

# Operating Instructions

ATEX - Plug fans

(Translation of the original)

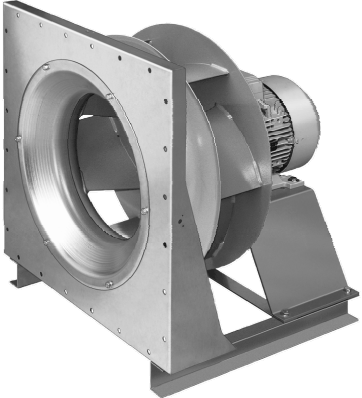
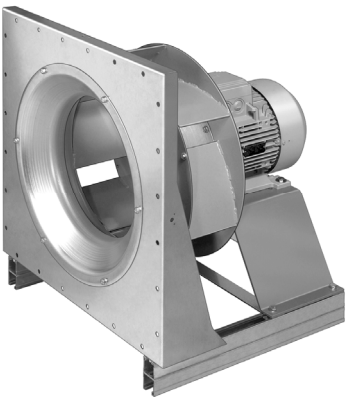
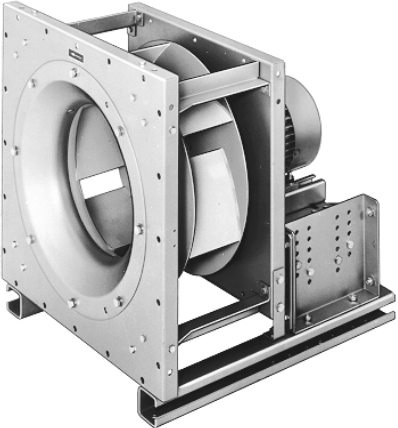
EN

AIRTREND Ltd.  
Kumanovska 14,  
11000 Beograd, Srbija  
Tel. 011 383 68 86, 308 57 40  
Faks 011 344 41 13  
E-mail: gobrid@eunet.rs  
www.airtrend.rs



II 2G c IIB(+H2) T4

## BA-CFD-RLM-ATEX 3.5 – 06/2014

		<p><b>RLM E6</b> <b>RLM 56</b></p>
		<p><b>RLM 55</b></p>

**NICOTRA** | **Gebhardt**

fan|tastic solutions

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Further languages on request!

## 1. Revision Index

*Table 1-1: Revision Index*

<b>Revision</b>
BA-CFD-RLM-ATEX 3.1 – 08/2011
BA-CFD-RLM-ATEX 3.2 – 03/2012
BA-CFD-RLM-ATEX 3.2 – 03/2012
BA-CFD-RLM-ATEX 3.4 – 03/2012
BA-CFD-RLM-ATEX 3.5 – 06/2014

## 2. About This Operating Manual



These operating instructions are an integral part of the fan. Nicotra Gebhardt GmbH shall not accept any liability or provide any warranty cover for primary damage or secondary damage arising as a consequence of disregarding these operating instructions.

- ▶ Read the operating manual carefully before use.
- ▶ Retain the operating manual for the entire service life of the fan.
- ▶ Keep the operating manual accessible to personnel at all times.
- ▶ Pass the operating manual on to any subsequent owner or user of fan.
- ▶ Insert any supplementary instructions received from the manufacturer into the operating manual.

### 2.1. Validity

This operating manual only applies to the fans stated on the front page

### 2.2. Target Group

This operating manual is intended for operators and qualified professionals trained in installation, commissioning, operation, maintenance and decommissioning.

### 2.3. Other Applicable Documents

- ▶ **In addition to reading these instructions, due notice should also be taken of the type plate, warning signs, indicating label on the fan and the following documents and specifications:**
  - IEC 60364-1
  - DIN EN 60204-1
  - DIN EN ISO 13857
  - DIN EN ISO 12100
  - DIN EN ISO 13732-1
  - DIN EN 13463-1; -5
  - DIN EN 1127-1
  - DIN EN 60079-0
  - DIN EN 14986
  - Technical catalogue
  - EC-Directive 94/9/EC

### 2.4. Symbols und Markings

#### 2.4.1. Use of Warning Signs






Signal word

**Nature, source and consequences of hazard!**

- ▶ Steps required to avert danger

## 2.4.2. Levels of Danger in Warning Signs

Table 2-1: Levels of danger in warning signs

Symbol / Danger Level	Likelihood of Occurrence	Consequences of Neglect
 <b>DANGER!</b>	Imminent danger	Death, serious physical injury
 <b>WARNING!</b>	Potential danger	Death, serious physical injury
 <b>CAUTION!</b>	Potential danger	Minor physical injury
<b>CAUTION</b>	Potential danger	Damage to property

## 2.4.3. Notes

**Note** Note giving pointers for easier or safe work.

- ▶ Steps required for easier or safe work.

## 2.4.4. Other Symbols and Markings

Table 2-2: Other symbols and markings

Symbol	Meaning
☑	Requirement for an operation
▶	Operation with one step
1. .... 2. .... 3. ....	Operation with several steps
•	Bullet point (primary list)
-	Bullet point (secondary list)
<b>Accentuation (bold)</b>	For emphasis

## 3. Designated Use

### 3.1. Operating Data / Maximum Ratings



#### Risk of injury!

- ▶ Adhere to the technical specifications and permissible limits.

For technical specifications please refer should be made to the type plate, technical data sheet and technical catalogue.

