

**General Safety Instructions:**

READ SAFETY INSTRUCTIONS

**Servicing:**

These products are not customer serviceable TDK-Lambda UK LTD and their authorised agents only are permitted to carry out repairs.

**Critical Components:**

These products are not authorised for use as critical components in nuclear control systems, life support systems or equipment for use in hazardous environments without the express written approval of the Managing Director of TDK-Lambda EMEA.

**Product Usage:**

These products are designed for use within a host equipment which restricts access to authorised competent personnel.

This product is a component power supply and is only to be installed by qualified persons within other equipment and must be not operated as a stand alone product.

This product is for sale to business to business customers and can be obtained via distribution channels. It is not intended for sale to end users.

This product is a component power supply and does not fall within the scope of the EMC directive. Compliance with the EMC directive must be considered in the final installation. Please contact your local TDK-Lambda office.

**Environmental:**

These products are IPX0, and therefore chemicals/solvents, cleaning agents and other liquids must not be used.

**Environment:**

This power supply is a switch mode power supply for use in applications within a Pollution Degree 2, overvoltage category II environment. Material Group IIIb PCB's are used within it.

**Output Loading:**

The output power taken from the power supply must not exceed the rating stated on the power supply label, except as stated in the product limitations in this handbook.

**Input Parameters:**

This product must be operated within the input parameters stated in the product limitations in this handbook.

**End of Life Disposal:**

The unit contains components that require special disposal. Make sure that the unit is properly disposed of at the end of its service life and in accordance with local regulations.



RISK OF ELECTRIC SHOCK

**High Voltage Warning:**

Dangerous voltages are present within the power supply. The professional installer must protect service personnel from inadvertent contact with these dangerous voltages in the end equipment.

**WARNING:** When installed in a Class 1 end equipment, this product must be reliably earthed and professionally installed.

The (+) or (-) output(s) can be earthed or left floating.

The unit cover(s)/chassis (where applicable) must not be made user accessible.

The mains input connector is not acceptable for use as field wiring terminals.

For encased products, do not use mounting screws, which penetrate the unit more than; See drawings.

Internal fuses protect the unit and must not be replaced by the user. In case of internal defect, the unit must be returned to TDK-Lambda UK LTD or one of their authorised agents.

A suitable mechanical, electrical and fire enclosure must be provided by the end use equipment for mechanical, electric shock and fire hazard protection.

**Energy Hazards:**

The main output of this product is capable of providing hazardous energy (240VA). Final equipment manufacturers must provide protection to service personnel against inadvertent contact with the output terminals.

The unit cover/chassis, where applicable, is designed to protect skilled personnel from hazards. They must not be used as part of the external covers of any equipment where they may be accessible to operators, since under full load conditions, part or parts of the unit chassis may reach temperatures in excess of those considered safe for operator access.

**Allgemeine Sicherheitsvorschriften:**

LESEN SIE DIE SICHERHEITSVORSCHRIFTEN

**Wartung:**

Diese Produkte können nicht durch den Kunden gewartet werden. Nur TDK-Lambda UK LTD. und deren zugelassene Vertriebshändler sind zur Durchführung von Reparaturen berechtigt.

**Kritische Komponenten:**

Diese Produkte sind nicht für die Verwendung als kritische Komponenten in nuklearen Kontrollsystemen, Lebenserhaltungssystemen oder Geräten in gefährlichen Umgebungen geeignet, sofern dies nicht ausdrücklich und in Schriftform durch den Geschäftsführer von TDK-Lambda EMEA genehmigt wurde.

**Produktverwendung:**

Diese Produkte sind zur Verwendung innerhalb von Host-Anlagen gedacht, die einen auf das Fachpersonal beschränkten Zugang haben.

Dieses Produkt ist eine Stromversorgungs-Komponente und sie darf nur von qualifiziertem Personal in andere Geräte eingebaut werden und sie darf NICHT als eigenständiges ("Stand-Alone") Gerät betrieben werden.

Dieses Produkt ist für den Verkauf an Geschäftskunden entwickelt worden und es kann über Distributionskanäle bezogen werden.

Es ist NICHT für den Verkauf an Endkunden gedacht und konzipiert.

Dieses Produkt ist eine Stromversorgungsbaugruppe und sie fällt NICHT in den Bereich der EMV Direktive.

Die Konformität mit der EMV Richtlinie muss in der finalen Gesamtinstallation betrachtet werden.

Bitte kontaktieren Sie Ihr regionales TDK-Lambda Vertriebsbüro im Falle von Rückfragen.

**Umwelt:**

Diese Produkte sind IPX0, aus diesem Grund dürfen keine Chemikalien/Lösungsmittel, Reinigungsmittel und andere Flüssigkeiten verwendet werden.

**Umgebung:**

Dieses Netzteil ist ein Schaltnetzteil zur Verwendung in einer Umgebung mit einem Verschmutzungsgrad 2, Überspannungskategorie II. Materialgruppe IIIb mit darin verwendeten PCBs.

**Ausgangsstrom:**

Der Ausgangsstrom des Netztesiles darf die Leistung, die auf dem Label des Netztesiles vermerkt ist, nur dann überschreiten, wenn dies in den Produktgrenzen dieses Handbuches ausgezeichnet ist.

**Eingangsparameter:**

Dieses Produkt muss innerhalb der Eingangsparameter, die in den Produktgrenzen dieses Handbuches angegeben sind, betrieben werden.

**Entsorgung am Ende der Betriebszeit:**

Das Gerät enthält Komponenten die unter Sondermüll fallen. Das Gerät muss am Ende der Betriebszeit ordnungsgemäß und in Übereinstimmung mit den regionalen Bestimmungen entsorgt werden.

**GEFAHR DURCH ELEKTRISCHEN SCHLAG****Hochspannungswarnung:**

Innerhalb des Netztesiles gibt es gefährliche Spannungen. Der Elektroinstallateur muss das Wartungspersonal vor versehentlichem Kontakt mit den gefährlichen Spannungen im Endgerät schützen.

**WARNUNG!** Falls Sie unser Netzgerät in eine Anwendung mit Schutzklasse 1 eingebaut haben, stellen Sie sicher, dass es fachgerecht installiert und zuverlässig geerdet ist.

Die (+) oder (-) Ausgänge können geerdet werden oder unangeschlossen bleiben.

Die Abdeckung des Gerätes/das Gehäuse darf für den Benutzer nicht zugänglich sein.

Der Haupteingangsanschluss ist nicht für die Verwendung als Feldverdrahtungsanschluss geeignet.

Für ummantelt Produkte, verwenden Sie keine Schrauben, die das Gerät mehr als durchdringen; siehe Zeichnung. Eine interne Sicherung schützt das Gerät und darf durch den Benutzer nicht ausgetauscht werden. Im Fall von internen Defekten muss das Gerät an TDK-Lambda UK LTD oder einen der autorisierten Vertriebshändler zurückgeschickt werden.

Ein geeignetes mechanisches, elektrisches und brandgeschütztes Gehäuse muss als Schutz vor der Gefahr von mechanischen Risiken, Stromschlägen und Brandschutz in dem Endgerät vorgesehen werden.

Gefahren durch elektrische Energie:

Von bestimmten Modulen kann je nach Einstellung der Ausgangsspannung gefährliche elektrische Energie ausgehen (240 VA). Die Endgerätehersteller müssen einen Schutz für Servicepersonal vor unbeabsichtigtem Kontakt mit den Ausgangsanschlüssen dieser Module vorsehen. Kann aufgrund der Einstellung gefährliche elektrische Energie auftreten, dürfen die Modulanschlüsse für den Benutzer nicht zugänglich sein.

Die Geräteabdeckung/das Gehäuse ist so entworfen, dass das Fachpersonal vor Gefahren geschützt wird. Sie dürfen nicht als Teil der externen Abdeckung für Geräte verwendet werden, die für den Betreiber zugänglich sein müssen, da Teile oder das gesamte Gerätegehäuse unter voller Auslastung übermäßige Temperaturen erreichen kann, die für den Zugang des Betreibers nicht mehr als sicher betrachtet werden.

**Consignes générales de sécurité:**

LIRE LES CONSIGNES DE SECURITE

**Entretien:**

Ces produits ne peuvent pas être réparés par l'utilisateur. Seuls, TDK-Lambda UK LTD et ses agents agréés sont autorisés à effectuer des réparations.

**Composants critiques:**

Ces produits ne doivent pas être utilisés en tant que composants critiques dans des systèmes de commande nucléaire, dans des systèmes de sauvetage ou dans des équipements utilisés dans des environnements dangereux, sans l'autorisation écrite expresse du directeur général de TDK-Lambda EMEA.

**Utilisation du produit:**

Ces produits sont conçus pour être utilisés dans un équipement hôte dont l'accès n'est autorisé qu'aux personnes compétentes.

Ce produit est une alimentation considérée comme un composant devant être installé par des personnes qualifiées, dans un autre équipement. Il ne doit pas être utilisé en tant que produit fini.

Ce produit est destiné à la vente entre entreprises et peut être obtenu via des canaux de distribution.

Il n'est pas prévu à la vente pour les particuliers.

Ce produit est une alimentation considérée comme un composant, il ne relève pas du champ d'application de la directive CEM. Le respect de la directive CEM doit être pris en compte dans l'installation finale. Veuillez contacter votre bureau TDK-Lambda le plus proche.

**Environnement:**

Ces produits sont IPX0, et donc on ne doit pas utiliser des produits chimiques/solvants, des produits de nettoyage et d'autres liquides.

**Environnement fonctionnel :**

Cette alimentation fonctionne en mode commutation pour utilisation dans des applications fonctionnant dans un environnement avec Degré de Pollution 2 et catégorie de surtension II. Elle utilise des cartes des circuits imprimés (PCB) de Groupe IIIb.

**Intensité soutirée:**

L'intensité soutirée de l'alimentation ne doit pas dépasser l'intensité nominale marquée sur la plaque signalétique, sauf indications contraires dans les limitations du produit décrit dans ce manuel.

**Paramètres d'entrée:**

Ce produit doit être utilisé à l'intérieur des paramètres d'entrée indiqués dans les limitations du produit dans ce manuel.

**Elimination en fin de vie:**

L'alimentation contient des composants nécessitant des dispositions spéciales pour leur élimination. Vérifiez que cette alimentation est mise au rebut correctement en fin de vie utile et conformément aux réglementations locales en vigueur.



