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1. General Rules

1.1 Use of the Manual

- A copy of this manual should be distributed and made available to all operators dealing with ventilator installation, operation and maintenance, in order to operate in compliance with the instructions indicated on this manual.
- This manual is an integrating part of the ventilator. All reproduction and distribution rights of this manual and its attachments are reserved.
- It is forbidden to remove parts, tear pages from or modify this manual.
- Give this manual to any new user or owner of the ventilator.
- Do not damage this manual during its use.
- Keep this manual in cool and dry areas.

1.2 Conventions

- ◆ **All texts about safety are written in red.**
- ◆ **All warning messages are written in red and signaled by the following message:**



1.3 Identification Data

- The Limited Company Mistral Aspiratori-Ventilatori S.r.l. is identified as ventilator Manufacturer, in compliance with all Legislation in force.
- A special adhesive label applied on the ventilator indicates the information required for CE stamp and is reproduced in the Section 1.6.5 of this manual.
- The CE stamp and its compliance declarations certify that the ventilator complies with the European Union regulations in force.
- If the label is accidentally damaged or removed from its location, the User must replace it and inform the Manufacturer.

1.4 Technical Assistance

- ◆ All maintenance activities not described in this manual should be considered as extraordinary maintenance activities, and, therefore, they must be executed by qualified personnel indicated by Mistral

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1.5 General Safety Notices

- ◆ The following rules and recommendations correspond to the safety legislation in force; therefore, they are substantially based upon the respect of these safety rules.
- ◆ Mistral will not be responsible for any damage to people and/or things caused by the non-respect of safety rules in force and of the instructions indicated hereafter.
- ◆ Therefore, all operators must respect and implement the following instructions and carefully follow all accident prevention rules of the country where the ventilator is installed and used.
- ◆ Safety guards must not be removed, unless there is an absolute need for routine or extraordinary maintenance interventions.
- ◆ If safety guards are removed, all safety measures required must be applied to clearly highlight any potential hazard.
- ◆ The safety guards that have been removed must be immediately re-installed as soon as the reasons for their temporary removal are no longer valid.
- ◆ During all routine and extraordinary maintenance interventions, the ventilator must be off and power supply disconnected.
- ◆ To avoid the risk of ventilator being accidentally turned on during maintenance interventions, warning signs should be put on electrical panels and/or control panels, saying:

<p>WARNING: CONTROL NOT AVAILABLE FOR MAINTENANCE ACTIVITIES IN PROCESS</p>

- Before connecting the power supply cable to the motor terminal strip, check line tension to make sure it corresponds to the value indicated on the motor information plate.
- **All ventilator transportation, installation, use, routine and extraordinary maintenance activities must be executed by specialized and properly trained operators only.**
- **A SPECIALIZED AND PROPERLY TRAINED OPERATOR is a person who, after receiving proper and indispensable instructions, is authorized and charged by the ventilator owner with the responsibility for all operations required for the installation and/or use of the ventilator or the system where it is installed.**

- All maintenance operators should wear suitable safety clothing and, most of all, cannot wear fluttering clothes or clothes which can be caught in moving parts.



WARNING

- ◆ The ventilator cannot be used for other purposes than those suggested and corresponding to its destination, without previous agreement from Mistral.

1.6 Safety Signs Installed around the Equipment

1.6.1 Use

- Always be very careful and observe all indications on the signs, labels and plates on the ventilator.
- They must be immediately replaced, if they are worn-out and instructions cannot be read any longer or if they have accidentally been removed or fallen.
- Any removal, although it is accidental, of warning signs must be considered as a safety guard removal; therefore, it must comply with the rules indicated in section 1.5 above.

