

## FANS FOR CONDENSING UNITS

### 1 Introduction

Condensing units manufactured by Copeland are equipped with fan(s). Various fan models are and were used. That is to say that today, it is possible to meet various fan(s) on the after-sales market.

### 2 General information

Condensing units can be equipped with 1, 2 or 4 fans. The complete fan consists of an external rotor motor with the fan blades permanently fixed to the rotor and the fan guard. The grid has 4 feet to mount it on the condenser. Fan motors are protected by a thermostatic switch. A single-pole bimetallic-element switch protects the motor against damage from:

- Motor overload
- Over-voltage and under-voltage
- Electrical and mechanical blockages
- Inadequate cooling.

The fans protection is IP 54 and its insulation class is "F". Most fans can be equipped with a speed controller connected to the condensing pressure.

### 3 Fans for Copeland Scroll and DWM Copeland semi-hermetic condensing units

The fan is positioned in order to blow the air from the condenser to the compressor, so the compressor additional fan is not necessary any more.

**NOTE:** After connecting the condensing unit electrically, check the rotational direction. **The fan must blow from the condenser to the compressor.**

**NOTE:** All fans presently used on condensing units are **single-phase** fans.

#### 3.1 Single-phase fans

Single-phase fans are used since January 2003.

##### 3.1.1 Technical data

As described in table 1, various fan models are used.

Fan model	Blade diameter	Power input W	Voltage V (±10%) / Ph / Hz	Run capacitor µF / V		Motor current A	Winding resistance Ω (±10%), 25°C	
	mm			EBM	Rotomatika		Main	Auxiliary
71	300	95	220 - 240 / 1 / 50	3 / 400	2.5 / 400	0.44	115	129
121	350	117	220 - 240 / 1 / 50	4 / 400		0.54	72	108
271	420	300	220 - 240 / 1 / 50	5 / 400	6.3 / 400	1.35	25	88
611	500	570	220 - 240 / 1 / 50	10 / 400		2.4	8.5	20.5

**Table 1:** Technical data – single-phase fans

### 3.1.2 Single-phase fan wiring diagram

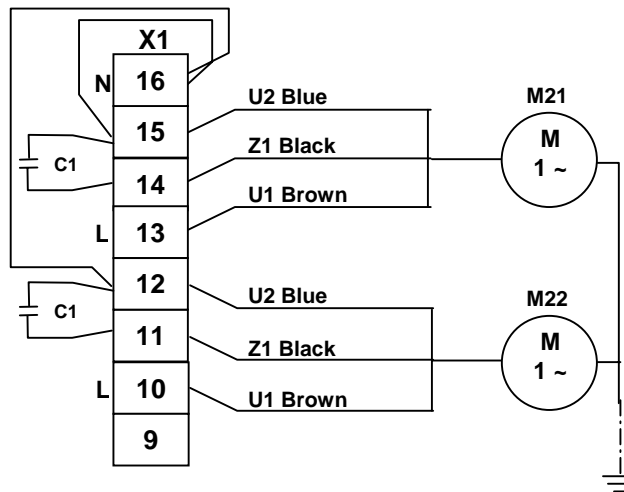


Figure 1: Single-phase wiring diagram (230V ±15% / 1 ~ / 50-60 Hz)

## 3.2 Three-phase fans

Before January 2003, three-phase fans were used.

### 3.2.1 Technical data

Fan model	Blade diameter	Power input	Voltage	Run capacitor	Motor current	Winding resistance		
	mm		W				V (±10%) / Ph / Hz	µF / V
75	300	80	220 - 240 / 1 / 50	5 / 400	0.36	102		
			220-240 Δ / 380-420 Y / 3 / 50				0.33 / 0.19	104 ± 3 / 218 ± 6
			500 - 550 / 3 / 50					
120	350	135	220 - 240 / 1 / 50	8 / 400	0.63	54.7		
			220-240 Δ / 380-420 Y / 3 / 50				0.55 / 0.32	57 ± 3 / 172 ± 10
			500 - 550 / 3 / 50					
270	420	280	220 - 240 / 1 / 50	16 / 400	1.3	20		
			220-240 Δ / 380-420 Y / 3 / 50				1.10 / 0.65	20 / 60
			500 - 550 / 3 / 50					
610	500	630	220 - 240 / 1 / 50	25 / 400	3.6	6.2		
			220-240 Δ / 380-420 Y / 3 / 50				2.95 / 1.70	6.2 / 18.6
			500 - 550 / 3 / 50					

Table 2: Technical data – three-phase fans

“Old” units were delivered with three-phase fans as a standard, but it is possible to convert these fans into single-phase motor by the mean of a capacitor. The characteristics of this run capacitor are given in table 2.

