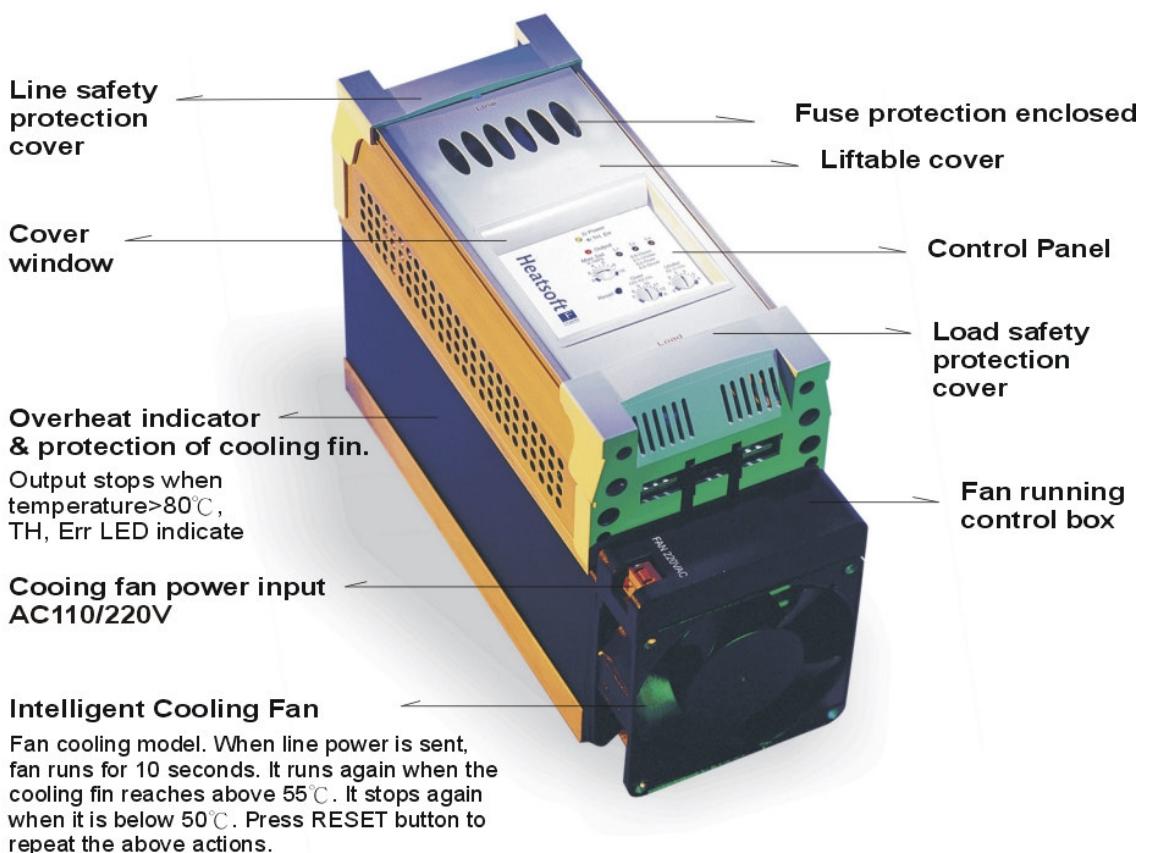
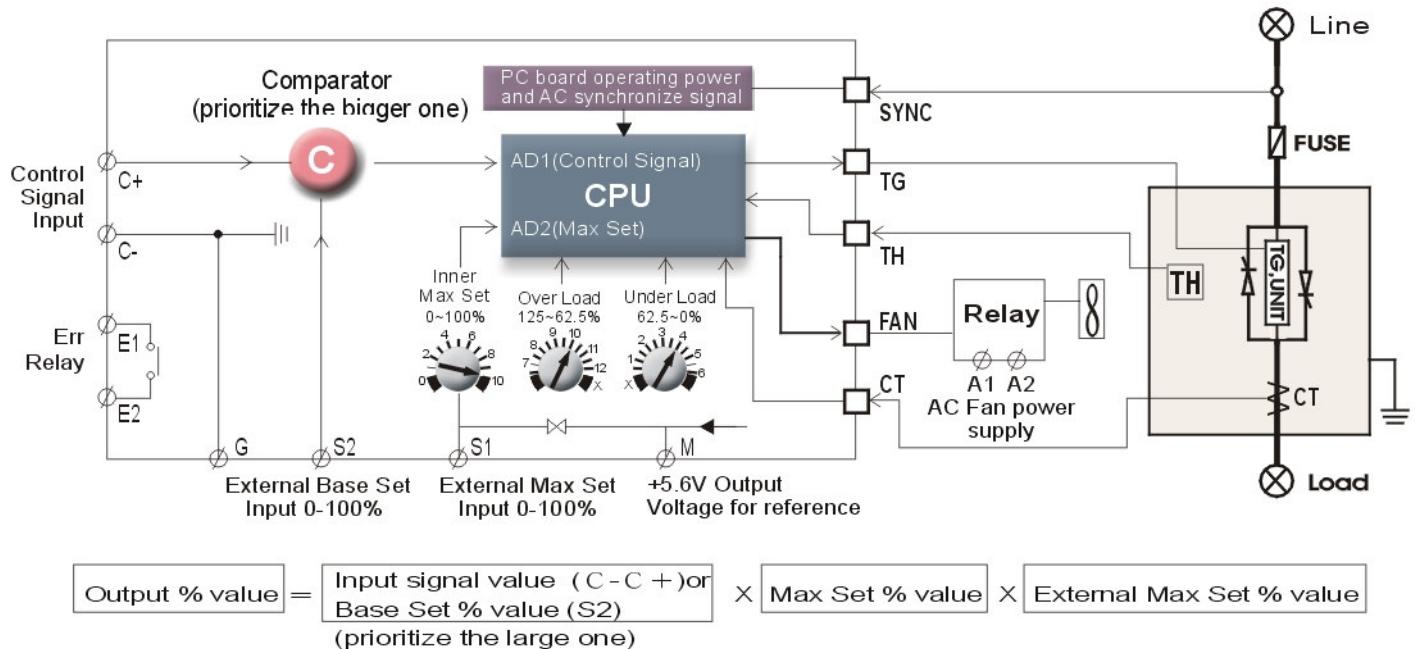


