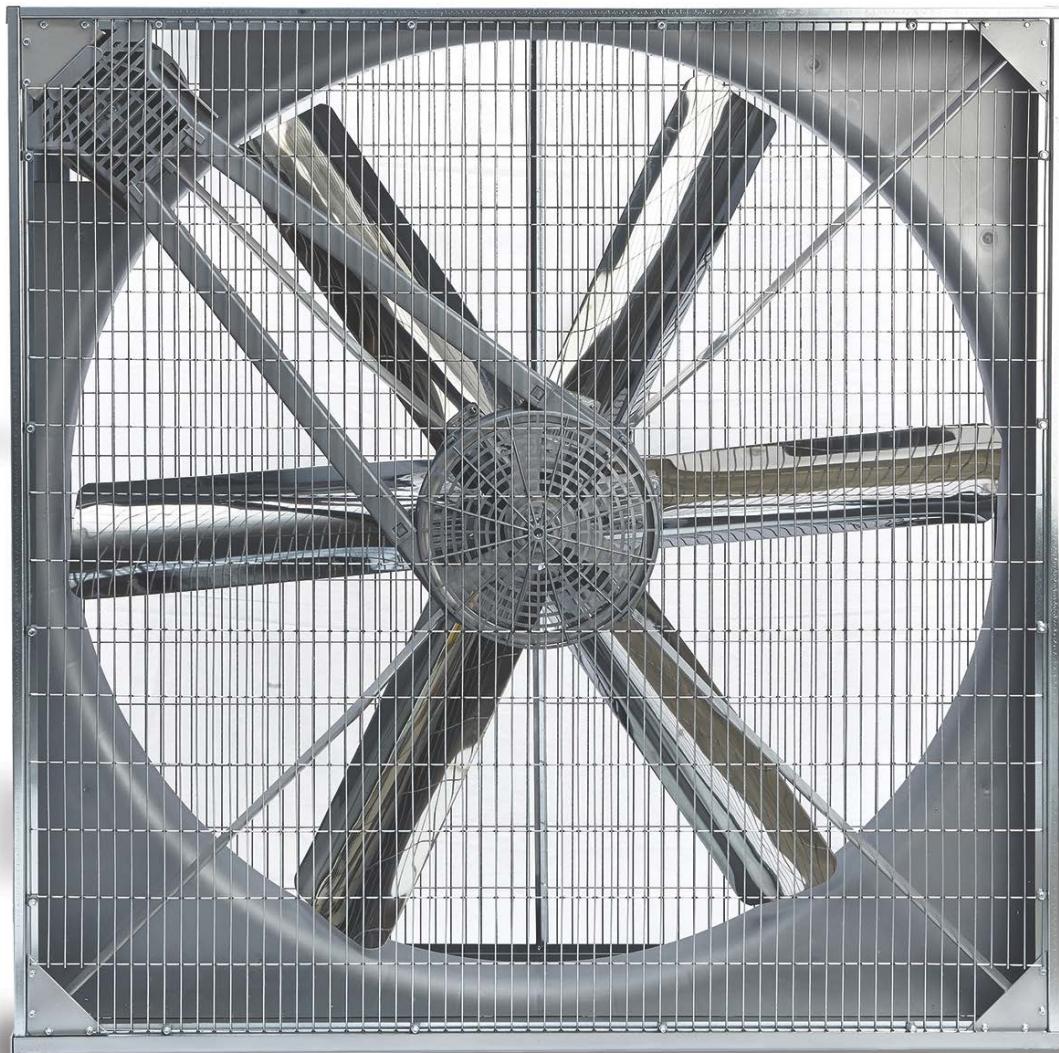


GigolA®



INSTRUCTION MANUAL (TECHNICAL HANDBOOK) AIR CIRCULATOR FAN

ES 200 R/R - ES 150 R/R - ES 140 R/R - ES 120 R/R - ES 100 R/R - ES 80 R/R

69"

55"

51"

39"

31"

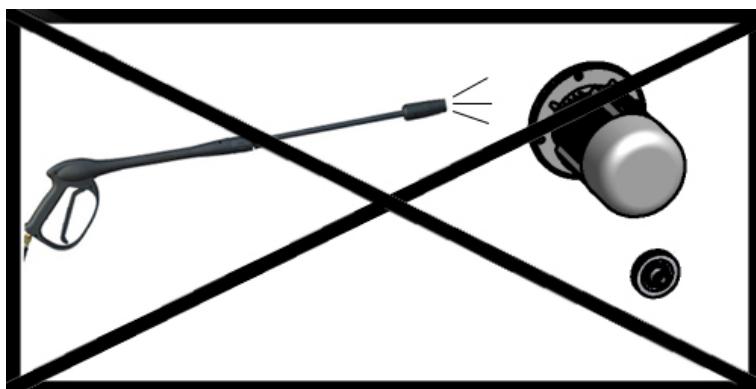
26"



CE

Gigola	Instruction manual (technical handbook)	g&r – im th – Air circulation fan - eng	First edition 01/01/1995	
	Air circulator fan		Rev. No. 04 28/07/2016	Page 2 of 77

The fan is resistant to humidity, heat and cold (as better clarified in the operation and maintenance manual). It has been designed specifically to operate in highly corrosive environments or in environments with abrasive substances. The fan is only to be used for the purpose for which it is designed and in compliance with current regulations. The user assumes full responsibility for any improper use. Please refer to the operation and maintenance manual for any further clarification.



**The use of high-pressure cleaners is strictly prohibited
either in the motor area or in the vicinity of bearings**

Gigola	Instruction manual (technical handbook)	g&r – im th – Air circulation fan - eng	First edition 01/01/1995	
	Air circulator fan		Rev. No. 04 28/07/2016	Page 3 of 77

Contents

1. Introduction.....	6
1.A. General warnings	7
1.B. Purposes and intentions of the manual	7
1.C. Glossary and terminology	7
1.D. Typographical conventions and pictograms used in the manual	13
1.E. Intended users of the manual, safekeeping	15
1.F. Qualification of maintenance personnel.....	15
1.G. Work clothing and personal protective equipment.....	18
1.H. Contents of the manual	18
1.I. Standard documentation supplied.....	18
1.J. Updates of the manual	19
1.K. Important information	19
1.L. Meaning of the pictograms affixed on the machine.....	20
1.M. Manufacturer's responsibility	20
1.N. Guarantee	21
1.O. Customer service and after-sales support	21
1.P. Suggestions and feedback from the user	21
2. General features of the machinery.....	22
2.A. Envisaged conditions of use and features	22
2.B. Main aspects linked to operation.....	22
2.C. Description of the machine.....	22
2.C.I. Protection grid - extraction side	23
2.C.II. Motor and transmission.....	23
2.C.III. Fan box	24
2.C.IV. Fan	24
2.C.V. Protection grid (delivery side).....	25
2.D. Identification of the manufacturer.....	25
2.E. Declaration of conformity	25
2.F. Identification of the machinery	26
2.F.I. Position and structure of the ID plate	26
2.F.II. Intelligibility, maintenance and substitution of the plate	26
2.G. Overall dimensions.....	27
2.H. Technical information on fans belonging to the EOLOSTAR family:	27
2.I. Unpermitted, unenvisioned and/or improper (foreseeable and unforeseeable) use of the machine	27
3. Warnings and general precautions	28
3.A. Accident prevention warnings	28
3.B. Warnings on the protection devices installed on the machine	29
3.C. Notes on the residual risks	29
3.D. Warnings for use in potentially explosive atmosphere (ATEX)	30
3.E. Precautions for the installation of parts by the user	30
4. Shipping, receipt and acceptance	31
4.A. Shipping and transportation	31
4.B. Receipt	31
4.C. Acceptance	31
4.C.I. Non-acceptance due to flaws, defects and/or non-conformities	31
5. Packing – Unpacking – Handling – Transportation	32
5.A. Packaging	32
5.A.I. Packaging free	32
5.A.II. Cardboard box	32

Gigola	Instruction manual (technical handbook)	g&r – im th – Air circulation fan - eng	First edition 01/01/1995	
	Air circulator fan		Rev. No. 04 28/07/2016	Page 4 of 77

5.A.III. Cardboard box strapped on pallet.....	33
5.A.IV. Cardboard boxes strapped on pallet wrapped with plastic stretch film	33
5.B. Unpacking.....	34
5.B.I. Disposal of the packaging	34
5.C. Handling	35
5.C.I. Loading, unloading and manual handling of the machinery (with or without packaging)	36
5.C.II. Mechanical loading, unloading and handling of the machinery (with or without packaging)	37
6. Storing and stowing	38
6.A. Short term.....	38
6.B. Long-term	38
7. Assembly - Disassembly	39
7.A. Completely disassembled machinery.....	39
8. Installation and connections.....	40
8.A. Choosing the unit's position.....	40
8.B. Ceiling installation with metal supports.....	41
8.C. Electrical connection	42
8.D. Connection to the aeraulic system.....	43
8.E. Minimum distances	43
9. First start-up - Commissioning - Decommissioning	43
9.A. First start-up	44
9.A.I. Current input check	44
9.A.II. Check of the bearing temperature.....	45
9.A.III. Check of vibrations.....	46
9.B. Regular operation check.....	47
9.C. Commissioning	47
9.C.I. Running in.....	49
9.C.II. Checks during the machine's life cycle.....	49
9.D. Putting out of service and decommissioning	50
9.D.I. Decommissioning.....	50
9.D.II. Demolition	51
9.D.III. Disposal	51
10. Starting - Operation - Stopping - Emergency stopping	52
10.A. Starting	52
10.B. Operation	52
10.B.I. Noise	52
10.C. Stopping	53
10.D. Emergency stop	53
11. Cleaning	54
11.A. Fan support hub and motor support.....	54
11.B. Motor	55
11.C. Protection cover	56
11.D. Transmission belts	57
11.E. Pulleys.....	58
11.F. Impeller.....	59
11.G. Venturi nozzle	60
11.H. Protection grids	61
12. Inspection - Routine maintenance - Extraordinary maintenance.....	62
12.A. Intervention timetable	62
12.B. Conduct during inspections and maintenance.....	62
12.C. Supervision / Simple Inspection	63

Gigola	Instruction manual (technical handbook)	g&r – im th – Air circulation fan - eng	First edition 01/01/1995	
	Air circulator fan		Rev. No. 04 28/07/2016	Page 5 of 77

12.D. Thorough Check / Inspection	63
12.E. Routine maintenance	64
12.F. Extraordinary maintenance	64
12.F.I. Venturi nozzle	65
12.F.II. Impeller	65
12.F.III. Bearings, impeller shaft and spacer	65
12.F.IV. Pulleys	65
12.F.V. Protection cover	65
12.F.VI. Transmission belts	65
12.F.VII. Motor support arm	65
12.F.VIII. Motor	65
12.F.IX. Cross-shaped hub	65
12.F.X. Protection grid	65
13. Maintenance logbook	66
13.A. Logbook structure (Suggestions)	66
14. Lubrication	68
14.A. Impeller transmission shaft bearings	68
15. Spare parts	68
16. Troubleshooting	69
17. Facsimile of the machine documents accompanying the standard supply	72
17.A. Declaration of conformity	72
18. Diary of revisions	73
19. Notes	74
20. Annexes	75
20.A. ANNEX 1 - Overall dimensions	75
20.B. ANNEX 2 – Alignment of the transmission belts	76
20.C. ANNEX 3 – Tensioning the transmission belts	76

Gigola	Instruction manual (technical handbook)	g&r – im th – Air circulation fan - eng	First edition 01/01/1995	Page 6 of 77
	Air circulator fan		Rev. No. 04 28/07/2016	

1. Introduction

Thank you for purchasing a manufactured an air circulator fan by **GIGOLA & RICCARDI S.p.A** (from here on simply referred to as “**G&R**”). In addition to expressing our gratitude to you for having chosen our product, we are also pleased to inform you that the product you have purchased has been designed in accordance with the provisions contained in the **Machinery Directive 2006/42/EC** and respects all the regulatory and legislative requirements relating to health and safety (**Legislative Decree 9 April 2008, no. 81 – CONSOLIDATED LAW ON HEALTH AND SAFETY AT THE WORKPLACE coordinated with Leg.Decree 3 August 2009, no. 106**). The components which make up the machinery have not only been exclusively produced using high-quality materials, but have also been designed, shaped and manufactured in order to guarantee a long service life. By drawing up an appropriate schedule for periodical checks, and carrying out all necessary ordinary and extraordinary maintenance operations at set times and in set ways (or immediately, should any operational issues arise), it will be possible to increase the effectiveness and efficiency of the machine, as well as extending its general service life.

Considering that axial fans are **MACHINES** (though they may be simple constructions and their operation easy to understand) they pose an intrinsic hazard and, therefore, we advise those who are working and/or positioned in close proximity to the machine or its working range, either when it has been shut down or (in particular) when it is in operation, to always proceed with caution, take heed of the safety operating procedures and always use common sense during operation. Finally, it is to be taken into consideration that the relative elementary nature of the fans does not lessen the responsibility of those working on the machinery and does not give non-qualified and/or non-authorised personnel the permission to perform operations on it. Prior to working on the machine or any of its components, in order to prevent the occurrence of dangerous or potentially harmful situations (for the user, the machinery, those positioned in close proximity and the installation itself) we categorically advise that this operation and maintenance manual be read thoroughly. Should you require further or more detailed information about the machinery, installation operations, startup, maintenance and/or disposal, we advise you to refer to our post-sales technical assistance service [*Ref. Par. 1.O*], consult “our sales catalogue” or visit our website: www.gigolariccardi.com

Before moving to another topic, we remind you that:

- the information contained in this document is in line with the technical and safety specifications of the machine which the manual refers to;
- the instructions, drawings, diagrams, tables, technical data and other details included in this manual are of a specific technical nature and are therefore subject to confidentiality;
- the drawings, diagrams, tables and technical data are up-to-date as of the publication date of this document and exclusively refer to the machinery to which they are attached;
- the information contained in this operation and maintenance manual is not to be used for purposes other than those for which the information has been prepared;
- this publication forms an integral and inseparable part of the documentation supplied with the air circulator fan produced by G&R (**STANDARD SUPPLIED KIT**);
- the guarantee of proper functioning and full performance of the machinery is strictly dependent on the correct implementation of all the instructions contained in this manual;
- **the contents of this manual can be altered by G&R without prior notice and without incurring any penalty.**

Gigola	Instruction manual (technical handbook)	g&r – im th – Air circulation fan - eng	First edition 01/01/1995	Page 7 of 77
	Air circulator fan		Rev. No. 04 28/07/2016	

1.A. General warnings

Certain illustrations included in this manual may depict the machinery (or its components) open and/or dismantled. However, this is solely and exclusively for clarification of explanations. The machine must NOT be used unless all the components are correctly positioned and secured in place.

We remind users that, whilst the information included in this document aims to highlight the necessary measures to be taken by those working with the fan or operating on it to ensure they do so in a safe manner, it is assumed in this manual that, in areas where the machinery is destined to operate:

- the current regulations relating to occupational safety and hygiene be observed;
- personnel responsible for operating and maintaining the machinery possess a level of instruction and training which enables them to correctly interpret and apply the information provided.

1.B. Purposes and intentions of the manual

G&R has produced this document with the specific aim of immediately rendering all the necessary information simple and accessible, so that those using the air circulator fan can perform all activities related to the life cycle of the machinery in a safe manner.

Considering that failure to take heed of all the available information is an effective source of risk and a clear cause of dangerous situations, those who come into contact with the machinery mentioned in this document during their daily working activities, or even come into contact with it in exceptional circumstances, are required to refer to this manual or, if necessary/in case of doubt:

- contact the G&R post-sales technical assistance service [*Ref. Par. 1.O*]);
- consult the "sales catalogue";
- visit our website: www.gigolariccardi.com.

G&R shall not to be held criminally or civilly responsible or liable for damages caused due to an incorrect use of this documentation.

1.C. Glossary and terminology

SAFETY COLOUR A colour to which a specific meaning is assigned.

**MACHINE
(GENERAL DEFINITION)** A term used in this operation and maintenance manual to refer to the air circulator fan.

**MACHINE
(DEFINITION ACCORDING TO THE
MACHINERY DIRECTIVE
2006/42/EC)**

- An assembly consisting of linked parts or components, at least one of which moves, with the appropriate actuators, control and power circuits, etc., joined together for a specific application, in particular for the processing, treatment, moving or conditioning of materials.
- An assembly of machines and devices which, in order to achieve the same end, are arranged and controlled so that they function as an integral whole.
- Interchangeable equipment modifying the function of a machine, which is placed on the market for the purpose of being fitted on a machine or a series of different machines or on a tractor by the operator himself in so far as this equipment is not a spare part or a tool.

P.P.E. Personal Protective Equipment.

C.P.E. Collective Protective Equipment.

DANGER The properties or intrinsic qualities of a given factor with the potential to cause harm.

RISK The probability of reaching the potential damage threshold in the conditions of use and exposure to a given factor or agent or to a combination of them. The risk (R) is a function of the level of damage (D) provoked and of the probability (P) or frequency of occurrence of the damage.

RISK IDENTIFICATION The process for recognition of the existence of a risk and definition of its characteristics.

Gigola	Instruction manual (technical handbook)	g&r – im th – Air circulation fan - eng	First edition 01/01/1995	
	Air circulator fan		Rev. No. 04 28/07/2016	Page 8 of 77

<u>RISK ASSESSMENT</u>	Procedure for assessing the possible scale of the damage such as the consequence of the risk for the health and safety of the worker when performing their activities, deriving from the occurrence of a danger in the workplace.
<u>EDUCATION</u>	Educational process through which knowledge and procedures of use for acquiring skills are transferred to workers and other persons involved in the company's prevention and protection system: <ul style="list-style-type: none"> - for performing their respective jobs in the company in safety; - for the identification, reduction and management of the risks.
<u>INFORMATION</u>	The totality of the activities intended to provide useful knowledge for the identification, reduction and management of the risks in the work environment.
<u>TRAINING</u>	The totality of the activities aimed at ensuring that workers learn the correct use of the equipment, machines, plants, substances, devices (including personal protective equipment) and work procedures.
<u>ACCIDENT</u>	An event that can give rise to an injury or which has the potential for leading to an injury. An accident which does not give rise to illnesses, injuries, damage or other losses is described as a near miss or near accident. The term accident includes near misses/near accidents.
<u>INJURY</u>	An undesired event that can give rise to death, illnesses, wounds, harm or other losses.
<u>CORROSIVE</u>	Can effect a destructive action in contact with living tissues or inanimate materials.
<u>IRRITANT</u>	Though not being corrosive can cause an inflammatory reaction with direct, prolonged or repeated contact with the skin or mucous membranes.
<u>EQUIPMENT</u>	This is intended as any machine, apparatus, tool or plant intended to be used during work.
<u>DANGER ZONE</u>	Any zone inside or in the vicinity of work equipment in which the presence of a worker constitutes a risk for the health or safety of the same.
<u>EXPOSED PERSON</u>	Any person wholly or partly found in a danger zone.
<u>USER</u>	Any PERSON (entrepreneur/enterprise/sole trader) who uses the machine adequately or who entrusts the use or the operations associated with use to prepared persons.
<u>OPERATOR</u>	Personnel, generally without specific skills, who perform the operations necessary for running the machine as well as cleaning the same and the place in which it is installed; if necessary they are able to perform simple adjustment operations or for restoring machine operation.

Gigola	Instruction manual (technical handbook)	g&r – im th – Air circulation fan - eng	First edition 01/01/1995	
	Air circulator fan		Rev. No. 04 28/07/2016	Page 9 of 77

**PERSONNEL
CHARGED WITH
MECHANICAL
MAINTENANCE**

QUALIFIED ENGINEER [Def. Ref. Par. 1.F.] who, in relation to the assignment level, can put operations of a mechanical nature in place in order to make adjustments, repairs and maintenance operations.

Personnel charged with mechanical maintenance are usually persons with sufficient experience in the field of aeraulic machines as well as there control and adjustment technology; they are generally not qualified to perform work on electrical systems either off-line or live.

**PERSONNEL
CHARGED WITH
ELECTRICAL
MAINTENANCE**

QUALIFIED ENGINEER [Def. Ref. Par. 1.F.] with PES-PAV-PEI (skilled/trained) permits and official assignment by the company proprietor (letter of appointment) who, in relation to the pay grade, is responsible for operations of an electrical nature (adjustment, maintenance and repair) on live and off-line machinery, equipment and/or entire sites.

**PERSONNEL
ASSIGNED TO
HANDLING**

QUALIFIED PERSONNEL [Def. Ref. Par. 1.F.] with fork-lift driver's licence (if the operation requires the use of motorised lifting devices) and official appointment from the company proprietor who, in relation to the assignment level, is charged with handling loads on site, with managing internal logistics and/or with positioning loads on means of transport.

**MANUFACTURER'S
ENGINEER**

QUALIFIED ENGINEER [Def. Ref. Par. 1.F.] made available by G&R for the performance of operations of a complex nature in particular situations or, in any case, when agreed with the user.

PACKING PERSONNEL

QUALIFIED PERSONNEL charged with:

- placing machinery in its packaging;
- closing the packaging in accordance with the internal procedures;
- unpacking the machinery in accordance with the internal procedures and instructions indicated on the packaging itself.
- handling the machinery (packed and unpacked) manually or, where applicable, using lifting means (in this case they must also hold forklift drivers' licences), in full compliance with internal procedures and the safety conditions for persons, the product and the environment.

