

**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 Netzteiles darf die Leistung, die auf dem Label des Netzteiles 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 Netzteiles 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 raggugli.

**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.

## **TDK-Lambda**

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# HWS 1500/ME Series

## Instruction Manual

### BEFORE USING THE POWER SUPPLY UNIT

Be sure to read the following precautions thoroughly before using this power supply unit.

Pay attention to all warnings and cautions before using the unit. Incorrect usage could lead to an electrical shock, damage to the unit or a fire hazard.

#### ⚠ WARNING

- Do not make unauthorized changes to power supply unit, otherwise you may have electric shock and void your warranty.
- Do not touch the internal components; they may have high voltage or high temperature. You may get electrical shock or burned.
- When the unit is operating, keep your hands and face away from it; an accident may injure you.
- Do not use unit under unusual condition such as emission of smoke or abnormal smell and sound etc. It might cause fire and electric shock.

In such case, please contact us; do not repair by yourself, as it is dangerous for the user.

- Do not drop or insert anything into unit. It might cause failure and fire, when using the unit under such condition.
- Do not operate these units at the condition of condensation. It may cause fire and electric shock.
- This power supply has a possibility that hazardous voltage may occur in output terminal depending on failure mode.
- The outputs of these products must be earthed in the end use equipment to maintain SELV.

If the outputs are not earthed, they must be considered hazardous and must not be made user accessible.

#### ⚠ CAUTION

- This power supply is primarily designed and manufactured to use and enclose in other equipment.
- This power supply unit has a built-in fan for air-cooling. Do not block air intake and exhaust. It might cause fire.
- Input voltage, Output current, Output power, ambient temperature and ambient humidity should be used within specifications, otherwise the unit will be damaged.
- The unit might be broken down by accident or unexpected situation. For application equipment, which requires very high reliability (nuclear related equipment, traffic control equipment, medical equipment, etc.), please provide fail safety function in the equipment.
- Do not make an improper wiring to input and output terminals. It may cause damage.
- Do not use in environment such as strong electromagnetic field, erosive gas etc, or any environment where conductive foreign substance may enter.
- Do not operate and store this unit at the condition of condensation. In such case, waterproof treatment is necessary.
- Do not operate this unit after it falls down.
- The output voltage of this power supply unit is considered to be a hazardous energy level (The voltage is 2V or more and the electric power is 240VA or more), prevention from direct contact with voltage output is highly necessary. While installing or servicing this power supply unit, avoid dropping tools by mistake or direct contact with voltage output. This might cause an electrical shock.

While repairing this power supply unit, the AC input power must be switch off and the I/O terminal voltage should be less than the safety level.

DWG NO. : DA006-04-80/ME-B

APPD	CHK	DWG
K. Nakata	G. Shimizu	T. Oshio
15. Oct. 2009	15. Oct. 2009	14. Oct. 2009

## Important safety instructions


### Servicing

These products are not customer serviceable. Repairs may only be carried out by DENSEI-LAMBDA K.K. or their authorised agents. 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 DENSEI-LAMBDA K.K..

### Safety Class of Protection

These products are designed for the following parameters : Material Group IIIa, Pollution Degree 2, Overvoltage Category II, Class 1 (earthed), Indoor use as part of an overall equipment such that the product is accessible to service engineers only.

## Input markings and symbols

 Caution refer to supplementary documents

Symbol “~” = AC = Alternating current

Symbol “—” = DC = Direct current

## EMC performance

### Immunity

Test	Standard	Passed	Comments
Electrostatic discharge	IEC61000-4-2	Level 2,3	Air discharge 8kV Contact discharge 4kV
Electromagnetic field	IEC61000-4-3	Level 3	10V/m
Fast / burst transient	IEC61000-4-4	Level 3	Tested to 2kV
Surge immunity	IEC61000-4-5	Level 3,4	Common mode to 4.0kV Differential mode 2.0kV
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
Radiated electric field	EN55022	Class A (as per CISPR 22)
Conducted emissions	EN55022	Class A (as per CISPR 22)
Conducted harmonics	IEC61000-3-2	Compliant
Flicker	IEC61000-3-3	Compliant

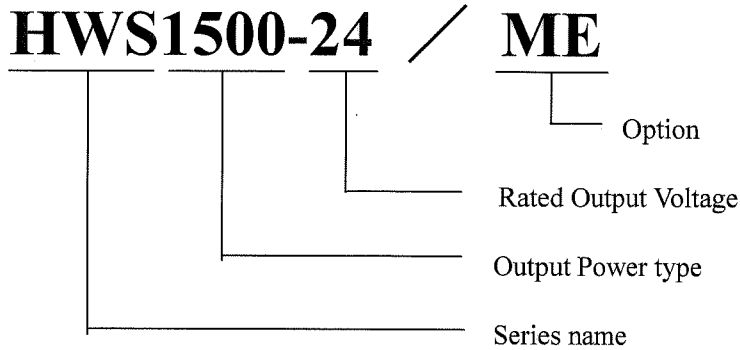
## General installation instructions

- 1) These products are Class 1 and must therefore be reliably earthed and professionally installed in accordance with the prevailing electrical wiring regulations and the safety standards covered herein.
- 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/EN/UL/CSA 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/EN/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/EN/UL60601-1 and are NOT protected against the ingress of water.
- 4) Connect only apparatus complying with IEC/EN/UL60601-1 to the signal ports.
- 5) Except for permanently installed equipment as defined in Clause 57.6 of IEC/EN/UL60601-1 the overall equipment in which these products are installed must have double pole fusing on the input mains supply. The products themselves have single pole fusing in the live line.
- 6) These products provide basic insulation only between mains and output, with reference to IEC/EN/UL60601-1. Sure to add supplemental insulation to input or output in the equipment.
- 7) When the PSU is installed within medical equipment an all pole mains input disconnect device must be fitted.
- 8) Reference should be made to local regulations concerning the disposal of these products at the end of their useful life.
- 9) The maximum normal leakage current of this product is 500 microamperes for IEC/EN/UL60601-1. when using it as a patient care equipment, all outer surfaces of the equipment shall be constructed of nonconductive material. See Clause 19.5DV.2 of UL60601-1.
- 10) These products have not been assessed to IEC/EN60601-1-2 (EMC) but EMC test data is available from DENSEI-LAMBDA K.K..

1. Model name identification method



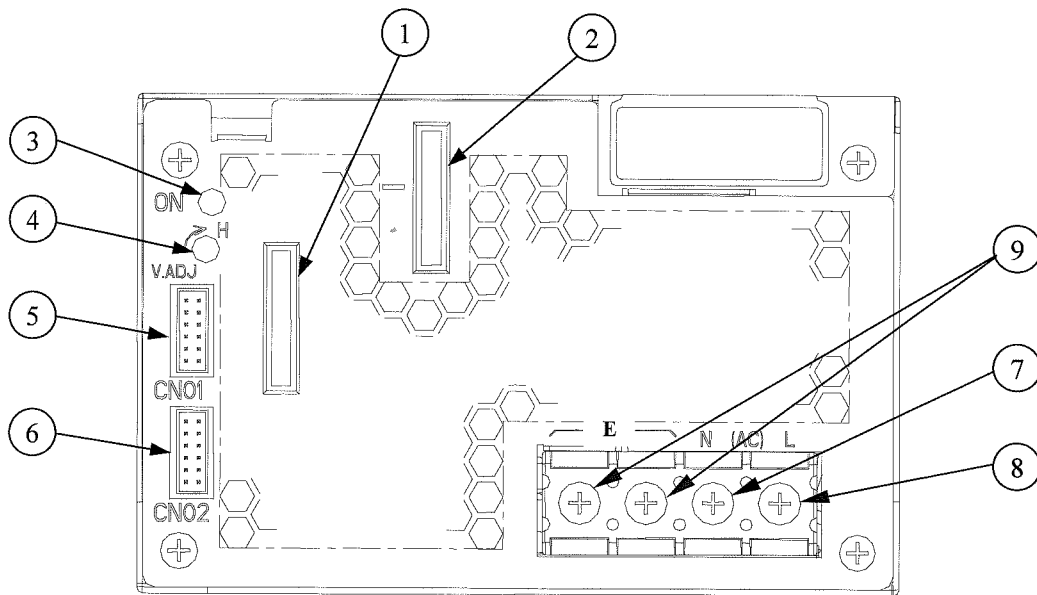
2. Terminal Explanation

Please pay extra attention to the wiring. Incorrect connection will damage the power supply.

