EVS300W/600W Series
Instruction Manual

BEFORE USING THE PRODUCT

Be sure to read this instruction manual thoroughly before using this product. Pay attention to all cautions and warnings before using this product. Incorrect usage could lead to an electrical shock, damage to the product or a fire hazard.

⚠ DANGER

- Never use this product in locations where flammable gas or ignitable substances are present.

⚠ INSTALLATION WARNING

- When installing, ensure that work is done in accordance with the instruction manual. When installation is improper, there is risk of electric shock and fire.
- Installation shall be done by Service personnel with necessary and appropriate technical training and experience. There is a risk of electric shock and fire.
- Do not cover the product with cloth or paper etc. Do not place anything flammable around. This might cause damage, electric shock or fire.

⚠ WARNING on USE

- Do not touch this product or its internal components while circuit in operation, or shortly after shutdown. You may receive a burn.
- While this product is operating, keep your hands and face away from it as you may be injured by an unexpected situation.
- For products with no cover, do not touch them as there are high-voltage and high temperature parts inside. Touching them might cause injury such as electric shock or burn.
- There are cases where high voltage charge remains inside the product. Therefore, do not touch even if they are not in operation as you might get injured due to high voltage and high temperature. You might also get electric shock or burn.
- Do not make unauthorized changes to this product nor remove the cover as you might get an electric shock or might damage the product. We will not be held responsible after the product has been modified, changed or dis-assembled.
- Do not use this product under unusual condition such as emission of smoke or abnormal smell and sound etc. Please stop using it immediately and shut off the product. It might lead to fire and electric shock. In such cases, please contact us. Do not attempt repair by yourself, as it is dangerous for the user.
- Do not operate and store these products in environments where condensation occurs due to moisture and humidity. It might lead fire and electric shock.
- Do not drop or apply shock to this product. It might cause failure. Do not operate these products mechanical stress is applied.

⚠ CAUTION on MOUNTING

- Confirm connections to input/output terminals are correct as indicated in the instruction manual before switching on.
- Input voltage, Output current, Output power, ambient temperature and ambient humidity should be kept within specifications, otherwise the product will be damaged.
- Input line, please use the wires as short and thick as possible.
- Do not use this product in special environment with strong electromagnetic field, corrosive gas or conductive substances and direct sunlight, or places where product is exposed to water or rain.
- Mount this product properly in accordance with the instruction manual, mounting direction and shall be properly be ventilated.
- Please shut down the input when connecting input and output of the product.
- When mounted in environments where there is conductive foreign matter, dust of liquid, there is possibility of product failure or malfunction. Such as install filter, please consider that a conductive foreign matter, dust and liquid do not invade inside the product.

⚠ CAUTION on USE

- Product individual notes are shown in the instruction manual. If there is any difference with common notes individual notes shall have priority.
- Before using this product, be sure to read the catalog and instruction manual. There is risk of electric shock or damage to the product or fire due to improper use.
- Input voltage, Output current, Output power, ambient temperature and ambient humidity should be kept within specifications, otherwise the product will be damaged, or cause electric shock or fire.

- If the built-in fuse is blown, do not use the product even after replacing the fuse as. There is risk of abnormality inside. Be sure to request repair to our company.
- For products without built-in protection circuit (element, fuse, etc.), insert fuse at the input to prevent smoke, fire during abnormal operation. As for products with built-in protection circuit, depending on usage conditions, built-in protection circuit might not work. It is recommended to provide separate proper protection circuit.
- For externally mounted fuse do not use other fuses aside from our specified and recommended fuse.
- As our product is standard industrial use product that was manufactured by purpose that is used to an general electronics equipment etc., it is not products that to designed for High Safety uses (Uses extremely high reliability and safety are required, if reliability and safety has not been secured, with significant dangerousness for directly life or body) is expected. Please consider a fail safe (Systems that was provided with protection circuit protective devices or systems that redundant circuit was mounted so that was not unstable in single failure) design enough.
- When used in environments with strong electromagnetic field, there is possibility of product damage due to malfunction.
- When used in environment with corrosive gas (hydrogen sulfide, sulfur dioxide, etc.) , there is possibility that they might penetrate the product and lead to failure.
- When used in environments where there is conductive foreign matter or dust, there is possibility of product failure or malfunction.
- Provide countermeasure for prevention of lightning surge voltage as there is risk of damage due to abnormal voltage.
- Connect together the frame ground terminal of the product and the ground terminal of the equipment for safety and noise reduction. If these ground is not connected together, there is risk of electric shock.
- Parts with lifetime specifications (built-in fan, electrolytic capacitor) are required to be replaced periodically. Set the overhaul period depending on the environment of usage and perform maintenance. Also, note that there are cases when EOL products cannot be overhauled.
- Take care not to apply external abnormal voltage to the output. Especially, applying reverse voltage or overvoltage more than the rated voltage to the output might cause failure, electric shock or fire.
- Do not use this product in special environment with strong electromagnetic field, corrosive gas or conductive substances and direct sunlight, or places where product is exposed to water or rain.
- The product on this instruction manual are PC Board Type (300W) and Unit Type (600W), which have surface-mounted components on the solder side of PCB. PCB stress such as bending, twisting etc. could cause damage. Therefore, please handle with care.
- When handling EVS300W, hold the board edge and take care not to touch the component side. When installing this product in apparatus or equipment, mount it on spacers.
- The outputs of this product may, under fault conditions, exceed SELV voltage limits. Therefore the outputs must be protected in the end equipment to maintain SELV.
- This product has used power thermistor to protect the circuit from inrush current. Frequent repetition of input might cause damage to internal components because of generating surge current.
- The output power is considered to be a hazardous energy level (The voltage is 2V or more and the power is 240VA or more). It must not be made accessible to users. Protection must be provided for Service Engineers against indirect contact with the output terminals and/or to prevent tools being dropped across them. While working on this product, the AC input power must be switched off and the input and output voltage should be zero.
- EVS600W has a built-in fan for air-cooling. Do not block air intake and exhaust. It might cause fire.

⚠ Note

- Consider storage of the product at normal temperature and humidity avoiding direct exposure to sunlight at environment with minimal temperature and humidity changes. Storage of product at high temperature, high humidity and environments with severe changes in temperature and humidity might cause deterioration, and occurrence of condensation in the product.
- When disposing product, follow disposal laws of each municipality.
- Published EMI (CE, RE) or immunity is the result when measured in our standard measurement conditions and might not satisfy specification when mounted and wired inside end-user equipment.
  Use the product after sufficiently evaluating at actual end-user equipment.
- If products are exported, please register the export license application etc. by the Government of Japan according to Foreign Exchange and Foreign Trade Control Law.
- The Information in the catalog or the instruction manual is subject to change without prior notice. Please refer to the latest version of the catalog or the instruction manual.
- No part of this document may be copied or reproduced in any form without prior written consent of TDK-Lambda.

Note : CE MARKING

CE Marking, when applied to a product covered by this handbook, indicates compliance with the low voltage directive.

1. Model name identification method

EVS 18 - 16R7 /□

- Option (*1)
- Rated Output Current
- Rated Output Voltage
- Series Name

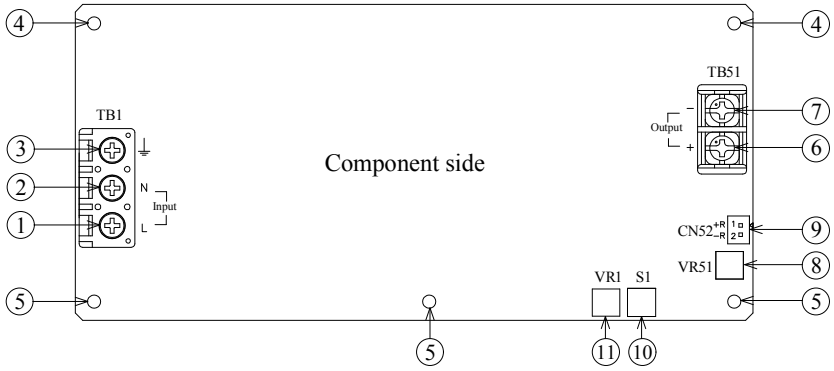
(*1)

EVS300W,EVS600W common options
Blank : Standard
/R : With remote ON/OFF control model.

EVS300W only
/A : With chassis and cover model.
/RA : With chassis and cover and Remote ON/OFF control model.

2. Terminal Explanation

■EVS300W



① L : Input terminal (Live line) (M4 screw)
(Fuse in line)
② N : Input terminal (Neutral line) (M4 screw)
③ ⏚ : Earth terminal (M4 screw)
④ Mounting hole (hole diameter : ϕ3.5mm)
These holes are connected to ⏚ terminal of TB1.
Must be connected to electrically conductive spacer. The mounting surface of the spacer should be within Max ϕ8mm.
⑤ Mounting hole (hole diameter : ϕ3.5mm)
These holes are not connected to ⏚ terminal of TB1.
⑥ ＋ : + Output terminal (M4 screw)
⑦ － : - Output terminal (M4 screw)
⑧ V.ADJ : Output voltage adjustment trimmer. The output voltage rises when a trimmer is turned clockwise.
⑨ Remote ON/OFF control terminal (Option“/R”,“/RA”)
⑩ I.ADJ : Output constant current adjustment rotary switch
(Refer to “4-7. Output Constant Current Adjustment Method” for usage)
⑪ This adjustment trimmer is for factory setting only. Do not touch this trimmer.