#### Note ATEX category II 2G IIB T4

Fans of this category are designed for areas where an explosive atmosphere – as a mix of air, gases, vapors or mist - is likely to occur occasionally. The unit related measures for explosion protection of this category have to offer the necessary amount of safety, even in the case of frequent unit troubles or failure modes, to be usually anticipated (predictable troubles). For the operation of the fans in explosion hazardous areas the relevant prescriptions, local regulations and directives (ATEX 94/9/CE) for manufacturers and user have to be respected.



The installation is authorized in a horizontal shaft position only

#### Permissible conveyed medium temperatures (ATEX)

Range	Perm. temperature of conveyed medium	Max. ambient temp. on drive motor
RLM 55 / 56 / E6	-20°C ... +40°C (60°C)	+ 40°C (60°C)

Table 3-1:  
Maximum ratings

#### 3.1.1 Examples of incorrect use include the following:

- Extraction of media with impermissibly high or low temperatures
- Extraction of corrosive media
- Extraction of very dusty media

#### 3.1.2 The results are:

- Bearing damage
- Corrosion damage
- Loss of balance
- Vibration
- Deformation
- Abrasion damage

#### **CAUTION** Unauthorised operation

- No operation above the indicated rpm (see type plate, data sheet)
- No operation at rpm ranges with increased vibration (resonance)
- No operation at rpm ranges out of permitted fan curve area (stability of flow pattern).
- No operation if fan becomes polluted



**Danger points:**  
 There can be injury to personnel and material damage through impeller breakage, shaft breakage, fatigue failure, fire (explosions) from spark creation.

### 3.2. Explosion Protection Markings

The marking on the type label of the explosion proof fans includes the group, category, ignition class and temperature class as well as a CE-EX-sign thus confirming the conformity to the European directive 94/9/EG.

The manufacturer’s declaration and the declaration of conformity 94/9 CE (ATEX 95) are attached to this maintenance instructions.

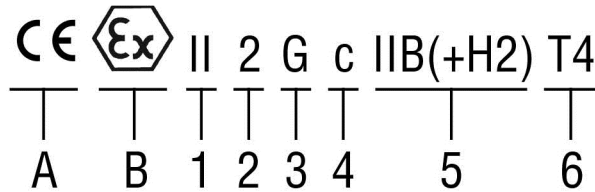


Fig 3-1: Explosion protection markings (example)

<b>A</b>	<b>CE-Mark</b>	
<b>B</b>	<b>Hazardous duty marking</b>	
<b>1</b>	<b>Machine group II</b>	Non-electric machines for use outside of the mining industry and underground mining
<b>2</b>	<b>Machine category 2</b>	(internal and external) for use in Zones 1+2; An explosive atmosphere is only present in the area occasionally
<b>3</b>	<b>Conveyed medium G</b>	Gaseous conveying medium
<b>4</b>	<b>Ignition protection c</b>	Explosion protection through design safety
<b>5</b>	<b>Explosion group IIB(+H2)*</b>	Type of gaseous atmosphere
<b>6</b>	<b>Temperature class T4</b>	max. temperature on machine surface +135°C

**\* (+H2) is only valid for RLM E6:**

For hydrogen-containing gas mixtures; Requirement is a material pairing between the rotating parts in steel - copper and the use of a Ex de IIC T4 motor.

## 4. Safety

### 4.1. Product safety

The fans offer a high degree of operational safety and high quality standards guaranteed by a certified Quality Management System (EN ISO 9001).

Before leaving the factory all the fans are inspected and sealed with a mark of conformity.

Nevertheless, when operating fans supplied by Nicotra Gebhardt GmbH there can be a risk of death or injury for the user or third parties, and a risk of damage to the fan or other material assets.

- Only use the fans in perfect working order and for its designated use as

intended, having due regard for safety, an awareness of hazards and in due compliance with the operating instructions.

- Arrange immediate repair of any faults which could compromise safety.



**Potentially explosive gas mixtures in conjunction with hot and moving parts may cause serious or fatal injury.**

**Risk of explosion due to increased ambient temperature!**

1. **Observe ambient temperature**
2. **Ensure adequate supply of cooling air**

## 4.2. Safety Instructions

The fan may only be commissioned, operated and serviced in compliance with the following instructions:

- Operating instructions
- Warning and information signs on the fan
- Any other operating and installation instructions pertaining to the machine
- Terms and requirements relevant to the machine
- Applicable national and regional regulations, especially regarding explosion protection, health & safety and accident prevention.

## 4.3. Safety Devices

1. Use appropriate safeguards to prevent contact with rotating parts (shafts, impeller, etc.).
2. Protection devices are so selected so that sucking or falling-in of objects will be prevented.
3. After installation (and before electrical connection) immediately refit any guards which have been removed during installation.



**The fans are delivered with inlet guards. If there is a danger of contact with the impeller owing to the way the fan is installed, then it is necessary to fit guards conforming to DIN EN ISO 13857.**

**Only then can the fan be set in operation!**



**ATEX fans of categories 2G or 3G are made for integration into installations. Care must be taken to avoid any ingress of object into the fan. (min. IP20 to EN 60529).**

**The user has to find corresponding protection in order to ensure a safe operation!**



**The suitability of protection devices and their fixtures to the fan have to be evaluated within the overall security concept of the installation.**

## 4.4. Professional Staff

1. Ensure that the Installation of the fan and any work on it is carried out by skilled professionals only with due regard to these operating instructions and any applicable regulations.
2. Electrical connection to be carried out by qualified electricians only.