- When connecting input and output wiring, input AC-Line should be off.
- Input wiring and output wiring shall be separated, otherwise noise susceptibility of power supply unit will be weak.
- Ground terminal (E) must be connected to the instrument chassis.
- Remote sensing lines shall be twisted or use the shielded wire.
- Remote ON/OFF control lines shall be twisted or use the shielded wire.

2-1. Front Panel Explanation

HWS1500 Front Panel



- ① + : + Output terminal
- ② - : - Output terminal
- ③ ON : Output (Power On) indication green LED  
(The indicator turns on when the power supply output is in normal operating condition.)
- ④ V.ADJ : Output voltage adjust trimmer (The output voltage rises when trimmer is turned clockwise.)
- ⑤ CN01: } Remote sensing, ON/OFF control signal, Current balance signal,
- ⑥ CN02: } Output voltage external control signal and Power fail signal output connector.
- ⑦ N : AC input terminal N : Neutral line
- ⑧ L : AC input terminal L : Live Line (Fuse in line)
- ⑨ E : Ground terminal



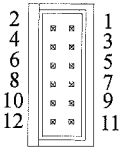
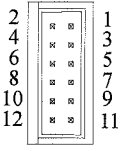
**2-2. CN01, CN02 Connector pin configuration and Function**

CN01, CN02 pin configuration and function are the same.

They are connected to each other in this power supply unit.

When the pin of CN01 side is shorted the same function pins of CN02 side are shorted.

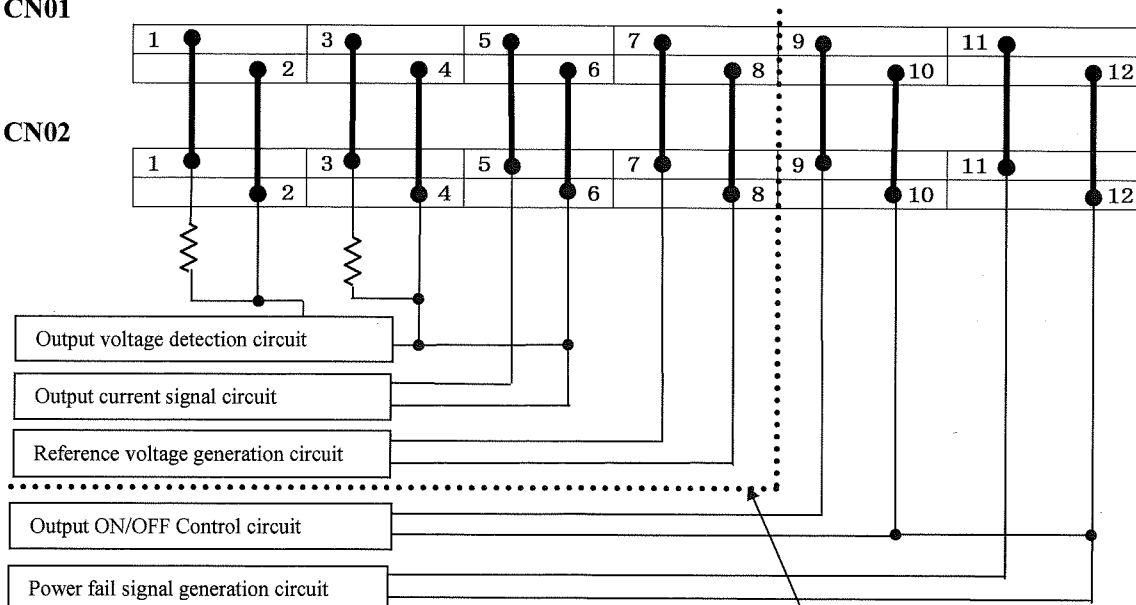
Please note that the function cannot be separately set with CN01 and CN02.

	Pin No.	Configuration	Function
 CN01	1	+V	Connected to + Output terminal in this Power supply unit. (+V terminal can not supply load current.)
	2	+S	Remote sensing terminal for + output (For remote sensing function, which compensates for line drop between power supply terminals and load terminals. Connect to +V terminal when remote sensing function is unnecessary)
	3	-V	Connected to - Output terminal in this Power supply unit. (-V terminal can not supply load current)
	4	-S	Remote sensing terminal for - output (For remote sensing function, which compensates for line drop between power supply terminals and load terminals. Connect to -V terminal when remote sensing function is unnecessary)
 CN02	5	PC	Current balance terminal (For output current balancing in parallel operation.)
	6	COM	Ground for PC and PV signal.
	7	PV	Output voltage external control terminal (For power supply output voltage control with an external voltage. Connect it with the terminal REF when PV function is unnecessary.)
	8	REF	Reference Voltage terminal for Output voltage control (REF and PV are connected when shipping.)
	9	CNT	Remote ON/OFF control terminal (When the CNT is pulled to TTL low, the power supply turns on.)
	10	TOG	Ground for CNT and PF signal.
	11	PF	Power fail signal output terminal. (As the output voltage drops, FAN stops and AC input voltage down, open collector output, "Power Fail" signal will output "High".)
	12	TOG	Ground for CNT and PF signal.

CN01, CN02 are connected in this power supply unit as follows.

**CN01**

**CN02**



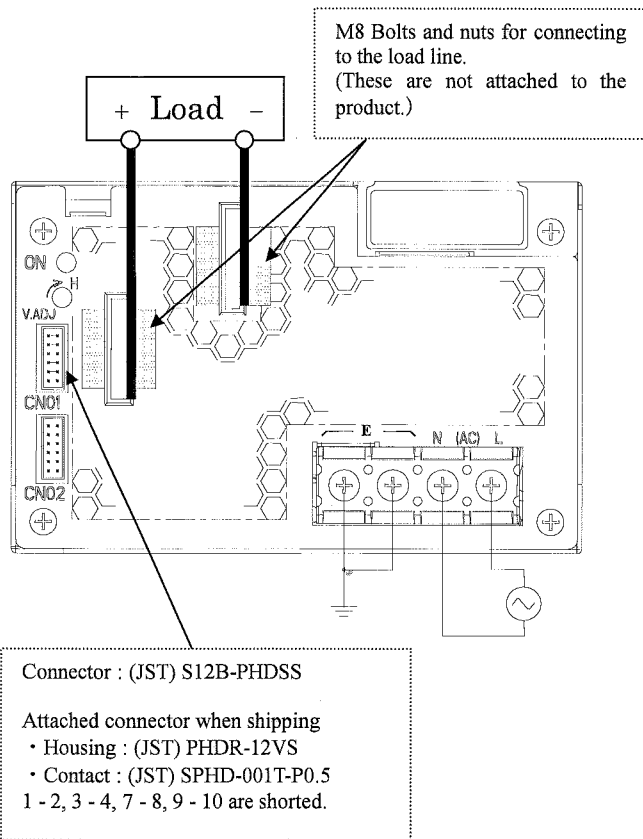
※Output ON/OFF control circuit and the Power fail signal circuit are insulated with other circuits in the power supply. (Insulating voltage AC100V)

# DENSEI-LAMBDA

## HWS1500/ME Series INSTRUCTION MANUAL

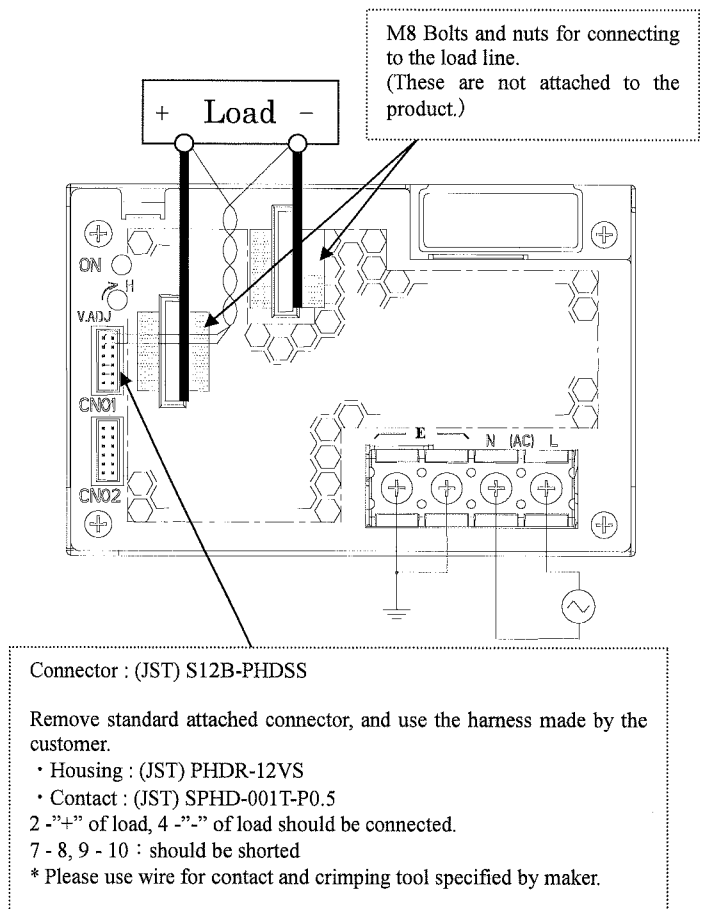
### 2-3. Basic Connection (Local sensing)

- ① Connect "+S" terminal to "+V" terminal and "-S" terminal to "-V" terminal with sensing wires.
  - ② Connect "CNT" terminal to "TOG" terminal with wire.
  - ③ Connect "PV" terminal to "REF" terminal with wire.
- ※ Please use attachment connector for each connection.
  - ※ In the following cases, the output is shut down.  
When CNT and TOG is opened.  
When PV and REF is opened.