■EVS300W Option“/R”,“/RA”

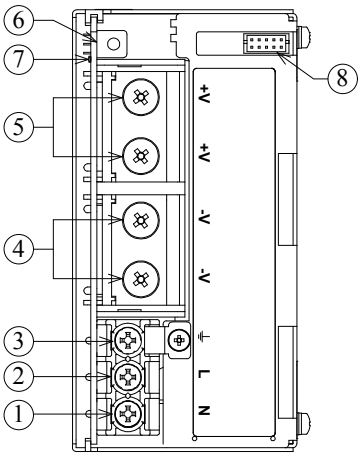
*Remote ON/OFF control terminal : Option“/R”,“/RA”

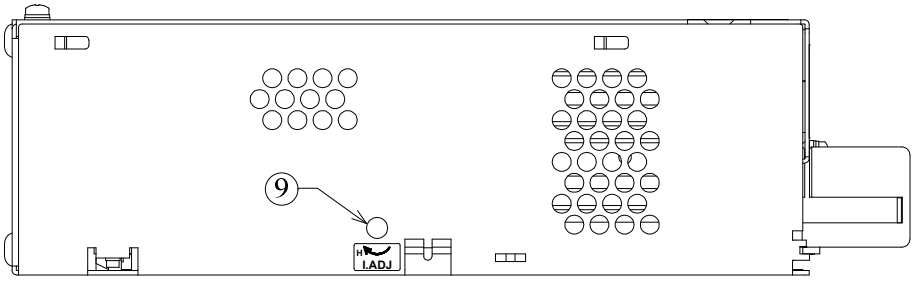
Ref.No.	Connector	Housing	Terminal Pin	Maker
CN52	B2B-XH-AM	XHP-2	BXH-001T-P0.6 or SXH-001T-P0.6	JST

Hand Crimping Tool : YC-110R (JST) or YRS-110 (JST)
Use maker recommended crimping tool.
Housing and terminal pin are not included in the product.

■EVS600W

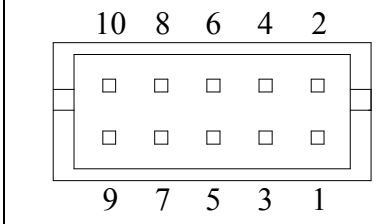
① N : Input terminal (Neutral line) (M3.5 screw)
② L : Input terminal (Live line) (M3.5 screw)
(Fuse in line)
③ ⏚ : Earth terminal (M3.5 screw)
④ －V : - Output terminal (M5 screw)
⑤ ＋V : + Output terminal (M5 screw)
⑥ V.ADJ : Output voltage adjustment trimmer.
The output voltage rises when a trimmer is turned clockwise.
⑦ Output monitoring indicator (Green LED)
⑧ Remote ON/OFF control terminal (Option“/R”)
⑨ I.ADJ : Output constant current adjustment trimmer
(Refer to “4-7. Output Constant Current Adjustment Method” for usage)





■EVS600W Option“/R”

*Remote ON/OFF control terminal : Option“/R”



No.	Configuration	Function
1	NC	No connection.
2	NC	No connection.
3	＋R	Remote ON/OFF control terminal.
4	－R	Remote ON/OFF control terminal.
5	NC	No connection.
6	NC	No connection.
7	NC	No connection.
8	NC	No connection.
9	NC	No connection.
10	NC	No connection.

Ref.No.	Connector	Housing	Terminal Pin	Maker
CN81	S10B-PHDSS	PHDR-10VS	SPHD-002T-P0.5 or SPHD-001T-P0.5	JST

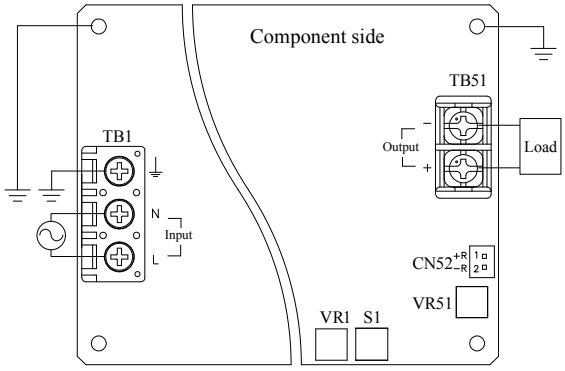
Hand Crimping Tool : YRS-620 (SPHD-002T-P0.5) (JST) or YC-610R (SPHD-001T-P0.5) (JST)
Use maker recommended crimping tool.
Housing and terminal pin are not included in the product.

3. Connecting method

Pay attention to the input wiring. If it is connected to wrong terminal, the product will be damaged.

- Input must be off when making connections.
- Connect ⏚ terminal to earth (frame ground of the equipment etc.) by thick wire for safety and improvement of noise sensitivity.
- The output load line and input line shall be separated to improve noise sensitivity.
- Do not apply stress to PCB, when connecting or removing connector.

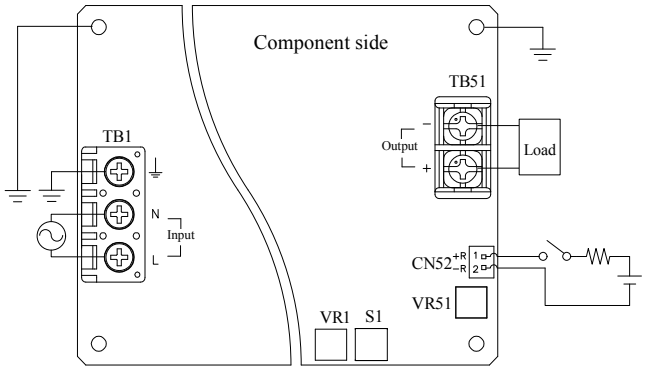
■EVS300W



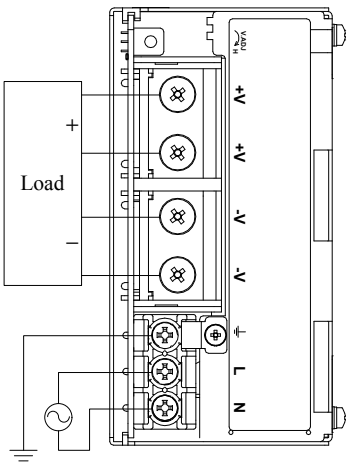
■EVS300W Option“/R”,“/RA”

Connect external voltage between " +R" terminal (Pin No.1) and "-R" terminal (Pin No.2) of CN52 for remote ON/OFF control.

(ON/OFF control lines shall be twisted.)



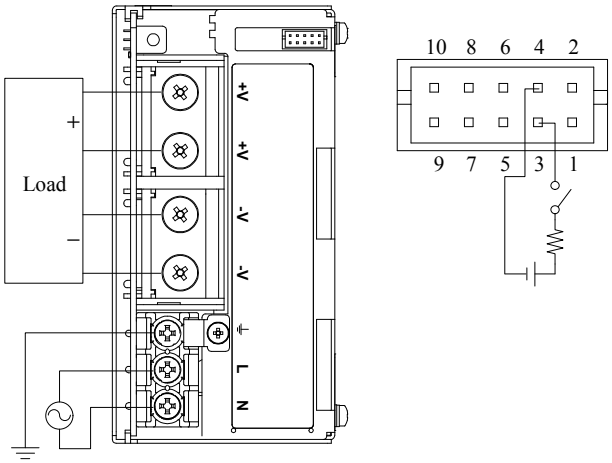
■EVS600W



■EVS600W Option“/R”

Connect external voltage between " +R" terminal (Pin No.3) and "-R" terminal (Pin No.4) of CN81 for remote ON/OFF control.

(ON/OFF control lines shall be twisted.)



Recommended torque :

M3.5 screw	1.0N·m (10.2kgf·cm) ~ 1.6N·m (16.3kgf·cm)
M4 screw	1.2N·m (12.3kgf·cm) ~ 1.6N·m (16.3kgf·cm)
M5 screw	2.2N·m (22.4kgf·cm) ~ 2.8N·m (28.6kgf·cm)

4. Explanation of Functions and Precautions

4-1. Input Voltage Range

EVS300W:Input voltage range is single phase 85-265VAC (47-63Hz) or 120-370VDC.
EVS600W:Input voltage range is single phase 85-265VAC (47-63Hz) or 120-330VDC.
Input voltage, which is out of specification, might lead the product damage. For cases where conformance to various safeties required, described as 100-240VAC (50-60Hz).
EVS300W:Output derating is required for AC input voltage less than 90VAC.
EVS600W:Output derating is required for AC input voltage less than 110VAC.

4-2. Output Voltage Range

Output voltage is set at the rated value. Output voltage within the range specified can be adjusted by V.ADJ trimmer. Please set output voltage within specified adjustable range.
Turning the trimmer clockwise, the output voltage will be increased. Take note when the output voltage is increased. excessively, over voltage protection (OVP) function may trigger and voltage will be shut down. Furthermore, when increasing the output voltage, reduce the output current as not to exceed the maximum output power.
When the trimmer turns quickly at no load condition, the output voltage might become unstable. To maintain the output voltage stable, flow the output current, or remove the input of the product until the output be shut down, and then re-input. Please turn the trimmer slowly during the output voltage adjustment.

4-3. Inrush Current

Inrush current is suppressed by power thermistor for EVS300W. Higher current will flow at higher ambient temperature or input re-turn on condition. Please select input switch or external fuse carefully. The inrush current value specified in the specification is under cold start condition (at 25°C).
Inrush current is suppressed by thyristor for EVS600W. Higher current may flow when input turn on interval is short. First inrush current and second inrush current flow. The inrush current value in the specification is first inrush current. Please select input switch and external fuse carefully.