## Exterior Description



**Note:** The cover can be lifted by pushing the load safety protection cover downwards. For wiring and fuse changing, if it is necessary, the aluminum side-on on top can be pulled open and away down the cover.

## Inner Wiring Block Diagram



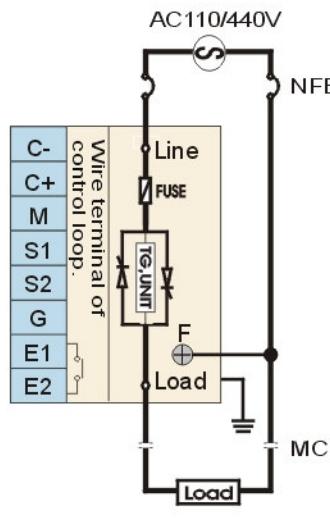
## Wiring Diagram and Operation Instruction

- Heatsoft-K type model doesn't need any external auxiliary power. In operation, the PC board is powered by Line. Please ensure that the power voltage is within the operation voltage range.
- Please refer to the load current curve and select appropriate power specifications.
- Please refer to screw tightness chart and fasten Line, Load and power screws of fuse.
- Please install the isolation magnetic switch (MC) on the Load side (Do not on the Line side).  
 Thus when MC goes off, Line is powered so that exception indicator light can keep glowing.
- Remember to wire F terminal of the single-phase (KB) model. Otherwise the Power LED will not turn on, and thus it is unable to operate.
- Heatsoft-K type model has embedded fuse as the protection against short current. If the fuse has fused, please replace it with another one with the same specification.
- Heatsoft-K Type model has an Error Relay output connection (output capacity: 3A/250V AC, 30V DC Resistive Load). It can be configured as the output for either A or B connection, used as alert or chain protection control.