## 4.5. Protective Gear



Ensure that members of staff are wearing protective gear appropriate to their deployment and environment.  
The protective clothing is specified below!

## 4.6. Specific Hazards

### 4.6.1. Noise Emission



The sound emission expected during normal use of the fan is documented in the technical lists and should be duly taken into account.

- ▶ **Wear ear defenders when working near to or on the running fan!**

### 4.6.2. Heavy Loads

The heavy weight of the fan and its components entail the following risks in transit and during installation:

- Risk of being trapped, crushed or cut by moving or toppling machinery
- Danger of falling components



- ▶ **Do not stand or work under suspended loads.**
- ▶ **Wear a hard hat, safety shoes and gloves.**

### 4.6.3. Rotating Shafts and Impellers

Objects falling onto rotating shafts and impellers can fly off at an angle and cause serious injury.

Articles of clothing and hair can get caught in rotating shafts and impellers.



- ▶ **Do not remove guards during operation.**
- ▶ **Do not wear loose-fitting clothing when working near rotating shafts and impellers.**
- ▶ **Wear goggles.**

### 4.6.4. Hot Surfaces

There is a risk of sustaining burns or scalds on hot surfaces during operation.



- ▶ **Do not touch the motor during operation.**
- ▶ **When the fan has stopped wait until the motor has cooled down.**
- ▶ **Wear protective gloves.**

## 4.7. Structural Modifications, Spare Parts

**Note** Unauthorised structural modifications may not be made to the fan without the consent of Nicotra Gebhardt GmbH.  
Nicotra Gebhardt GmbH shall not accept liability for any damage arising as a result such modifications.



Use only genuine spare parts supplied by Nicotra Gebhardt GmbH.

**CAUTION** In areas subject to explosion hazards the fan may only be modified or converted by Nicotra Gebhardt GmbH itself, by a service location approved by the company, or by personnel authorised and trained by the company.

### 4.8. Installation and Maintenance

The following steps should be taken before working on the fan:


1. Ensure that the atmosphere is not potentially explosive.
2. Switch off the machine and take measures to prevent it from being switched back on accidentally.
3. Display the following message on a sign:  
**Do not switch on! Work currently in progress on the machine.**

### 4.9. Signs on the Fan

Depending on the model, the type plate and the arrow indicating the direction of rotation are fitted to the fan for high visibility.

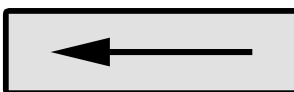
#### 4.9.1. Type plate

Fig 4-1:  
Example type plate

<b>Nicotra Gebhardt</b>		D-74638 Waldenburg		<b>CE</b>
Tel.: +49 (0)7942 101 384		Fax: -385		
E-Mail: service@nicotra-gebhardt.com				
RLM 56-3540-4Y-11-2G				
GERÄTE-Nr.	128-260549-220255/2	HERSTELLJAHR 2010		
<b>VENTILATOR</b>		<b>MOTOR</b>		
Dichte	= 1.2 kg/m <sup>3</sup>	UN	= 400	V (D/Y)
T max	= 40 °C	FN	= 50	Hz
n max	= 1810	F max	= 64	Hz
			= 3.3 / 1.88	A
			= 1395	1/min
			= 0.75	kW
			= P55	
		Wärmeklasse	= F	
		Stromart	= 3~	
<b>Example!</b>				
CE  II 2G c IIB T4 (innen/außen)				

#### 4.9.2 Arrow Indicating Direction of Rotation

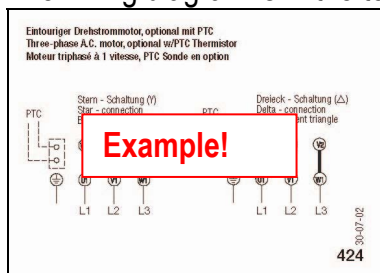
Fig 4-2: Arrow indicating direction of rotation



#### 4.9.3 Terminal Board Circuit Diagram

Fig 4-3: Example circuit diagram

The wiring diagram is in the terminal box of the motor.



## 5. Product Description

### 5.1. Centrifugal fan RLM without housing, direct driven (Plug Fan)



Plug fans RLM are optimized for operation without scroll. Direct drive with IEC motor. The centrifugal impeller with backward-curved blades is fitted directly to the motor shaft. The fan unit consisting of impeller with inlet cone, motor block and base frame, installed and adjusted at the factory. The fans are equipped with a volumeter as a standard.

Plug fans RLM are comply to the requirements of ATEX-Directive 94/9/CE by designed safety and safe construction according to EN 13463-1,-5; EN 14986. The classification of these fans is fitting into group II, category 2G, Explosion group IIB(+H2), Temperature class T4.

#### Materials:

- **Impeller** made of sheet steel, ATEX special coated.
- **Inlet cone** made of copper.