RISQUE DE CHOC ELECTRIQUE

**Attention-Danger haute tension:**

Des tensions dangereuses sont présentes dans l'alimentation. L'installateur doit protéger le personnel d'entretien contre un contact involontaire avec ces tensions dangereuses dans l'équipement final.

**AVERTISSEMENT:** Si ce produit est installé dans un équipement final de classe I, il doit être mis à la terre de manière fiable et installé par un professionnel averti.

Les sorties (+) ou (-) peuvent être raccordées à la terre ou laissées flottantes.

Le couvercle/châssis de l'alimentation ne doit pas être accessible à l'utilisateur. Le connecteur d'entrée d'alimentation principale ne doit pas être utilisé comme borne de raccordement.

N'utilisez pas de vis pénétrant dans le module sur une profondeur supérieure à : Voir dessins.

Un fusible interne protège le module et ne doit pas être remplacé par l'utilisateur. En cas de défaut interne, le module doit être renvoyé à TDK-Lambda UK LTD ou l'un de ses agents agréés.

Une enceinte appropriée doit être prévue par l'utilisateur final pour assurer la protection contre les chocs mécaniques, les chocs électriques et l'incendie.

Energies dangereuses :

Certains modules peuvent générer une énergie dangereuse (240 VA) selon le réglage de tension de sortie. Le fabricant de l'équipement final doit assurer la protection des techniciens d'entretien contre un contact involontaire avec les bornes de sortie de ces modules. Si une telle tension dangereuse risque de se produire, les bornes ou les connexions du module ne doivent pas être accessibles par l'utilisateur.

Le couvercle et le châssis du module sont conçus pour protéger des personnels expérimentés. Ils ne doivent pas être utilisés comme couvercles extérieurs d'un équipement, accessible aux opérateurs car en condition de puissance maximum, des parties du châssis peuvent atteindre des températures considérées comme dangereuses pour l'opérateur.

**Norme generali di sicurezza:**

SI PREGA DI LEGGERE LE NORME DI SICUREZZA

**Manutenzione:**

Il cliente non può eseguire alcuna manutenzione su questi prodotti. L'esecuzione delle eventuali riparazioni è consentita solo a TDK-Lambda UK LTD e ai suoi agenti autorizzati.

**Componenti critici:**

Non si autorizza l'uso di questi prodotti come componenti critici all'interno di sistemi di controllo nucleari, sistemi necessari alla sopravvivenza o apparecchiature destinate all'impiego in ambienti pericolosi, senza l'esplicita approvazione scritta dell'Amministratore Delegato di TDK-Lambda EMEA.

**Uso dei prodotti:**

Questi prodotti sono progettati per l'uso all'interno di un'apparecchiatura ospite che limiti l'accesso al solo personale competente e autorizzato.

Questo prodotto è da considerarsi come un alimentatore professionale componente e come tale deve essere installato da personale qualificato all'interno di altre apparecchiature e non può essere utilizzato come prodotto indipendente.

Questo prodotto non è inteso per la vendita al dettaglio o agli utilizzatori finali.

Questo alimentatore è da considerarsi come un componente e come tale non è assoggettato dagli scopi della direttiva EMC. Conformità alla direttiva EMC deve essere considerata nell'installazione finale di utilizzo. Gli uffici di TDK-Lambda Sas Succursale Italiana sono a vostra disposizione per ulteriori ragguagli.

**Condizioni ambientali:**

Questi prodotti sono classificati come IPX0, dunque non devono essere utilizzati sostanze chimiche/solventi, prodotti per la pulizia o liquidi di altra natura.

**Ambiente:**

Questo prodotto è un alimentatore a commutazione, destinato all'uso in applicazioni rientranti in ambienti con le seguenti caratteristiche: Livello inquinamento 2, Categoria sovratensione II. Questo prodotto contiene schede di circuiti stampati in materiali di Gruppo IIIb.

**Carico in uscita:**

La potenza in uscita ottenuta dall'alimentatore non deve superare la potenza nominale indicata sulla targhetta dell'alimentatore, fatto salvo dove indicato nei limiti per il prodotto specificati in questo manuale.

**Parametri di alimentazione:**

Questo prodotto deve essere utilizzato entro i parametri di alimentazione indicati nei limiti per il prodotto, specificati in questo manuale.

**Smaltimento:**

L'unità contiene componenti che richiedono procedure speciali di smaltimento. Accertarsi che l'unità venga smaltita in modo corretto al termine della vita utile e nel rispetto delle normative locali.



RISCHIO DI SCOSSA ELETTRICA

**Avvertimento di alta tensione:**

All'interno dell'alimentatore sono presenti tensioni pericolose. Gli installatori professionali devono proteggere il personale di manutenzione dal rischio di contatto accidentale con queste tensioni pericolose all'interno dell'apparecchiatura finale.

**ATTENZIONE:** Se installato in un'attrezzatura di classe I, questo prodotto deve essere collegato a terra in modo affidabile ed installato in modo professionale.

Le uscite (+) o (-) possono essere messa a terra o lasciate isolate.

I coperchi/il telaio dell'unità non devono essere accessibili da parte dell'utente.

Il connettore dell'alimentazione principale non può essere utilizzato come terminale di collegamento di campo.

Non utilizzare viti che penetrano nell'unità per più di : Vedi disegni

Un fusibile interno protegge l'unità e non deve essere sostituito dall'utente. Nell'eventualità di un difetto interno, restituire l'unità a TDK-Lambda UK LTD o a uno dei suoi agenti autorizzati.

L'apparecchiatura finale deve includere una recinzione meccanica, elettrica e antincendio per proteggere dai pericoli di natura meccanica, dalle scosse elettriche e dai pericoli di incendio.

#### Pericoli energetici:

Alcuni moduli sono in grado di erogare energia pericolosa (240 VA) a seconda della tensione in uscita impostata. I produttori delle apparecchiature finali sono tenuti a proteggere il personale di manutenzione dal rischio di contatto accidentale con questi terminali dei moduli di uscita. Se impostati su livelli che non escludono l'erogazione di energia pericolosa, questi terminali o collegamenti non devono risultare accessibili da parte dell'utente.

Il coperchio/telaio dell'unità è realizzato per proteggere il personale esperto dai pericoli. Non deve essere usato come parte degli involucri esterni di qualsiasi apparecchiatura, se risulta accessibile da parte degli addetti, poiché è possibile che in condizioni di pieno carico una o più parti del telaio dell'unità giunga/giungano a temperature superiori ai limiti considerati sicuri per l'accesso da parte degli addetti.



**Instrucciones generales de seguridad:**

LEA LAS INSTRUCCIONES DE SEGURIDAD

**Servicio:**

Estos productos no pueden ser reparados por los clientes. TDK-Lambda UK LTD. y sus agentes autorizados son los únicos que pueden llevar a cabo las reparaciones.

**Componentes fundamentales:**

Estos productos no pueden ser utilizados como componentes fundamentales en sistemas de control nuclear, sistemas de soporte vital o equipos a utilizar en entornos peligrosos sin el consentimiento expreso por escrito del Director General de TDK-Lambda EMEA.

**Uso de los productos:**

Estos productos han sido diseñados para ser utilizados en un equipo central que restrinja el acceso al personal cualificado autorizado.

Este producto es una fuente de alimentación y sólo puede ser instalado por personal cualificado dentro de otros equipos y no debe ser tratado como un producto independiente. Este producto debe ser vendido entre empresas profesionales y solo puede obtenerse a través de los canales de distribución. No está destinado para la venta a usuarios finales

Este producto es una fuente de alimentación y no se ve afectada por la directiva EMC. El cumplimiento de la directiva EMC se debe considerar en la instalación final. Por favor, póngase en contacto con su oficina local de TDK – Lambda.

**Medioambiental:**

Estos productos son IPX0 y, por tanto, no pueden utilizarse sustancias químicas/disolventes, agentes de limpieza ni otros líquidos.

**Medio ambiente:**

Esta fuente de alimentación es una fuente de alimentación de modo conmutado a utilizar en aplicaciones dentro de un entorno con un Grado de contaminación 2 y una Categoría de sobretensión II. En él se utilizan policloruros de bifenilo del Grupo de materiales IIIb.

**Carga de salida:**

La potencia de salida tomada de la fuente de alimentación no puede sobrepasar el valor nominal indicado en la etiqueta de la fuente de alimentación, excepto en los casos indicados en las limitaciones del producto en este manual.

**Parámetros de entrada:**

Este producto debe ser utilizado dentro de los parámetros de entrada indicados en las limitaciones del producto en este manual.

**Desecho de la unidad:**

La unidad contiene componentes que deben ser desechados de una manera especial. Asegúrese de desechar correctamente la unidad al final de su vida útil y conforme a las normas locales vigentes.



PELIGRO DE DESCARGAS ELÉCTRICAS

**Advertencia de alta tensión:**

En esta fuente de alimentación hay tensiones peligrosas. El instalador profesional debe proteger al personal de servicio contra cualquier contacto accidental con estas tensiones peligrosas en el equipo final.

**ADVERTENCIA:** La instalación de este producto en un equipo de clase I la deben llevar a cabo profesionales y el producto debe estar conectado a tierra.

La salida o salidas (+) o (-) pueden conectarse a tierra o se las puede dejar flotando.

Debe impedirse el acceso de los usuarios a la cubierta o cubiertas y al chasis de la unidad.

El conector de entrada de la red no es apto para ser utilizado a modo de bornes de cableado de campo.

No utilice tornillos de montaje susceptibles de penetrar en la unidad más de: Ver dibujos.

Un fusible interno protege la unidad y este no debe ser nunca reemplazado por el usuario. En caso de existir algún defecto interno, la unidad debe ser enviada a TDK-Lambda UK LTD o a uno de sus agentes autorizados.

El equipo de uso final debe constituir un recinto de protección mecánica, eléctrica y contra incendios de protección mecánica, contra descargas eléctricas y contra el peligro de incendios.

#### Peligros de energía:

Algunos módulos pueden generar energía peligrosa (240VA) dependiendo de la configuración de la tensión de salida. Los fabricantes de equipos finales deben proteger al personal de servicio contra un contacto accidental con estos bornes de salida de los módulos. Si se configura de modo que pueda generarse energía peligrosa, hay que evitar que el usuario pueda acceder a los bornes o conexiones del módulo.

La cubierta/chasis de la unidad ha sido diseñada para que proteja a las personas cualificadas de los peligros. No deben ser utilizadas como parte de las cubiertas externas de cualquier equipo al que pueden acceder los operarios, ya que bajo unas condiciones de carga completa, la pieza o piezas del chasis de la unidad pueden alcanzar temperaturas superiores a las consideradas seguras para el acceso de los operarios.