**TRANSPORT
PERSONNEL**

QUALIFIED PERSONNEL charged with:

- coordinating the personnel assigned to handling during the operations for loading, stowing and positioning the packs on the means of transport;
- transporting the packs to their destination in conditions of safety for persons, the product and the environment;
- coordinating the personnel charged with handling during the unloading stages.

DEALERS

Person charged with:

- illustrating the features of the machine to potential buyers;
- providing indications for choosing the most appropriate machinery for specific needs;
- warn potential clients about conditions of use that can be dangerous for persons, the product and environment;
- provide guidelines for the performance of operations relating to the product, the installation, use, maintenance, repair, disassembly and demolition.

Gigola	Instruction manual (technical handbook)	g&r – im th – Air circulation fan - eng	First edition 01/01/1995	Page 10 of 77
	Air circulator fan		Rev. No. 04 28/07/2016	

INSTALLATION PERSONNEL

QUALIFIED PERSONNEL, persons expressly or implicitly deputised by the buyer and with the dealer's collaboration to :

- position the machinery in a suitable place, following the correct installation and safety procedures;
- provide the user with the fundamental information on operation and maintenance in conditions of safety.

REPAIR PERSONNEL

QUALIFIED PERSONNEL charged with diagnosing faults and anomalous behavior of the machinery, availing themselves where applicable of information provided by the user, remedying the failures, making the necessary repairs, replacements and adjustments necessary for restoring the product's ability to work correctly and in conditions of safety for persons, for the product itself and for the environment.

DEMOLITION PERSONNEL

QUALIFIED PERSONNEL charged with:

- recognising the machinery's obsolescence and the need for demolition of the same;
- disassembling the machine into its constituent parts;
- differentiating the materials by type and nature;
- eliminating the parts that cannot be reused and/or recycled in a manner that is safe and correct from an environmental point of view;
- sending recyclable parts to suitable collection centres.

APPARATUS

Apparatuses are intended as the machines, materials, fixed or movable devices, the control components, the instrumentation and measurement and prevention devices which, on their own or combined, are intended for the production, transportation, storage, measurement, adjustment, and energy conversion and/or the transformation of material and which, because of the potential ignition or triggering sources specific to them, risk provoking an explosion.

PLANT

The totality of the equipment and conduits necessary for transporting the "energies" to supply in order to "serve" parts or entire buildings.

PRODUCTION UNIT

Factory or structure intended for the production of goods or services, provided with financial and technical-functional autonomy.

SAFETY COMPONENT

A component, provided that it is not a piece of interchangeable equipment, that the manufacturer, or its established representative in the European Union, markets for the purposes of ensuring a safety function by means of its use, and the poor operation of which jeopardises the health or safety of exposed persons.

PERIODICAL CHECK

The set of operations to perform at intervals of at least six months, for checking the complete and correct operation of the equipment and plants.

EXPLOSION

A sudden oxidation or decomposition reaction which creates an increase in temperature or pressure, or both simultaneously.

EXPLOSIVE ATMOSPHERE

An explosive atmosphere is intended as a mixture of air, in atmospheric conditions, with substances that are flammable at the gas state, vapours, mists or powders in which, following ignition, combustion propagates to the entire unburnt mixture.

Gigola	Instruction manual (technical handbook)	g&r – im th – Air circulation fan - eng	First edition 01/01/1995	
	Air circulator fan		Rev. No. 04 28/07/2016	Page 11 of 77

<u>EXPLOSION LIMITS</u>	If the concentration of the flammable substance dispersed in sufficient quantities in the air exceeds a given minimum value (lower explosion limit), it is possible for an explosion to occur. This does not happen if the concentration of gas or vapour exceeds the maximum limit (upper explosion limit). The explosion limits vary in non-atmospheric conditions. The range of concentrations between the explosion limits is normally broader, for example, with rises of the pressure and temperature of the mixture. An explosive atmosphere can form above a flammable liquid only if the surface temperature of the liquid exceeds a precise minimum value.
<u>LOWER EXPLOSION LIMIT</u>	The lower limit of the range of concentration of a flammable substance in the air inside which an explosion may occur.
<u>UPPER EXPLOSION LIMIT</u>	The upper limit of the range of concentration of a flammable substance in the air inside which an explosion may occur.
<u>EXPLOSION RISK AREAS</u>	The areas in which explosive atmospheres can form in such quantities as to require the implementation of measures for protecting the health and safety of the workers involved are defined as "explosion risk areas".
<u>DANGEROUS EXPLOSIVE ATMOSPHERE</u>	Explosive atmosphere present in an environment in quantities that are dangerous for the health and safety of persons.
<u>SAFE PLACE</u>	Place where persons can consider themselves to be safe from the effects of a fire.
<u>MAINTENANCE</u>	Operation or intervention intended to maintain the efficiency and good condition of equipment and plants.
<u>ROUTINE MAINTENANCE</u>	Operation that is performed on site with instruments and tools in everyday use. It is limited to small-scale repairs that only require small parts and entail the use of commonly used consumables or the replacement of expressly envisaged parts of modest value.
<u>EXTRAORDINARY MAINTENANCE</u>	Maintenance operation which cannot be performed on site or which even if it can: <ul style="list-style-type: none">- requires means of particular importance;- requires particular equipment or instruments;- involves replacements of entire plant parts;- entails the complete overhaul or replacement of apparatuses for which repair is not possible or convenient.
<u>HEALTH AND SAFETY SIGNAGE IN THE WORKPLACE</u>	Signage which, with reference to an object, an activity or a given situation, provides an indication or an instruction concerning safety or health in the workplace and that, as the case may be, utilises a sign, a colour, a luminous or acoustic warning, a verbal communication or a gesture.

Gigola	Instruction manual (technical handbook)	g&r – im th – Air circulation fan - eng	First edition 01/01/1995	Page 12 of 77
	Air circulator fan		Rev. No. 04 28/07/2016	

WORK SAFETY Conditions and factors that regard the wellbeing of the employees, temporary workers, visitors and every other person in the workplace.

**WORKPLACE SAFETY
MANAGEMENT
SYSTEM** Part of the overall management system that facilitates the management of risks in the work environment associated with the company's business. This includes the organisational structures, the programming activities, responsibilities, practices, procedures, processes and resources for developing, fulfilling, achieving, reviewing and maintaining the company's Work Safety policy.

OVERHAUL The set of operations consisting of replacing mechanical components that reveal signs of wear or of fatigue (cracks) that are such as to have a detrimental effect on machine operation. **An overhaul involves checking all the components of the machinery and is understood to include replacements if damage is found, and an investigation of the causes.**

**IMPLEMENTATION OF
SAFETY MEASURES** The following set of operations:

- Disconnecting the machine from all the sources of power supply;
- Checking that all the mechanical moving parts have stopped;
- Locking out all the moving parts;
- **Checking the concentration of flammable powders/gasses and verifying that the atmosphere is NOT explosive;**
- Controlling the machine's internal and external temperature and checking its compatibility with the burn prevention condition;
- Correct lighting of the area around the machine for the entire duration of the inspections and maintenance work (routine/extraordinary);
- Use by personnel who work on the machine of all the necessary Personal Protective Equipment (suitable, certified and integral) including the use of protective antistatic clothing (suitable, certified and integral);

Gigola	Instruction manual (technical handbook)	g&r – im th – Air circulation fan - eng	First edition 01/01/1995	
	Air circulator fan		Rev. No. 04 28/07/2016	Page 13 of 77

1.D. Typographical conventions and pictograms used in the manual

This manual was conceived and produced using graphics that permit easy recognition of the level of importance of the contents; In this light:

- the generic information notices (often associated with lists) are shown by means of a list whose profile is:
 - Information 1;
 - Information 2;
 - Information 3;
 -
- the instructions linked to particular operations or complex procedures the execution of which, as a consequence, is binding for the correct and safe execution of the operation in question (e.g. transport, storage, assembly, disassembly, etc.) are shown by means of a numbered list (Roman numerals) the profile of which is:
 - I. Action 1;
 - II. Action 2;
 - III. Action 3;
 - IV. ...
- the instructions associated with operations whose performance in sequence is not binding, but recommended (e.g. XXXXX) are shown by means of a secondary list whose profile is:
 - ✓ Action 1
 - ✓ Action 2
 - ✓ Action 3
 - ✓ ...
- *italic text* is used for:
 - cross references (e.g. paragraph, figure, table) in which case a number will also appear and the associated specification and name;
 - the specialist technical terms (only the first time they appear in the text);
 - foreign language terms or ones not commonly used (only the first time they appear in the text).
- **bold text** is used for:
 - highlighting phrases of parts of the text of particular importance;
 - highlighting cross references.
- Text **highlighted in red** is used for recommendations or extremely important indications.
- underlined text if:
 - **simple**: used for highlighting the importance of the sentence or part of the text. It is typically associated with danger situations of **MEDIUM LEVEL** importance, i.e. possibility of injury or acute exposure episode with reversible invalidity;
 - **bold**: used for highlighting the particular importance of the sentence or part of the text. It is typically associated with danger situations of **SEVERE LEVEL** importance, i.e. possibility of injury or acute exposure episode with reversible invalidity;
 - **highlighted in red** used for highlighting the extreme importance of the sentence or part of the text. It is typically associated with danger situations of **EXTREMELY SEVERE LEVEL** importance, i.e.: injury or acute exposure episode with lethal effects or total invalidity;
- Explanatory figures are used in the description of the machine, of its components and of all the stages of its life cycle and specific points of interest in them are indicated by number that follow the following convention:
 - number: symbolic depiction of a functional unit
 - letter: symbolic depiction of a part of the machine.

Finally, in order to make the importance of the message transmitted by some of the pieces of information contained in this manual clearer and more immediate, these are accompanied by warning pictograms (Ref. UNI EN ISO 7010:2015). These are always and entirely the same signs that can be found during normal working and other activities. However, in order to prevent erroneous interpretations the table below lists the meaning of some of them.

SIGN	INDICATION	MEANING
	GENERIC HAZARD	The operations described in these instructions require the operator to comply scrupulously with their contents in order to ensure their safety, the safety of those in the vicinity and to protect the machinery.
	GENERIC INFORMATION	The operations described in these instructions constitute useful advice for the operations described by the instructions.
	OBLIGATION	The operations described in these instructions require the operator to wear protective equipment for the head (P.P.E. – Cat. 2).
	OBLIGATION	The operations described in these instructions require the operator to wear hearing protection devices. (P.P.E. – Cat. 2).
	OBLIGATION	The operations described in these instructions require the operator to wear protective devices for the eyes (P.P.E. – Cat. 2).
	OBLIGATION	The operations described in these instructions require the operator to wear protective equipment for the face (P.P.E. – Cat. 2).
	OBLIGATION	The operations described in these instructions require the operator to wear respiratory protective equipment for the airways (P.P.E. – Cat. 2).
	OBLIGATION	The operations described in these instructions require the operator to wear protective equipment for the hands (P.P.E. – Cat. 2).
	OBLIGATION	The operations described in these instructions require the operator to wear technical garments or work overalls (P.P.E. – Cat. 1).
	OBLIGATION	The operations described in these instructions require the operator to wear protective footwear (P.P.E. – Cat. 2).
	OBLIGATION	The operations described in these instructions require the operator to use slings for preventing falls (P.P.E. – Cat. 3).
	RECYCLING	The operations described by these instructions or the information accompanying this sign provide information to the operator regarding the disposal of waste in a controlled manner and in a suitable place.

Gigola	Instruction manual (technical handbook)	g&r – im th – Air circulation fan - eng	First edition 01/01/1995	Page 15 of 77
	Air circulator fan		Rev. No. 04 28/07/2016	

1.E. Intended users of the manual, safekeeping

This operation and maintenance manual and all the information enclosed with it is intended for expert users.

The safekeeping of this document must be entrusted to a responsible person who has been specially put in charge of it.

The manual must be kept in a suitable place that guarantees both its best possible conservation and easy traceability in case of need.

If the manual gets lost, deteriorates to the point that it is no longer readable (in whole or in part) or is split up or damaged (missing pages or tearing of some of them), replacement documentation must be requested directly from the manufacturer, quoting the name of this manual.

1.F. Qualification of maintenance personnel

The concept of maintenance operation intended as a single action on the machine is obsolete. Because they involve numerous work and organisational processes, the operations must be looked on as a real "system" and, in this light, the qualification of personnel, intended as an attribute that comprises a multiplicity of coexisting values that range from organisation and management skills, technological and technical knowledge of the machinery on which to work, becomes a factor that is not only obligatory and of fundamental importance.

In the light of the above, the following three qualified professional figures are defined (Rif. UNI EN 15628):

MAINTENANCE SPECIALIST <i>(Level 1)</i>	A persons with the ability to:
	<ul style="list-style-type: none"> - directly follow the maintenance operations for which he is responsible, using the personal protective devices envisaged for the purpose (P.P.E.); - perform fine-tuning and adjustment of the instrumentation and work equipment; - perform the inspection activity on assets in order to highlight and prevent any degradation phenomena; - perform the replacement, adjustment and restoration maintenance operations and, when the work is complete, check the functionality of the machinery in compliance with the legislation and standards in force regarding the protection of workers' health, safety and the protection of the environment, and company procedures (work permit, etc.); - define materials, means, equipment and workforces for the work assigned from time to time, and ensure their availability for the execution of the work itself within the established times; - ensure compliance with the safety regulations by the coordinated personnel; - draw up the work report on paper or electronic form, in accordance with company procedures; - use the maintenance IT system, if available, for all the activities included in it.

MAINTENANCE ENGINEER <i>(Level 2)</i>	A persons with the ability to:
	<ul style="list-style-type: none"> - ensure compliance with the maintenance budget relating to the machinery for which he is responsible; - manage employees and ensure their compliance with the legislation and standards in force regarding the protection of workers' health, safety and the protection of the environment, and company procedures (work permit, etc.); - manage the maintenance workshop and improve its layout in order to optimise the efficiency of the personnel;

Gigola	Instruction manual (technical handbook)	g&r – im th – Air circulation fan - eng	First edition 01/01/1995	
	Air circulator fan		Rev. No. 04 28/07/2016	Page 16 of 77

MAINTENANCE ENGINEER
(Level 2)
- Cont. -

- provide the *Head of Maintenance* with the information necessary for defining the budget proposals for the elements for which he is responsible;
- provide personnel with the instructions and information necessary for performing the works assigned to them;
- inform the Head of Maintenance as regards the state of the machinery with the aid of work reports and the results of inspections, in order to define the maintenance plans and operations with the user;
- agree with the machinery user on the schedule for the individual maintenance jobs required;
- plan the activities relating to the maintenance jobs for which he is responsible and define the resources for them;
- coordinate the maintenance work performed by company personnel and any third parties, ensuring the effectiveness and efficiency of the interventions and checking the functionality of the machinery along with the user when the work is complete;
- train the specialised maintenance operators and ensure that they have the necessary skills;
- support the Head of Maintenance for the identification of the machine criticalities;
- coordinate the inspection activities, analyse them and inform the Head of Maintenance as regards the results and his deductions; update and use the maintenance IT system for all the activities for which it is prepared; ensure that employees use it correctly;
- propose solutions aimed at optimising the costs and times of maintenance operations;
- support the Head of Maintenance for the development of ameliorative actions with the aid of analysis of Maintenance Engineering.

HEAD OF MAINTENANCE
(Level 3)

A persons with the ability to:

- guarantee, also with the help of the Health and Safety Manager (H&S Manager), compliance with the legislation and standards in force regarding the protection of workers' health, safety and the protection of the environment, and company procedures (work permit, etc.);
- ensure that the maintenance operations satisfy or improve the safety conditions of the machinery;
- optimise the effectiveness and efficiency of the maintenance operations, with the appropriate planning both of the activities relating to both the maintenance operations and the resources;
- provide the picture of the maintenance needs for the definition of the maintenance budget;
- agree on the maintenance plans, programs and times with the user;
- ensure the most appropriate maintenance policies and techniques for optimising the technical-economic management of maintenance;

Gigola	Instruction manual (technical handbook)	g&r – im th – Air circulation fan - eng	First edition 01/01/1995	
	Air circulator fan		Rev. No. 04 28/07/2016	Page 17 of 77

HEAD OF MAINTENANCE

(Level 3)

- Cont. -

- define the criteria for the diagnostics and monitoring of the assets;
- guaranteeing continuous monitoring of the maintenance system;
- guaranteeing respect for the budget and checking the results with the use of performance indices;
- draw up reports for the manager of the assets;
- promote maintenance *benchmarking* and analyse the results in order to fill any gaps;
- define the inspections required for guaranteeing the technical and legal controls of the assets;
- analyse the inspection and service reports;
- formulate proposals for improving the machinery;
- improve the reliability and safe availability of the machinery;
- guarantee the availability of the consumables and spares necessary for self-maintenance;
- guarantee the correct execution of the maintenance work carried out by company personnel or third parties;
- manage contracts with third parties and assess the effectiveness and efficiency of the work entrusted to them;
- promote and ensure personnel training and instruction;
- guarantee correct and accurate use of the maintenance IT system, with the promotion of the updates and implementations necessary for rendering it consistent with the technical-managerial needs of the service;
- collaborate in the design of new assets, providing all the information and experience necessary for the greatest success of the project;
- participate actively with his own collaborators in pre-commissioning and commissioning the new assets;
- analyse the failure data and find the criticalities in them using analytical methodologies (FMECA, RAMS, RCM, etc);

It is the duty of the machine user to appoint personnel in line with the indications given in the previous definitions.

It is also obvious that in order to work on the machinery the above-mentioned personnel must:

- have reached the minimum age to be allowed to work (with reference to the regulations in force at the moment of utilisation of the machinery);
- have an adequate level of education and training for the work to be carried out (Ref. UNI EN 15628:2014 – “*Maintenance - Qualification of Maintenance Personnel*”);
- Be familiar with the matters illustrated in this manual;
- Be familiar with the accident-prevention rules in force at the moment of use;
- Be in suitable physical condition for the work to be carried out;
- Possess and use suitable, integral and certified personal protective equipment (P.P.E.).

Gigola	Instruction manual (technical handbook)	g&r – im th – Air circulation fan - eng	First edition 01/01/1995	
	Air circulator fan		Rev. No. 04 28/07/2016	Page 18 of 77

1.G. Work clothing and personal protective equipment

Before taking any action, personnel charged with performing work on the machinery must wear:

- suitable and accident prevention clothing, as indicated by the standard 89/686/EEC as amended;
- P.P.E. in conformity with Leg. Decree 475/92 et seq., as indicated by Leg. Decree 81/08 and seq.

It is obvious that at the moment of their use the above must be integral and in good condition and must be replaced immediately if there are clear signs of damage or deterioration.

When necessary, the use of P.P.E. is recalled in this operation and maintenance manual by means of pictograms inside informative boxes.

	Even when the legal P.P.E. are worn, working on or with a machine is never totally risk-free and therefore it is always necessary to work with sufficient visibility both in the work areas and in the surroundings (even when this is not deemed to be immediately dangerous). It is also advisable never to work when tired, ill, injured, or under the influence of alcohol, drugs or medicines that are capable of altering a person's mental and physical capacities.
---	--

1.H. Contents of the manual

This document consists of 77 pages and, for simplicity of consultation, has been subdivided into chapters that make it easy at each stage of the machine's life (transportation, packaging, handling, storage and stowing, installation on site ...) to find the information required by the users of the same.

The information contained herein refers to the envisaged use of the air circulator fan as defined below [Ref. Par. 2.A] and is addressed to users so that:

- that they have a means for learning the potential of the machine, the problems that can arise when running it and everything associated with the maintenance of the product, as well as its acceptance, transportation, packaging, handling, storage and stowing, installation in the site served, assembly of the parts supplied separately, starting up, operation, stopping, putting out of service, demolition and disposal;
- they can set up specific information, training and instruction courses for those who - directly or indirectly - come into contact with the machinery;
 - ✓ the person responsible for the machine installation site;
 - ✓ machine users;
 - ✓ maintenance specialists;
 - ✓ maintenance engineers;
 - ✓ maintenance heads;
 - ✓ persons charged with installation, disassembly and dismantling;
 - ✓ visitors;
 - ✓ personnel from third-party companies present in the machine installation site;

Given the above it is therefore necessary to read all the chapters of this manual carefully.

	<p>The configuration of some of the machine components as well as the position of the safety devices installed in it - and described or depicted here - may be subject to variations in virtue of the satisfaction of particular completions linked to specific customer needs or safety regulations. In this case:</p> <ul style="list-style-type: none"> - descriptions, references and procedures may be incomplete or inexact and should therefore be understood as being of a "general nature". - drawings and photographs may differ from the reality and therefore should be taken for reference for easier understanding of the text.
---	---

1.I. Standard documentation supplied

"Standard documentation supplied" is intended as all the documentation (technical and otherwise) that is supplied at the moment of purchase of the machinery.

The following are included in the standard documentation supplied herewith air circulator fan:

- The EC Declaration of conformity [Ref. Par. 17.A];
- This operation and maintenance manual.