“New” single-phase kits can be used for retrofitting on units equipped with three-phase fans.

- fan 75 is replaced by 71
- fan 120 is replaced by 121
- fan 210 is replaced by 211
- fan 610 is replaced by 611

3.2.2 Three-phase fan wiring diagrams

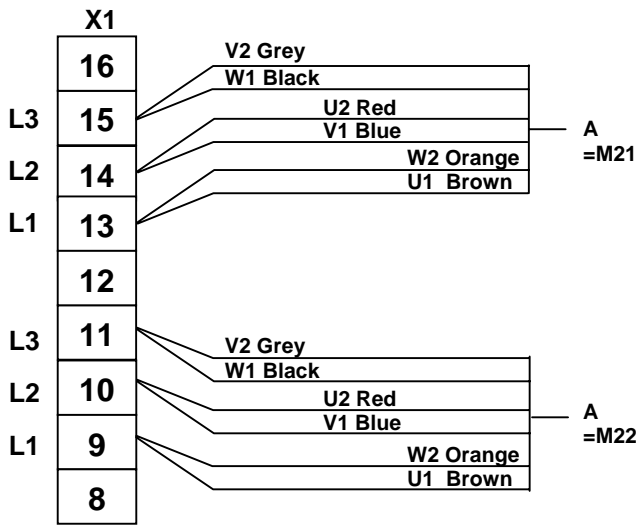


Figure 2: Δ 230V ±15% / 3 ~ / 50-60 Hz

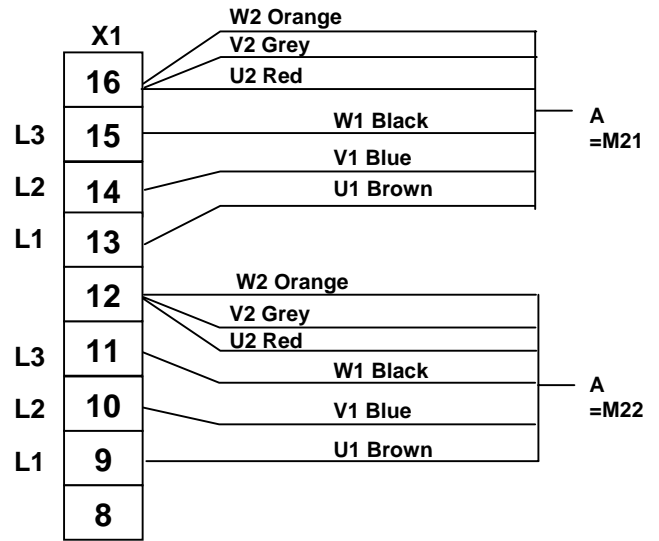


Figure 3: Y 400V±15% / 3 ~ / 50-60 Hz - Y 500V±15% / 3 ~ / 50-60 Hz

Three-phase fans can also be connected in single-phase thanks to a run capacitor.

