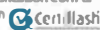


Installation, operating  
and maintenance manual.

# Dry Coolers and Air Cooled Condensers



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Installation, operating  
and maintenance manual.

# **Dry Coolers and Air Cooled Condensers**

[www.refrion.com](http://www.refrion.com)



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# 1 LIST OF THE INCLUDED SERIES

## 1.1 "HORIZONTAL/VERTICAL AIR FLOW" RANGE

### DRY COOLERS

FAN $\Phi$ 500mm		FAN $\Phi$ 630mm		FAN $\Phi$ 800mm		FAN $\Phi$ 910mm		FAN $\Phi$ 1000mm	
TA <sup>00</sup> 1 <sup>0</sup> 50	VA <sup>00</sup> 2 <sup>0</sup> 50	EA <sup>00</sup> 1 <sup>0</sup> 63	EA <sup>00</sup> 2 <sup>0</sup> 63	EA <sup>00</sup> 1 <sup>0</sup> 80 EB <sup>00</sup> 1 <sup>0</sup> 80	EA <sup>00</sup> 2 <sup>0</sup> 80 EB <sup>00</sup> 2 <sup>0</sup> 80	EA <sup>00</sup> 1 <sup>0</sup> 90 EB <sup>00</sup> 1 <sup>0</sup> 90	EA <sup>00</sup> 2 <sup>0</sup> 90 EB <sup>00</sup> 2 <sup>0</sup> 90	EA <sup>00</sup> 1 <sup>0</sup> 10 EB <sup>00</sup> 1 <sup>0</sup> 10	EA <sup>00</sup> 2 <sup>0</sup> 10 EB <sup>00</sup> 2 <sup>0</sup> 10
VA <sup>00</sup> 1 <sup>0</sup> 50		VA <sup>00</sup> 1 <sup>0</sup> 63		UA <sup>00</sup> 1 <sup>0</sup> 80 UB <sup>00</sup> 1 <sup>0</sup> 80	UA <sup>00</sup> 2 <sup>0</sup> 80 UB <sup>00</sup> 2 <sup>0</sup> 80	UA <sup>00</sup> 1 <sup>0</sup> 90 UB <sup>00</sup> 1 <sup>0</sup> 90	UA <sup>00</sup> 2 <sup>0</sup> 90 UB <sup>00</sup> 2 <sup>0</sup> 90	UA <sup>00</sup> 1 <sup>0</sup> 10 UB <sup>00</sup> 1 <sup>0</sup> 10	UA <sup>00</sup> 2 <sup>0</sup> 10 UB <sup>00</sup> 2 <sup>0</sup> 10
				VA <sup>00</sup> 1 <sup>0</sup> 80		VA <sup>00</sup> 1 <sup>0</sup> 90		VA <sup>00</sup> 1 <sup>0</sup> 10	
				ZA <sup>00</sup> 1 <sup>0</sup> 80 ZB <sup>00</sup> 1 <sup>0</sup> 80	ZA <sup>00</sup> 2 <sup>0</sup> 80 ZB <sup>00</sup> 2 <sup>0</sup> 80				

### REMOTE CONDENSERS

FAN $\Phi$ 350mm		FAN $\Phi$ 450mm		FAN $\Phi$ 500mm	
NH <sup>00</sup> 1 <sup>0</sup> 35	NV <sup>00</sup> 1 <sup>0</sup> 35	NH <sup>00</sup> 2 <sup>0</sup> 35 NV <sup>00</sup> 2 <sup>0</sup> 35	NH <sup>00</sup> 1 <sup>0</sup> 45 NV <sup>00</sup> 1 <sup>0</sup> 45	NH <sup>00</sup> 2 <sup>0</sup> 45 NV <sup>00</sup> 2 <sup>0</sup> 45	NA <sup>00</sup> 1 <sup>0</sup> 50 KA <sup>00</sup> 2 <sup>0</sup> 50 KA <sup>00</sup> 1 <sup>0</sup> 50

FAN $\Phi$ 630mm		FAN $\Phi$ 800mm		FAN $\Phi$ 910mm		FAN $\Phi$ 1000mm	
NA <sup>00</sup> 1 <sup>0</sup> 63	KA <sup>00</sup> 2 <sup>0</sup> 63	CA <sup>00</sup> 1 <sup>0</sup> 80 CB <sup>00</sup> 1 <sup>0</sup> 80	CA <sup>00</sup> 2 <sup>0</sup> 80 CB <sup>00</sup> 2 <sup>0</sup> 80	CA <sup>00</sup> 1 <sup>0</sup> 90 CB <sup>00</sup> 1 <sup>0</sup> 90	CA <sup>00</sup> 2 <sup>0</sup> 90 CB <sup>00</sup> 2 <sup>0</sup> 90	CA <sup>00</sup> 1 <sup>0</sup> 10 CB <sup>00</sup> 1 <sup>0</sup> 10	CA <sup>00</sup> 2 <sup>0</sup> 10 CB <sup>00</sup> 2 <sup>0</sup> 10
KA <sup>00</sup> 1 <sup>0</sup> 63		KA <sup>00</sup> 1 <sup>0</sup> 80 KB <sup>00</sup> 1 <sup>0</sup> 80	KA <sup>00</sup> 2 <sup>0</sup> 80 KB <sup>00</sup> 2 <sup>0</sup> 80	KA <sup>00</sup> 1 <sup>0</sup> 90 KB <sup>00</sup> 1 <sup>0</sup> 90	KA <sup>00</sup> 2 <sup>0</sup> 90 KB <sup>00</sup> 2 <sup>0</sup> 90	KA <sup>00</sup> 1 <sup>0</sup> 10 KB <sup>00</sup> 1 <sup>0</sup> 10	KA <sup>00</sup> 2 <sup>0</sup> 10 KB <sup>00</sup> 2 <sup>0</sup> 10

## 1.2 "TOWER" RANGE

### DRY COOLERS

FAN $\Phi$ 800mm		FAN $\Phi$ 910mm		FAN $\Phi$ 1000mm	
ET <sup>00</sup> 1 <sup>0</sup> 80 UT <sup>00</sup> 1 <sup>0</sup> 80		ET <sup>00</sup> 1 <sup>0</sup> 90 UT <sup>00</sup> 1 <sup>0</sup> 90		ET <sup>00</sup> 1 <sup>0</sup> 10 UT <sup>00</sup> 1 <sup>0</sup> 10	

### REMOTE CONDENSERS

FAN $\Phi$ 800mm		FAN $\Phi$ 910mm		FAN $\Phi$ 1000mm	
KT <sup>00</sup> 1 <sup>0</sup> 80		KT <sup>00</sup> 1 <sup>0</sup> 90		KT <sup>00</sup> 1 <sup>0</sup> 10	

### 1.3 "WALL" RANGE

#### DRY COOLERS

FAN $\Phi$ 800mm		FAN $\Phi$ 910mm	
EK <sup>00</sup> 1 <sup>0</sup> 80		EK <sup>00</sup> 1 <sup>0</sup> 90	
UK <sup>00</sup> 1 <sup>0</sup> 80		UK <sup>00</sup> 1 <sup>0</sup> 90	

#### REMOTE CONDENSERS

FAN $\Phi$ 800mm		FAN $\Phi$ 910mm	
KK <sup>00</sup> 1 <sup>0</sup> 80		KK <sup>00</sup> 1 <sup>0</sup> 90	

### 1.4 "COMBO" RANGE

#### DRY COOLERS

FAN $\Phi$ 800mm		FAN $\Phi$ 910mm	
	EK <sup>00</sup> 2 <sup>0</sup> 80		EK <sup>00</sup> 2 <sup>0</sup> 90
	UK <sup>00</sup> 2 <sup>0</sup> 80		UK <sup>00</sup> 2 <sup>0</sup> 90

#### REMOTE CONDENSERS

FAN $\Phi$ 800mm		FAN $\Phi$ 910mm	
	KK <sup>00</sup> 2 <sup>0</sup> 80		KK <sup>00</sup> 2 <sup>0</sup> 90

### 1.5 "SUPERJUMBO" RANGE

#### DRY COOLERS

FAN $\Phi$ 800mm		FAN $\Phi$ 910mm		FAN $\Phi$ 1000mm	
	ES <sup>00</sup> 2 <sup>0</sup> 80		ES <sup>00</sup> 2 <sup>0</sup> 90		ES <sup>00</sup> 2 <sup>0</sup> 10
	US <sup>00</sup> 2 <sup>0</sup> 80		US <sup>00</sup> 2 <sup>0</sup> 90		US <sup>00</sup> 2 <sup>0</sup> 10

### 1.6 "MODULAR" RANGE

#### DRY COOLERS

FAN $\Phi$ 800mm	
	EM <sup>00</sup> 2 <sup>0</sup> 80

#### REMOTE CONDENSERS

FAN $\Phi$ 800mm	
	NM <sup>00</sup> 2 <sup>0</sup> 80

### 1.7 "CENTRIFUGAL" RANGE

#### DRY COOLERS

FAN $\Phi$ 500mm	
	WHR <sup>00</sup> 1 <sup>0</sup> 50

#### REMOTE CONDENSERS

FAN $\Phi$ 500mm	
CHR <sup>00</sup> 1 <sup>0</sup> 50	




1. Before installing the equipment, read all the information contained in this manual carefully and thoroughly. Refrion S.r.l. declines all responsibility for damage to people and property resulting from failure to comply with this request and all other instructions contained in the manual.
2. Refrion S.r.l. reserves the right to make any modification it deems necessary to the manual at any time.
3. The original version of this manual is in Italian and can be found on the website: [www.refrion.com](http://www.refrion.com). The total or partial reproduction of this manual without the written authorisation of Refrion S.r.l. is prohibited.
4. Keep this manual for possible future reference.
5. For the parameters of the equipment and for the types of fluids to be used, please refer to the unit data sheet or to the catalogue available on the website: [www.refrion.com](http://www.refrion.com). To obtain information or a copy of the data sheet of a specific unit, please contact Refrion S.r.l. indicating the part number on the identification label located on the header side of the unit (see PIC.01).
6. The Sound Power Level (A weighed) and the Sound Pressure Level at a determined distance are stated in compliance with EN 13487:2004. The Sound Pressure Level at a determined distance is an indicative datum since it is influenced by the characteristics of the installation site. The Sound Levels are stated on the unit data sheet.
7. Do not use or add substances or solvents to the fluid indicated for the use the product has been designed for. Corrosive, toxic, flammable and explosive substances and, in general, substances classified as group 1 fluids are considered aggressive in accordance with Directive 97/23/EC.
8. The fin pack heat exchangers used in the units conform to the provisions of Directive 97/23/EC.
9. In case of non-CE marked condensers or dry coolers, because of the absence of an electrical control panel, machines are not considered finished. Their use is forbidden until the plant or machinery they are a part of is declared to be in conformity with all the regulations applicable. For the aforementioned condensers or dry coolers please ignore the instructions contained in this manual that do not apply.
10. Do not install the units in environments classified as having a potentially explosive atmosphere according to Directive 1999/92/EC.
11. In the event of fire, use only a dry powder extinguisher.
12. The customer is solely responsible for compliance with local legislation and regulations in relation to the installation and operation of the machine.
13. The unit must be installed correctly, by qualified personnel, in compliance with the intended use and undergo preventative maintenance.

14. The units are not suitable for use where there is “water hammering”. The design engineer is responsible for preparing the system so as to avoid the occurrence of “water hammering”.

15. During installation, maintenance and cleaning always use appropriate personal protective equipment (see. PAR.12).

16. For the “General Conditions of Sale and Supply” please refer to the document attached to the order confirmation. The “General Conditions of Sale and Supply” are also available on the website: [www.refrion.com](http://www.refrion.com).

17. Work of any kind not included in this manual must be agreed beforehand with Refrion S.r.l. Failure to comply with this will void the “General Conditions of Sale and Supply” and will also void all liability for damage to people, animals or property.

Manufactured by Refrion S.r.l. vicolo Malvis 1, 33030 Fiumignano di Talmassons, Udine, Italy		<b>REFRION</b>  a better innovation
<b>Order</b>	XXXXXXXXXXXX	
<b>Part Number</b>	XXXXXXXXXXXX	
<b>Item Code</b>		
<b>Vn</b>	XXXV	<b>In</b> XXA
<b>f</b>	XXHz	<b>Ith</b> X,X kA
<b>Pha</b>	Xph	<b>Pn</b> XX,XX Kw
<b>Description</b>	XXXXXXXXXXXX	
	XXXXXXXXXXXX	
<b>Data</b>	DD/MM/AAAA	
<b>Quality Control</b>	_____	

PIC.01: Unit identification label.

### 3

## UNPACKING, HANDLING AND POSITIONING

1. It is mandatory to use the appropriate personal protective equipment (see. SEC.12).
2. Employ authorised personnel only for using moving equipment (forklifts, cranes, etc.).
3. Never stop or pass within range of moving equipment.
4. Where applicable, remove the packing, taking care not to damage the equipment, paying particular attention to the fin pack.
5. The equipment must be installed on a level surface. To design a support structure fare please refer to the Assembly Drawing of the unit provided together with the Order Confirmation. To obtain information or a copy of the data sheet of a specific unit, please contact Refrion S.r.l. indicating the part number on the identification label located on the header side of the unit (see PIC.01).
6. Provide proper anchorage devices. In case of installation of units with horizontal airflow, make provision for additional anchorage.
7. Provide the space and means of access for periodic maintenance (e.g.: runway).
8. Lift using straps with a weight-distributing beam. Use at least two lifting points next to the ends of the equipment. For units with five fans per row or more, use two further intermediate lifting points. The headers must not be used as lifting points. Avoid flexing or deforming the structure.
9. Use the lifting points provided for this action.
10. When using a forklift truck ensure that the forks protrude from the equipment by an appropriate length (200mm) at least. The distance of the forks must be at least 800 mm (PIC.02).
11. Strictly refer to the lifting sketches (PICS.03-36).
12. Position the equipment following the minimum advisable distances (PICS.37-52).



