



Mini Multiple Compressor Condensing Units



Supermarket refrigeration systems, small and medium sized air conditioning, chillers, small and medium sized refrigeration systems, centralized cooling and air conditioning systems, industrial process systems.

Mini  
C-flex



14.730 to 49.092 Kcal/h  
17.128 to 57.083 W

**INTENSE**

Mini Multiple Compressor Condenser Units

#### Benefits

- Standard electronic engines
- Standardized Electrical assembly(NBR5410)
- Greater range of capacities
- Adaptable to all refrigerants
- 2 levels of protection against harsh environments
- Higher thermal and energy efficiency
- Longer motor fan life
- Maximum efficiency throughout its lifecycle
- Plug & Play concept: ease of installation and operation
- Prepared to receive semi-hermetic compressors (SH), hermetic (HR) and scroll (HS).
- Removable panels ensure quick and easy access for inspection and maintenance.
- Models with straight condensing coils and models with curved condensing coils.

#### Standard version

- Copper tubes with 3/8" external diameter
- Galvanized steel cabinet and white epoxy painting
- Central electrical box for connecting the fans
- Espacing between aluminum louver fins by 12 app
- Lifting handles
- Bottom base closed
- 500mm electronical motor fan


#### Optionals

- Filter on air input.
- Multiple circuits able to supply several compressors at the same time.
- Anti-corrosion treatment for installations close to the seafont
- Crossbars for fixing the compressor.

#### Applications

Supermarket refrigeration systems, small and medium sized air conditioning, chillers, small and medium sized refrigeration systems, centralized cooling and air conditioning systems, industrial process systems.

## Electronic Fans Capacities and Features

		DT 10°C			Heat exchange area	Face Area	Input	Output	Net Weight	Gross Weight	Current	Power
		Kcal/h	W	Noise								
	14L	15025	17470	43 dB(a)	53,8 m <sup>2</sup>	0,68 m <sup>2</sup>	1 1/8"	3/4"	120 Kg	140 Kg	220V 3F 2,77A 380V 3F 1,6A	0,95 kW
	16L	16485	19169	43 dB(a)	71,7 m <sup>2</sup>	0,68 m <sup>2</sup>	1 1/8"	3/4"	126 Kg	151 Kg		
	18L	18853	21922	44 dB(a)	97,0 m <sup>2</sup>	1,23 m <sup>2</sup>	1 1/8"	3/4"	135 Kg	162 Kg		
	23L	23166	26937	45 dB(a)	65,2 m <sup>2</sup>	1,24 m <sup>2</sup>	1 1/8"	3/4"	163 Kg	195 Kg	220V 3F 5,54A 380V 3F 3,2A	1,90 kW
	27L	27440	31907	46 dB(a)	101,0 m <sup>2</sup>	1,93 m <sup>2</sup>	1 1/8"	3/4"	174 Kg	209 Kg		
	29L	29103	33840	45 dB(a)	97,8 m <sup>2</sup>	1,24 m <sup>2</sup>	1 1/8"	3/4"	172 Kg	206 Kg		
	32L	32165	37401	45 dB(a)	130,4 m <sup>2</sup>	1,24 m <sup>2</sup>	1 1/8"	3/4"	183 Kg	220 Kg		
	34L	34907	40590	46 dB(a)	151,9 m <sup>2</sup>	1,93 m <sup>2</sup>	1 1/8"	3/4"	187 Kg	224 Kg		
	39L	39603	46049	48 dB(a)	137,2 m <sup>2</sup>	2,62 m <sup>2</sup>	1 1/8"	3/4"	227 Kg	272 Kg	220V 3F 8,31A 380V 3F 4,8A	2,85 kW
	44L	44690	51965	47 dB(a)	151,6 m <sup>2</sup>	1,93 m <sup>2</sup>	1 1/8"	3/4"	232 Kg	278 Kg		
	48L	49092	57083	47 dB(a)	202,0 m <sup>2</sup>	1,93 m <sup>2</sup>	1 1/8"	3/4"	247 Kg	296 Kg		