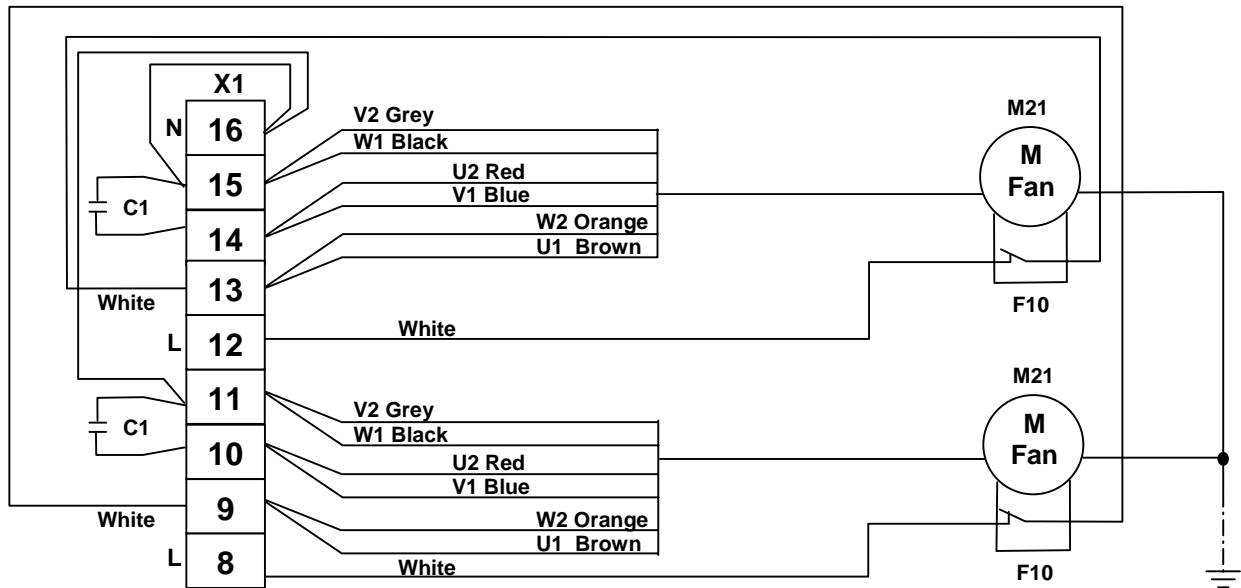


Figure 4: Three-phase fan converted to single-phase: Δ 230V ±15% / 1 ~ / 50 Hz

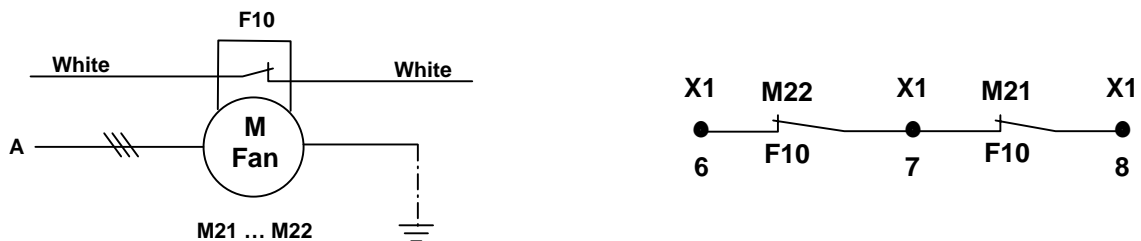


Figure 5: Fan motor protection = F10

### 3.3 Fans used on units manufactured before 1994

If you have an "old" unit manufactured before 1994, some fans are not supplied anymore, but you can replace them with the present fans.

You can find the equivalent in the following cross reference (table 3).

Old condensor	Fan characteristics			Replacement fan
	Blade $\phi$ mm	Motor		
Q2 Q3	350	25W	1 Ph	still supplied
Q3 Q4 T42 T43 T81	350	60W	3 Ph	model 120 / 121
Q5 Q6 Q7 T5 T71 T82	356	60W	3 Ph	model 120 / 121
Q8 Q10 Q12 T93 T94 T101 T121 T151	420	200W	3 Ph	model 270 / 271
T17 U61 U121	500	700W	3 Ph	still supplied

Table 3: Cross-reference: replacement fans

## 4 Fans for Copeland EazyCool outdoor condensing units

The OM and OL units are fitted with a single-phase fan since the beginning of 2003, earlier manufactured units are provided with a three-phase fan, models 120 and 270 depending on the condensing unit model.

Current used fans (model 121 or 271) are interchangeable with the previous models, but the wiring has to be changed to single-phase wiring.

The OMQ and OLQ have a low speed (910 rpm) 6 pole single-phase motor.

Today, the condensers of the OM, OMQ, OL and OLQ units are equipped with single-phase fan(s).

The fan model is given in our Product Selection Catalogues and in Copeland Selection Software, both available on [www.eCopeland.com](http://www.eCopeland.com).

### 4.1 Technical data

Fan model	Blade diameter	Power input W	Voltage V ( $\pm 10\%$ ) / Ph / Hz	Run capacitor $\mu F / V$		Motor current A	Winding resistance $\Omega$ ( $\pm 10\%$ ), 25°C	
	mm			EBM	Rotomatika		Main	Auxiliary
121	350	117	220 - 240 / 1 / 50	4 / 400		0.54	72	108
271	420	300	220 - 240 / 1 / 50	5 / 400	6.3 / 400	1.35	25	88
65	350	78	220 - 240 / 1 / 50	2 / 400	3.15 / 400	0.31	143	159
145	420	155	220 - 240 / 1 / 50	4 / 400	6.3 / 400	0.67	45.9	51.6
301	500	290	220 - 240 / 1 / 50	8 / 400		1.7	24.7	33.3

Table 4: Technical data – fans for Copeland EazyCool condensing units

### 4.2 Wiring diagram

See figure 1.

Information in this document are subject to change without notification.