

## ZMZ91/92/93 Series

### PTC THERMISTORS 正溫度系數熱敏電阻器

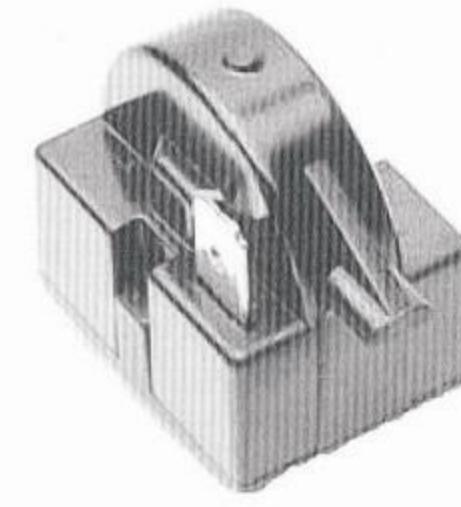
用于壓縮機啟動保護  
-For motor starting & refrigeration compressors

#### 產品特點FEATURES

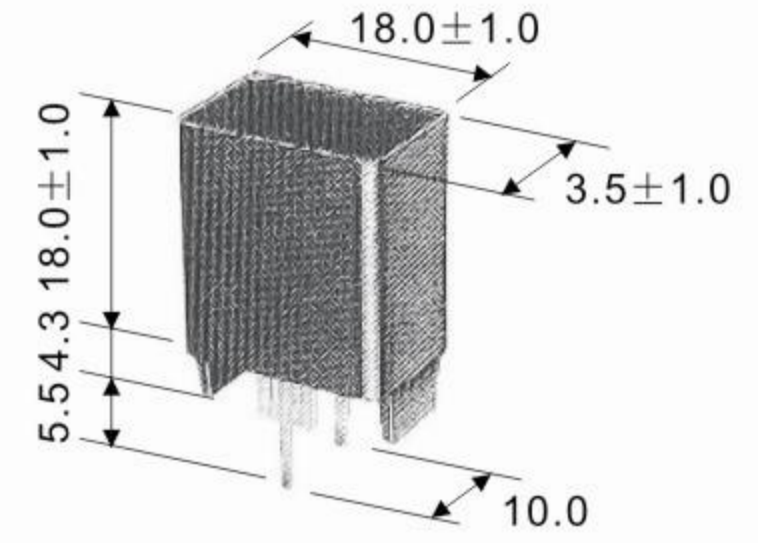
- 冰箱、飲水機、制冰機壓縮機啟動用PTC熱敏電阻器  
制冷壓縮機由單相感應電動機驅動。電機啟動時，既要克服本身的慣性，又要克服負載——高壓制冷劑的反作用力，需要提供較大的啟動電流和轉矩，當電機運轉正常後，需要的轉矩將大幅度下降。因此，通常採用如下的啟動電路（見下圖1），將PTC熱敏電阻器串聯于啟動繞組中，電機開始通電時，PTC處於低阻態，電機在啟動繞組和運行繞組的共同作用下啟動，經過0.2~3S後，PTC由于自熱使其電阻值躍升幾個數量級，相當于切斷啟動繞組使主繞組進入正常運轉，從而完成啟動工作。
- 變頻空調啟動用PTC熱敏電阻器  
變頻空調啟動時，電壓經過PTC元件加到整個濾波電路上，對電容器平穩充電至設定值，功率模塊IPM開始工作，將輸入的直流電壓逆變為三祇交流電加到三相電機繞組上，使電機正常運轉。同時電容器充電至設定值後，經IPM輸出一直流低電壓至繼電器吸合開關K，PTC元件被短接，停止工作（見下圖2）。主回路中串聯PTC元件的作用是：避免在通電初期，整流濾波電路直接承受大電流的衝擊，造成儲能元件受損。即PTC元件在通電初期起一個緩衝與保護的作用。此外，若繼電器失效（無法正常吸合）時，PTC元件成為高阻態，可對電路進行保護。



ZMZ91



ZMZ92



ZMZ93

#### PTC thermistors for starting refrigerator compressor:

Refrigerator compressor is driven by single-phase induction motor. The start-up of motor needs to overcome the inertia of itself, and also the load-the back-action strength of high-pressure refrigeration agent, which requires high start-up current and torque. When the motor is operating normally, the torque required will decrease substantially. Therefore, usually the following start-up circuit(Figure 1)is adopted to establish PTC thermistors in series in start-up coil. When the motor is started under the joint functioning of start-up coil and operating coil, and after 0.4~3s,the resistance of PTC will increase by several orders of magnitude because of its own heat, which is equivalent to cutting off start-up coil to enable normal operation of major coil, so that the starting process is accomplished.