Gigola	Instruction manual (technical handbook)	g&r – im th – Air circulation fan - eng	First edition 01/01/1995	
	Air circulator fan		Rev. No. 04 28/07/2016	Page 19 of 77

All the standard documentation of the air circulator fan supplied constitutes an integral and inseparable part of the same (on penalty of the cessation of the guarantee).

In the case of transfer to third parties, the primary custodian of the machinery is obliged to hand over all the machine standard documentation supplied, integral and in a good state of conservation, (on penalty of the immediate cessation of the guarantee and the immediate exclusion of the manufacturer from all objective and subjective, civil and criminal responsibility with regard to the machinery).

Finally, in the event of transfer to third parties, the primary custodian of the machinery is required and strongly requested to report G&R the address of the new user so that the manufacturer can send it and notices and/or updates that are seemed indispensable.

1.J. Updates of the manual

The machine documentation complies with all the laws, directives and binding rules in force as at 01 January 2015. Its contents reflect the state of the art at the moment of marketing of the air circulator fan, of which it constitutes an integral and inseparable part [Ref. Par. 1.L.].

Any improvements or changes that may be made by G&R to the aforesaid fan in the future, inspired by:

- new experiences;
- new know-how acquired in the area of ***“ventilation techniques and technology”***;
- strategic market decisions;
- any other reasons;

do not oblige G&R to intervene on any previous supplies of air circulator fans, nor to consider the machinery and/or associated manual to be lacking or inadequate.

G&R reserves the right to make improvements, modifications and integrations both to the machinery and to this operation and maintenance manual, without notifying those who are already in possession of them, save the case in which the change and/or modification lead to the elimination, or the notable reduction, of one or more immediate and/or grave dangers regarding health and safety and, above all, without this constituting a justification for claims against G&R.

Any integrations of the manual which the manufacturer deems appropriate to send to the users, must be kept along with the operation and maintenance manual already in their possession and handled in the same way as them.

1.K. Important information

If it is necessary to replace deteriorated or worn parts and/or ones damaged by use, time, lack of care or anything else, it is obligatory to use original spare parts and accessories because, the use of non-original spares can not only cause the termination of the guarantee on the machine, but can be dangerous and/or shorten the life and reduce the performance of the machine.

If the pictograms, or other labels on the machinery in addition to the identification plate, affixed by the manufacturer (and only by it during production) deteriorate or degrade over time and following the continued and continuative action of atmospheric agents to the point of alteration of legibility, even of only one of the informative elements on it, it is necessary to restore/replace them immediately.

All the spare parts can be requested directly from the manufacturer, quoting the data indicated on the label of the machinery or the fan information data in this operation and maintenance manual.

Gigola	Instruction manual (technical handbook)	g&r – im th – Air circulation fan - eng	First edition 01/01/1995	Page 20 of 77
	Air circulator fan		Rev. No. 04 28/07/2016	

1.L. Meaning of the pictograms affixed on the machine

In addition to the legally obligatory pictograms referred to in Par. 1.D, prohibition or warning pictograms may be affixed to the machinery in the vicinity of points that are critical for safety or fundamental for some types of intervention/action. The table below contains the prescription and the meaning of each of them.

SIGN	PRESCRIPTION	MEANING
	PROHIBITION	Do not tamper with the protections and safety devices
	PROHIBITION	Never clean, grease, oil, repair or adjust parts in motion
	ATTENTION	Generic hazard
	ATTENTION	Live machine parts Dangerous electrical voltage
	ATTENTION	Danger of electric shock
	ATTENTION	Danger of serious injuries
	ATTENTION	Danger of material being projected at a distance
	ATTENTION	Rotating parts
	ATTENTION	Impeller rotation direction
	ATTENTION	Air flow direction

1.M. Manufacturer's responsibility

The contents of this operation and maintenance manual do not in any way replace the legislation governing safety and accident-prevention in the workplace, but they reinforce and, if possible, enrich it.

G&R cannot be deemed responsible in any way (civilly and/or criminally) in case of:

- non-compliance with the instructions provided in this operation and maintenance manual;

Gigola	Instruction manual (technical handbook)	g&r – im th – Air circulation fan - eng	First edition 01/01/1995	
	Air circulator fan		Rev. No. 04 28/07/2016	Page 21 of 77

- incorrect observance of the instructions provided in this manual;
- use of a machine other than the envisaged on and clearly specified in this operation and maintenance manual;
- use by uninformed, untrained and/or uninstructed personnel;
- injury of internal company personnel, external personnel (third-party companies) and visitors to the site in which the machinery is installed as a result of:
 - ✓ internal safety shortcomings;
 - ✓ breaches of procedures for protecting individual and collective safety;
 - ✓ lack of supervision;
 - ✓ “catastrophic events” linked to operations of the machinery and directly attributable to poor maintenance of the same;
 - ✓ “catastrophic events” linked to operations taking place on the site in which the machinery is installed as well as running, and which directly or indirectly involve the machinery itself;
- injury to company personnel who have not read and fully understood the manual contents;
- work on the machine and/or operations involving it performed by personnel who are not authorised and/or trained and/or suitable;
- use of the machine contrary to national laws governing safety and accident prevention;
- incorrect installation, in cases in which this has been done by personnel other than the “MANUFACTURER’S ENGINEER”;
- power supply defects;
- unauthorised modifications and/or repairs;
- tampering and/or vandalism and/or adverse atmospheric events;
- use of non-original and/or non-specific spare parts and application articles;

1.N. Guarantee

This fan is guaranteed to be in conformity with and within the limits envisaged in the general conditions of sale.

1.O. Customer service and after-sales support

Given that with regard to extraordinary maintenance operations, this manual cannot replace the instruction, training and experience of the manufacturer’s engineers, the G&R customer and after-sales service is always available for providing assistance and technical support; in particular:

- telephonic support as regards characteristics and the more simple work that can be carried out on the machine;
- sending documentation;
- planning information, instruction and training actions both for the user and for the latter’s technical personnel;
- the execution of feasibility studies relating to the possibility of modifying the machine following changed operating and/or application needs.

The contact details are as follows:

GIGOLA E RICCARDI S.P.A CUSTOMER SERVICE AND AFTER-SALES SUPPORT
<i>Gigola e Riccardi S.p.A. Via Alessandro Volta, 7 / 25046 Cazzago San Martino (BS) Italy Tel. (+39) 030 72.53.68 / Fax: (+39) 030.72.55.438 / e-mail: info@gigolariccardi.it</i>

It should be recalled that, in the event of a request for technical service, it is absolutely necessary to indicate the name and model of the machine (information that can be found on the ID plate) and the nature of the problem.

1.P. Suggestions and feedback from the user

G&R has adopted the methods of the *Six Sigma* and *T.Q.M. (Total Quality Management)*, as instruments for company management and the achievement of excellence. Because of this, our technical office is available - through the customer and after-sales support service - for the examination of suggestions, advice and proposals in order to render the manual and the machinery it refers to more adherent to the needs for which both were conceived, designed and produced. **Any personal information and details that you may send us will remain strictly confidential in accordance with our privacy policy.** Do not worry if you prefer to remain anonymous: your advice will still be taken into consideration by us and therefore carefully assessed by our technical staff.

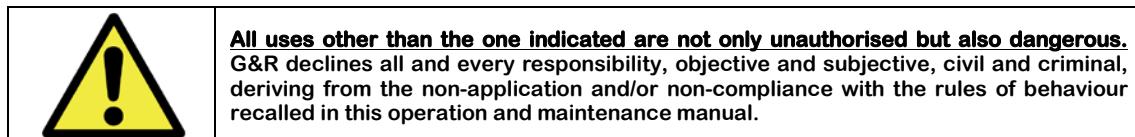
Gigola	Instruction manual (technical handbook)	g&r – im th – Air circulation fan - eng	First edition 01/01/1995	
	Air circulator fan		Rev. No. 04 28/07/2016	Page 22 of 77

2. General features of the machinery

2.A. Envisaged conditions of use and features

The air circulator fan is specifically designed to function as:

- ventilation of air contaminated by extremely aggressive/corrosive agents (e.g. livestock buildings, agricultural facilities and industrial sheds).



2.B. Main aspects linked to operation

The processing of the exhausted air, highly contaminated by extremely aggressive/corrosive agents, is done by the circulation unit in the following three stages:

- Suction of the air through a plastic duct (*Venturi nozzle*);
- Transfer of energy to the extracted air by means of an axial impeller fitted with curved lamellar blades inside an annular manifold;
- Ejection of the air processed by the impeller through the discharge section.

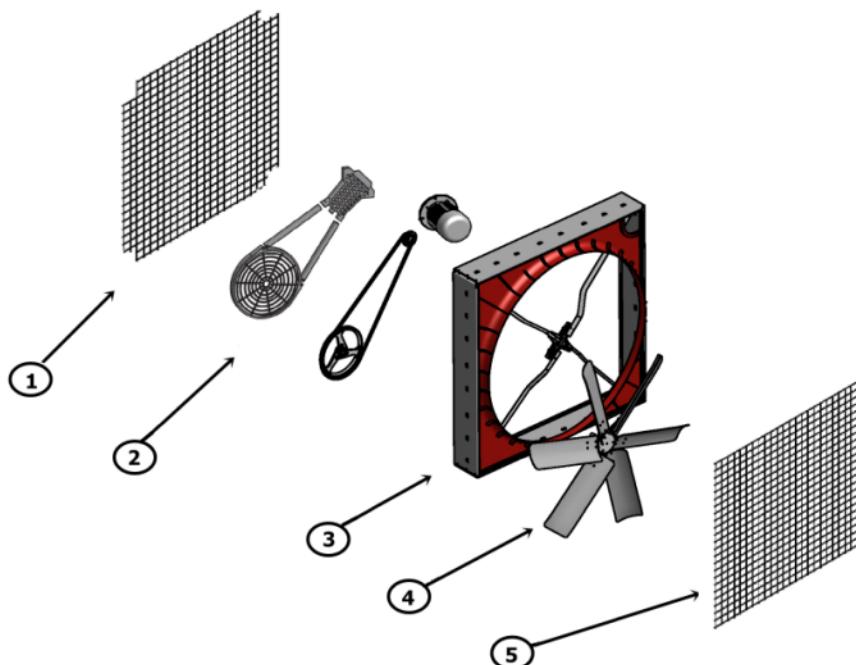
2.C. Description of the machine

ATTENTION:

The illustrations in all the paragraphs of Chap. 2.c are indicative of the fan unit: **THEY ARE NOT ASSEMBLY PLANS OF THE SAME**

The constituent functional units of the machine are:

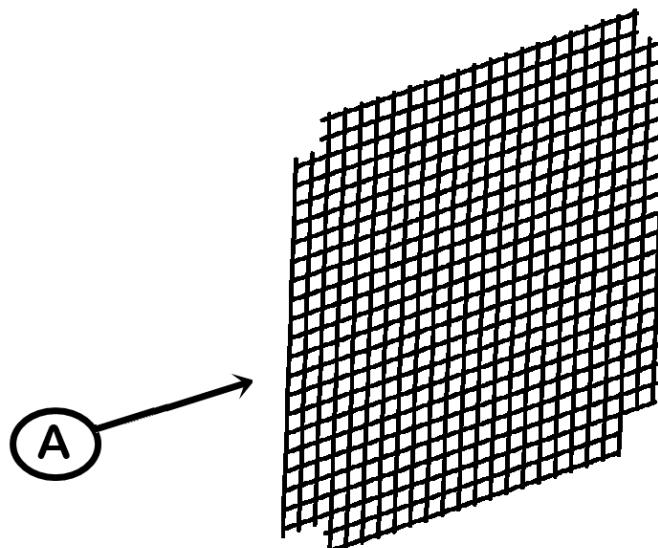
- Protection grid – extraction side (Pos. 1);
- Protection cover, motor and transmission (Pos. 2);
- Venturi nozzle box (Pos. 3);
- Fan (Pos. 4);
- Protection grid – delivery side(Pos. 5).



Gigola	Instruction manual (technical handbook)	g&r – im th – Air circulation fan - eng	First edition 01/01/1995	
	Air circulator fan		Rev. No. 04 28/07/2016	Page 23 of 77

2.C.I. Protection grid - extraction side

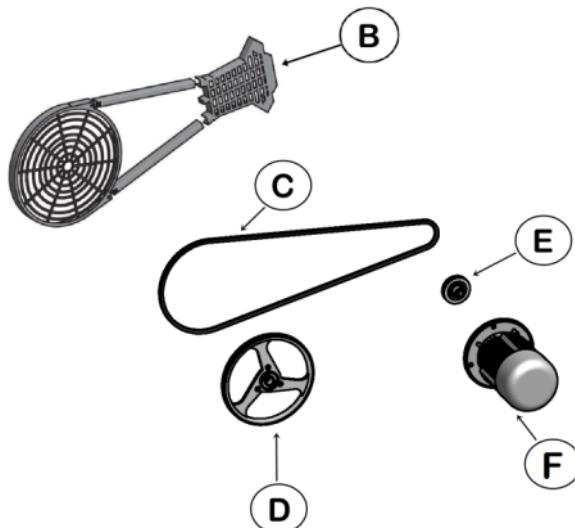
The protection grid functional unit consists of a wire mesh (1:1 ratio¹) fastened to the Venturi nozzle box by means of fasteners.



PROTECTION GRID components (extraction side)			
A	Protection grid - extraction side	-	-

2.C.II. Motor and transmission

The motor and transmission operating unit is composed of a pair of pulleys (motor side and fan side), a belt for the transfer of power and an electric control and drive motor.



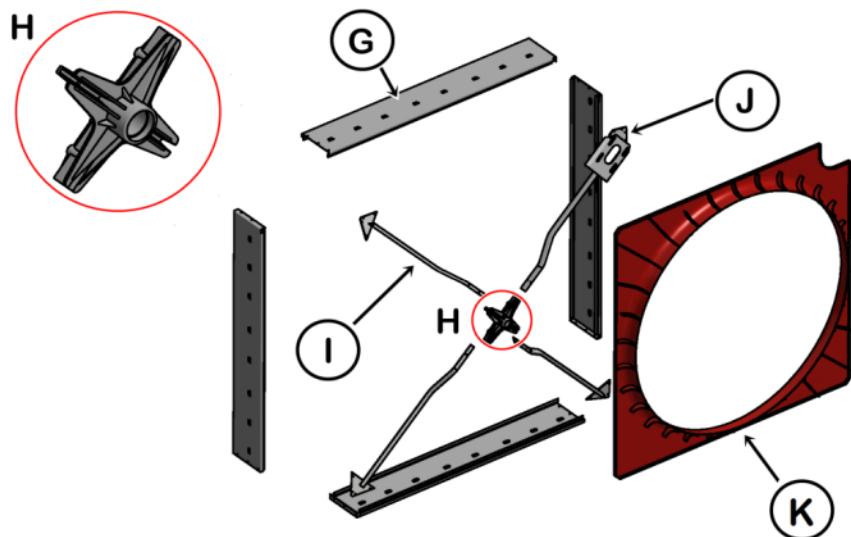
MOTOR and TRANSMISSION components			
B	Protection cover	E	DRIVE pulley (motor side)
C	Transmission belt	F	Electric drive and control motor
D	DRIVEN pulley (fan side)	-	-

N.B.: If necessary, request reference documentation for all the components' operation and regulation details directly from the G&R customer service.

¹ simple weave, in which all the odd warp wires raise at the passage of the odd wefts, and even warp wires raise at the passage of even wefts.

2.C.III. Fan box

The fan box operating unit is composed of a spoked support structure with cross-shaped hub fastened to the box panels, and a Venturi nozzle.



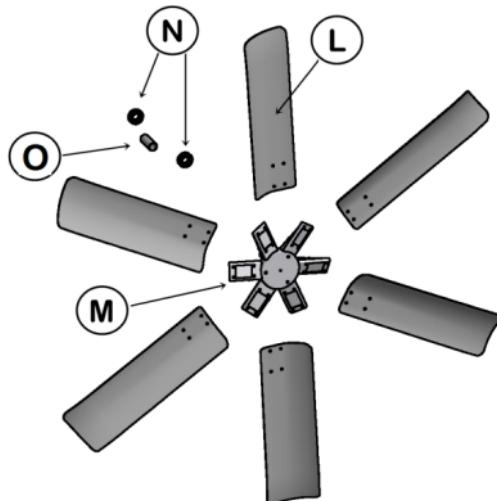
FAN BOX components

G	Box panel	J	Arm with motor support
H	Cross-shaped hub	K	Venturi nozzle
I	Standard arm	-	-

N.B.: If necessary, request reference documentation for all the components' operation and regulation details directly from the G&R customer service.

2.C.IV. Fan

The fan operating unit is composed of a hub, with supports of the bearing type, to which #6 blades with a curved profile are connected.



FAN components

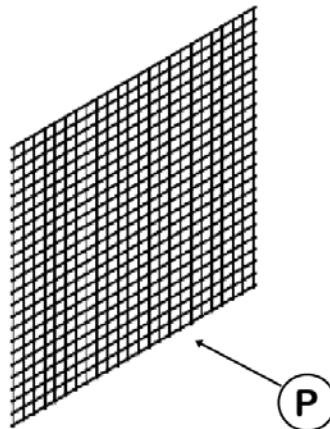
L	Blade	N	Bearings
M	Blade hub	O	Spacer

N.B.: If necessary, request reference documentation for all the components' operation and regulation details directly from the G&R customer service.

Gigola	Instruction manual (technical handbook)	g&r – im th – Air circulation fan - eng	First edition 01/01/1995	
	Air circulator fan		Rev. No. 04 28/07/2016	Page 25 of 77

2.C.V. Protection grid (delivery side)

The protection grid functional unit consists of a wire mesh (1:1 ratio²) fastened to the Venturi nozzle box by means of fasteners.



PROTECTION GRID components (delivery side)				
P	Protection grid	-	-	

2.D. Identification of the manufacturer

Gigola

GIGOLA E RICCARDI S.p.A.

Works and administrative offices

*Via Alessandro Volta, 7 / 25046 Cazzago San Martino (BS) - Italy
VAT. No. IT02050120985*

Tel. (+39) 030 72.53.68 | Fax: (+39) 030.72.55.438

e-mail: info@gigolariccardi.it

website: http://www.gigolariccardi.com/

Managing director

Giuseppe Riccardi

2.E. Declaration of conformity

The design hereof air circulator fan was done in accordance with the following:

EC directives 2006/42 EC (Machinery), 2006/108 EC (Electromagnetic compatibility), 2006/95 EC (Low voltage), 2009/125 EC (Eco-Design) as amended.

Harmonised standards ISO 281, ISO 1813, UNI ISO 1940, UNI ISO 10816, UNI ISO 11228, EN ISO 12100-1, EN ISO 12100-2, UNI EN ISO 12499, EN 13463-1, UNI EN ISO 13857, EN 13463-5, ISO 14694, EN 14986, DIN EN ISO 55474, EN 60529.

National standards and particular technical specifications UNI EN ISO 5136, ISO 3744, DIN EN ISO 5801, AMCA STD 210, CEI 17-50 (CEI EN 60947), MIL B131G CLASSE 1

Observance of the applicable paragraphs of the aforesaid standards has made it possible to eliminate or reduce as far as possible the risks related and/or relatable to the entire life cycle of the machine.

² simple weave, in which all the odd warp wires raise at the passage of the odd wefts, and even warp wires raise at the passage of even wefts.

Gigola	Instruction manual (technical handbook)	g&r – im th – Air circulation fan - eng	First edition 01/01/1995	
	Air circulator fan		Rev. No. 04 28/07/2016	Page 26 of 77

It is declared that all the components installed on G&R machinery from third parties are:

- CE marked (when envisaged);
- in conformity with the associated directives of reference;
- selected carefully from those available on the market;
- free from risks for the health and integrity of persons;
- rigorously controlled in order to ensure their conformity with the quality standards laid down by the standards in force.

The warning and protection measures necessary for the residual risks have also been adopted for the machine *[Ref. Par. 3.C.]*.

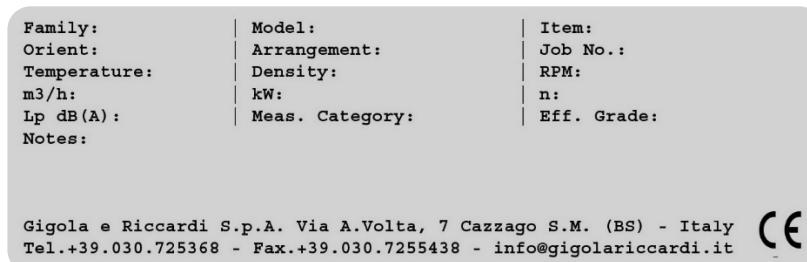
A facsimile of the declaration of conformity can be found in *paragraph 17* of this manual while the original is attached to the machinery documentation.

2.F. Identification of the machinery

Every air circulator fan is make uniquely recognisable by affixing an ID plate.

2.F.I. Position and structure of the ID plate

A copy of the machine ID plate is shown in the figure below.



2.F.II. Intelligibility, maintenance and substitution of the plate

Given that the machine ID plate:

- is fixed to the structure of the machine in such a way as to make it extremely difficult, if not indeed impossible, to remove it from the point where it is fixed;
- is made from material whose strength specifications are virtually inalterable by the continued and continuative action of atmospheric agents;
- is over-printed with inks that are resistant to the continued and continuative action of atmospheric agents;

protecting its intelligibility is the responsibility of the user who must make certain and ensure that in the case of deterioration this never reaches levels such as to affect its comprehensibility (even of just one informative element).

