

**MANUALE USO E MANUTENZIONE
AEROEVAPORATORI A SOFFITTO DOPPIO FLUSSO**



**USE AND MAINTENANCE HANDBOOK
CEILING UNIT COOLERS DUAL AIR FLOW**

**BEDIENUNGS- UND WARTUNGSANLEITUNG
DOPPELSTROM- DECKENLUFTVERDAMPFER**

RDF



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1. HANDBOOK PURPOSE

This handbook is issued in order to assist an operator properly to bring the unit cooler on stream, give explanations about the relevant safety norms in force within the European Community and avoid any risks that may be caused by a wrong usage.

2. NORMS FOR GENERAL USE

- For a correct and safe use of the machine, it is necessary to follow the prescriptions present in this manual as it gives instructions and information about :
 - ✓ installation
 - ✓ use
 - ✓ maintenance
 - ✓ disabling and disposal
- *The manufacturer cannot accept any liability for damages resulting from failure to follow the prescriptions and advice given in this handbook.*
- Read carefully labels placed on the machine, do not cover them for any reason and replace them in case they are damaged .
- Keep this manual carefully.
- The manufacturer may review this manual at any time, without notice.
- The unit coolers are designed for the use in industrial and commercial refrigeration application for stable cold rooms. They are not intended for any other purpose. Any other use is to be considered improper and dangerous .
- When the package is removed, please check that every part of the machine is intact; if not, contact the retailer immediately .
- It is forbidden the use of the machine in environment with presence of inflammable gas or where there is a risk of explosion.
- Do not clean the machine with direct water jet, under pressure or with improper substances .
- Do not use the machine without its protections (housing and grid)
- Do not expose the machine to heating sources
- In case of fire use a powder fire extinguisher
- Packaging material must be suitably disposed of according to the law in force

3. MACHINE IDENTIFICATION

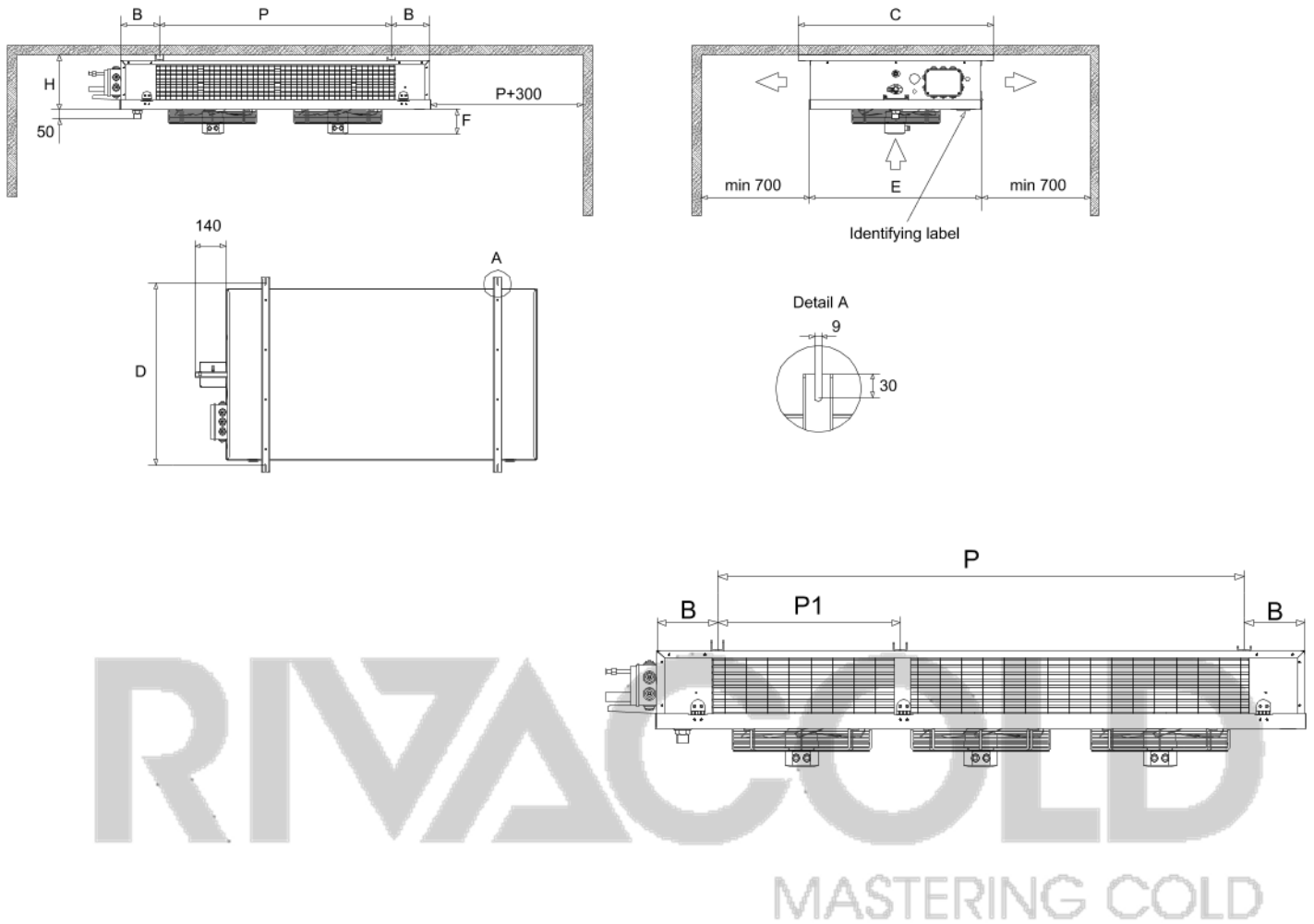
All the machines are equipped with an identifying label (the position of the label is shown in Drawing 1) where the following data are quoted :

