

General-purpose power supply with high cost performance

TDK Switching Power Supply

# E SERIES EAK-G

UL approved

## [FEATURES]

- AC.100V input low-price single output power supply.
- Compact (Height: 95mm).
- Wide variety of lineup covering 15W to 150W.
- LED indicator display function.
- Low noise (FCC class B compliant).

## [SUMMARY]

The E series EAK-G power supplies are bestsellers that have realized low price and compact size (95mm in height). The 5, 12, 15, and 24V outputs versatile for switching power supplies are standardized in a range of the 15W to 150W types. This series of products have been approved in the UL safety standards and in FCC class B of the noise terminal voltage. We recommend them for a wide variety of uses.



## PART NUMBERS AND RATINGS

### EAK-G: AC.100V INPUT(UL RECOGNIZED)

Output voltage(V)	15W Type		30W Type		50W Type		100W Type		150W Type	
	Current(A)	Part No.	Current(A)	Part No.	Current(A)	Part No.	Current(A)	Part No.	Current(A)	Part No.
5	3	EAK05-3R0G	6	EAK05-6R0G	10	EAK05-10RG	20	EAK05-20RG	30	EAK05-30RG
12	1.3	EAK12-1R3G	2.5	EAK12-2R5G	4.2	EAK12-4R2G	8.4	EAK12-8R3G	12.5	EAK12-12RG
15	1	EAK15-1R0G	2	EAK15-2R0G	3.4	EAK15-3R4G	6.7	EAK15-6R6G	10	EAK15-10RG
24	0.7	EAK24-0R7G	1.3	EAK24-1R3G	2.1	EAK24-2R1G	4.2	EAK24-4R2G	6.3	EAK24-6R0G

- :Stock products.

# E SERIES EAK-G15W TYPE

UL approved

## SPECIFICATIONS AND STANDARDS

PART NO.		EAK05-3R0G	EAK12-1R3G	EAK15-1R0G	EAK24-0R7G
Rated output voltage and current*1		5V • 3A	12V • 1.3A	15V • 1A	24V • 0.7A
Maximum output power	W	15	15.6	15	16.8

### INPUT CONDITIONS

Input voltage	V	Eac(V)85 to 132[Rating: 100 to 115] Edc(V)110 to 175			
Input frequency	Hz	47 to 66[Rating: 50 to 60](Single phase)			
Input current	A	0.6/0.5/0.4max.[AC.85/100/115V]			
Fuse rating	A	2[Built-in]			
Surge current	A	8 to 9max.[Input and output ratings, 25°C, cold start]			
Leakage current	mA	0.5max.[Input and output ratings]			
Efficiency	%	71typ.	80typ.	80typ.	80typ.

### OUTPUT CHARACTERISTICS

Output voltage Edc	V	5	12	15	24
Voltage variable range Edc	V	4.5 to 5.5	10.8 to 13.2	13.5 to 16.5	21.6 to 26.4
Maximum output current	A	3	1.3	1	0.7
Overvoltage threshold Edc	V	6 to 6.9	13.7 to 15.7	17 to 19	27 to 30.5
Overcurrent threshold	A	3.3 to 4.9	1.4 to 2.2	1.1 to 1.6	0.8 to 1.2
Voltage stability	Input variation	%	±1max.(±0.3typ.)(Within the input voltage range)		
	Load variation	%	±1.5max.(±0.6typ.)(10 to 100% load)		
	Temperature variation	%	±1max.(±0.3typ.)(Ambient temperature: -10 to +60°C)		
	Drift	%	1max.[25°C, input and output ratings, after input voltage ON for 30min to 8h]		
	Dynamic load	%/ms	±4max./1max.[50 to 100% sudden load change]		
Ripple Ep-p	mV	50max.(30typ.)	80max.(40typ.)	80max.(40typ.)	100max.(50typ.)
Ripple noise Ep-p	mV	120max.	190max.	220max.	310max.
Start up time	ms	100max.			
Hold up time	ms	20min./17min.[0 to +60/-10 to 0°C]			

### AUXILIARY FUNCTIONS

Indicator display	LED(Red) indicates when voltage output is ON.
Overvoltage protection	Voltage shut-down type, recovers upon reset(interval approx. 30s).
Overcurrent protection	Fixed current and voltage threshold type, automatic recovery.
Remote ON-OFF	No
Remote sensing	No
Output voltage external variable function	No

### STANDARDS

Safety standards	UL1950-3 approved.
Noise terminal voltage	FCC class B compliant.

### CONSTRUCTIONS

External dimensions	mm	95×35×90[H×W×L]
Weight	g	380max.
Mounting method		Can be attached to 2 sides.
Case material		Cover: Zinc-plated iron

\*1 Current rating(maximum output current) is determined for -10 to +40°C. Derating is required when used outside this temperature range.