1.6.2 Danger Signs



**POWER SUPPLY (ref. A, figure 1):
1 sign on motor terminal box**

1.6.3 Obligation Signs



FAN WHEEL ROTATION DIRECTION (ref. B, fig. 1):
1 sign on ventilator box or stamp on identification label

1.6.4 Identification Signs

		20030 BARLASSINA (MI)Via Capuana, 33/35 Tel. 0362/542040 Fax 0362/560792	
		MOD. <input type="text"/>	OR. <input type="text"/>
Qv <input type="text"/>	m ³ /sec	ps <input type="text"/>	pa <input type="text"/>
Pv <input type="text"/>	kW inst.	ng <input type="text"/>	g/1' <input type="text"/>
MATR. <input type="text"/>	Lw <input type="text"/>	dB(A) <input type="text"/>	

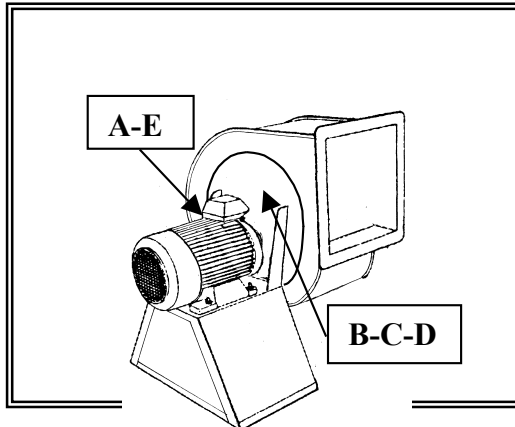
IDENTIFICATION PLATE (ref. C, figure 1):
1 plate on ventilator box

	Mod. <input type="text"/>
	Anno <input type="text"/>

CE STAMP PLATE (ref. D, figure 1):
1 plate on ventilator box

ELECTRICAL DATA IDENTIFICATION PLATE (ref. E, figure 1):
1 plate on electrical motor, according to motor type and brand name.

Figure 1



1.7 Noise

- Noise strength values indicated on catalogues have been obtained through the measuring methods indicated in ISO 3744 regulations. For the use of noise strength values, refer to “Technical Notes” section of Mistral manual, where a sound pressure calculation example has been developed.
- However, the values indicated on catalogues cannot refer to operation conditions, the presence of accessories and environmental conditions different from test room conditions which should be considered during system design stage.
- Check that noise level respects limit values provided for by the legislation in the destination country. Therefore, the use of proper protections, if required, is recommended for operators (such as, noise-proof earphones or earplugs), if noise level is higher than allowed limits.

1.8 References

- ◆ For all weight, size and performance technical data, refer to specifications and any technical drawings supplied during order stage.

1.9 Warranty

- A 12 (twelve) month warranty includes all ventilator parts, unless otherwise specified, and spare parts replacement and labour for all equipment shipped to Manufacturer plant, **Carriage Paid**.
- If the user does not respect maintenance rules, the manufacturer will not be responsible for any problem or fault on ventilator.
- For any intervention during warranty period, all travelling expenses will be paid by the customer, according to tariffs in force.
- The warranty immediately expires in case of continuous misuse, improper use or alteration of ventilator.

2. Handling and Transportation

2.1 Notice

- **The ventilator must always be disconnected from any power supply and its moving part suitably locked during transportation, handling and stocking activities.**
- **The User will make sure that all handling operations are implemented by observing all safety regulations in force.**

2.2 Reception

- All ventilators are carefully checked before shipment. Upon receipt, packaging and packed material must be checked for any damage. In case of damage, report any problem to the transporter, responsible for any damage during transportation.

2.3 Handling

- Some ventilator models may be equipped, according to their weight and size, with suitable lifting and handling components (shown in the figures) or eyebolts, by making sure that lifting equipment capacity is chosen according to ventilator weight.
- Handling operations must be very careful, avoiding any equipment knocks which may damage the ventilator and hinder its regular operation.
- In handling the equipment with fork lifts, observe allowed speed and slopes.
- Never leave transportation means with load lifted.

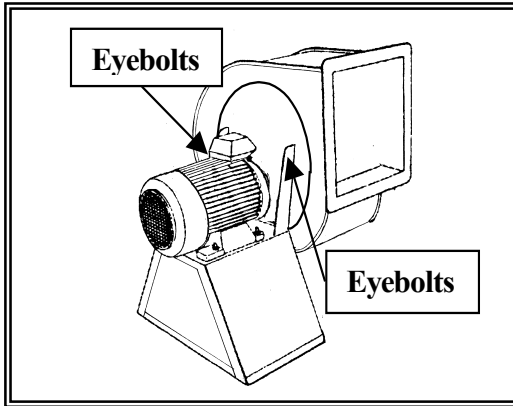


Figure 2

2.4 Transportation

- If ventilator needs to be transported with special transportation means (by sea, plane), it must be packed and protected with suitable systems to avoid any damage caused by knocks or atmospheric agents. All moving parts should be properly anchored.