- | | |
|-----------------------------------------------|-----------------------------------------|
| • code | Watt absorption(W) |
| • no. of fan motors - no. of revolutions(RPM) | power supply voltage (Volt/Ph) |
| Watt absorption (W) | • refrigerant group: Group 2(*) |
| Ampere absorption (A) | • PS pressure (max working pressure) |
| Power supply voltage (Volt/Ph/Hz) | • TS temperature (min. operating temp.) |
| • defrosting: | • serial number |
| heaters number | |

(*) According to EN378/1 norm belong to the group 2 the following gas types:
R22,R134a,R507,R404A,R407C,R410A,R410B

All RDF range unit coolers belongs to CAT 0 in conformity with the 97/23/CE (P.E.D.) directive.

Drawing 1



RDF version with 3 fan motors and 3 fixing brackets;

Features table for model RDF -250

Model	RDF	1250 1250ED	2250 2250ED	3250 3250ED	4250 4250ED
Dimensions (mm)	P	335	735	1335	1535
	B	93,5	93,5	93,5	93,5
	C	710	710	710	710
	D	650	650	650	650
	E	638	638	638	638
	H	150	150	150	160
	F	50	50	50	50
Coil connections	Ø inlet	10 x 1mm -1/2"SAE	10 x 1mm -1/2"SAE	12 x 1mm -1/2"SAE	12 x 1mm -1/2"SAE
	Ø outlet	12 x 1 mm	12 x 1 mm	18 x 1mm	22 x 1mm
	Ø drain connection	1/2" gas (20mm)	1/2" gas (20mm)	1" gas (33mm)	1" gas (33mm)
Weight (kg)	Without ED	11,5	18,0	27,0	34,0
	With. ED	12,0	19,0	28,5	36,0

Features table for model RDF –350

Model	RDF	23503 23503ED	23507 23507ED	33503 33503ED	33507 33507ED	43503 43503ED	43507 43507ED	53503 53503ED	53507 53507ED
Dimensions (mm)	P	1020		1470		1920		2370	
	P1	---		510		960		960	
	B	173		173		173		173	
	C	860		860		860		860	
	D	800		800		800		800	
	E	756		756		756		756	
	H	241		246		251		256	
	F	110		110		110		110	
Coil connections	∅ inlet	12x1mm – 1/2" SAE		12x1 mm – 1/2" SAE		16x1 mm – 5/8" SAE		16x1 mm – 5/8" SAE	
	∅ outlet	22 x 1 mm		28 x 1.5mm		35 x 1.5mm		35 x 1.5mm	
	∅ drain connection	1" gas (33mm)		1" gas (33mm)		1" gas (33mm)		1" gas (33mm)	
Weight (kg)	Without ED	38	37.9	54	53.1	65.4	64.3	79.7	78.3
	With. ED	41	40.4	57.5	56.6	69.9	68.8	85.5	8

Serial number designation :

- number 1 and 2 = last two numbers of the manufacturing year +50
- number 3 and 4 = week of the year when the unit was manufactured
- numbers 5,6,7and 8 = progressive number

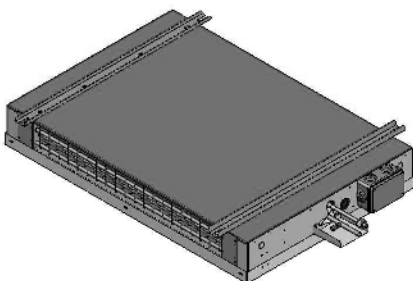
4. INSTALLATION (general notes)

Installation must be carried out by qualified personnel having the necessary technical requirements asked for by the country where the machine is to be installed.
 For moving the machine use safety anti-cut gloves and suitable hoisting device.
 Check that the structure where the RDF is going to be fixed is suitable to its weight .
 Do not convey the motor fan air in order not to increase load losses.
Particular operating conditions such as cold rooms having too small height, excessive loading , obstacles to the air flow, may have an influence to the stated performances .