**Instruções gerais de segurança:**

LEIA AS INSTRUÇÕES DE SEGURANÇA

**Manutenção:**

Estes produtos não são podem ser submetidos a manutenção por parte do cliente. Apenas a TDK-Lambda UK LTD e os seus agentes autorizados têm permissão para realizar reparações.

**Componentes essenciais:**

Não é autorizada a utilização destes produtos como componentes essenciais de sistemas de controlo nuclear, sistemas de suporte de vida ou equipamento para utilização em ambientes perigosos sem a expressa autorização por escrito do Director-Geral da TDK-Lambda EMEA.

**Utilização do produto:**

Estes produtos foram concebidos para utilização dentro de um equipamento de alojamento que apenas permita o acesso a pessoal qualificado autorizado.

Este produto é uma alimentação considerado com um componente para ser instalado por pessoas qualificadas, em outros equipamentos. Não deve ser usado como um produto acabado.

Este produto é destinado para venda entre as empresas e pode ser obtido através de canais de distribuição.

Não se destina à venda aos particulares.

Este produto é uma alimentação considerado com um componente, não é dentro do application âmbito da directiva CEM.

Conformidade com a directiva CEM devem ser considerados na instalação final.

Entre em contacto com seu escritório TDK-Lambda mais próximo.

**Ambiental:**

Estes produtos são IPX0 e, como tal, não se devem utilizar químicos/solventes, agentes de limpeza e outros líquidos.

**Ambiente:**

Esta fonte de alimentação é uma fonte de alimentação do modo de comutação para utilização em aplicações com um Nível de Poluição 2 e ambientes da categoria de sobretensão II. São utilizadas placas de circuitos impressos do grupo de materiais IIIb.

**Carga de saída:**

A potência de saída extraída da fonte de alimentação não deve exceder a classificação assinalada na etiqueta da fonte de alimentação, excepto quando indicado nas limitações do produto neste guia.

**Parâmetros de entrada:**

Este produto deve ser utilizado dentro dos parâmetros de entrada indicados nas limitações do produto neste guia.

**Eliminação no fim de vida:**

A unidade contém componentes que necessitam de procedimentos especiais de eliminação. Certifique-se de que a unidade é devidamente eliminada no fim da sua vida útil e que tal é feito em conformidade com os regulamentos locais.



RISCO DE CHOQUE ELÉCTRICO

**Aviso de alta tensão:**

Estão presentes tensões perigosas dentro da fonte de alimentação. O profissional que realizar a instalação deve proteger o pessoal de assistência contra contactos inadvertidos com estas tensões perigosas do equipamento final.

**AVISO:** Quando instalado num equipamento de Classe I, este produto deve ser ligado à terra de forma fiável e instalado por um profissional.

As saídas (+) e (-) podem ser ligadas à terra ou deixadas soltas.

O chassis/cobertura(s) da unidade não deve estar acessível ao utilizador.

O conector de entrada de alimentação não deve ser utilizado como terminal de cablagens no local.

Não utilize parafusos de montagem, uma vez que estes penetrarão na unidade em mais do que: Veja os desenhos

Existe um fusível interno que protege a unidade e que não deve ser substituído pelo utilizador. Em caso de defeito interno, a unidade deve ser devolvida à TDK-Lambda UK LTD ou a um dos seus agentes autorizados.

O equipamento de utilização final deve fornecer um bastidor com protecção mecânica, eléctrica e contra incêndios adequada.

Perigos de energia:

Alguns módulos tem a capacidade de fornecer energia perigosa (240 VA), de acordo com a configuração da tensão de saída. O equipamento final do fabricante deve garantir que o pessoal de assistência está protegido contra contactos inadvertidos com estes terminais de saída do módulo. Se essa energia perigosa for produzida, as ligações e os terminais do módulo não devem ser acessíveis pelos utilizadores.

O chassis/cobertura da unidade está concebido de forma a proteger o pessoal especializado de perigos. Não devem ser utilizados como parte das coberturas externas de qualquer equipamento em que possam estar acessíveis aos operadores, uma vez que em condições de carga máxima, algumas peças do chassis da unidade podem atingir temperaturas superiores às consideradas seguras para o acesso do operador.

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# *CUS60M Series*

## *Instruction Manual*

### **BEFORE USING THE POWER SUPPLY UNIT**

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 unit 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.

### **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.
- This product was made for general purpose electronic equipment for standard industrial use and is not designed for applications requiring high safety (such as extremely high reliability and safety requirements. Even though high reliability and safety are not required, this product should not be used directly for applications that have serious risk for life and physical safety. Take sufficient consideration in fail-safe design (such as providing protective circuit or protective device inside the system, providing redundant circuit to ensure no instability when single device failure occurs).
- 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 grounds are 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 in special environment such as places directly exposed to sunlight, dew condensation, moisture, rain, strong electro-magnetic field, or corrosive gas (hydrogen sulfide, sulfur dioxide).

### **Note**

- Take note that traces of sheet metal processing be left in our power supplies.
- 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.
- When exporting our products, apply for necessary permissions as required by rules and regulations of Foreign Exchange and Foreign Trade Control Act.
- Catalogue, contents of the instruction manual may be changed without a prior notice. Refer to latest catalogue or instruction manual.
- Reproduction or reprinting the instruction manual or its portion is forbidden without our permission.
- CE Marking  
CE Marking, when applied to a product covered by this handbook, indicates compliance with the low voltage directive.

## Important safety instructions


### Servicing

These products are not customer serviceable. Repairs can only be carried out by TDK-Lambda or their authorized agents. These products are not authorized for use as critical components in nuclear control systems, life support systems or equipment for use in hazardous environments without the express written approval of the Managing Director of TDK-Lambda Corporation.

### Safety Class of Protection

This power supply is a switching mode power supply for use in applications within a Pollution Degree 2, overvoltage category II environment. Material Group IIIb PCB is used within it.

## Input markings and symbols

 Caution refer to supplementary documents

## EMC performance

### Immunity

Test	Standard	Passed	Comments
Electrostatic discharge	IEC61000-4-2	Level 4,3	Input/Output Air discharge 8kV FG Air discharge 15kV FG Contact discharge 8kV
Electromagnetic field	IEC61000-4-3	Level 3	10V/m
Fast / burst transient	IEC61000-4-4	Level 3	2.0kV (100kHz)
Surge immunity	IEC61000-4-5	Level 4	Normal mode 2.0kV Common mode 4.0kV
Conducted RF immunity	IEC61000-4-6	Level 3	10V
Power frequency magnetic field	IEC61000-4-8	Level 4	30A/m
Voltage dips, variations, interruptions	IEC61000-4-11	Pass	

### Emissions

Test	Standard	Comments
EMI	EN55032	Class B (as per CISPR 32)
Conducted harmonics	IEC61000-3-2	Meet Class A

## General installation instructions

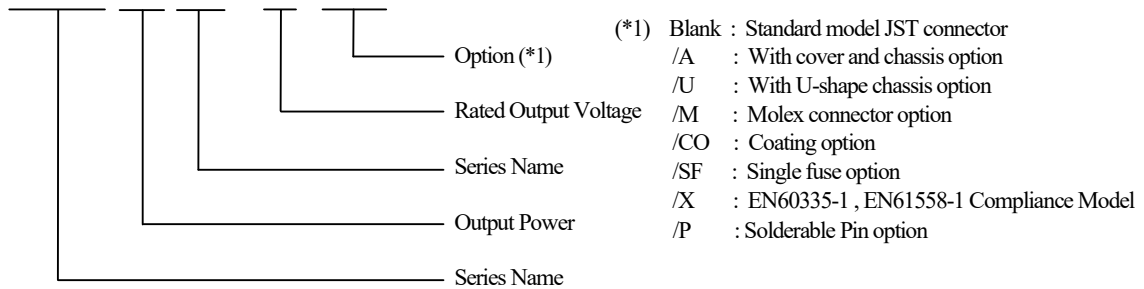
- 1) CUS60M Series is optional for installation in Class I or Class II end equipment, and for Class I must be reliable earthed and professionally installed, and for Class II no earthing connection to the power supply is required.
- 2) These products are IPX0, and therefore chemicals/solvents, cleaning agents and other liquids must not be used.
- 3) The first protective earth connection in the final installation must be marked with the protective earth symbol.

## Special Instructions for IEC/UL/ 60601-1

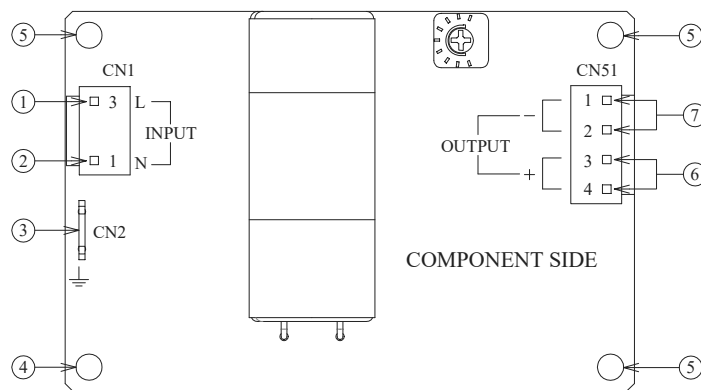
- 1) These products are designed for continuous operation within an overall enclosure, and must be mounted such that access to the mains terminals is restricted. See Clause 16, IEC/UL60601-1.
- 2) These products are NOT suitable for use in the presence of flammable anaesthetic mixtures with air or with oxygen or with nitrous oxide.
- 3) These products are classed as ordinary equipment according to IEC/UL60601-1 and are NOT protected against the ingress of water.
- 4) Reference should be made to local regulations concerning the disposal of these products at out of their useful life.
- 5) For Class II installation, the product needs to be fixed such that they are isolated from unearthed accessible conductive parts by at least 2 MOPP's.
- 6) For IEC/EN 60601-1 3rd Edition, ANSI/AAMI ES 60601-1, CSA 22.2 No 60601-1, these products provide reinforced insulation between input and outputs of 2 MOPPs. 1 MOPP from input to earth and 1 MOPP from output to earth.
- 7) All outputs have basic spacing's to earth rated for mains - 250Vac, and due consideration must be given to this in the end product design.
- 8) Products have SELV outputs.