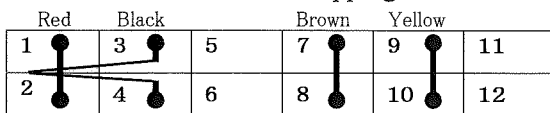


### 2-4. Remote sensing required

- ① Connect "+S" terminal to "+" terminal of load with sensing wire.
  - ② Connect "-S" terminal to "-" terminal of load with sensing wires.
  - ③ Connect "CNT" terminal to "TOG" terminal with wire.
  - ④ Connect "PV" terminal to "REF" terminal with wire.
- ※ The accuracy of the output voltage will deteriorate when the sensing terminals are opened.
  - ※ In the following cases, the output is shut down.  
When CNT and TOG is opened.  
When PV and REF is opened.

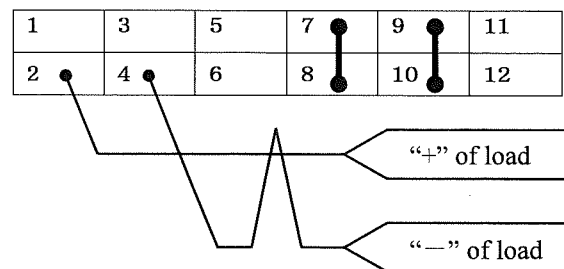


Attached connector when shipping



Twist wire

Connecting circuit with CN01 or CN02 connector



# DENSEI-LAMBDA

## HWS1500/ME Series INSTRUCTION MANUAL

### 2-5. Remote ON/OFF control required

① Remove standard attached connector, and use the harness made by the customer and connect external signal to between CNT and TOG terminal.

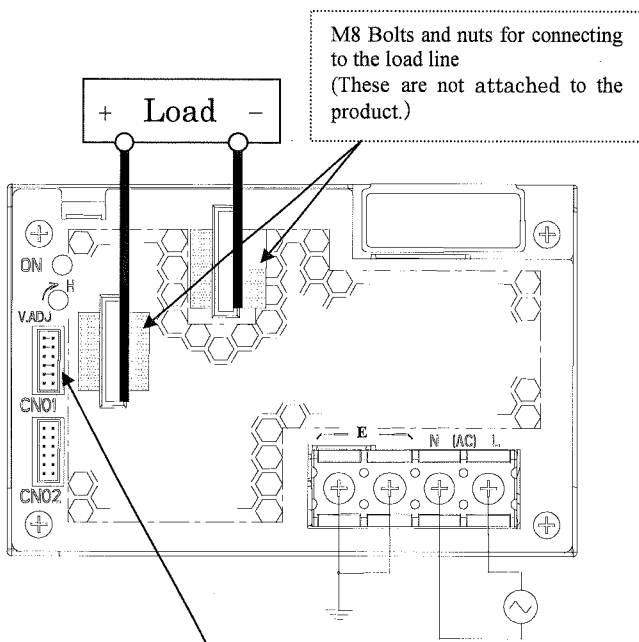
② "TOG" terminal is ground for "CNT" terminal.

In case this function is not used, please short between CNT and TOG terminal.

### 2-6. PF signal output required

① PF signal is an open collector output, therefore PF signal outputs is shown in circuit below.

② "TOG" terminal is ground for "PF" terminal.



Connector : (JST) S12B-PHDSS

Remove standard attached connector, and use the harness made by the customer.

- Housing : (JST) PHDR-12VS
- Contact : (JST) SPHD-001T-P0.5

1 - 2, 3 - 4, 7 - 8 : should be shorted

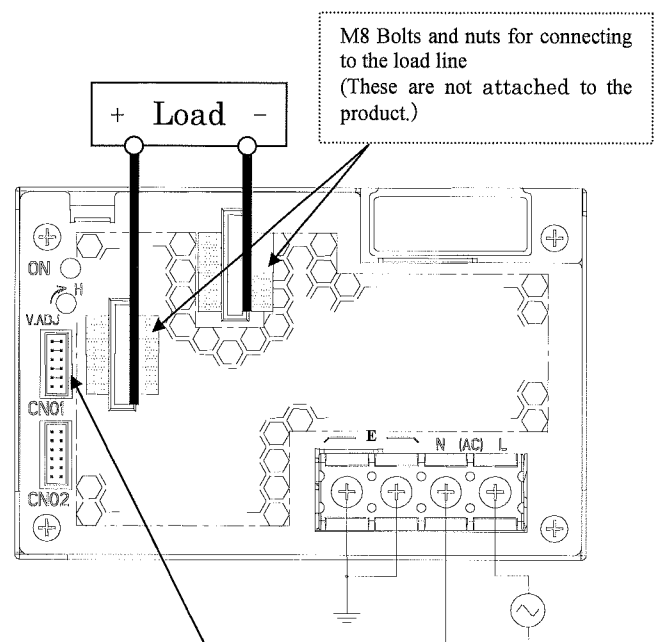
9 : CNT

Should be connected to ON/OFF control signal.

10 : TOG

Should be connected to Signal Ground.

\* Please use wire for contact and crimping tool specified by maker.



Connector : (JST) S12B-PHDSS

Remove standard attached connector, and use the harness made by the customer.

- Housing : (JST) PHDR-12VS
- Contact : (JST) SPHD-001T-P0.5

1 - 2, 3 - 4, 7 - 8, 9 - 10 : should be shorted.

11 : PF

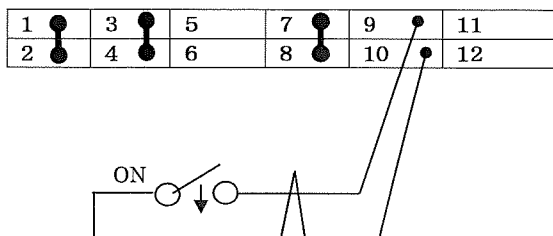
Should be connected to PF signal output

12 : TOG

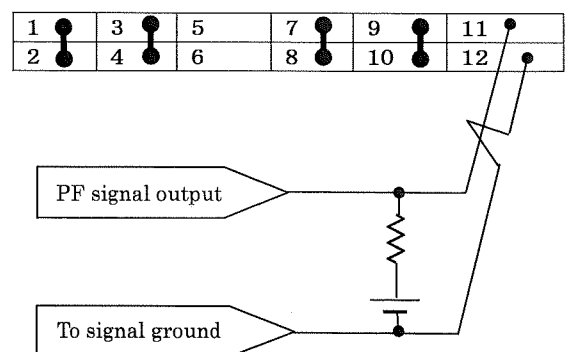
Should be connected to Signal Ground.

\* Please use wire for contact and crimping tool specified by maker.

Connecting circuit with CN01 or CN02 connector



Connecting circuit with CN01 or CN02 connector



**3. Functions and Precautions**

**3-1. Input Voltage Range**

Input voltage range is single phase 85 - 265VAC (47 - 63Hz). Input voltage, which is out of specification, may cause unit damage. Rated input voltage range fix during safety standard application is from 100V to 240VAC (50/60Hz). While applying input voltage from 85Vac to 90Vac, output load current derating is required.

**3-2. Output Voltage Range**

Output voltage is set to the rated value at shipping. V.ADJ trimmer on the front panel side is use to adjust the output voltage within the range specified. Output voltage trimming range is within -20% - +20% of the rated output voltage (48V Output Model: -20% - +10%). Turn the trimmer clockwise to increase output voltage. Take note when the output voltage is increased excessively over voltage protection (OVP) function may trigger and output voltage will shut down.