The capacities above refer to the total heat discharged in the condenser under the following conditions:

- Altitude = sea level
- Refrigerant = R-22
- Room Temperature = +35°C
- Condensing temperature = +45°C
- Electronic motor fans with frequency in 60Hz, to 50Hz multiply the capabilities by 0,92.
- Sound level of the reported equipment, refers only to that produced by the fans mounted in the cabinet at 10m distance.
- Other operating conditions and refrigerant gas, see the capacity correction table in this catalog.

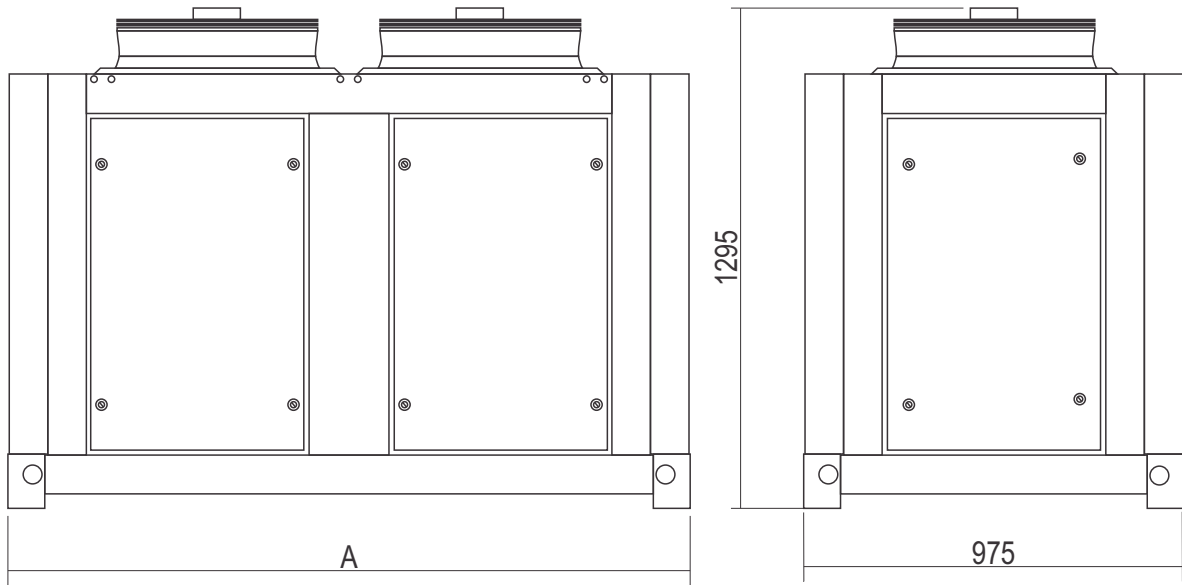
## AC Fans Capacities and Features


		DT 10°C			Heat exchange area	Face Area	Input	Output	Net Weight	Gross Weight	Current	Power
		Kcal/h	W	Noise								
	14L	14730	17128	43 dB(a)	53,8 m <sup>2</sup>	0,68 m <sup>2</sup>	1 1/8"	3/4"	120 Kg	140 Kg	220V 3F 2,77A 380V 3F 1,6A	0,95 kW
	16L	16162	18793	43 dB(a)	71,7 m <sup>2</sup>	0,68 m <sup>2</sup>	1 1/8"	3/4"	126 Kg	151 Kg		
	18L	18483	21492	44 dB(a)	97,0 m <sup>2</sup>	1,23 m <sup>2</sup>	1 1/8"	3/4"	135 Kg	162 Kg		
	23L	22712	26409	45 dB(a)	65,2 m <sup>2</sup>	1,24 m <sup>2</sup>	1 1/8"	3/4"	163 Kg	195 Kg	220V 3F 5,54A 380V 3F 3,2A	1,90 kW
	27L	26902	31281	46 dB(a)	101,0 m <sup>2</sup>	1,93 m <sup>2</sup>	1 1/8"	3/4"	174 Kg	209 Kg		
	29L	28532	33177	45 dB(a)	97,8 m <sup>2</sup>	1,24 m <sup>2</sup>	1 1/8"	3/4"	172 Kg	206 Kg		