2.5 Ventilator Inactivity

- If ventilator is stored or left aside for a long time, its uncovered metal parts must be properly cleaned and protected with oil or grease, to avoid any oxidation. The ventilator should also be covered with a sheet and kept in a dry and sheltered place.
- Close all vacuum and delivery inlets with paper or plastic sheets to prevent animals, dust and other materials from entering the ventilator.
- The electrical terminal strip must be disconnected from power line.
- In case of start-up, follow the instructions of Section 3.

3. Installation

3.1 Notice

Before installing the ventilator, proceed with the following checks:

- Check that the floor structure is suitable to hold ventilator weight. The foundations should preferably be made of reinforced concrete and their minimum weight should be about twice the total static weight. If the equipment is laid on metallic structures, check that they are properly stiff. **It is anyhow advisable to install the equipment with proper vibration-damping brackets.**
- Check proper leveling of the supporting structure or foundations, in order to prevent any misalignment and vibration during equipment operation.
- The ventilator should be positioned by ensuring free access to the equipment for all required routine and extraordinary maintenance activities.
- When the dimensions and characteristics of equipment room are established, the air flow necessary during ventilator operation should be considered; therefore, sufficient air circulation should be guaranteed to ensure that equipment room is sufficiently aerated and safe for operators.
- Room lights should allow perfect visibility of ventilator.

3.2 Ventilator Positioning

- To install the ventilator in its housing, use the holes purposely created on the base.
- If required, use the special vibration-damping brackets.



WARNING

- **If vacuum and delivery inlets are not canalized, install protection grids.**
- If the orientation angle set during choice stage needs to be modified, all required interventions can be performed according to the instructions of Section 5.2.

3.3 Power Supply Connection

- The electrical safety of this ventilator is guaranteed only when it is properly connected to an effective grounding system, in compliance with electrical safety legislation. Therefore, this fundamental safety requirement must be checked and, for any doubt, ask professionally qualified personnel to carry out an accurate check of the whole power supply system. The Manufacturer will not be responsible for any damage caused by no ventilator grounding.
- **The ventilator motor should be connected to power supply line by observing the legislation in force and using the special terminal strip on the motor.**
- Check power installed on ventilator (Ref. Motor electrical information label) and install a suitable thermal switch to protect the motor.



WARNING

- **Check power tension and frequency and, subsequently, the phase order.**

4. Use of Ventilator

4.1 Notice

Operators responsible for ventilator use and maintenance must be properly trained and wear the proper safety clothes and safety devices required.

4.2 Checks

Before starting the ventilator, the operators responsible for its operation should perform the following checks:

1. Check that there is no foreign material inside the fan wheel, in the ventilator box and in vacuum and delivery conduits, if present.
2. Check that all ventilator and junction bolts are properly tightened.
3. Check that all physical and chemical features (density, temperature, composition, etc.) of the fluid in the ventilator and/or environmental conditions (altitude, humidity, temperature, etc.) comply with the specifications established during order definition stage.

4.3 Start-up

1. Start the motor.
2. Check that rotation direction corresponds to the direction indicated on the information plate. If they do not correspond, the ventilator air flow would be too low and motor power input would be lower than what is established by characteristic curves.
3. If rotation direction is reversed, stop the motor, turn power off on the control panel and reverse two phases in the terminal strip. Re-start the motor by checking the rotation direction.
4. Check that the power input value of the electrical motor is not higher than the value indicated on the motor information plate. If the ventilator flow is higher than the capacity allowed, the motor will be overloaded and a flow adjusting device should be installed on the equipment (e.g.: shutter on free inlets) and its calibration will allow to bring power value to the information plate nominal value.
5. Leave the ventilator running for about one hour.
6. Check that all bolts are properly tightened, and check motor temperature.