## 1. Model name identification method

**CUS 60 M – 5 / □**



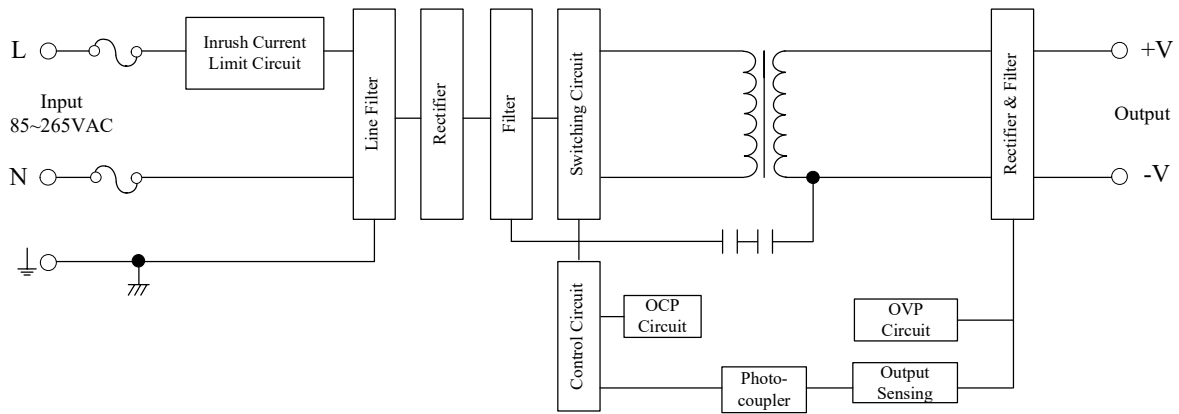
## 2. Terminal Explanation



- ① L : AC Input terminal Live line (Fuse in line.)
- ② N : AC Input terminal Neutral line (Fuse in line.)
- ③  $\perp$  :  $\perp$  Terminal CN2(Protective Earth)
- ④ Mounting hole (hole diameter :  $\phi 3.5\text{mm}$ )  
This hole is electrically connected to CN2.
- ⑤ Mounting hole (hole diameter :  $\phi 3.5\text{mm}$ )  
This hole is used for support the unit.
- ⑥ + : + Output Terminal
- ⑦ - : - Output Terminal



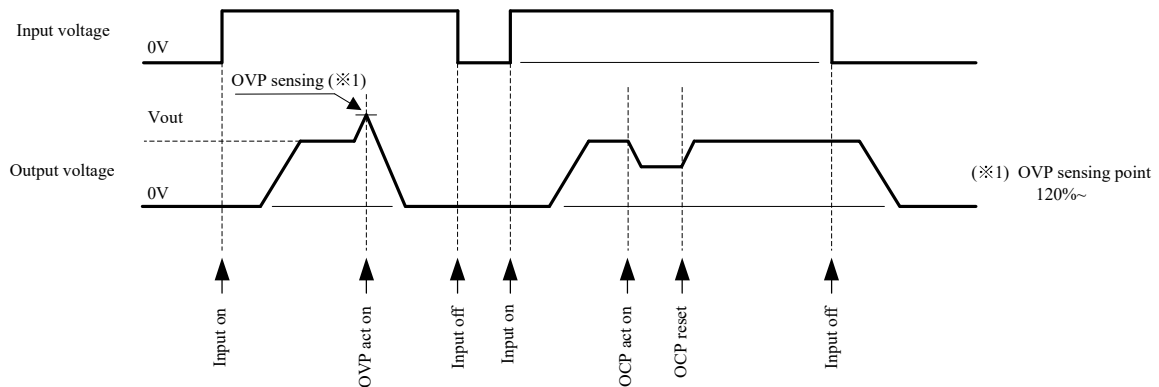
### 3. Block Diagram



● Fuse rating  
2.0A

● Circuit topology , switching frequency  
100KHz

### 4. Sequence time chart



### 5. Terminal Connection Method

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

- Input must be off when making connections.
- $\perp$  terminal must be connected to protective earth of the equipment in Class I installation.
- Output current of each terminal pin must be less than 7A.
- 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.
- Use input/output connector (housing) specified by the table below.
- Use recommended crimping tool. Connector is not included with this product. (Refer to the following)

**Input/Output Connector**

	Model	Connector	Housing	Terminal Pin	Maker
Input (CN1)	Common	B2P3-VH(LF)(SN)	VAR-2 / VHR-3N	SVH-41T-P1.1 BVH-41T-P1.1	J.S.T.
Output (CN51)	Common	B4P-VH(LF)(SN)	VHR-4N		
FG TAB (CN2)	Common	---	22~18AWG: STO-21T-250N 18~14AWG: STO-61T-250N	---	J.S.T.

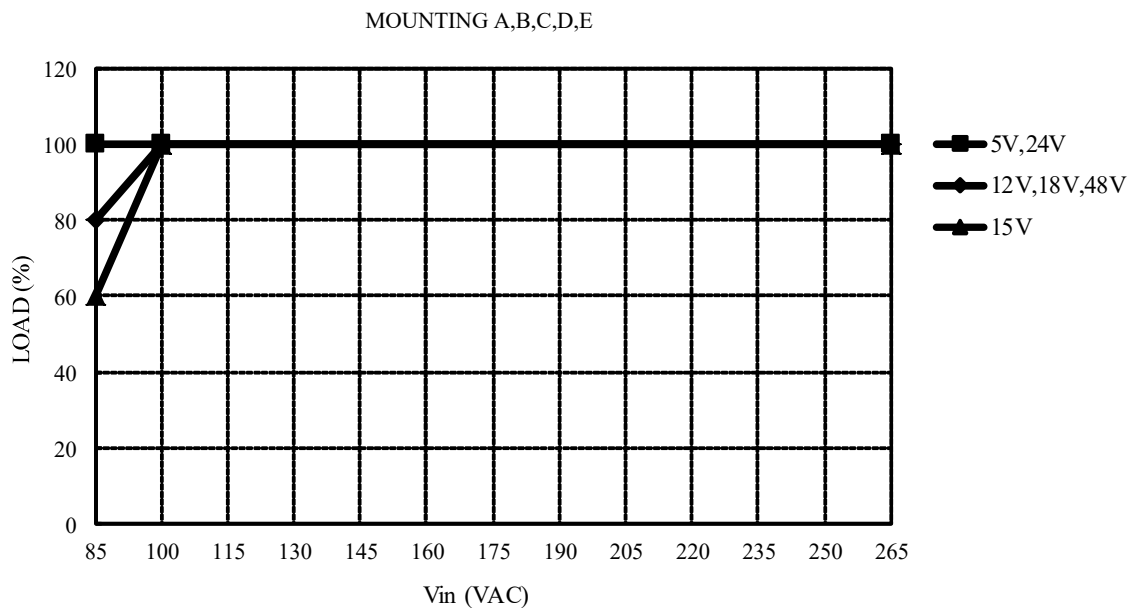
Hand Crimping Tool : YC-930R,YC-931R (J.S.T.)

**6. Explanation of Function and Precautions**

**6-1. Input Voltage Range**

Input voltage range is single phase 85-265VAC(47-63Hz). Never operate the unit out of the specified input voltage range to avoid unit failure. For cases where conformance to various safeties required, input voltage range will be 100-240VAC (50-60Hz). If input voltage is less than 100VAC, output power need to be derated.

Derating curve of the Input voltage



**6-2. Output Voltage Range**

Output voltage is set the rated value at shipment.

**6-3. Inrush Current**

These products equipped power thermistor to limit the inrush current. Higher inrush current will flow at higher ambient temperature or re-input condition. Please select input switch and fuse carefully in consider of the high temperature and re-input the power condition. The Inrush Current value is under cold start at 25°C in the specification.

#### 6-4. Over Voltage Protection (OVP)

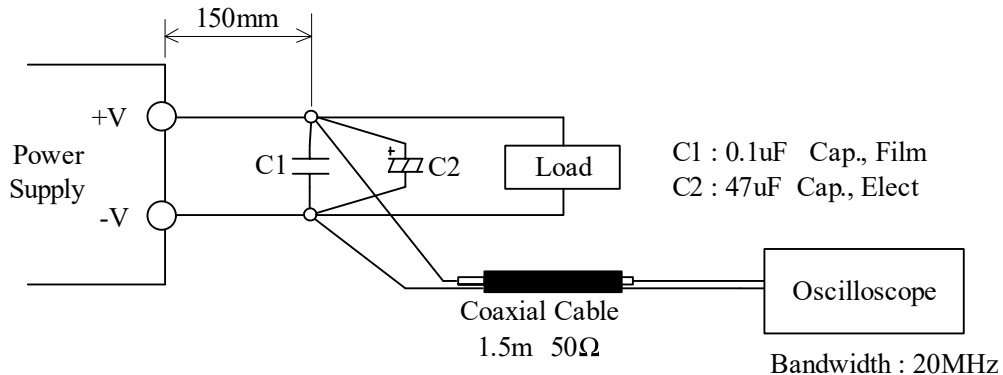
The OVP function (Inverter shut down method, manual reset type) is provided. Please refer to its specification for OVP operating range. When OVP triggers, the output will be shut down. To reset OVP, remove the input of power supply for a few minutes, and then re-input. In addition, the setting value of OVP is fixed and not adjustable. Pay attention not to apply higher voltage externally to the output terminal to avoid unit failure. In case of inductive load, put protective diode in series to the output power line. In heavy load condition, OCP may triggered before output reach OVP threshold.

#### 6-5. Over Current Protection (OCP)

OCP is hiccup mode with automatic recovery. Outputs will be automatically recovered when the overload condition is canceled. OCP function operates when the output current exceeds 105% of maximum DC output current of specification. Never operate the unit under over current or shorted conditions for more than 30seconds, which may lead to damage or insulation failure. OCP setting is not adjustable externally.