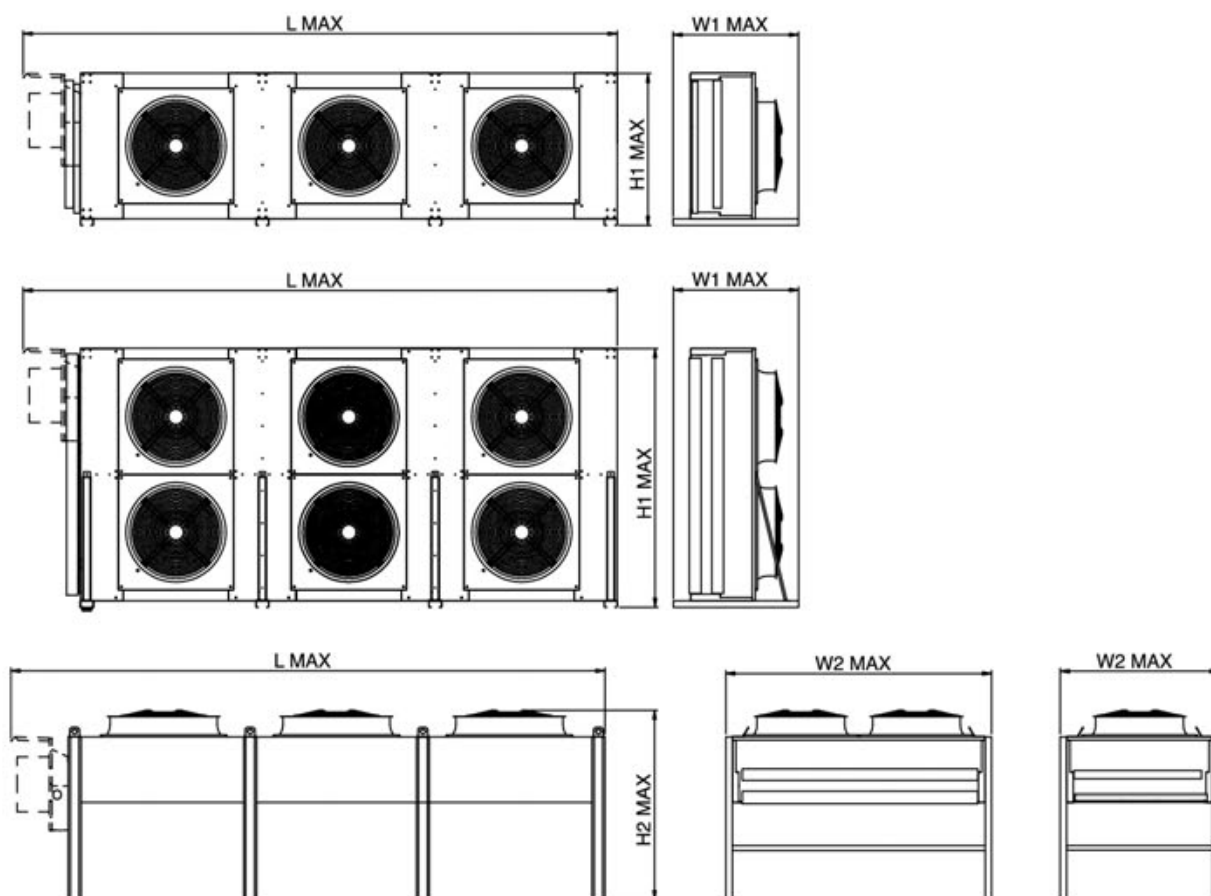
**NO - NO - NEIN - NON**



**SI - YES - JA - OUI**

PIC.02

## HANDLING OF THE “H/V” RANGE



PIC.03: H/V - overall dimensions.

MODEL	NH <sup>00</sup> 1135	NH <sup>00</sup> 1235	NH <sup>00</sup> 1335	NH <sup>00</sup> 2235	NH <sup>00</sup> 2335
FAN No.	1	2	3	4	6
LENGTH MAX [MM]	860	1330	1800	1540	1800
H1 MAX [MM]	560	560	560	1060	1060
W1 MAX [MM]	670	670	670	670	670
WEIGHT MAX [KG]	19	36	53	72	110

MODEL	NV <sup>00</sup> 1135	NV <sup>00</sup> 1235	NV <sup>00</sup> 1335	NV <sup>00</sup> 2235	NV <sup>00</sup> 2335
FAN No.	1	2	3	4	6
LENGTH MAX [MM]	860	1330	1800	1540	1800
H2 MAX [MM]	800	800	800	800	800
W2 MAX [MM]	580	580	580	1080	1080
WEIGHT MAX [KG]	19	36	53	72	110

MODEL	NH <sup>00</sup> 1145	NH <sup>00</sup> 1245	NH <sup>00</sup> 2245
FAN No.	1	2	4
LENGTH MAX [MM]	1100	1800	1800
H1 MAX [MM]	760	760	1460
W1 MAX [MM]	670	670	670
WEIGHT MAX [KG]	40	74	150

MODEL	NV <sup>00</sup> 1145	NV <sup>00</sup> 1245	NV <sup>00</sup> 2245
FAN No.	1	2	4
LENGTH MAX [MM]	1100	1800	1800
H2 MAX [MM]	800	800	800
W2 MAX [MM]	780	780	1480
WEIGHT MAX [KG]	40	74	150

MODEL	NV <sup>00</sup> 1150	NV <sup>00</sup> 1250
FAN No.	1	2
LENGTH MAX [MM]	1100	1800
H2 MAX [MM]	800	800
W2 MAX [MM]	780	780
WEIGHT MAX [KG]	47	788

MODEL	◦A <sup>00</sup> 1150	◦A <sup>00</sup> 1250	◦A <sup>00</sup> 1350	◦A <sup>00</sup> 2250	◦A <sup>00</sup> 2350
FAN No.	1	2	3	4	6
LENGTH MAX [MM]	1320	2120	2920	2120	2920
H1 MAX [MM]	860	860	860	1660	1660
H2 MAX [MM]	1040	1040	1040	1040	1040
W1 MAX [MM]	900	900	900	900	900
W2 MAX [MM]	880	880	880	1680	1680
WEIGHT MAX [KG]	92	152	225	299	425

MODEL	◦A <sup>00</sup> 1163	◦A <sup>00</sup> 1263	◦A <sup>00</sup> 1363	◦A <sup>00</sup> 1463	◦A <sup>00</sup> 1563
FAN No.	1	2	3	4	6
LENGTH MAX [MM]	1620	2620	3620	4620	5620
H1 MAX [MM]	1060	1060	1060	1060	1060
H2 MAX [MM]	1340	1340	1340	1340	1340
W1 MAX [MM]	900	900	900	900	900
W2 MAX [MM]	1080	1080	1080	1080	1080
WEIGHT MAX [KG]	135	237	355	468	575

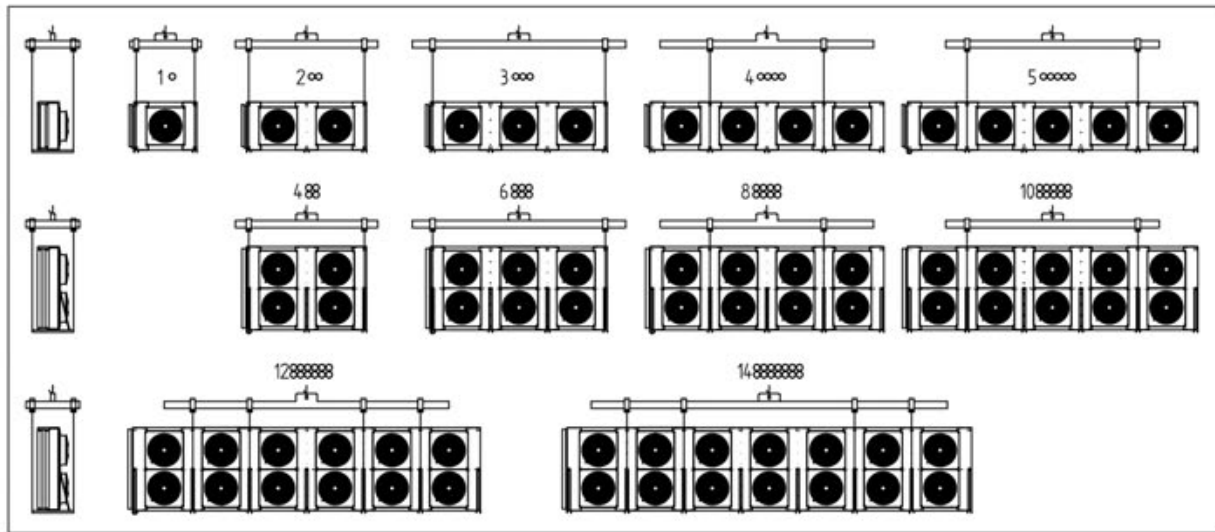
MODEL	▫A▫▫2263	▫A▫▫2363	▫A▫▫2463	▫A▫▫2563
FAN No.	2	6	8	10
LENGTH MAX [MM]	2620	3620	4620	5620
H1 MAX [MM]	2060	2060	2060	2060
H2 MAX [MM]	1340	1340	1340	1340
W1 MAX [MM]	900	900	900	900
W2 MAX [MM]	2080	2080	2080	2080
MAX WEIGHT [KG]	460	648	851	1057

MODEL	▫A▫▫11	▫A▫▫12	▫A▫▫13	▫A▫▫14	▫A▫▫15
	80/90/10	80/90/10	80/90/10	80/90/10	80/90/10
FAN No.	1	2	3	4	5
LENGTH MAX [MM]	2300	3900	5500	7100	8700
H1 MAX [MM]	1410	1410	1410	1410	1410
H2 MAX [MM]	1740	1740	1740	1740	1740
W1 MAX [MM]	1160	1160	1160	1160	1160
W2 MAX [MM]	1470	1470	1470	1470	1470
MAX WEIGHT [KG]	368	633	936	1210	1501

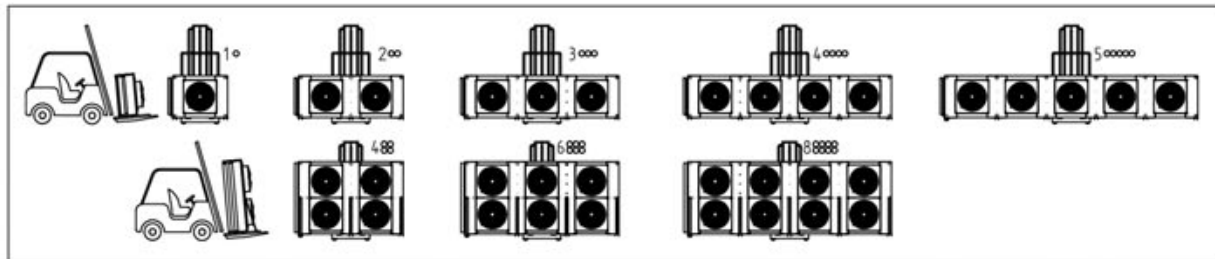
MODEL	▫A▫▫22	▫A▫▫23	▫A▫▫24	▫A▫▫25	▫A▫▫26	▫A▫▫27
	80/90/10	80/90/10	80/90/10	80/90/10	80/90/10	80/90/10
FAN No.	4	6	8	10	12	14
LENGTH MAX [MM]	3900	5500	7100	8700	10300	11900
H1 MAX [MM]	2400	2400	2400	2400	2400	2400
H2 MAX [MM]	1740	1740	1740	1740	1740	1740
W1 MAX [MM]	1160	1160	1160	1160	1160	1160
W2 MAX [MM]	2380	2380	2380	2380	2380	2380
MAX WEIGHT [KG]	1060	1571	2029	2503	2970	3463

MODEL	▫B▫▫11	▫B▫▫12	▫B▫▫13	▫B▫▫14	▫B▫▫15
	80/90/10	80/90/10	80/90/10	80/90/10	80/90/10
FAN No.	1	2	3	4	5
LENGTH MAX [MM]	2700	4700	6700	8700	10700
H1 MAX [MM]	1410	1410	1410	1410	1410
H2 MAX [MM]	1740	1740	1740	1740	1740
W1 MAX [MM]	1150	1150	1150	1150	1150
W2 MAX [MM]	1470	1470	1470	1470	1470
MAX WEIGHT [KG]	387	730	1087	1396	1715

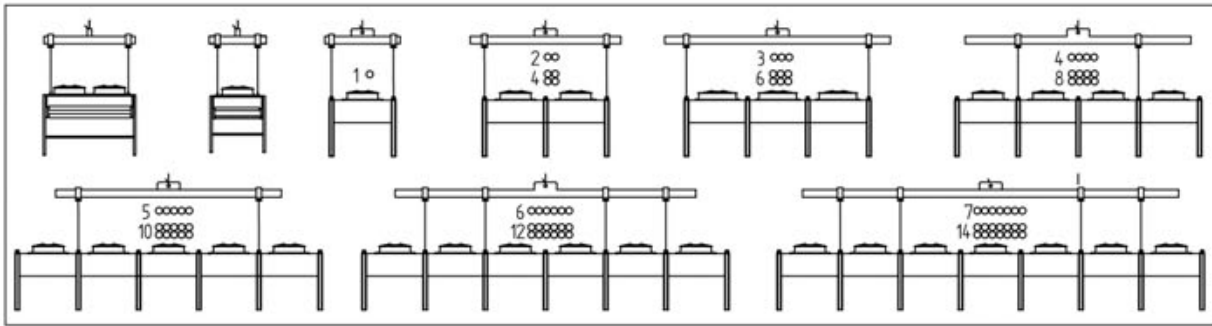
MODEL	▫B▫▫22	▫B▫▫23	▫B▫▫24	▫B▫▫25	▫B▫▫26
	80/90/10	80/90/10	80/90/10	80/90/10	80/90/10
FAN No.	4	6	8	10	12
LENGTH MAX [MM]	4700	6700	8700	10700	12700
H1 MAX [MM]	2400	2400	2400	2400	2400
H2 MAX [MM]	1740	1740 </td <td>1740</td> <td>1740</td> <td>1740</td>	1740	1740	1740
W1 MAX [MM]	1160	1160	1160	1160	1160
W2 MAX [MM]	2380	2380	2380	2380	2380
WEIGHT MAX [KG]	1225	1803	2332	2877	3414



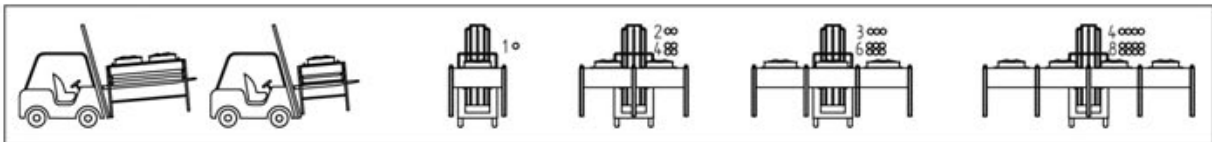
PIC.04: H/V - HORIZONTAL AIRFLOW - lifting by straps and weight-distributing beam.