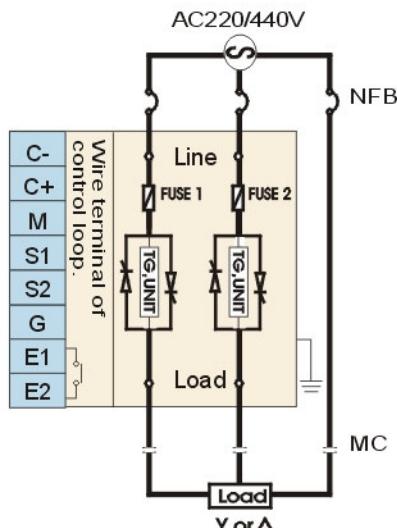


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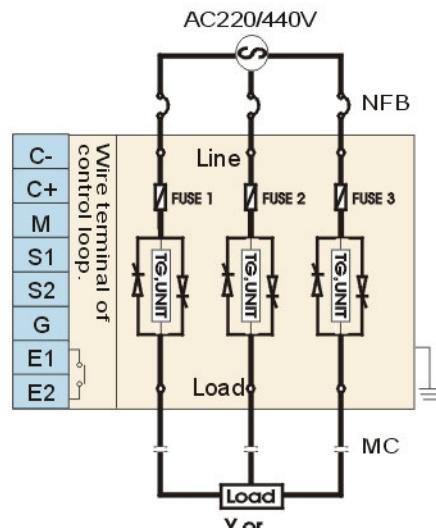
**KB** 1φ 1 Leg 1 Fuse Double Functions: Zero Crossing, Phase Angle



**KD** 3φ 2LEG 2FUSE ZERO CROSSING



**KF** 3φ 3LEG 3FUSE ZERO CROSSING



### Panel Indicator Lamp and Operating Adjustment Description



1. Power --- Indicator lamp (green)  
TH Err  
Green lamp is continuously lightened when line conveys power. It blinks when the cooling fin is overheated or the temperature detector of cooling fin breaks down or disconnected.
2. Output indicator lamp (red) Indicates the output condition of Heatsoft-F. ●Zero crossing control: Blinking indication. The lamp blinks faster, the output is bigger.  
●Phase angle control: Brightness indication. Brighter lamp Shows bigger output.
3. Max Set adjusting VR: Internal biggest output value adjusting VR (adjustable within 0-100%). If the temperature of the facility increases too fast or the designed watt is too high, output % can be lowered with this VR.

4. Reset button manual resume button after unusual condition is resolved. By pressing this button, the machine will restart.
5. Over configuration VR - It sets the value to trigger load current overload detection  
Overload Current(A) = VR value (%) x Heatsoft-K rated current
6. Under configuration VR - It sets the value to trigger load current under load detection  
Under Load Current(A) = VR value (%) x Heatsoft-K rated current  
※ Over or Under set VR will disable detection function when switch to X.
7. Error indicator light (yellow) - It indicates the following 4 error messages:  
E0 (Always on) - Load open or Fuse meltdown  
E1 (one flash) - Load current underflow E2 (two flashes) - Load current overflow  
E3 (three flashes) - Thyristor short circuited



Type

## Input signal and function switching

◆ Lift the Heatsoft-K panel upwards. There are DIP.SW S1~S8 to switch functions on main control PC board.  
Setting Code Example: \* APNAA (Refer to the chart below, arrange ① ② ③ ④ in sequence)

① Input Signal	A DC4-20mA	B DC1-5V	C DC2-10V	D DC0-20mA	E DC0-5V	F DC0-10V
S1	ON	OFF	OFF	ON	OFF	OFF
S2	OFF	OFF	ON	OFF	OFF	ON
S8	OFF	OFF	OFF	ON	ON	ON