	32L	31534	36667	45 dB(a)	130,4 m <sup>2</sup>	1,24 m <sup>2</sup>	1 1/8"	3/4"	183 Kg	220 Kg		
	34L	34223	39794	46 dB(a)	151,9 m <sup>2</sup>	1,93 m <sup>2</sup>	1 1/8"	3/4"	187 Kg	224 Kg		
	39L	38826	45147	48 dB(a)	137,2 m <sup>2</sup>	2,62 m <sup>2</sup>	1 1/8"	3/4"	227 Kg	272 Kg	220V 3F 8,31A 380V 3F 4,8A	2,85 kW
	44L	43814	50947	47 dB(a)	151,6 m <sup>2</sup>	1,93 m <sup>2</sup>	1 1/8"	3/4"	232 Kg	278 Kg		
	48L	48129	55964	47 dB(a)	202,0 m <sup>2</sup>	1,93 m <sup>2</sup>	1 1/8"	3/4"	247 Kg	296 Kg		

The capacities above refer to the total heat discharged in the condenser under the following conditions:

- Altitude = sea level
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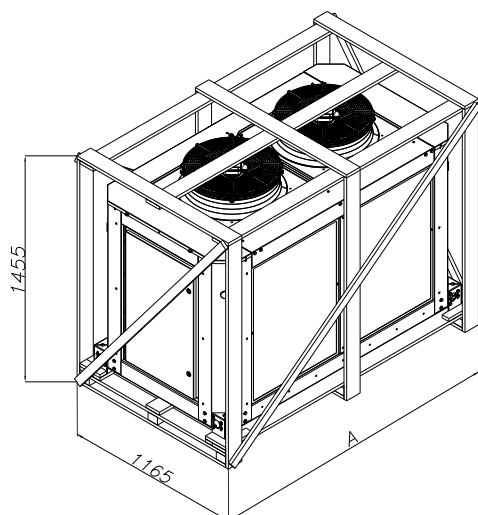
## Dimensional




Dimensional			
		Coil Type	mm
			A
14	1	Straight	1130
16	1	Straight	1130
18	1	Curved	1130
23	2	Straight	1760
27	2	Curved	1760
29	2	Straight	1760
32	2	Straight	1760
34	2	Curved	1760
39	3	Curved	2530
44	3	Straight	2530
48	3	Straight	2530

Connector resistant to temperature variations, vibration and shock. Spring-loaded technology reduces the time for electrical installations without the need for special tools.

## Packing



	Quota A
	mm
1	1276
2	1900
3	2672

(\*) For gross weight, refer to the capacity and characteristics table.