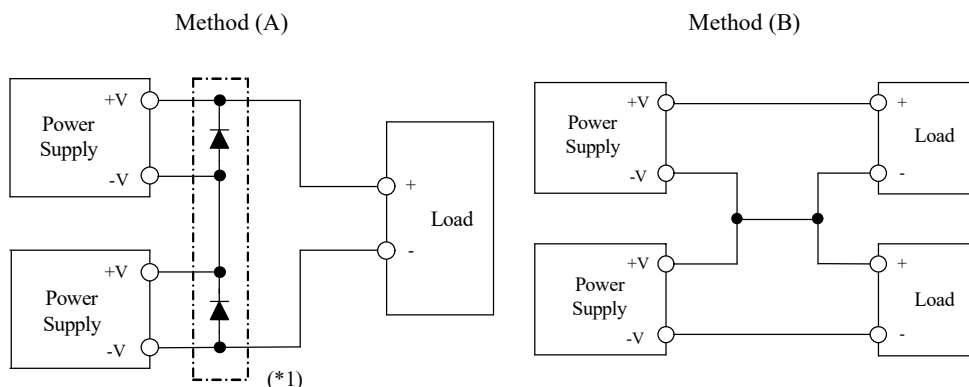
#### 6-6. Output Ripple & Noise

The standard specification for maximum ripple value is measured according to measurement circuit specified as below. When load lines are longer, ripple will become larger. In this case, electrolytic capacitor, film capacitor, etc. might be necessary to use across the load terminal. The output ripple cannot be measured accurately if the probe ground lead of oscilloscope is too long. A circuit reducing light load input power consumption is built in this model. When output current is within 0-35% of rated load, the internal switch element is intermittent operated, to decrease switching loss. The specification of the Ripple & Noise changes by this intermittent operation. The dynamic load response characteristic changes by this intermittent operation too. Different input voltage and dynamic load condition has different dynamic load response characteristic. Please contact us for details.



#### 6-7. Series Operation

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

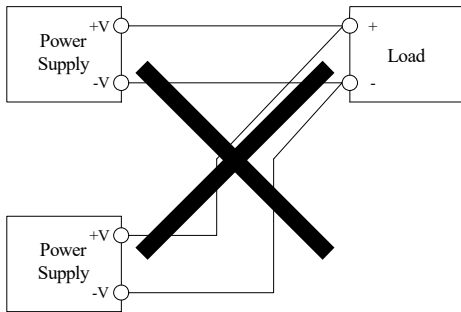


(\*1) Please select a bypass diode with maximum forward current rating more than output load current. And maximum reverse voltage must withstand each power supply output voltage.

### 6-8. Parallel Operation

For parallel operation, method (B) is possible.

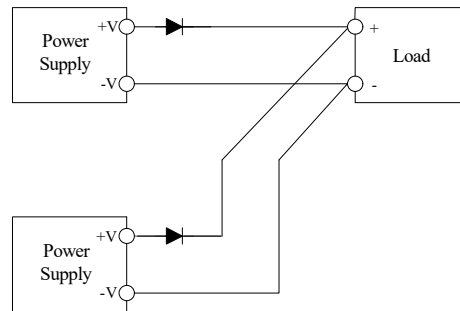
(A) To increase the Output Current is not possible.



(B) To use as Backup Power Supply.

1. Select appropriate backup diode whose rated  $V_{rm}$  higher than power supply output voltage with margin.
2. Design sufficient heat dissipation for backup diode for safe operation.

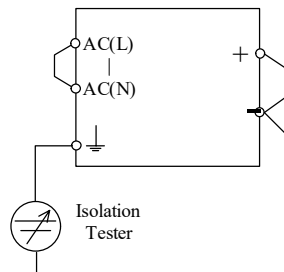
Use within the specification for output power.



### 6-9. Isolation Test

Isolation resistance between Output and  $\perp$  (Protective Earth) is more than  $100M\Omega$  at 500VDC. For safety operation, voltage setting of DC isolation tester must be done before the test. Ensure that the unit is fully discharged after the test.

Output -  $\perp$  (Protective Earth) : 500VDC More than  $100M\Omega$



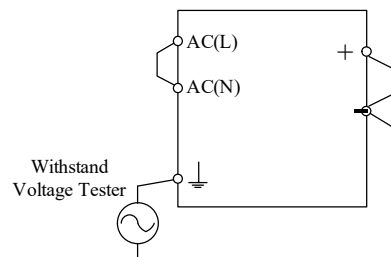
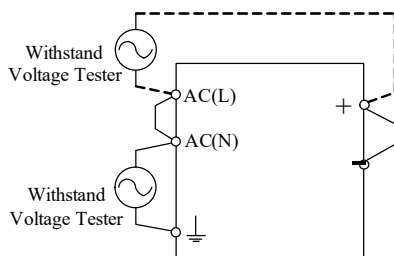
### 6-10. Withstand Voltage

These products are designed to withstand 4.0kVAC between input and output, 2.0kVAC between input and  $\perp$ , and 1.5kVAC between output and  $\perp$  each for 1 minute. When testing withstand voltage, set current limit of the withstand voltage test equipment to 20mA. The applied voltage must be gradually increased from zero to the testing value and then gradually decreased for shut down. When timer is used, the power supply may be damaged by high impulse voltage at timer switch on and off. Connect input and output as follows.

Input - Output(Dashed line) : 4.0kVAC 1min(20mA)

Input -  $\perp$  (Protective Earth)(Solid line) : 2.0kVAC 1min(20mA)

Output -  $\perp$  (Protective Earth) : 1.5kVAC 1min(20mA)



**Instructions for using the power supply in customer's system**

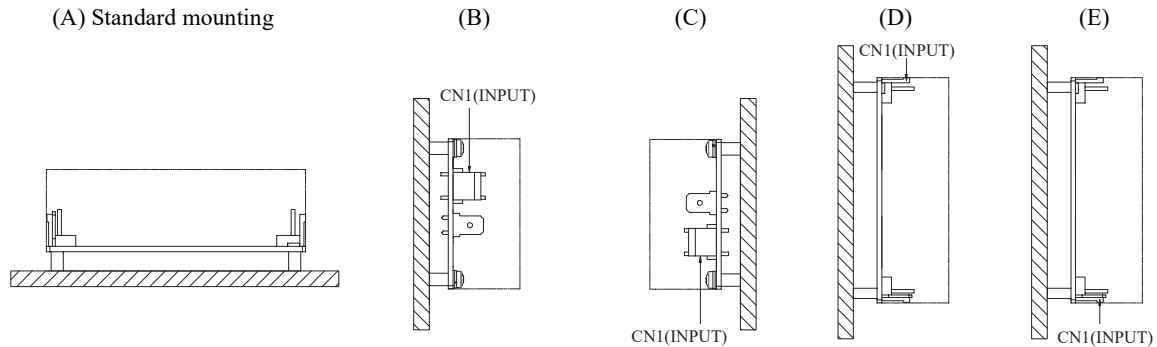
1. If the output of power supply is connected to FG in the application, the withstand voltage test between input and output (FG) should be tested at 2kVAC.
2. If there is external noise filter and Y-caps connected at the input and output of the power supply, the voltage distribution between primary and secondary circuit will be changed during the withstand voltage test, and may cause test fail. In this case, please contact TDK-Lambda for the technical support and instructions.

**7. Mounting**

**7-1. Mounting Directions**

**7-1-1. Mounting directions for models (except CUS60M/A, CUS60M/U)**

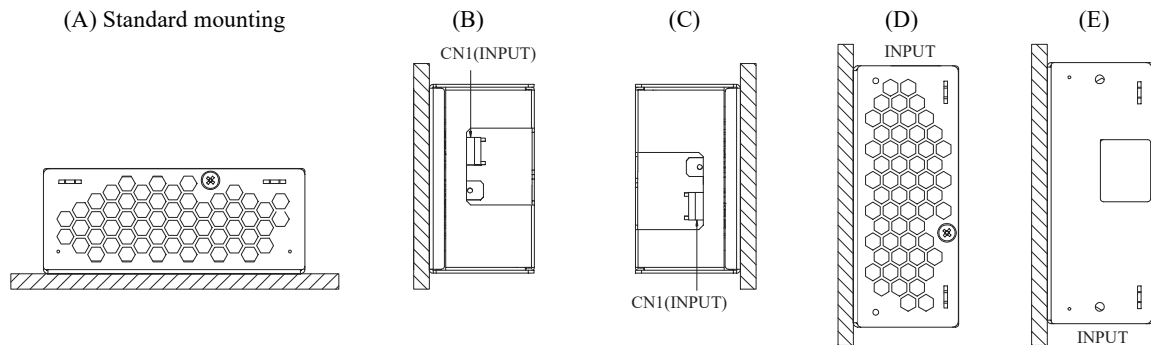
Recommended standard mounting direction is (A). Mounting direction (B)-(E) are also possible.



**7-1-2. Mounting directions for CUS60M/A**

Recommended standard mounting direction is (A). Mounting direction (B)-(E) are also possible.

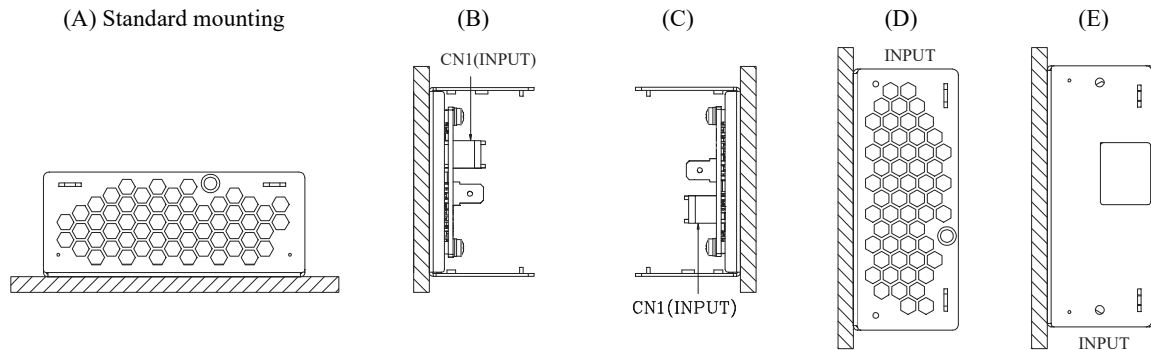
Please use the mounting holes on bottom side of the power supply, do not use the side of the chassis for power supply mounting.



**7-1-3. Mounting directions for CUS60M/U**

Recommended standard mounting direction is (A). Mounting direction (B)-(E) are also possible.

Please use the mounting holes on bottom side of the power supply, do not use the side of the chassis for power supply mounting.