Use the output power of the power supply below the rated output power value when you raise the output voltage.

**3-3. Over Voltage Protection (OVP)**

The OVP function (Inverter shut down method, manual reset type) is provided. OVP function operates within 125-145% of the rated DC output voltage value (36V type: 125-138%, 48V type: 115-135%), and the output will be shut down when OVP function triggers. When OVP function operates, the input power is cut off for a few minutes, and then power is re-input or remote ON/OFF control signal shall be input for recovery of the output. OVP value is fixed and can not be adjusted.

**3-4. Over Current Protection (OCP)**

The OCP function (Constant current limiting, Time delay shutdown type) is provided. OCP function operates when the output current exceeds 105% of maximum DC output current specification and the over current or short circuit condition continues 5-second or more, the output will be shut down. When the OCP is triggered, the input power is cut off for a few minutes, and then power is re-input or remote ON/OFF control signal should be input for recovery of the output. The OCP setting is fixed and not to be adjusted externally.

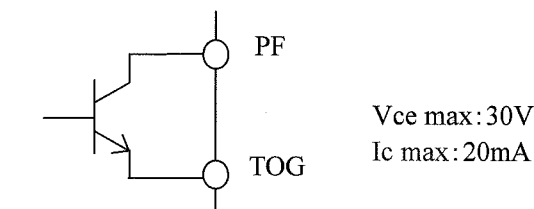
**3-5. Over Temperature Protection (OTP)**

Over temperature protection function (manual reset type) is provided. When ambient or internal temperature rises abnormally, OTP will shut down the output. When OTP is triggered, input power is cut off and allow sufficient cooling to reset the OTP function. Then power is re-input or remote ON/OFF control signal should be input for recovery of the output.

**3-6. Low Output Detection Circuit (PF)**

Low output voltage detection circuit is provided. Power Fail signal (PF signal) will output when output voltage decrease by either the drop or brown out of the input voltage or OCP, OVP and OTP function operation. PF signal will turn "High" level to indicate the abnormal status of the power supply when the output voltage decrease to 80% of the output voltage setting value. The PF signal circuit is insulated from the power supply input and output circuit and it is an open collector. TOG terminal is ground for PF terminal.

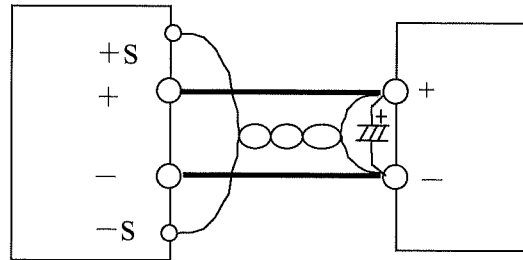
When the Built-in Fan Motor of this power supply unit stops, PF signal will turn to "H" and the output power will shut down. The Built-in Fan Motor is a component with lifetime. We recommend a periodic replacement. Please contact our sales office. Replacement is at customer's expenses.



**3-7. Remote Sensing (+S, -S terminal)**

Remote sensing function is provided to compensate for voltage drop across the wiring from the power supply output terminals to the load input terminals. Connect “+S” terminal to “+” terminal of the load and “-S” terminal to “-” terminal of the load with sensing wires. The total line voltage drop (+ side line and - side line) shall be less than 0.3V. In case that sensing line is too long, it is necessary to put an electrolytic capacitor across the load terminals.

Please take note that the electrolytic capacitor has generation of heat etc. done by the ripple current depending on connected load. Therefore, the electrolytic capacitor must have a ripple current allowance higher than the output ripple current. If CN01 (or CN02) is in use, terminal +S, -S for CN02 (or CN01) must be in open condition.

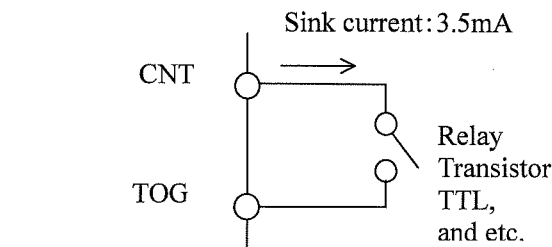


When the function of remote sensing is not in used, connect +S terminal to +V terminal, and -S terminal to -V terminal by the attachment connector.

If remote sensing terminals are opened, the stability and the accuracy of the output deteriorate. Therefore, terminal +S, -S must be connected.

**3-8. Remote ON/OFF Control**

Remote ON/OFF control is provided. Output can be remotely switch ON and OFF by using CNT terminal and TOG terminal even though input is connected. The output is turned to ON when TOG and CNT terminals are shorted and output is turned to OFF when these terminals are opened. When the function is not used, connect TOG and CNT terminals with short piece. The standards for this function are as follows. “TOG” terminal is ground for “CNT” terminal.



The Mode of control

CNT Level for TOG Terminal	Output	Built-in Fan Motor
Short or L (0 - 0.8V DC)	ON	Rotate
Open or H (2.4 - 12V DC)	OFF	Stop

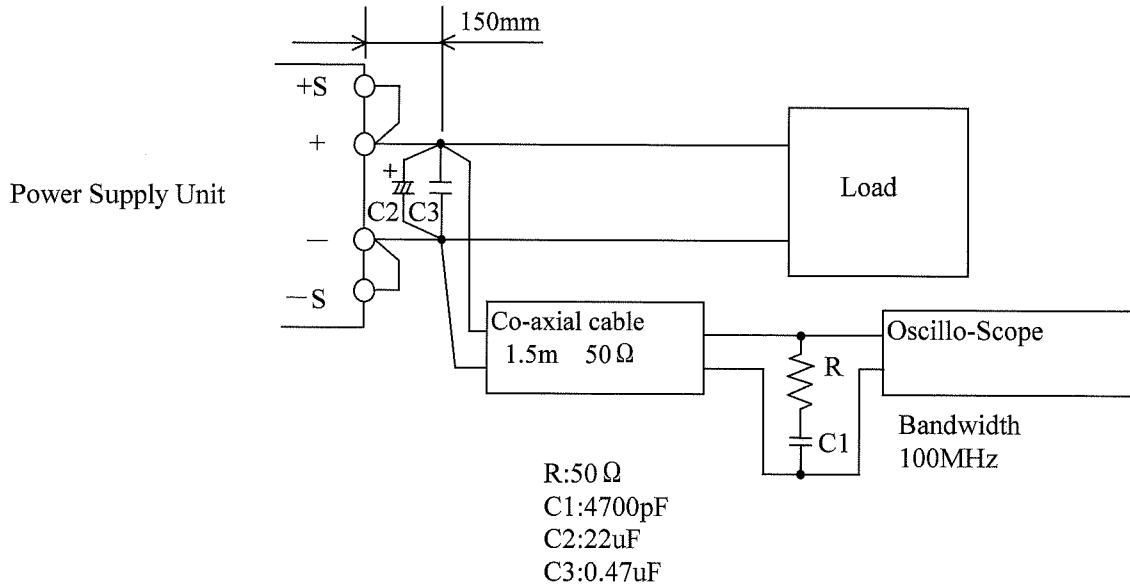
- (1) TTL compatible. The maximum input voltage to CNT terminal is 12V, and the maximum allowable reverse voltage is -1V. The sink current of CNT terminal is 3.5mA.
- (2) Output ON/OFF control can be enable by a switch, relay or a transistor ON/OFF. When CNT terminal - TOG terminal is shorted power supply is turn ON, and when CNT terminal - TOG terminal is opened power supply is turn OFF.
- (3) Remote ON/OFF control circuit is isolated from the input and output circuit of power supply. It is possible to use it regardless of the positive and negative of the power supply output.

Please be aware that if CNT terminal and TOG terminal is short and input voltage is gradually increase, this will trigger the low output voltage detector protection circuit and will result to output voltage shut down.

When the low output voltage detector protection circuit is triggered, the input power is cut off for a few minutes, and then power is re-input or remote ON/OFF control signal should be input for recovery of the output.