#### PTC thermistors for starting frequency conversion air-conditioner:

When starting frequency conversion air-conditioner,the voltage is added to the whole wave filtration circuit through PTC components to recharge the capacitor stably to the preset value, and the power module IPM begins to work and transform inversely the input DC voltage into 3 lines of AC power added on the coils of 3-phase motor.In the mean time,after the capacitor is recharged to the preset value,the IPM will output DC low voltage to the relay pick-up switch to short-circuit and stop the PTC components.(Figure2)  
The function of series PTC components in main loop is to avoid the impact of high current on rectification wave-filtration circuit and consequently the damage of energy-conservation components during the initial period of galvanization.That is, PTC components function as a buffer and protector. Besides, in case of the failure(unable to pick up normally) of relay, PTC components will have high resistance, which can protect the circuit.

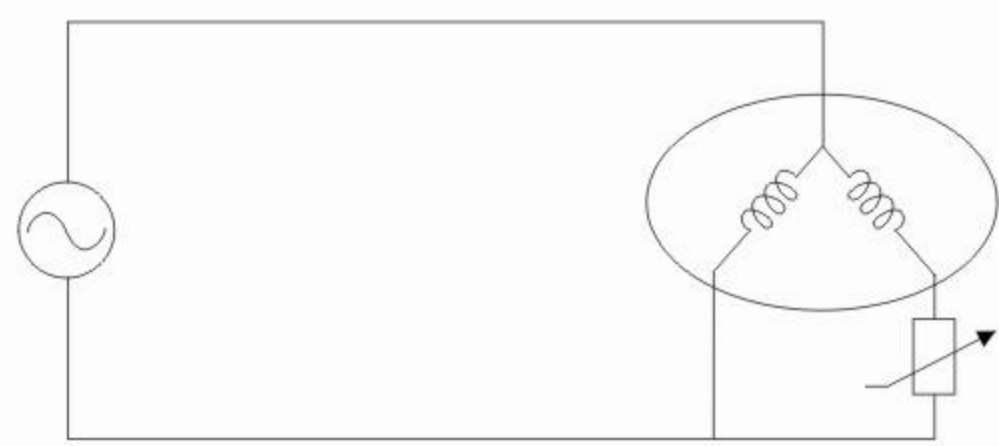


圖1

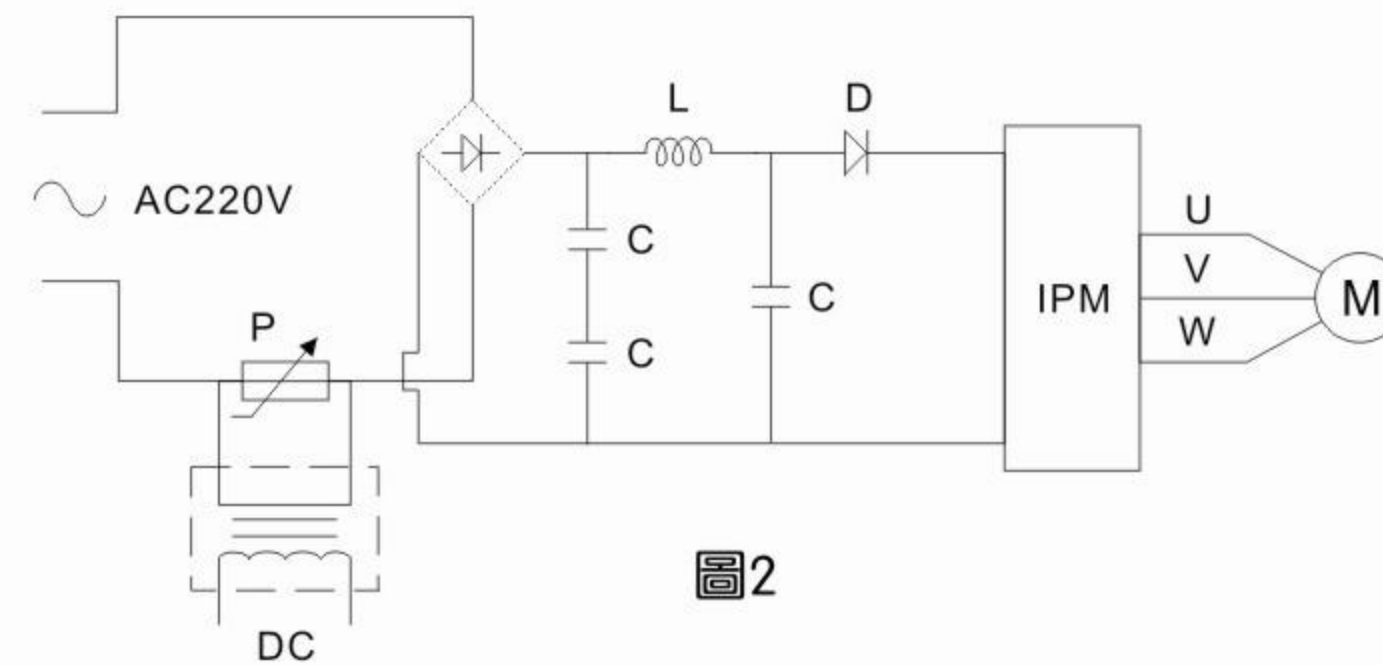


圖2

#### HOW TO ORDER

ZMZ91 105 HL 330 M 355 N

ZMZ91=Disc Type 芯片型  
ZMZ92=Encased Type 殼裝型  