## 7-2. Output Derating

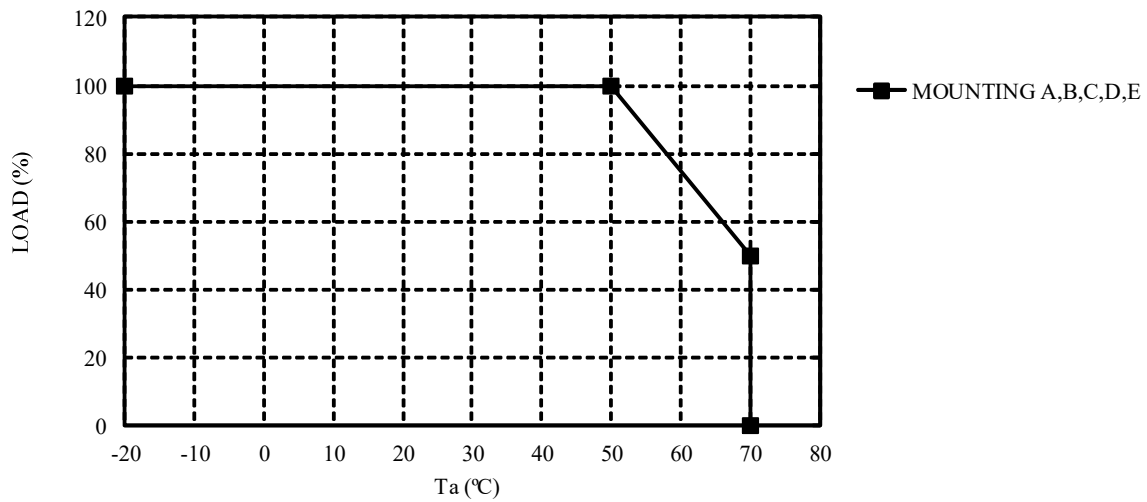
### 7-2-1. Output derating for CUS60M(except CUS60M/A)

Make sure that the specified temperature range is maintained.

#### (1) 5V, 18V, 48V model

Convection Cooling: Mounting A,B,C,D,E

Ta (°C)	Load (%)
-20 - +50	100
70	50



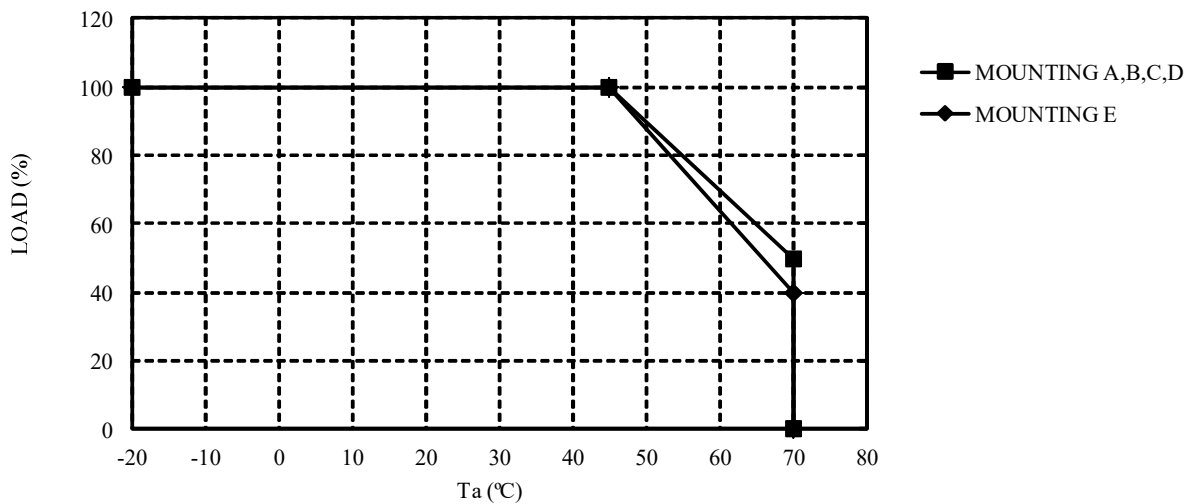
#### (2) 12V model

Convection Cooling: Mounting A,B,C,D

Convection Cooling: Mounting E

Ta (°C)	Load (%)
-20 - +45	100
70	50

Ta (°C)	Load (%)
-20 - +45	100
70	40



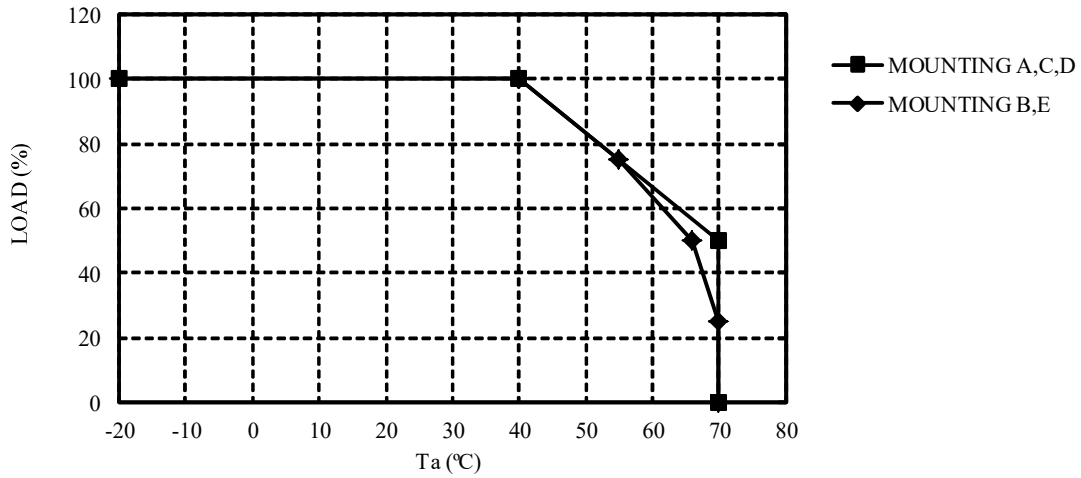
**(3) 15V model**

Convection Cooling: Mounting A,C,D

Ta (°C)	Load (%)
-20 - +40	100
70	50

Convection Cooling: Mounting B,E

Ta (°C)	Load (%)
-20 - +40	100
55	75
66	50
70	25



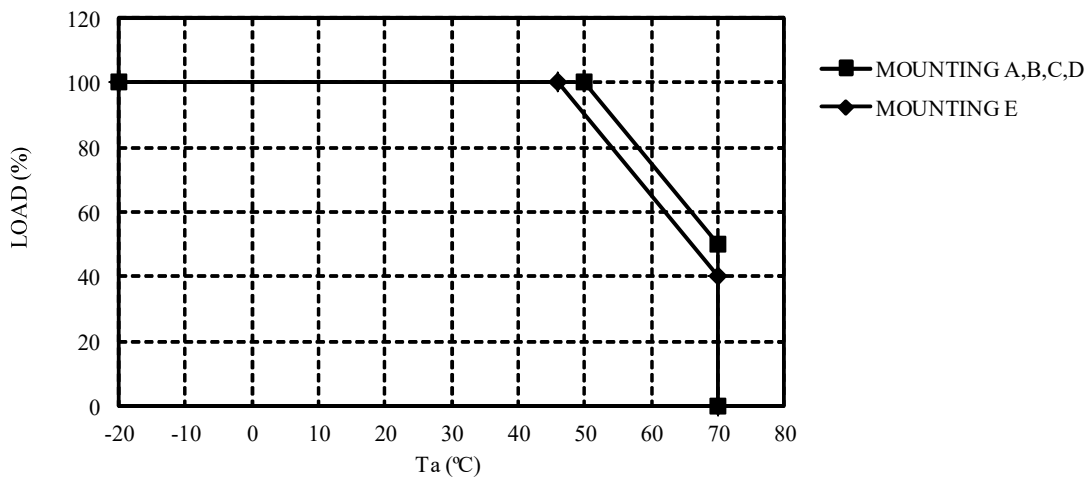
**(4) 24V model**

Convection Cooling: Mounting A,B,C,D

Ta (°C)	Load (%)
-20 - +50	100
70	50

Convection Cooling: Mounting E

Ta (°C)	Load (%)
-20 - +46	100
70	40



**7-2-2. Output derating for CUS60M/A**

Make sure that the specified temperature range is maintained.