Model	Description	Available Options												
CFLM	Mini Cold Central	CFLM • Mini Cold Central												
F	Spacing Between Fins	F • 12APP												
014L	Model	<table border="1"> <tr> <td>014L</td> <td>023L</td> <td>032L</td> <td>044L</td> </tr> <tr> <td>016L</td> <td>027L</td> <td>034L</td> <td>048L</td> </tr> <tr> <td>018L</td> <td>029L</td> <td>039L</td> <td></td> </tr> </table>	014L	023L	032L	044L	016L	027L	034L	048L	018L	029L	039L	
014L	023L	032L	044L											
016L	027L	034L	048L											
018L	029L	039L												
TN	Circuits	Number of circuits												
00	Accessories	<ul style="list-style-type: none"> <li>00 • Without accessories</li> <li>04 • Pressure transducer</li> <li>05 • Electrical panel with control</li> <li>06 • Electrical panel without control</li> <li>07 • Electric box</li> <li>08 • Electric box and pressuretransducer</li> <li>09 • Pressure transducer andelectrical panel without control</li> </ul>												
A	Finishing	<ul style="list-style-type: none"> <li>J • Protected steel cabinet</li> <li>K • Protected steel cabinet and fins N1 protection</li> <li>L • Protected steel cabinet and fins N2 protection</li> <li>S • Protected steel cabinet and fins N3 protection</li> </ul>												
EC500	Motor	<ul style="list-style-type: none"> <li>Ec500 • EC 500mm Motor Fan</li> <li>AC50A • AC 500mm Motor Fan with 04 Poles</li> </ul>												
Q	Voltage and Frequency	<ul style="list-style-type: none"> <li>H • Motor = 230V/3F/50Hz</li> <li>Q • Motor = 230V/3F/60Hz</li> <li>E • Motor = 380V/3F/50Hz</li> <li>V • Motor = 380V/3F/60Hz</li> </ul>												
1	Packing	1 • Crate												

# Capacity Correction

F1	Factor related to DT (*)													
DT	7	8	9	10	11	12	13	14	15	18	20			
F1	1,42	1,25	1,11	1	0,91	0,83	0,77	0,71	0,67	0,55	0,5			
F2	Coolant factor													
Refrigerant	R22			R134A			R404A			R407C			R410A	
F2	1			1,01			0,983			0,98			0,95	
F3	Factor related to air inlet temperature													
Input Temperature	+15	+20	+25	+30	+35	+40	+45	+50						
F3	0,9	0,95	0,97	0,98	1	1,03	1,08	1,12						
F4	Factor relative to the altitude of the installation site													
Altitude (m)	0	600	800	1000	1200	1400	1600	1800	2000					
F4	1,00	1,04	1,06	1,07	1,09	1,10	1,12	1,14	1,16					
Fsom	Correction of the sound level according to the distance of the condenser and the desired location													
Length (m)	1	2	3	4	5	10	15	20	40	60	80			
Fsom	+20	+14	+10	+8	+6	0	-4	-6	-12	-16	-20			

The thermal capacities shown in the tables in this catalog correspond to standard operating conditions and are not always those available in the project. Thus, we present a correction method for real conditions that must be applied before entering the equipment selection table.

(\*) DT = difference between air inlet and condensation temperatures

FCP	Evaporation Temperature	Coefficient Fcp for hermetic or semi-hermetic compressors Condensing Temperature °C						Coefficient Fcp for open compressors Condensing Temperature °C					
	°C	32	35	40	45	50	55	32	35	40	45	50	55
	10	1,14	1,16	1,18	1,22	1,24	1,29	1,09	1,11	1,13	1,16	1,18	1,21
5	1,18	1,20	1,22	1,25	1,29	1,33	1,12	1,13	1,16	1,18	1,21	1,24	
0	1,21	1,23	1,25	1,29	1,33	1,37	1,14	1,15	1,18	1,21	1,24	1,28	
-5	1,25	1,27	1,30	1,33	1,38	1,41	1,16	1,18	1,21	1,24	1,28	1,32	
-10	1,29	1,31	1,34	1,38	1,43	1,48	1,19	1,21	1,24	1,28	1,32	1,36	
-15	1,33	1,35	1,39	1,43	1,48	1,55	1,23	1,25	1,28	1,32	1,36	1,40	
-20	1,38	1,41	1,44	1,48	1,55	1,62	1,26	1,28	1,32	1,36	1,40	1,45	
-25	1,44	1,47	1,50	1,55	1,62	1,72	1,30	1,32	1,36	1,40	1,45	1,49	
-30	1,51	1,53	1,57	1,62	1,72	1,87	1,34	1,36	1,40	1,45	1,49	1,55	
-35	1,58	1,60	1,66	1,75	1,87	2,07	1,37	1,40	1,45	1,49	1,55	1,62	
-40	1,66	1,70	1,76	1,87	2,03	2,27	1,39	1,45	1,50	1,55	1,62	1,67	