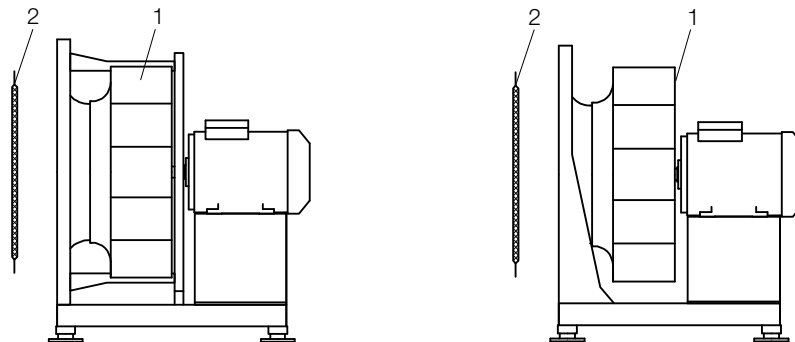
**Note** The ATEX fan must not be modified by the user. Any modification will render ATEX conformity invalid.

### 5.2. Centrifugal fan (Plug fan) RLM

#### 5.2.1 Centrifugal fan direct driven RLM

RLM 55-1112/-1214

RLM 56-2528/-1011  
RLM E6-2528/-9010



1. Fan
2. Inlet guard
  - Safety of machinery DIN EN ISO 13857
  - Degrees of protection DIN EN 60529

Figure 5-1:  
Ranges

## 6. Transport and Storage




### 6.1. Packaging

Fans are packaged in sturdy cardboard boxes or wooden crates depending on their size and weight. Instructions for removing transportation locks are enclosed.

### 6.2. Symbols on Packaging

The following symbols are printed on the cardboard boxes:

Table 6-1:  
Symbols on packaging

Symbol			
Meaning	Handle with care	Keep dry	Top

### 6.3. Transportation of Plug fans



#### **Danger of injury from falling components!**

Use tested and appropriate load handling equipment only (see type plate or data sheet). Transport the fan in the original packaging for as long as possible. Secure the load

- **Do not stand under suspended loads**

1. Select means of transport according to weight and dimensions of fan. Fan must be attached at the base frame, base plate or supporting plate. (For weights please see the technical catalogue)
2. Lift the fan by the base frame and/or by the carrier plate only.
3. When using transport belts always provide 4 points of suspension (2 belts). The belt may not exert a deforming force on the fan or its packing. If necessary, use a spacer!
4. Secure load with belts or fix it against sliding!
5. Handle centrifugal fan with care to prevent damages avoid e.g. shock or rough placement.

#### **CAUTION** These are NOT fixing points at the fan!

- Motor lifting ring bolt
- Impeller
- Inlet cone

### 6.4. Storage of Centrifugal Fan

#### **CAUTION** Risk of corrosion!

- ▶ Store the fan in its packaging adding any other protection dictated by its storage environment.
- ▶ Store centrifugal fan in a well-ventilated room only at normal temperatures and in a non-corrosive atmosphere.
- ▶ Store centrifugal fan in conditions registering less than 70 % atmospheric humidity.
- ▶ Adhere to max. permissible temperature of -20°C to +40°C (60°C).

## 7. Installation

### 7.1. Safety Instructions for Installation

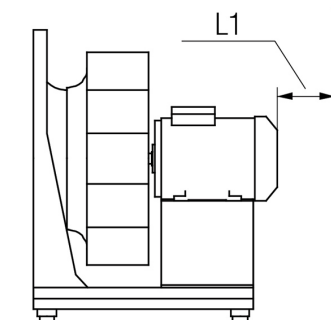
- ▶ Observe the safety instructions and preventive measures in Chapter 4 and the relevant legal requirements.

**CAUTION** The ATEX- fan system supplied by Nicotra Gebhardt must not be modified in any way! Its operation is exclusively permitted in its state as originally supplied and within the LIMITS SPECIFIED. (Respect catalogue- and type plate data).

#### 7.1.1. Installation notes

In order to achieve a sufficient motor cooling, care has to be taken that the fan at motor side is keeping a minimum clearance (L1) to the next wall. For disclosures on L1 refer to the motor operating instructions.

Figure 7-1:  
Clearance



### 7.2. Preparation to Installation

- The place of installation must be suitable for the fan in terms of its category, condition, ambient temperature and environmental media.
- The base must be level and have sufficient load-bearing capacity.
  1. Unpack centrifugal fan carefully.
  2. Unfasten or dismantle transport locks
  3. Packing material to be fully removed and disposed.
  4. Check gaps as per 7.4.

### 7.3. Carrying out the Installation

1. The fan or base frame must be fixed without stressing to the supporting structure.
2. loose fitted AVM to be regularly placed around centre of gravity and definitely fixed. Check whether the AVM is evenly under load.
3. Ensure that the fan is earthed in accordance with regulations. The anti-vibration mounts themselves do not ensure electrical transmission.
- No forces or vibrations may be transferred from other plant parts to the fan (flexible connection)!
- The flexible connections (ATEX) at intake and/or discharge are installed, well aligned, freely moving and earthed plant side.
- The AVM are freely moving and under even load!

- ☑ The impeller is turning idly and does not touch the intake cone!
- ☑ The distances from the impeller to the plant parts on site are checked and meet the requirements for explosion protection.
- ☑ The stability of the fan against collapse of the fan has been checked.

### 7.4 Checking the Gap Dimension on the Fan

- ▶ Check gap between impeller and inlet cone and between impeller border and pressure measuring nipple of the volumeter against chart values below!