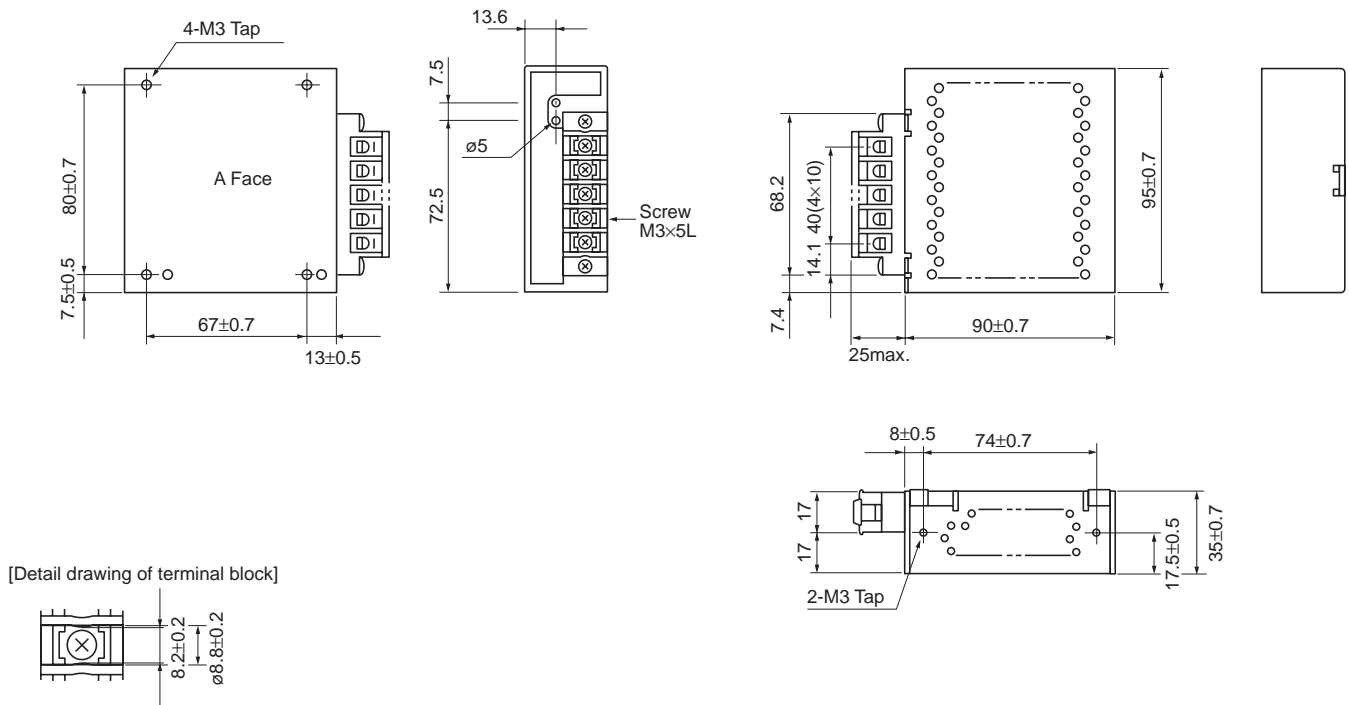
# E SERIES EAK-G15W TYPE

UL approved



## SHAPES AND DIMENSIONS EAK-G15W TYPE

Dimensions in mm  
±1mm : without specified dimensions



Note)

- Do not insert M3 tap installation screws more than 7mm from surface of power supply.
- Important system to earthquake-proof, insert installation Screws to 4 places of A side.

# E SERIES EAK-G30W TYPE

UL approved

## SPECIFICATIONS AND STANDARDS

PART NO.		EAK05-6R0G	EAK12-2R5G	EAK15-2R0G	EAK24-1R3G
Rated output voltage and current*1		5V • 6A	12V • 2.5A	15V • 2A	24V • 1.3A
Maximum output power	W	30	30	30	31.2

### INPUT CONDITIONS

Input voltage	V	Eac(V)85 to 132[Rating: 100 to 115] Edc(V)110 to 175			
Input frequency	Hz	47 to 66[Rating: 50 to 60](Single phase)			
Input current	A	1/0.9/0.8max.[AC.85/100/115V]			
Fuse rating	A	2.5[Built-in]			
Surge current	A	17 to 20max.[Input and output ratings, 25°C, cold start]			
Leakage current	mA	0.5max.[Input and output ratings]			
Efficiency	%	77typ.	81typ.	81typ.	84typ.

### OUTPUT CHARACTERISTICS

Output voltage Edc	V	5	12	15	24
Voltage variable range Edc	V	4.5 to 5.5	10.8 to 13.2	13.5 to 16.5	21.6 to 26.4
Maximum output current	A	6	2.5	2	1.3
Overvoltage threshold Edc	V	6 to 6.9	13.7 to 15.7	17 to 19	27 to 30.5
Overcurrent threshold	A	6.5 to 8.5	2.7 to 4	2.2 to 3.3	1.4 to 2.1
Voltage stability	Input variation	%	±1max.(±0.3typ.)[Within the input voltage range]		
	Load variation	%	±1.5max.(±0.6typ.)[10 to 100% load]		
	Temperature variation	%	±1max.(±0.3typ.)[Ambient temperature: -10 to +60°C]		
	Drift	%	1max.[25°C, input and output ratings, after input voltage ON for 30min to 8h]		
	Dynamic load	%/ms	±4max./1max.[50 to 100% sudden load change]		
Ripple Ep-p	mV	50max.(30typ.)	80max.(40typ.)	80max.(40typ.)	100max.(50typ.)
Ripple noise Ep-p	mV	120max.	190max.	220max.	310max.
Start up time	ms	100max.			
Hold up time	ms	20min./17min.[0 to +60/-10 to 0°C]			

### AUXILIARY FUNCTIONS

Indicator display	LED(Red) indicates when voltage output is ON.
Overvoltage protection	Voltage shut-down type, recovers upon reset(interval approx. 30s).
Overcurrent protection	Fixed current and voltage threshold type, automatic recovery.
Remote ON-OFF	No
Remote sensing	No
Output voltage external variable function	No

### STANDARDS

Safety standards	UL1950-3 approved.
Noise terminal voltage	FCC class B compliant.

### CONSTRUCTIONS

External dimensions	mm	95×35×115[H×W×L]
Weight	g	380max.
Mounting method		Can be attached to 2 sides.
Case material		Cover: Zinc-plated iron

\*1 Current rating(maximum output current) is determined for -10 to +40°C. Derating is required when used outside this temperature range.