② Model	KB				KD	KF
	P 1φ 1W phase angle (standard mode)	R 1φ 1W phase angle (High speed model)	Y 1φ 1W Phase angle start, zero crossing running	Z 1φ 1W zero crossing	Z 3φ 3W phase angle (standard mode)	Z 3φ 3W phase angle (High speed model)
S3	ON	OFF	OFF	OFF	OFF	OFF
S4	OFF	ON	ON	OFF	OFF	OFF
S5	OFF	ON	OFF	ON	OFF	ON

③ Output reaction speed	S7	Other model	OFF	N	Adjust reaction speed 0.6 seconds (0~100%), soft start speed 8 seconds (0~100%)	N1	
			ON	S	Adjust reaction speed 10 seconds (0~100%), soft start speed 30 seconds (0~100%)		
	Real Time model	OFF	Q	Adjust reaction speed 0.1 second (0~100%), no soft start function	N1		
		ON	R	Adjust reaction speed 0.1 second (0~100%), soft start speed 8 seconds (0~100%)			

- N1. Heatsoft-K will enter buffered boot-up mode automatically at power-on or when the input signal, including BASE SET signal, drop to 0% for more than 60 seconds.

④ Error reset	S6	OFF	A	Auto reset	When error happened, Power green lamp flash, after error is cleared, it runs auto reset, (error of heater & thyristor error detection can not run auto reset)	N1
		ON	B	Manual reset	When error was happened, Power green lamp flash, after error is cleared, it must reset manual (press reset key or auxiliary power supply again, to re-start)	

⑤ N2	Output connection	B Connection B: Normally Closed (NC).	A Connection A: Normally Open (NO)	Always closed after being powered.	Always Open.
		OFF	ON	ON	OFF
		ON	OFF	ON	OFF

- N2. When switched to connection B in NC mode, it can detect if LINE is powered. When there's no power in LINE, Relay connection will be closed due to the lack of power. If Relay is open at that time, it's an error signal.

## Exception Detection

Exceptions	Indication Light	Output and Relay Connection Status			S6 On Manual Reset
		S6 Off Auto Reset		S6 On Manual Reset	
Open Open Load or Fuse fused	Yellow Light Always On	3φ 3 legs model and 3φ 2 legs model will keep updating output but broken leg. Single phase 1 leg model didn't keep updating output.	Err. Relay is enabled 30 seconds Auto reset after exception is eliminated.	The red light for output goes off. Output is suspended. Err. Relay is enabled. You have to reboot or press Reset button to reset.	
Under Load current under load.	Yellow Light One Flash	Keep updating output.			
Over Load current over load.	Yellow Light One Flash	The red light for output goes off. Output is suspended. Err. Relay is enabled. You have to reboot or press Reset button to reset.			
Short Thyristor shorted.	Yellow Light Three Flashes	The red light for output goes off. Output is suspended. Err. Relay is enabled. You have to reboot or press Reset button to reset.			
TH Err. Heat sink overheat at >80°C	Yellow Light Flashing	The red light for output goes off. Output is suspended. Err. Relay is enabled. Auto reset after the temperature of the heat sink drops below 75°C			

## Output Modes and Appropriate Load

### ● Linear type phase angle



High power stability, stable output, ampere meter runs stably. But, there is one harmonic interruption for every half wave. Weaker in power factor  $\text{COS}\theta$ .

**Features of heating** / Fixed resistor heater, variable resistor heater, and inductive load (Special requirement when making order)

**Application/** Vacuum furnace, high temperature box furnace, lighting control, infrared tube. A facility with fast and sensitive in temperature changes

### ● Distribute type zero crossing



Zero crossing control is in the unit of a whole wave. Without component of half wave, highest power factor  $\text{COS}\theta$  can be reached, saving power and no interruption of harmonics.