4-4. Over Voltage Protection (OVP)

The OVP function is inverter shut down method and manual reset type. OVP function operates within 110-130% of nominal output voltage.
When OVP triggers, the output will be shut down. To reset OVP, remove the input of the product for a few minutes, and then re-input. In addition, the setting value of OVP is fixed and not adjustable. Never apply higher voltage externally to the output terminal to avoid the product Failure. In case of inductive load, put protective diode in series to the output power line.

4-5. Battery Charger Applications

It is possible to set constant current value of the product and use it for battery charger applications.
Connect our reverse prevention module "EVS-RP" or an ORing-diode to the output side of the product.
Use a protective circuit with a fuse or a breaker etc. to prevent the situation that severe electric current drifts from the battery to the product side.
When connecting ORing-diode, heat will be generated by power losses due to diode forward voltage Vf and output current Io (Pd = Vf × Io). Therefore, the diodes must be cooled.
In addition, please use the product within the rated output voltage and output power specification.

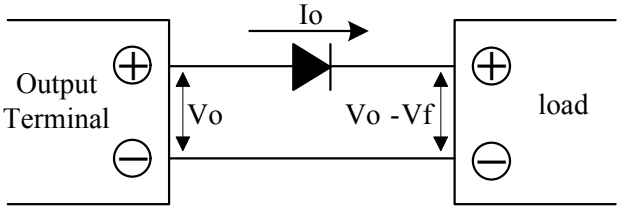
◆Specification of reverse prevention module

Model : EVS-RP6020 (TDK-Lambda)

Input Voltage Range : 7 - 60 [VDC]
Maximum Input Current : 20 [A]
Voltage drop : 200 [mV]
Reverse Current : 50 [uA]
Size : 50×26×77.5 [mm]

◆ When connecting ORing-diode

loss: Pd = Vf × Io



4-6. Output Constant Current Setting Accuracy

Output constant current of EVS300W can be set to preset value by output constant current adjustment rotary switch. Output voltage droops with constant current within ±10% accuracy of rated output current.
Output constant current of EVS600W can be set to preset value by output constant current adjustment trimmer. Output voltage droops with constant current within ±10% accuracy of rated output current.

4-7. Output Constant Current Adjustment Method

■EVS300W

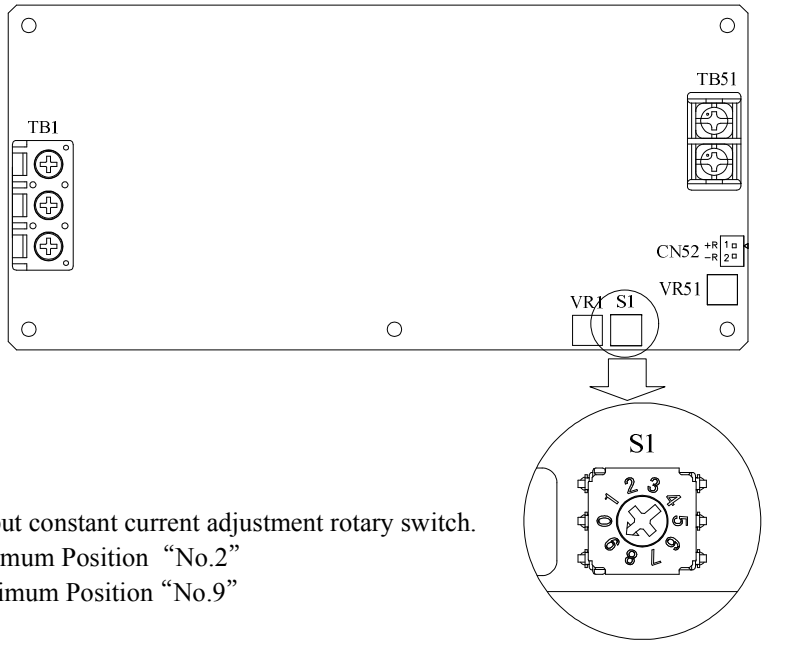
Rotary switch S1 can set output constant current value.
During setting the output constant current adjustment rotary switch, power off the product.
Do not touch the adjust trimmer VR1 next to the rotary switch because the trimmer is fixed. Output constant current adjustment rotary switch is primary side component.
When the product is installed into equipment, the installation should be done by staff, who is instructed on safety standard and has experiences in adjustment works.

◇Method of Constant Current Setting

(1)Power off the product and set constant current to required value by output constant current adjustment rotary switch.
Refer to "■EVS300W Output Constant Current Value Setting" to set the position of the rotary switch.
Refer to "■EVS300W Output Constant Current Set List" on the relation between the rotary switch position and constant current value.
Set rotary switch to the position which corresponds to required constant current value.
Confirm the direction of arrow groove which indicates position No..

(2)Increase load than output constant current set value and confirm output constant current value become same as set value. In addition, the output voltage decreases at constant current operation.

■The location for EVS300W Output Constant Current Value Setting



S1 is set at position No.9

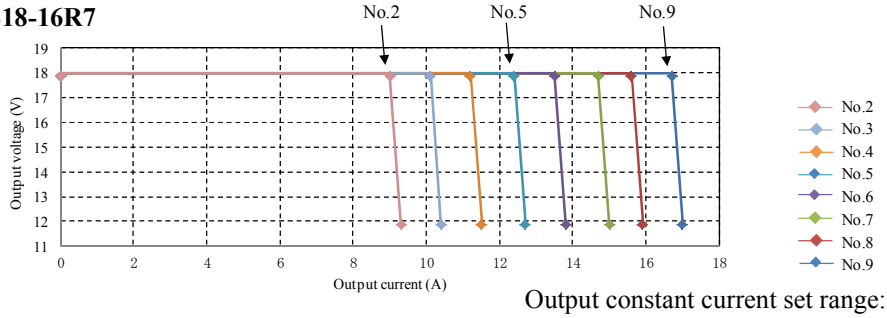
S1 : Output constant current adjustment rotary switch.
Minimum Position "No.2"
Maximum Position "No.9"

VR1 : Adjust trimmer VR1 for factory setting only.
Do not touch adjust trimmer VR1 because this is for factory setting only. If the adjust trimmer is forced to be rotated, the product may get some damages.
(Adjust trimmer is fixed with adhesive.)

■EVS300W Output Constant Current Set List

The output constant current values in the table below are reference values.
Select constant current value, which is close to your target value, by the rotary switch.
Use the product with the position No.2 ~ No.9 of rotary switch.
Factory default setting of the rotary switch is position No.9.

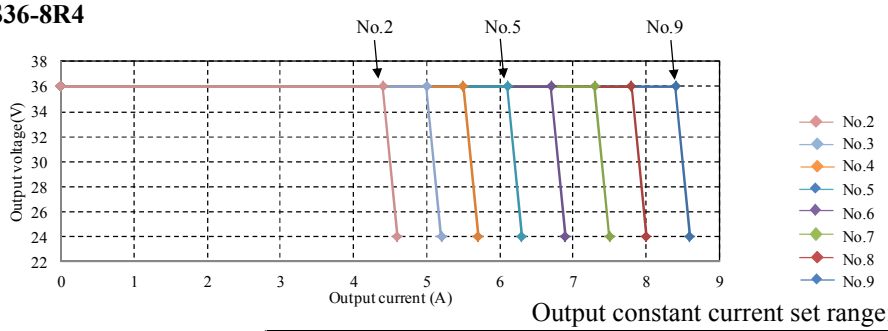
◇EVS18-16R7



Output constant current set range:8.35～16.7A

	Output constant current (A)									
the position number of the rotary switch	No. 0	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	No. 9
Output Voltage 18V	※1		9.0	10.1	11.2	12.4	13.5	14.7	15.6	16.7
Output Voltage 12V			9.3	10.4	11.5	12.7	13.8	15.0	15.9	※2

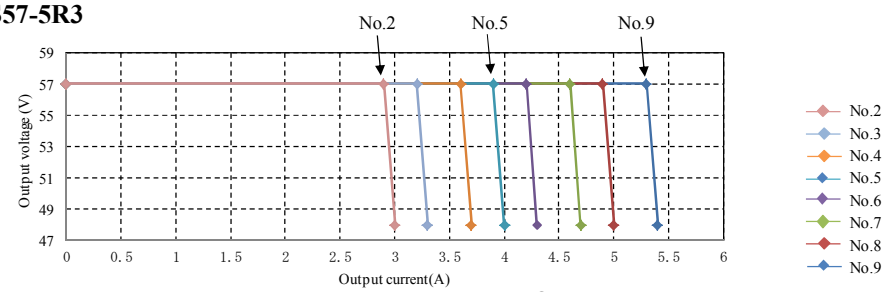
◇EVS36-8R4



Output constant current set range:4.2～8.4A

	Output constant current (A)									
the position number of the rotary switch	No. 0	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	No. 9
Output Voltage 36V	※1		4.4	5.0	5.5	6.1	6.7	7.3	7.8	8.4
Output Voltage 24V			4.6	5.2	5.7	6.3	6.9	7.5	8.0	※2

◇EVS57-5R3



Output constant current set range:2.65～5.3A

	Output constant current (A)									
the position number of the rotary switch	No. 0	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	No. 9
Output Voltage 57V	※1		2.9	3.2	3.6	3.9	4.2	4.6	4.9	5.3
Output Voltage 48V			3.0	3.3	3.7	4.0	4.3	4.7	5.0	※2

※1 This case is out of specified range and may cause the product operation unstable.
※2 When the rotary switch position is set at No.9 and output voltage is set at the minimum output voltage, output current may exceed the limit of the allowable output current range.