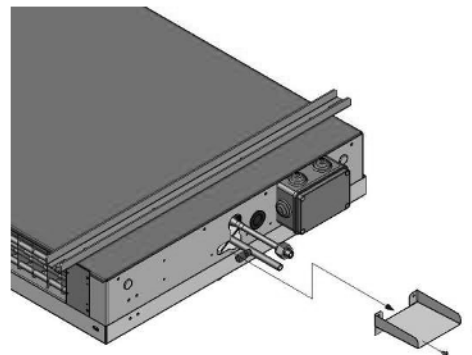
4. 1 Thermostatic valve mounting (not supplied)

The thermostatic valve is to be properly sized and will have to be installed with external balance.

Drawing 2.1



Drawing 2.2

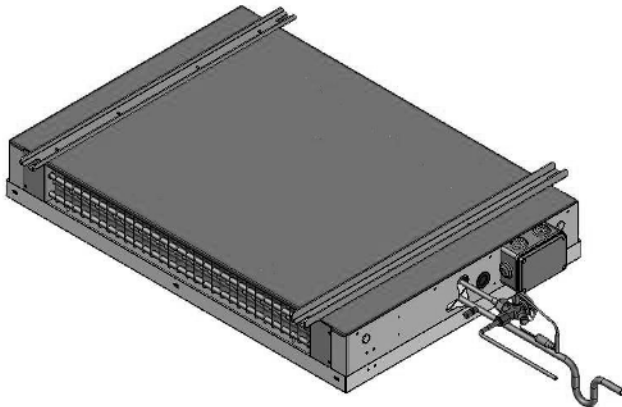


4. 1 Thermostatic valve mounting (not supplied)

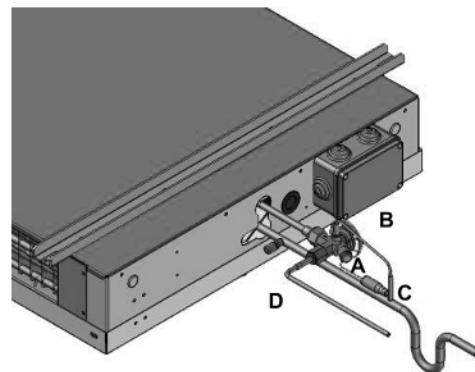
Connect the outlet of the thermostatic valve to the distributor, which is already fitted with a coupling to be flanged, as shown in Draw. 3.2 Part. A.

Fit the external equaliser pipe, which must be welded to the thermostatic valve and near to the end of the evaporator manifold, in the position shown in Draw. 3.2 Part. B. Position the thermostatic valve bulb on the suction manifold so that it is just before the external equaliser pipe. Fix it into place on the top section of the suction pipe, using the metal clip (Draw. 3.2 Part. C). Weld a suitably bent pipe (Draw. 3.2 Part D) to the thermostatic valve inlet. The pipe will then be connected to the refrigerating system liquid pipes.

Drawing 3.1



Drawing 3.2



4. 2 Positioning on the ceiling

Once the thermostatic valve is connected, fix the unit cooler to the cold room ceiling.

The unit has to be installed in horizontal position, by means of the proper fixing slots. The fixing distances between centers and the position of the fans relating to the cold room walls is shown in Drawing 1. Keep around the unit enough space for a good air cycling and for a maintenance operation in safe conditions.

The minimum distance from the wall is of 700mm (Drawing 1). Keep enough space (previously and subsequently to the evaporator) for an easy replacement of the thermostatic valve and for fitting or replacing the electrical defrosting heaters (if it is not possible to have enough space on the heater side provide an opening through the cold room wall by means of a demounting panel).

5. REFRIGERATING CONNECTION

A siphon must be inserted on the evaporator outlet (bottom pipe) (Fig. 3.1), and this must be welded to the suction pipe of the cooling system.

Connect the pipe that was previously soldered to the inlet side of the thermostatic valve to the liquid piping of the refrigerating system.

In order to guarantee a good hermetic seal and reduce break risks, execute all the joints by means of a "bell type" welding. If the pipe diameter does not allow that, use proper soldering joints.

During the pipe connection procedure pay attention not to force or modify the position of the header as this may be a cause of breaks.

