depends on the structures located in the immediate vicinity, such as girders.

• Make sure the airflow at the outlet side is not obstructed, e.g. by structural elements such as girders.

• Then affix the diffuser fins using self-drilling screws size 4.2X1 (torque: 4.5 N).



Transport, Storage, Assembly

AJ8/AJR



Electrical Connections

The connection diagram is depicted in the cover of the junction box. Connect the wires as indicated, observing all local regulations.

For the electrical specifications, refer to the nameplate or the enclosed data sheet. Ground the fan using the grounding terminals on the outside of the fan housing.

Make sure all motors are equipped with motor-circuit switches (not included in delivery). Do not attach anything to the fan housing.



Danger!

Danger of personal injury from electrical voltage.

Check the electrical data on the nameplate against the specifications of the local power connection; for example, in the control cabinet.

Two-speed:



Notice!

Refer to the identification plate on the motor for the correct connections in each case.

One-speed:



Adjusting the Blade Angle



Notice!

If the fan has to be installed in a different location, with the result that the angle of the impeller blades must be adjusted, please contact the Service Department at Systemair.

Adjusting the blade angle requires detailed knowledge of the power consumption of the motor and the maximum permissible blade angle in relation to the motor installed.



Commissioning the Fan

Danger!

Danger of personal injury and hazard of damage to the fan. Prior to initial commissioning of the fan, read the operation instructions carefully and check the following:

- Installation of the equipment (mounting: potential deformations)
- All residues of the installation work removed from within the fan and the connected ducts
- Safety features installed
- Tightness test carried out
- Correct execution and correct connection to the electrical installation
- Connection data matches data on the nameplate

Before putting the fan into operation, check the minimum clearance between impeller blade tips and fan housing again.

Danger!

Danger of injury to eyes by installation residues or dust expelled when checking the direction of rotation. Be sure to wear safety goggles when checking the rotation direction of the impeller.

If the clearance is correct, switch the device on briefly and then off again to check the direction of impeller rotation. The impeller must rotate in the direction indicated by the arrow on the fan housing. Check by looking through the inspection window on the fan housing.



Danger!

Live cables and connections.

Danger of personal injury from electrical current.

Have all electrical work performed by a qualified electrician.

If the direction of rotation is wrong, interchange the two phases to set the correct direction of rotation. As soon as you have put the fan into operation, make sure it is functioning properly; check that the impeller is not obstructed; measure the current consumption; check for vibration and noises.



Attention!

Risk of damage to the fan.

If the fan is operated outside the specified characteristic curve, there is a hazard of unstable rotation and unacceptable vibrations, which can lead to destruction of the fan. Do not operate the fan outside the specified characteristic curve.

Do not operate the fan outside the specified characteristic curve. Improper operating characteristics can result from poor current inflow or excessively high resistance. The fan must be operated at the specified operating point. Fill out the enclosed commissioning record form and store it for future reference in case of warranty claims.

12 Operation

The operating instructions supplied by the manufacturer of the motor must be observed when operating the fan. Inspect the fan regularly for proper functioning; check that the impeller is not obstructed; measure the current consumption; check for vibration and noises.

13 Service and Maintenance



Danger!

Live cables and connections. Danger of personal injury from electrical current. Have all electrical work performed by a qualified electrician.

Check the following periodically in accordance with regulatory guidelines, and at least once per year:

- Threaded connections, in particular the attachment of the impeller
- Check the fan wheel for dirt or dust deposits and clean as needed.
- Check the impeller for dirt or dust deposits and clean as needed.
- Proper functioning of safety components
- Proper functioning of the controller system
- Coil resistance
- Operating current
- Vibrations
- Noises coming from the bearings in the electric motor

Check for proper functioning of the system and control (circuit breaker) in accordance with the system's maintenance book at least every 3 months, if more frequent reviews are not specified

Check the first four items in this list with the fan switched off. •The parameters for the other items must match the parameters recorded upon initial installation. If there is any deviation in any of the parameters, replace the motor or the fan or have the relevant component repaired by the manufacturer. Any unauthorized work performed on the fan or its components will void all claims under the warranty. Perform regular service and maintenance on the electric motor as specified in the manufacturer's instructions supplied with the motor. Fill out the maintenance record attached in the appendix.