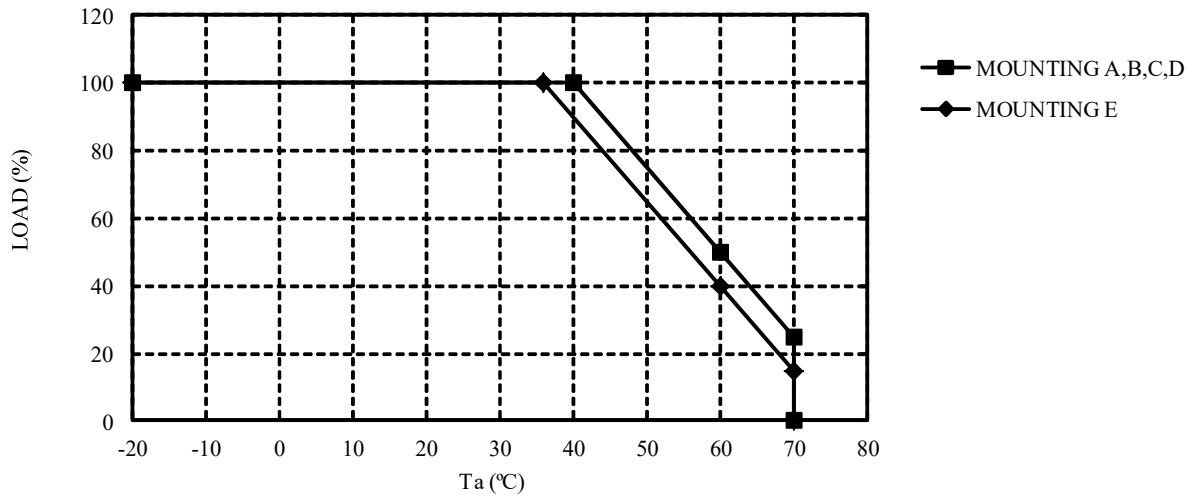
**(1) 5V,18V,24V,48V model**

Convection Cooling: Mounting A,B,C,D

Ta (°C)	Load (%)
-20 - +40	100
60	50
70	25

Convection Cooling: Mounting E

Ta (°C)	Load (%)
-20 - +36	100
60	40
70	15



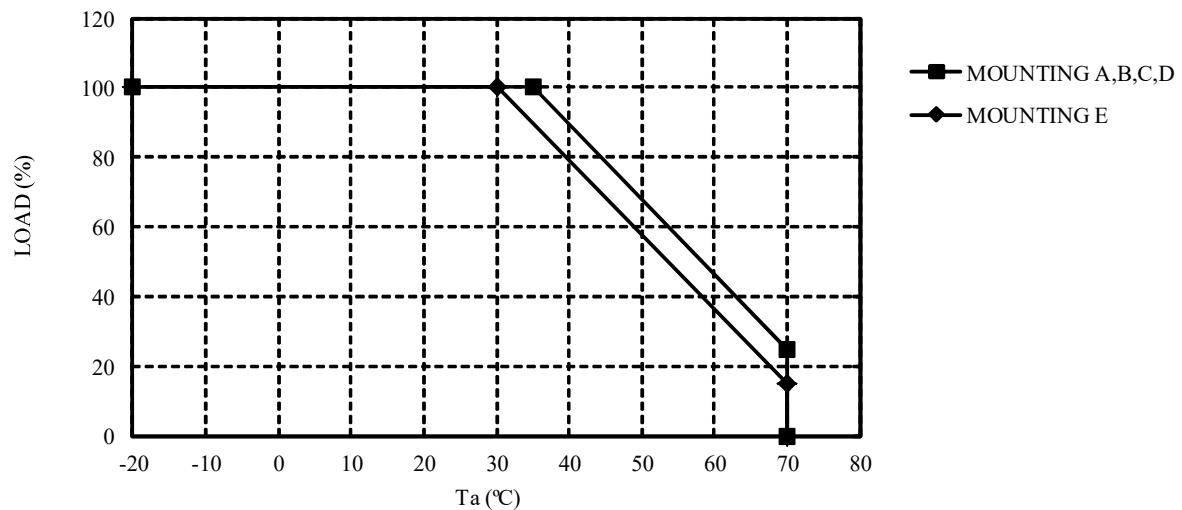
**(2) 12V model**

Convection Cooling: Mounting A,B,C,D

Ta (°C)	Load (%)
-20 - +35	100
70	25

Convection Cooling: Mounting E

Ta (°C)	Load (%)
-20 - +30	100
70	15





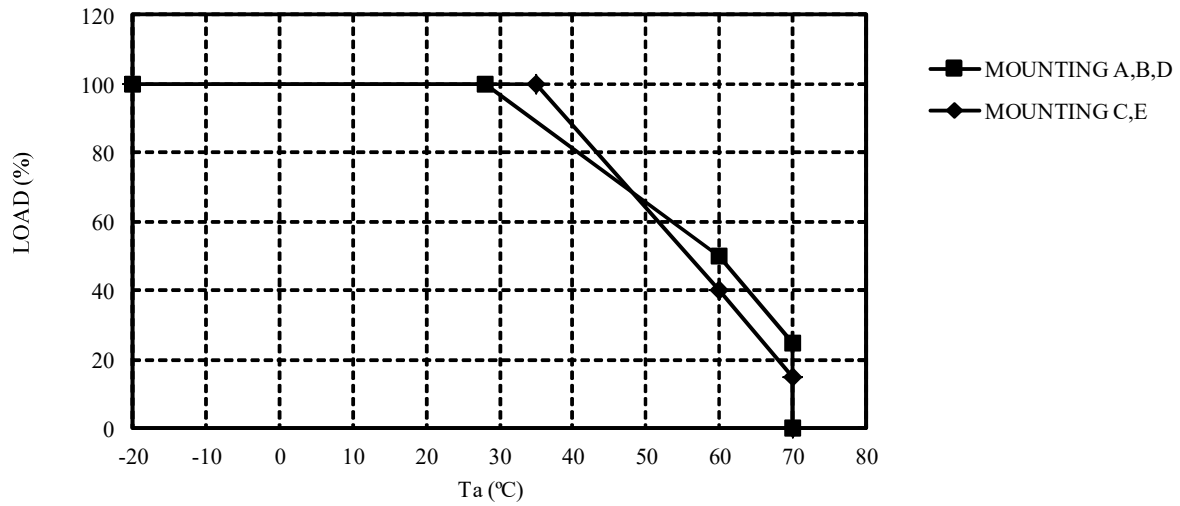
**(3) 15V model**

Convection Cooling: Mounting A,B,D

Ta (°C)	Load (%)
-20 - +28	100
60	50
70	25

Convection Cooling: Mounting C,E

Ta (°C)	Load (%)
-20 - +35	100
60	40
70	15



### 7-3. Mounting Method

#### 7-3-1. Mounting method for standard model

Note: Except /A, /U.

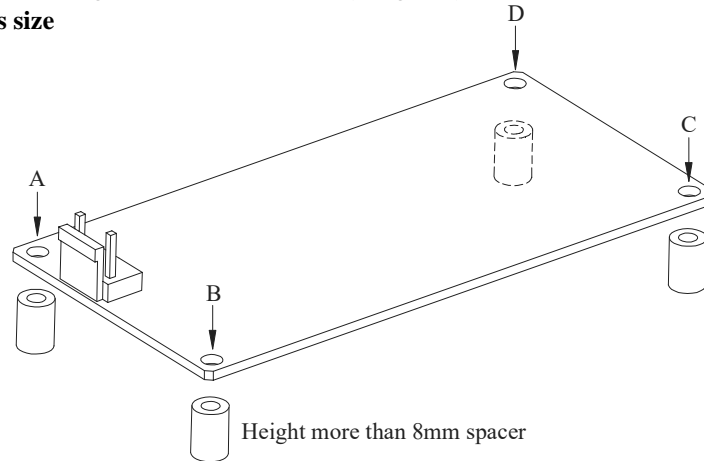
Insert the spacer (Max $\phi$ 6) of height more than 8mm to lift the unit. And use all mounting holes for the unit installation. The vibration specification is specified under this mounting condition.

All four mounting holes on this model should be utilized for best electrical and mechanical performance.

Recommended torque for mounting screw: M3 screw, 0.49N·m (5.0 kgf·cm).

#### ■ Mounting Holes size

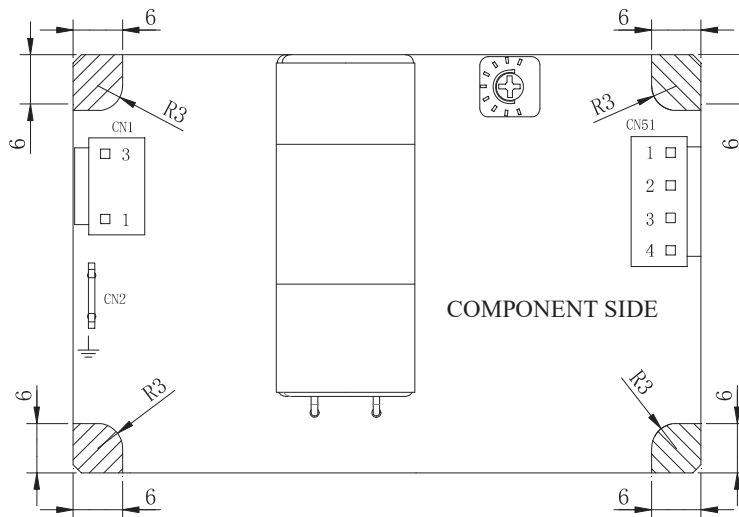
4 holes $\phi$ 3.5mm.



B: Connected to the earth terminal(Protective Earth).

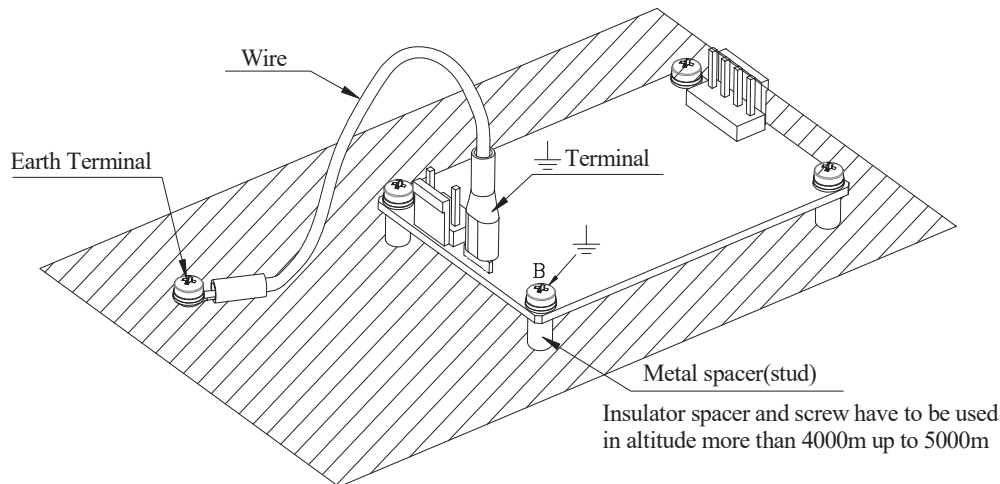
For application in altitude more than 4000m up to 5000m, please use insulator material spacer like plastic , nylon , PBT spacer.

Refer to the shadow in the figure below for allowable area touched by conductive material on top and bottom side of the PCB.

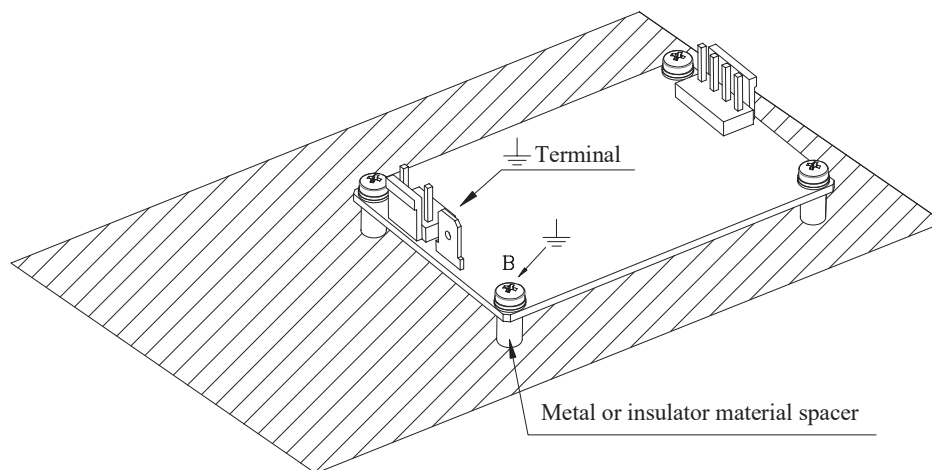


▪ **Condition to meet EMC, Isolation, Withstand Voltage and Cooling requirement.**

- (1) Keep 4mm space minimum from the surface and sides of power supply, 8mm space minimum from the bottom side of PCB to meet safety requirement, or more space depend on safety requirement. If the space is not enough, the specification of isolation and withstand voltage will not be satisfied.
- (2) More space may be required in the surrounding of power supply and the upper area of components for effective cooling depends on the application conditions.
- (3) For installation in Class I end equipment,  $\perp$  terminal (Protective Earth) must be connected to the earth terminal of the equipment, also the mounting hole B (as shown below) needed to be connected to earthed metal plane or metal chassis of end product by metal spacer to ensure EMC performance. All equipment ideally should be mounted inside an earthed shielded metal box. Alternatively an earthed metal plate can be used to mount the power supply and load. Please use insulator material studs for application in altitude more than 4000m up to 5000m.