PIC.05: H/V - HORIZONTAL AIRFLOW - lifting by forklift.



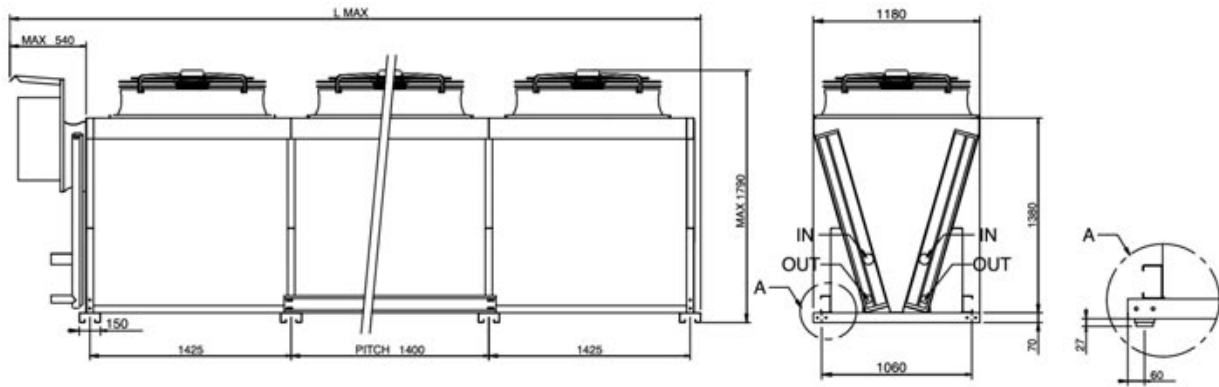
PIC.06: HV - VERTICAL AIRFLOW - lifting by straps and weight-distributing beam.



PIC.07: HV - VERTICAL AIRFLOW - lifting by forklift.

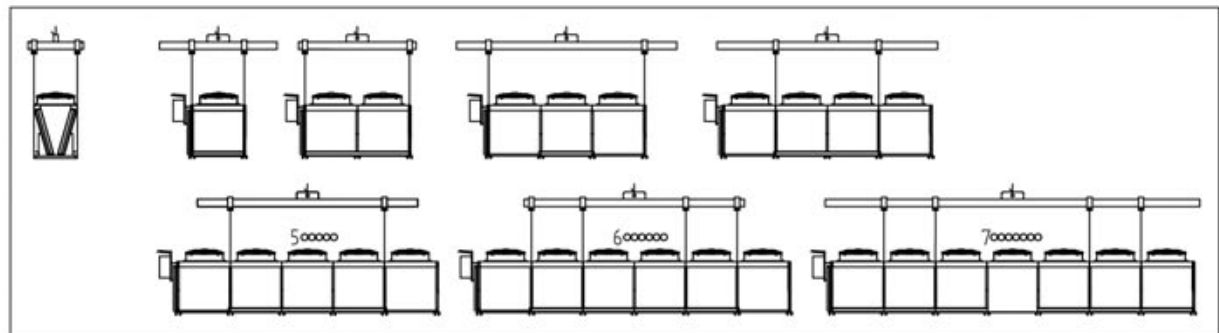


## HANDLING OF THE "TOWER" RANGE

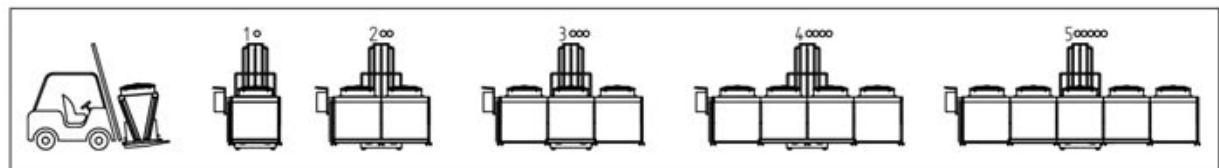


PIC.08: TOWER - overall dimensions.

MODEL	□T <sub>00</sub> 11	□T <sub>00</sub> 12	□T <sub>00</sub> 13	□T <sub>00</sub> 14	□T <sub>00</sub> 15	□T <sub>00</sub> 16	□T <sub>00</sub> 17
		80/90/10	80/90/10	80/90/10	80/90/10	80/90/10	80/90/10
FAN No.	1	2	3	4	5	6	7
LENGTH MAX [MM]	2335	3760	5160	6560	7960	9360	10760
WEIGHT MAX [KG]	335	670	965	1255	1540	1835	2140

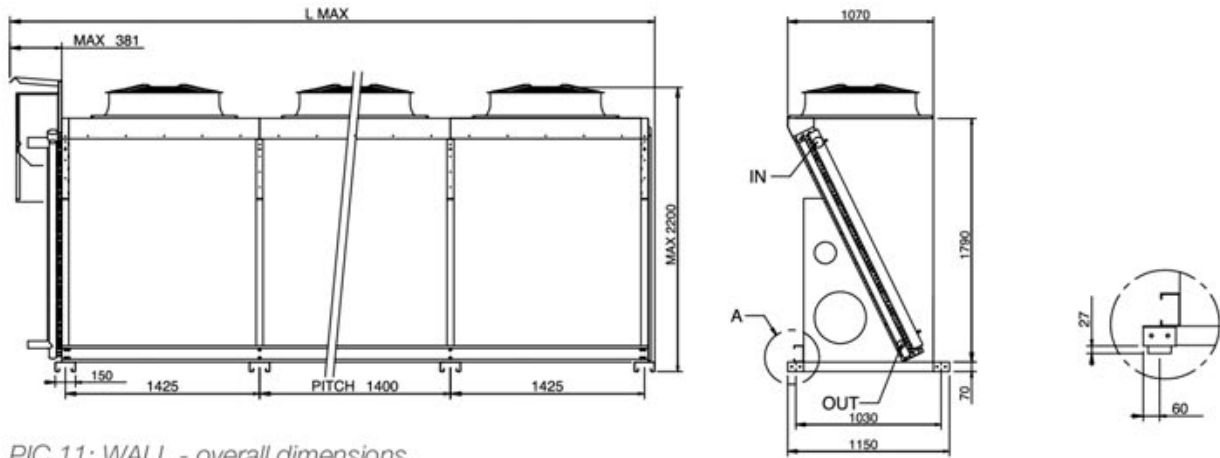


PIC.09: TOWER - lifting by straps and weight-distributing beam.



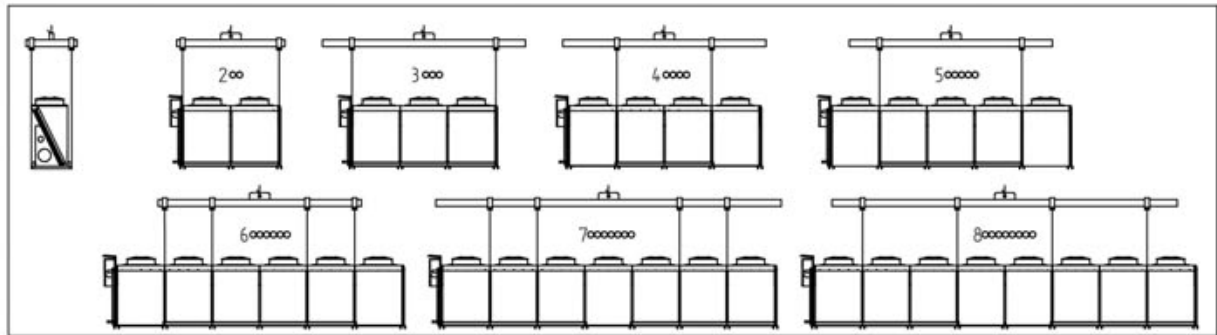
PIC.10: TOWER - lifting by forklift.

## HANDLING OF THE "WALL" RANGE

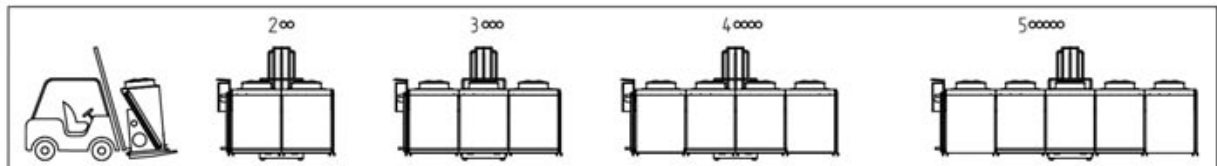


PIC.11: WALL - overall dimensions.

MODEL	◻K◻◻12	◻K◻◻13	◻K◻◻14	◻K◻◻15	◻K◻◻16	◻K◻◻17	◻K◻◻18
		80/90	80/90	80/90	80/90	80/90	80/90
FAN No.	2	3	4	5	6	7	8
LENGTH MAX [MM]	3315	4715	6115	7515	8915	10315	11715
WEIGHT MAX [KG]	625	910	1185	1450	1730	2015	2300

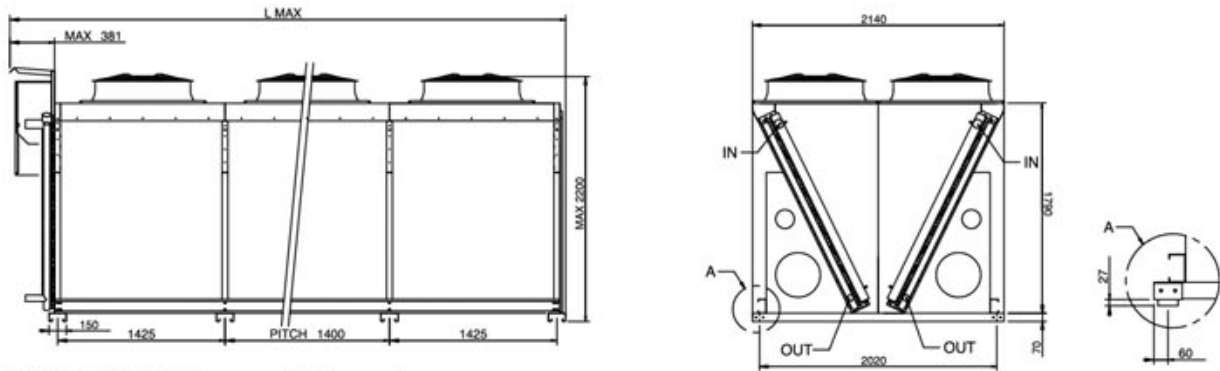


PIC.12: WALL - lifting by straps and weight-distributing beam.



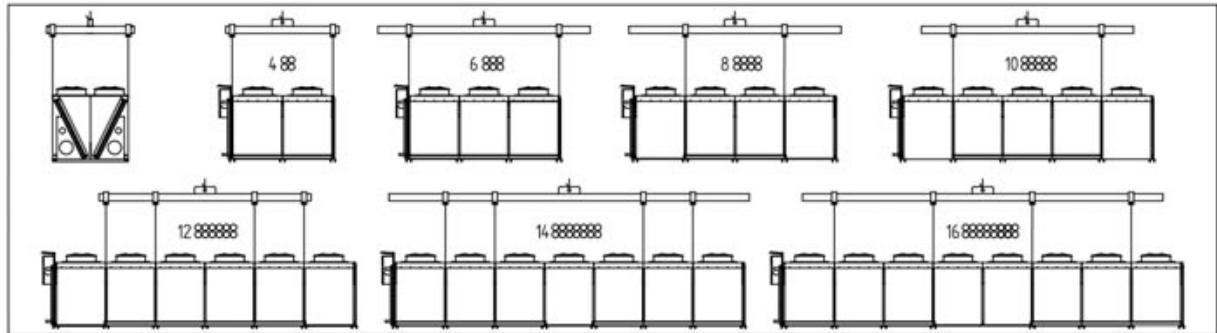
PIC.13: WALL - lifting by forklift.

## HANDLING OF THE "COMBO" RANGE

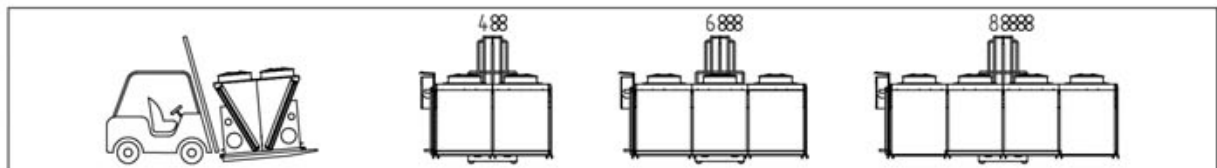


PIC.14: COMBO - overall dimensions.

MODEL	□K□□22	□K□□23	□K□□24	□K□□25	□K□□26	□K□□27	□K□□28
		80/90	80/90	80/90	80/90	80/90	80/90
FAN No.	4	6	8	10	12	14	16
LENGTH MAX [MM]	3315	4715	6115	7515	8915	10315	11715
WEIGHT MAX [KG]	1245	1820	2450	2995	3790	4165	4760

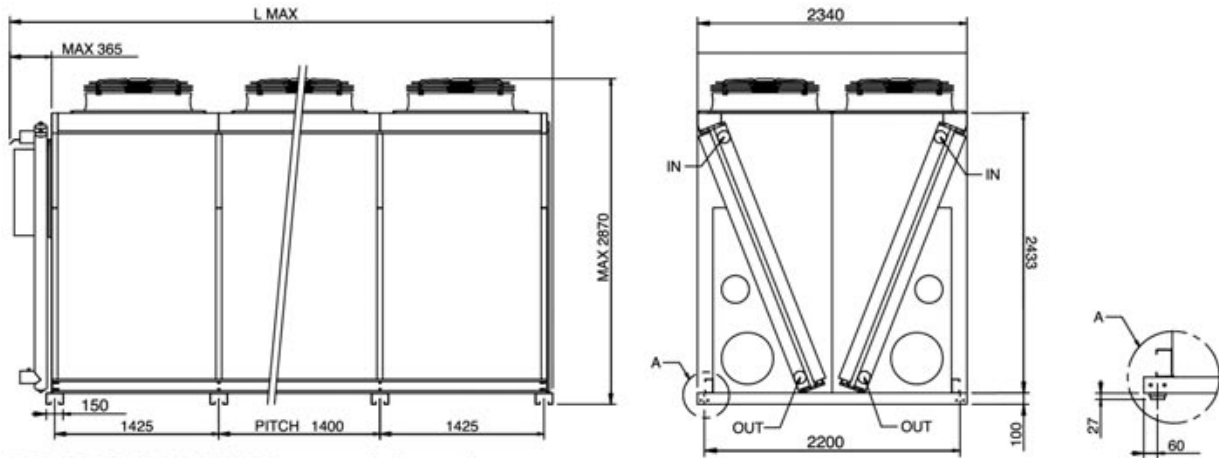


PIC.15: COMBO - lifting by straps and weight-distributing beam.