6. CONDENSATE DRAIN CONNECTION

The piping for condensation water drainage is to be connected to a 20 mm male coupling (for models with 1 or 2 fans with a diameter of $\varnothing 250$) or to a 33 mm coupling (for all other RDF models) on the electrical/refrigeration connection side (the minimum slope must be greater than 20%).

Provide on the cold room wall, next to the unit cooler, for a hole through which the pipe will come out leading to a siphon trap. Seal the hole by means of silicon (the features of which will be suitable to the cold room use) in order to avoid infiltration of warm air. In case of a low temperature cold room the draining line must be heated during defrosting time by means of a silicon heater (optional) of about 100W placed inside it.

7. ELECTRICAL INSTALLATION

The wiring must be carried out by qualified personnel having the necessary technical requirements asked for by the country where the machine is to be installed.

- Provide for proper protection systems on the power supply line and check that the voltage corresponds to that quoted on the label placed on the unit (allowed tolerance $\pm 10\%$ of the rated tension).

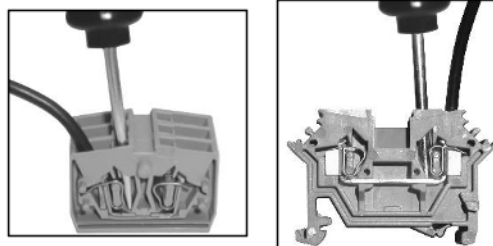
MASTERING COLD

- The law requires that the unit is earthed: therefore it is necessary to connect it to an efficient earthing equipment. No liability whatsoever can be accepted if the above instruction requirement is not complied with or if the electrical plant to which the unit is to be connected is not made by following the law in force
- On the unit cooler is to be installed a mechanical thermostat properly set which will disable the heaters in case of overheating. The thermostat bulb must be placed inside the finned coil on the upper side of the unit cooler .

7. 1 Electrical connection

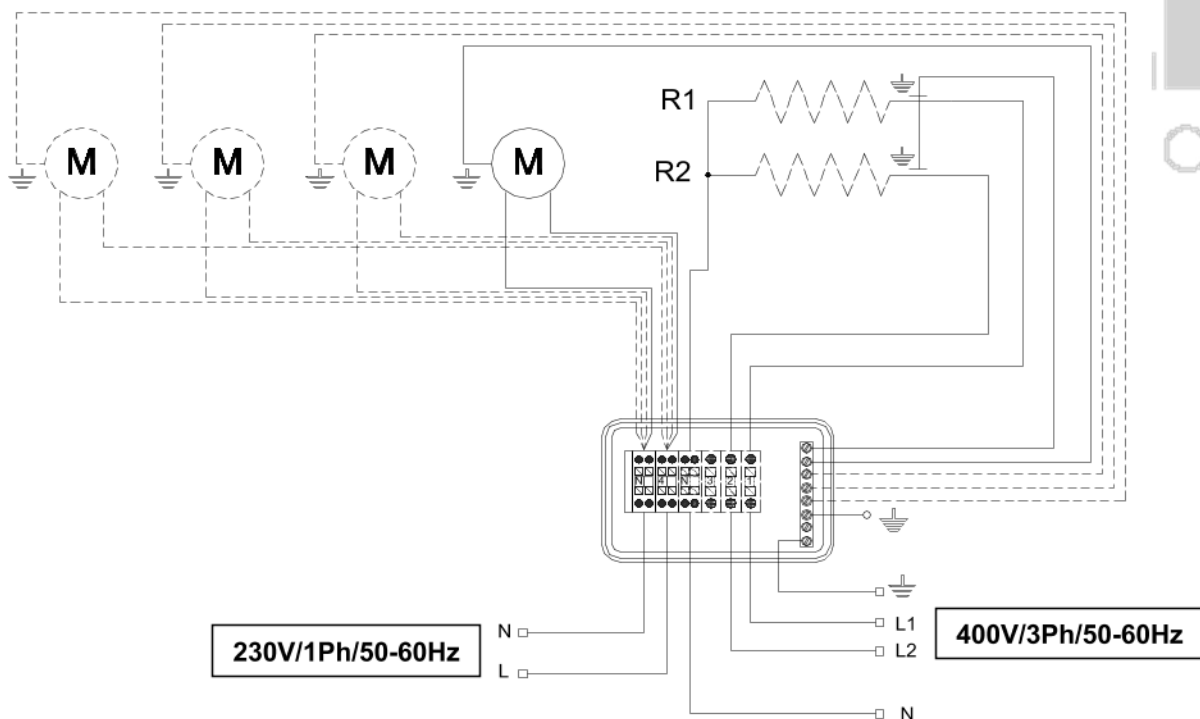
On the electrical connection side (see Drawing 8-9) it is placed the terminal box used for the connection of all electrical components of the unit cooler . For RDF models with a diameter of \varnothing 250, inside the terminal box there are two terminal boards : one for the earth connection the other for the fast connections where the power supply of the fan motors and heaters will be connected . For models with \varnothing 350, inside the terminal box, there is a single terminal block for the fast connection where the heaters and grounds will be connected. For the placing of wires on the fast connections terminal board , see the instructions as follows:

- 1- Insert a screw driver in the proper opening (near the centre of the terminal board)
- 2- the screw blade keeps the spring open allowing the insertion of the wire
- 3- Insert the wire end without insulating cover or provided with pinched terminal
- 4- Take the screw driver out. The wire now is fixed in a safe way .

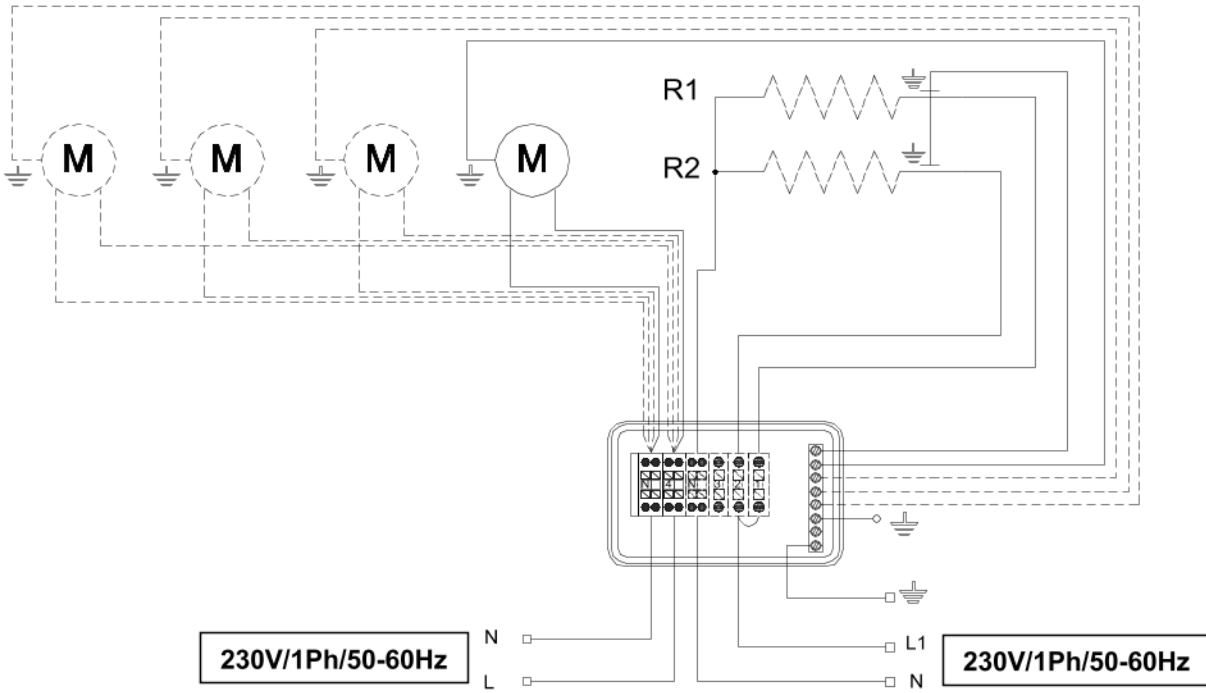


All models are equipped with fan motors having a voltage of 230V/1Ph/50-60Hz. The model with /ED are fitted with defrosting heaters, which are preset for being powered with a voltage of 400V/3Ph/50-60Hz (see Drawing 4-6). In case there is the need of powering the heaters with a voltage of 230V/1Ph/50-60Hz, change the connection as shown in Drawing 5-7. For making the wires pass through , use the preset side openings .