Figure 7-2: Gap width

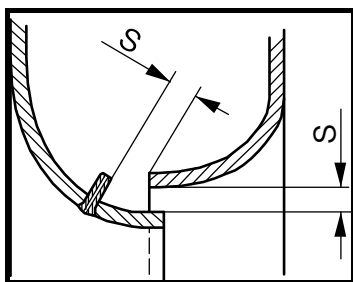
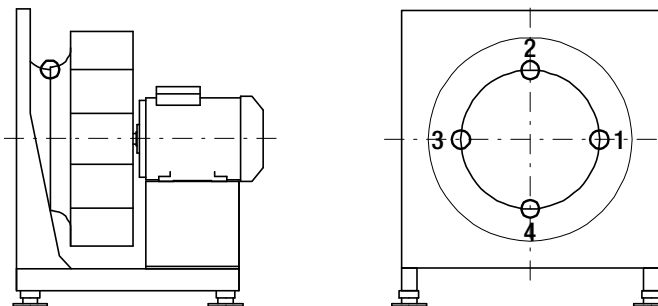


Table 7-1: Gap width

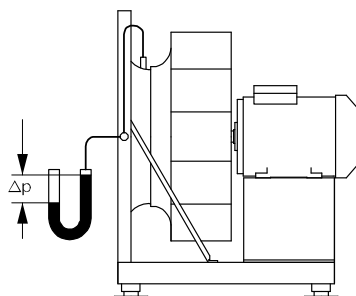
RLM	Gap width „s“	RLM	Gap width „s“
2528	2,0	6371	4,8
2831	2,2	7180	5,4
3135	2,4	8090	6,0
3540	2,7	9010	6,7
4045	3,0	1011	7,5
4550	3,4	1112	8,5
5056	3,8	1214	9,5

Figure 7-3: Measured points



1. Measure the gap and ensure that the width of the gap does not fall below the threshold in any phase of the rotation (manual rotation).
2. Carry out measurements on four 90° points on the circumference. Ensure that the gauge is placed on the outer diameter of the inlet cone.

### 7.5 Volumeter



The fans are equipped with a volumeter as a standard. With this flow measuring device it is possible to measure/monitor the flow easily after the fan is installed.

- Measuring nipple on intake cone
- piping to connector at support unit
- connector (external diameter 6mm) to pressure measuring device

Figure 7-4: Volumeter

$$qv = K \times \sqrt{\frac{2}{\rho} \times \Delta p_{Dü}}$$

- qv volume flow [m³/h]
- K calibration factor [m²s/h]
- ρ density of media [kg/m³]
- Δp<sub>Dü</sub> pressure difference at cone [Pa]

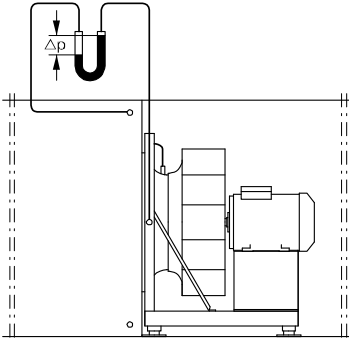


Figure 7-5 :Built in fan

When fans are built in a plenum, it is required to measure the differential pressure between the static pressure in the plenum on the suction side and the pressure at the inlet cone.

To ensure that the static pressure to be measured at the inlet nozzle is not distorted by dynamic velocities, it is recommended to attach a ring-line of measuring points on the wall as shown in the following diagram.

When using a differential pressure sensor, the signal can be used for automatic control purpose.

For calculation of the flow rate a calibration coefficient (k-factor) for every fan required this is determined by comparative measurement on a standard test rig with none disturbed air flow at suction.

**K-Factor deviation**  
Standard calibration  
K10 < 10%

RLM E6-	Calibration factor K10	RLM 56- 55-	Calibration factor K10
2528	79 m <sup>2</sup> /s/h	2528	73 m <sup>2</sup> /s/h
2831	94 m <sup>2</sup> /s/h	2831	90 m <sup>2</sup> /s/h
3135	106 m <sup>2</sup> /s/h	3135	105 m <sup>2</sup> /s/h
3540	128 m <sup>2</sup> /s/h	3540	120 m <sup>2</sup> /s/h
4045	155 m <sup>2</sup> /s/h	4045	150 m <sup>2</sup> /s/h
4550	190 m <sup>2</sup> /s/h	4550	190 m <sup>2</sup> /s/h
5056	242 m <sup>2</sup> /s/h	5056	240 m <sup>2</sup> /s/h
5663	310 m <sup>2</sup> /s/h	5663	300 m <sup>2</sup> /s/h
6371	385 m <sup>2</sup> /s/h	6371	385 m <sup>2</sup> /s/h
7180	490 m <sup>2</sup> /s/h	7180	485 m <sup>2</sup> /s/h
8090	628 m <sup>2</sup> /s/h	8090	620 m <sup>2</sup> /s/h
9010	794 m <sup>2</sup> /s/h	9010	790 m <sup>2</sup> /s/h
		1011	1000 m <sup>2</sup> /s/h
		1112	1260 m <sup>2</sup> /s/h
		1214	1540 m <sup>2</sup> /s/h

## 7.6 Install Protection Devices

1. Fit guards to protect exposed inlet openings (EN ISO 13857).
2. Design safety devices in such a way that they prevent objects from being sucked in or from falling in (see EN 60529).