In the event of deterioration (as defined above) and in every case of necessity however, the user must request a new ID label from the manufacturer, quoting the data contained in this manual or, if possible, on the plate itself, and therefore provide promptly and obligatorily for its replacement.

Without the written authorisation of G&R no reason authorises the users (on anyone else):

- to cover the ID plate;
- to remove the ID plate or alter the information on it (even of a single element and even if the importance of the piece of information in question is marginal);
- and affix another ID plate (on the machine or part of it) other than the G&R one (received by the users as a spare);

on penalty of the immediate and final cessation of the guarantee as well as of any subjective and objective, civil and criminal responsibilities.

Gigola	Instruction manual (technical handbook)	g&r – im th – Air circulation fan - eng	First edition 01/01/1995	
	Air circulator fan		Rev. No. 04 28/07/2016	Page 27 of 77

2.G. Overall dimensions

See Annex 1 of this operation and maintenance manual.

2.H. Technical information on fans belonging to the EOLOSTAR family:

Airflow range	0 – 77 340 [m ³ /h]
Pressure range	0 – 50 [Pa]
Impeller rotation speed range	0 – 550 [RPM]
Fluid processed	EXHAUST AIR, HIGHLY CONTAMINATED BY VERY AGGRESIVE/CORROSIVE AGENTS
Sound pressure level	Below 84 [dB(A)] at 1[m]
Operating temperature limits	- 25 [°C] / + 50 [°C]
Storage temperature limits	- 25 [°C] / + 50 [°C]
Maximum permitted relative humidity for operation	90 %
Power range of the installable drive units	0.25 – 1.85 [kW]

2.I. Unpermitted, unenvised and/or improper (foreseeable and unforeseeable) use of the machine

With the exclusion of the conditions referred to in Par. 2.A, all other uses of the machinery are not only dangerous but must also be considered to be unforeseen, improper and therefore prohibited.

Along with what has just been said the following are also prohibited:

- **use of the machine without protection and/or retention systems;**
- **the use in environments which because of their nature can give rise to deflagrations or detonations.**

What is provided constitutes a "*reasonably foreseeable*" list of the possibilities of improper use of the machinery but does not however cover the complete range of possibilities.

Gigola	Instruction manual (technical handbook)	g&r – im th – Air circulation fan - eng	First edition 01/01/1995	Page 28 of 77
	Air circulator fan		Rev. No. 04 28/07/2016	

3. Warnings and general precautions

When installing the machine always check that the environmental conditions fall within the operating range of the air circulator fan and that the definitive point of installation of the same is suitable as well as compliant with the instructions regarding the minimum safe distances (operating areas and/or workstations for the operators away from the range of action of the machinery and such as to guarantee rapid disengagement in case of necessity).

Before starting any work/production activity, check that the actions carried out in the vicinity of the machinery never constitute an obstacle for it or hindrance for its operation/control.

Remembering that intrinsically safe machines do not exist, just as there are no users who, through attention, can always prevent the transformation of a potential risk into a real one, all users are cautioned NEVER to underestimate the risks associated with the operation and maintenance of the machine (or deriving from them) and are warned to concentrate at all times on what they are doing. **Distractions, poor concentration and oversights at work, with regard to either the safety warnings or compliance with the instructions contained in this document, can be (and often are) the cause of fires and/or serious injuries.**

	Some safety systems only operate when power is on; therefore, after cutting off the power supply and before starting any operation on the machinery always wait until the impeller has stopped turning.
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3.A. Accident prevention warnings

In general:

- NEVER modify the functional/performance characteristics of the machine or of its components in an attempt to increase their potential;
- NEVER use the machine with "*makeshift connections*" or provisional and/or uninsulated electrical cables;
- NEVER effect makeshift connections;
- NEVER allow the machine to be started and/or used by persons:
 - ✓ less than 18 years old
 - ✓ with reduced physical capacities;
 - ✓ with reduced sensorial or mental capacities;
 - ✓ with a lack of experience or knowledge.
- NEVER start the machine before ascertaining the complete absence of any contingent danger conditions. **The preparations for starting, actuating the control units and any other operation to be set using electrical controls always implicitly presuppose the operator's awareness and prudence.**
- NEVER start and/or run the fan without ensuring that the **passive** protective guards (grids and safety covers) are present and secured firmly. In cases of absolute necessity for work reasons, take appropriate safety measures and keep the possible danger highlighted. Guards and safety devices must be reinstalled as soon as the reasons for their temporary removal have ceased.
- **NEVER modify, tamper with or elude the safety devices (active and/or passive) installed on the machine. Modification and/or tampering, even if minimum, will exonerate the manufacturer from all responsibility - objective and subjective, civil and criminal - relating to proper use, correction operation and the safety of persons and/or property.**
- NEVER try to brake rotating parts with your hands or other tools in order to speed up stopping.
- NEVER carry out inspections, routine maintenance work and/or cleaning with the machine in motion.
- NEVER carry out inspections, routine maintenance work and/or cleaning with the machine powered or in stand-by.
- NEVER carry out inspections, routine maintenance work and/or cleaning without first deactivating the machine by means of the master switch and without disconnecting the plug from the power distribution unit.
- When connecting and disconnecting the power supply, always ensure that the earth wire is disconnected last and connected first;
- NEVER perform provisional repairs and/or resetting operations that are not compliant with these instructions;

Gigola	Instruction manual (technical handbook)	g&r – im th – Air circulation fan - eng	First edition 01/01/1995	
	Air circulator fan		Rev. No. 04 28/07/2016	Page 29 of 77

- NEVER carry out adjustment operations on the machine without placing appropriate danger warnings and informing the head of the department;
- NEVER place/abandon tools, equipment, materials or other bulky objects on the machine, on its auxiliary parts and/or in the vicinity of parts that may start to rotate or move in any way.
- NEVER point water jets directly onto the fan and in any case on the electric drive motor;

Also remember to:

- Comply scrupulously with the accident prevention regulations in force regarding safety (consult the company's H&S Manager beforehand);
- Ensure that the installation, maintenance, cleaning, decommissioning and dismantling operations are carried out exclusively by competent, instructed and adequately trained personnel;
- Always pay attention to the labels affixed to the fan;

3.B. Warnings on the protection devices installed on the machine

G&R fans are fitted with accident-prevention devices in compliance with EN ISO 12499 and in particular:

- protection grids in accordance with UNI EN ISO 13857³ (on request and only in the case of installation of the fan at a height lower than 2.5 [m] from the ground);
- protection grids for the free inlet or outlet in accordance with *UNI EN ISO 13857*
- immediate stop button (**only on request**);

3.C. Notes on the residual risks

The *residual risks* relating to a machine are the risks of injury associated with its use that remain despite the installation on the machine of suitable safety systems and despite the adoption of procedural/operational prevention and protection measures.

Even though the design stage of the machine that is the subject of this manual was accompanied by an accurate and attentive analysis of the risks to which both users and those who have anything to do with the machinery itself could be exposed (Ref. EN ISO 12100) and, though this analysis rendered the machine fan safe and reliable, because of factors linked to the type of installation and to the operating conditions, risks remain (residual risks) that it is not possible to foresee beforehand and which thus cannot be eliminated completely. In addition to this, there are also residual risks due to incorrect behaviour, operating faults and/or events of force majeure.

The most serious residual risks, and to which all the safety signage installed on the machine is also associated, are listed below.

Residual risk	Behavioural measure for eliminating or reducing the risk to a minimum
Risk of machine falling from the installation seat	Do not exceed the capacity of the support brackets or the strength limits of the constraining and securing systems
Risks of structural yielding of the seat of installation	Check that the support structure is capable of resisting the fatigue stresses induced by the weight of the fan at the natural vibration frequency of the machinery.
Risks of various kinds associated with incorrect installation and use	Read this operation and maintenance manual carefully.

³ G&R sells and ships free impeller fans, i.e. ones with no box and/or accident-prevention grid on the air outlet and inlet, only on the customer's explicit indication that said element constitutes the supply of spare parts for another air circulator fan produced by G&R.

The presence of the grids does not completely exclude the possible entry of foreign bodies into the fan. If dangerous bodies or particles are mixed in with the treated air, it is the user's responsibility to make an overall assessment of the risk that takes account of the size of the particles dispersed in the air and the mesh of the protection grid. If the mesh of the standard grid provided is not sufficient for guaranteeing the minimum safety requirements, the user must give G&R notice of the new grid safety requirement and, if it is impossible to meet the specification, put in place, autonomously and at its own total expense, all the protections necessary for preventing all residual risks.

Gigola	Instruction manual (technical handbook)	g&r – im th – Air circulation fan - eng	First edition 01/01/1995	
	Air circulator fan		Rev. No. 04 28/07/2016	Page 30 of 77

Residual risk	Behavioural measure for eliminating or reducing the risk to a minimum
Risk of falling or impact when lifting	Do not handle the machine on your own if the dimensions of the same reduce visibility and/or the weight of the machine exceeds 25 [kg].
Risk of falls for the user and/or machine technical personnel	Climbing onto the machine and/or hanging from it are forbidden.
Risks due to the illegibility of the labels	Never cover labels. Replace illegible (damaged, torn, faint) labels
Risks due to lack of periodical maintenance	Perform the periodic maintenance on the machine.
Risks due to incorrect power supply.	Ensure that the power supply is correct for the type of plant in use in the destination country.
Risks of an electrical nature due to failure to cut off the power supply before any work on the machinery.	Cut off the power supply to the machine before any operation.
Sudden starting following closure of the electrical control circuit	Place on the electrical control board a sign with the wording DO NOT OPERATE! TECHNICAL PERSONNEL AT WORK ON THE MACHINE and apply safety seals or switch actuation inhibition devices.
Risks of various kinds due to tampering or removal of the safety devices.	Tampering with labels and/or the safety devices installed on the machine is prohibited Replace illegible labels (damaged, worn, faint) and/or safety devices removed and/or tampered with.

With a view to increasing internal safety, the plant designer, as well as the user of the machinery that is the subject of this manual, are required to draft their own safety procedures, envisage appropriate protective measures (having recourse for both, as required, to the content of this manual) and take action to ensure that they are respected.

3.D. Warnings for use in potentially explosive atmosphere (ATEX)

G&R does not produce any air circulator fan with ATEX marking.

3.E. Precautions for the installation of parts by the user

G&R machines are fully assembled when they reach the user. If this is not the case, for reasons of bulkiness, the case of spares or because expressly agreed with G&R, the assembly and/or installation of parts by the user must be done in specific and scrupulous compliance with the provisions of the assembly and disassembly section [Ref. Par. 7].

Gigola	Instruction manual (technical handbook)	g&r – im th – Air circulation fan - eng	First edition 01/01/1995	Page 31 of 77
	Air circulator fan		Rev. No. 04 28/07/2016	

4. Shipping, receipt and acceptance

4.A. Shipping and transportation

Unless otherwise instructed by the customer, the machinery and any accessories are shipped/transported (in accordance with company practice) using any of the following *packaging* configurations:

- In the case of **ASSEMBLED** fan:
 - o With no packaging;
 - o Film-strapped on pallet;
- In the case of **DISASSEMBLED** fan:
 - o All the components on pallet in sight with film (strapped where necessary);
 - o Some of the components in cardboard boxes on pallet where necessary.

Every G&R pack:

- is subjected before packaging to:
 - ✓ check to ensure completeness of the supply;
 - ✓ general visual examination of the state of the order and integrity of the parts;
- the packaging then undergoes:
 - ✓ sealing (if necessary) [Ref. Par. 5.A.II];
- before shipment and when loading it undergoes:
 - ✓ storing in a safe sheltered place;
 - ✓ careful handling exclusively by specifically assigned personnel (handling personnel) [Rif. Par 1.C.].

The following applies, depending on the packaging configuration:

PACKAGING CONFIGURATION	STORAGE	STACKABILITY
With no packaging	Covered	NO
Cardboard box	Covered	NO
Cardboard box strapped on pallet	Covered	NO
Cardboard boxes strapped on pallet wrapped with plastic stretch film	Covered	NO

4.B. Receipt

At the moment of receipt the material collected must be checked or inspected within and no later than the imperative term of 2 days (48 hours) from the date of receipt (documented by the waybill). It must be ascertained by this deadline that:

- the machines corresponds to the order specifications;
- the machine and any accessories are in perfect state of conservation and that are free from:
 - ✓ signs of abrasion (superficial or deep);
 - ✓ leakages of lubricant liquid or grease;
 - ✓ anomalous deposits of dust, earth and/or machining residues;
 - ✓ traces of rust;
 - ✓ traces of chemical aggression;
 - ✓ traces of humidity;
 - ✓ dents;
 - ✓ other.
- the safety pictograms are:
 - ✓ original;
 - ✓ all present;
 - ✓ free from damage, wear or discolouring;
- the standard supply of documents complies with that of the machinery purchased and/or to be installed.
- the standard supply of documents is complete.

4.C. Acceptance

Save any other action [Ref. Par. 4.C.I.] what has been received is tacitly and integrally accepted by the recipient.

4.C.I. Non-acceptance due to flaws, defects and/or non-conformities

Reference should be made to the general sales conditions as regards flaws, defects and/or non-conformities.

Gigola	Instruction manual (technical handbook)	g&r – im th – Air circulation fan - eng	First edition 01/01/1995	Page 32 of 77
	Air circulator fan		Rev. No. 04 28/07/2016	

5. Packing – Unpacking – Handling – Transportation

5.A. Packaging

5.A.I. Packaging free

In this configuration the machinery is shipped to its destination completely assembled but without any form or type of packaging including any pallet for lifting.

5.A.II. Cardboard box

In this configuration the machinery is shipped to its destination completely disassembled and the constituent elements are packed in "CH-flute corrugated board" containers.

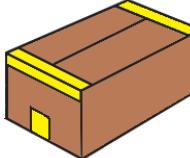
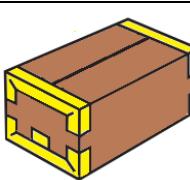
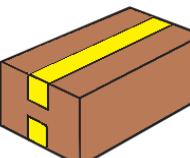
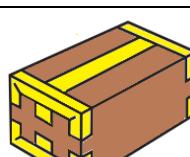
Box type	Weight of contents	Stacking height [Compatibly with the loading limits of the cartons sides]
	1 ÷ 1,500 [kg]	0 ÷ 150 [cm]

CH-flute corrugated board

The sealing scheme (by means of highly-adhesive tear-proof PVC) varies depending on the contents and, in particular:

- the dimensions of the parts;
- the risk of escape/leakage;
- the safety level requested;

and can typically be:

BOX TAPING SCHEME		
IMAGE	DESCRIPTION	SECURITY LEVEL
	Closed with 3 strips	LOW
	Closed with 5 strips	MEDIUM
	Closed with 2 strips	HIGH
	Closed with 6 strips	VERY HIGH

Gigola	Instruction manual (technical handbook)	g&r – im th – Air circulation fan - eng	First edition 01/01/1995	
	Air circulator fan		Rev. No. 04 28/07/2016	Page 33 of 77

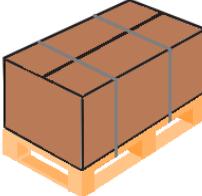
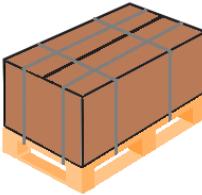
Where necessary in order to prevent damage to the content the boxes are filled with protective inserts, such as:

- paper in strips or balls;
- packaging chips;
- air cell cushions;
- air chamber pack film;
- bubble pack film;
- films and sheets of foamed material;

5.A.III. Cardboard box strapped on pallet

Box and sealing as indicated in paragraph 5.A.II.; in addition, however, there are:

- box packed on europallet;
- palletising by means of metal or plastic (Nylon) straps.

BOX TAPING SCHEME		
IMAGE	DESCRIPTION	SECURITY LEVEL
	Strapping with 2 straps	HIGH
	Strapping with 4 straps	VERY HIGH

5.A.IV. Cardboard boxes strapped on pallet wrapped with plastic stretch film

Box and sealing as indicated in paragraph 5.A.II.; in addition, however, there are:

- placing the boxes on europallets;
- palletising using plastic stretch film.

BOX TAPING SCHEME		
IMAGE	DESCRIPTION	SECURITY LEVEL
	-	HIGH

Gigola	Instruction manual (technical handbook)	g&r – im th – Air circulation fan - eng	First edition 01/01/1995	Page 34 of 77
	Air circulator fan		Rev. No. 04 28/07/2016	

5.B. Unpacking

	The operations described in this paragraph require the operator to wear protection for the hands (P.P.E. - Cat. 2).
	The operations described in this paragraph require the operator to wear technical garments or overalls (P.P.E. - Cat. 1).
	The operations described in this paragraph require the operator to wear protective footwear (P.P.E. - Cat. 2).

Save the case in which the machinery reaches its destination in packaging-free mode, i.e. without packaging of any kind, it is necessary to start unpacking to gain access to the machinery. Despite its simplicity and speediness, this operation still requires caution.

	<p>In order not to damage the machinery, only unpack the container when it is resting on the ground or on a support that is suitable for the purpose.</p> <p>For purely practical reasons, only unpack in the vicinity of the place of machine assembly and/or installation.</p>
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OPERATING INSTRUCTIONS

- I. Unless already done, take the pack to the place of assembly and/or installation of the machine;
- II. Unless already done, removed the straps or stretch film that constrain the pack/s to the europallet. Take care not to cut the cardboard boxes.
- III. Cut the seal on the top of the box, following the edges of the same. Take care not to cut the surfaces of the machine parts inside;
- IV. Open the top flaps of the box;
- V. Remove any inserts for the protection of the parts of the machine;
- VI. Take out all the machine components including all the standard documentation supplied;
- VII.A. If the machine is supplied disassembled, assemble it, following the assembly instructions;
- VII.B. If the machine is supplied assembled, proceed to install it, following the instructions in this operation and maintenance manual.

5.B.I. Disposal of the packaging

G&R constantly seeks to optimise its shipping system, both in order to improve itself from the technical-organisation standpoint, and to reduce its environmental impact (the company's responsibility). In general, this means that we only print the documents that are strictly necessary (where possible on recycled, unbleached paper), we minimise the waste linked to our activities and we use packaging that is as environmentally friendly as much as possible or recycled, and much more.

The optimisation of the packaging (including its eco-sustainability) and its correct disposal are, we believe, desirable goals in which the joint commitment of industry, consumers (customers and/or users) and local authorities can really make a difference.

Because of this, all our packaging bears the symbol universally associated with recycling [Ref. Par. 1.D.], possibly along with the abbreviation or numerical code for identifying the constituent material of the waste to recycle.

Gigola	Instruction manual (technical handbook)	g&r – im th – Air circulation fan - eng	First edition 01/01/1995	
	Air circulator fan		Rev. No. 04 28/07/2016	Page 35 of 77

	Both the primary packaging ⁴ and the tertiary packaging ⁵ are normal solid urban waste and can therefore be disposed of without any difficulty. We recommend separating the packaging materials by type (differentiated collection), in scrupulous compliance with the specific regulations in force in the place in which the machine is unpacked.
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It should be recalled that the volume of waste should be reduced by compacting before disposal.

G&R shall not be responsible (neither civilly nor criminally) for any environmental damage caused by failure to dispose of the packaging in an envisaged place or for disposing of it in an inadequate place.

5.C. Handling

	The operations described in this paragraph require the operator to wear protection for the hands (P.P.E. - Cat. 2).
	The operations described in this paragraph require the operator to wear technical garments or overalls (P.P.E. - Cat. 1).
	The operations described in this paragraph require the operator to wear protective footwear (P.P.E. - Cat. 2).

The machinery/pack should be handled with caution, taking care not to let it fall, overturn or hit hard surfaces as this would certainly jeopardise the operation of the machinery itself.

In virtue of the fact that its weight, form and dimensions do not always allow the machinery/pack to be moved by hand, it is recommended when the circumstances render it necessary to use appropriate equipment (forklifts, pallet trucks, cranes, etc.).

	For accident-prevention reasons and for individual and collective safety and the safety of the machinery, all the handling operations, including loading and unloading operations must be performed only and exclusively by personnel charged with handling [Def. Ref. Par. 1.C.]. It should be recalled that if the overall dimensions of the load do not permit sufficient visibility for the operator or if the contingent working conditions are not such as to guarantee adequate safety during the handling operations, one or more assistants on the ground must obligatorily help the operator by providing him with the indications necessary for correct (and totally safe) performance of the operations.
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The safety and wellbeing of the persons involved in handling the machinery/package or those in the immediate vicinity of the areas in which this operation takes places is the responsibility of the handler and of the Health & Safety Manager in the workplace.

⁴ Packaging designed in such a way as to constitute a unit of sale in the sales outlet, both for the purchaser and for the user.

⁵ Packaging designed to facilitate handling and transporting the goods, from the raw materials to the finished products, of a certain number of units of sale, or of multiple packs to avoid handling and damage linked to transport, excluding containers for road, rail, sea and air transport.