If the output voltage decreases to 50% or less of the rated output voltage in constant current operation, it will be outside specified range. Furthermore, if it decreases to 15% or less, the output current may increase excessively and damage the product, or you may hear abnormal noise from the product.
When the product is used outside of specified range, safety standard will not be complied.
If you use the product outside of specified range, contact your nearest TDK-Lambda sales office with the details of usages and conditions.

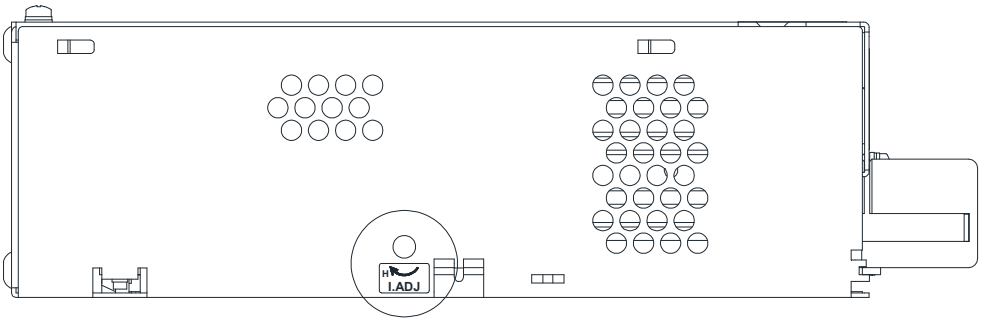
■EVS600W

Output constant current adjustment trimmer can adjust output constant current value.
Please do not set output constant current value more than a maximum output current. Might cause damage of the product.
Output constant current adjustment trimmer is primary side component.
Output constant current adjustment trimmer should be adjusted by skilled person once this product to be installed into the equipment.

◇Method of Constant Current Setting

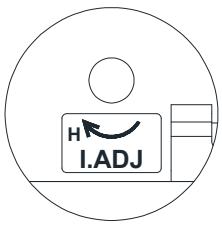
(1)Check the output voltage and the output current are normal after the product power on.
Set the load current with your target current value within 50-100% of the maximum rated output current.
(2)Turn output constant current adjustment trimmer I.ADJ counterclockwise until output voltage starts to fall.
Refer to "■EVS600W Output Constant Current Set Point" on positions of output constant current adjust trimmer.
Refer to "■EVS600W Output Constant Current Set List" on constant current value.
(3)Increase load than output constant current set value and confirm output constant current value stays same as set value. In addition, the output voltage decreases at constant current operation.

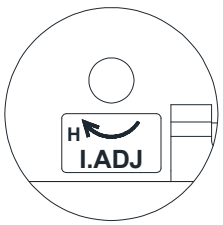
■EVS600W Output Constant Current Set Point



The output current falls
when a trimmer is turned counterclockwise.

The output current rises
when a trimmer is turned clockwise.





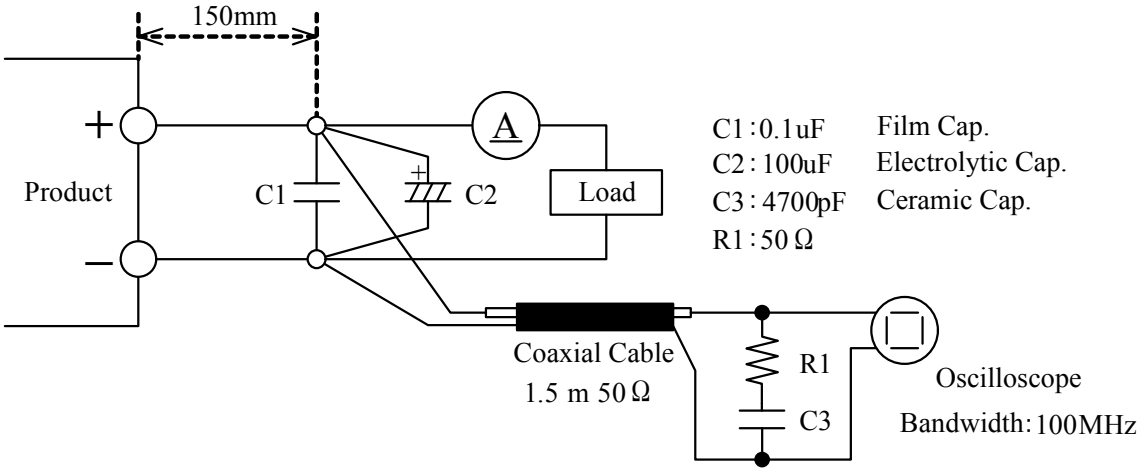
■EVS600W Output Constant Current Set List

Please set constant current value in the following range.

Classification	EVS36-16R7	EVS57-10R6	Input Voltage condition
Factory setting	15.8～16.7A	10.0～10.6A	200VAC
Adjustable range	8.35～15.3A	5.3～9.7A	100VAC
	8.35～16.7A	5.3～10.6A	200VAC

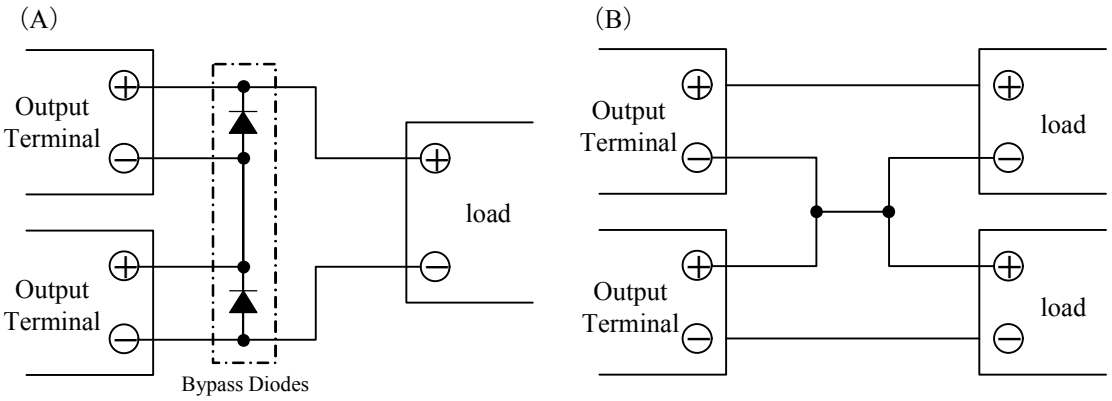
4-8. Output Ripple & Noise

The specified maximum ripple & noise value is measured according to measurement circuit specified by JEITA-RC9131B. When load lines are longer, ripple will becomes larger. In this case, electrolytic capacitor, film capacitor, etc. might be necessary to be used across the load terminal.
The output ripple cannot be measured accurately if the probe ground lead of oscilloscope is too long.



4-9. Series Operation

For series operation, either method (A) or (B) is possible.
In series operation, the actual voltage between output and ⏚ must be less than withstand voltage (500VAC).
In addition, take note that using the product with total output voltage 60V or more does not comply with SELV in safety standard. In series operation, the rising waveform may have steps.
When connecting with a battery, connect an ORing-diode to the output side of the product.



Note :Series operation also can be used without bypass diode. But ensure that all products must be in operation.
(Never use in condition that one of the product is not operated.)

4-10. Parallel Operation

For parallel operation, either method (A) or (B) is possible.

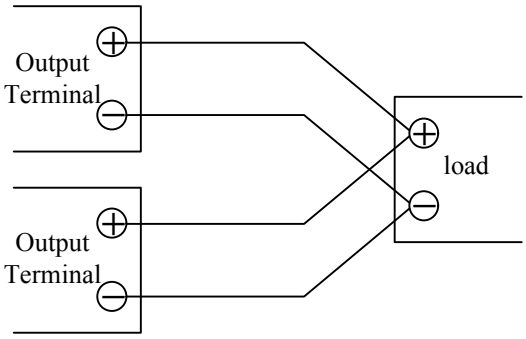
(A) Operation to increase the Output Current

(1)Adjust each product output to same voltage. (The difference of each product output voltage should be within ±5%.) If the difference of each product output voltage is too big, the output current becomes uneven and the products may be damaged.
(2)Connection wires between the product and load should be same type and same length.
(3)Parallel connection is acceptable up to 5 units maximum.
(4)The purpose of parallel operation is to increase the static maximum output current. There is a possibility that output voltage dips at dynamic load change.
(5)There might be a step in the output rise waveform during parallel operation.

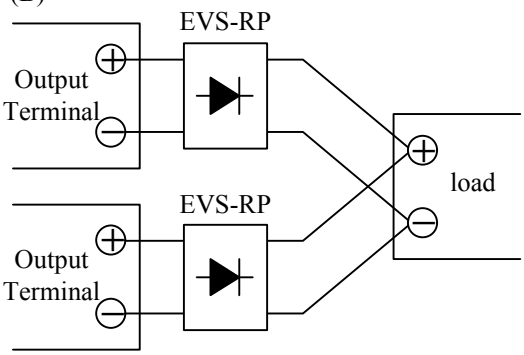
(B) Operation as a Backup System

(1)Adjust each product output to same voltage. (The difference of each product output voltage should be within ±5%.)
(2)Adjust the output voltage higher by the value of the voltage drop (90mV typ.) of EVS-RP or the forward voltage drop (Vf) of ORing-diode.
(3)Output voltage and output power should be used within specifications.
(4)When using EVS-RP, output load current should be used within specifications. When using ORing-diode, current rating must be more than output load current.