## 8. Electrical Connection

### 8.1. Safety Instructions for Electrical Connection



#### **Danger of electric shock!**

- ▶ Observe the safety instructions and preventive measures in Chapter 4 as well as the relevant legal requirements.
- ▶ EN 60204-1, IEC 60364 / DIN VDE 0100; DIN EN 60079-0, VDE 0170-1  
DIN EN 60079-14, VDE 0165-1.

All fans are delivered ready for connection. The terminal box is easily accessible. The wiring diagram is in the terminal box.

**No mains connection operation allowed for models with max. operating frequency <50 Hz!**

**Note** As a standard feature the fans are suitable for operation by a frequency inverter. When operating the fans together with frequency inverter or control equipment containing electronic components the manufacturer's recommendations of are to be observed concerning radio noise suppression (EMC) (through suitable earthing, cable lengths, cable screening, etc.).

**CAUTION** **Inspection switches, electronic control units and frequency converters can cause material damage!**

- ▶ Do not use electronic control units or frequency converters in areas subject to explosion hazards.
- ▶ Install inspection switches - except inspection switches approved for areas subject to explosion hazard – outside the area subject to explosion hazards.

**CAUTION** **Excessive te-time can cause material damage using Ex ell motors!**

- ▶ When using overload protective devices do not exceed the te-time stated on the motor rating plate.

**Note** The standard motors are classified as protection category "Explosion proof EEx de II", temperature class T1 to T4 for ambient temperature from -20°C to +40°C (60°C) in accordance with Directive 94/9/EC (ATEX 95) and IEC/EN 60079-0, IEC/EN 60079-1.

- ▶ Current, voltage and frequency of mains supply checked for conformity with fan type plate and motor rating plate.
- ▶ Star-delta or soft start provided for motors with a nominal output >4 kW.
- ▶ Adhere to the output limits imposed by the power supply company.
- ▶ If necessary, an Isolator must be provided(outside the area subject to explosion hazards)
- ▶ All components are provided with an earthing. The fan components are electrically connected to each other.
- ▶ **The fan is protected against unexpected start!**
- ▶ **Chapter 4. „Safety“ must be respected!**

## 8.2. Electrical connection of the motor

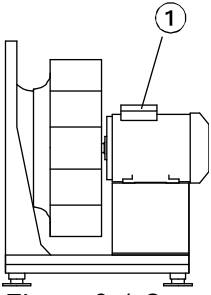


Figure 8-1 Connection box

1. Fit inspection switch if applicable.
2. Connect feed line to fan or service switch.
3. Connect motor as shown on connection diagram supplied.
4. Ensure that all the electrical safety devices have been fitted and connected.

1 = Connection box

## 8.3. Motor Protection

Protect motors against overload in accordance with DIN EN 60204-1.

- Speed controlled, pressure resistant encapsulated motors, equipped with certified PTC-thermistors have to be operated – in the case of explosion proof application – with an ATEX certified tripping unit!
- Only motors conforming to the corresponding ATEX – category of the fan are permitted.
- Motor protection switches must be set to the nominal motor current (see type plate). A higher setting value is not admitted!
- Respect the te-time for overload protection indicated on the motor type plate.

**CAUTION** Fuses or circuit breakers do not provide sufficient motor protection. Damage due to insufficient motor protection invalidates the manufacturer's guarantee.

**Note** In all cases the power limitations provided by the existing power supply company must be taken into account.

If plant conditions necessitate a direct start the suitability of the fan design must be confirmed with Nicotra Gebhardt. Fans with high inertia impellers can take over 6 seconds to reach top running speed. In these cases heavy duty motor protection relays or bimetal relays must be provided.

## 8.4. Carrying out a Test Run



**Risk of injury from rotating impeller!**

- ▶ Never reach into the impeller when the fan is open.

1. Take measures to prevent the centrifugal fan from being switched on accidentally
2. Clear the ducting system and fan of all foreign bodies (tools, small parts, construction waste, etc.
3. Close all the inspection openings.
4. Switch on the fan and check the direction of rotation of the impeller by comparing it with the arrow on the fan indicating the direction of rotation.
5. If the direction of rotation is wrong, reverse the polarity of the motor having due regard to the safety instructions.



6. Once operating speed has been reached measure the current consumption and compare it with the nominal motor current on the fan type plate or motor rating plate
7. If there is continuous overload switch the fan off immediately.
8. Check that the fan runs smoothly and quietly. Ensure that there are no unusual oscillations or vibrations.
9. Check the motor for any abnormal noises.

## 9. Commissioning

The motors are designed for continuous operation S1. If operations involve more than three starts per hour Nicotra Gebhardt GmbH shall be required to confirm the suitability of the motor.



**Potentially explosive gas mixtures in conjunction with hot and moving parts may cause serious or fatal injury.**

**Risk of explosion due to increased ambient temperature!**

1. **Observe ambient temperature.**
2. **Ensure adequate supply of cooling air.**

### 9.1. Conditions for Commissioning in Ex-Area

The following requirements must be met before operating the fan in areas subject to explosion hazards:

- Specifications on the type plate to meet the standards required in the local operating conditions in respect of explosion hazards (machine group, explosion hazard category, explosion hazard zone, temperature class).
- All the components connected to the fan carrying a risk of ignition or explosion to have the required approval certificates.
- The ambient temperature during subsequent use to be within in the allowed limits!
- All the requisite safety devices to be installed.
- Prevent impeller from contact and from being hit by falling or sucked-in objects.
- The fan is not operated in a dusty environment.
- Ensure that unacceptable levels of dust are not allowed to gather on the fan.
- The distances from the impeller to the plant parts on site are checked and meet the requirements for explosion protection.
- Ensure that the fan is earthed in accordance with regulations.