**3-9. Output Ripple & Noise**

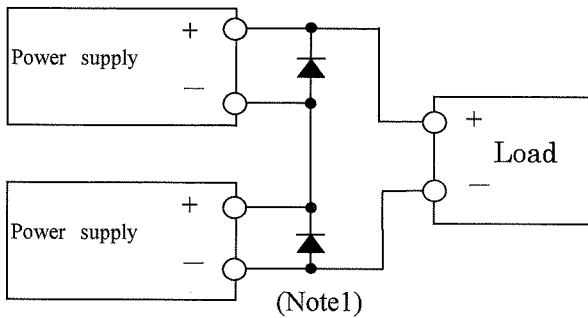
Maximum ripple & noise value in specifications is measured according to measurement circuit specified by JEITA-RC9131A. When Load lines are longer, ripple & noise becomes larger. In this case, electrolytic capacitor, film capacitor, etc. might be necessary to use across the load terminal. The output ripple & noise cannot be measured accurately if the probe ground lead of oscilloscope is too long.



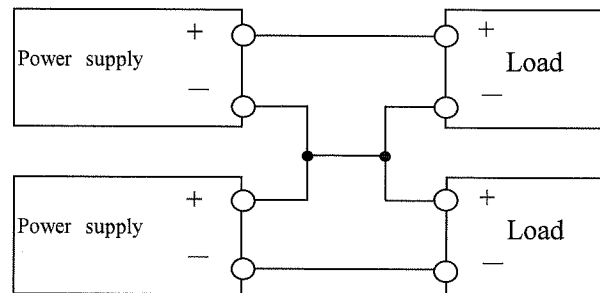
**3-10. Series Operation**

For series operation, either method (A) or (B) is possible.  
There might be a step in the rise waveform during series operation.

Method (A)



Method (B)



(Note1) Please connect a diode for by-pass when using method (A) of the series operation.  
Please use the diode with rated forward current is equal or more than load current and that the rated maximum reverse voltage is higher than output voltage for each power supply.

**3-11. Parallel Operation**

Current balancing function is provided. There are 3 operation modes possible which is (A), (B) and (C).

**(A) To Increase the Output Current**

Current balancing function activates by connecting PC-to-PC terminal and COM-to-COM terminal, and output current of each power supply is equivalently supplied to load. Wires to PC terminals shall be as short as possible, same length and twisted.

There is a possibility that output could be unstable caused by external noise. For this case, disconnect COM terminal and connect -S terminal from parallel power supply to a single point on the load. Please refer connection Method (A)-2.

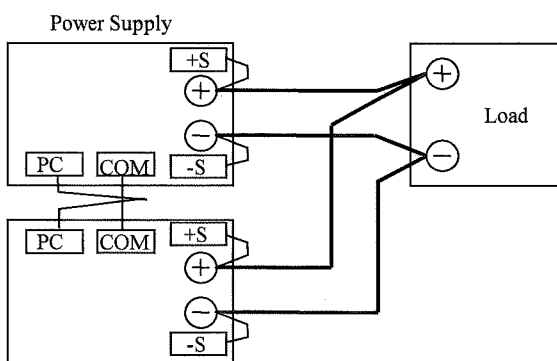
1. Adjust the output voltage of each power supply to be same value within 1% or 100mV, whichever is smaller.
2. Use same length and type of wires for all load lines.
3. Maximum value of output current in parallel is up to 80% of all paralleled models. The purpose of the current balancing function is the static power-up. Therefore the output voltage might decrease according to the condition of dynamic load. There might be a step in the rise waveform during parallel operation.
4. Up to 5 units can be connected in parallel.

**(B) To Use as a Backup Power Supply**

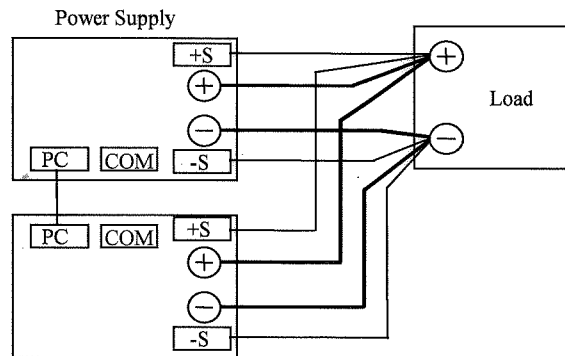
1. Set power supply output voltage higher by the forward voltage drop of diode.
2. Adjust the output voltage of each power supply to be same value.
3. Use within the specifications for output voltage and output power.

(C) In the case of parallel connections, it is possible to control the output voltage by adjusting the volume from only 1 unit. Choose 1 unit that would act as the master and this unit's volume will determine the output voltage. The volume on each slave units must be turned clockwise to maximum position. Then adjust the master volume to set the output voltage. Connection for this application is shown in figure (c).

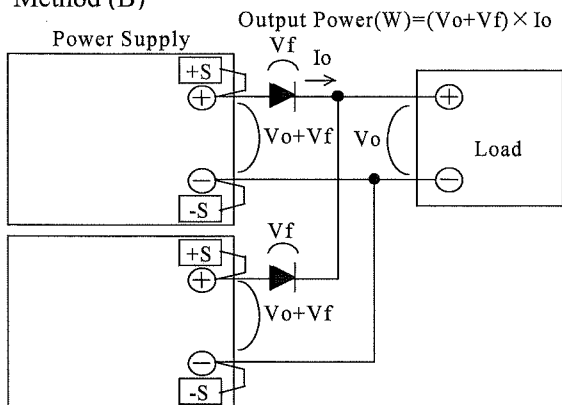
Method (A)-1



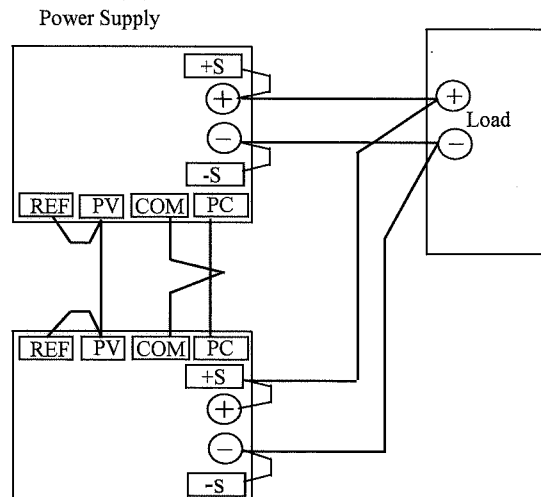
Method (A)-2



Method (B)

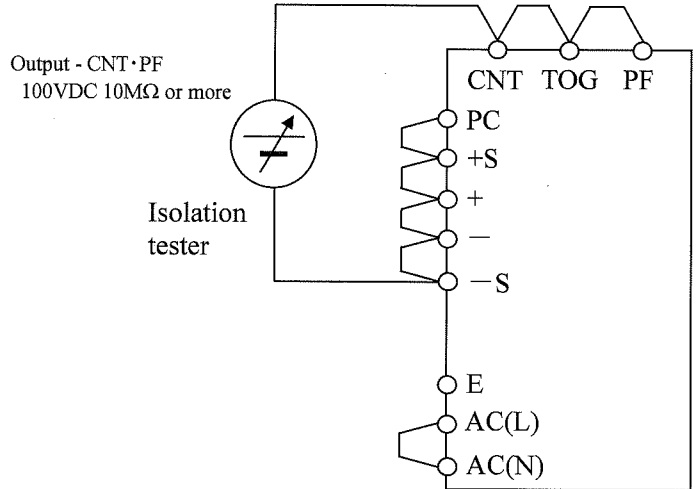
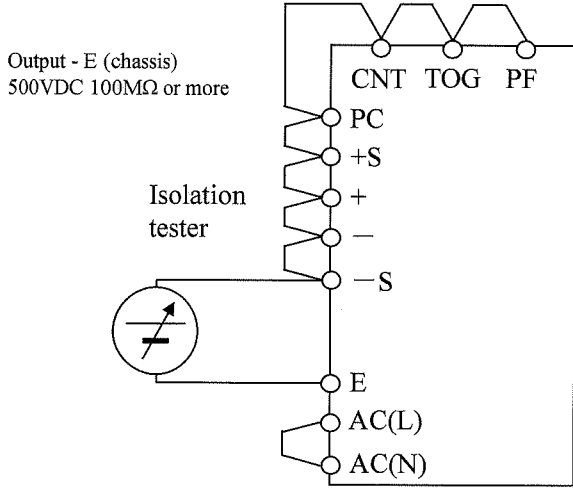


Method (C)



**3-12. Isolation Test**

Isolation resistance between output and E(chassis) shall be more than 100MΩ at 500VDC and between output and CNT·PF shall be more than 10MΩ at 100VDC. For safety operation, voltage setting of DC isolation tester must be done before the test. Ensure that it is fully discharged after the test.