- (4) For Installation in Class II end equipment  $\perp$  terminal (Protective Earth) is unnecessary to be connected to earth terminal of the equipment.



### 7-3-2. Mounting method for /A model

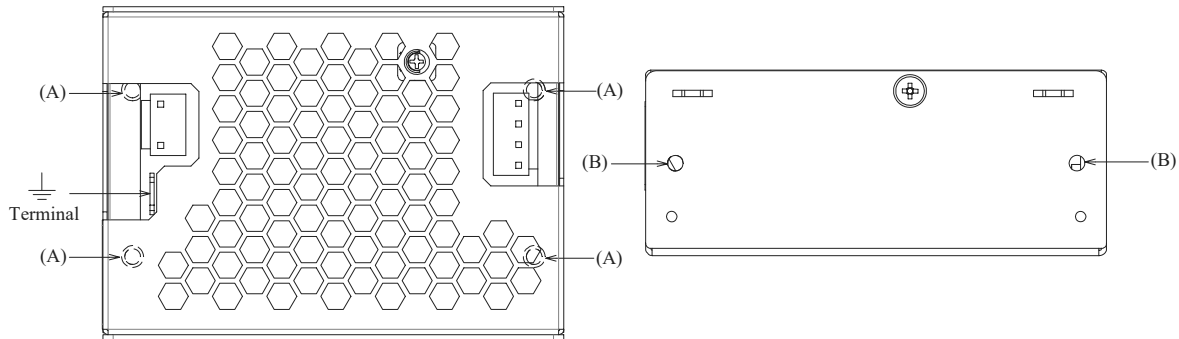
/A model is optional model with metal chassis and cover.

The mounting holes on the bottom(A) or on the side(B) of the chassis are for power supply fixing.

The maximum allowable penetration for screw into chassis is 4mm.

Recommended torque for mounting screw: M3 screw, 0.49N·m (5.0 kgf · cm).

Refer to the /A model outline drawings for the detailed dimensions.



#### ■ Mounting Holes

A: 4-M3 tapped, embossed and countersink holes for mounting screws to fix the power supply from bottom.

B: 2-M3 tapped, embossed and countersink holes for mounting screws to fix the power supply from side.

#### ■ Condition to meet EMC, Isolation, Withstand Voltage and Cooling.

- (1) This series is convection cooling type. In consideration of the heat radiation and safety, please keep a distance of more than 15mm between the power supply and the peripheral parts. When lining up multiple units, please make sure to leave 15mm or more apart from each other.
- (2) More space may be required in the surrounding of power supply and the upper area of components for effective cooling depends on the application conditions.
- (3) For installation in Class I end equipment only,  $\perp$  terminal (Protective Earth) must be connected to the earth terminal of the equipment. All equipment ideally should be mounted inside an earthed shielded metal box. Alternatively an earthed metal plate can be used to mount the power supply and load to ensure the EMC performance.

### 7-3-3. Mounting method for /U model

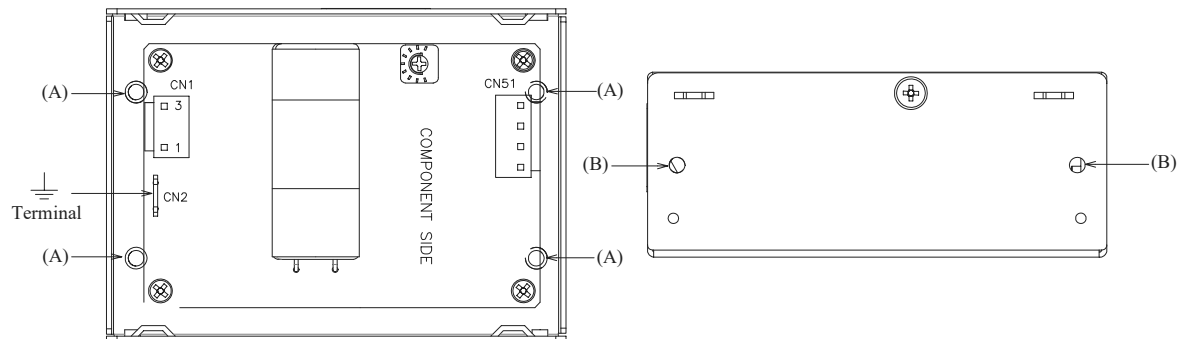
/U model is optional model With U-shape chassis.

The mounting holes on the bottom(A) or on the side(B) of the chassis are for power supply fixing.

The maximum allowable penetration for screw into chassis is 4mm.

Recommended torque for mounting screw: M3 screw, 0.49N·m (5.0 kgf · cm).

Refer to the /U model outline drawings for the detailed dimensions.



#### ■ Mounting Holes

A: 4-M3 tapped, embossed and countersink holes for mounting screws to fix the power supply from bottom.

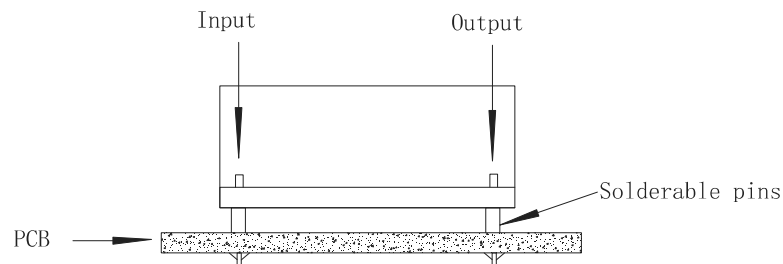
B: 2-M3 tapped, embossed and countersink holes for mounting screws to fix the power supply from side.

▪ **Condition to meet EMC, Isolation, Withstand Voltage and Cooling.**

- (1) This series is convection cooling type. In consideration of the heat radiation and safety, please keep a distance of more than 15mm between the power supply and the peripheral parts. When lining up multiple units, please make sure to place them 15mm or more apart from each other.
- (2) Keep more than 4mm space from the top of components to meet safety requirement. If the space is not enough, the specification of isolation and withstand voltage will not be satisfied.
- (3) More space may be required in the surrounding of power supply and the upper area of components for effective cooling depends on the application conditions.
- (4) For installation in Class I end equipment only,  $\perp$  terminal (Protective Earth) must be connected to the earth terminal of the equipment. All equipment ideally should be mounted inside an earthed shielded metal box. Alternatively an earthed metal plate can be used to mount the power supply and load to ensure the EMI and EMC performance.

**7-3-4. Mounting method for /P model**

/P model is optional model with solderable-pin type Input and Output connectors, which should be fixed on PCB of the end products by soldering.



**8. EMC and Wiring Method**

This power supply is primarily designed and manufactured to be used and enclosed in other equipment. The installation, wiring, grounding and end application of the switching power supply in the equipment system may influence its EMC characteristics. Therefore, the EMC performance has to be tested on end system level. Additional filtering may be required depends on application and installation methods.

Please refer to following application notes which may help to improve EMC performance.

- (1) The output load line and input line shall be separated each other and twisted individually to improve noise.
- (2) Use all lines as thick and short as possible to make lower impedance.
- (3) Noise can be reduced by attaching a capacitor to the load terminals.
- (4) For safety and EMI considerations, connect  $\perp$  (Protective Earth) terminal to Frame Ground terminal of equipment firmly.

**9. External Fuse Rating**

Refer to the following fuse rating when selecting the external fuses that are to be used on input line. Surge current flows when line turns on. Have to use slow-blow or time-lag type fuse, not fast-blow fuse. Fuse rating is considered by in-rush current value at line turn-on. Do not select the fuse according to input current (RMS.) values under the actual load condition.

CUS60M: 2.0A

## 10. Before concluding that the unit is at fault

- (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 thickness is enough.
- (4) Check if the output current and output power does not over specification.
- (5) Audible noise can be heard when input voltage waveform is not sinusoidal wave.
- (6) Audible noise can be heard during Dynamic-Load operation.
- (7) Ensure that a large capacitor is not connected across the output terminals. Please use within maximum capacitance shown below.

MODEL	maximum external capacitance						
	5V	12V	15V	18V	24V	36V	48V
CUS60M	6000uF	5000uF	4000uF	3350uF	2500uF	1680uF	1250uF

## 11. Altitude

CUS60M Series is safety approved for operation at below altitude.

- Up to 5000m by IEC60950-1 clearance requirement.
- Up to 5000m by IEC60601-1 clearance requirement(2MOPPs).

Thermal evaluation should be considered for products operating at elevated altitudes above 3000m. Derating 5°C/1000m above 3000m.

## 12. The life expectancy

The life of the power supply depends on the life of the built-in aluminum electrolytic capacitor. The life is described in reliability data.

The life of the aluminum electrolytic capacitor varies depending on the method of mounting the power supply, the load current, and the ambient temperature. Please refer to “Electrolytic Capacitor Lifetime”.

Please do not use the product which passed over the life expectancy. There is a risk of unexpected output shutdown and specifications may not be satisfied.

Please contact us for maintenance or exchange the product which passed over the life expectancy.

## 13. Warranty Period

This product is warranted for a period of 3 years from the date of shipment.

For damages occurring at normal operation within this warranty period, repair is free of charge.

Please read the General Safety Instruction before using the products.

3 years warranty applies but not limited to the following.

- (1) Average operating temperature (ambient temperature of the power supply unit) is under 40°C.
- (2) 3 years warranty base on 24 hours/day operation at 100% load.


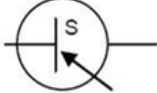
Please refer to electrolytic capacitor life time from reliability data for various application conditions such as mounting, load derating, operating ambient temperature etc.

Customer system design could be improved with better electrolytic capacitor life time by selecting proper application method.

Following cases are not covered by warranty.

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

**14. EN60335-1 , EN61558-1 Compliance Model CUS60M/X**

Ta	Rated maximum ambient temperature :Ta max=70°C
	<b>SMPS</b> incorporating a short-circuit-proof safety isolating transformer ( inherently or non-inherently )
	<b>SMPS</b> ( Switch mode power supply unit )