### 9.2. Commissioning the Centrifugal Fan



**Risk of injury from rotating parts and hot surfaces!**

1. Ensure that all the safety devices are fitted.
2. Ensure that the impeller has been secured acc. to DIN EN ISO 13857!

**Commissioning**

1. Check the working order of all the connected control instruments.
2. **Switch on the centrifugal fan.**

## 10. Maintenance

### 10.1. Safety Instructions for Maintenance

- ▶ Observe the safety instructions and preventive measures in Chapter 4 as well as the relevant legal requirements.
- ▶ Follow the directions of the motor supplier and the instructions specified by the manufacturers of the switches and control units.

**WARNING!**

**Work on the fan is only permitted when the power supply is fully cut!**

**CAUTION**

**Pressure washers can cause damage to property!**

- ▶ Do not use pressure washers (steam jet cleaners) to clean the equipment.

**CAUTION**

**Breakdown and hazard because of leaking gas media.**

- ▶ Exchange leak flexible connections.

### 10.2. Observing Regular Inspection Intervals

In the interests of upkeep and safety we recommend having the operation and condition of the fans inspected at regular intervals by duly qualified service personnel or a professional maintenance firm and documenting these inspections. The nature and extent of the maintenance work, the service intervals and any additional work required needs to be specified on a case-by-case basis depending on the use of the fans and the general conditions on site. Our servicing and inspection recommendations based on VDMA 24186-1 can be found on our website.

### 10.3. Preparing for Maintenance

1. Disconnect the motor from the mains.
2. Plug fans fitted with an inspection switch should be switched off using the inspection switch.
3. Take measures to prevent the centrifugal fan from being switched on accidentally.
4. Wait until the impeller has stopped.
5. Wait until all hot surfaces have cooled down.
6. Remove any residues from the fan.
7. Depending on the situation installation components may be dismantled for inspection and maintenance.

**Preparation for maintenance is completed**

## 10.4 Maintenance recommendations for Fans RLM-ATEX

Table 10-1: Maintenance recommendation

- ▶ Conduct test run if applicable (see Chapter 8.4).
- ▶ Document inspection intervals observed.

	Description	quarterly	cyclic	on demand
<b>1.0</b>	<b>Fan</b>			
1.1	Check deposit, damages, corrosion and fixing	X		
1.2	Check impeller for damage and unbalancing, vibration check	X		
1.3	Check the axial and radial gap	X		
1.4	Check flexible connections for tightness	X		
1.5	Check correct function of AVM	X		
1.6	Check correct function of safety devices (guards)	X		
1.7	Check condensate water drain	X		
1.8	Clean entire unit in order to keep all elements in best working conditions	X		
1.9	Check rotational sense of impeller (for all speeds)	X		
2.0	Check fan function and its readiness for immediate start up		X	
<b>2.1</b>	<b>Motor</b>			
2.2	Visual control for dirt, damages, corrosion and correct fixing	X		
2.3	Check rotational sense	X		
2.4	Check bearing noise	X		
2.5	Lubricate bearing (where bearings are re-lubricable)		X	
2.6	Check correct function of safety devices (guards)	X		
2.7	Check tight electrical connections on tight fixing	X		
2.8	Clean entire unit in order to keep all elements in best working conditions	X		

**10.4.1 Vibration monitoring**

The fan has to be frequently checked for vibrations. The max. vibration velocity values admitted are those which relate to ISO 14694.

Table 10-2: Vibrations

Fan with AVM		Fan without AVM	
Motor power	Vibration velocities	Motor power	Vibration velocities
≤ 3,7 kW	9,0 mm/s	≤ 3,7 kW	5,6 mm/s
> 3,7 kW	6,3 mm/s	> 3,7 kW	4,5 mm/s

These vibration velocities are to be measured in a radial direction on the bearing or bearing casing of the motor.

Deposits of dirt and dust on the impeller can cause unbalancing and subsequent damages. In order to prevent this danger frequent inspections and cleaning measures have to be carried out depending on the degree of possible deposit.

**10.4.2 Motor bearings**

The motor bearings are supplied permanently lubricated by the factory; experience has shown that the grease needs to be changed only after several years only under normal operating conditions.

In the case of bearing noise please contact Nicotra Gebhardt-Service for a check and a possible change of defective bearings.

**10.4.3 Periods of stand still**

During longer periods of standstill the fan must from time to time be put into operation for a short while. This is to avoid bearing damages due to the mechanical load and ingress of humidity.

After longer periods of storage, the fan and motor bearings have to be checked prior to installation.

**CAUTION** If the condition of the fan does not allow modified repair measures it must be put out of commission and be replaced immediately if required.

**11. Faults**

If any faults occur during operation which cannot be repaired by maintenance personnel please contact the service department at Nicotra Gebhardt GmbH.



**Risk of explosion caused by improper operating states!**

- ▶ Switch the fan off immediately if permissible limits are exceeded and in the event of irregularities or faults.