5. Installation and Maintenance

5.1 Notice

- **All maintenance activities must be performed when the ventilator is not running and power supply is turned off.**

- **Observe periodical maintenance activities indicated for maintenance interventions.**
- **To ensure a perfect operation, any components must be replaced with original spare parts only.**
- **In any case, personnel responsible for operation, maintenance, cleaning, etc. must carefully observe safety rules in force in the country where the ventilator is installed.**

5.2 Installation

Before beginning with the installation or starting the equipment, when it is supplied already assembled, check the condition of the fan wheel and of all components in general. All complete assemblies supplied need only to be installed on foundations (see Section 3). When the ventilator is shipped disassembled, all parts where the position has not been clearly indicated should be marked again to facilitate their installation. Installation stages are as follows:

1 Scroll Positioning

The scroll must be laid on the foundation in such a way that no tension or deformation is created when its bolts are tightened, by applying some supporting blocks under its bearing points, where required.

2 Chair Positioning (if it is separated from the scroll)

Follow the procedure used for scroll positioning.

3 Installation of Fan Wheel on the Shaft

Before starting installation, remove any burr from the shaft with a smooth file or an emery cloth, put the key in its slot, push the fan wheel up to its final location, tighten the fan wheel bolt only after its final alignment.

4 Installation of Vacuum Inlet (if required)

The inlet should be tightened between the scroll side and vacuum conduit flange. Do not tighten bolts completely.

5 Motor Leveling

Check motor perpendicularity compared to the scroll and its leveling. Check the right distance between the fan wheel and the inlet. When motor leveling is checked, completely tighten all foundation, support base and cap bolts, as well as all bolts of scroll connection in two halves.

6 Installation Stages

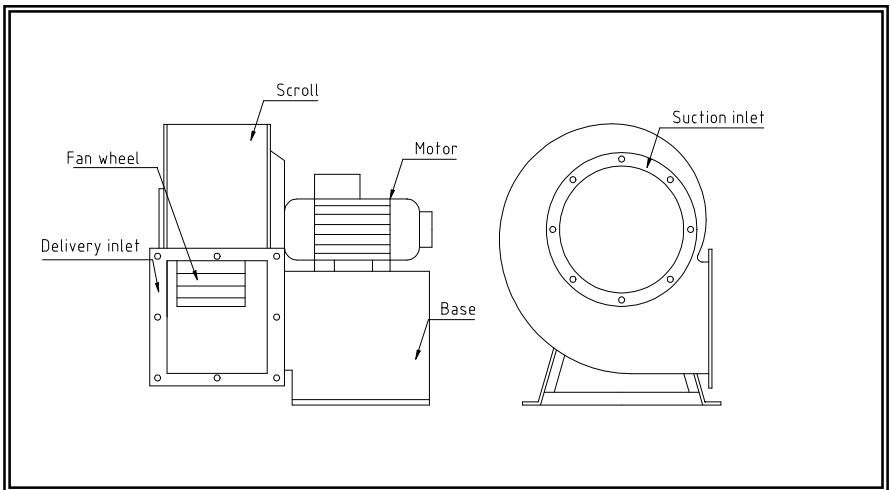
Operation sequence may need to be changed for some special conditions; however, experience shows that the previous procedure is the fastest one.

The ventilator has now been completely installed with the shaft perpendicular to the scroll and on level, with all support and foundation bolts tightened. The right fan wheel positioning in relation to the inlet can also be done remembering that the inlet can be moved both horizontally and vertically. Tighten the bolts by manually and slowly turning the fan wheel, and make sure that it does not touch any vacuum inlet area.

In ventilators with independent chairs operating at high temperature, keep the slack between the inlet lower part and the fan wheel counter disk as low as possible. Vacuum and delivery conduits should always be equipped with a vibration-damping coupling.

When the ventilator reaches its standard temperature, the supports chair will be expanded and the coupling will be perfectly aligned. This operation must not be executed when the supports and motor are installed on a common steel chair, otherwise independent chairs, supports and motors are supplied.

