

Energy Saving for Air Conditioning System (Prosperity Dielectrics Co., Ltd.)

Etern

By: Kidd Feng 2013/11/20



Case information

Location: Taoyuan, Taiwan

Industry: SMD magnetic chips, power chokes, coils, diode and transformers

Employees: About 450 employees (Taoyuan factory)

Requirement: Energy saving for cooling water pump

Implementation: Inverter control system is designed for cooling water pump to reduce power consumption

◆ Equipment



40HP cooling water pump

◆ Analysis

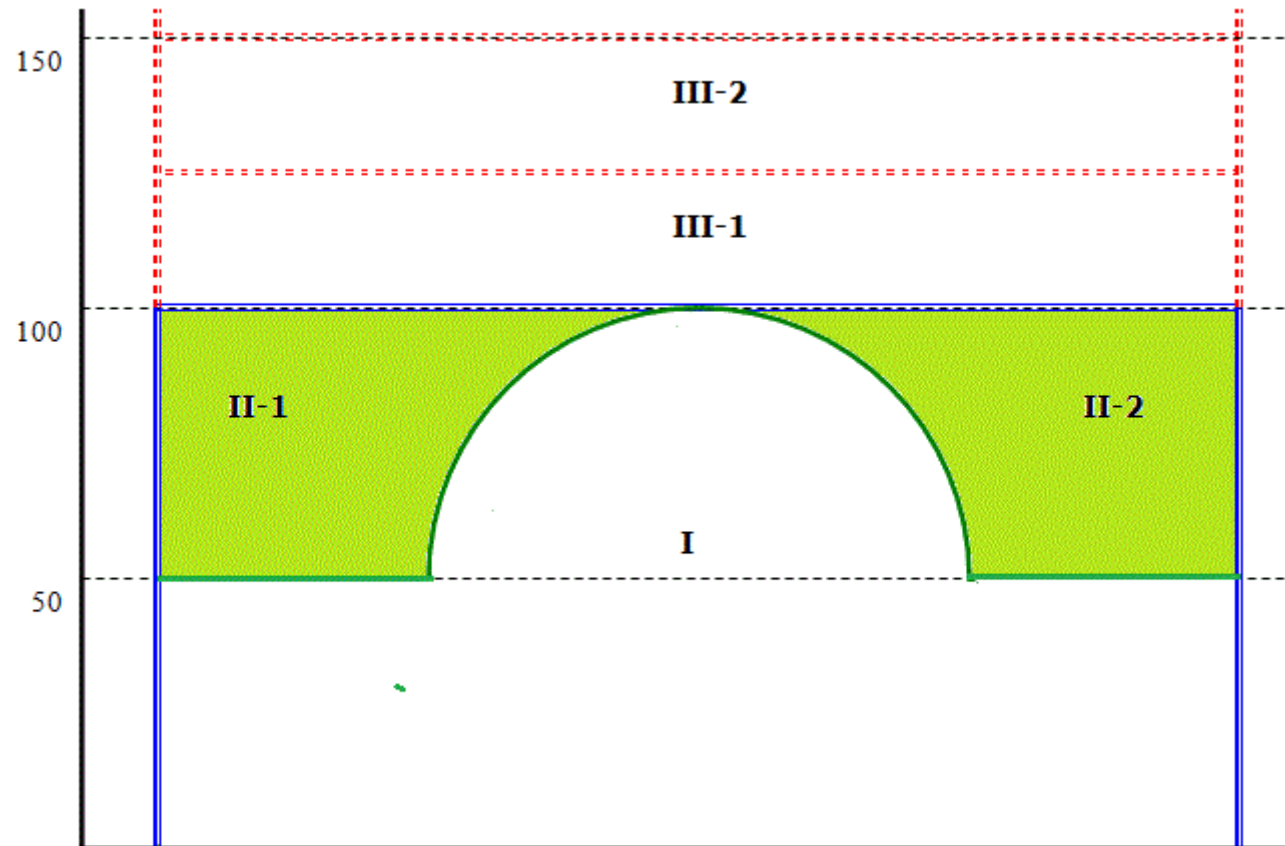
Item	Current	Estimate	Guarantee
Capability (HP)	40	40	40
Consumed (KW)	30.0	30.0	30.0
Energy saving (%)	-	30%	20%
Consumption (KWH/hr)	30.0	21.0	24.0
Operating (hr/day)	24	24	24
Operating (day/month)	30	30	30
Consumption (KWH/month)	21,600	15,120	17,280
Electricity (NT\$/month)	75,600	52,920	60,480
Saving (KWH/month)	-	6,480	4,320
Saving (NT\$/month)	-	22,680	15,120
Implement cost (NT\$)	-		
Return of I.C. (month)	-		

NT\$3.5 /度

◆ Energy saving system



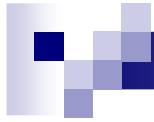
◆ Theorem



- Power consumption of water pump = I + II-1 + II-2 + III-1~2.
- Energy saving by VFD only = III-1~2 (over design).
- Energy saving by VFD with controller = II-1 + II-2 + III-1~2.

◆ Benefits

Place	Air conditioning room					
Equipment	Cooling water pump (40HP)					
Op. mode	Fixed Hz (without ES sys.)			Flexible Hz (with ES sys.)		
Op. period	6/18 ~ 6/26			6/11 ~ 6/18		
Op. hrs	192.5			161.2		
KWH meter	Start	End	Accum.	Start	End	Accum.
KWH	2,530.42	7,681.00	5,150.58	11.84	2,530.42	2,518.58
Standard	KWH/hr	26.76		KWH/hr	15.62	
Saving(%)	$(26.76 - 15.62) / 26.76 = 41.63\%$					
Saving (KWH/month)	$(26.76 \times 24 \times 30) \times 41.63\% = 8,021$					
Saving (NT\$/month)	$8,021 \times 3.5 = \text{NT\$}28,074$					
Saving (NT\$/year)	$28,074 \times 12 = \text{NT\$}336,888$					
Acceptance	Qualified					



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