**3-13. Withstand Voltage**

This series is designed to withstand 3.0kVAC between input and output, 2.0kVAC between input and E (chassis), 500VAC between output and E (chassis), and 100VAC between output and CNT·PF terminal each for 1 minute. When testing withstand voltage, set current limit of withstand voltage test equipment at 20mA.

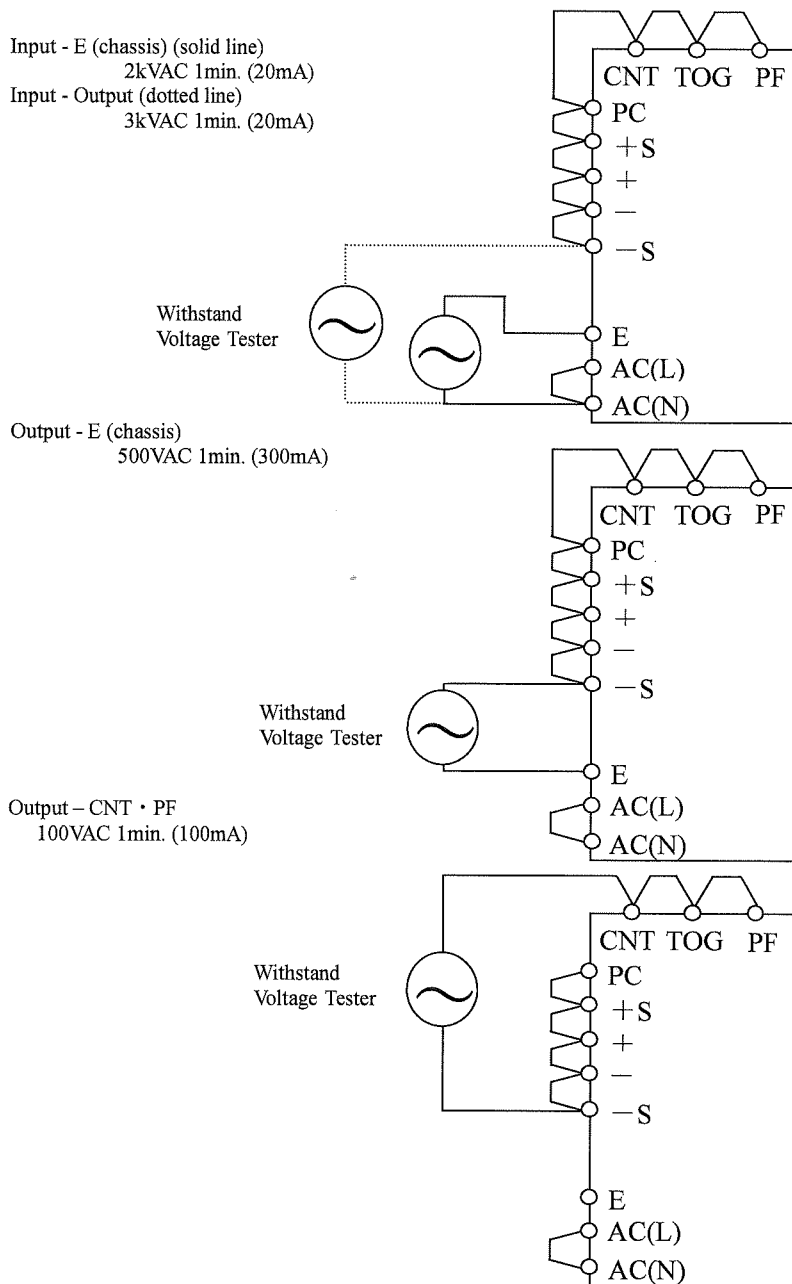
(Output - E (chassis) : 300mA, Output- CNT·PF : 100mA).

The applied voltage must be gradually increased from zero to 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. If output is left open during test, output voltage might appear momentarily.

This product have monolithic ceramic capacitor in secondary circuit to frame ground.

Some of the withstand voltage tester may generate high voltage at the matching with monolithic ceramic capacitor and may cause the unit damage.

So, please check the waveform of test voltage.

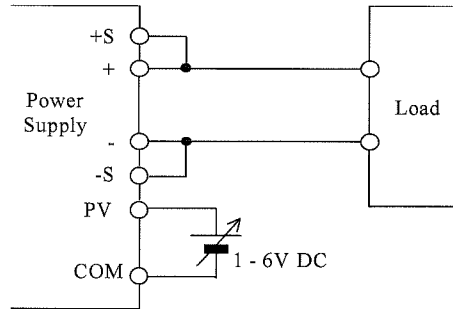


**3-14. Output Voltage External Control (PV)**

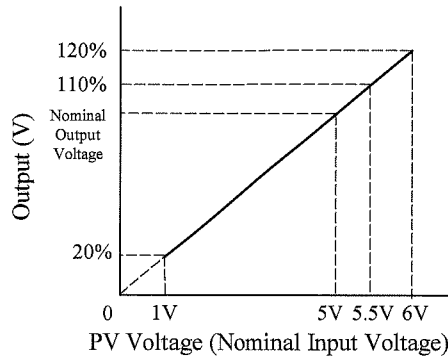
**(A) Control by External Voltage**

Output voltage external control function is provided. Output voltage can be varied by applying an external voltage (1 - 6V DC) to “PV” terminal and “COM” terminal. Note if an external voltage is not applied, there will be no output. Please consider the following characteristics below when operating the unit.

**Connection Method**

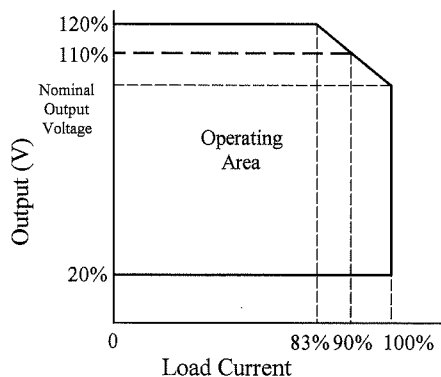


**Output Voltage Linearity**



Note: Only as for the type of 48V output, the output voltage is used from 20% to 110% at the PV voltage is from 1V to 5.5V

**Output Voltage Derating**



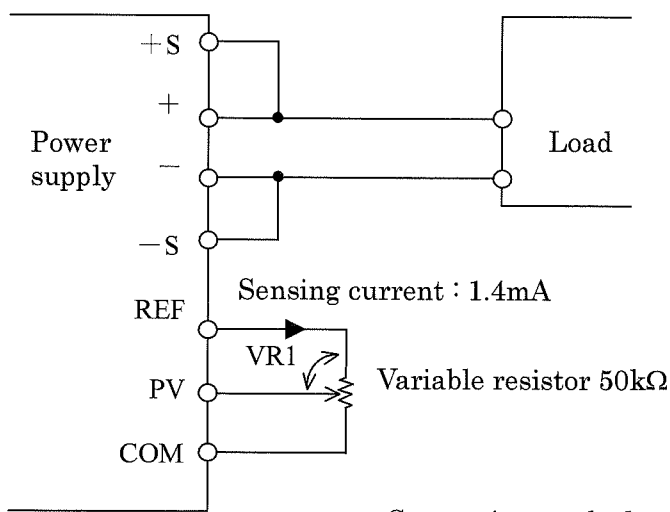
Note: Only as for the type of 48V output, the maximum output voltage is used up to 110% at 90% load current.

\* Output voltage usage below 20% is not a guaranteed. There is a possibility that it cannot be use with certain product. Please conduct a thorough evaluation test before using it.

### (B) Control by External Variable Resistor

“PV” terminal and “COM” terminal usage is the same as explained in section 「control by external voltage」. But in this method voltage for control is supplied through REF terminal. Variable resistor is connected between REF terminal and COM terminal and the middle point of variable resistor is connected to PV terminal. Please use the output voltage within 20% - 120% of rated output voltage value (48V output type : 20% - 110%). Wires for control lines must be as short as possible and use twisted wire or shield wire. In addition, maximum variable voltage when control by external variable resistor is rated output voltage (100%). When output voltage must be externally control to 120% of rated output voltage (110% for 48V output type ), please follow the following procedure.