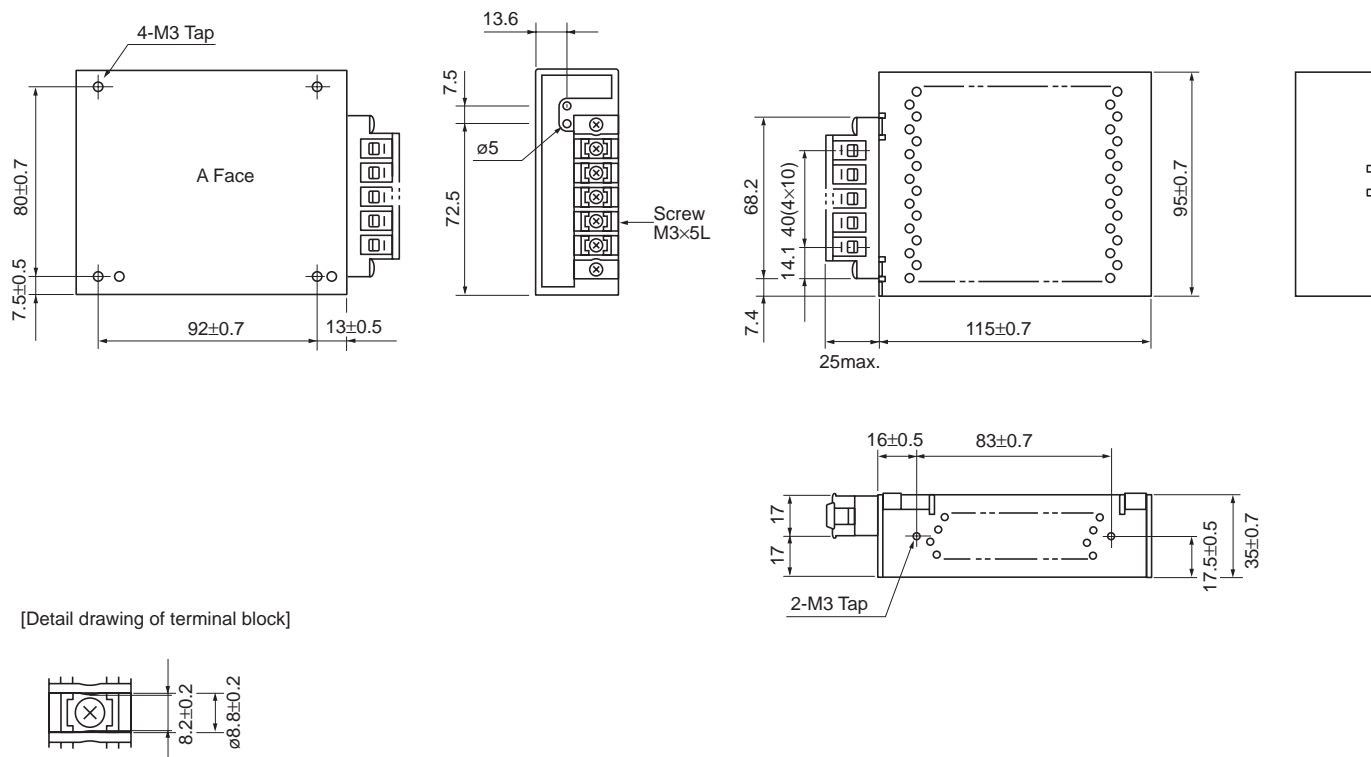
# E SERIES EAK-G30W TYPE

UL approved



## SHAPES AND DIMENSIONS EAK-G30W TYPE

Dimensions in mm  
±1mm : without specified dimensions



[Detail drawing of terminal block]

Note)

- Do not insert M3 tap installation screws more than 7mm from surface of power supply.
- Important system to earthquake-proof, insert installation Screws to 4 places of A side.

# E SERIES EAK-G50W TYPE

UL approved

## SPECIFICATIONS AND STANDARDS

PART NO.		EAK05-10RG	EAK12-4R2G	EAK15-3R4G	EAK24-2R1G
Rated output voltage and current*1		5V • 10A	12V • 4.2A	15V • 3.4A	24V • 2.1A
Maximum output power	W	50	50.4	51	50.4

### INPUT CONDITIONS

Input voltage	V	Eac(V)85 to 132[Rating: 100 to 115] Edc(V)110 to 175			
Input frequency	Hz	47 to 66[Rating: 50 to 60](Single phase)			
Input current	A	1.4/1.2/1.1max.[AC.85/100/115V]			
Fuse rating	A	3.15[Built-in]			
Surge current	A	36 to 41max.[Input and output ratings, 25°C, cold start]			
Leakage current	mA	0.5max.[Input and output ratings]			
Efficiency	%	80typ.	83typ.	84typ.	85typ.

### OUTPUT CHARACTERISTICS

Output voltage Edc	V	5	12	15	24
Voltage variable range Edc	V	4.5 to 5.5	10.8 to 13.2	13.5 to 16.5	21.6 to 26.4
Maximum output current	A	10	4.2	3.4	2.1
Overvoltage threshold Edc	V	6 to 6.9	13.7 to 15.7	17 to 19	27 to 30.5
Overcurrent threshold	A	11 to 13.5	4.6 to 5.7	3.7 to 4.6	2.3 to 2.9

Voltage stability	Input variation	%	±1max.(±0.3typ.)[Within the input voltage range]		
	Load variation	%	±1.5max.(±0.6typ.)[10 to 100% load]		
	Temperature variation	%	±1max.(±0.3typ.)[Ambient temperature: -10 to +60°C]		
	Drift	%	0.5max.[25°C, input and output ratings, after input voltage ON for 30min to 8h]		
	Dynamic load	%/ms	±4max./1max.[50 to 100% sudden load change]		

Ripple Ep-p	mV	50max.(30typ.)	80max.(40typ.)	80max.(40typ.)	100max.(50typ.)
Ripple noise Ep-p	mV	120max.	190max.	220max.	310max.
Start up time	ms	150max.			
Hold up time	ms	20min./17min.[0 to +60/-10 to 0°C]			

### AUXILIARY FUNCTIONS

Indicator display	LED(Red) indicates when voltage output is ON.
Overvoltage protection	Voltage shut-down type, recovers upon reset(interval approx. 60s).
Overcurrent protection	Fixed current and voltage threshold type, automatic recovery.
Remote ON-OFF	No
Remote sensing	No
Output voltage external variable function	No

### STANDARDS

Safety standards	UL1950-3 approved.
Noise terminal voltage	FCC class B compliant.

### CONSTRUCTIONS

External dimensions	mm	95×37×150[H×W×L]
Weight	g	510max.
Mounting method		Can be attached to 2 sides.
Case material		Cover: Zinc-plated iron

\*1 Current rating(maximum output current) is determined for -10 to +40°C. Derating is required when used outside this temperature range.