## 12. Service, Spare Parts and Accessories

**Nicotra Gebhardt GmbH**  
Gebhardtstraße 19–25  
74638 Waldenburg  
Germany

Phone: +49 (0) 7942 101 384  
Fax: +49 (0) 7942 101 385  
E-mail: [info@nicotra-gebhardt.com](mailto:info@nicotra-gebhardt.com)  
[www.nicotra-gebhardt.com](http://www.nicotra-gebhardt.com)

### 12.1. Ordering Spare Parts

- Use only genuine spare parts supplied by Nicotra Gebhardt GmbH as featured in the list of spare parts.

The use of spare parts supplied by other manufacturers may compromise the safety of the equipment. Nicotra Gebhardt GmbH shall not accept any liability or provide any warranty cover in respect of primary or secondary damage arising as a consequence of using spare parts supplied by other manufacturers.

Spare parts can be ordered online at -- [www.nicotra-gebhardt.com/Partshop](http://www.nicotra-gebhardt.com/Partshop)

### 12.2. Accessories

Nicotra Gebhardt GmbH has a wide range of accessories for the economical and efficient use of its fans.

Accessories are optional and always need to be ordered separately.

Spare parts should be selected on the basis of the technical specifications or via our electronic selection program. Accessories are supplied with separate operating or installation instructions unless their installation or uses are self-explanatory.

## 13. Annex

### 13.1 Further Documentation Supplied by Nicotra Gebhardt GmbH

*Tabelle 13 1: Further documentation*

Type of Documentation	File Location
Maintenance and inspection recommendations	Internet
EC-Declaration of Conformity	Annex
EC-Declaration of Incorporation	Annex

## EC Declaration of Conformity to EC Council Directive 94/9/EC (ATEX 95)

The manufacturer: **Nicotra Gebhardt GmbH**,  
Gebhardtstrasse 19-25, 74638 Waldenburg, Germany

herewith declares, that the machinery designated below, on the basis of its design and construction in the form brought onto the market by us is in accordance with the relevant safety and health requirements of the EC Council Directive as mentioned below.

If any alterations are made to the machinery without prior consultations with us this shall render the declaration invalid.

Designation: **Plug fans without scroll of categories 2G for conveying explosive atmosphere**

Machine type: **RLM 55-....-2G; RLM 56-....-2G; RLM E6-....-2G**

Year of Production/Type: **See type plate**

Relevant EC Council Directive: **EC Directive 94/9/EG (ATEX 95)**

Statement of deposition: **EX9 12 10 78300 006 (RLM E6)**  
**EX9 11 09 78300 003 (RLM 55/56)**

Name of Notified Body: **TÜV SÜD Product Service; Zertifizierstelle; Riedlestrasse 65;  
80339 Munich; Germany**

Applied harmonized standards 1), in particular: **EN 13463-1, EN 13463-5, EN 1127-1, EN 14986**

**It is the responsibility of the manufacturer or contractor to ensure that conformity to these standards is observed when installing the fan in a machine or system.**

Waldenburg, 05.06.2014



i.V. I. Stöbe  
Head of production



i.V. Dr. J. Anschütz  
Research and Development Director

1) For the complete list of applied standards and technical specifications please see the manufacturer's documentation.

**NICOTRA||Gebhardt**  
**fan|tastic solutions**

**Nicotra Gebhardt GmbH**  
Gebhardtstrasse 19-25  
74638 Waldenburg, Germany

[www.nicotra-gebhardt.com](http://www.nicotra-gebhardt.com)

## EC-Declaration of Incorporation

The manufacturer: **Nicotra Gebhardt GmbH**,  
Gebhardtstrasse 19-25, 74638 Waldenburg, Germany

herewith declares, that the following product:

Product designation: **Plug fan**

Type nomination: **RLM 55-....-2G; RLM 56-....-2G; RLM E6-....-2G**

Serial n°: **see type plate**

Year of manufacture: **see type plate**

qualifies as a partly completed machine, according to Article 2, clause “g” and complies with the following basic requirements of the **Machine Directive (2006/42/EC): Annex I, Article 1.1.2; 1.3.7.**

The partly completed machine may be put into operation only if it has been stated that the machine into which the uncompleted machine has to be incorporated complies with the requirements of the Machine Directive (2006/42/EC).

The following harmonised standards<sup>1)</sup> have been applied:

**DIN EN ISO 12100** Safety of machines – General design principles  
**DIN EN ISO 13857** Safety of machines – Safety distances to hazardous areas

The manufacturer is committed to providing the special documents for partly completed machines to any state authority on request.

Waldenburg, 05.06.2014

Representative for the documentation: Michael Hampel

*i.V. J. Stöbe*

i.V. I. Stöbe  
Head of production

*i.V. J. Anschütz*

i.V. Dr. J. Anschütz  
Research and Development Director

1) The complete listing of applied standards and technical specifications see manufacturer's documentation.

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fan|tastic solutions

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74638 Waldenburg, Germany

www.nicotra-gebhardt.com

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**Nicotra Gebhardt GmbH**  
Gebhardtstrasse 19-25  
74638 Waldenburg  
Germany

Telefon +49 (0)7942 1010  
Telefax +49 (0)7942 101170  
E-Mail [info@nicotra-gebhardt.com](mailto:info@nicotra-gebhardt.com)

[www.nicotra-gebhardt.com](http://www.nicotra-gebhardt.com)