Drawing 4



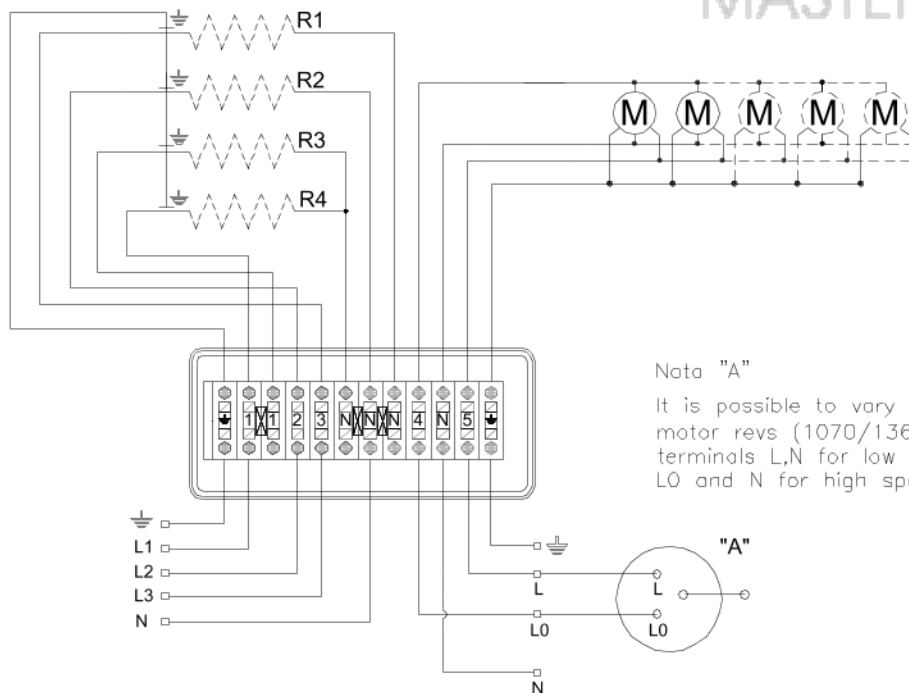
Drawing 5



Model	RDF	1250 1250ED	2250 2250ED	3250 3250ED	4250 4250ED
Fan motors	n x ømm	1 x 250	2 x 250	3 x 250	4 x 250
Fan motor absorptions	A	0,45	0,90	1,35	1,8
	W	65	130	195	260
Heater power	W	800	1650	2500	3150

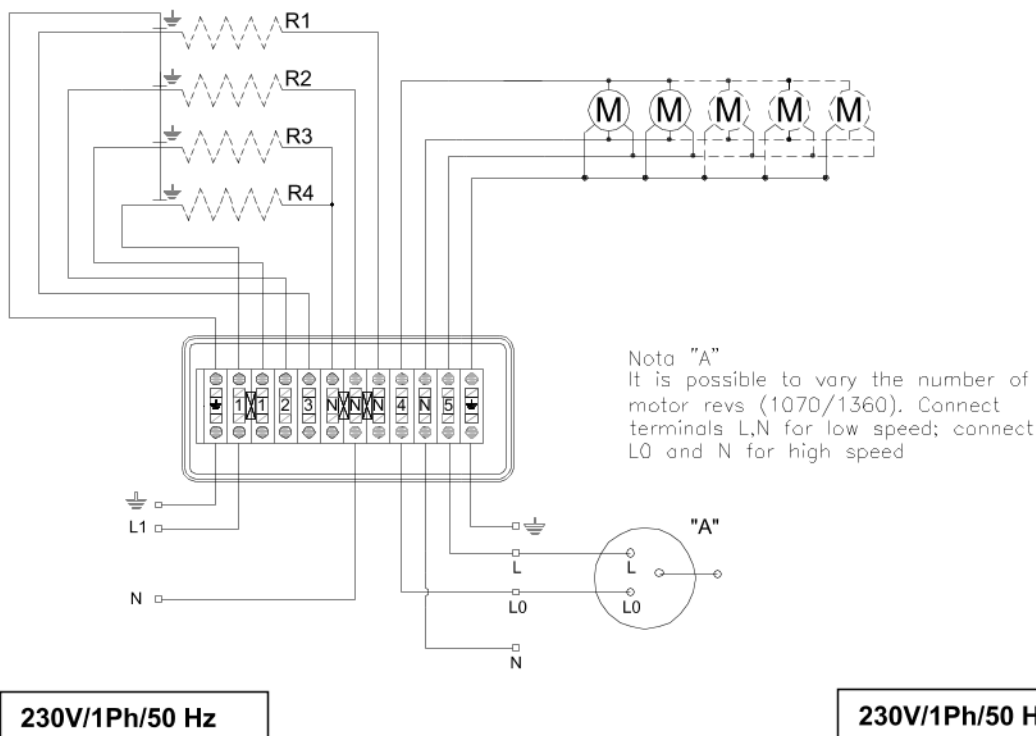
Drawing 6

MASTERING COLD



400V/3Ph/50 Hz

230V/1Ph/50 Hz



230V/1Ph/50 Hz

230V/1Ph/50 Hz

Model	RDF	23503 - 23503ED 23507 - 23507ED	33503 - 33503ED 33507 - 33507ED	43503 - 43503ED 43507 - 43507ED	53503 - 53503ED 53507 - 53507ED
Fan motor	n x ømm	2 x 350	3 x 350	4 x 350	5 x 350
Fan motor absorption 1070 rpm	A	1,28	1,92	2,56	3,20
	W	290	435	580	725
Fan motor absorption 1360 rpm	A	1,36	2,04	2,72	3,40
	W	306	459	612	765
Heater power	W	2800	4096	5360	6160

The fan motors are equipped with an internal protection system with automatic cutout. In case there is the need of fitting a regulation system of fan motor number of revolutions , check that it is suitable for the fan motor itself .