(A)



(B)

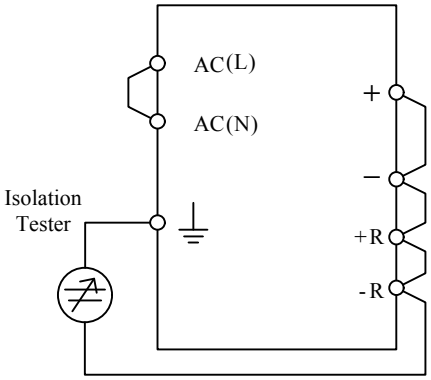


For more information about EVS-RP, please refer to “4-5. Battery Charger Applications” or “EVS-RP Instruction Manual”.
EVS-RP can be replaced by ORing-diode. In such case, please take care of ORing-diode temperature.

4-11. Isolation Test

Isolation resistance between Output - ⏚ terminal is more than 100MΩ at 500VDC. For safety operation, voltage setting of DC isolation tester must be done before the test. Ensure that the product is fully discharged after the test.

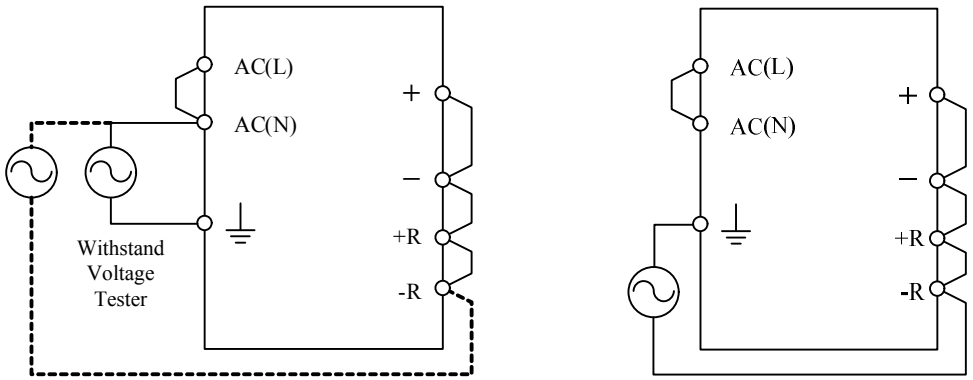
■ Output - ⏚ terminal : 500VDC More than 100MΩ



4-12. Withstand Voltage

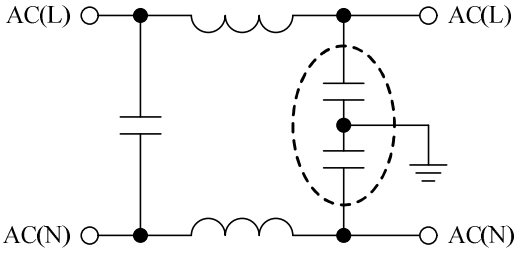
This series is designed to withstand 3.0kVAC between input and output, 2.0kVAC between input and ⏚ terminal and 500VAC between output and ⏚ terminal each for 1 minute. When testing withstand voltage, set current limit of withstand voltage test equipment at 10mA (Output - ⏚ terminal : 20mA).
The applied voltage must be gradually increased from zero to testing value and then gradually decreased for shut down. When timer is used, the product may be damaged by high impulse voltage at switch on and off timing.
Connect input and output as follows.

■ Input - Output (dotted line) : 3.0kVAC, 1min (10mA) ■ Output - ⏚ terminal : 500VAC, 1min (20mA)
Input - ⏚ terminal (solid line) : 2.0kVAC, 1min (10mA)

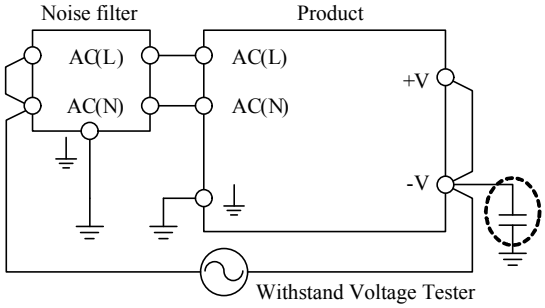


Note 1 : EVS600W has multilayer ceramic capacitor in secondary circuit to ⏚ terminal.
Some of the withstand voltage tester may generate high voltage due to distortion of test voltage and may cause the product damage.
So, please check the waveform of applied voltage.

Note 2 : In case of using external noise filter, capacitance between "Input and ⏚ terminal" might be increased.
When testing withstand voltage between "Input and Output", there is a possibility exceeding withstand voltage between "Output and ⏚ terminal" (500VAC). Please check the voltage between "Output and ⏚ terminal". If the voltage exceeding withstand voltage, please add external capacitor to "Output and ⏚ terminal". It can decrease the voltage.
On the other hand, no need to check the voltage in case of "Output and ⏚ terminal" is shorted.



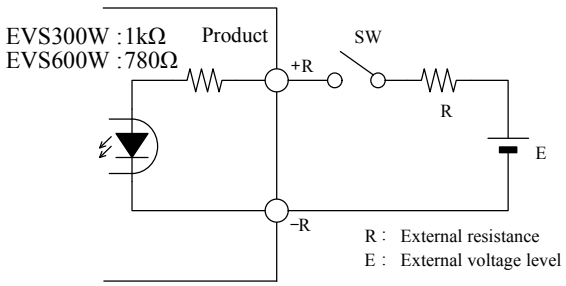
The example of noise filter circuit that may increase capacitance value between "Input and ⏚".
(Capacitance value in dashed line is added.)



External capacitor adding point or short point.
Even in the case of "+V and ⏚",
there is a similar effect.

4-13. Remote ON/OFF Control (Option "/R","/RA")

Remote ON/OFF control function is provided on option model "/R" and "/RA". Using this function allows the user to turn the output on and off without having to turn the AC input off and on. It is controlled by the external voltage applied to +R and -R of remote ON/OFF terminal. This circuit is in the secondary side of the product. Never connect to primary side.



+R & -R terminal condition	Output Voltage	Fan condition (EVS600W)
SW ON (Higher than 4.5V)	ON	Operate
SW OFF (Lower than 0.5V)	OFF	Not Operate

External voltage level:E	External resistance:R
4.5～ 12.5VDC	Not required
12.5～ 24.5VDC	1.5kΩ

5. Mounting Method

5-1. Mounting Direction

The standard mounting is direction (A).

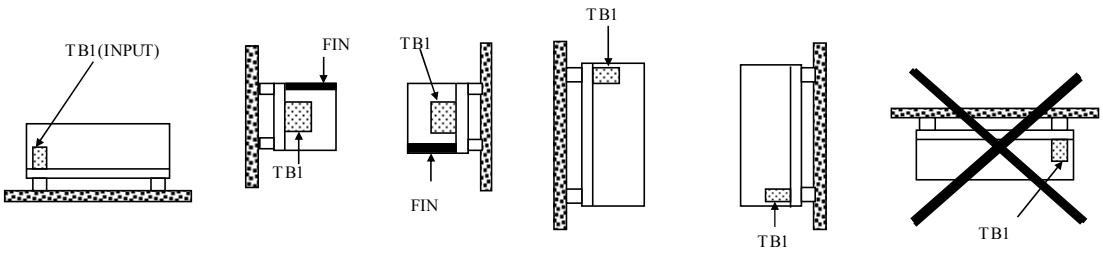
EVS300W: Possible mounting directions are (A), (B),(C), (D) and (E) only. Do not mount the product in any other directions.

EVS600W: Possible mounting directions are (A), (B),(C) and (D) only. Do not mount the product in any other directions.

Do not exceed the derating of maximum load, which is limited by mounting direction and ambient temperature. Refer to "5-2.Output Derating" for more information.

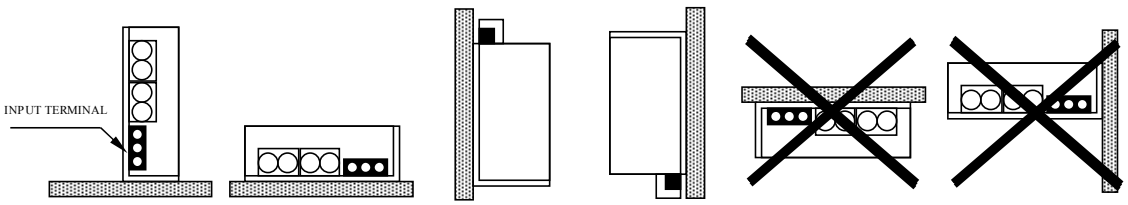
■EVS300W

(A) Standard Mounting (B) (C) (D) (E) (F) Not Possible



■EVS600W

(A) Standard Mounting (B) (C) (D) (E) Not Possible (F) Not Possible

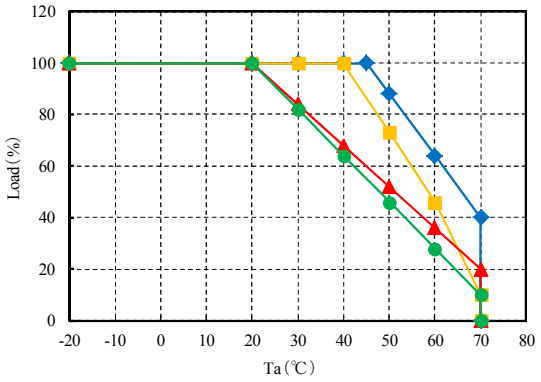


5-2. Output Derating

Refer to the output derating below, load (%) is percent of maximum output current value in a rated output voltage.