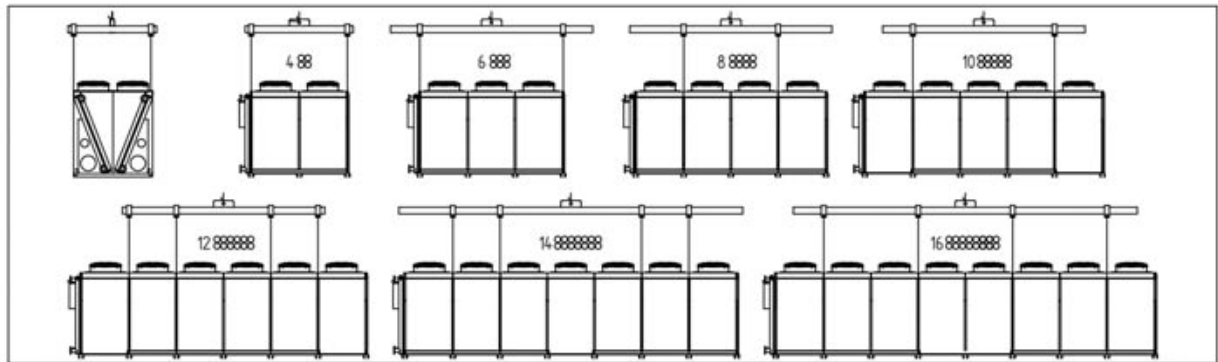
PIC.16: COMBO - lifting by forklift.

## HANDLING OF THE "SUPERJUMBO" RANGE

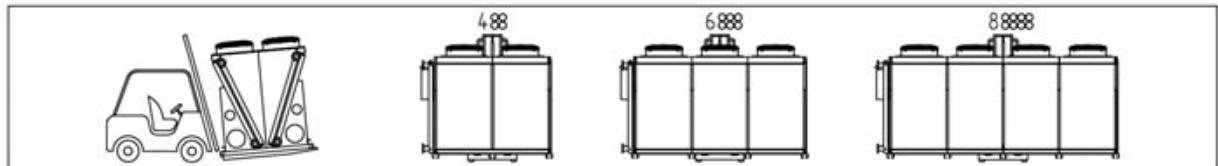


PIC. 17: SUPERJUMBO - overall dimensions.

MODEL	□K□□22	□K□□23	□K□□24	□K□□25	□K□□26	□K□□27	□K□□28
		80/90	80/90	80/90	80/90	80/90	80/90
FAN No.	4	6	8	10	12	14	16
LENGTH MAX [MM]	3315	4715	6115	7515	8915	10315	11715
WEIGHT MAX [KG]	1680	2515	3180	3875	4550	5310	6069

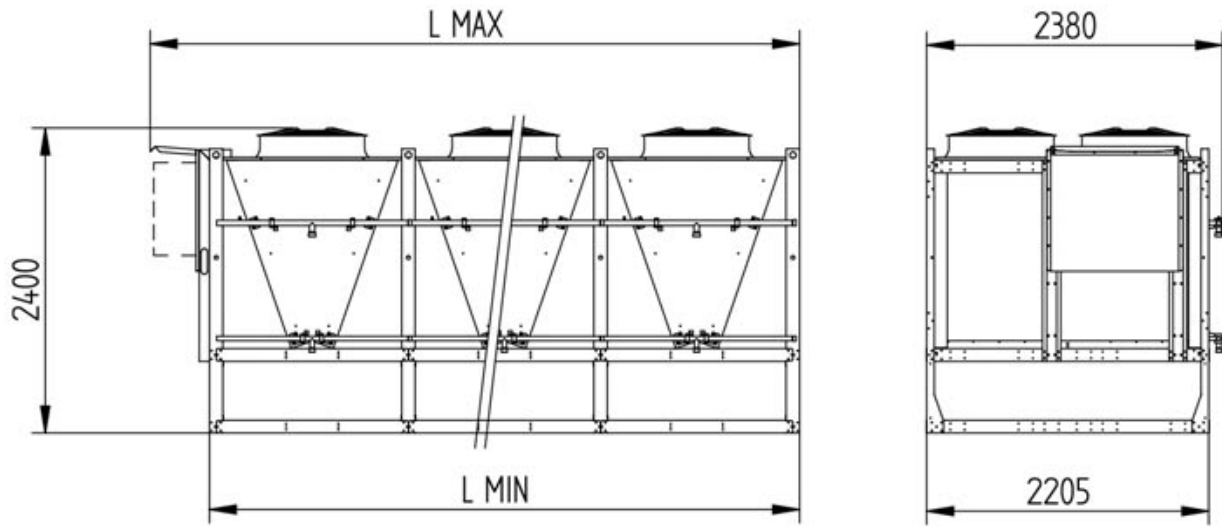


PIC. 18: SUPERJUMBO - lifting by straps and weight-distributing beam.



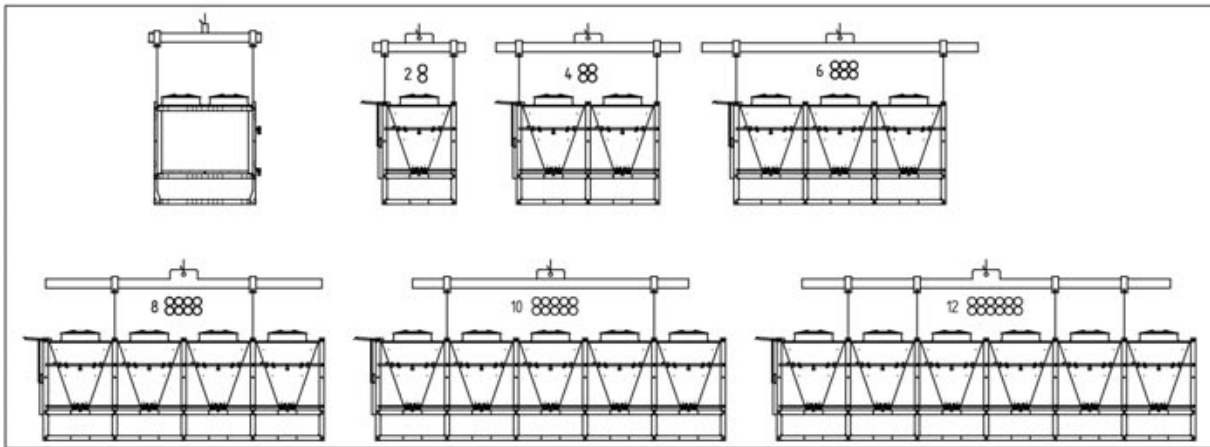
PIC. 19: SUPERJUMBO - lifting by forklift.

## HANDLING OF THE “MODULAR” RANGE

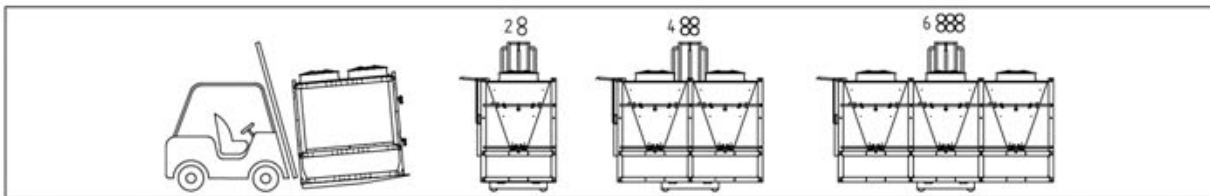


PIC.20: MODULAR - overall dimensions.

MODEL	EM=21	EM=21	EM=21	EM=21	EM=21	EM=21
	80	80	80	80	80	80
FAN No.	1	2	3	4	5	6
LENGTH MAX [MM]	2000	3500	5000	6500	8000	9500
WEIGHT MAX [KG]	670	1340	2009	2679	3348	4018

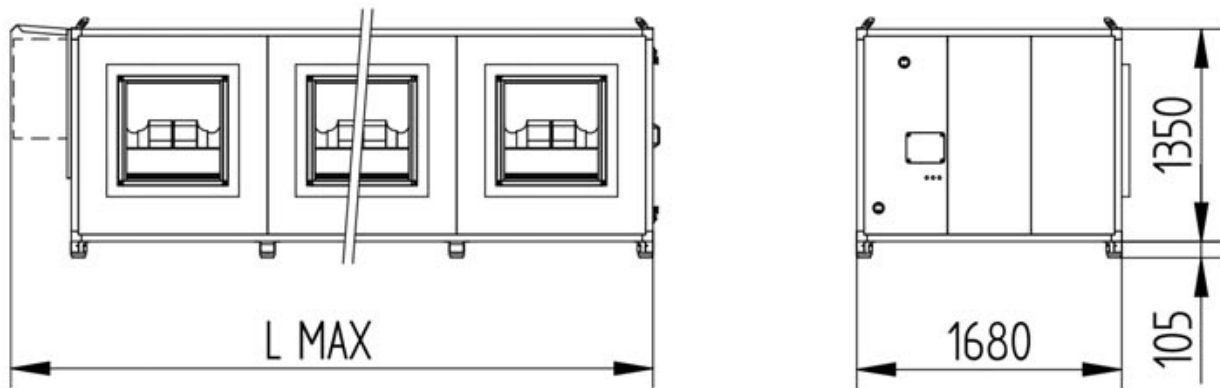


PIC.21: MODULAR - lifting by straps and weight-distributing beam.



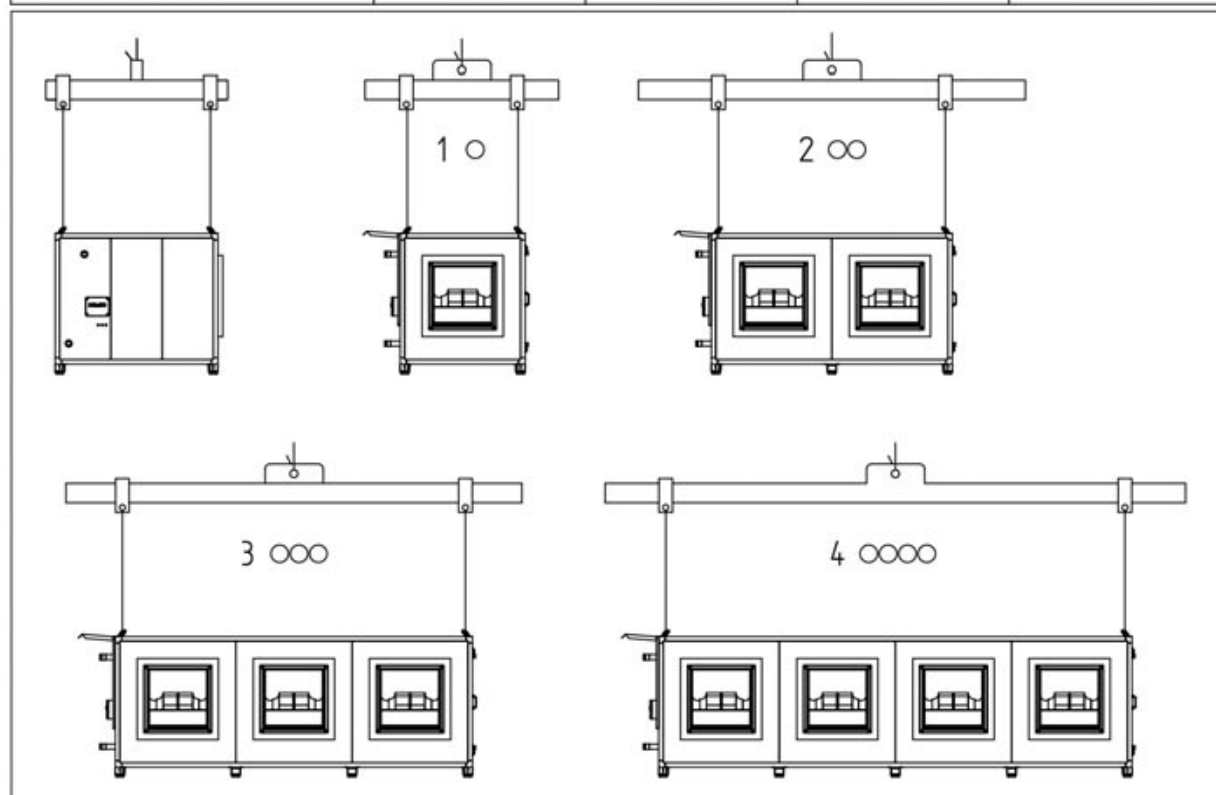
PIC.22: MODULAR - lifting by forklift.

## HANDLING OF THE "RADIAL" RANGE

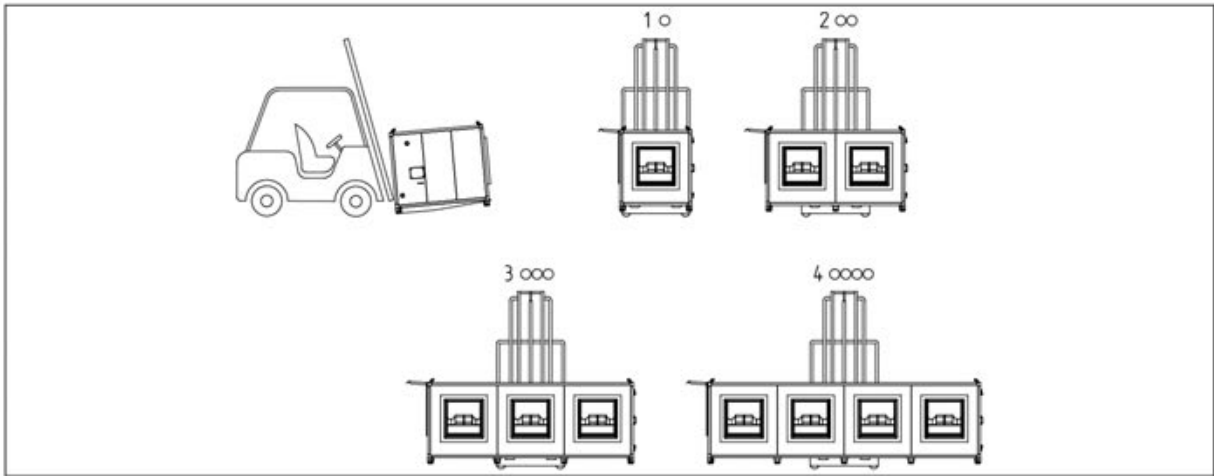


PIC.23: RADIAL - overall dimensions.