Figura 3



5.3 Maintenance During Running in

These maintenance activities must be performed weekly during the first operation weeks, in order to check the real maintenance intervention frequency, according to operation hours and the kind of circulating fluid (presence of lubricating oil, grease, powders etc. which may reduce fan wheel performances or cause vibrations by settling of fan wheel blades):

- 1 Lubrication of block bearings with grease
- 2 Cleaning of fan wheel blades, cleaning of motor, cleaning of filters and of filter-holders, if present.

5.4 Regular Maintenance

After the first operation weeks, according to the indications given from the operations described at Section 5.2, it will be necessary to establish an operation maintenance calendar.

5.5 Maintenance of Fan Wheel

For fan wheel maintenance, the following instructions are recommended:

- Inspect the fan wheel from the inspection manhole cover, if present, otherwise provide for the possibility to enter the fan wheel from the vacuum inlet.
- For cleaning activities, use a wet cloth dampened with water or detergent. Do not use solvents which would damage the paint.
- Do not use water jets.
- Scrape off the scale from the fan wheel with a compressed air jet and remove the resulting scale with a vacuum cleaner.
- If necessary, disassemble the fan wheel, loosen the head screw and remove the fan wheel from the motor shaft with an extractor. Do not use a hammer to remove the fan wheel from the motor shaft nor separate the fan wheel from its boss, since a new assembly balancing process will be required. When the fan wheel is re-assembled, check the slack between the fan wheel and vacuum inlet very carefully.

5.6 Maintenance of Motor

Electrical motors that are not equipped with external oilers do not need any regular lubrication, since they are equipped with permanently lubricated watertight bearings.

Electrical motors with external oilers need a regular lubrication: in this case, refer to motor user's manual.

5.7 Extraordinary Maintenance

Maintenance interventions not described in this manual should be considered as extraordinary maintenance and must be performed by specialized personnel, usually indicated by the Manufacturer.

6. Spare Parts

For spare part orders, get in contact directly with the Manufacturer, indicating all ventilator identification data.

The user should not need to keep a stock of spare parts, except for drive belts and any special parts defined in the order.

7. Analysis of Residual Risks

7.1 Analysis of Residual Risks

When the ventilators are produced, all manufacturing criteria and legislation on guards and safety protection devices are carefully considered; however, some hazards may yet be possible. The purpose of this section is to remind the operator about the possible hazards which may arise in special situations.

1. Usually, the electrical motors used are not equipped with braking devices. Therefore, it is recommended to be extremely careful with coasting of fan wheel and drive components during maintenance activities; it is also advisable to wait long enough until the ventilator stops completely, before any intervention is performed.
2. It is recommended to take all precautions required, such as precise procedures and proper individual protection devices, if the circulating fluid creates special hazards, which must be evaluated by the user.

8. Operation Faults

8.1 Operation Faults and their Causes

FAULTS	CAUSES
Insufficient flow	<ul style="list-style-type: none"> - Fan wheel partially obstructed - Low rotation speed - Pressure higher than plate specifications - Fan wheel installed up-side-down - Rotation direction reversed
Insufficient pressure	<ul style="list-style-type: none"> - Low rotation speed - Capacity higher than plate specifications - Specific weight lower than expected - Fan wheel installed up-side-down - Rotation direction reversed
Pressure drop after an operation period	<ul style="list-style-type: none"> - Leaking delivery and vacuum pipes - Leaking ventilator box seal
Excessive power input	<ul style="list-style-type: none"> - Rotation speed too high - Pressure lower than plate specifications with capacity higher than plate specifications - Excessive fluid specific weight
Mechanical defects	<ul style="list-style-type: none"> - Fan wheel unbalanced because of wear or dust deposit - Fan wheel rubs on ventilator box because of strain provoked by pressure unloaded by pipes on ventilator inlets - Bearing faults caused by fan wheel unbalance (fan wheel side) or bearing intrinsic faults.

9. Equipment Disabling and Disposal

9.1 Equipment Disabling

- If it is decided to stop using the ventilator, it is recommended to disable it by removing its electrical motor, its fan wheel and block.
- It is recommended to make sure that hazardous parts cannot create dangers.