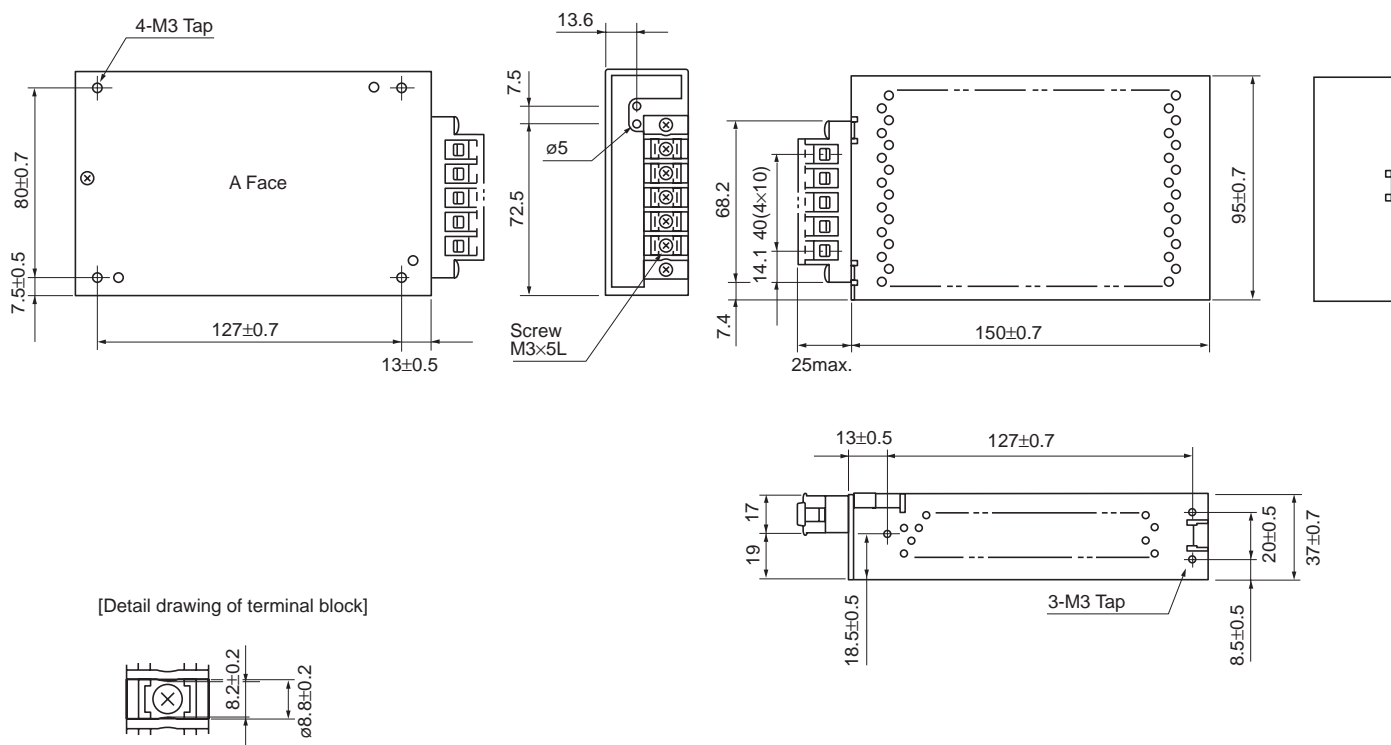
# E SERIES EAK-G50W TYPE

UL approved



## SHAPES AND DIMENSIONS EAK-G50W TYPE

Dimensions in mm  
±1mm : without specified dimensions



[Detail drawing of terminal block]

Note)

- Do not insert M3 tap installation screws more than 7mm from surface of power supply.
- Important system to earthquake-proof, insert installation Screws to 4 places of A side.

# E SERIES EAK-G100W TYPE

UL approved

## SPECIFICATIONS AND STANDARDS

PART NO.		EAK05-20RG	EAK12-8R3G	EAK15-6R6G	EAK24-4R2G
Rated output voltage and current*1		5V • 20A	12V • 8.4A	15V • 6.7A	24V • 4.2A
Maximum output power	W	100	100.8	100.5	100.8

### INPUT CONDITIONS

Input voltage	V	Eac(V)85 to 132[Rating: 100 to 115] Edc(V)110 to 175			
Input frequency	Hz	47 to 66[Rating: 50 to 60](Single phase)			
Input current	A	2.9/2.5/2.2max.[AC.85/100/115V]			
Fuse rating	A	4[Built-in]			
Surge current	A	15 to 17max.[Input and output ratings, 1st surge current, reset after 30s minimum.]			
Leakage current	mA	0.5max.[Input and output ratings]			
Efficiency	%	78typ.	80typ.	81typ.	82typ.

### OUTPUT CHARACTERISTICS

Output voltage Edc	V	5	12	15	24
Voltage variable range Edc	V	4.5 to 5.5	10.8 to 13.2	13.5 to 16.5	21.6 to 26.4
Maximum output current	A	20	8.4	6.7	4.2
Overvoltage threshold Edc	V	6 to 6.9	13.7 to 15.7	17 to 19	27 to 30.5
Overcurrent threshold	A	22 to 27	9.2 to 11.3	7.4 to 9.1	4.6 to 5.7

Voltage stability	Input variation	%	±1max.(±0.3typ.)[Within the input voltage range]		
	Load variation	%	±1.5max.(±0.6typ.)[10 to 100% load]		
	Temperature variation	%	±1max.(±0.3typ.)[Ambient temperature: -10 to +60°C]		
	Drift	%	0.5max.[25°C, input and output ratings, after input voltage ON for 30min to 8h]		
	Dynamic load	%/ms	±4max./1max.[50 to 100% sudden load change]		

Ripple Ep-p	mV	50max.(30typ.)	80max.(40typ.)	80max.(40typ.)	100max.(50typ.)
Ripple noise Ep-p	mV	120max.	190max.	220max.	310max.
Start up time	ms	150max.			
Hold up time	ms	20min./17min.[0 to +60/-10 to 0°C]			

### AUXILIARY FUNCTIONS

Indicator display	LED(Red) indicates when voltage output is ON.
Overvoltage protection	Voltage shut-down type, recovers upon reset(interval approx. 60s).
Overcurrent protection	Fixed current and voltage threshold type, automatic recovery.
Remote ON-OFF	No
Remote sensing	No
Output voltage external variable function	No

### STANDARDS

Safety standards	UL1950-3 approved.
Noise terminal voltage	FCC class B compliant.

### CONSTRUCTIONS

External dimensions	mm	95×55×180[H×W×L]
Weight	g	900max.
Mounting method		Can be attached to 2 sides.
Case material		Cover: Zinc-plated iron

\*1 Current rating(maximum output current) is determined for -10 to +40°C. Derating is required when used outside this temperature range.