### ● Phase angle start, zero crossing running



After progressive output soft start under low voltage in phase angle mode, automatically switched to the zero crossing output mode to swiftly adjust temperature.

This control mode combines the advantages of phase angle and zero crossing control, enabling phase angle soft start to protect heater and also featuring low power consumption and interruption free in zero crossing.

### Features of heating element

CR heating element (cannot be used for impedance, rheostat heating element and inductive load that follow rapid temperature changes)

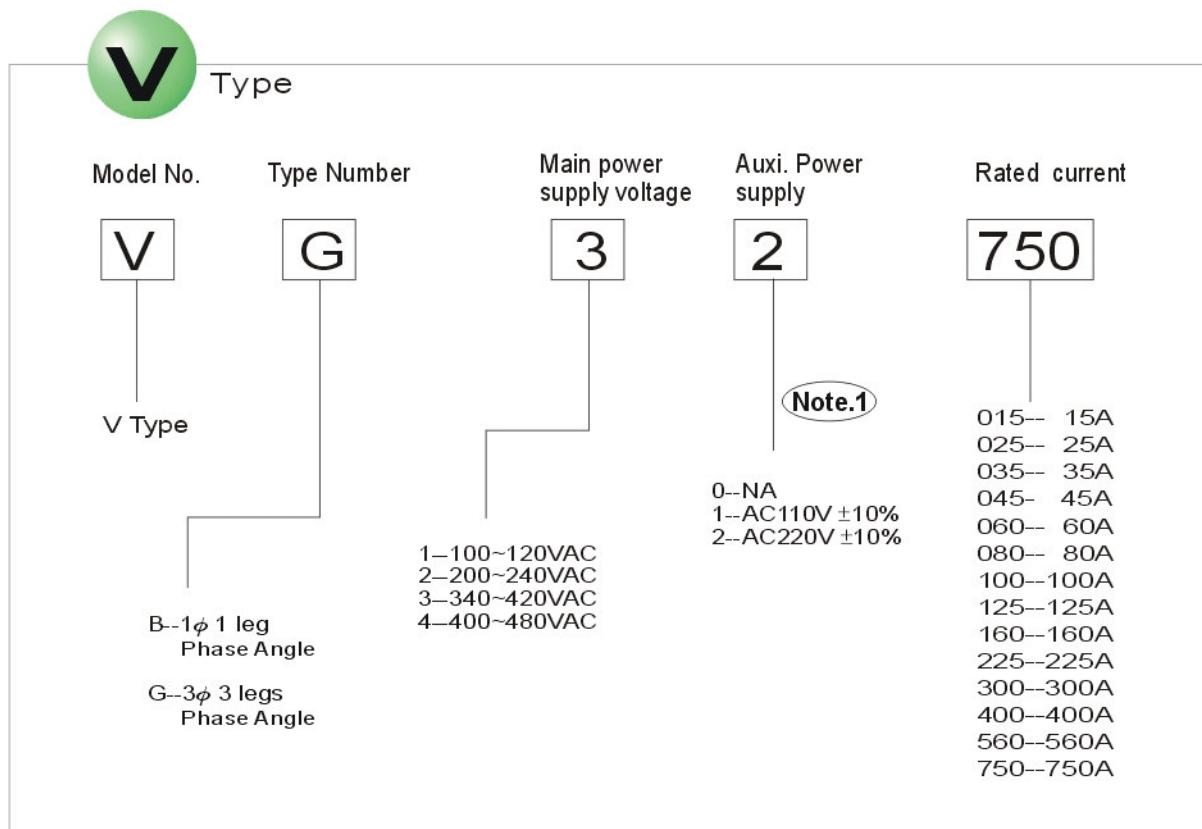
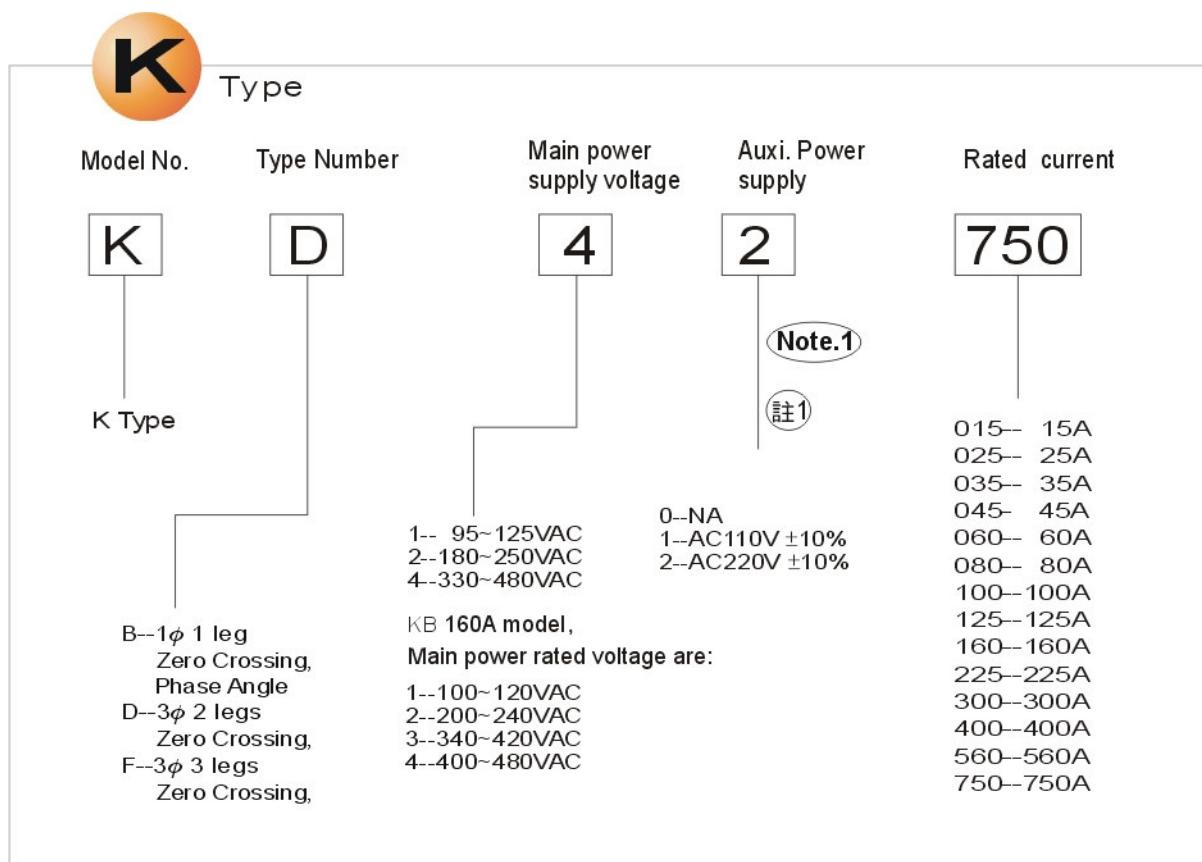
### Application