Gigola	Instruction manual (technical handbook)	g&r – im th – Air circulation fan - eng	First edition 01/01/1995	Page 36 of 77
	Air circulator fan		Rev. No. 04 28/07/2016	

5.C.I. Loading, unloading and manual handling of the machinery (with or without packaging)

	The operations described in this paragraph require the operator to wear protection for the hands (P.P.E. - Cat. 2).
	The operations described in this paragraph require the operator to wear technical garments or overalls (P.P.E. - Cat. 1).
	The operations described in this paragraph require the operator to wear protective footwear (P.P.E. - Cat. 2).

Manual handling of the machine is only permitted if:

- the overall dimensions are such as to permit it in a simple manner;
- the weight is below 25 [kg] (in accordance with UNI ISO 11228);
- gripping is easy;
- once picked up, transporting and handling the machine do not entail any particular difficulty;
- there are no sharp and/or cutting edges;
- the flooring is not uneven in such a way as to engender risks of tripping or slipping;
- the flooring is not on several levels that make it necessary to handle the load at different heights;
- the point from which handling begins is such that is not necessary to twist or tilt the body's trunk;

	For accident-prevention reasons and for individual and collective safety and the safety of the machinery, if even one of the above conditions is not met manual handling of the load is forbidden.
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OPERATING INSTRUCTIONS (to be integrated with the instructions of the company's H&S Manager:

- I. It is obligatory to wear the P.P.E. indicated at the beginning of the paragraph (including any further ones indicated by the company H&S Manager):
- II. Lower yourself to a balanced position, bending your knees and taking care to keep your back straight and arms stiff;
- III. Grasp the machine with a firm grip while keeping your feet well apart (in such a way as to ensure the stability of your body) and at a distance from the vertical dead weight fall line (in order to avoid accidents if you lose your grip);
- IV. Lift the machine without overloading the muscle-skeleton system (by assuming a disorderly position), and let the lifting effort be supported prevalently by the lower limbs;
- V. Transport the machine, keeping it close to the body's centre of gravity while taking care to distribute the weight evenly on the arms (without rocking);
- VI. Place the machinery on the ground, lowering yourself to a balanced position (or bending your knees while taking care to keep your back straight and arms stiff);
- VII. Check that your hands and feet are away from the point of contact of the machine with the ground);
- VIII. Release the machine delicately so as to prevent overturning.

	For accident-prevention reasons as well as for individual, collective and machine safety, if the path is particularly long or twisting, take one or more rest stops along the way towards the destination.
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Gigola	Instruction manual (technical handbook)	g&r – im th – Air circulation fan - eng	First edition 01/01/1995	
	Air circulator fan		Rev. No. 04 28/07/2016	Page 37 of 77

It should be remembered that dragging and rolling the machinery along the ground are not permitted, even for short distances!

It is also forbidden to lift the machine by the impeller and/or blades of the same.

5.C.II. Mechanical loading, unloading and handling of the machinery (with or without packaging)

	The operations described in this paragraph require the operator to wear head protection (P.P.E. - Cat. 2).
	The operations described in this paragraph require the operator to wear protection for the hands (P.P.E. - Cat. 2).
	The operations described in this paragraph require the operator to wear technical garments or overalls (P.P.E. - Cat. 1).
	The operations described in this paragraph require the operator to wear protective footwear (P.P.E. - Cat. 2).

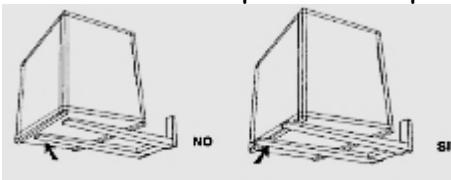
If the needs for handling and transporting require it or if the contractual provisions/agreements for shipping it envisage it, the machinery can be placed and strapped onto wooden crosspieces or europallets. In this case, when choosing the characteristics of the means of handling (forklift, pallet trucks etc.), it is the responsibility of the personnel charged with handling, in collaboration with the company H&S Manager, take account of the weight, dimensions, gripping points and centre of gravity of the pack to handle.

Should it be necessary to hoist the machinery and if there are gripping points(indicated by means of special pictograms), it is obligatory to use eyebolts, shackles, snap-hooks, slings, ropes, hooks and anything necessary for the purpose, that are certified, integral and suitable for the weight to lift.

	The gripping point for all the hoisting machine operations are indicated by the pictogram at the side. The use of insecure gripping points must be avoided; the machine could give way and fall without any advance warning signs and at any time, exposing anyone directly under it or in the immediate vicinity to serious danger.
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OPERATING INSTRUCTIONS (to be integrated with the instructions of the company's H&S Manager:

- I. Prepare an adequate delimited area, with a flat base of paving;
- II. Ensure that if handling using a forklift truck (manual/electric/motorised), the length of the forks is greater than that of the wooden crosspieces or europallet.



III. Handle the pack, taking care to:

- ✓ always keep it horizontal;
- ✓ respect the indication of the side that must be kept at the top;

Remember that dragging and rolling the pack along the ground are not permitted, even for short distance!

Gigola	Instruction manual (technical handbook)	g&r – im th – Air circulation fan - eng	First edition 01/01/1995	
	Air circulator fan		Rev. No. 04 28/07/2016	Page 38 of 77

6. Storing and stowing

Every air circulator fan produced by G&R can be stored and/or stowed for a maximum period of 12 months (365 days). The storage and/or stowing can start right from the moment of purchase (or from the receipt of the same at destination) provided that the following are checked:

- all the conditions referred to in par. 4.B, points 2, 3, 4 and 5 are confirmed;
- the machine is free (or has been freed) from any packaging and assembled;
- both the machine and accessories (if supplied separately or not installed) have been placed on europallets and away from machines in operation and/or sources of vibration;
- nothing has been placed against the machines and/or its accessories;
- no aggressive chemicals are stored in the stowage/stowing area (to any extent or degree of aggressiveness);
- the machinery is:
 - ✓ protected from direct sunlight;
 - ✓ protected from extreme temperatures (below – 25 [°C] or above + 50 [°C]);
 - ✓ not exposed to environments with relative humidity levels above 90%.

6.A. Short term

Keeping the machinery (in a safe place⁶) for periods of less than 3 months (90 days) does not require any particular precautions.

	<i>In order to preserve the strength specifications of the machine components and particularly plastic and/or rubber parts, it is recommended that the windows of the storage/stowing areas be screened by means of a high-pitch optical filter calibrated to wavelength 570 [mm] (UV filter).</i>
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6.B. Long-term

Keeping the machinery (in a safe place) for periods of more than 6 months (180 days) up to a maximum of 12 months (365 days) requires specific procedures which are provided only on direct request to the manufacturer.

Given the above and for the entire duration of long-term storage/stowing, it is necessary:

- to keep the protective covers of the belts, bearings, seals, motor transmission shaft and the motor itself in place (in order to prevent harmful accumulations of dust);
- check the position and tightness of the lock and stop pins on the impeller and/or fan monthly;
- turn the impeller by hand monthly so that it completes at least 10 complete revolutions;
- ensure that the new rest position of the impeller differs by at least a half turn from the previous one.

	<i>In order to preserve the strength specifications of the machine components and particularly plastic and/or rubber parts, it is recommended that the windows of the storage/stowing areas be screened by means of a high-pitch optical filter calibrated to wavelength 570 [mm] (UV filter).</i>
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⁶ Both as specifically defined in relation to prevention and protection from injuries in the workplace, and as generally understood with reference to storing and protecting machinery.

Gigola	Instruction manual (technical handbook)	g&r – im th – Air circulation fan - eng	First edition 01/01/1995	Rev. No. 04 28/07/2016	Page 39 of 77
	Air circulator fan				

7. Assembly - Disassembly

This air circulator fan can reach its destination either **COMPLETELY DISASSEMBLED** or **PARTLY ASSEMBLED**. The information required for assembling the unassembled parts of the machinery is given below.

	<p>In order to consider the fan unit to have been assembled correctly, it is not sufficient for every part to be positioned properly and fixed there correctly. This is because every element not only requires correct assembly, but also a check that the final assembly is correct (e.g. after fitting the pulleys it is necessary to check that they have been aligned exactly ...). FOR THIS REASON IT IS RECOMMENDED THAT YOU NEVER START THE FAN BEFORE HAVING CARRIED OUT THE AFORESAID CHECKS. In case of necessity, contact the G&R after-sales technical support service. The manufacturer does not assume any responsibility for poor machine operation following INCORRECT assembly by the customer/users.</p>
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7.A. Completely disassembled machinery

For the assembly of a completely disassembled fan unit, comply scrupulously with the **ASSEMBLY INSTRUCTIONS** for the specific machine (Instructions to request directly from the G&R after-sales service). Without prejudice to the safety warning given in *paragraph 7*, these instructions provide the information necessary for error-free assembly of the various components of the machine.

Gigola	Instruction manual (technical handbook)	g&r – im th – Air circulation fan - eng	First edition 01/01/1995	
	Air circulator fan		Rev. No. 04 28/07/2016	Page 40 of 77

8. Installation and connections

Unless the machine is a replacement for another identical one from the manufacturer or an equivalent surrogate in terms of type of construction, function and applicative principle (even from another manufacturer), **before proceeding with the installation of this air circulator fan it is indispensable to calculate the fluid-dynamic flows for the room involved. The more accurate this calculation, the better the machine will carry out the job for which it has been designed.** In particular, as regards the choice of location, the definition of the number and the minimum size of the machine/s for guaranteeing compliance with the legal limit for the number of hourly air changes in the room to ventilate, always refer to the regulations in force and, for particularly important applications, contact specialised technical firms.

Recalling that the phases and procedures for the installation of a machine must be considered right from the creation of the general project for the site, even though they vary in relation to the type, size and weight of the machine as well as the specific suppositions for its operation, it is also advisable for the customer/user, before proceeding with the installation:

- to draw up a safety plan (to safeguard the wellbeing of the persons directly involved in the installation operations) that takes account of all the existing laws governing accident prevention in the workplace (in collaboration with the company's H&S Manager);
- to undertake to ensure that the provisions of the aforesaid safety plan are always scrupulously applied.

Whatever its intrinsic and extrinsic characteristics, this machine must always and mandatorily be installed in the design position and in accordance with the envisaged fixing procedures even if the conditions on site differ just slightly from these.

	Do not proceed with the machine installation operations without first checking that it is complete and intact.
	The installation of the machinery in its definitive place should not require the disassembly of parts or components; however, if this is not the case, remember that when the contingent need ceases, these components must be put back in place and fixed correctly to the machine.
	When installation is complete, sufficient space must remain around the machine to allow maintenance personnel to perform normal assembly, disassembly, cleaning, inspection and maintenance operations.

8.A. Choosing the unit's position

Without prejudice to what has been said above regarding the installation of the machinery, in order to prevent drops in performance, and/or danger conditions (including serious ones), the following suggestions should be respected (some of them *indispensable conditions*):

- I. the wall on which the fan unit is fixed:
 - ✓ must communicate with the exterior;
 - ✓ must be strong and suitable for supporting the weight of the machinery (Structural check);
- II. the piercing points
 - ✓ **MUST NOT** cut water pipes, cut through electric wires, etc.;
 - ✓ **MUST NOT** interrupt the continuity of bearing structures and/or bearing pillars;
- III. any architectural or technical components, or elements of other kinds (natural and/or artificial) on site must NOT obstruct the free circulation of the air, both on the extraction side and on the exhaust side (otherwise they could create turbulence which could inhibit the proper operation of the machinery);
- IV. the installation point of the fan unit:
 - ✓ **MUST NOT** be such that the air flow is aimed directly towards persons;
 - ✓ **MUST NOT** be such that other machines are located below it.

Gigola	Instruction manual (technical handbook)	g&r – im th – Air circulation fan - eng	First edition 01/01/1995	Page 41 of 77
	Air circulator fan		Rev. No. 04 28/07/2016	

8.B. Ceiling installation with metal supports

	The operations described in this paragraph require the operator to wear protection for the hands (P.P.E. - Cat. 2).
	The operations described in this paragraph require the operator to wear technical garments or overalls (P.P.E. - Cat. 1).
	If the operations described in this paragraph are carried out at a height of more than 3.0 [m] above ground, the operator must use slings for preventing falls (P.P.E. - Cat. 3).
	The operations described in this paragraph require the operator to wear protective footwear (P.P.E. - Cat. 2).
	Before installing the destratification unit, it is necessary to ensure that the structure it must be hung on is suitable for bearing both the individual and the collective weight.

The installation of a air circulator fan is very similar to the installation of a hanging lamp: the machinery must be "hung" on the ceiling (by means of the hooking/support items provided, present on the box) and connected to the power supply network. The relative simplicity of installation is, unfortunately, burdened by the fact that the machine must often be hung at a height of over 3.0 [m] above ground; for this reason **it is recommended that it be performed only and exclusively by expert personnel, trained for the purpose.**

OPERATING INSTRUCTIONS:

Without prejudice to the requirements of par. 8.a and unless the machine is not a replacement from another identical one from the manufacturer, before proceeding with the installation, it is necessary to:

- I. measure the thickness of the element that should be pierced and verify its suitability to the purpose;
- II. mark out on the wall the points where the holes should be drilled;
- III. drill a pilot hole with a drill equipped with a suitable bit;

	It is necessary to proceed slowly in the final part of the hole so as to avoid damage and/or breakage of the external plaster of the wall, and also reduce the pressure on the drilling tool.
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- IV. enlarge the pilot holes to the dimension suitable for the expansion anchors used for the support of the machine;

	For safety reasons, the hole in the wall must be larger than the nominal diameter of the expansion anchors by maximum 2 [mm].
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- V. Tighten the hook plugs in the expansion anchors until reaching a complete tightening;
- VI. attach the suspension chains to the hooks and to the points provided on the machine frame box;
- VII. make the electrical connections [Ref. Par. 8.D.];

Gigola	Instruction manual (technical handbook)	g&r – im th – Air circulation fan - eng	First edition 01/01/1995	Page 42 of 77
	Air circulator fan		Rev. No. 04 28/07/2016	

As an alternative, the fan unit can be hung on the ceiling by means of ring harness, as long as each ring begins and ends at the support points placed on the same side as the machinery.

8.C. Electrical connection

	The operations described in this paragraph require the operator to wear protection for the hands (P.P.E. - Cat. 2).
	The operations described in this paragraph require the operator to wear technical garments or overalls (P.P.E. - Cat. 1).
	If the operations described in this paragraph are carried out at a height of more than 3.0 [m] above ground, the operator must use slings for preventing falls (P.P.E. - Cat. 3).
	The operations described in this paragraph require the operator to wear protective footwear (P.P.E. - Cat. 2).

The connection of the fan to the electricity distribution system (line, board, socket, earthing system, etc.) as well as the conformity, both of the connection and of the electrical system, with the regulations in force regarding electrical safety are the responsibility solely and exclusively of the customer/user.

	The electrical connection must always be made by specialised personnel, provided with appropriate technical and theoretical training (PES-PEI-PAV permits).
	Incorrect electrical connection can seriously damage the electronic control equipment and the electric motor of the fan.

In all cases, before making the electrical connections, check that:

- the section of the supply wires, in the board-motor-board section, is such as to be able to support the electric power necessary for operation of the drive motor;
- the line is cut off and/or earthed;
- the electric control board is off, provided with a "do not turn on - personnel at work" tagout sign and equipped with a system for preventing erroneous powering-up;

The motor units used on the fan units referred to in this manual are of the **single-phase or three-phase** type.

	As the motors used never exceed 5.5 [kW] no recourse is necessary to a battery of condensers for correcting the power factor of the inductive reactance, or to starting techniques of the "SOFT START" type (e.g. Star-Delta, Inverters, etc.).
	All the electric motors driving the fan units referred to in this operation and maintenance manual are fitted with appropriate protection systems calibrated to adapt to the real starting time of the machinery, to the peak current and to the current at full load.

In order to simplify the electrical connection operations and make them quicker, the motors are configured for fast assembly and therefore the motor terminal block is:

Gigola	Instruction manual (technical handbook)	g&r – im th – Air circulation fan - eng	First edition 01/01/1995	
	Air circulator fan		Rev. No. 04 28/07/2016	Page 43 of 77

- configured with a suitable type of internal connection for the place of installation (Star/Delta connection) and for the machine's typical work cycle.
- pre-connected to a fragmented supply cable (the free end of the supply cable is left without any plug/element for connection to the mains, so that those in charge of the electrical wiring can use the most suitable elements for the specific characteristics of the electricity system on site).

OPERATING INSTRUCTIONS:

No indications in this regard have been given deliberately. Contact qualified and specifically charged personnel for the terminal wiring.

	<p>It should be remembered that during the operation of the fan temporary alterations may occur in the aeraulic load that may give rise to mechanical imbalances (more/less electromechanical power is necessary to provide for the changes the plant requests).</p> <p>With the exception of cases in which the operating point of the fan unit is located in the unstable balance zone of the characteristic curves (left-hand end of the same) or if the excess power is zero (right-hand extreme of the characteristic curve), the electric drive motor will automatically tend to compensate the changed power demand required for machine operation (auto-stability property of the system).</p> <p>In order to prevent the balancing action of the motor from leading to rapid deterioration of the stator windings, with consequent damage to the motor itself, it is necessary to check the aeraulic imbalances, and then the electrical imbalances, by means of ordinary thermal relays.</p>
	<p>In accordance with CEI 17-7 standards, it is indispensable to use differential thermal relays⁷ that are sensitive to phases differences.</p>
	<p>For the purposes of dimensioning the thermal magnetic circuit breaker it should be remembered that the peak current in the case of direct starting can reach 6.5 times the rated current.</p>

8.D. Connection to the aeraulic system

G&R does not produce any air circulator fan set up for connection to the aeraulic system.

8.E. Minimum distances

To ensure good machine operation it is necessary to take care when positioning the machine so that it is at least 2.0 [m] from the inlet and less than 10.0 [m] from the outlet grid.

	<p>For the purposes of individual and collective safety, positioning the unit in industrial and non-industrial environments must be done in scrupulous compliance with the provisions of ISO 13857.</p>
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9. First start-up - Commissioning - Decommissioning

The first machine start-up is a critical and delicate moment (especially if it is delivered completely disassembled at its destination) because for this reason this provides the first real occasion for checking both the correct assembly of the components and the regular operation of all of its parts. This phase is also the circumstance in which the need may emerge to perform small calibrations and/or adjustments that are indispensable for the proper operation, present and future, of the machine.

It is clear that, in virtue of the fundamental prerequisite for the guarantee of long, problem-free and efficient operation of the machine, the first start-up must not be done in an improvised manner, nor entrusted to engineers who are not expert and competent.

⁷ In this case the term 'differential' refers to a mechanical device that triggers accelerated intervention in the case of phase loss and has nothing to do with the same term used to refer to automatic circuit breakers.

Gigola	Instruction manual (technical handbook)	g&r – im th – Air circulation fan - eng	First edition 01/01/1995	Rev. No. 04 28/07/2016	Page 44 of 77
	Air circulator fan				

9.A. First start-up

	The operations described in this paragraph require the operator to wear protection for the face (P.P.E. - Cat. 2).
	The operations described in this paragraph require the operator to wear protection for the hands (P.P.E. - Cat. 2).
	The operations described in this paragraph require the operator to wear technical garments or overalls (P.P.E. - Cat. 1).
	The operations described in this paragraph require the operator to wear protective footwear (P.P.E. - Cat. 2).

OPERATING INSTRUCTIONS:

- I. Move away from the machine to a safe distance (at least 3 [m] in all directions);
- II. Run the fan for sufficient time for checking the correct rotation of the impeller (indicated by an appropriate pictogram); If you find that the impeller's rotation direction is incorrect:
 - II.A. isolate the machine and the corresponding circuit electrically;
 - II.B. after successfully completing the operation referred to in the previous point, invert two of the three wires that come out of the fan;
 - II.C. To check on completion, restore the general conditions of safety and repeat the operations from point 1 of these operating instructions.

	Do not obstruct the protection grid on the extraction side in an attempt to reduce the peak power absorption of the motor (electrical overload) because this is dangerous in terms of individual and collective safety.
	The duration of the first start must be commensurate with the need for checking the impeller rotation direction and the need not to compromise the operation of the electric drive motor. More precise indications on the maximum number of hourly starts cannot be given as this parameter is greatly influenced by exogenous factors such as: the power of the motor installed, the impeller RPM, the impeller PD2, the installation conditions, the fluid-dynamic characteristics of the gaseous mixture conveyed, etc. It is good practice NEVER to prolong the first start for more than 15 seconds and NEVER repeat it before at least 15 minutes have passed from the previous start.

- III. Check with the fan running that:

- ✓ you cannot hear strong hissing and/or screeching from scraping;
- ✓ there are no signs of the existence of vibrations;
- ✓ the machine is stable in its point of installation.

In the event of anomalies, cut off the power supply and consult paragraph 16. If the anomaly persists contact G&R after-sales service,

9.A.I. Current input check

	The operations described in this paragraph require the operator to wear protection for the hands (P.P.E. - Cat. 3).
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	The operations described in this paragraph require the operator to wear technical garments or overalls (P.P.E. - Cat. 2).
	The operations described in this paragraph require the operator to wear protective footwear (P.P.E. - Cat. 3).

OPERATING INSTRUCTIONS (integration of the Operating Instructions given in par. 8.A):

- I. When the nominal speed of the machine has been reached, measure the electric motor current input and compare it to the nominal value on the rating plate.