## Selection Example

Terminology	
Q <sub>cd</sub>	Heat actually rejected in the condenser (value for entry in the selection tables)
Q <sub>cp</sub>	Compressor refrigeration capacity (installation design data)
Q <sub>m</sub>	Heat produced by the compressor motor
Q <sub>bhp</sub>	Shaft power in open compressors (in HP)
Q <sub>kw</sub>	Power consumed by hermetic and semi-hermetic compressors
F1, F2, F3, F4, Fsom e FCP	Correction factors and factor for compressors
TA	Room temperature

Data	
Compressor Semi-hermetic	QCP Capacity 68000 Kcal/h
Refrigerant R 404A	Ambient temperature of the installation site + 30°C
TEV Evaporation -10°C	Altitude of installation location 800m
TCD Condensation +45°C	Maximum permissible sound level 55 Dba at 20m of the place

Resolution:

$Q_{cd} = Q_{cp} \times F_{cp} \times F_1 \times F_2 \times F_3 \times F_4$   
 $Q_{cp} = 68000 \text{ Kcal/h}$   
 $F_{cp} = -10^\circ\text{C}/+45^\circ\text{C} = 1,38$  for semi-hermetic compressor  
 $F_1 = T_{cd}-T_a = 45-30 = 15 = 0,67$   
 $F_2 = \text{Gas R404A} = 1,05$   
 $F_3 = +30^\circ\text{C} = 0,98$   
 $F_4 = \text{Altitude} = 1,06$

$Q_{cd} = 68000 \times 1,38 \times 0,67 \times 1,05 \times 0,98 \times 1,06 = 68577 \text{ Kcal/h}$  - Capacity effectively rejected by the condenser in these design conditions.  
 Noise level = 55DBa at 20m = 55-6 = 49DBa at 10m

Defined the capacity to 68577 Kcal/h and the noise level by 49 Dba, go to the table and select the model CDR 094 with the capabilities by 91.108 Kcal/h and 46 Dba.