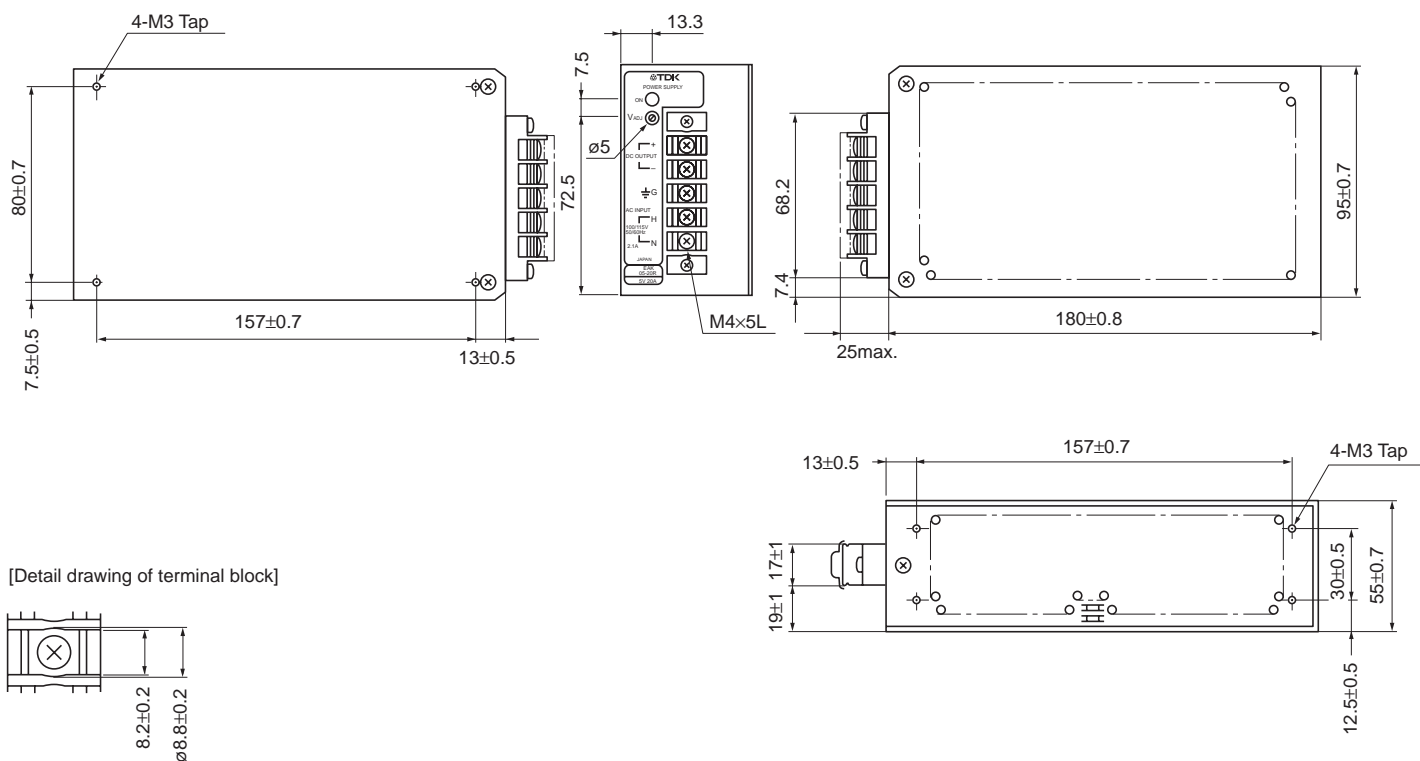
# E SERIES EAK-G100W TYPE

UL approved



## SHAPES AND DIMENSIONS EAK-G100W TYPE

Dimensions in mm  
±1mm : without specified dimensions



Note)

- Do not insert M3 tap installation screws more than 7mm from surface of power supply.

# E SERIES EAK-G150W TYPE

UL approved

## SPECIFICATIONS AND STANDARDS

PART NO.		EAK05-30RG	EAK12-12RG	EAK15-10RG	EAK24-6R0G
Rated output voltage and current*1		5V • 30A	12V • 12.5A	15V • 10A	24V • 6.3A
Maximum output power	W	150	150	150	151.2

### INPUT CONDITIONS

Input voltage	V	Eac(V)85 to 132[Rating: 100 to 115] Edc(V)110 to 175			
Input frequency	Hz	47 to 66[Rating: 50 to 60](Single phase)			
Input current	A	4/3.3/2.9max.[AC.85/100/115V]			
Fuse rating	A	6.3[Built-in]			
Surge current	A	15 to 17max.[Input and output ratings] 1st surge current, reset after 30s minimum.			
Leakage current	mA	0.5max.[Input and output ratings]			
Efficiency	%	78typ.	80typ.	81typ.	82typ.

### OUTPUT CHARACTERISTICS

Output voltage Edc	V	5	12	15	24
Voltage variable range Edc	V	4.5 to 5.5	10.8 to 13.2	13.5 to 16.5	21.6 to 26.4
Maximum output current	A	30	12.5	10	6.3
Overvoltage threshold Edc	V	6 to 6.9	13.7 to 15.7	17 to 19	27 to 30.5
Overcurrent threshold	A	33 to 40.5	13.7 to 16.8	11 to 13.5	6.9 to 8.5
Voltage stability	Input variation	%	±1max.(±0.3typ.)[Within the input voltage range]		
	Load variation	%	±1.5max.(±0.6typ.)[10 to 100% load]		
	Temperature variation	%	±1max.(±0.3typ.)[Ambient temperature: -10 to +60°C]		
	Drift	%	0.5max.[25°C, input and output ratings, after input voltage ON for 30min to 8h]		
	Dynamic load	%/ms	±4max./1max.[50 to 100% sudden load change]		
Ripple Ep-p	mV	50max.(30typ.)	80max.(40typ.)	80max.(40typ.)	100max.(50typ.)
Ripple noise Ep-p	mV	120max.	190max.	220max.	310max.
Start up time	ms	150max.			
Hold up time	ms	20min./17min.[0 to +60/-10 to 0°C]			

### AUXILIARY FUNCTIONS

Indicator display	LED(Red) indicates when voltage output is ON.
Overvoltage protection	Voltage shut-down type, recovers upon reset(interval approx. 70s).
Overcurrent protection	Fixed current and voltage threshold type, automatic recovery.
Remote ON-OFF	No
Remote sensing	No
Output voltage external variable function	No

### STANDARDS

Safety standards	UL1950-3 approved.
Noise terminal voltage	FCC class B compliant.

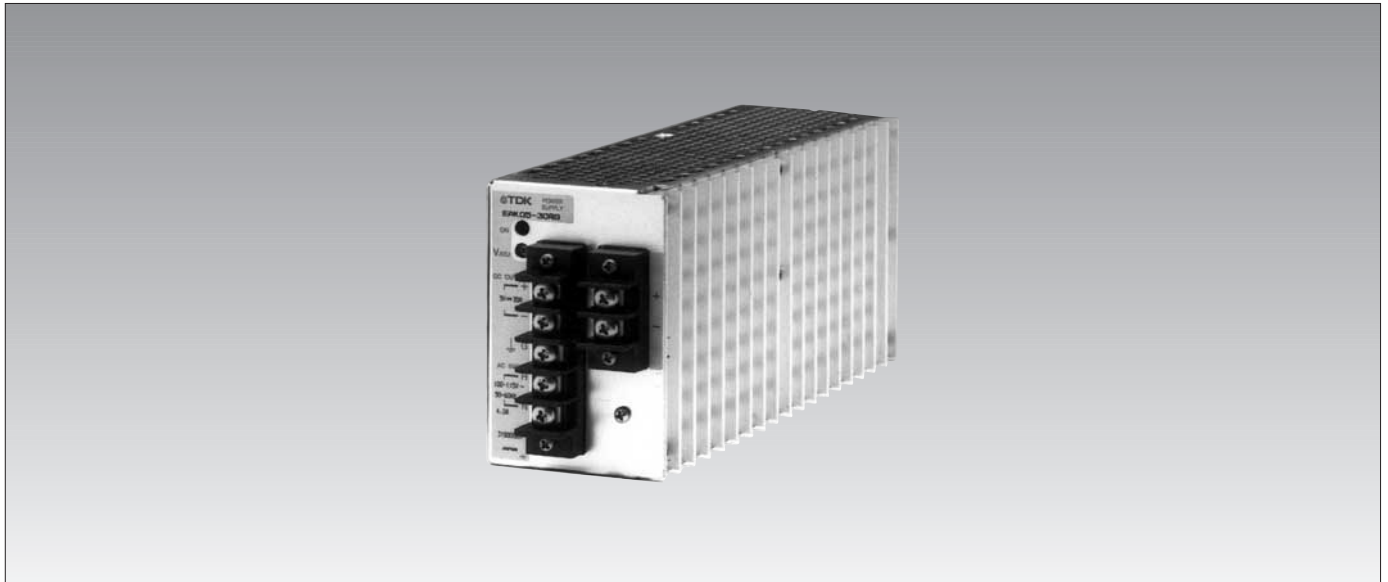
### CONSTRUCTIONS

External dimensions	mm	95×65×220[H×W×L]
Weight	kg	1.5max.
Mounting method		Can be attached to 2 sides.
Case material		Cover: Zinc-plated iron

\*1 Current rating(maximum output current) is determined for -10 to +40°C. Derating is required when used outside this temperature range.