8. TECHNICAL DATA

The ceiling unit coolers are equipped with axial fan motors which are not suitable for additional air. The heat exchanger is made of copper-aluminium ; therefore it is not suited for being used in aggressive ambient.

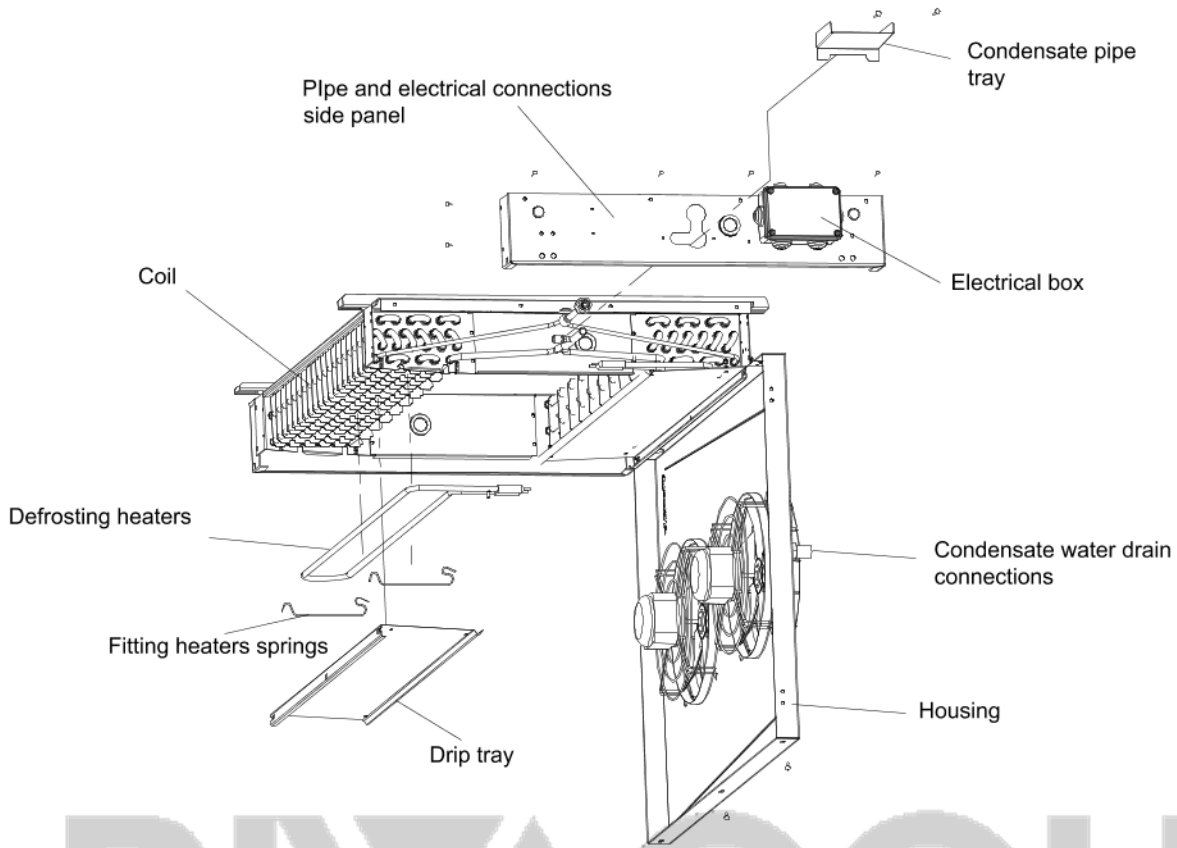
9. MAINTENANCE AND CLEANING

Maintenance and cleaning have to be carried out by qualified technical presonnel only . Before any intervention make sure that the electrical feed is disconnected from the mains.