	The correct current input check must be done exclusively by specialised personnel with adequate technical and theoretical training (PES-PEI-PAV permit).
	To check the input it is necessary to use amperometric pliers, a power meter or a 3-phase power analyser with clips.

In the event of anomalies, cut off the power supply and consult paragraph 16. If the anomaly persists contact the after-sales service G&R.

9.A.II. Check of the bearing temperature

	The operations described in this paragraph require the operator to wear protection for the hands (P.P.E. - Cat. 2).
	The operations described in this paragraph require the operator to wear technical garments or overalls (P.P.E. - Cat. 1).
	The operations described in this paragraph require the operator to wear protective footwear (P.P.E. - Cat. 2).

OPERATING INSTRUCTIONS (integration of the Operating Instructions given in par. 9.A):

- I. Check the temperature of the bearings on the fan side every 30 minutes and for the first two hours of continuous operation of the machinery.

	For individual and collective safety reasons, never put your limbs (or anything else) through the protection grids fitted for your safety and for machine protection.
	It is necessary to use an infrared ray thermometer or a laser pyrometer for checking the temperature of bearings .
	The maximum recommended working temperature of the standard hardened steel bearings used on the fan units referred to in this use and maintenance manual is between -40 [°C] and +120 [°C]. However G&R reserves the right to modify these components without notice or need to inform.

In the event of anomalies, cut off the power supply and consult paragraph 16. If the anomaly persists contact G&R after-sales service.

Gigola	Instruction manual (technical handbook)	g&r – im th – Air circulation fan - eng	First edition 01/01/1995	
	Air circulator fan		Rev. No. 04 28/07/2016	Page 46 of 77

9.A.III. Check of vibrations

	The operations described in this paragraph require the operator to wear protection for the hands (P.P.E. - Cat. 2).
	The operations described in this paragraph require the operator to wear technical garments or overalls (P.P.E. - Cat. 1).
	The operations described in this paragraph require the operator to wear protective footwear (P.P.E. - Cat. 2).

Like all machines with rotating parts, fans are also affected by problems relating to vibrations induced by eccentricity (due to uneven distribution of weights and/or incorrect geometric coupling alignments between the mechanical components). The theory of vibrations is quite a rich and complex subject but, for the purposes of this document, it is sufficient to say that the main source of vibrations in fans is the impeller (however the pulleys, transmission shaft, bearings, etc. also contribute to a lesser extent).

In order to prevent damage from fatigue⁸ all the rotating parts are statically and dynamically balanced by default⁹; however the terminal assembly of the impeller is subjected to a specific balancing process in accordance with ISO 1940 and ISO 14694 standards (final balancing degree 6.3).

	Oscillatory reaction motions could appear during the machine start-up transient. These are temporary vibrations that cease after a few tens of seconds. If this does not happen, stop the machine and contact G&R after-sales service immediately.
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OPERATING INSTRUCTIONS (integration of the Operating Instructions given in par. 9.A):

Because of the constructive execution of the air circulator fan referred to in this manual (similar to execution 9¹⁰ but with motor inside the box, supported by a specific support flange):

- Measure the vibrations on the support of the bearing on the fan side in the three main directions (horizontal, vertical and axial). **The maximum speed admitted in relation to the support type and risk condition are shown in the table on the page below.**

	For individual and collective safety reasons, never put your limbs (or anything else) through the protection grids fitted for your safety and for machine protection when it is running and/or powered.
	RISK CONDITION
	Level 1 (NORMAL OPERATION)
	Level 2 (CRITICAL OPERATION)
	Level 3 (DANGEROUS OPERATION)
	VIBRATION INTENSITY [mm/s]
	0.0 ÷ 6.3
	6.3 ÷ 11.8
	11.8 ÷ 16.0

If the vibration speed in one of the three main directions reaches and/or exceeds the CRITICAL OPERATION threshold, cut off the power to the machine immediately and consult paragraph 16. If the anomaly persists contact the after-sales service G&R.

⁸ Fatigue is a mechanical phenomenon (it is typically metallurgical fatigue but also occurs in other classes of materials such as polymers and ceramics) in which a material subjected to loads that vary over time in a regular or manual manner is weakened until it breaks (fatigue failure or rupture even if the stress state always remained under the limit of elasticity, i.e. notwithstanding the fact that during the material's "useful life" the maximum intensity of the loads in question remained notably below the breaking stress or yield stress (i.e. in the absence of stress cycles).

⁹ It is possible over time for the residual imbalance of the impeller to increase as a result of corrosive or abrasive phenomena or, more commonly, because of the accumulation, stratification or accretion of material.

¹⁰ UNI EN ISO 13349.

Gigola	Instruction manual (technical handbook)	g&r – im th – Air circulation fan - eng	First edition 01/01/1995	Page 47 of 77
	Air circulator fan		Rev. No. 04 28/07/2016	

9.B. Regular operation check

	The operations described in this paragraph require the operator to wear protection for the hands (P.P.E. - Cat. 2).
	The operations described in this paragraph require the operator to wear technical garments or overalls (P.P.E. - Cat. 1).
	The operations described in this paragraph require the operator to wear protective footwear (P.P.E. - Cat. 2).

Regular operation of the fan is highlighted by:

- absence of vibratory movements (generalised or localised, temporary or continuative);
- absence of vibrations higher than the values indicated in *paragraph 9.A.III* (vibration intensity);
- absence of metallic noises or sound of rubbing from the box and/or bearings;
- absence of parts of the machinery at temperatures above those deemed ordinary for operation in normal working conditions.

It should be noted that most of the breakdowns that tend to occur during the running-in period are almost exclusively originated by slackening of the fixing nuts and bolts. This is substantially due to the fact that while the machine is being run in, and general setting of the rotating and other parts takes place, also including the associated mechanical and electrical connections.

OPERATING INSTRUCTIONS:

1. Stop the fan after 2 hours of continuous operation and perform a general check of the machine with the maximum accuracy, in particular:
 - ✓ check the tightness of all the fixing elements and, if it is the case, tighten and restore operation again;
 - ✓ check the state of wear as well as the correctness of the transmission belts and, if appropriate, replace or re-tension them [Ref. Par. 11.F].

	For reasons of individual and collective safety, perform all the operating instructions referred to in this paragraph with the machine stopped and in conditions of safety.
	The checks indicated in the operating instructions referred to in this paragraph must be repeated once again after 7 days of continuous operation of the machine.

9.C. Commissioning

	The operations described in this paragraph require the operator to wear protection for the face (P.P.E. - Cat. 2).
	The operations described in this paragraph require the operator to wear protection for the hands (P.P.E. - Cat. 2).

Gigola	Instruction manual (technical handbook)	g&r – im th – Air circulation fan - eng	First edition 01/01/1995	Page 48 of 77
	Air circulator fan		Rev. No. 04 28/07/2016	

	The operations described in this paragraph require the operator to wear technical garments or overalls (P.P.E. - Cat. 1).
	The operations described in this paragraph require the operator to wear protective footwear (P.P.E. - Cat. 2).

Putting the fan into service envisages that the date and time of the commencement of service, as well as the results of all the checks with the fan unit stopped and running listed below, be noted in the **MACHINE LOGBOOK**, along with the person responsible for the operations

OPERATING INSTRUCTIONS (checks with machine stopped and with machine running):

CHECKS TO BE PERFORMED WITH MACHINE STOPPED

- I. Check the SOLIDITY AND STRENGTH OF THE WALL FIXING of the machinery;
- II. Check that there is no PLAY in the ASSEMBLY of the parts of the fan unit (Impeller - Venturi nozzle - Box - Belt protection cover - Bearings - Transmission Shaft ...);
- III. Check the STATE OR WEAR OF THE BEARINGS;
- IV. Check the STATE OF THE CONNECTIONS of the machine's EARTHING POINTS;

CHECKS TO BE PERFORMED WITH MACHINE RUNNING:

- I. CHECK THE ROTATION SPEED both of the motor and of the impeller and correspondence with the values indicated on the relevant rating plates;
- II. Check that the magnitude of the machine VIBRATIONS matches the values given in *paragraph 9.A.III*;
- III. Check the TEMPERATURE OF THE BEARINGS;
- IV. Check that the SURFACE TEMPERATURE OF THE MACHINERY is close to the temperature envisaged as routine for operation in normal working conditions;
- V. Check that there is no HISSING and/or SCREECHING from scraping;
- VI. Check that the MOTOR INPUT DATA match the relevant rating plate.

	The final unit cannot be put into service on site until it has been declared to be in conformity with the provisions of the Machinery Directive 2006/42/EC
	For individual and collective safety reasons, never put your limbs (or anything else) through the protection grids fitted for your safety and for machine protection when it is running and/or powered.

Gigola	Instruction manual (technical handbook)	g&r – im th – Air circulation fan - eng	First edition 01/01/1995	Page 49 of 77
	Air circulator fan		Rev. No. 04 28/07/2016	

9.C.I. Running in

This fan unit has a running-in period of 160 hours' operation.

	During the entire running-in period, it is recommended not to subject the machine to frequent and repeated start and stop cycles (even if compatible with the maximum number of hourly starts that can be supported by the motor).
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9.C.II. Checks during the machine's life cycle

	The operations described in this paragraph require the operator to wear protection for the face (P.P.E. - Cat. 2).
	The operations described in this paragraph require the operator to wear protection for the hands (P.P.E. - Cat. 2).
	The operations described in this paragraph require the operator to wear technical garments or overalls (P.P.E. - Cat. 1).
	The operations described in this paragraph require the operator to wear protective footwear (P.P.E. - Cat. 2).

The sequence of checks to perform during the machine's life cycle depends both on the concentration of particulate and/or filaments dispersed in the atmosphere treated by the fan unit, and by the history of the maintenance performed on the machine.

The repetition intervals indicated below refer to a new fan unit and are merely approximate. It is up to the person responsible for the plant, based on his specific knowledge of the nature, fineness (for particulate) or length (for filaments), concentration, variability, chemical aggressiveness, erosive capacity, etc. of the airborne elements on the site, as well as of the machinery itself, to determine the correct frequency of checks.

REPETITION INTERVAL	CONCENTRATION OF AIRBORNE DUST AND/OR FILAMENTS
10 000 hours	Nil
8 200 hours	Weak
6 300 hours	Moderate
4 300 hours	High
2 000 hours	Very high
750 hours	Extremely high

OPERATING INSTRUCTIONS (checks with machine stopped and with machine running):

CHECKS TO BE PERFORMED WITH MACHINE STOPPED

- I. Check the SOLIDITY AND STRENGTH OF THE WALL FIXING of the machinery;
- II. Check that there is no PLAY in the ASSEMBLY of the parts of the fan unit (Impeller - Venturi nozzle - Box - Belt protection cover - Bearings - Transmission Shaft ...);
- III. Check the STATE OR WEAR OF THE BEARINGS;
- IV. Check the STATE OF THE CONNECTIONS of the machine's EARTHING POINTS;

CHECKS TO BE PERFORMED WITH MACHINE RUNNING:

- I. CHECK THE ROTATION SPEED both of the motor and of the impeller and correspondence with the values indicated on the relevant rating plates;

Gigola	Instruction manual (technical handbook)	g&r – im th – Air circulation fan - eng	First edition 01/01/1995	Page 50 of 77
	Air circulator fan		Rev. No. 04 28/07/2016	

- II. Check that the magnitude of the machine VIBRATIONS matches the values given in paragraph 9.A.III;
- III. Check the TEMPERATURE OF THE BEARINGS;
- IV. Check that the SURFACE TEMPERATURE OF THE MACHINERY is close to the temperature envisaged as ordinary for operation in normal working conditions;
- V. Check that there is no HISSING and/or SCREECHING from scraping;
- VI. Check that the MOTOR INPUT DATA match the relevant rating plate.



For individual and collective safety reasons, never put your limbs (or anything else) through the protection grids fitted for your safety and for machine protection when it is running and/or powered.

9.D. Putting out of service and decommissioning

At the end of its life or when the machine is being replaced it is necessary to perform the operations for putting it out of service and decommissioning it (Demolition and Disposal).

Putting a fan unit out of service is a relatively simple operation. However, given that the machine is often required to run at length in environments that are generically described as “*unhealthy*” (because they are dusty, filamentous or enriched by chemical and bacteriological agents of anthropic origin¹¹), it is subject to hidden risks associated with activities that are not directly linked to activities of a manual type and therefore must never be done in an improvised manner and much less so be entrusted to persons who are not expert and competent.

9.D.I. Decommissioning

	The operations described in this paragraph require the operator to wear respiratory protective equipment (P.P.E. - Cat. 2).
	The operations described in this paragraph require the operator to wear protection for the hands (P.P.E. - Cat. 2).
	The operations described in this paragraph require the operator to wear technical garments or overalls (P.P.E. - Cat. 1).
	The operations described in this paragraph require the operator to wear protective footwear (P.P.E. - Cat. 2).
	If the operations described in this paragraph are carried out at a height of more than 3.0 [m] above ground, the operator must use slings for preventing falls (P.P.E. - Cat. 3).

Putting the fan out of service envisages annotation of the date and time of decommissioning, plus the person responsible for the operations, in the **MACHINE LOGBOOK**

OPERATING INSTRUCTIONS:

ELECTRICAL DISCONNECTION

- I. Cut off the supply to the machine's electrical control board and wait until the impeller, the motor and all the moving parts have stopped;
- II. Secure the safety of the area surrounding the workplace [Ref. Ref. Par. 1.C.];

¹¹ Dangerousness of an anthropic origin is intended as the direct or indirect dangerousness, both for human life and for the environment, deriving from human activities that are potentially dangerous such as, for example, management of sewage, and livestock breeding, industrial and farming waste.

Gigola	Instruction manual (technical handbook)	g&r – im th – Air circulation fan - eng	First edition 01/01/1995	
	Air circulator fan		Rev. No. 04 28/07/2016	Page 51 of 77

III. Disconnect the motor's power supply wires.

MECHANICAL DISCONNECTION (in the case of wall installation)

- I. Remove the material applied to seal the technical interspaces between the fan unit and the wall;
- II. Remove the machine from its seat;

	During this phase, dust that has accumulated on/in the machine over the course of time/operation could be dispersed in the air.
	During this stage, it is possible for the machine to overturn and/or fall.

MECHANICAL DISCONNECTION (in the case of wall installation with metal supports)

- I. Remove the material applied to seal the technical interspaces between the fan unit and the wall;
- II. Remove the nuts and bolts fixing the machine to the metal supports.
- III. Remove the machine from its seat;

	During this phase, dust that has accumulated on/in the machine over the course of time/operation could be dispersed in the air.
	During this stage, it is possible for the machine to overturn and/or fall.

IV. Remove the wall's metal supports by slackening the fixing nuts and bolts.

HANDLING

- I. Move the fan in accordance with the procedures described in paragraph 5.C.
- II. Remove the machine to a safe place that is inaccessible to unauthorised personnel until ready to begin the demolition and dismantling operations.

9.D.II. Demolition

It is necessary to demolish/dismantle the machinery before proceeding with its disposal. Refer to operating instructions contained in *paragraph 7* of this operation and maintenance manual for correct demolition.

To dispose of the constituent materials correctly, remember to:

- separate and group all the plastic and/or rubber parts;
- separate and group all the metal parts (steel - aluminium - copper);
- separate and group all the electrical or electronic parts;
- recover and group any exhausted lubricants;

	The demolition and/or dismantling of the machinery can be done both by the customer/user and by delegated companies that are specialised in this activity.
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9.D.III. Disposal

	The machine and/or its parts should never be abandoned in the environment but must be transferred to a safe and suitable place for the disposal and recovery of the constituent materials.
	All the materials the machine is composed of can be recycled and reintroduced into the production cycle if disposed of appropriately.

G&R shall not be responsible (neither civilly nor criminally) for any environmental damage caused by failure to dispose of the above in an envisaged place or for disposing of it in an inadequate place.

Gigola	Instruction manual (technical handbook)	g&r – im th – Air circulation fan - eng	First edition 01/01/1995	Page 52 of 77
	Air circulator fan		Rev. No. 04 28/07/2016	

10. Starting - Operation - Stopping - Emergency stopping

10.A. Starting

The machine can be started only and exclusively from the fan unit electrical control board (switch control unit - switch panel - local switch).

	<p>The units that are connected to a frequency variator (VFD or Inverter) require the start-up frequency be set:</p> <ul style="list-style-type: none"> - taking account of the parameters relating to an acceptable speed for the drive motor; - excluding the resonance frequencies of the frequency variator and of the machine (if necessary consult the operation and maintenance manual and/or the manufacturer of both).
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It should be recalled, for safety reasons, that before starting to run the machine it is necessary to ensure that:

- **all the safety systems are working and in operation;**
- **there are no impediments to the movement of the fan, belt transmission unit, the impeller shaft and the motor shaft;**
- **no one is carrying out inspection and/or maintenance activities on the machine.**

	<p>The starting stage is a critical moment for the machine because several elements pass from a total rest condition to the normal running speed in just a few seconds. Though all the fan unit components are dimensioned in order to safely overcome the contingent load components that occur when starting, it is advisable not to subject the machine to pointless repeated start cycles.</p>
	<p>In order to preserve the motor, and therefore good machine operation, the maximum number of hourly starts declared by the manufacturer for the specific motor must never be exceeded (as this can subject the motor to stresses and/or electrical over-absorption that could lead to rapid yielding/failure/thermal collapse).</p> <p>More precise indications on the maximum number of hourly starts cannot be given as this parameter is greatly influenced by exogenous factors such as:</p> <ul style="list-style-type: none"> - the power of the installed motor; - the fan rotation speed; - the fan PD2; - the installation conditions; - the fluid dynamic characteristics of the gaseous mixture moved; - the machine's previous history; - any accretions or accumulations of dust on the fan. <p>It is good practice NEVER to repeat more than 4 starts in one hour.</p>

10.B. Operation

This air circulator fan envisages only the following operating conditions:

- ON (fan running at the nominal design speed);
- OFF (fan stopped or at rest).

	<p>The fan unit is not set up for the condition known as “EMERGENCY OPERATION”¹².</p>
	<p>It is not possible to make adjustments to modify the fan work point (Flow rate - Pressure). Contact the G&R customer services directly for any needs.</p>

10.B.I. Noise

	<p>Integral and certified category 2 hearing protection devices must be worn if it is necessary to work near the machine for extended periods while it is running.</p>
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¹² 1st condition: “overdrive” or fan running at incremented rotation speed;
2nd condition: “retrograde motion” or operation with inverted airflow.

Gigola	Instruction manual (technical handbook)	g&r – im th – Air circulation fan - eng	First edition 01/01/1995	
	Air circulator fan		Rev. No. 04 28/07/2016	Page 53 of 77

The noise level (equivalent sound pressure level - LAEq) connected to the working of this air circulator fan (corresponding to the nominal working point) expressed in [dB(A)]¹³ (detection procedure in accordance with the execution rules mentioned in the ISO 3744¹⁴ standard) is lower than 84 [dB(A)].

	<p>It is important to underline that the effective sound pressure level in the machine work environment is highly influenced, as well as by the noise generated by the fan unit, also by the acoustic characteristics of the installation environment¹⁵ and by the concomitant presence of other machines (even in cases in which these are stopped or not running). Given this, it is therefore likely that the effective sound pressure level in the machine operating environment be higher (even to a great extent) than the nominal noise level generated by the fan unit (acoustic amplification or resonance effect).</p> <p>If it is necessary to fulfil specific obligations on site regarding the environmental noise level, it is strictly necessary for the purchase of the fan unit to be preceded by an acoustic impact study for the purposes of characterising the machine installation environment and defining the maximum threshold level permitted for it. IN ORDER TO GUARANTEE RESPECT FOR A PARTICULAR NOISE LIMIT IT IS NOT SUFFICIENT TO USE A FAN UNIT WHOSE NOMINAL NOISE LEVEL IS THE SAME AS THE THRESHOLD ITSELF. MOREOVER, EVEN WHEN A FAN UNIT IS SELECTED WITH A LOWER NOISE LEVEL, WITHOUT ANY IMPACT ANALYSIS, IT IS NOT GIVEN THAT THE LOWER NOISE LEVEL OF THE MACHINE WILL COMPLY WITH THE ACOUSTIC LIMIT IMPOSED ON SITE.</p> <p>The manufacturer is available <u>on the customer's express request, without any obligation and/or constraint</u>, to provide advice on the actions necessary for reducing the level of noise emitted by the machine.</p>
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It should be noted that local legislation defines:

- the **personnel exposure time** in relation to the sound emission characteristics (intensity - nature - duration);
- the **threshold level that can be produced by a machine/factory/plant during the daytime/night-time work cycle** (acoustic zoning).

Those who are responsible for designing the plant must obligatorily bear the above in mind and must also comply scrupulously with the laws and regulations in force. G&R is not responsible (civilly and/or criminally, cannot be deemed to be such and is not obliged to take action to correct "unlawful" situations that are not directly attributable to the machinery produced by it and/or deriving from errors committed when making the request for an offer.

10.C. Stopping

This machine can be stopped (in normal mode) only and exclusively by acting on the electrical control board of the same (cutting off the power supply by means of a switch).