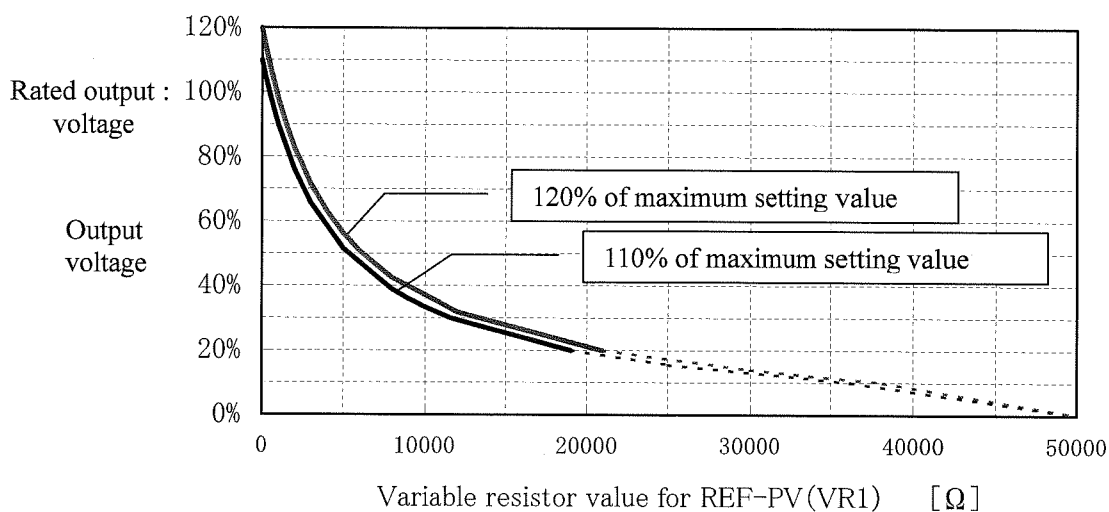
- (1) PV terminal and REF terminal is short by using standard connector supplied.
- (2) Set the power supply output voltage to maximum value of the output voltage variable range mentioned in specification standard by adjusting V.ADJ volume at the front panel.
- (3) Remove standard connector after input is cut off.
- (4) Connect external variable resistor (50kΩ) between REF terminal and COM terminal. Then connect middle point of external variable resistor to PV terminal.(sensing current is 1.4mA)



Connection method

When output voltage is over rated value, please make sure that maximum output power is below rated value. Moreover, when output voltage is below rated value, please make sure that maximum output current is below rated value.

Please consider the following characteristic during usage.



\* Output voltage usage below 20% is not a guaranteed. There is a possibility that it cannot be use with certain product. Please conduct a thorough evaluation test before using it.

**3-15. Output peak Current**

For model HWS1500-24 and HWS1500-36, please meet the following condition.

Reduce peak current value according to output derating as section 4-1.

The output is shut down by protection circuit when rated current and continuous peak output time (  $\tau$  ) exceeds rated value during usage.

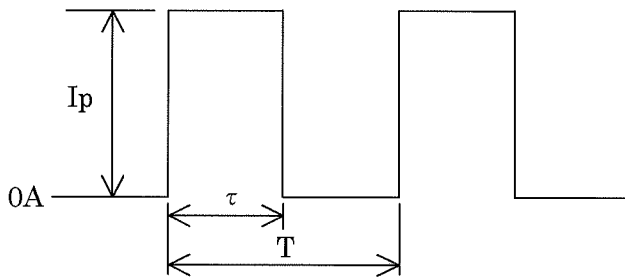
When protection circuit is activated, input is temporarily cut off for a few minutes and then power is re-input or remote ON/OFF control signal should be input for recovery of the output.

- Input voltage range : AC180V - 265V
- Continuous Peak output time. (  $\tau$  ) : Within 10 seconds
- Peak output current (  $I_p$  ) : Within the rated peak output current

Duty : up to 35%

$$\text{Duty} = \frac{\tau}{T} \times 100 (\%)$$

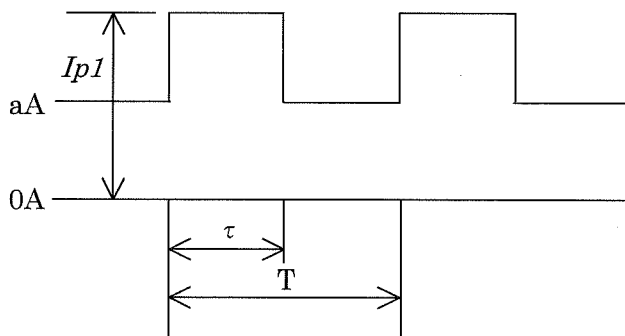
Condition 1



Model	Irms max
HWS1500-24	62.1A
HWS1500-36	41.4A

$$\sqrt{I_p^2 \times \frac{\tau}{T}} \leq \text{Irms max}$$

Condition 2



$$\sqrt{\left( I_{p1}^2 \times \frac{\tau}{T} + a^2 \times \left( 1 - \frac{\tau}{T} \right) \right)} \leq \text{Irms max}$$

- $I_{p1}$  : Peak output current (A)
- Irms : Effective current (A)
- $\tau$  : Peak current pulse width (sec)
- T : cycle (sec)

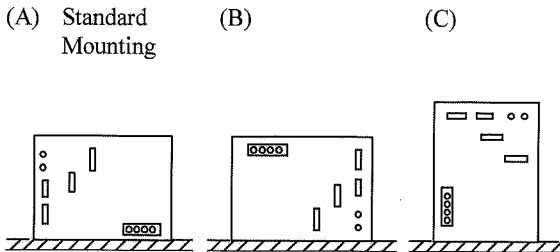
**4. Mounting Directions**

**4-1. Output Derating**

Mounting directions are as follows.

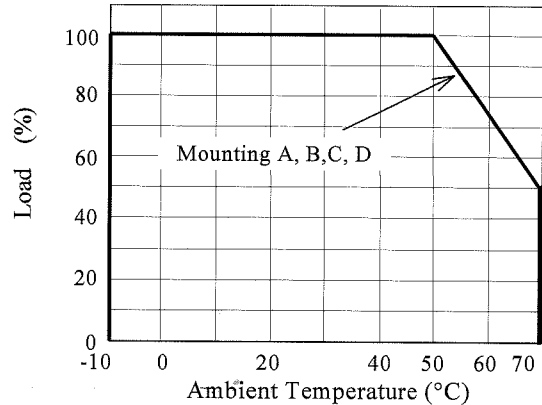
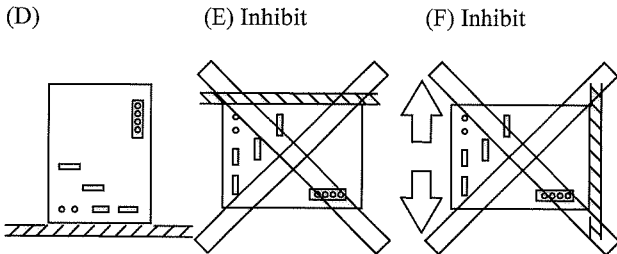
Standard mounting method is (A). Methods (B), (C) and (D) are also possible.

Mounting methods besides (A),(B),(C) and (D) (example : (E) and (F)) are inhibit.



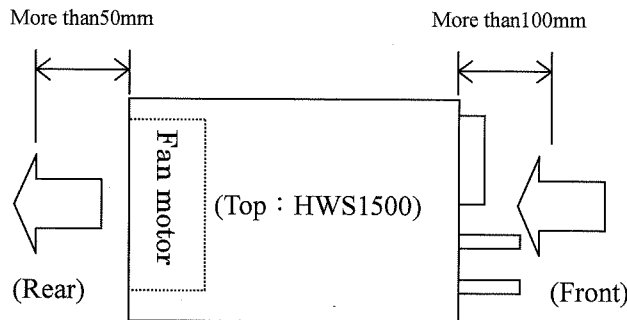
HWS1500 Output Derating

Ta(°C)	LOAD(%)			
	A	B	C	D
-10 - +35	100	100	100	100
45	100	100	100	100
50	100	100	100	100
60	75	75	75	75
70	50	50	50	50



**4-2. Mounting Method Caution**

- (1) This Power supply unit is a forced air-cooling system with a built-in fan.
- (2) This power supply has ventilating holes on the front and back panels.  
Keep these areas freely more than 100mm from front side and more than 50mm from rear side.
- (3) Please note that ventilation will be worsened in a dusty environment.
- (4) Built-in fan is limited life part, which require periodic replacement. (Replacement will be charge).
- (5) The ambient temperature of this power supply is less than 50mm from the center of a front side.
- (6) The maximum allowable penetration of mounting screw is 6mm.
- (7) Recommended torque for mounting screw (M4) is 1.27N · m.