### Calculation formulas

$$Q_m = P_{bhp} \times 642 \text{ (for open compressors)}$$

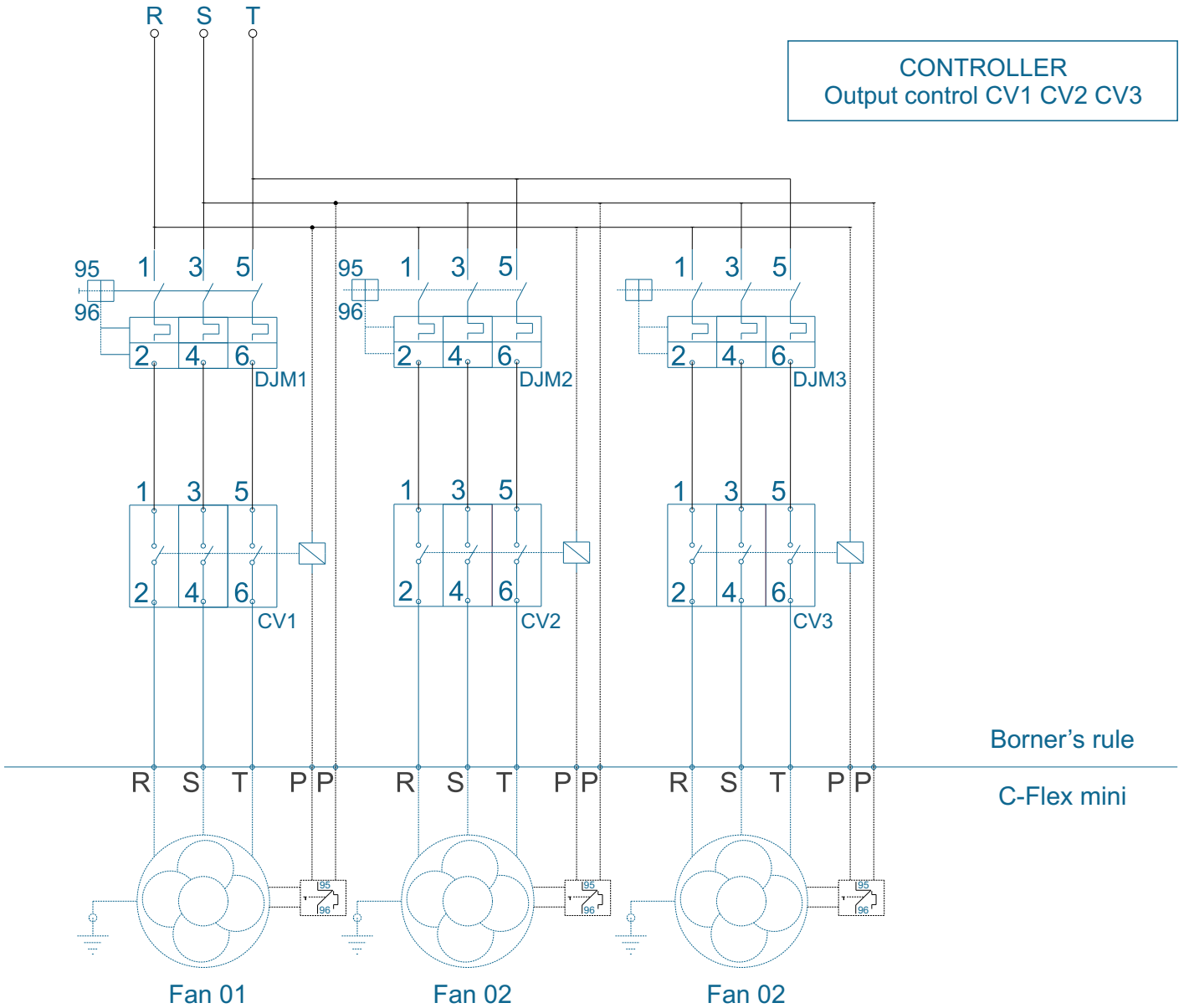
$$Q_m = Q_{kw} \times 860 \text{ (for hermetic or semi-hermetic compressors)}$$

$$Q_{cd} = (Q_{cp} + Q_m) \times F_1 \times F_2 \times F_3 \times F_4$$

If the informations of motor and compressor consumption, we indicate practical factors (Fcp), that can be utilized for the effective rejected capacity in the condenser, follow the formula below:

$$Q_{cd} = Q_{cp} \times F_{cp} \times F_1 \times F_2 \times F_3 \times F_4$$

Main Power



Attention:

- When dimensioning installation components, refer to the catalog data table
- To change factory power, contact Mipal engineering
- The safety thermostat must be connected in series with the contactor coil and the controller heating
- Always use the ground wire
- Connect the fan thermal protector in series with the contactor coil and drive the controller

Subtitles:

- R = Phase 1  
 S = Phase 2  
 T = Phase 3
- PP = Thermal Protector  
 CV = Fan Contactor  
 DJM = Motor Circuit Breaker

Since 1956 Mipal are writing the history of refrigeration. With a complete line of condensers, evaporators and fins for the most varied commercial and industrial applications, stands out in the market by the high quality and efficiency in our products.

That's why it's growing in large scale our presence in other countries.

This is the result of dedication for innovation and attention to our customers. That's why the Mipal brand it's too strong, becoming a synonym of technology and reliability.

## INTENSE

Mipal developed the Intense system with electronic motor fans and the concept of intense thermal exchange, improving the efficiency in finned equipments. This represents one more innovation from Mipal, aligned with world trends for maximum performance and low energy consumption.