	The modest inertia torque that distinguishes the axial fans installed in the fan units referred to in this operation and maintenance manual is such that when the electrical control circuit is turned on stopping is gradual and quite fast. The time interval between opening the electrical control circuit and complete stopping of the fan is called <i>stop transient</i> and varies, depending on the size of the impeller, its weight and the nominal rotation speed, from a few tens of seconds to a few minutes.
	Do not attempt to reduce the stop transient of the fan by means of improvised braking systems such as, for example, rods, foreign bodies or limbs, as this would not only be imprudent and potentially dangerous for your own safety but would certainly damage the machine (alteration of the blade geometry, variation of the balancing level of the impeller, misalignment of the movement transmission components and general compromising of operating efficiency, as well as the safety, of the machine).

10.D. Emergency stop

	The fan unit referred to in this use and maintenance manual is not fitted with systems or devices for fast stopping in emergencies; therefore pay attention when close to it.
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¹³ Weighted decibels in the audio band (scale A)

¹⁴ At a distance of 1.5 [m] from the surface enveloping the machine (outline parallelepiped) and in free field on a single reflecting surface

¹⁵ The acoustic characteristics of an environment are conditioned by the number of reflecting surfaces, the constituent materials, the presence or otherwise of windows, doors and/or other openings, etc.

Gigola	Instruction manual (technical handbook)	g&r – im th – Air circulation fan - eng	First edition 01/01/1995	
	Air circulator fan		Rev. No. 04 28/07/2016	Page 54 of 77

11. Cleaning

Regular and thorough cleaning of the fan unit allows the same to operate better (efficiently) and for longer. In general, it is not necessary to use particular products; simple compressed air and/or cloths soaked in water with the addition of common non-alkaline products are more than sufficient.

	<p>The products for cleaning the machine must be selected carefully, also ensuring that the selected products:</p> <ul style="list-style-type: none"> - are not solvents and/or chemically aggressive for the element to clean (as it would generate imbalances and/or alterations that could affect the mechanical strength of the element itself); - are not chemically reactive with deposits that have accumulated on the machine (with generation of toxic reaction products); - do not give rise to chemico-physical reactions of the exothermal type with deposits that have accumulated on the machine (with generation of heat).
	<p>It is absolutely forbidden to use high-pressure washers, water jets, steam jets (at high temperature and/or pressure) or abrasives for any cleaning operations that involve (or could involve) the machine as a whole or in part.</p>

In order to reduce the risk of injury at work and prevent unauthorised personnel from accessing the work area - thereby creating situations that are potentially dangerous for the same, for the operator and operators at work on the fan unit and for the machinery itself - the work area should be delimited by means of signage poles with access-prevention chains and special warning signs.

	Before starting any cleaning operation it is obligatory to stop the machinery and secure its safety .
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11.A. Fan support hub and motor support

	The operations described in this paragraph require the operator to wear head protection (P.P.E. - Cat. 2).
	The operations described in this paragraph require the operator to wear hearing protection. (P.P.E. – Cat. 2).
	The operations described in this paragraph require the operator to wear protection for the face (P.P.E. - Cat. 2).
	The operations described in this paragraph require the operator to wear respiratory protective equipment (P.P.E. - Cat. 2).
	The operations described in this paragraph require the operator to wear protection for the hands (P.P.E. - Cat. 2).
	The operations described in this paragraph require the operator to wear technical garments or overalls (P.P.E. - Cat. 1).

Gigola	Instruction manual (technical handbook)	g&r – im th – Air circulation fan - eng	First edition 01/01/1995	Page 55 of 77
	Air circulator fan		Rev. No. 04 28/07/2016	

	If the operations described in this paragraph are carried out at a height of more than 3.0 [m] above ground, the operator must use slings for preventing falls (P.P.E. - Cat. 3).
	The operations described in this paragraph require the operator to wear protective footwear (P.P.E. - Cat. 2).

The fan support hub and motor support do not require in-depth cleaning because accumulations of dirt do not influence its functionality.

	Cleaning the internal parts of the machinery is a good occasion for ascertaining the integrity of the welds of the motor support and for checking the tightness of the nuts and bolts fixing the motor to it. If the result is negative, suspend cleaning the machine, immediately contact the G&R support services and do NOT restart the machine for any reason.
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11.B. Motor

	The operations described in this paragraph require the operator to wear head protection (P.P.E. - Cat. 2).
	The operations described in this paragraph require the operator to wear hearing protection. (P.P.E. – Cat. 2).
	The operations described in this paragraph require the operator to wear protection for the face (P.P.E. - Cat. 2).
	The operations described in this paragraph require the operator to wear respiratory protective equipment (P.P.E. - Cat. 2).
	The operations described in this paragraph require the operator to wear protection for the hands (P.P.E. - Cat. 2).
	The operations described in this paragraph require the operator to wear technical garments or overalls (P.P.E. - Cat. 1).
	If the operations described in this paragraph are carried out at a height of more than 3.0 [m] above ground, the operator must use slings for preventing falls (P.P.E. - Cat. 3).
	The operations described in this paragraph require the operator to wear protective footwear (P.P.E. - Cat. 2).

Dirt deposits and incrustations are the main cause of the accumulation of heat by the motor and, in virtue of this, a fundamental reason for the reduction of its efficiency and for the transformation of the motor into a potential source of fire and/or a triggering point for potentially explosive atmospheres. It is therefore advisable to clean the motor, taking great care to eliminate all the

Gigola	Instruction manual (technical handbook)	g&r – im th – Air circulation fan - eng	First edition 01/01/1995	Page 56 of 77
	Air circulator fan		Rev. No. 04 28/07/2016	

dirt and incrustations completely both from the cast iron box and from its fins, cooling fan and motor terminal block.

	For motor cleaning, always refer to the use and maintenance manual of the motor manufacturer. G&R shall not be responsible civilly or criminally for damage and/or property nor shall it be deemed responsible for economic damage deriving from machine stoppages linked to yielding triggered by incorrect cleaning of the electric drive and control motor.
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11.C. Protection cover

	The operations described in this paragraph require the operator to wear head protection (P.P.E. - Cat. 2).
	The operations described in this paragraph require the operator to wear hearing protection. (P.P.E. – Cat. 2).
	The operations described in this paragraph require the operator to wear protection for the face (P.P.E. - Cat. 2).
	The operations described in this paragraph require the operator to wear respiratory protective equipment (P.P.E. - Cat. 2).
	The operations described in this paragraph require the operator to wear protection for the hands (P.P.E. - Cat. 2).
	The operations described in this paragraph require the operator to wear technical garments or overalls (P.P.E. - Cat. 1).
	If the operations described in this paragraph are carried out at a height of more than 3.0 [m] above ground, the operator must use slings for preventing falls (P.P.E. - Cat. 3).
	The operations described in this paragraph require the operator to wear protective footwear (P.P.E. - Cat. 2).

The protection cover does not require in-depth cleaning because accumulations of dirt do not influence its functionality.

	Protection cover cleaning provides a good opportunity for checking its integrity and the absence of damage from impact and/or wear. If any is found, suspend cleaning the machine, immediately contact the G&R support services and do NOT restart the machine for any reason.
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Gigola	Instruction manual (technical handbook)	g&r – im th – Air circulation fan - eng	First edition 01/01/1995	Page 57 of 77
	Air circulator fan		Rev. No. 04 28/07/2016	

11.D. Transmission belts

	The operations described in this paragraph require the operator to wear head protection (P.P.E. - Cat. 2).
	The operations described in this paragraph require the operator to wear hearing protection. (P.P.E. – Cat. 2).
	The operations described in this paragraph require the operator to wear protection for the face (P.P.E. - Cat. 2).
	The operations described in this paragraph require the operator to wear respiratory protective equipment (P.P.E. - Cat. 2).
	The operations described in this paragraph require the operator to wear protection for the hands (P.P.E. - Cat. 2).
	The operations described in this paragraph require the operator to wear technical garments or overalls (P.P.E. - Cat. 1).
	If the operations described in this paragraph are carried out at a height of more than 3.0 [m] above ground, the operator must use slings for preventing falls (P.P.E. - Cat. 3).
	The operations described in this paragraph require the operator to wear protective footwear (P.P.E. - Cat. 2).

Accumulations and incrustations of dirt contribute to wear of the transmission belt and are at the basis of the reduction of the transfer of mechanical power from the motor to the impeller, as well as of the shortening of the average lifetime of the belt itself. It is therefore important to clean the transmission belt, paying great attention to ensure that every trace of dirt is eliminated completely.

	Never remove the belt from its seat if it is not strictly necessary. Its removal always and absolutely involves stretching it. G&R shall not be responsible civilly or criminally for damage and/or property nor shall it be deemed responsible for economic damage deriving from machine stoppages linked to yielding triggered by failure to tension the belt correctly after removing it from its seat.
	Cleaning the belt provides an opportune occasion for checking that it free from hardening, cracks and/or unravelling. If the result is negative, stop cleaning the machine, immediately contact the G&R support services and do NOT restart the machine for any reason.

Gigola	Instruction manual (technical handbook)	g&r – im th – Air circulation fan - eng	First edition 01/01/1995	
	Air circulator fan		Rev. No. 04 28/07/2016	Page 58 of 77

11.E. Pulleys

	The operations described in this paragraph require the operator to wear head protection (P.P.E. - Cat. 2).
	The operations described in this paragraph require the operator to wear hearing protection. (P.P.E. – Cat. 2).
	The operations described in this paragraph require the operator to wear protection for the face (P.P.E. - Cat. 2).
	The operations described in this paragraph require the operator to wear respiratory protective equipment (P.P.E. - Cat. 2).
	The operations described in this paragraph require the operator to wear protection for the hands (P.P.E. - Cat. 2).
	The operations described in this paragraph require the operator to wear technical garments or overalls (P.P.E. - Cat. 1).
	If the operations described in this paragraph are carried out at a height of more than 3.0 [m] above ground, the operator must use slings for preventing falls (P.P.E. - Cat. 3).
	The operations described in this paragraph require the operator to wear protective footwear (P.P.E. - Cat. 2).

Accumulations and incrustations of dirt are the main cause of imbalanced pulleys and therefore of transmission vibrations (a basic cause of both a drop in the efficiency of the transfer of mechanical energy from the motor to the impeller, but also of fracturing of the transmission itself because of fatigue). Accumulations and incrustations of dirt accelerate the belt wear process and also contribute to the reduction of their average lifetime. It is therefore important to clean the pulleys both internally and in the races, taking great care to ensure that all the dirt and incrustations are eliminated completely.

	Never remove the pulleys from their seat if it is not strictly necessary. Removing the pulleys obligatorily entails their realignment. G&R shall not be responsible civilly or criminally for damage and/or property nor shall it be deemed responsible for economic damage deriving from machine stoppages linked to yielding triggered by failure to realign the pulleys after removing them from their seat.
	Cleaning the pulleys is a good occasion for checking that the pulleys are fixed correctly on the transmission shaft and on the motor shaft. If the result is negative, stop cleaning the machine, immediately contact the G&R support services and do NOT restart the machine for any reason.

Gigola	Instruction manual (technical handbook)	g&r – im th – Air circulation fan - eng	First edition 01/01/1995	
	Air circulator fan		Rev. No. 04 28/07/2016	Page 59 of 77

11.F. Impeller

	The operations described in this paragraph require the operator to wear head protection (P.P.E. - Cat. 2).
	The operations described in this paragraph require the operator to wear hearing protection. (P.P.E. – Cat. 2).
	The operations described in this paragraph require the operator to wear protection for the face (P.P.E. - Cat. 2).
	The operations described in this paragraph require the operator to wear respiratory protective equipment (P.P.E. - Cat. 2).
	The operations described in this paragraph require the operator to wear protection for the hands (P.P.E. - Cat. 2).
	The operations described in this paragraph require the operator to wear technical garments or overalls (P.P.E. - Cat. 1).
	If the operations described in this paragraph are carried out at a height of more than 3.0 [m] above ground, the operator must use slings for preventing falls (P.P.E. - Cat. 3).
	The operations described in this paragraph require the operator to wear protective footwear (P.P.E. - Cat. 2).

Dirt accumulations and incrustations on the fan are the main “external cause” of machine vibrations and are the basic reason for the reduction of the aeraulic performance of the fan unit, and for breakage of its parts as a result of fatigue. It is therefore important for both faces of the impeller blades to be clean at all times. When cleaning the impeller blades avoid excessive “levering” on the same and always take great care to ensure that all the dirt and incrustations are eliminated completely. Particular care must be dedicated to the leading edge and trailing edge of the blades, to their connectors to the hub and to the technical interspace between the Venturi nozzle and the tips of the blades.

	Impeller cleaning is an extraordinary maintenance procedure [Ref. Par. 12.F] an obligatorily entails rebalancing the same. G&R shall not be responsible civilly or criminally for damage and/or property nor shall it be deemed responsible for economic damage deriving from machine stoppages linked to yielding triggered by failure to rebalance the impeller dynamically after cleaning it.
	Cleaning the impeller provides a good occasion for checking the structural integrity of its constituent elements and, in particular, for controlling the total absence of damage caused by wear and/or fatigue (cracks). If any is found, stop cleaning the machine, immediately contact the G&R support services and do NOT restart the machine for any reason.

Gigola	Instruction manual (technical handbook)	g&r – im th – Air circulation fan - eng	First edition 01/01/1995	
	Air circulator fan		Rev. No. 04 28/07/2016	Page 60 of 77

11.G. Venturi nozzle

	The operations described in this paragraph require the operator to wear head protection (P.P.E. - Cat. 2).
	The operations described in this paragraph require the operator to wear hearing protection. (P.P.E. – Cat. 2).
	The operations described in this paragraph require the operator to wear protection for the face (P.P.E. - Cat. 2).
	The operations described in this paragraph require the operator to wear respiratory protective equipment (P.P.E. - Cat. 2).
	The operations described in this paragraph require the operator to wear protection for the hands (P.P.E. - Cat. 2).
	The operations described in this paragraph require the operator to wear technical garments or overalls (P.P.E. - Cat. 1).
	If the operations described in this paragraph are carried out at a height of more than 3.0 [m] above ground, the operator must use slings for preventing falls (P.P.E. - Cat. 3).
	The operations described in this paragraph require the operator to wear protective footwear (P.P.E. - Cat. 2).

Accumulations and incrustations of dirt on the Venturi nozzle are the main cause of falls in the aerodynamic performance of the impeller and constitute one of the causes of the displacement of the operating point of the machine. It is therefore important for the Venturi nozzle to be clean at all times, especially in correspondence with the technical interspace created between this and the tips of the blades.

It is recommended not to apply excessive pressure on the Venturi nozzle so as prevent its breakage (in one or more points).

	Venturi nozzle cleaning is a good occasion for checking its integrity and the absence of damage from fatigue, impact and/or wear. If any is found, suspend cleaning the machine, immediately contact the G&R support services and do NOT restart the machine for any reason.
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Gigola	Instruction manual (technical handbook)	g&r – im th – Air circulation fan - eng	First edition 01/01/1995	
	Air circulator fan		Rev. No. 04 28/07/2016	Page 61 of 77

11.H. Protection grids

	The operations described in this paragraph require the operator to wear head protection (P.P.E. - Cat. 2).
	The operations described in this paragraph require the operator to wear hearing protection. (P.P.E. – Cat. 2).
	The operations described in this paragraph require the operator to wear protection for the face (P.P.E. - Cat. 2).
	The operations described in this paragraph require the operator to wear respiratory protective equipment (P.P.E. - Cat. 2).
	The operations described in this paragraph require the operator to wear protection for the hands (P.P.E. - Cat. 2).
	The operations described in this paragraph require the operator to wear technical garments or overalls (P.P.E. - Cat. 1).
	If the operations described in this paragraph are carried out at a height of more than 3.0 [m] above ground, the operator must use slings for preventing falls (P.P.E. - Cat. 3).
	The operations described in this paragraph require the operator to wear protective footwear (P.P.E. - Cat. 2).

Accumulations and incrustations of dirt on the protection grid/s are the main cause of falls in the aeraulic performance of the fan unit and constitute a reason for the machine beginning to pump. It is therefore important to clean the protection grid/s, taking great care to ensure that all the parts are free from dirt and incrustations.

	Cleaning the grid/s is an appropriate occasion for checking the continuity of the welds between the weft and warp, as well as for that there are no holes caused by impact. If any is found, stop cleaning the machine, immediately contact the G&R support services and do NOT restart the machine for any reason.
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Gigola	Instruction manual (technical handbook)	g&r – im th – Air circulation fan - eng	First edition 01/01/1995	Page 62 of 77
	Air circulator fan		Rev. No. 04 28/07/2016	

12. Inspection - Routine maintenance - Extraordinary maintenance

This section of the operation and maintenance manual describes the checks to perform during the inspection, and routine and extraordinary maintenance operations on the machine as well as the associated operating procedures of the same.

12.A. Intervention timetable

STAGE	PERIODICITY ¹⁶	QUALIFICATION OF THE OPERATOR
Supervision/Simple Inspection	Quarterly	User
Thorough Check / Inspection	Half-yearly	Qualified Engineer
Routine Maintenance	Occasional	Qualified Engineer
Extraordinary maintenance	Occasional/Rare	Specialised firm

12.B. Conduct during inspections and maintenance

	<u>Stop the machine and secure its safety before starting inspection and/or maintenance operations</u>
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The inspection and/or maintenance operations can entail:

- the removal of guards put in place to protect personnel from harm;
- the removal of guards put in place to protect the integrity of the machinery;
- partial disassembly of fan components;
- partial disassembly of plant components related to fan operation.

In order to reduce the risk of injury at work and prevent unauthorised personnel from accessing the work area - thereby creating situations that are potentially dangerous for the same, for the operator and operators at work on the fan unit and for the machinery itself - the work area should be delimited by means of signage poles with access-prevention chain and special warning signs.

	If you note any evident deformations, breakages, operating irregularities and/or anomalies in the general condition of the machinery, interrupt all the operations in progress, contact G&R after sales service and do not restart the machine for any reason.
	At the end of every inspection and/or maintenance operation that involves any one of the above actions, restore the pre-existing machine/plant safety and set-up state.
	The following is recommended: <ul style="list-style-type: none"> - Never use controls, hoses or electrical connection lines as grips; - Notify management as regards any tampering and/or modification to the machine compared to the previous inspection.

¹⁶ Machine in continuous cycle operation (24h/365 days per year).

Gigola	Instruction manual (technical handbook)	g&r – im th – Air circulation fan - eng	First edition 01/01/1995	
	Air circulator fan		Rev. No. 04 28/07/2016	Page 63 of 77

12.C. Supervision / Simple Inspection

	The operations described in this paragraph require the operator to wear protection for the hands (P.P.E. - Cat. 2).
	The operations described in this paragraph require the operator to wear technical garments or overalls (P.P.E. - Cat. 1).
	The operations described in this paragraph require the operator to wear protective footwear (P.P.E. - Cat. 2).

Simple inspections are normal quarterly machine supervision activities that can be carried out in complete autonomy by the users (they do not actually require the material executor of the same to have particular abilities and/or be familiar with specific notions, apart from the general safety rules in place of operation of the machine).

CHECK-UP – SIMPLE INSPECTION:

- Control of the general state of the brick (and possibly metal) structure on which the machine rests;
- Verification of the absence of localised and/or corrosive phenomena on the machine and/or parts of it;
- Verification of the surface layer of dust and/or incrustations present on the fan unit structure and surface cleaning (without disassembling the parts);
- General verification of the absence of loose and/or missing nuts and bolts;
- Control of the absence of anomalous noises or sounds that cannot be attributed to normal machine operation;
- Check that there is no excessive vibration;

12.D. Thorough Check / Inspection

	The operations described in this paragraph require the operator to wear head protection (P.P.E. - Cat. 2).
	The operations described in this paragraph require the operator to wear respiratory protective equipment (P.P.E. - Cat. 2).
	The operations described in this paragraph require the operator to wear protection for the hands (P.P.E. - Cat. 2).
	The operations described in this paragraph require the operator to wear technical garments or overalls (P.P.E. - Cat. 1).
	If the operations described in this paragraph are carried out at a height of more than 3.0 [m] above ground, the operator must use slings for preventing falls (P.P.E. - Cat. 3).

Gigola	Instruction manual (technical handbook)	g&r – im th – Air circulation fan - eng	First edition 01/01/1995	
	Air circulator fan		Rev. No. 04 28/07/2016	Page 64 of 77

	The operations described in this paragraph require the operator to wear protective footwear (P.P.E. - Cat. 2).
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Thorough inspections are half-yearly supervisory activities that must be performed exclusively by qualified technical personnel (they actually require the material executor of the same to have particular abilities and be familiar with specific technical ideas as well as well as specific elements regarding safety in the workplace).

CHECK UP - THOROUGH INSPECTION:

- Check the tightness of nuts and bolts and of the fixed and moving elements;
- Check the tightness of wall fixing nuts and bolts;
- Check the wear of both the fixed and moving elements (both general and localised);
- Check of the correct tightness of the fixing and mechanical power transfer elements;
- Check the temperature of the fixed and moving elements;
- Check of the general state of lubrication of the moving elements;
- Check of vibrations;
- Check that there are no cracks and/or damage from impacts on the inside and outside parts of the machine;
- Verification of the surface layer of dust and/or incrustations present on the internal structure of the fan unit and cleaning (with possible disassembly of parts);
- Check of minimum distances.