MODEL	WHR=11	WHR=12	WHR=13	WHR=14
		50	50	50
FAN No.	1	2	3	4
LENGTH MAX [MM]	1725	2925	4125	5325
WEIGHT MAX [KG]	435	740	1080	1475



PIC.24: RADIAL - lifting by straps and weight-distributing beam.



PIC.25: RADIAL - lifting by forklift.

## OVERTURNING OF THE "H/V" RANGE

Unless otherwise specified at the time of the order placement, units belonging to the "H/V" range are factory assembled to operate in HORIZONTAL AIR FLOW.



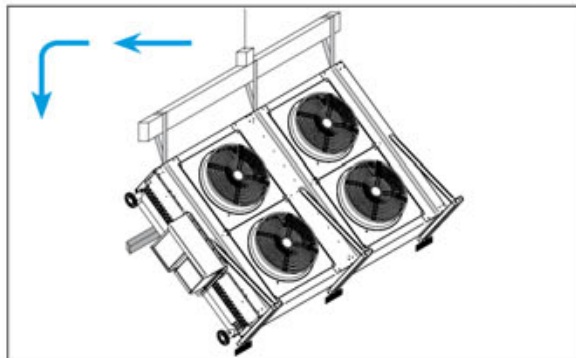
**NOTE:** The accessory supporting board is factory assembled to operate in VERTICAL AIR FLOW.

To install units belonging to the "H/V" range operating in VERTICAL AIR FLOW strictly refer to the following procedure:

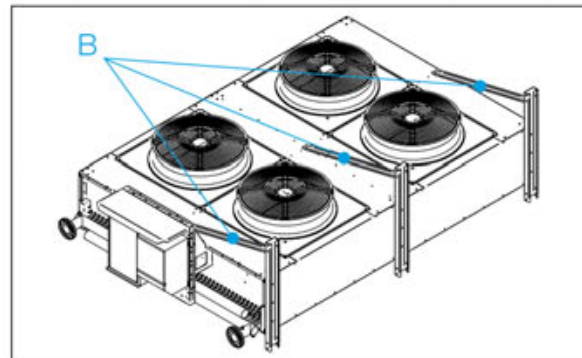
- Place the equipment on a level surface.
- Gird the device with bands according to the lifting sketch shown in PIC.04.
- To rotate the equipment in a horizontal position, start by pulling sideways; ensure that the equipment basement is locked to prevent slipping (PIC.26).



**ATTENTION:** During the overturning, make sure that the lifting straps always remain taut.  
**ATTENTION:** During the overturning, do not stop or pass within range of the moving equipment.

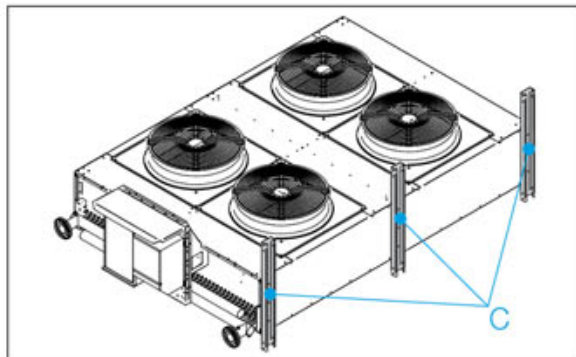


PIC.26

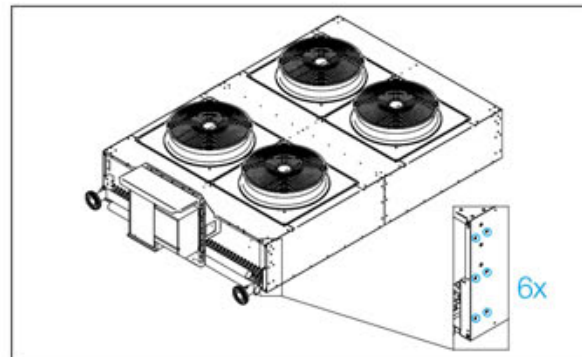


PIC.27

- For units with two rows of fans, remove the Reinforcement Brackets "B" (PIC.27).
- Remove the Ground Brackets "C" (PIC.28).



PIC.28



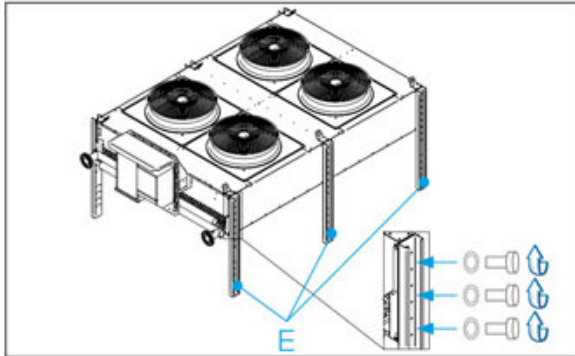
PIC.29

- Fix the Vertical Brackets "D" with the screws and washers supplied (PIC.29-30).

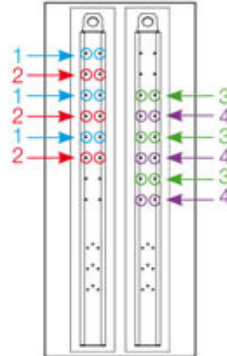




**NOTE:** For the units equipped with fans of diameter  $\Phi=800\text{mm}$ ,  $\Phi=910\text{mm}$  and  $\Phi=1000\text{mm}$ , 4 different mounting heights are available with 100mm pitch (PIC.31).

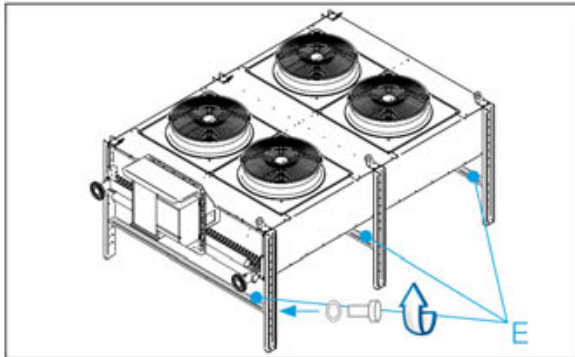


PIC.30

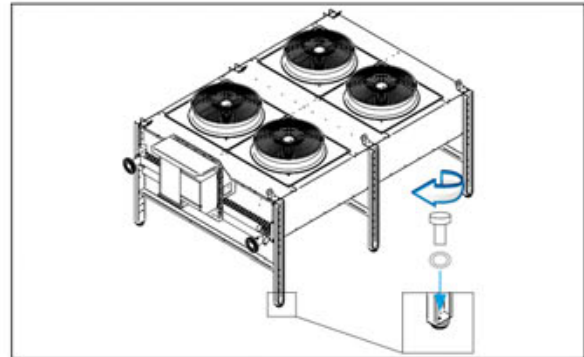


PIC.31

- Fix the Reinforcement Brackets "E" with the screws, washers and nuts supplied (PIC.32).



PIC.32



PIC.33

- Where provided, fix the accessory A – Vibration-dumpers with the screws and washers supplied (PIC. 33).

## ROTATION OF THE ACCESSORY SUPPORTING BOARD

To install units belonging to the "H/V" range operating in HORIZONTAL AIR FLOW it is necessary to rotate the accessory supporting board.

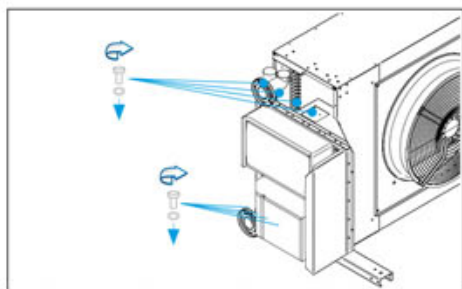
Strictly refer to the following procedure:



**ATTENTION:** The following operations must be carried out by qualified personnel.

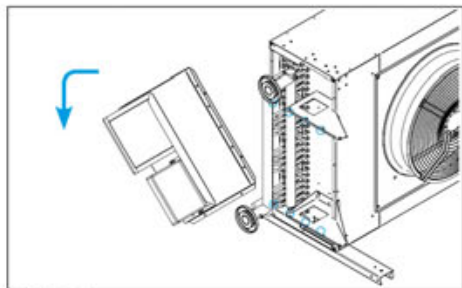
**ATTENTION:** Before any type of intervention cut off the power supply to the equipment. Act on the main switch to set the position "0".

- Loosen the screws that fix the accessory supporting board to the Supporting Brackets (PIC.34).



PIC.34

- Rotate the board by 90° with the rain protecting sheet facing upwards (PIC.35).



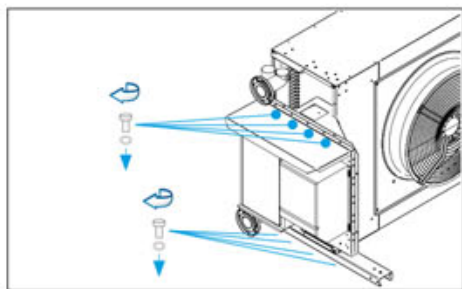
PIC.35



**NOTE:** For convenience, it can be necessary to cut the clamps holding the electrical cables. When the operations are completed, it is recommended to fasten the cables with new clamps.

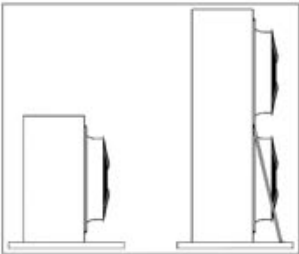
**NOTE:** Two operators are needed to carry out the operation.

- Fasten the accessory supporting board in the new position to the Supporting Brackets; fasten the electrical cables to the board (PIC.36).