Constant temperature control. General heating, baking oven, heat treat furnace, plodding machine, injection machine)

★The control precision of the above output modes is accurately calculated. High linear is available  $\pm 1\%$ , resolution is 0.4%, 0-99% of output range, and posses intelligent soft start function (Refer to P5~N1).

## Model no. Identification

F Type				
Model No.	Type Number	Main power supply voltage	Auxi. Power supply	Rated current
F	B	2	0	750
F Type				
B-1φ 1 leg Zero Crossing, Phase Angle	FB 160A model, FD 60A,80A models and FG all models	1-- 95~125VAC 2--180~250VAC 4--330~480VAC	0-NA 1-AC110V $\pm 10\%$ 2-AC220V $\pm 10\%$	025-- 25A 035-- 35A 045- 45A 060-- 60A 080-- 80A 100--100A 125--125A 160--160A 225--225A 300--300A 400--400A 560--560A 750--750A
D-3φ 2 legs Zero Crossing,	Main power rated voltage are:			
F-3φ 3 legs Zero Crossing,	1--100~120VAC 2--200~240VAC 3--340~420VAC 4--400~480VAC			
G-3φ 3 legs Phase Angle				



**Note.1** For those models using compulsive cooling fans (please refer to the "cooling method" column in the shape/size table), ones with LINE voltage differ from AC 110V or AC 220V must equip with an external AC power for cooling fans.