(1)Convection Cooling

■EVS300W
(Option "/R" included)

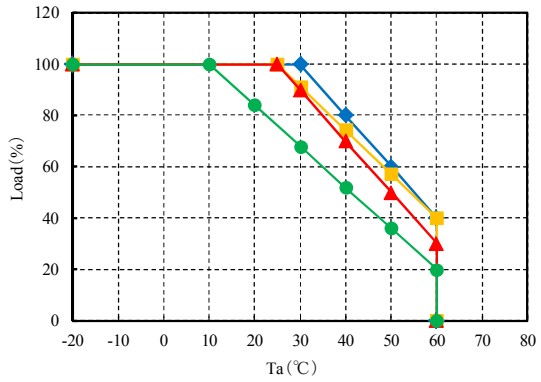


Mounting (A),(B)
Mounting (C)
Mounting (D)
Mounting (E)

Ta (°C)	Load (%)	
	Mounting (A),(B)	Mounting (C)
-20 - +40	100	
45	100	86
50	88	73
60	64	46
70	40	10

Ta (°C)	Load (%)	
	Mounting (D)	Mounting (E)
-20 - +20	100	
30	84	82
40	68	64
50	52	46
60	36	28
70	20	10

■EVS300W/A (With chassis and cover model.)
(Option "/RA" included)



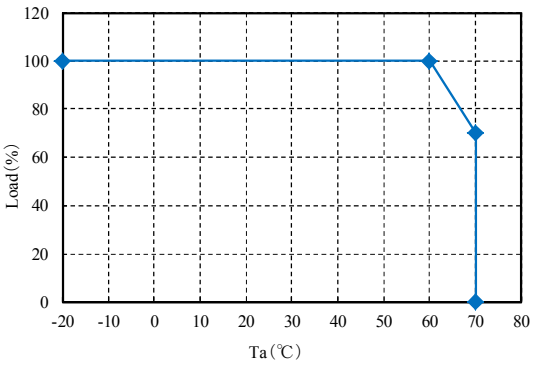
Mounting (A)
Mounting (B)
Mounting (C)
Mounting (D),(E)

Ta (°C)	Load (%)		
	Mounting (A)	Mounting (B)	Mounting (C)
-20 - +25	100		
30	100	91	90
40	80	74	70
50	60	57	50
60	40	40	30

Ta (°C)	Load (%)
	Mounting (D),(E)
-20 - +10	100
20	84
30	68
40	52
50	36
60	20

(2)Forced Air Cooling

■EVS300W
(Option "/R" included)



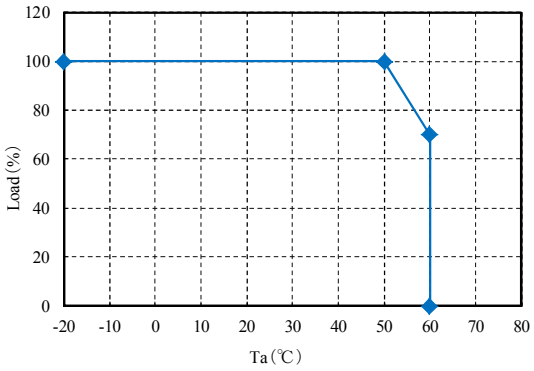
Cooling : Wind velocity ≧ 1.4m/s

Ta (°C)	Load (%)
	Mounting (A) - (E)
-20 - +60	100
70	70

Electrolytic capacitor allowable Max temperature

	Allowable Max temperature (℃)
C6	75
C52	75

■EVS300W/A (With chassis and cover model.)
(Option "/RA" included)



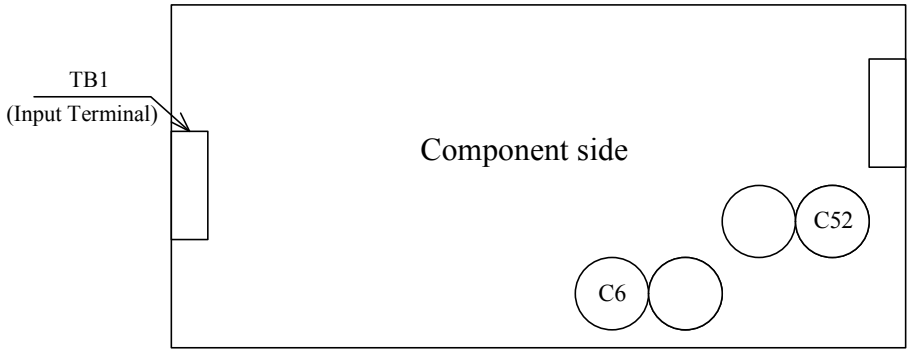
Cooling : Wind velocity ≧ 1.4m/s

Ta (°C)	Load (%)
	Mounting (A) - (E)
-20 - +50	100
60	70

Electrolytic capacitor allowable Max temperature

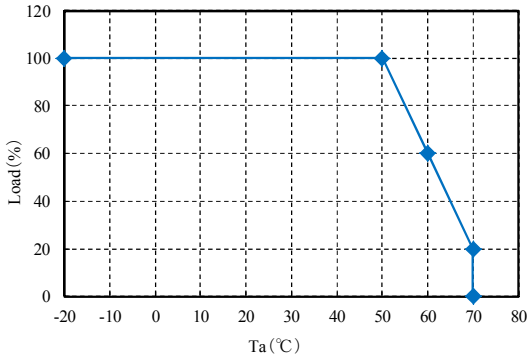
	Allowable Max temperature (℃)
C6	75
C52	75

The entire component must be cooled. The maximum temperature of the electrolytic capacitor C6 and C52 must keep lower than "Electrolytic capacitor allowable Max temperature" in the above table. As reference, set wind velocity at 1.4m/s.



■EVS600W

EVS600W is forced air cooling type product with built-in fan. This product has ventilating holes.



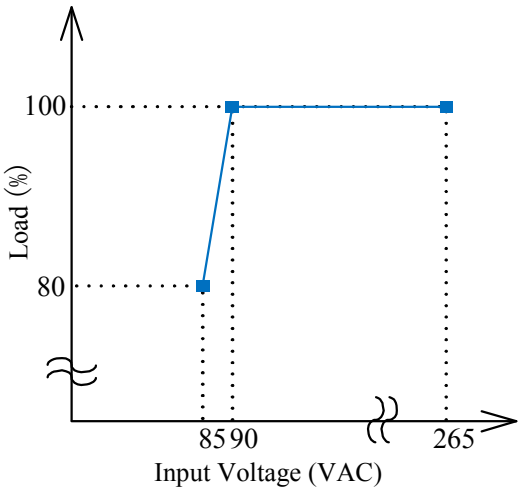
Mounting (A) - (D)

Ta (°C)	Load (%) Mounting (A) - (D)
-20 - +50	100
60	60
70	20

5-3. Output Derating according to the Input Voltage

Load (%) is percent of maximum output current value in a rated output voltage.

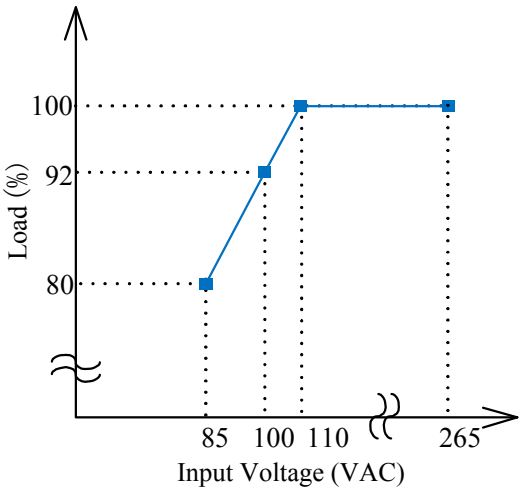
■EVS300W



Mounting (A) - (E)

Input Voltage (VAC)	Load (%) Mounting (A) - (E)
85	80
90-265	100

■EVS600W



Mounting (A) - (D)

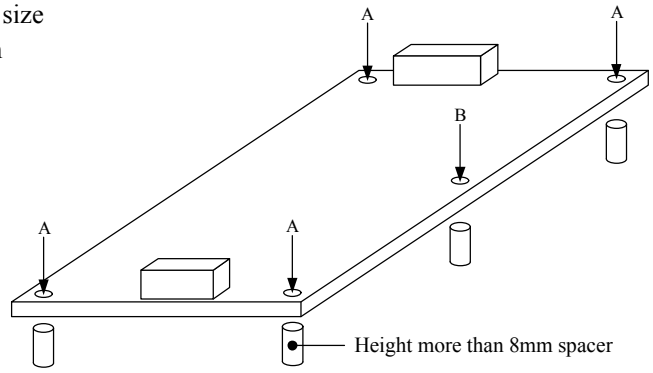
Input Voltage (VAC)	Load (%) Mounting (A) - (D)
85	80
100	92
110-265	100

5-4. Mounting Method

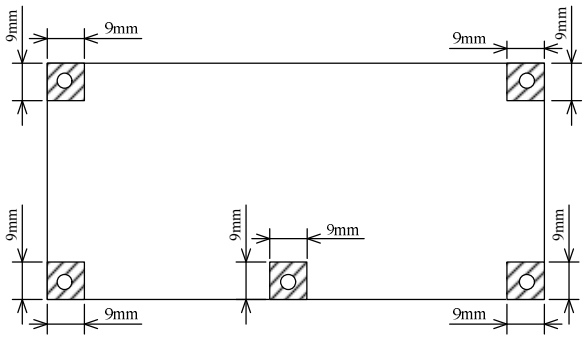
■EVS300W

Insert the spacer (Max ϕ 8) of height more than 8mm to lift the product. And use all mounting holes A for the product installation. The vibration spec is specified under this mounting condition. Please use mounting hole B as needed, vibratility resistant improves.