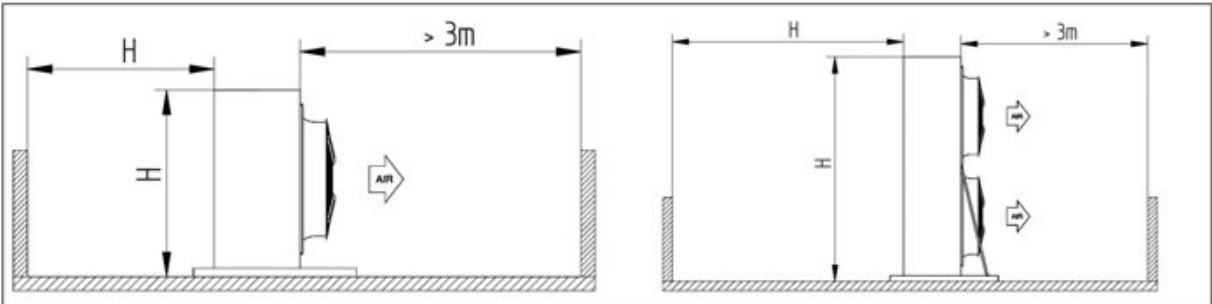


PIC.36

**POSITIONING OF THE “H/V” RANGE - HORIZONTAL AIR FLOW**

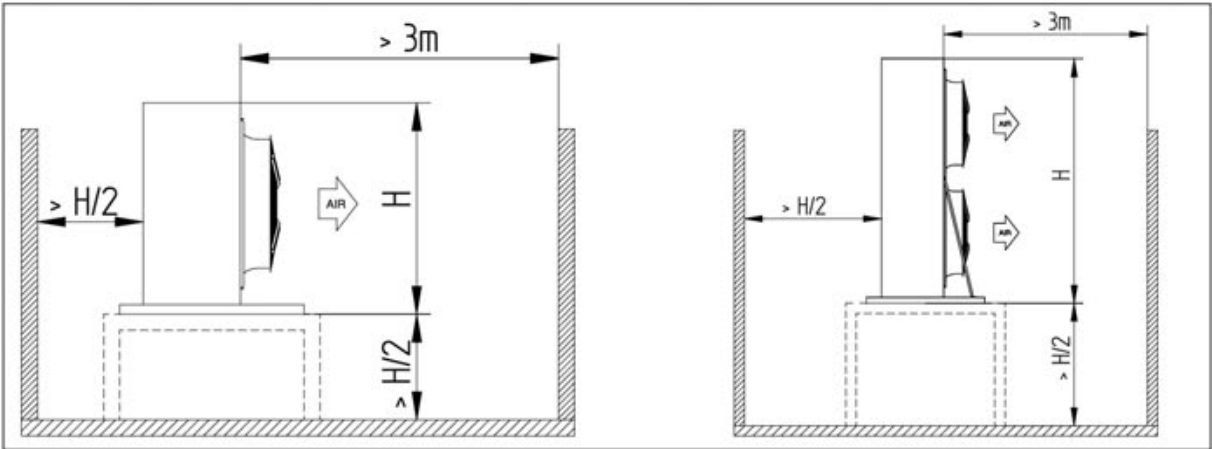


PIC.37



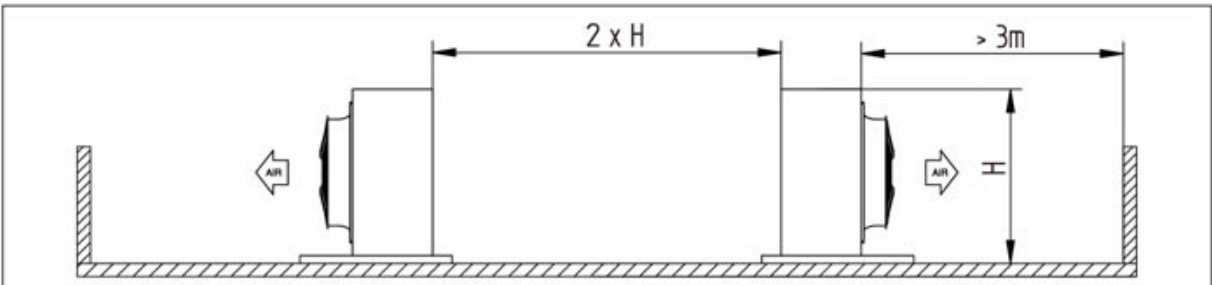
PIC.38

PIC.39



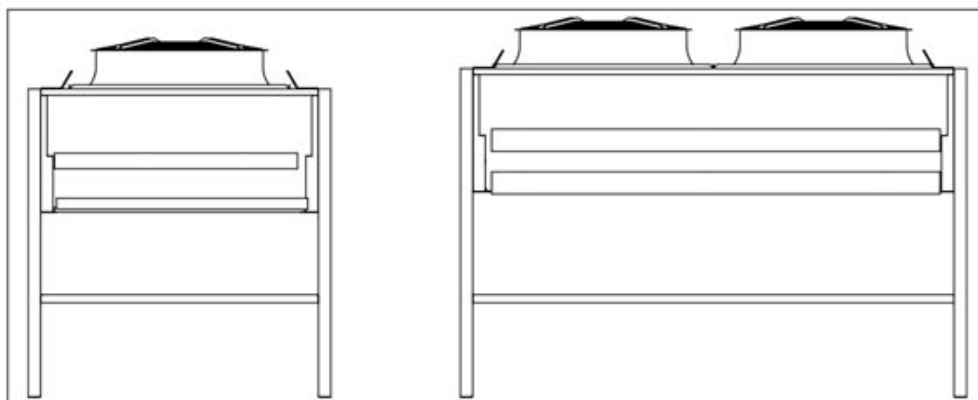
PIC.40

PIC.41

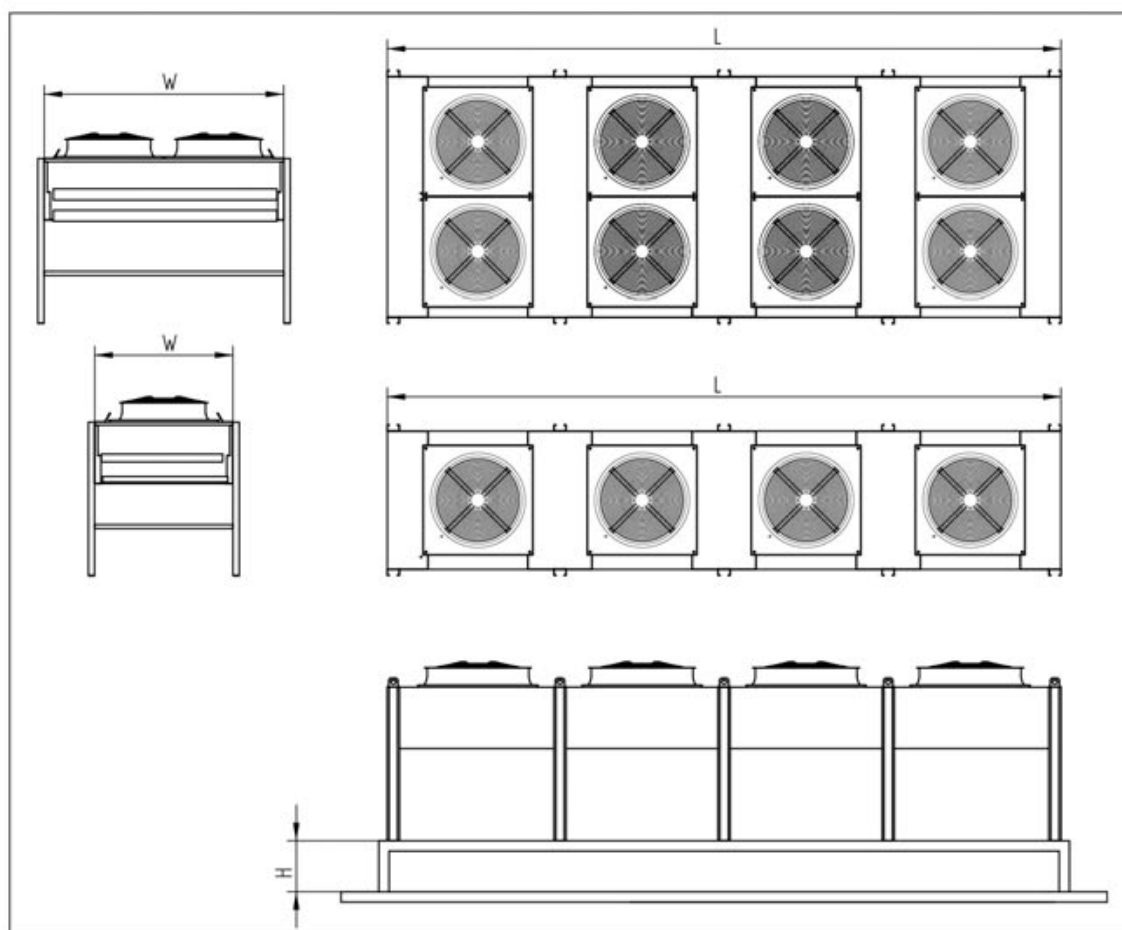


PIC.42

## POSITIONING OF THE “H/V” RANGE - VERTICAL AIR FLOW

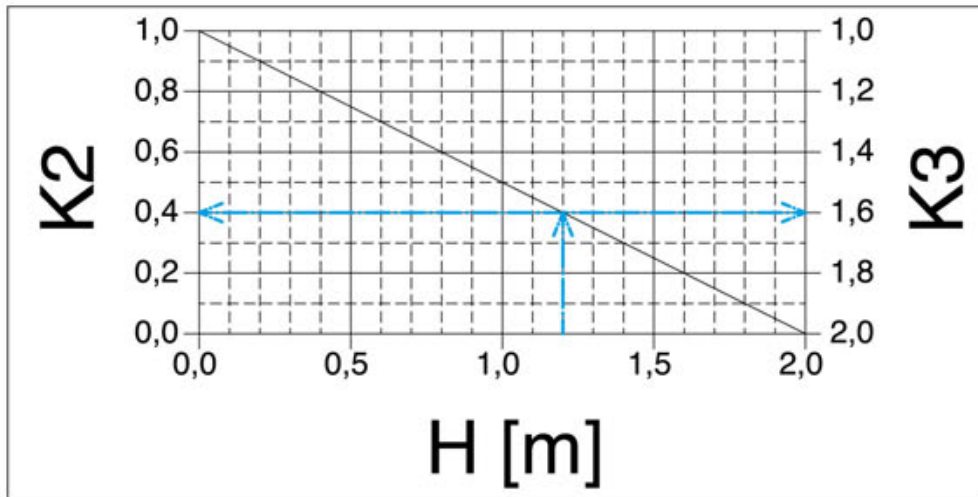


PIC.43

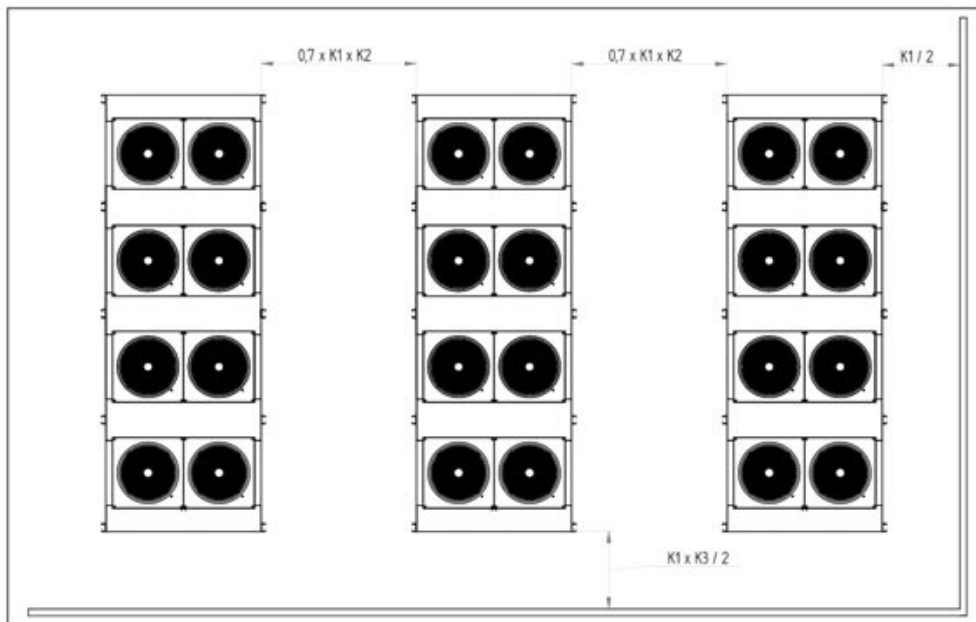


PIC.44

$$K1 = 0.5 \times \sqrt{W^2 + L^2}$$



PIC.45

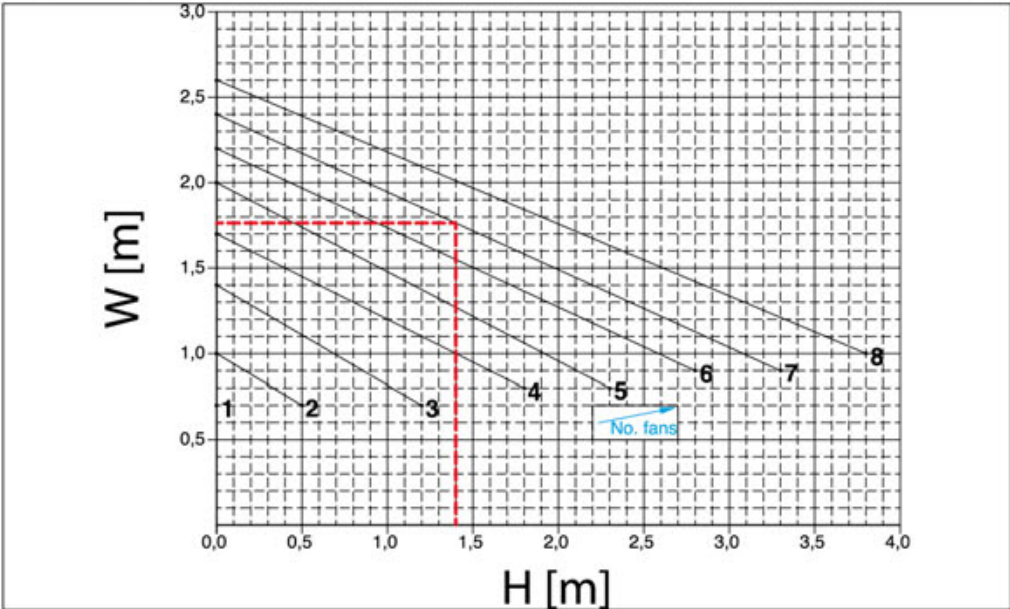


PIC.46

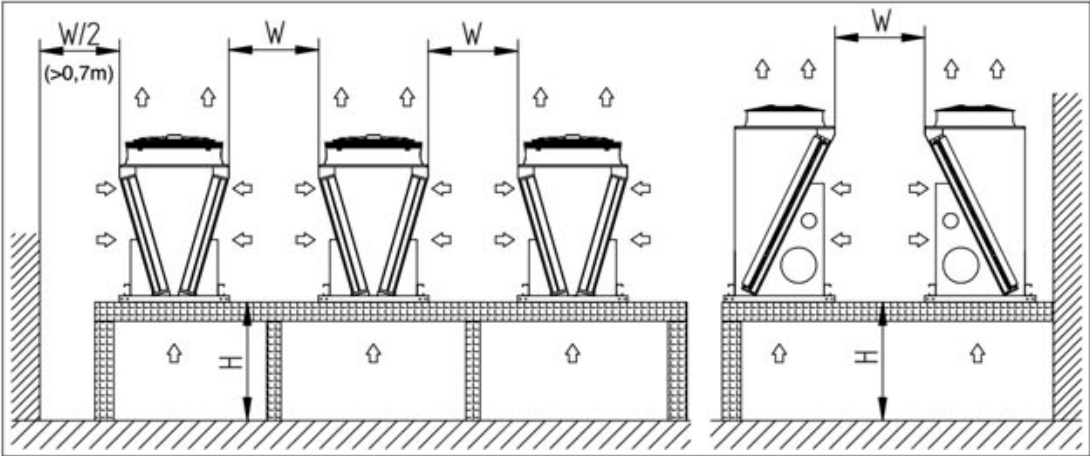
### POSITIONING OF THE “TOWER” AND “WALL” RANGES