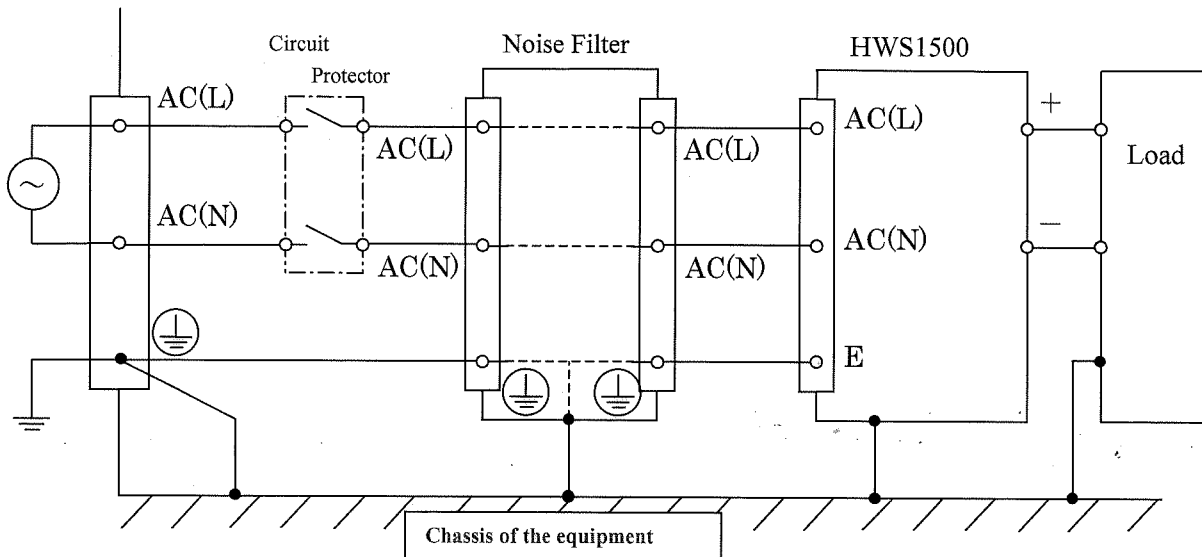


**5. Wiring Method**

- (1) The output load line and input line shall be separated and twisted to improve noise sensitivity.
- (2) The sensing lines shall be twisted or shield wire and separated from the output lines.
- (3) Use all lines as thick and short as possible to make lower impedance. Wires are to be twisted or use shield wire to improve noise sensitivity.
- (4) Attaching a capacitor to the load terminals can eliminate noise.
- (5) E terminal of this power supply is functional earthing. For safety purposes, connect protective earthing terminal to the mounting set ground terminal.
- (6) Recommended torque for the terminal piece:

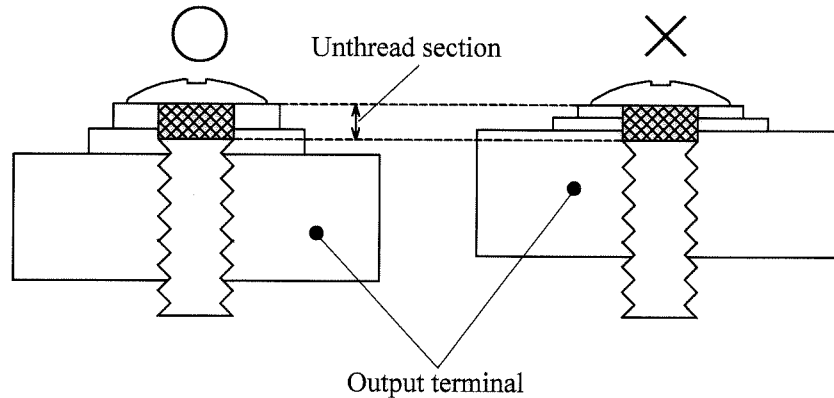
Input terminal (M4 screw) : 1.27 N·m  
Output terminal (M8 Bolt & Nut) : 10.8N·m

(7) Recommended wiring



- Recommended circuit protector : AC250V30A  
Recommended noise filter : MXB1220 (DENSEI-LAMBDA)

- (8) M4 screw for output terminal might damage the terminal's inner thread. This is mainly caused by the M4 screw's unthread section. Therefore, please select a washer, spring washer, etc. to avoid unthread screw section from penetrating into output terminal inner section.



## 6. External Fuse Rating

Refer to the following fuse rating when selecting the external fuses for input line. Surge current flows when line turns on. Use slow-blow fuse or time-lag fuse. Do not use fast-blow fuse. Fuse rating is specified 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.

- HWS1500 : 30A

## 7. Troubleshooting

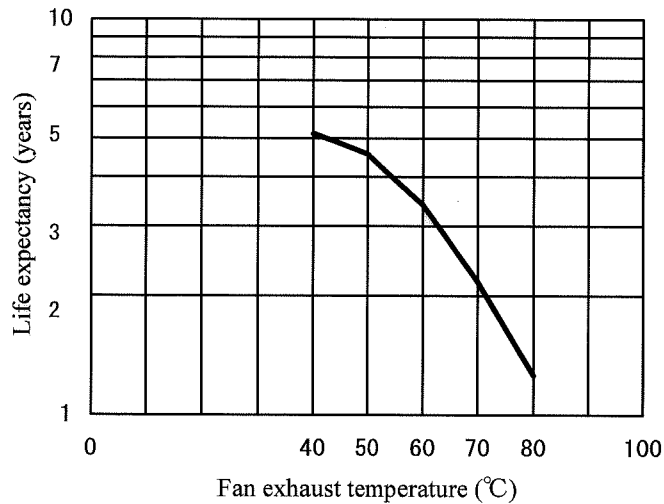
Before concluding that the unit is at fault, make the following checks.

- (1) Check if the rated input voltage is apply.
- (2) Check if the wiring of input and output is correct.
- (3) Check if the I/O terminal connection is properly tighten by a regulated tightening torque.
- (4) Check if the wire material is not too thin.
- (5) Check if the output voltage control (V.ADJ) is properly adjusted. OVP might be trigged and output is cut off.
- (6) Check if the wiring of "+S" and "-S" terminal is correct. If in open condition, the stability and the accuracy of the output deteriorate.
- (7) If use function of the remote ON/OFF control, check if the remote ON/OFF control connector is not opened.  
If in open condition, output is cut off.
- (8) Check if the built-in fan is not stopped. Is fan stopped by something irregulars or dust, etc.  
If fan stops, the PF signal is turn on.  
Moreover, the output is intercepted with the protection circuit if fan stops.  
Fans are the limited life parts.  
This power supply has ventilating holes on the front and back panels. Check if there is any irregulars or dust, etc.
- (9) Is the main body of the power supply abnormally hot?  
Please turn on the input again after allowing the unit to cool down sufficiently. The output shut down by over temperature protection function.
- (10) Check if the output current and output power is not applied over specification.
- (11) Check if the input voltage wave is sinusoidal. If this power supply unit is connected to a UPS, input voltage wave might not be sinusoidal. An audible noise is emmitted from the power supply unit.
- (12) Audible noise can be heard during Dynamic-Load operation.

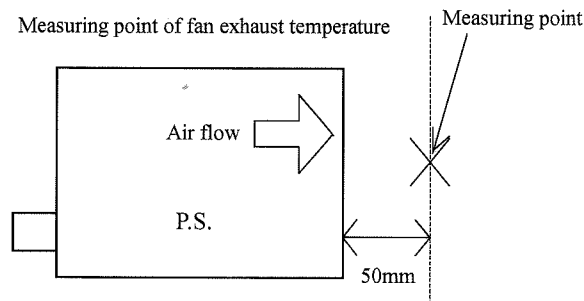
**8. Warranty**

This product is warranted for a period of 5 years from the date of shipment. As for the breakdown under a normal use during free warrantee term, repair is at free of charge. However, the Built-in Fan Motor replacement is for a fee. Please contact your nearest sales office for replacement.

The Fan-life has limitation. Therefore, periodic maintenance by replacing the life-expired fan is required. The following figure shows the life of fan.



Life expectancy	Fan exhaust temperature	45°C	45,000	hour
	Fan exhaust temperature	80°C	11,000	hour



Conditions of usage at the free of charge warrantee are as follows.

- (1) Average operating temperature (ambient temperature of the power supply unit) is 40°C
- (2) Average load factor is 80% or less
- (3) Installation method: Standard installation. However, the maximum rating is within the output derating.

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).
- (3) Unauthorized modifications or repair by the buyers.
- (4) Defects not cause by DENSEI LAMBDA.



**DENSEI-LAMBDA**

*HWS1500/ME Series*  
*INSTRUCTION MANUAL*

## **TDK-LAMBDA**

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