ZMZ93=Soldering Leads Type 焊接引綫型

Curie Temp.居裏溫度  
105=105<sup>+10</sup><sub>-5</sub> °C,  
121=120 ± 7°C,135=135 ± 7°C.

Dimension 尺寸  
(HL=φ16.0X2.5mm,LL=φ19.5X2.5mm,  
LM=φ19.5X3.2mm,LN=φ19.5X5.0mm)

N: 符合ROHS要求  
N: Compliance with ROHS directive

Max.Operating Vol.最大工作電壓:  
180V 250V 300V 355V 450V

Tolerance of Resistance 阻值誤差  
(M= ± 20%,V= ± 25%,X=+30%/-20%)

額定零功率電阻R  
Rated zero power resistance  
330=33Ω,4R7=4.7Ω,101=100Ω

#### 規格 Specifications

#### ZMZ91 Series

No. 序號	Rated zero-power resistance 額定零功率電阻 Rn(Ω)	Curie Temp. 居裏溫度 Tc(°C)	Max. Voltage 最大電壓 Umax(V)	Max. Current 最大電流 Imax(A)	Start-up time 啟動時間 to(S)	Power consumption 消耗功率 Pmax(W)	Restoration time 恢復時間 Tmax(S)	Coil resistance 綫圈電阻 Rref(Ω)	Dimensions尺寸	
									Diameter 直徑 D (mm)	Thickness 厚度 T (mm)
01	5.0	105 <sup>+10</sup> <sub>-5</sub>	180	12	0.2-1.2	3.0	110	10	16.0±0.5	2.5±0.2
02	6.8		180	12	0.2-1.2	3.0	105	10		
03	10		180	12	0.2-1.2	3.0	95	10		
04	22		300	7	0.2-1.2	3.0	105	25		
05	33		355	6	0.2-1.2	3.0	110	25		
06	4.7	120±7	180	12	0.2-1.3	3.3	85	10	16.0±0.5	2.5±0.2
07	6.8		180	10	0.2-1.2	3.3	90	10		
08	15		350	8	0.2-1.2	2.8	100	30		
09	22		350	7	0.2-1.0	2.8	85	30		
10	33		355	6	0.2-1.0	2.8	90	55		
11	47		350	5	0.2-1.0	2.8	80	30		