9.2 Equipment Disposal

- Divide the various materials according to disposal types and rules.
- Materials must be collected in special containers, classified, labeled and disposed according to the legislation in force in the destination country, by resorting to specialized Companies, if required.
- Do not throw waste of any kind in natural environment.

User and Maintenance Manual for CENTRIFUGAL VENTILATORS

Series N model	r.p.m. rev/min	Lp dBA	Power kW	Max. weight kg	Series B model	r.p.m. rev/min	Lp dBA	Power kW	Max. weight kg	Series B model	r.p.m. rev/min	Lp dBA	Power kW	Max. weight kg	
N102	2750	48,0	0,09	2,5	B20/1	1380	56,0	0,18		15 B55/1	965	77,3	5,50	171	
N202	2750	48,9	0,09	2,5	B20/2	2850	71,7	1,10		22 B55/2	965	78,5	7,50	223	
N252	2750	59,3	0,12	5,0	B20/3	2850	71,7	1,50		25 B55/3	965	78,9	11,00	245	
N302	2800	62,3	0,18	5,5	B25/1	1400	63,1	0,35		22 B55/4	710	71,7	3,00	171	
N402	2800	64,0	0,25	7,5	B25/2	1400	63,1	0,55		26 B55/5	710	72,3	5,50	223	
N502	2800	68,1	0,35	9,2	B25/3	920	54,0	0,78		22 B60/1	965	79,6	7,50	240	
N502/1	2800	68,1	0,55	8,2	B30/1	1420	68,6	0,75		34 B60/2	965	81,6	11,00	261	
N552	2800	72,4	0,55	10,0	B30/2	1420	68,9	1,10		38 B60/3	965	81,6	15,00	331	
N552/1	2800	72,4	0,75	11,7	B30/3	930	59,7	0,35		34 B60/4	720	75,2	5,50	240	
N602	2850	74,1	1,10	22,0	B35/1	1430	72,9	1,50		53 B60/5	720	75,2	7,50	261	
N602/1	2850	74,1	1,50	24,5	B35/2	1430	73,8	2,20		62 Series M model	r.p.m. rev/min	Lp dBA	Power kW	Max. weight kg	
N304	1400	46,6	0,12	5,5	B35/3	1430	73,8	3,00		66	2850	74,8	0,75	21	
N404	1400	49,7	0,12	5,5	B35/4	950	64,9	0,75		76	M20/1	2850	74,8	1,10	22
N504	1400	52,1	0,12	6,0	B40/1	1430	76,6	3,00		76	M20/2	2850	74,8	1,50	30
N554	1400	57,3	0,18	6,5	B40/2	1430	77,8	4,00		83	M25/1	2850	78,4	1,50	30
N604	1400	58,8	0,25	11,0	B40/3	1430	77,8	5,50		113	M25/2	2850	81,6	2,20	33
N606	910	49,2	0,09	8,0	B40/4	950	68,9	1,50		72	M25/3	2850	81,6	3,00	39
N608	690	42,8	0,09	11,0	B45/1	1450	80,5	5,50		128	M30/1	2900	84,6	4,00	55
Series NP model	r.p.m. rev/min	Lp dBA	Power kW	Max. weight kg	B45/2	1450	81,7	7,50		140	M30/2	2900	87,3	5,50	90
NP16	2750	58,8	0,12	5	B45/3	1450	81,7	11,00		190	M30/3	2900	87,3	7,50	90
NP20	2800	63,7	0,18	8	B45/4	950	72,5	2,20		99	M35/1	2920	88,7	7,50	106
NP25	2800	68,4	0,35	13	B45/5	950	72,5	3,00		128	M35/2	2920	91,9	11,00	162
NP28	2800	70,7	0,55	15	B50/2	965	75,3	4,00		157	M35/3	2920	92,0	15,00	169
NP30	2850	72,7	0,75	20	B50/3	965	76,0	5,50		207					
NP35	2850	77,0	1,50	29											B50/300
NP40	2850	80,2	2,20	32											B50/300