(1)Mounting Holes size
5 holes ϕ 3.5mm

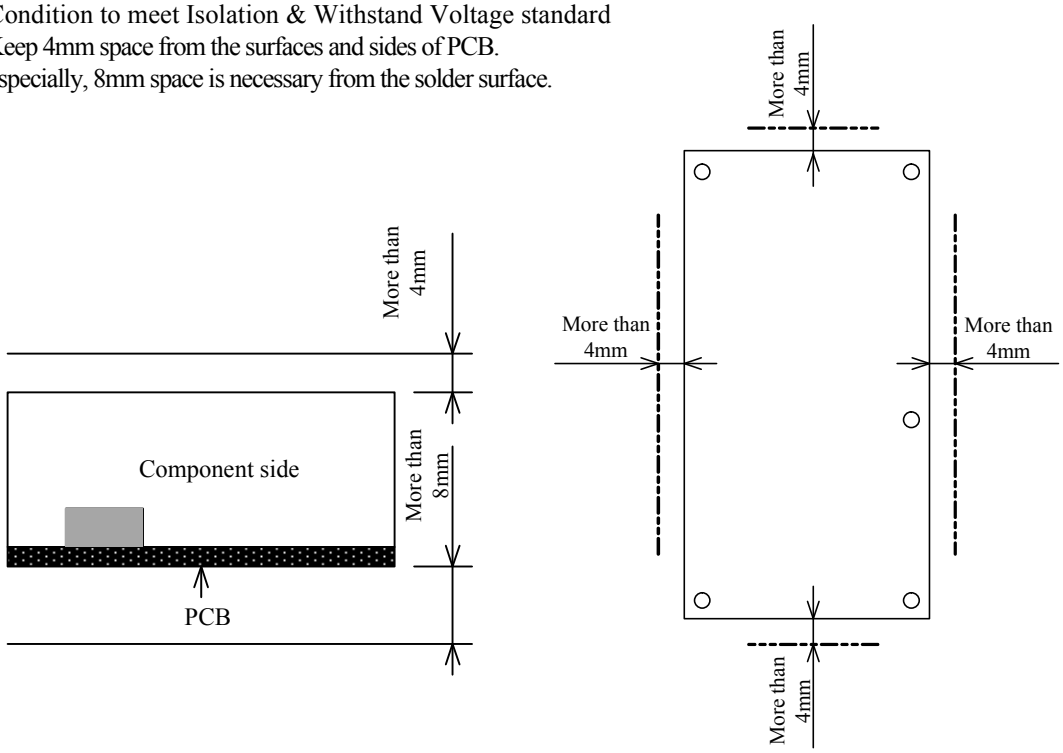


Allowable area by metal pieces is 9mm from each PCB corners. Refer to figure below.



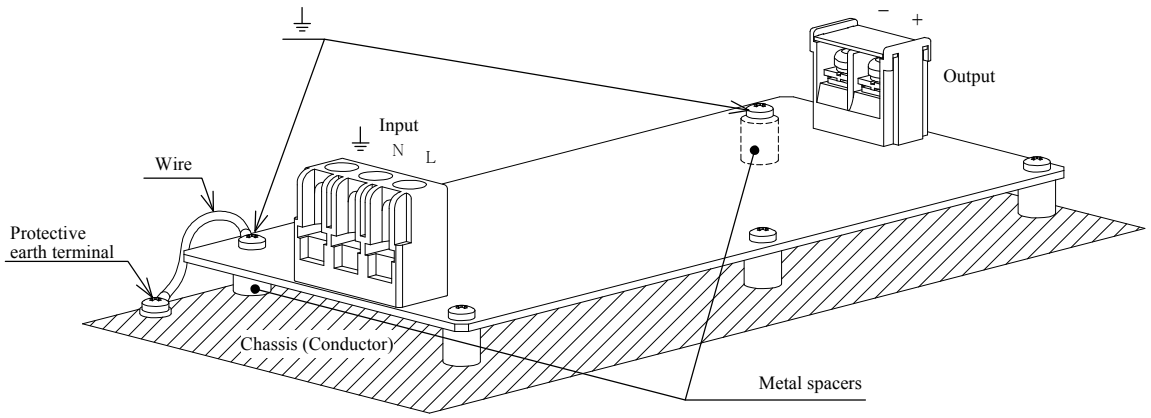
If the space is not enough, the specification of isolation and withstand will not be satisfied. Take the space in the product surroundings and the upper area of components to keep enough for convection cooling.

(2)Condition to meet Isolation & Withstand Voltage standard
Keep 4mm space from the surfaces and sides of PCB.
Especially, 8mm space is necessary from the solder surface.



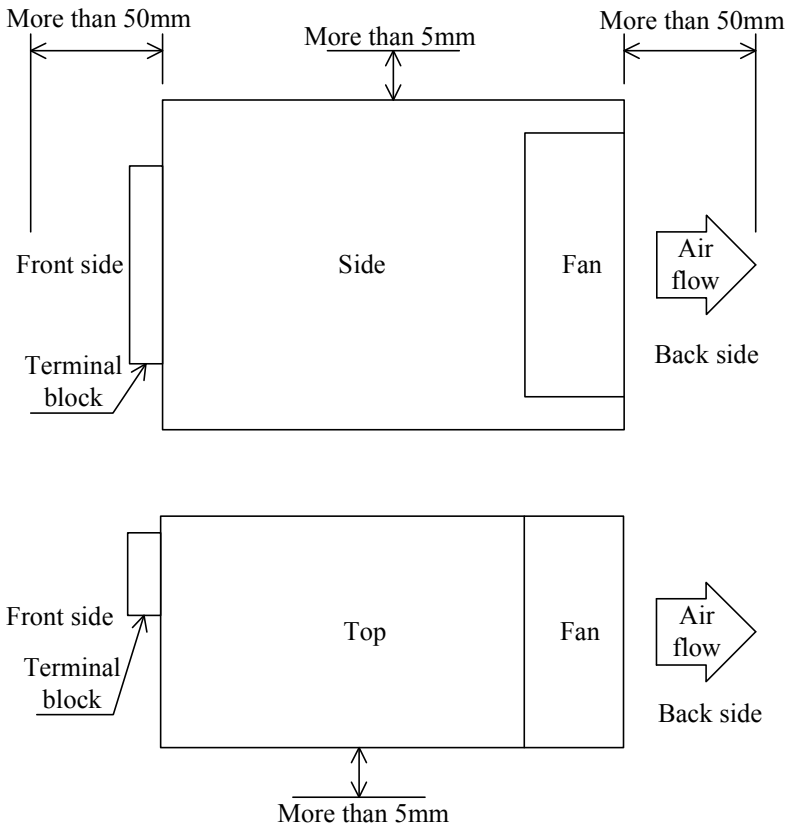
(3)Earth terminal ⏚

⏚ terminal must be connected to the Protective earth terminal of the equipment. Also 2 mounting holes are must be connected to the Chassis (Conductor) by Metal spacer. If not, the conducted noise, radiation noise and output noise will increase. (The location of 2 mounting holes for Chassis connection is shown with ⏚ mark in below figure.)



■EVS600W

(1)This model is forced air cooling type product. This product has ventilating holes. Keep a space more than 50mm between front side of the product and peripheral parts. Back side as well.
Also keep a space more than 5mm between other surfaces and the peripheral parts. Never use in the dusty environment.



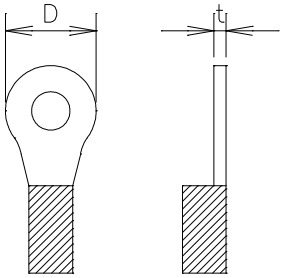
(2)The maximum allowable penetration of mounting screws is 6mm.
(3)Recommended torque for mounting screw（M4 screw）: 1.27N·m（13.0kgf·cm）

6. Wiring Method

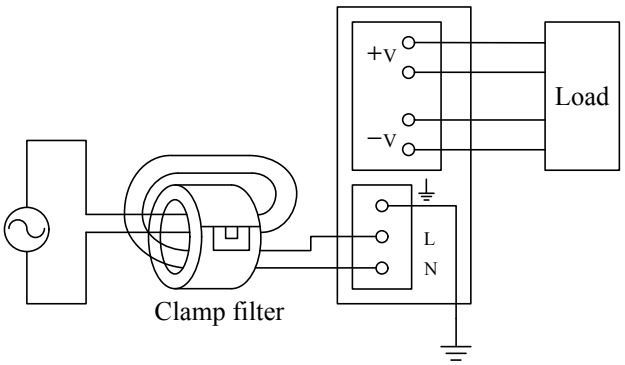
(1)The output load line and input line shall be separated, and use all lines as thick and short as possible to make lower impedance. The output load line and input line shall be twisted or use shielded wire to improve noise sensitivity.
(2)Remote ON/OFF control lines shall be twisted and separated from the output lines.
(3)Noise can be eliminated by attaching a capacitor to the load terminals.
(4)For safety and EMI considerations, connect between ⏚ terminal and Frame Ground terminal of equipment firmly.
(5)The recommended wire type, torque and crimp-type terminal :

Model	Recommended Wire	Recommended torque	Recommended crimp-type terminal		
			D (MAX)	t (MAX)	Mounting pieces (MAX)
EVS300W	AWG12 - 22	M4 Screws 1.2N/m(12.2kgf/cm)～1.6N/m(16.3kgf/cm)	8.1mm	1.0mm	1 piece
				0.8mm	2 pieces
		M4 Screws 1.2N/m(12.2kgf/cm) ～1.6N/m(16.3kgf/cm)	-		
EVS600W	AWG12 - 22	M3.5 Screws 1.0N/m(10.2kgf/cm) ～1.6N/m(16.3kgf/cm)	8.1mm	1.0mm	1 piece
				0.8mm	2 pieces
		M5 Screws 2.2N/m(22.4kgf/cm)～ 2.8N/m(28.6kgf/cm)	-		

Note 1 : When using separate loads, use of two pcs. of 0.8mm thick crimp -type terminal is recommended.
Note 2 : For recommended wire type, refer to wire maker recommended allowable current and voltage drop.
Recommended wire type and crimp-type terminal vary depending on actual conditions. Choose most appropriate wire type and crimp-type terminal by refer to wire maker recommended allowable current and voltage drop.