Notice!

Risk of damage to the fan from use of high-pressure cleaner Clean the fan manually, with a vacuum cleaner or with compressed air.



Notice!

Risk of damage to the fan.

Systemair cannot accept liability for damage resulting from the use of parts supplied by other manufacturers. Use only genuine Systemair parts.

14 Troubleshooting



Danger!

Live cables and connections. Danger of personal injury from electrical current. Have all electrical work performed by a qualified electrician.



Danger!

Danger of injury to eyes by installation residues or dust expelled when checking the direction of rotation. Be sure to wear safety goggles when checking the rotation direction of the impeller.



Problem	Solution
Fan does not run	Check power supply and motor-circuit switch. If problem not found, check motor. If motor has separate coils, check both speeds.
Volume of airflow too low	Check direction of rotation. If necessary, change motor rotation direction by inter- changing two phases. Check intake area for blockage. Check operating point and execution of the system.
Motor-circuit switch has been triggered	Check the motor specifications. If OK, check electrical supply (mains) and motor (short circuit, damage in storage, impeller blocked or scraping); contact customer service.
Abnormal noises	The development of noise in a fan depends to a great extent on the installation situation and the operating conditions. This is why no generally applicable data on noise can be given; such data is always relative to the conditions of measurement. For details, please check our data sheets. Possible sources of error: • Bearing damage on motor; impeller blocked or scraping • Impeller unbalanced or damaged • Impeller blades at non-matching angles • Impeller running in the stalling range • Loose components Have the motor or, if necessary, the entire fan repaired.
Vibrations	Check operating point and execution of the system. If the actual overall resistance of the system is higher than specified, this can cause some fan models to operate in the stalling range. Contact the manufacturer's customer service center. Change for damage or dust deposits on impeller. Check welding seams on housing.

When in doubt, contact the manufacturer's customer service center.

15 Decommissioning, Disposal



Danger!

Live cables and connections. Danger of personal injury from electrical current. Have all electrical work performed by a qualified electrician.



Danger!

Danger of personal injury if the fan falls. Make sure the area is inaccessible to unauthorized persons while dismantling the fan. Use suitable hoisting devices and fastening equipment. Do not stand under the load during transport.

Disconnect the equipment from power before decommissioning the fan. Put the motor out of service and dispose of it as described in the manufacturer's operating instructions. After final decommissioning of the fan, dispose of all materials in accordance with the applicable laws and regulations.



16 Spare Parts

A defective fan must be replaced as an entire unit. Repairs may be carried out only by the manufacturer and on the manufacturer's premises.

17 Customer Service Center

You can contact our customer service center as follows:

Systemair GmbH Seehöfer Str. 45 D-97944 Windischbuch

Tel.: +49 (0)7930/9272-0 Fax: +49 (0)7930/9273-92



EC Declaration of Conformity

18 EC Declaration of Conformity

EC Declaration of Conform	nity System an
Der Hersteller: The Manufacturer	Systemair GmbH Seehöfer Str. 45 D-97944 Windischbuch Tel.: +49-79 30 / 92 72-0
erklärt hiermit, dass folgende certified herewith that the followin	e Produkte: g products:
Produktbezeichnung: product designation	Jet-Ventilatoren Jet fans
Typenbezeichnung: type designation	AJR, AJ8; AJR (B); AJ8 (B); AJR-TR; IV
Baujahr: year of manufacture	2011
allen einschlägigen Bestimmu ensure all relavant regulations of r	ngen der Richtlinie Maschinen RL 2006/42/EG entspricht. nachinery directive electrical equipment RL 2006/42/EG.
Die Maschine entspricht wei	rerhin allen Bestimmungen der Richtlinien Flektrische Betriehsmittel (2006/95/FG) und
Die Maschine entspricht wei Elektromagnetische Verträgli The products ensure furthermore Folgende harmonisierte Nor The following standards are used:	terhin allen Bestimmungen der Richtlinien Elektrische Betriebsmittel (2006/95/EG) und chkeit (EMV) (2004/108/EG). all regulations of directives electrical equipment and electromagnetic compatibility (EMC) (2004/108/EG). men wurden angewandt:
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Boxberg,

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