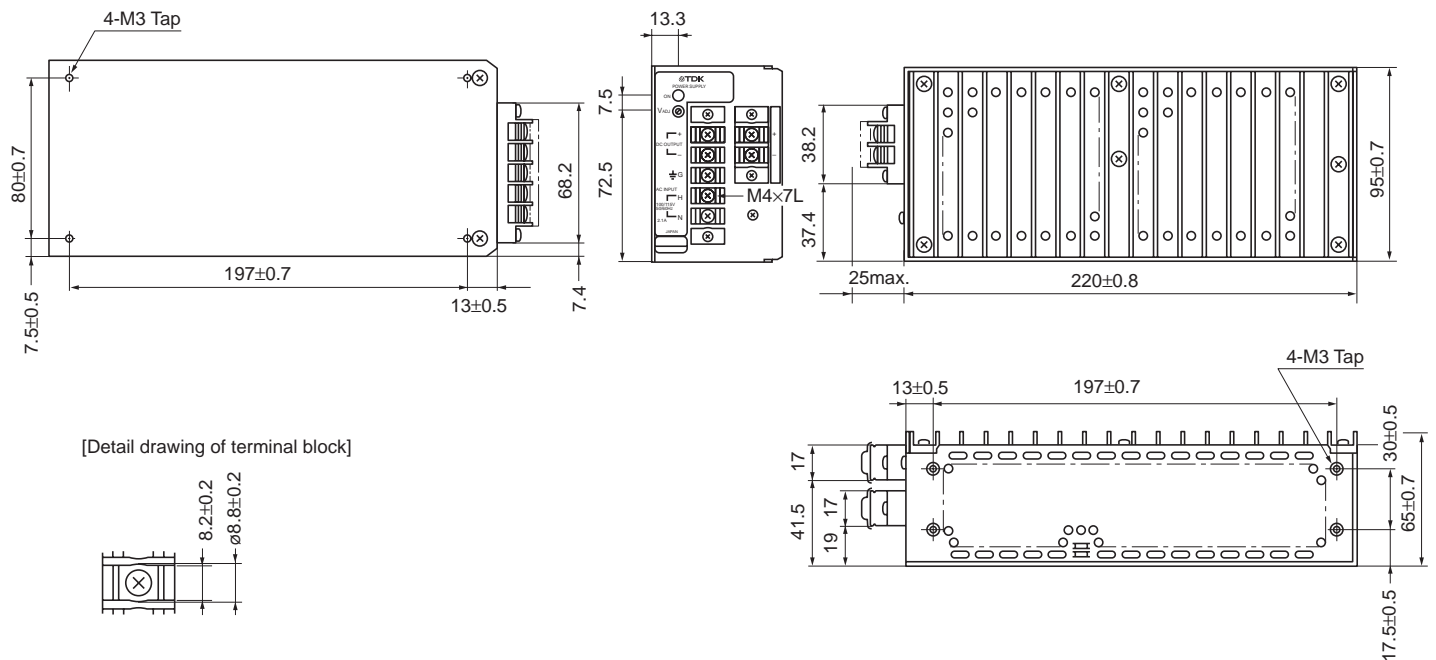
# E SERIES EAK-G150W TYPE

UL approved



## SHAPES AND DIMENSIONS EAK-G150W TYPE

Dimensions in mm  
±1mm : without specified dimensions

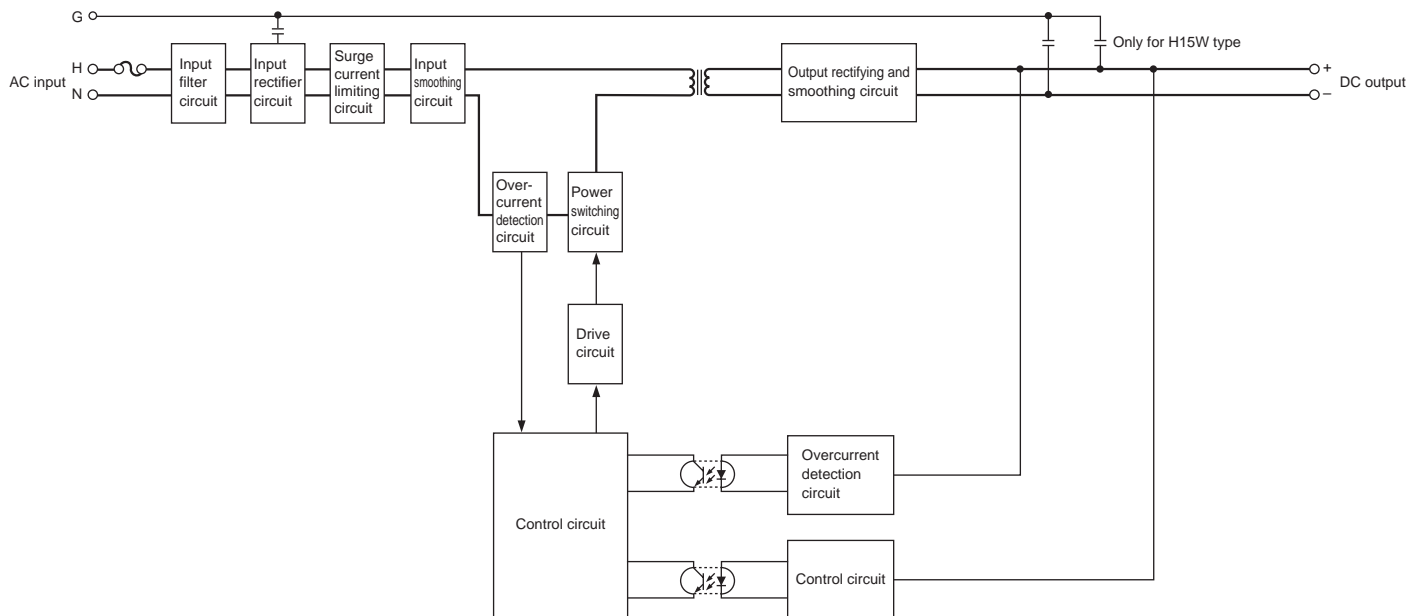


Note)