PIC.47

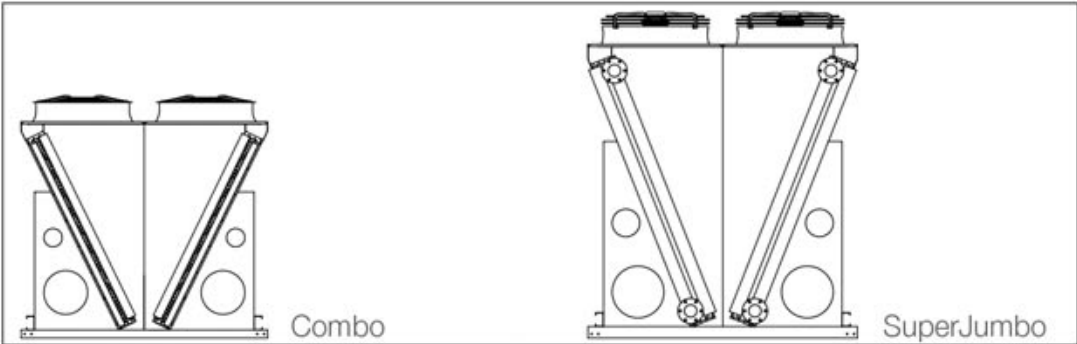


PIC.48

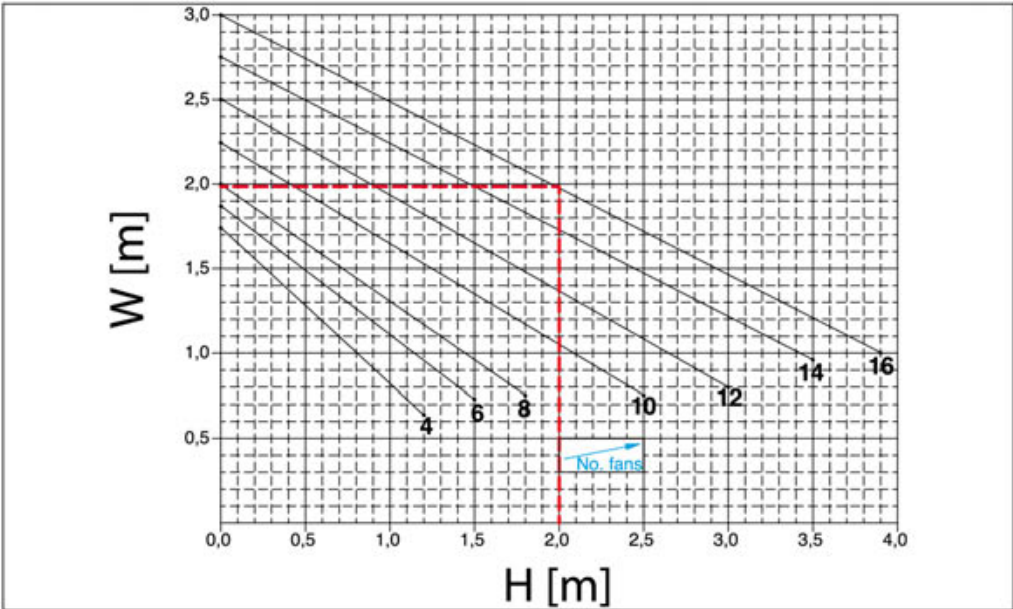


PIC.49

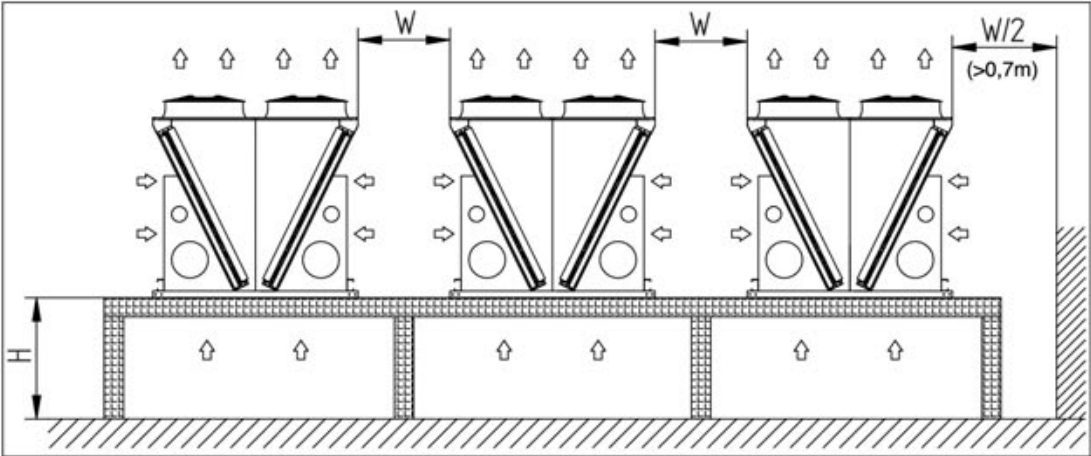
**POSITIONING OF THE “COMBO” AND “SUPERJUMBO” RANGES**



PIC.50



PIC.51

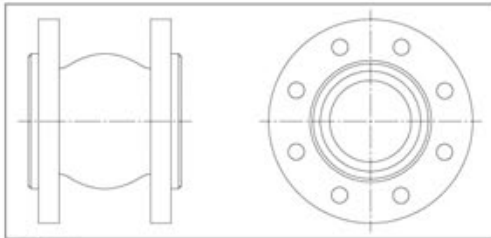


PIC.52

## 4

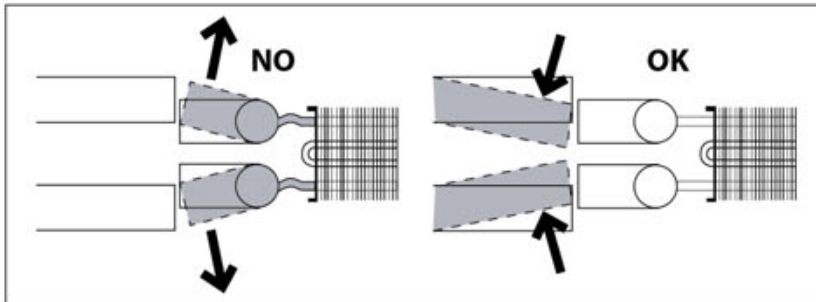
## HYDRAULIC AND REFRIGERATION CONNECTIONS

1. It is mandatory to use the appropriate personal protective equipment (see. SEC.12).
2. Comply with the design dimensions of the hydraulic and refrigeration connections. To obtain information on a specific unit, please contact Refrion S.r.l. indicating the part number on the identification label located on the header side of the unit (see PIC. 01).
3. If the unit is a Dry Cooler, arrange the inlet and outlet piping connections paying attention to the direction labels positioned next to the sleeves or the flanges (see. SEC.14).
4. It is mandatory to use anti vibration joints on the hydraulic connections (PIC. 53).

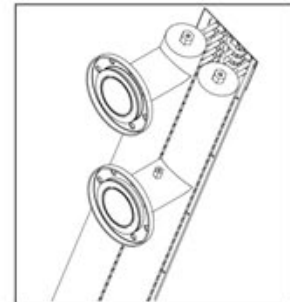


PIC.53

5. If the unit is a Condenser, weld the inlet and outlet piping connections taking care not to point the flame towards the equipment.
6. Do not adapt the headers position to the suction line (PIC.54).



PIC.54



PIC.55

7. Provide shut-off valves upstream of the equipment in order to facilitate maintenance.
8. If necessary add sleeves of appropriate dimensions (besides those already installed on the manifolds) downstream to the shut-off valve to allow for a quicker drainage.
9. In the event of units equipped with Accessory B - Spray Adiabatic System and Accessory Z - Industrial Adiabatic System please refer to specific manuals available on the website: [www.refrion.com](http://www.refrion.com)



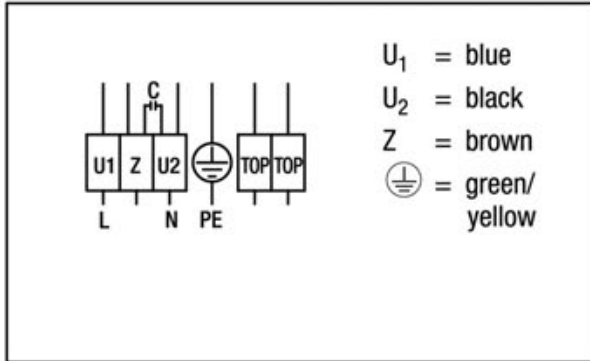
## 5 ELECTRICAL CONNECTION

It is mandatory to use the appropriate personal protective equipment (see. SEC.12).

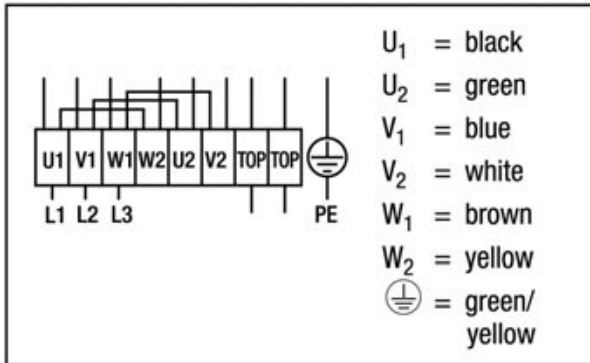
1. All connection, maintenance, or repair operations must be carried out by qualified personnel only, meeting all the regulations applicable in the country of installation.
2. Before any type of intervention cut off the power supply to the equipment. Act on the main switch to set the position "0".
3. Ensure that the line voltage and frequency matches the data shown on the identification label of the unit.
4. If the units are supplied without a switchboard please refer to connection screen shown on the junction box of the fans (PIC.56-57-58). If it is missing, or to ask for a copy, please contact Refrion S.r.l. indicating the part number on the identification label located on the header side of the unit (see PIC.01).
5. The power cables must be from the appropriate section and suitable for the equipment. The power cables must be suitable for the power consumption of the equipment matching the data shown on the identification label of the unit (PIC 01). If necessary please contact Refrion S.r.l. indicating the part number on the identification label located on the header side of the unit (see PIC.01).
6. The power cable must be laid straight (avoid bindings or overlaps) in a position not exposed to any shock or tampering, protected from water or other liquids, and from heat sources.
7. Replace the power cable in case of damage. The replacement must be carried out by qualified personnel only, meeting all the regulations applicable in the country of installation.
8. The power supply system must be equipped with an effective protection system against overcurrent and short circuits (e.g.: differential magneto thermal switch).
9. The equipment must be earthed. The yellow/green wire close to the power terminals must be left longer than the others, in order to be the last to be unplugged from the terminals in the event of the cable being stretched.
10. If several machines are connected in series, they must be included in an equipotential system. The diameter of the (yellow/green) wire must be equal to or greater than the maximum diameter of the power cable.
11. If the unit is equipped with a switchboard, the diameter of the remote control connection cable must be equal to or greater than 2.5mm<sup>2</sup> and its length must be no longer than 50 meters.
12. The power and signal must not be connected to the switchboard or junction box from the top. The power cable must pass through the dedicated clamp and then tighten the cable glands.



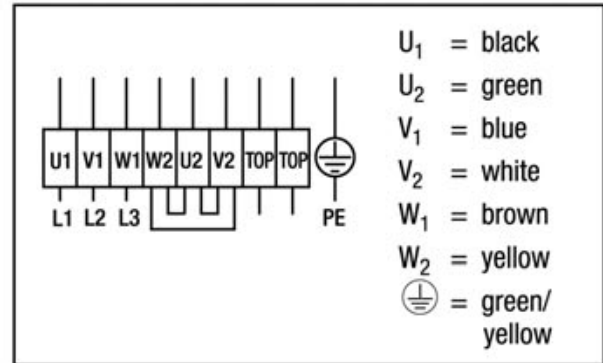
**NOTE:** Unless it is not explicitly agreed in the order, the units are supplied in the standard configuration, that is to say without wiring and without any type of control device.



PIC.56 Connection screen example.  
 Single-phase AC fan.



PIC.57 Connection screen example  
 Three-phase AC fan.  
 TRIANGLE connection.



PIC.58 Connection screen example  
 Three-phase AC fan.  
 STAR connection.



**NOTE:** If the units are equipped with electronically commutated fans "EC", please contact Refrion S.r.l. indicating the part number on the identification label located on the header side of the unit (see PIC.01).

**NOTE:** According to EN 60529 the protection class of the fans is IP54 as design standard.

## TYPES OF WIRING

The wiring of the equipment is available on request according to the executions listed in the table below.



**NOTE:** All the materials used are suitable for outdoor installation.

AC FANS - 3Ph - 400V - 50 Hz

## WIRING TYPE

FEATURES	Wiring Execution (Accessory Name)				
	C	T	Q	E	E2
PROTECTION CLASS ACCORDING TO EN 60529	IP55	IP55	IP55	IP55	IP55
MINIMUM OPERATING TEMPERATURE $T_{MIN}$ [°C]	-25	-25	-25	-25	-25
MAXIMUM OPERATING TEMPERATURE $T_{MAX}$ [°C]	60	60	60	60	60
MAIN SWITCH		•	•	•	•
REPAIR SWITCHES FOR EACH FAN (ACCESSORY "S")	o	o	o		
MATCHING WITH SPEED CONTROLLER	•	•	•	•	•
FANS PROTECTION	•(a)	•(b)	•(a)	•(a)	•(a)
MOTOR PROTECTION UNITS (ACCESSORY "M") - MAXIMUM OPERATING TEMPERATURE $T_{MAX} = +55^{\circ}C$	o		o		
SPEED CONTROLLER PROTECTION		•(a)	•(a)	•(a)	•(a)
BY-PASS FUNCTION				•	•
INPUT: START/STOP REMOTE CONTROL SIGNAL			•	•	•
INPUT: REMOTE RESET SIGNAL				•	•
INPUT: SPEED CONTROLLER DIGITAL INPUTS AVAILABLE INSIDE THE SWITCHBOARD		•		•	•
OUTPUT: SWITCHBOARD ON/OFF SIGNAL				•	•
OUTPUT: THERMAL PROTECTION CONDITION SIGNAL		•			
OUTPUT: FAN THERMAL PROTECTION SIGNAL	•	•	•	•	•
OUTPUT: SPEED CONTROLLER ALARM SIGNAL					•
THERMAL PROTECTION TYPE (*)		•	•	•	•

•: standard    o: optional

(a): FUSE

(b): MAGNETOTHERMAL SWITCH

(\*)THERMAL PROTECTION TYPE

Wiring Execution (Accessory Name)	OPERATION
T	THE MAGNETOTHERMAL SWITCH EXCLUDES THE SINGLE FAN
Q	IF ONLY ONE FAN IS OVERHEATING ALL THE FANS ARE SWITCHED OFF
E	ONLY THE FAN OVERHEATING IS SWITCHED OFF
E2	ONLY THE PAIR OF FANS INCLUDING THE ONE OVERHEATING IS SWITCHED OFF

## SPEED CONTROLLERS

FEATURES	Wiring Execution (Accessory Name)	
	R	I
PROTECTION CLASS ACCORDING TO EN 60529	IP54	IP54
MINIMUM OPERATING TEMPERATURE $T_{MIN}$ [°C]	-20	-20
MAXIMUM OPERATING TEMPERATURE $T_{MAX}$ [°C]	40	40
ALLOWABLE RELATIVE HUMIDITY (NO MOISTURE CONDENSATION)	85%	85%
MULTI-FUNCTIONAL DISPLAY	●	●
DIGITAL INPUTS	2	2
ANALOGICAL INPUTS	1	1
DIGITAL OUTPUTS	2	2
ANALOGICAL OUTPUTS	1	1
COMMUNICATION STANDARDS	MODBUS	MODBUS



**ATTENTION:** When using the Accessory “R” ELECTRONIC THREE-PHASE VOLTAGE CONTROLLER (PHASE-CUT) electromagnetic motor noise levels may rise due to the control technology adopted.

In this case the Sound Power Level and the Sound Pressure Level could be higher than those stated on the unit data-sheet.



**ATTENTION:** To adopt the Accessories “B” SPRAY ADIABATIC SYSTEM and “Z” INDUSTRIAL ADIABATIC SYSTEM the power supply system must include the NEUTRAL electrical conductor.