## 規格 Specifications

No. 序號	Rated zero-power resistance 額定零功率電阻 R <sub>N</sub> (Ω)	Curie Temp. 居裏溫度 T <sub>c</sub> (°C)	Max. Voltage 最大電壓 U <sub>max</sub> (V)	Max. Current 最大電流 I <sub>max</sub> (A)	Start-up time 啟動時間 t <sub>0</sub> (S)	Power consumption 消耗功率 P <sub>max</sub> (W)	Restoration time 恢復時間 T <sub>max</sub> (S)	Coil resistance 綫圈電阻 R <sub>ref</sub> (Ω)	Dimensions尺寸	
									Diameter 直徑 D (mm)	Thickness 厚度 T (mm)
12	3.3	135±7	160	12	0.4-1.3	3.5	90	25	16.0±0.5	2.5±0.2
13	4.7		180	12	0.4-2.5	3.5	85	10		
14	6.8		200	10	0.2-1.5	3.0	75	10		
15	10		200	8	0.2-1.5	3.0	65	25		
16	15		350	8	0.15-1.0	3.0	60	30		
17	22		300	7	0.2-1.0	3.0	65	30		
18	33		355	6	0.2-1.0	2.8	60	55		
19	47		400	5	0.2-1.0	3.5	60	25		
20	68		400	4	0.2-1.0	3.5	60	55		
21	4.7		120±7	180	12	0.3-1.5	3.5	100		
22	5.5	200		10	0.3-1.5	3.5	90	10		
23	10	200		10	0.2-1.5	3.5	90	10		
24	20	300		8	0.2-1.3	3.5	85	30		
25	33	355		6	0.2-1.3	3.5	85	55		
26	4.7	120±7	180	12	0.5-2.5	3.5	100	10	19.5±1.0	2.5±0.2
27	6.8		200	10	0.2-1.5	3.5	100	25		
28	15		350	8	0.2-1.5	3.0	100	30		
29	22		350	7	0.2-1.5	3.0	85	30		
30	33		355	6	0.2-1.5	3.0	85	55		
31	47		400	5	0.2-1.5	3.0	75	55		
32	4.7	135±7	180	12	0.5-2.5	3.5	90	10	19.5±1.0	2.5±0.2
33	6.8		200	10	0.2-1.5	3.5	90	15		
34	15		350	8	0.2-1.5	3.5	100	30		
35	22		350	7	0.2-1.5	3.5	80	30		
36	33		355	6	0.2-1.5	3.3	65	55		
37	47		400	5	0.2-1.5	3.0	60	55		
38	4.7	120±7	180	12	0.2-2.5	4.0	120	25	19.5±1.0	3.2±0.2
39	6.8		200	10	0.2-2.0	4.0	120	10		
40	10		250	10	0.2-2.0	4.0	110	15		
41	15		250	8	0.2-1.5	3.5	100	30		
42	30		350	6	0.2-1.5	3.5	100	30		
43	40		350	5	0.2-1.5	3.5	100	30		
44	15	120±7	250	8	0.5-5.0	5.0	130	25	19.5±1.0	5.0±0.2
45	25		300	7	0.5-5.0	5.0	120	25		
46	30		350	6	0.5-4.0	4.0	120	25		
47	40		350	5	0.5-4.0	4.0	110	25		

## ZMZ92 Series

No. 序號	Rated zero-power resistance 額定零功率電阻 R <sub>N</sub> (Ω)	Curie Temp. 居裏溫度 T <sub>c</sub> (°C)	Max. Voltage 最大電壓 U <sub>max</sub> (V)	Max. Current 最大電流 I <sub>max</sub> (A)	Start-up time 啟動時間 t <sub>0</sub> (S)	Power consumption 消耗功率 P <sub>max</sub> (W)	Restoration time 恢復時間 T <sub>max</sub> (S)	Coil resistance 綫圈電阻 R <sub>ref</sub> (Ω)
01	4.7	120±7 135±7	180	12	0.2-2.5	4.0	120	10
02	6.8		200	10	0.2-2.5	4.0	120	10
03	15		350	8	0.2-1.5	3.5	110	30
04	22		350	7	0.2-1.5	3.5	105	30
05	33		350	6	0.2-1.5	3.3	95	30
06	47		350	5	0.2-1.2	3.3	85	30
07	68		350	4	0.2-1.2	3.3	80	30
08	100		350	3.5	0.2-1.0	3.3	80	30

## ZMZ93 Series

No. 序號	Rated zero-power resistance 額定零功率電阻 R <sub>N</sub> (Ω)	Curie Temp. 居裏溫度 T <sub>c</sub> (°C)	Max. Voltage 最大電壓 U <sub>max</sub> (V)	Max. Current 最大電流 I <sub>max</sub> (A)	Start-up time 啟動時間 t <sub>0</sub> (S)	Power consumption 消耗功率 P <sub>max</sub> (W)	Restoration time 恢復時間 T <sub>max</sub> (S)	Coil resistance 綫圈電阻 R <sub>ref</sub> (Ω)
01	12	120±7	200	12	0.2-1.5	4.0	100	25
02	15		250	8	0.2-1.5	3.5	100	30
03	22		300	7	0.2-1.2	3.5	100	30
04	33		350	6	0.2-1.2	3.3	90	30
05	47		350	5	0.2-1.2	3.0	90	30
06	68		350	4	0.1-1.2	3.0	90	30
07	100		350	3.5	0.1-1.0	3.0	90	30