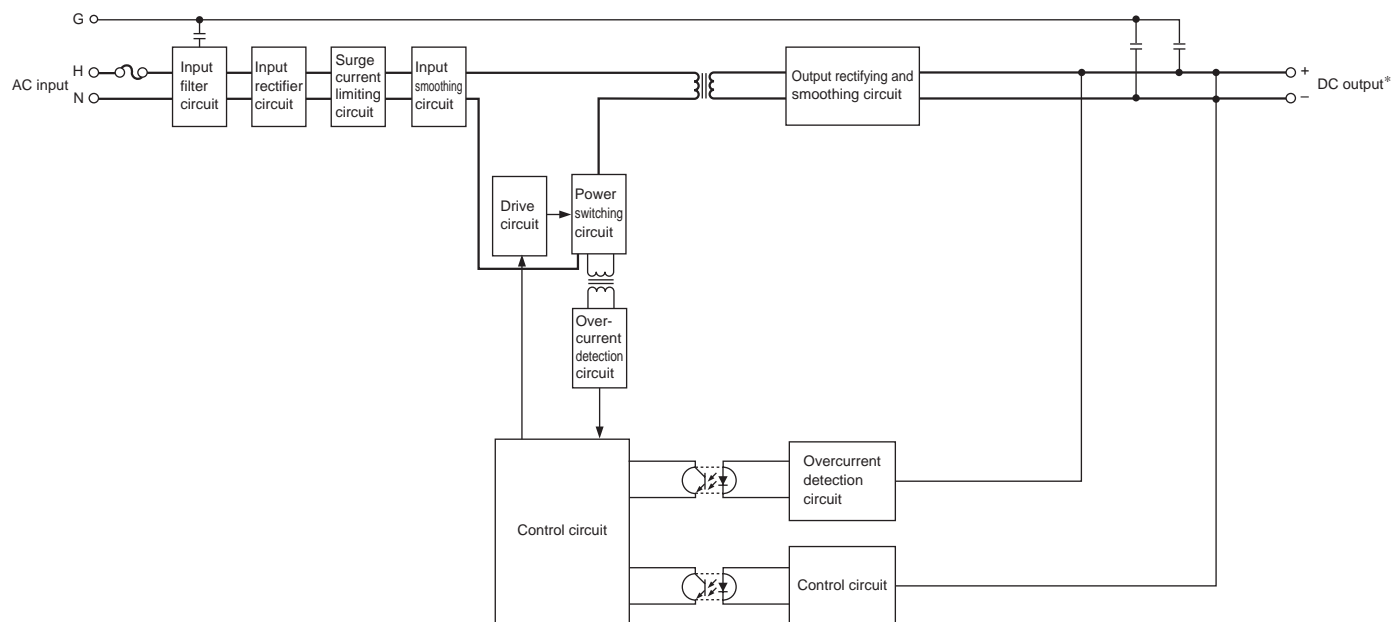
- Do not insert M3 tap installation screws more than 7mm from surface of power supply.
- Output terminals on 2 places. Connect both terminals when output current was over 25A.

# Characteristics, Functions, and Applications

## BLOCK DIAGRAM 15W AND 30W TYPES



## 50W, 100W AND 150W TYPES

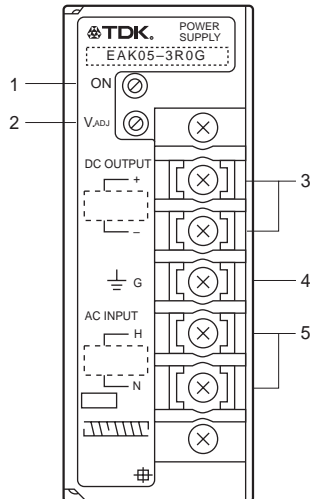


\* The 150W type provides 2 each + and - output terminals.

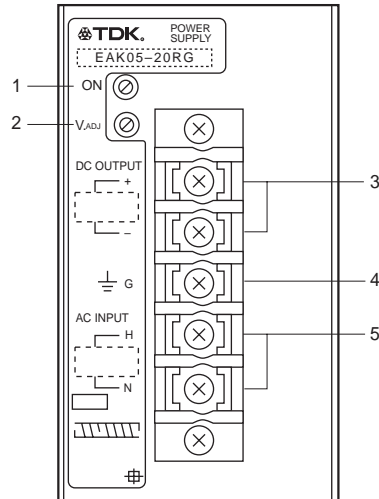
# Characteristics, Functions, and Applications

## TERMINAL DESIGNATIONS AND FUNCTIONS

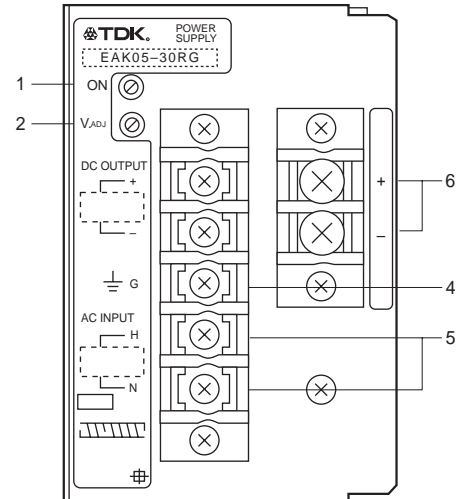
### 15W TYPE(30W, 50W)



### 100W TYPE



### 150W TYPE



#### 1 Operation indicator LED(ON)

This Red LED becomes indicated when voltage is output.

#### 2 Output voltage adjustment trim(V<sub>ADJ</sub>)

Adjusts output voltage. The output voltage increases by rotating it clockwise.

#### 3 DC output terminals(DC OUTPUT +, -)

Connect to load.

#### 4 Frame ground terminal(G)

Connect to earth ground. This is connected to the case.

#### 5 AC input terminals(H, N, AC INPUT)

Connect to AC. 100/115V (EAK-G) or AC. 200/230V (EAK-HG) single phase input line.

#### 6 Direct output terminal(DC OUTPUT, +, -, +, -)

##### 150W Type

Connect a load line to this terminal. Allowable current per pin is 25A max. A use of two pins each is recommended.