	If it is found that the case of the reduction of the minimum distances is due to slackening of the tightness of the Venturi nozzle immediately retighten the same.
	If it is noted that the reduction of the minimum distances is due to a deformation of the box or of the impeller or to slackening of some of its elements DO NOT PERFORM ANY MAINTENANCE OPERATION but contact the G&Rtechnical after sales service. Do not restart the fan for any reason.

12.E. Routine maintenance

With reference to the definition given in *paragraph 1.C*, the simple inspection can be classified as a routine maintenance procedure.

12.F. Extraordinary maintenance

Everything that does not come within the definition of routine maintenance given in *paragraph 1.C* and the contents of *paragraph 12.E* (including thorough inspection of the machine), must be deemed to be an **extraordinary maintenance provision**.

	Do not attempt in any way to repair parts of the fan on which damage is noted from impact, abrasion, wear and rubbing/rolling or in which breaks are noted in the continuity of the welds, fatigue cracks, thermal stress and hardening from rusting (both localised and generalised). If any is found, suspend the extraordinary maintenance of the machine, immediately contact the G&Rsupport services and do NOT restart the machine for any reason.
	Consult G&R after-sales technical support service before undertaking extraordinary maintenance actions.

Gigola	Instruction manual (technical handbook)	g&r – im th – Air circulation fan - eng	First edition 01/01/1995	
	Air circulator fan		Rev. No. 04 28/07/2016	Page 65 of 77

12.F.I. Venturi nozzle

The only extraordinary maintenance operations permitted on the Venturi nozzle are those envisaged in the thorough inspection [Rif. Par. 12.D.] applicable to the Venturi nozzle and/or the complete substitution of the Venturi nozzle itself.

12.F.II. Impeller

The only extraordinary maintenance operations permitted on the impeller are those envisaged in the thorough inspection [Ref. Par. 12.D.] applicable to the impeller and/or its complete replacement.

12.F.III. Bearings, impeller shaft and spacer

The only extraordinary maintenance operations permitted on the bearings, on the impeller shaft and on the spacer are those envisaged in the thorough inspection [Rif. Par. 12.D.] applicable to the specific component. **The replacement of these elements is not permitted for construction reasons (it is necessary to replace the entire impeller).**

12.F.IV. Pulleys

The only extraordinary maintenance operations permitted on the pulleys are those envisaged in the thorough inspection [Ref. Par. 12.D.] applicable to the pulleys and replacement.

12.F.V. Protection cover

The only extraordinary maintenance operations permitted on the protection cover are those envisaged in the thorough inspection [Ref. Par. 12.D.] applicable to the protection cover and replacement.

12.F.VI. Transmission belts

The only extraordinary maintenance operations permitted on the pulleys are those envisaged in the thorough inspection [Ref. Par. 12.D.] applicable to the belts and replacement.

12.F.VII. Motor support arm

The sole extraordinary maintenance activity permitted on the motor support is touching up the protective paint locally in the event of flaking that is not attributable to rusting of the base metal. **The replacement of these elements is not permitted for construction reasons (it is necessary to replace the entire arm with the motor support).**

12.F.VIII. Motor

The only extraordinary maintenance operations permitted on the motor are those envisaged in the thorough inspection [Ref. Par. 12.D.] applicable to the motor and replacement.

12.F.IX. Cross-shaped hub

The only extraordinary maintenance operations permitted on the cross-shaped hub are those envisaged in the thorough inspection [Rif. Par. 12.D.] applicable to the cross-shaped hub and replacement.

12.F.X. Protection grid

The only extraordinary maintenance operations permitted on the protection grids are those envisaged in the thorough inspection [Ref. Par. 12.D.] applicable to protection grids and their replacement.

Gigola	Instruction manual (technical handbook)	g&r – im th – Air circulation fan - eng	First edition 01/01/1995	Page 66 of 77
	Air circulator fan		Rev. No. 04 28/07/2016	

13. Maintenance logbook

The maintenance logbook is the document in which all the annotation regarding maintenance operations (routine and extraordinary) performed on the fan unit during its life cycle are recorded. It is in fact a detailed report of who did what and when, complete with the outcome of the controls and any annotations of interest regarding them.

A draft maintenance logbook layout is suggested in the paragraph that follows, with the list of the typical checks to carry out on the machinery. The creation, completion and caretaking of the maintenance logbook are the responsibility of the user and in its absence the support under the warranty and requests for after-sales made to the G&R after-sales service could be much more costly.

13.A. Logbook structure (Suggestions)

MAINTENANCE LOGBOOK					
DATE	CHECK OR TEST	HOURS OF SERVICE	TYPE OF ACTION	OBSERVATION	SIGNATURE
	Accumulation of dust on the fan (Motor support- box)				
	Accumulation of dust on the bearings				
	Accumulation of dust on the motor				
	Accumulation of dust and/or lubricant On the transmission belts				
	State of the transmission belts				
	Tension of the transmission belts				
	Accumulation of dust and/or lubricant on the pulleys				
	State of the pulleys				
	Accumulation of dust or other airborne material on the fan				
	Tightness of the support bolts for wall fixing				
	Tightness of the fan nuts and bolts				
	Bearing wear				
	Check of minimum distances of impeller				
	Accumulation of dust on the impeller				

Gigola	Instruction manual (technical handbook)	g&r – im th – Air circulation fan - eng	First edition 01/01/1995	
	Air circulator fan		Rev. No. 04 28/07/2016	Page 67 of 77

MAINTENANCE LOGBOOK					
DATE	CHECK OR TEST	HOURS OF SERVICE	TYPE OF ACTION	OBSERVATION	SIGNATURE
	State of rivets securing impeller blades to the hub				
	State of motor support welds				
	State of tightness of protection grids				
	State of protection grids				
	State of tightness of parts not fastened together by nuts and bolts				
	Presence of localised rust				
	Generalised vibrations [mm/s]				
	State of pictogram wear				

Gigola	Instruction manual (technical handbook)	g&r – im th – Air circulation fan - eng	First edition 01/01/1995	Page 68 of 77
	Air circulator fan		Rev. No. 04 28/07/2016	

14. Lubrication

14.A. Impeller transmission shaft bearings



All the bearings of the impeller transmissions shaft are lubricated for life and therefore it is not necessary to relubricate them

15. Spare parts



All G&R fan units must be fitted only and exclusively with original spares. The manufacturer shall not be responsible, neither criminally nor civilly, for damage deriving from the use of non-original spares. In particular G&R is not obliged to act to correct situations and/or breakages/damages deriving from the use of spare parts not supplied by G&R itself.

All the spare parts for the fan unit can be requested directly from the G&R customer service with indications of the following:

- Designation;
- Type;
- Item;
- Job no.;
- Spare part (list).

LIST OF THE SPARE PARTS AVAILABLE

PROGRESSIVE No.	DESCRIPTION	PROGRESSIVE No.	DESCRIPTION
A	Protection grid (extraction side)	I	Standard arm
B	Protection cover	J	Arm with motor support
C	Transmission belt	K	Venturi nozzle
D	DRIVEN pulley (fan side)	L	Blade
E	DRIVE pulley (motor side)	M	Blade hub
F	Electric drive and control motor	N	Bearings
G	Box panel	O	Spacer
H	Cross-shaped hub	P	Protection grid (delivery side)

16. Troubleshooting

Problem	Cause	Corrective action
The machine does not start	Power supply	Check that the machine's electrical control board circuit breaker is in the ON position.
	Power supply	Check that the protection fuses have not blown
	Power supply	Check the correct power supply voltage
	Electrical connection	Check that all the connections have been made correctly on the motor terminal block.
	Defective motor	Replace the motor.
	Mechanical	Check that all the transmission belts are intact
		Check the tension of the transmission belts
		Check the tightness of the pulleys
	Incorrect motor dimensioning	Replace the motor.
The motor is overheated	Overload	Check that the mechanical parts driven by the motor are not subject to unforeseen and unplanned-for resistance
	Incorrect motor dimensioning	Replace the motor.
	Start-up time too long	The impeller PD2 has been underestimated: change the motor.
		Correct the start-up method
Excessive electrical input	Circuit	Possible accretion of dirt in the collar, seat of the impeller
		Possible entry of foreign bodies into the fan that are braking the impeller motion
		Check correct operation of the shutters
	Defective motor	Replace the motor.
	Incorrect motor dimensioning	Replace the motor.
	Impeller	Check the RPM
		Check the impeller rotation direction
Bearings overheating	Lubrication	The grease on the bearings is degraded.
	Damage	Replace the bearings.
	Transmission	Excessive transmission belt tension.
	Mechanical	Bearings not aligned correctly
	Mechanical	The transmission shaft is not straight
Transmission belt deterioration	Incorrect pretensioning	Replace the belt and adjust its tension
	Incorrect fitting	Replace the belt and fit it correctly
	Incorrect pulley alignment	Align the pulleys and replace the belt
	Pulleys worn	Replace the pulley unit + belt and tension the transmission again
	Strong vibrations	Check the tension of the belt and replace it
	Insufficient tension	Change the belt and tension it again
	Excessive tension	Change the belt and tension it again
	Excessive slipping	Change the belt and tension it again
	Life exceeded	Replace the belt
	Dirt/Foreign bodies	Clean/remove the foreign bodies and change the belts
	High temperature (>80 [°C])	Use belts for high temperatures or remove the cause of overheating
	Leaks from the motor, bearings or monobloc	Eliminate the leaks, clean the pulleys and change the belt

Problem	Cause	Corrective action
The transmission belt has turned around	Poor pulley alignment	Align the pulleys and replace the belt
	Races worn	Replace the pulleys
The transmission belt has turned around	Incorrect race profile	Replace the pulleys
	Strong vibrations	Check the tension of the belt
	Insufficient tension	Change the belt and tension it again
	Wear of the sides of the belt	Replace the belt
Transmission belt broken	Transmission under-dimensioned	Recalculate the transmission
	Forced fitting	Change the belts and fit them without forcing
Lubricant leakage	Defective or worn sealing rings	Change the ring or replace the bearings
	Seal seat on the shaft is worn	Change the o-rings or replace the shaft
Noise is excessive or anomalous	Impeller	Check the minimum distances
		Tighten the impeller hub
		Check that there are no excessive obstructions in correspondence with the outlet (loud and intermittent noise) or the inlet (acute and continuous noise)
		Clean dirt deposited on the blades
		Perform the rebalancing
	Box/Scroll	Check the minimum distances
		Tighten collars and Venturi nozzles
		Tighten the bearing collars on the shaft.
		Lubricate the bearings
		Replace the defective bearings
	Mechanical	Tighten the pulleys on the motor/impeller shaft
		Check correct belt tension
		Check the wear of the belts
		Check the pulley alignment
		The motor is running with one phase
	Motor	There is an electrical imbalance in the motor
Excessive or anomalous vibration	Impeller	Check/redo impeller balancing
	Bearings worn	Replace the bearings
	Anti-vibration joints worn	Replace worn joints
	Transmission joint (Misalignment)	Realign the joint
	Transmission joint (Screws slackened and/or micro frictions under the screw head)	Check the joint parts and replace if worn, change the fixing screws and tighten them completely
	Transmission joint (Set screw slackened)	Correct the alignment of the joint, correct if necessary and tighten the hub set screw
Breakage of fixing screws	Mechanical	Reduce the vibrations of the impeller and/or motor.

Gigola	Instruction manual (technical handbook)	g&r – im th – Air circulation fan - eng	First edition 01/01/1995	
	Air circulator fan		Rev. No. 04 28/07/2016	Page 71 of 77

Problem	Cause	Corrective action
Low flow	Circuit	Check that there are no anomalous or unforeseen obstructions in the inlet or outlet
		The mesh weft of the protection grids installed is too fine (change the protection grids if allowed/permited)
	Fan	Check that the impeller rotation direction is correct.
		The fan is under-dimensioned
		Check the angle of incidence of the impeller blades (Angle of incidence too low)
		Check that the impeller rotates at the correct speed (Increase RPM)
	Circuit	Protection grids not installed
		The mesh weft of the installed protection grids is too large (change the protection grids if allowed/permited)
High flow	Fan	Check that the impeller rotates at the correct speed (Reduce RPM)
		Check the angle of incidence of the impeller blades (Angle of incidence too high)
Static pressure incorrect	Circuit	Check that there are no airflow obstructions in the outlet or inlet
		Clean the protection grids
	Fan	Clean the impeller
		Clean the impeller box
		Clean the Venturi nozzle and/or the outlet

Gigola	Instruction manual (technical handbook)	g&r – im th – Air circulation fan - eng	First edition 01/01/1995	
	Air circulator fan		Rev. No. 04 28/07/2016	Page 72 of 77

17. Facsimile of the machine documents accompanying the standard supply

17.A. Declaration of conformity



DECLARATION OF CONFORMITY

Name and address of the person in charge for the technical file	Giuseppe Riccardi c/o Gigola & Riccardi Spa – Via Alessandro Volta n. 7 – Cazzago San Martino (BS) – Italia
Generic name	
Function	
Model	
Type	
Commercial name	

We declare and grant that the machine is compliant to the following directives: 2006/42 CE (Machines), 2006/108 CE (Electromagnetic Compatibility), 2006/95 CE (Low Tension), 2009/125 CE (ERP) and their following integrations and modifications.

In particular it complies with:

- ISO 281, ISO 1813, UNI ISO 1940, UNI ISO 10816, UNI ISO 11228, EN ISO 12100-1, UNI ISO 12100-2, UNI EN ISO 12499, EN 13463-1, UNI EN ISO 13857, EN 13463-5, ISO 14694, EN 14986, DIN EN ISO 16474, EN 60529
- UNI EN ISO 5136, ISO 3744, DIN EN ISO 5801, AMCA STD 210, CEI 1-50 (CEI EN 60079-1), MIL B131G CLASS 1

According to UE regulations UE nr. 327/2011 e 1253/2014 we specify that the fan has been specifically designed to operate in highly corrosive environments or in environments with abrasive substances. The fan shall only be used for the purpose for which it has been designed and in compliance with the law. The user is responsible for any improper use. Please refer to the use and maintenance manual for any further classification.

The compliance with the aforementioned regulations allowed to minimize or reduce (as much as possible) risks connected to the entire life cycle of the machine.

We also declare that all the components coming from third parties installed on the machines are:

- Marked CE (when needed)
- Compliant to regulations
- Chosen with accuracy according to the market's availability
- Riskless for people's health and safety
- Strictly controlled to verify its compliance to quality standards set by the law

The machine comes with adequate protections and warnings that are mandatory to minimize residual risks, as better clarified in the user and maintenance manual.

We also remind you that:

The aforementioned fan, if supplied without a protection grid (or if the grid is removed) can only be installed in connection with a duct on the side of the fan without any grid installed.

The conformity of the fan is valid only if it is assembled, installed, put into service and maintained following the instructions provided by Gigola e Riccardi S.p.A., and included in the technical file for the machine.

IT IS FORBIDDEN TO OPERATE THE FAN IF ANY MACHINE IN WHICH IT IS INCORPORATED IS NOT COMPLIANT TO THE MACHINES DIRECTIVE.

Cazzago San Martino, 2 Gennaio 2016

Giuseppe Riccardi
Administrator

Gigola & Riccardi Spa

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GIGOLA E RICCARDI S.p.A.

a socio unico, assoggettata a direzione e coordinamento di G.R. S.p.A.

**FANS, EVAPORATIVE & DARKENING PADS
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	Instruction manual (technical handbook)	g&r – im th – Air circulation fan - eng	First edition 01/01/1995	
	Air circulator fan		Rev. No. 04 28/07/2016	Page 73 of 77

18. Diary of revisions

DIARY OF REVISIONS

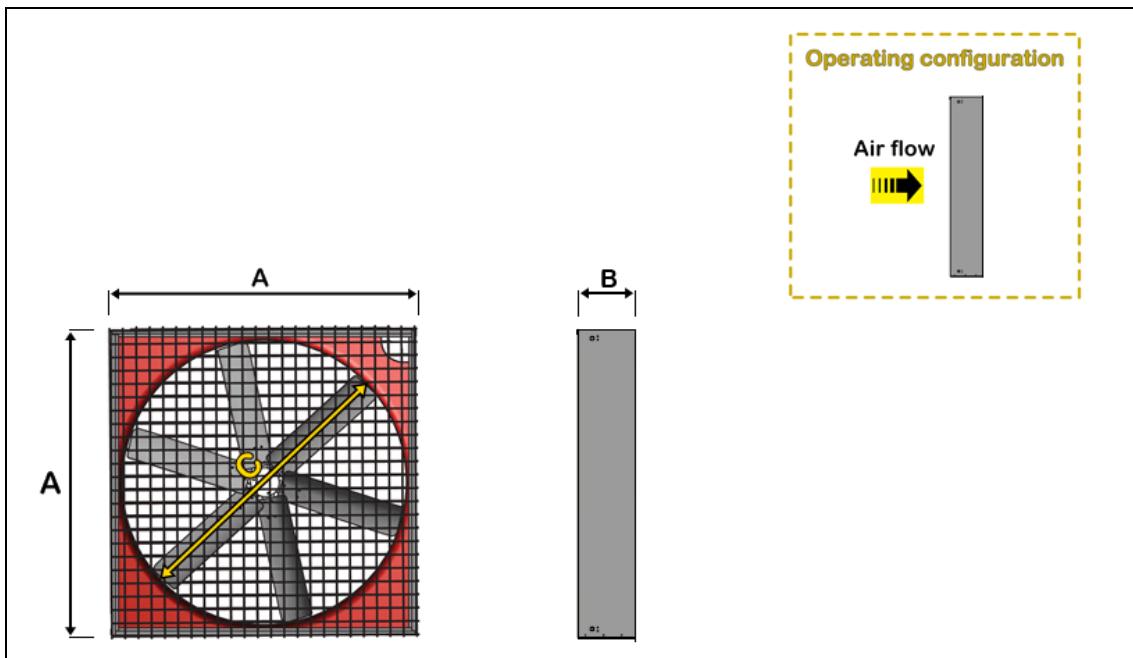
	Instruction manual (technical handbook)	g&r – im th – Air circulation fan - eng	First edition 01/01/1995	
	Air circulator fan		Rev. No. 04 28/07/2016	Page 74 of 77

19. Notes

Gigola	Instruction manual (technical handbook)	g&r – im th – Air circulation fan - eng	First edition 01/01/1995	
	Air circulator fan		Rev. No. 04 28/07/2016	Page 75 of 77

20. Annexes

20.A. ANNEX 1 - Overall dimensions



Type	A [mm] / [inch]	B [mm] / [inch]	C [mm] / [inch]
ES 200 R/R	1930 / 76.0	450 / 17.7	1753 / 69.0
ES 150 R/R	1495 / 58.9	430 / 16.9	1397 / 55.0
ES 140 R/R	1380 / 54.3	330 / 13.0	1296 / 51.0
ES 120 R/R	1150 / 45.3	330 / 13.0	991 / 39.0
ES 100 R/R	960 / 37.8	330 / 13.0	787 / 31.0
ES 80 R/R	800 / 31.5	330 / 13.0	660 / 26.0

Gigola	Instruction manual (technical handbook)	g&r – im th – Air circulation fan - eng	First edition 01/01/1995	Rev. No. 04 28/07/2016	Page 76 of 77
	Air circulator fan				

20.B. ANNEX 2 – Alignment of the transmission belts

Misalignment of the pulleys that form the transmission system is often the cause of:

- Medium frequency noises;
- Early wear of the transmission belt
- Jumping from the race.

The possible types of misalignment in transmission systems with belt transmissions are: angular, parallel and combined.



DISALLINEAMENTO ANGOLARE



DISALLINEAMENTO PARALLELO



DISALLINEAMENTO COMBINATO



G&R exclusively fits transmissions with a single transmission belt on its machines.
The figure below is for informative purposes only.



It is constructive practice during the machine assembly stage in the G&R works to check that the alignment of the pulleys is correct; if it is not it must be checked (by means of a template supplied optionally) and recorded in the machine logbook before the machine can be put into service.

20.C. ANNEX 3 – Tensioning the transmission belts

The whole transmission system installed in the fan unit is not equipped with a system for the geometrical compensation of belt tension. Proper operation of the belt transmission system is subordinate however to fitting the belt at the correct working tension. It is constructive practice during the machine assembly stage in the works G&R to check this tension; if it is not it must be checked and recorded in the logbook before the machine can be put into service. An alignment jig is available for this purpose (element supplied optionally); it is useful for guaranteeing that the belt is correctly tensioned when the transmission unit has been assembled.



The machine beds down generally during the fan running-in period and this often leads to slackening of the transmission belt tension. In order to perform the later adjustment operation (rendered more complicated by the installation of the machine in its definitive seat) it is possible to overcome the problem in the transmission unit by installing a belt stretcher (supplied optionally) that is designed to maintain the correct tension of the belt at all times.

¹⁷ Contact the G&R after-sales service if there is still residual misalignment after checking that assembly is correct.

Gigola	Instruction manual (technical handbook)	g&r – im th – Air circulation fan - eng	First edition 01/01/1995	
	Air circulator fan		Rev. No. 04 28/07/2016	Page 77 of 77

The QR code on the right contains
all the information regarding this manual
and GIGOLA e RICCARDI S.p.A.