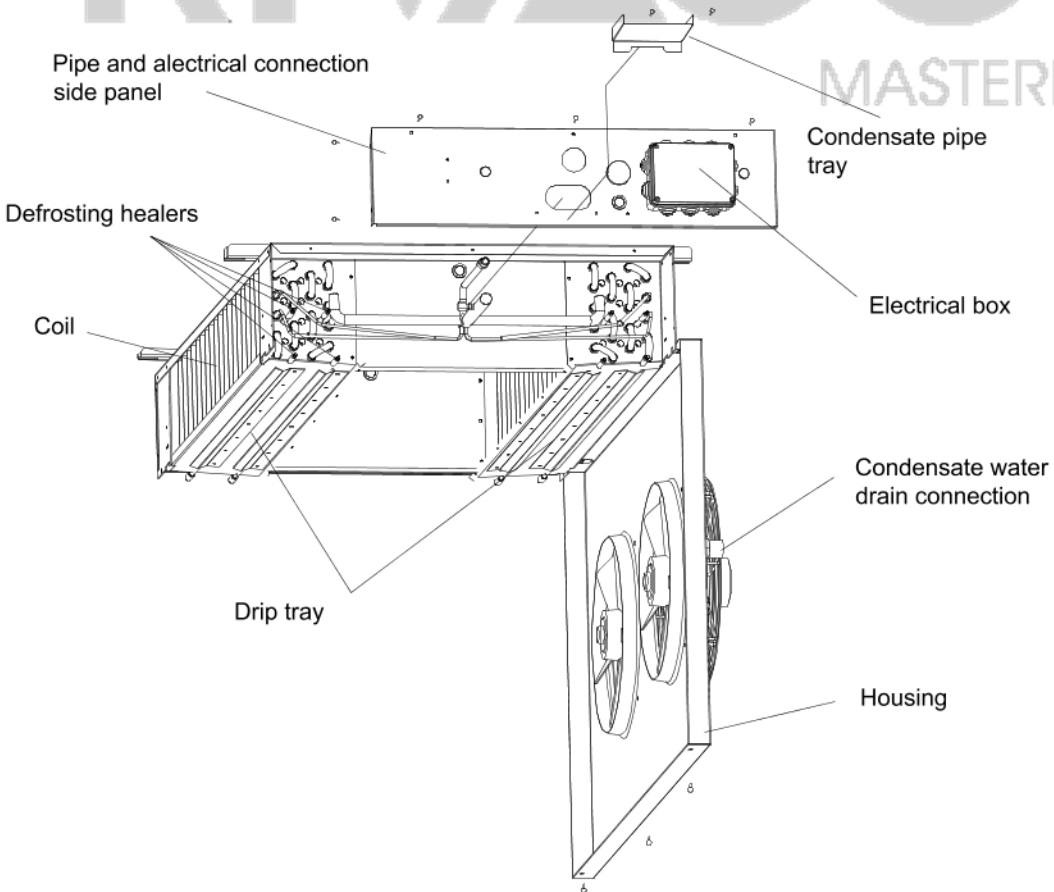
- Check the fastening of all terminals inside the electrical box (every four months)
- Visually check the refrigerating circuit completely, also inside the machines, in order to detect refrigerant leaks, that are also put in evidence by traces of lubricant oil. Make a fast intervention and further check in case of doubt . (every four month)
- Periodically clean the unit in order to avoid deposits of toxic substances. The use of water and soap is recommended and avoid using solvents , aggressive agents , abrasive or ammonia-based materials.
- **In the event that machine parts need replacing, they have to be replaced by items exactly the same to the originals ones**

Important: once the maintenance is accomplished, replace all safeties previously removed (housing and grid ; see Drawing 8-9).

Drawing 8



Drawing 9



10. DISPOSAL

In case the machine is to be disabled , it is necessary to disconnect it from the mains. The gas inside the plant must not be dispersed in the environment.

11. FAILURES : Causes – Solutions

<u>Problem</u>	<u>Possible cause</u>	<u>solution</u>
Iced Evaporator	Defrosting time too short	Increase defrosting time.
	Time Interval between two defrostings too long	Increase defrosting cycles. Check the possible presence of squashed pipes
	Dripping time not long enough	Check the set dripping time.
	Air infiltration through the door which is too frequently opened	Reduce the door opening frequency and eliminate possible fissure
	Burnt electrical heaters.	Replace the faulty heaters .
Iced evaporator only near the thermostatic valve	The refrigerant inflow to the evaporator is reduced .	Check the size of the thermostatic valve.
	The orifice of the thermostatic valve is too little.	Increase the orifice diameter
	High Overheating.	Check the temperatures and operate on the valve
Damaged evaporator	Deformed fins	Straighten the fins with a comb .
Blocked fan motors	Fan motor breakdown.	Replacement.
	Mains Tension lower than the allowed limits.	Check the tension value by a voltmeter .

12. OPTIONAL ITEMS

Coil varnishment

The varnishment give the coil a protection from corrosive agent that can be present inside the cold room.

Discharge pipe heater

It has to be inserted into the condensation water discharge pipe so that the water formed during defrosting operations does not freeze inside the waste.

This is used for application in low temperature cold rooms.