## COMMON SPECIFICATIONS

### Temperature and humidity

Temperature range	Operating(°C)	-10 to +60 Derating is necessary when operating environment temperature exceed 40°C.
	Storage(°C)	-25 to +75

Humidity range	Operating(%)RH	20 to 95[Maximum wet-bulb temperature: 35°C, without dewing]
	Storage(%)RH	

### Amplitude and vibration

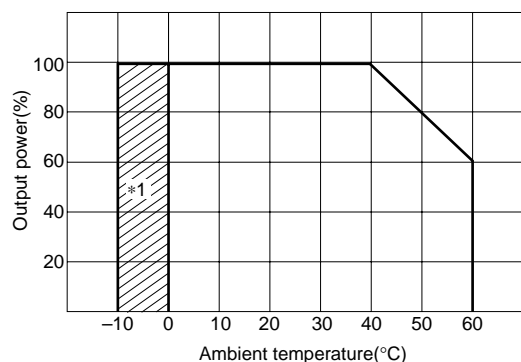
Amplitude	5 to 10Hz	All amplitude 10mm[3 directions, each 1h]
	10 to 200Hz	Acceleration 19.6m/s <sup>2</sup> [2G, 3 directions, each 1h]
Vibration	Acceleration	588m/s <sup>2</sup> [60G, 3 directions, each 3 times]
	Vibration time	11±5ms

### Withstand voltage and insulation resistance

Withstand voltage	Input terminal to case(G)	Eac(kV)2, 1min[Normal temperature, normal humidity, cutout current 10mA]
	Input terminal to output terminal	
Insulation resistance	Input terminal to case(G)	Edc(V)500, 100MΩ min. [Normal temperature, normal humidity]
	Input terminal to output terminal	
	Output terminal to case(G)	

# Characteristics, Functions, and Applications

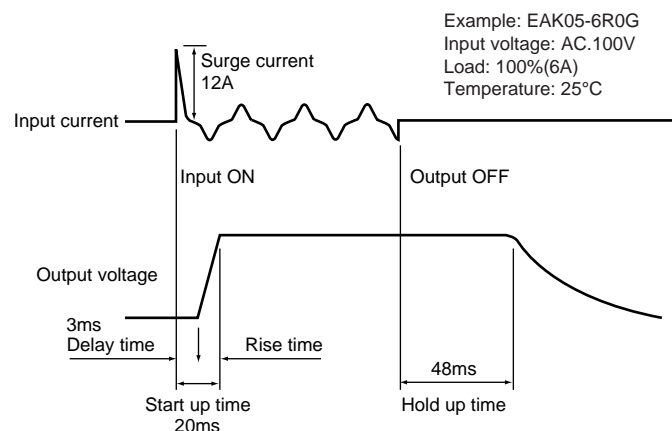
## OUTPUT POWER-AMBIENT TEMPERATURE(DERATINGS)



\*1 Different standards are used for ripple, noise, and hold up time in a range of -10 to 0°C.

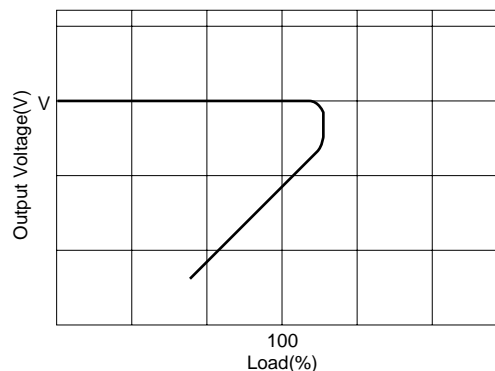
- For use at 40°C or higher temperature, reduce the output power based on the above table.
- When starting the power supply at 0°C or lower ambient temperature, the output ripple, the start up time, the hold up time or the like may not satisfy the specification values.

## SURGE CURRENT AND START UP TIME • HOLD UP TIME

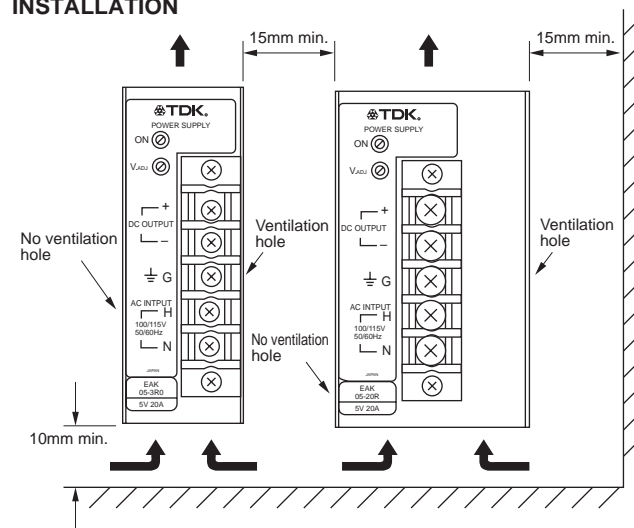


## OVERCURRENT PROTECTION

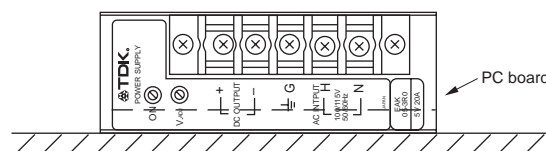
- If short or load current in the load side is excessive, the output voltage is automatically decreased.
- The output voltage automatically recovers upon a release from the overload condition.
- The 15W and 30W types have the load characteristics as shown below. Therefore, the rated output voltage possibly cannot be maintained if the rated output current is exceeded as peak current at the start-up or during operation. Be careful in case of large current flowing at the start-up of a motor or the like. There is no problem for use within a range of normal rated current.



## INSTALLATION



- The ventilation holes are provided on three surfaces, top, bottom, and side surfaces. Install each power supply in such a way as to provide sufficient ventilation.
- Maintain a 15mm min. distance from surrounding equipment, etc. and a 10mm min. distance from the bottom up to the power supply.
- Tapped holes for M3 are located on the bottom and side surfaces. Mount the power supply with M3 screws. During the mounting, be careful not to insert the screw 7mm or deeper from the surface of the product.

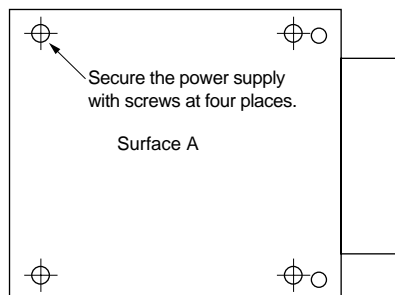


- If the power supply is laterally installed, the heat dissipation is slightly deteriorated due to a difference from the natural convectional direction. Derating of 60 to 80% is recommended. Install the power supply so that the inside PC board is located at the bottom.

# Characteristics, Functions, and Applications

## VIBRATION PROOF

For equipment in which the vibration proof is significant, install the power supply with the tapped holes for installation located at four places on the surface A as shown below. Note that, however, this installation is intended only for EAK 15W, 30W, and 50W types.



## OTHERS

1. Unless conditions are otherwise specified in the specifications or standards, 25°C and rated input-output should be applied.
2. Two or more EAK-G 150W type units cannot be used with output terminals connected in parallel.