(6)Radiated Emission (EVS600W only)
It is recommended to use the clamp filter to meet EN55011/EN5502-B, FCC-ClassB, VCCI-B.
The product might meet the standard without using the clamp filter depend on wiring and mounting product installed conditions (for example, by using other external input filter or using at light load etc.).
Evaluating well by the system before use is recommended.

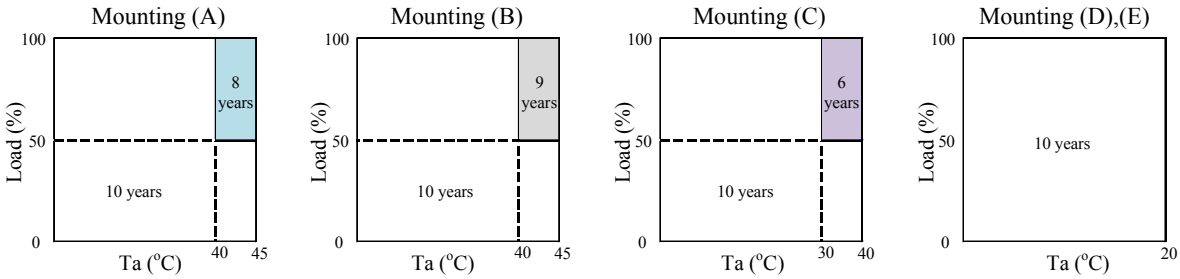


Note : Recommended clamp filter is ZCAT3035-1330 (TDK).
Winding input wire around the clamp filter by 2 turns.

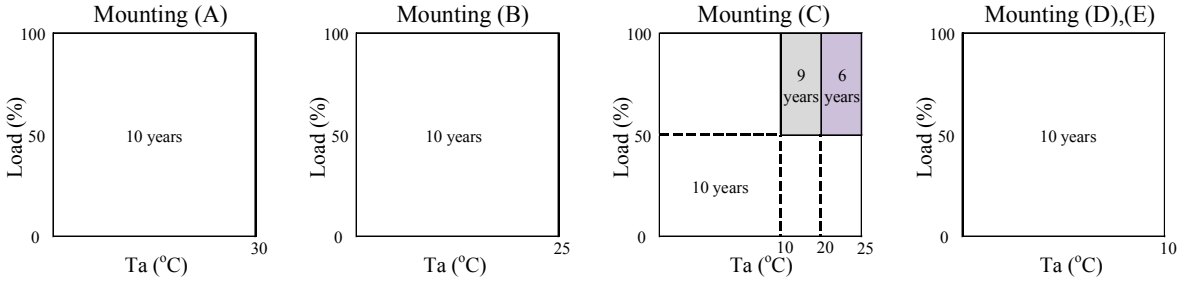
7. Expected life

The life expectancy of the product is as follows.
The life expectancy is dependent on the lifetime of electrolytic capacitor and/or the fan.
The life expectancy is not a guaranteed value, please consider as a reference.
Do not use the product which passed over the life expectancy.
There is a risk of unexpected output shutdown or specifications may not be satisfied.
Please contact us for maintenance or exchange the product which passed over the life expectancy.
The life expectancy of the product is calculated in condition of rated input voltage and 24-hour continuous operation.
Load (%) is percent of maximum output current in a rated output voltage.

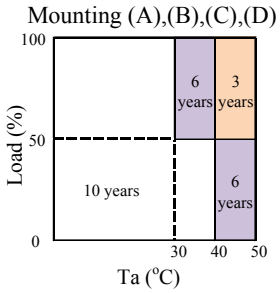
■EVS300W



■EVS300W/A (With chassis and cover model.)



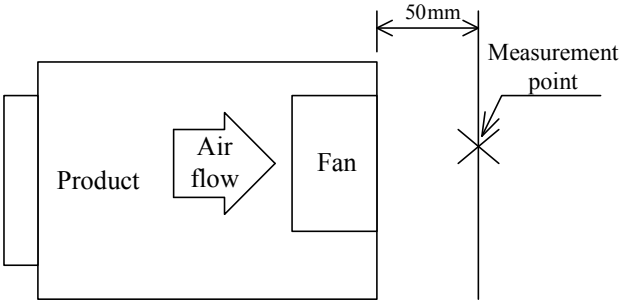
■EVS600W

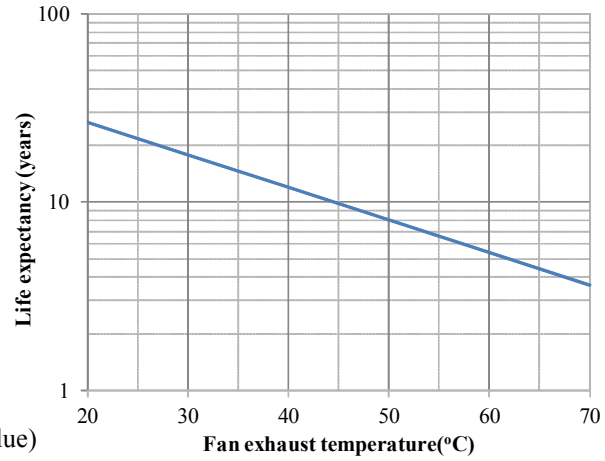


The following figure shows the life expectancy of the fan (EVS600W)

The difference between the intake temperature and the exhaust temperature of the product at 100%.
EVS600W : 10°C

Measurement point of fan exhaust temperature





The noise to occur from fan : 25dB~45dB (Reference value)

8. External Fuse Rating

Refer to the following fuse rating when selecting the external input fuse.
Surge current flows when input turn on. Use slow-blow fuse or time-lug fuse. Fast-blow fuse can not be used.
Fuse rating is specified by inrush current value at input turn on.
Do not select the fuse according to actual input current (rms.) values.

EVS300W : 6.3A
EVS600W : 15A

9. Before concluding that the product is at fault…

Before concluding that the product is at fault, make the following checks.
(1)Check if the rated input voltage is connected.
(2)Check if the wiring of input and output is correct.
(3)Check if the wire size is not too thin.
(4)Check if the output voltage control (V.ADJ) is properly adjusted.
(5)Check if the output current and output power does not over specifications.
(6)Audible noise can be heard when input voltage waveform is not sinusoidal wave.
(7)Audible noise can be heard during Dynamic-Load operation.
(8)The built-in fan speed is reduced or stopped at light load (about 5% or less of rated output current).
The built-in fan is stopped due to output shut down. (Such as OVP or ON/OFF control, etc.)
(EVS600W only)

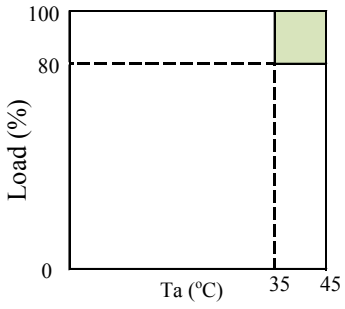
10. Warranty Period

Warranty Period applies for Standard Mounting (A) and the number of output ON/OFF is only once a day.
Do not exceed its derating of maximum load. However, only if EVS300W is in forced air cooling, the warranty period applied for direction (A), (B), (C), (D) and (E).
For damages occurring at normal operation within this warranty period, repair is free of charge.
Please contact our sales office for warranty in other mounting directions if required.

■EVS300W

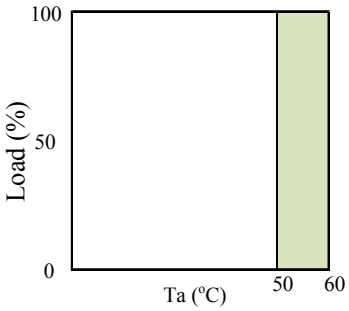
(1)Convection Cooling

Mounting(A)



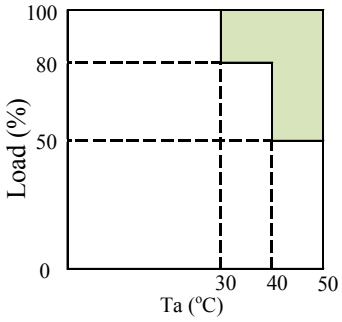
(2)Forced Air Cooling

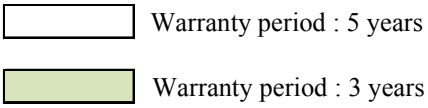
Mounting(A) - (E)



■EVS600W

Mounting(A)





Following cases are not covered by warranty

(1) Improper usage like dropping products, applying shock and defects from operation exceeding specification of the product.
(2) Defects resulting from natural disaster (fire, flood etc.).
(3) Unauthorized modifications or repair.