EC FANS - 3Ph - 400V - 50 Hz

WIRING TYPE

FEATURES	Wiring Execution (Accessory Name)				
	C	Q	E	E2	D
PROTECTION CLASS ACCORDING TO EN 60529	IP55	IP55	IP55	IP55	IP55
MINIMUM OPERATING TEMPERATURE TMIN [°C]	-25	-25	-25	-25	-20
MAXIMUM OPERATING TEMPERATURE TMAX[°C]	60	60	60	60	60
MAIN SWITCH		•	•	•	•
REPAIR SWITCHES FOR EACH FAN (ACCESSORY "S")	o	o			
MATCHING WITH SPEED CONTROLLER	•	•	•	•	
FANS PROTECTION	•(a)	•(b)	•(b)	•(b)	•(b)
MOTOR PROTECTION UNITS (ACCESSORY "M") MAXIMUM OPERATING TEMPERATURE TMAX = +55°C	o	o			
SPEED CONTROLLER PROTECTION	•(a)	•(a)	•(a)	•(a)	•(a)
BY-PASS FUNCTION	•	•	•	•	•
INPUT: START/STOP REMOTE CONTROL SIGNAL		•	•	•	•
INPUT: REMOTE RESET SIGNAL			•	•	
INPUT: SPEED CONTROLLER DIGITAL INPUTS AVAILABLE INSIDE THE SWITCHBOARD	•	•	•	•	•
OUTPUT: SWITCHBOARD ON/OFF SIGNAL			•	•	•
OUTPUT: THERMAL PROTECTION CONDITION SIGNAL		•	•	•	•
OUTPUT: FAN THERMAL PROTECTION SIGNAL	•	•	•	•	•
OUTPUT: SPEED CONTROLLER ALARM SIGNAL			•	•	•
THERMAL PROTECTION TYPE (*)	•	•	•	•	•

•: standard

o: optional

(\*)THERMAL PROTECTION TYPE

(a): FUSE

(b): MAGNETOTHERMAL SWITCH

Wiring Execution (Accessory Name)	OPERATION
C Q E E2 D	THE EC FAN OVERHEATING AUTOMATICALLY SWITCHES OFF

## SPEED CONTROLLERS

FEATURES	Wiring Execution (Accessory Name)	
	U	D
PROTECTION CLASS ACCORDING TO EN 60529	IP54	IP55
MINIMUM OPERATING TEMPERATURE T <sub>MIN</sub> [°C]	-20	-20
MAXIMUM OPERATING TEMPERATURE T <sub>MAX</sub> [°C]	55	60
ALLOWABLE RELATIVE HUMIDITY (NO MOISTURE CONDENSATION)	85%	
MULTI-FUNCTIONAL DISPLAY	●	●
DIGITAL INPUTS	2	6
ANALOGICAL INPUTS	1	1
DIGITAL OUTPUTS	2	3
ANALOGICAL OUTPUTS	1	1
COMMUNICATION STANDARDS	MODBUS	MODBUS CAREL(*)

(\*)OPTIONAL: BACNET IP, BACNET MS/TP, KONNEX, ETHERNET, LON, SNMP



**NOTE:** In case of wiring execution with accessory "D" DIGITAL INTELLIBOARD please refer to specific manuals available on the website: [www.refrion.com](http://www.refrion.com).



**ATTENTION:** To adopt the Accessories "U" EC the power supply system must include the NEUTRAL electrical conductor.



**ATTENTION:** To adopt the Accessories "B" SPRAY ADIABATIC SYSTEM and "Z" INDUSTRIAL ADIABATIC SYSTEM the power supply system must include the NEUTRAL electrical conductor.



**ATTENTION:** the implementation of electronically commutated fans "EC" is not compatible with electrical distribution systems with a non-earthed (IT) NEUTRAL electrical conductor.

## AC FANS - 1Ph - 230V - 50 Hz

### WIRING TYPE

FEATURES	Wiring Execution (Accessory Name)		
	SB	K	QM
PROTECTION CLASS ACCORDING TO EN 60529	IP55	IP55	IP55
MINIMUM OPERATING TEMPERATURE T <sub>MIN</sub> [°C]	-25	-25	-25
MAXIMUM OPERATING TEMPERATURE T <sub>MAX</sub> [°C]	60	50	60
MAIN SWITCH	•	•	•
REPAIR SWITCHES FOR EACH FAN (ACCESSORY "S")			o
MATCHING WITH SPEED CONTROLLER	•		•
FANS PROTECTION	•		•
MOTOR PROTECTION UNITS (ACCESSORY "M") MAXIMUM OPERATING TEMPERATURE T <sub>MAX</sub> = +55°C			o
SPEED CONTROLLER PROTECTION	•		•
BY-PASS FUNCTION			
INPUT: START/STOP REMOTE CONTROL SIGNAL		•	•
INPUT: REMOTE RESET SIGNAL			
INPUT: SPEED CONTROLLER DIGITAL INPUTS AVAILABLE INSIDE THE SWITCHBOARD		•	
OUTPUT: SWITCHBOARD ON/OFF SIGNAL	•		
OUTPUT: THERMAL PROTECTION CONDITION SIGNAL			
OUTPUT: FAN THERMAL PROTECTION SIGNAL			
OUTPUT: SPEED CONTROLLER ALARM SIGNAL		•	
THERMAL PROTECTION TYPE (*)			

•: standard  
o: optional

(a): FUSE  
(b): MAGNETOTHERMAL SWITCH

### SPEED CONTROLLERS

FEATURES	Wiring Execution (Accessory Name)				
	K	Rm 2,5A	Rm>2,5A	Im 4A	Im>4A
PROTECTION CLASS ACCORDING TO EN 60529	IP55	IP54	IP54	IP54	IP54
MINIMUM OPERATING TEMPERATURE T <sub>MIN</sub> [°C]	-20	-20	-20	-20	-20
MAXIMUM OPERATING TEMPERATURE T <sub>MAX</sub> [°C]	50	40	40	35	40
ALLOWABLE RELATIVE HUMIDITY (NO MOISTURE CONDENSATION)		85%	85%	85%	85%
MULTI-FUNCTIONAL DISPLAY	1		1 (START/STOP)	1	1
DIGITAL INPUTS			1	2	2
ANALOGICAL INPUTS	1			2	2
DIGITAL OUTPUTS	1		1	1	1



**ATTENTION:** When using the Accessory “Rm” ELECTRONIC SINGLE-PHASE VOLTAGE CONTROLLER (PHASE-CUT) electromagnetic motor noise levels may rise due to the control technology adopted. In this case the Sound Power Level and the Sound Pressure Level could be higher than those stated on the unit data-sheet.



## 6

## OPERATING INSTRUCTIONS

1. Strictly follow all instructions and warnings related to hydraulic and electrical connections before starting the unit.
2. To start the unit, act on the main switch to set the position "1".

### FIRST-TIME START UP INSTRUCTIONS:

- a. Check the cleanliness of the installation area.
- b. Check for leakage.
- c. Verify the proper installation according to preceding chapters.
- d. Switch on the unit and check its proper operation (fan rotation direction, fluid circulation, absence of vibrations or unusual noises).
- e. In case of units equipped with a speed controller please refer to the operating instructions available inside the switchboard, ensuring the presence of the power supply during the regulation of the set-point. Never remove the plastic protection inside the controller; use only insulated footwear and tools suitable for use in presence of electricity.
- f. In case of units equipped with accessories, please refer to the specific manuals available on the website: [www.refrion.com](http://www.refrion.com).

## 7 OPERATING TROUBLESHOOTING

1. It is mandatory to use the appropriate personal protective equipment (see. SEC.12).
2. The intervention must be undertaken by qualified personnel only, meeting all the regulations applicable in the country of installation. The operating personnel must be aware of the project conditions and of the instructions included in this manual.
3. For the units equipped with accessories, please refer to the specific manuals.
4. Carry out maintenance only if weather conditions do not endanger the safety of the workers (absence of rain, wind, etc.).
5. Before any type of intervention cut off the power supply to the equipment. Act on the main switch to set the position "0".
6. In the event of fluid leaks from the equipment, immediately contact your installer.
7. In the event of excessive vibrations, contact your installer in order to check the proper fixing of the unit and the fan.
8. In case of no power supply to the unit, check the fuses in the switchboard and the status of the magneto thermal switch.
9. If one or more fans do not work, ensure that blades are free to rotate and that moving parts do not have obstacles; also check the cleanliness of the fin pack.
10. If a fan is faulty, replace it according to the proper connection screen (PIC.56-57-58). Loosen the screws that fix the supporting frame/protection grid of the motor and reassemble it with a new fan. Check the correct rotation direction.



**NOTE:** Refer to the installation instructions of the fan supplier. If it is missing, or to ask for a copy, please contact Refrion S.r.l. indicating the part number on the identification label located on the header side of the unit (see PIC.01).

## 8 MAINTENANCE

1. Maintenance is very important both for safety and for the proper functioning of the equipment.
2. It is mandatory to use the appropriate personal protective equipment (see. SEC.12).
3. The intervention must be undertaken by qualified personnel only, meeting all the regulations applicable in the country of installation. The operating personnel must be aware of the project conditions and of the instructions included in this manual.
4. Carry out maintenance only if weather conditions do not endanger the safety of the workers (absence of rain, wind, etc.).
5. Before any type of intervention cut off the power supply to the equipment. Act on the main switch to set the position "0". Wait until the fans stop rotating completely.
6. Twice a year, check the efficiency of the electrical connections, grounding and wearing parts.
7. Twice a year, check the efficiency of the electrical and mechanical component: the operating parameters must correspond to those specified on the data sheet provided together with the order confirmation. To obtain a copy of the data sheet of a specific unit, please contact Refrion S.r.l. indicating the part number on the identification label located on the header side of the unit (see PIC.01).
8. Clean the fin pack twice a year. Use a water jet with a pressure lower than 2 bar; remove the residual on the fins using a soft brush (PIC.59).

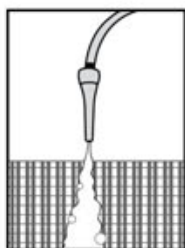


**ATTENTION:** Use only tap water; do not use detergents or solvents.

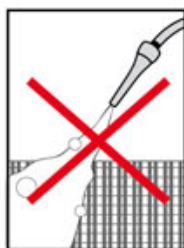


**NOTE:** The warranty excludes damage caused by corrosion.

9. After every period of inactivity of over four weeks, ensure the operating of the fans for at least three hours.
10. In case of Dry Coolers operating with water without glycol, ensure that the ambient temperature is always higher than 0°C. During arrest, drain off the Dry Coolers by blowing air several times and introduce glycol.



**YES**



**NO**

PIC.59



**NOTE:** Failure to comply with all the instructions provided in this manual will void the "General Conditions of Sale and Supply" and will also void all liability for damage to people, animals or property.

## 9

## SPARE PARTS

For the replacement of fans, accessories or components inside the switchboard, please contact Refrion S.r.l. indicating the part number on the identification label located on the header side of the unit (see PIC.01).

## 10

## DEMOLITION AND DISPOSAL

1. It is mandatory to use the appropriate personal protective equipment (see. SEC.12).
2. The intervention must be undertaken by qualified personnel only, meeting all the regulations applicable in the country of installation. The operating personnel must be aware of the project conditions and of the instructions included in this manual.
3. Before any type of intervention cut off the power supply to the equipment. Act on the main switch to set the position "0".
4. Empty all fluids from the equipment in conformity with the regulations applicable in the country of installation.

Refrion products are made from:

- Plastic Materials: PE, PA, ABS, rubber.
- Ferrous materials: carbon and stainless steel (possibly treated or painted), copper, aluminium, brass.
- Electrical cables.
- Electrical and electronic components.

## 11 RESIDUAL RISKS







1. During the installation of the equipment, enough free room must be provided in order to operate in safe conditions, taking care areas surrounding the equipment are always free from obstacles, clean and dry, well lit.
2. Due to the specific operation, the equipment may entail residual risks which are not entirely avoidable:
  - Risk of Burn: the operator may touch hot or freezing surfaces.
  - Risk of Electrocution: the operator may contact with live electrical parts.
  - Risk of cuts: the operator must pay attention to the sharp edge of the fins.
3. Foreseeable incorrect usage is forbidden:
  - Failure to disconnect the electrical power supply with the master switch in open position "0".
  - Structural modifications or modifications to the operating logic without authorization from Refrion S.r.l.
  - Tampering with the guards and safety systems.
  - Improper use of PPE.
  - Presence of non qualified personnel during operations.
  - Removing or making the safety signs illegible.



**NOTE:** Failure to comply with all the instructions provided in this manual will void the "General Conditions of Sale and Supply" and will also void all liability for damage to people, animals or property.







## 12 PERSONAL PROTECTIVE EQUIPMENT (PPE)

The customer is responsible for identifying and choosing the type and category of adequate and suitable PPE.

Phase						
Transport	X					
Handling	X	X				X
Unpacking	X	X				
Positioning	X	X				X
Assembly	X	X				
Normal Use						
Set Up						
Cleaning	X	X	X	X	X	X
Maintenance	X	X	X			
Disassembly	X	X				
Scrapping	X	X	X	X	X	X

Phase	Description
Transport	It consists of transferring the equipment from one place to another using a special vehicle.
Handling	It includes transferring the machine onto and from the vehicle used for transport, as well as moving it around inside the factory.
Unpacking	It consists of removing all the materials used for packing the machine.
Positioning	It includes all the operations needed to place the equipment in the operating position.
Assembly	It includes all the assembly operations that initially prepare the machine for being set up.
Normal use	The intended use of the machine (or use that is considered usual) in relation to its design, construction and function
Set up	It includes the adjustment, setting up and calibration of all the devices that must be adapted to the normally envisaged operating condition.
Cleaning	It consists of removing dust, oil and manufacturing residues that could compromise the proper operation and use of the machine as well as the health and safety of the worker.
Maintenance	It consists of the periodic checking of the parts of the machine that may wear out or that must be replaced.
Disassembly	This consists of completely or partially disassembling the machine for any kind of requirement.
Scrapping	This consists of the final removal of all the parts of the machine produced by the final dismantling operation, so as to allow possible recycling or separate collection of the components in accordance with the procedures provided for by the law regulations in force.

# 14 SYMBOLS AND LABELS

Lifting Points - Forklift	 A black silhouette of a forklift lifting a pallet, with a downward-pointing arrow below it containing the text "LIFT HERE".
Lifting points - straps and weight-distributing beam	 A yellow circle with a black hook symbol inside.
In/Out	 Two horizontal arrows: a red arrow pointing right and a blue arrow pointing left.
Ground connection	 A yellow inverted triangle with a black circle inside, and a vertical line extending upwards from the top vertex.
Hot / Cold surfaces	 A yellow triangle with three wavy lines inside, representing heat or cold.
Under Power	 A yellow triangle with a black lightning bolt symbol inside.





Refrion S.r.l. accepts no liability for any errors contained in this manual.  
The information contained in this manual is not binding and we at Refrion S.r.l. reserve the right, at any time and without notice, to make all the modifications to the products that we consider expedient or useful for improving their operation and performance.

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# REFRION

a better innovation

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