Series MR model	r.p.m. rev/min	Lp dBA	Power kW	Max. weight kg	Series A model	r.p.m. rev/min	Lp dBA	Power kW	Max. weight kg	Series B model	r.p.m. rev/min	Lp dBA	Power kW	Max. weight kg
MR25	2850	62,7	0,37	22	A45/1	2880	81,0	4,0	73	H30	2800	63,9	0,18	16
MR31/1	2850	68,5	0,75	33	A45/2	2880	81,0	5,5	102	H35	2800	68,6	0,35	22
MR31/2	2850	69,8	1,10	35	A50/1	2900	83,4	5,5	113	H40	2850	73,2	0,75	31
MR31/3	1400	54,3	0,25	31	A50/2	2900	84,4	7,5	113	H45/1	2850	75,8	0,75	36
MR35/1	2850	72,9	1,50	47	A55/1	2920	87,5	11,0	187	H45/2	2850	76,8	1,50	40
MR35/2	2850	73,5	2,20	51	A55/2	2920	87,5	15,0	187	H50/1	2850	80,0	1,50	48
MR35/3	1400	58,0	0,25	41	A60/1	2940	89,9	15,0	195	H50/2	2850	80,0	2,20	51
MR40/1	2880	77,5	3,00	68	A60/2	2940	90,3	18,5	215	H55/1	2870	82,2	2,20	57
MR40/2	2880	77,5	4,00	73	A60/3	2940	90,3	22,0	258	H55/2	2870	83,0	3,00	66
MR40/3	1400	61,8	0,55	55	Series AR model	r.p.m. rev/min	Lp dBA	Power kW	Max. weight kg	H60/1	2880	85,4	4,00	86
MR45/1	2900	81,3	5,50	102	AR63/1	2880	81,0	5,5	102	H60/2	2880	85,8	5,50	115
MR45/2	2900	81,8	7,50	107	AR31	2830	64,1	0,55	26	H65/1	2900	87,5	5,50	122
MR45/3	1420	65,8	1,10	71	AR35	2830	68,2	1,10	34	H65/2	2900	88,5	7,50	122
MR50/1	2920	83,1	7,50	139	AR40	2840	71,9	1,50	44	H70/1	2920	90,4	7,50	130
MR50/2	2920	84,8	1,10	173	AR45	2840	75,5	3,00	52	H70/2	2920	90,9	11,00	191
MR50/3	1420	69,1	1,50	105	AR50/1	2890	78,9	4,00	107	Series HR model	r.p.m. rev/min	Lp dBA	Power kW	Max. weight kg
MR56	1430	72,5	3,00	149	AR50/2	2890	79,1	5,50	122	HR45/1	2900	73,3	0,75	29
MR63	1430	76,0	4,00	193	AR57/1	2920	82,2	7,50	137	HR45/2	2900	74,1	1,5	33
Series A model	r.p.m. rev/min	Lp dBA	Power kW	Max. weight kg	AR63/1	2920	83,3	11,00	165	HR45/3	2900	77,2	1,5	53
A20	2800	55,8	0,18	12	AR63/2	2920	86,3	15,00	206	HR50/2	2900	77,2	2,2	58
A25	2800	62,6	0,35	18	AR71/1	2920	88,6	18,50	268	HR56/1	2900	79,1	2,2	70
A30	2850	68,5	0,75	22	AR71/2	2920	88,9	22,00	298	HR56/2	2900	80,7	3	79
A35/1	2850	73,2	1,10	33	AR71/3	2920	89,9	30,00	370	HR63/1	2900	83,6	4	113
A35/2	2850	73,2	1,50	37						HR63/2	2900	84,2	5,5	137
A40/1	2880	77,5	2,20	46										HR63/3
A40/2	2880	77,5	3,00	55										HR63/5
														HR230/5
														HR230/6
														HR230/8
														HR230/9

User and Maintenance Manual for CENTRIFUGAL VENTILATORS

A: FAN WHEEL WITH HUB
B: B3 MOTOR
C: B3 MOTOR BASE
D: B3/B5 MOTOR

E: B3/B5 MOTOR BASE
F: FIX SUCTION NOZZLE
G: MOVABLE SUCTION NOZZLE
H: SUCTION FLANGE