Various of rated current		Case	Length (mm)	Width (mm)	Height (mm)	Weight (kg)	Power and Fuse screw fasten torque	Cooling Type
1φ KB type	AC110 & 220V	15,25,35A	A	195	80	123	1.2	M6 35~50KGfCM
		45A	A	195	80	136	1.5	M6 50~60
		60A	C	195	80	178	2.0	M6 60~70
		80A	E	195	80	220	3.2	M6 70~80
	AC380 & 440V	15,25,35A	A	217	80	123	1.4	M6 35~50
		45A	A	217	80	136	1.8	M6 50~60
		60A	C	217	80	178	2.4	M6 60~70
		80A	E	217	80	220	3.8	M6 70~80
	100A	100A	E	217	80	220	3.8	M6 80~90
		125A	E	270	80	243	4.2	M8 150~170
		160A	F	305	80	243	4.7	M8 180~200
		225A	G	316	120	243	7.6	M10 240~260
	300A	300A	H	370	120	243	9.0	M10 260~280
		400A	H	370	120	243	9.8	M10X2 260~280
		560A	H	436	120	243	12	M10X2 280~300
		750A	H	558	120	243	15	M10X2 300~320
3φ 2 Legs KD type	AC110 & 220V	15A,25A35A	B	195	120	125	2.2	M6 35~50
		45A	D	195	120	168	3.2	M6 50~60
		60A	D	195	120	223	5.0	M6 60~70
		80A	G	240	120	223	6.0	M6 70~80
		100A	G	240	120	223	6.0	M6 80~90
		125A	G	263	120	223	6.5	M6 90~100
	AC380 & 440V	15A,25A35A	B	217	120	125	2.4	M6 35~50
		45A	D	217	120	168	3.5	M6 50~60
		60A	D	217	120	223	5.5	M6 60~70
		80A	G	263	120	223	6.5	M6 70~80
		100A	G	263	120	223	6.5	M6 80~90
		125A	G	316	120	243	7.5	M8 150~170
	160A	160A	G	316	120	243	7.7	M8 180~200
		225A	H	436	120	243	12	M10 240~260
		300A	I	370	240	243	17	M10 260~280
		400A	I	370	240	243	19	M10X2 260~280
	560A	560A	I	436	240	243	24	M10X2 280~300
		750A	I	558	240	243	30	M10X2 300~320
3φ 3 Legs KF type	AC110 & 220V	15,25A	B	195	120	145	2.3	M6 35~40
		35A	D	195	120	188	3.3	M6 40~50
	AC380 & 440V	15,25A	B	217	120	145	2.5	M6 35~40
		35A	D	217	120	188	3.6	M6 40~50
	45A	45A	D	217	120	243	5.6	M6 50~60
		60A	G	263	120	243	7.0	M6 60~70
		80A	G	263	120	243	7.0	M6 70~80
		100A	G	316	120	223	7.8	M6 80~90
	125A	125A	H	370	120	243	9.5	M8 150~170
		160A	I	316	240	243	14	M8 180~200
		225A	I	370	240	243	18	M10 240~260
		300A	I	370	240	243	20	M10 260~280
	400A	400A	J	370	360	243	28	M10X2 260~280
		560A	J	436	360	243	36	M10X2 280~300
		750A	J	558	360	243	45	M10X2 300~320

DC FAN--80x80x25mm DC12V 165mA  
 AC FAN--120x120x38mm AC110V 250mA/AC220V 125mA

