

**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 Vertriebs Händler 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.

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## FPS-T1U RACK INSTRUCTION MANUAL

FPS-T1U RACK SPECIFICATIONS			
1	Number of power supply modules (*1)	---	Maximum 3 x FPS1000 modules.
2	Maximum output power (*2)	W	3000
3	Input voltage / frequency range (*3)	---	85~265Vac continuous, 47~63Hz, Single phase
4	Maximum input current (at 100/200Vac)	A	12.0/6.0 for each FPS1000 unit installed
5	AC input connector	---	FPS-T1U :IEC inlet for each power supply module . FPS-T1U/P :None
6	Output terminals	---	Bus-bars.Refer to outline drawing.
7	Remote sensing (*4)	V	Possible.
8	Parallel operation	---	Possible. Up to 3 racks with max 8FPS 1000 units of the same voltage and current rating.
9	Series operation (*5)	---	Possible. Up to 3x FPS1000 units of the same voltage and current rating
10	Remote On/Off control (*6)	---	Separate control for each FPS 1000 unit , By electrical signal or dry contact On/Off logic is user selectable. Refer to instruction manual.
11	DC_OK signal	---	Separate control for each FPS1000 unit, Open collector signal. On when Vout >80% +/-5%. Max.sink current: 10mA
12	AC fail signal	---	Separate control for each FPS1000 unit ,Open collector signal. Refer to Instruction Manual
13	Over Temperature alarm signal	---	Separate control for each FPS1000 unit ,Open collector signal. Refer to Instruction Manual
14	Vout voltage trimming	---	Possible, via separate control for each FPS1000 unit .Refer to Instruction Manual.
15	Auxiliary power supply	---	11.2~12.5VDC.Maximum output current:0.25A, for each FPS1000 unit.
16	Operating temperature	---	0~50°C: 100% load. Derate 2%/°C, 50°C to 60°C.
17	Storage temperature	---	-30~85°C
18	Operating humidity	---	10~90% RH, no condensation.
19	Storage humidity	---	10~95% RH, no condensation.
20	Vibration	---	Built to meet ETS 300 019
21	Shock	---	Built to meet ETS 300 019
22	Applicable safety standards	---	UL60950-1, EN60950-1
23	Withstand voltage	---	Input-Output: 3000Vrms, 1min. Input-Ground: 2000Vrms, 1min. Output-Ground: 1414Vdc, 1min.
24	Insulation resistance	---	More than 100Mohm at 25°C and 70% RH. Output-Ground: 500Vdc
25	Weight (Typ)	Kg	3.7
26	Size (W*H*D)	---	440x44x351mm. Refer to Outline Drawing.
27	Warranty	Yr	Two Years

### Notes:

- \*1: The Output of all the FPS1000 modules are floating in the rack.
- \*2: For input voltage lower than 100Vac, maximum output power derated by 10% of the power rating.
- \*3: For cases where conformance to various safety standards (UL, EN etc.) is required, to be described as 100-240Vac (50/60Hz).
- \*4: Remote sensing can compensate up to 1V drop on each load wire.
- \*5: Not applicable for units with I<sup>2</sup>C bus option.
- \*6: Factory default: ON/OFF\_1 P.S. is on when AC is applied.

## REAR PANEL IN/OUT CONNECTOR PINS FUNCTION DESCRIPTION

Refer to the following table for description of the control and supervisory signals provided at the rear In/Out connectors. J1(A), J2(B), J3(C). Refer to Fig. 1-1~6-1 for typical connections for operation.

Pin No	Function	Description
1	SDA (I <sup>2</sup> C)	Serial Data used in the I <sup>2</sup> C interface option. Refer to the I <sup>2</sup> C interface description in the FPS1000 Instruction Manual.
2	SCL (I <sup>2</sup> C)	Serial Clock used in the I <sup>2</sup> C interface option. Refer to the I <sup>2</sup> C interface description in the FPS1000 Instruction Manual.
3	SIGNAL_RETURN	Return for the following control and supervisory signals: On/Off, DC_OK, Over_temperature Alarm, AC_Fail, Auxiliary 12V supply. The Signal return is isolated from the output terminals.
4	ON/OFF_2 (*1)	On/Off control. To use this input, pin#12 and pin#13 must be shorted together. Short between On/Off_2 to pin#3: Off. Open On/Off_2: On. The maximum source current is 1.2mA
5	DC_OK	Open collector signal, referenced to pin 3 (Signal Return). On when the output voltage of FPS1000 unit is higher than Vout ≥ 80% +/-5%. The maximum sink current: 10mA and the maximum external voltage is 15V.
6	V_TRIM	Connection for output voltage trimming of FPS1000 unit. The voltage can be trimmed within its range specifications.
7	-SENSE	Negative sensing. The -Sense signal should be connected to the negative terminal of the load. The -Sense and +Sense leads should be twisted pair to minimize noise pick-up effect. The maximum load wires drop compensation is 1V/wire.
8	+SENSE	Positive sensing. The +Sense signal should be connected to the positive terminal of the load. The +Sense and -Sense leads should be twisted pair to minimize noise pick-up effect. The maximum load wires drop compensation is 1V/wire.
9	+12V_AUX	Auxiliary voltage output, 11.2~12.5V, referenced to pin 3 (Signal Return). The maximum load current is 0.25A. This output is not controlled by the On/Off control.
10	CS	Current sharing signal. When FPS1000 units are connected in parallel, the CS pins of the units should be connected to allow current balance between units.
11	AC_FAIL	Open collector signal, referenced to pin 3 (Signal Return). On when the input voltage of FPS1000 unit is ≥85Vrms. The maximum sink current is 10mA, and the maximum external voltage is 15Vdc.
12	ON/OFF_1 (*1)	Turns the output of FPS1000 unit to On and Off by electrical signal or dry contact between pin 12 and pin 3 (Signal Return). 0~0.6V or Short: On, 2~15V or Open: Off. The maximum sink current is 2.6 mA (when using pin#12, it should be disconnected from pin#13).
13	ON/OFF LOGIC SELECT	Input used to select the On/Off control logic. Short this input to pin#12 when using On/Off_2 as On/Off control. Leave this input open when using On/Off_1 as On/Off control.
14	TEMP_ALARM	Open collector signal, referenced to pin 3 (Signal Return). On when the internal temperature of FPS1000 unit is within safe limit, Off approx. 10°C below Thermal shut down. The maximum sink current is 10mA and the maximum external voltage is 15V.
15	- LOCAL SENSE	When working in local sense mode, connect -Local Sense to -Sense (pin#7). When working in Remote sense mode, this input should be open.
16	+ LOCAL SENSE	When working in local sense mode, connect +Local Sense to +Sense (pin#8). When working in Remote sense mode, this input should be open.

Table 1: Rear In/Out connector pins function description (J1), (J2), (J3)

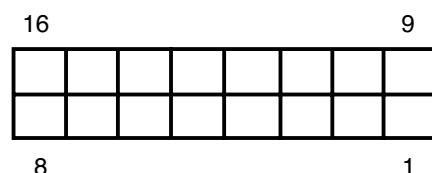
Note:

\*1: On/Off\_1 and On/Off\_2 are reversed logic inputs.

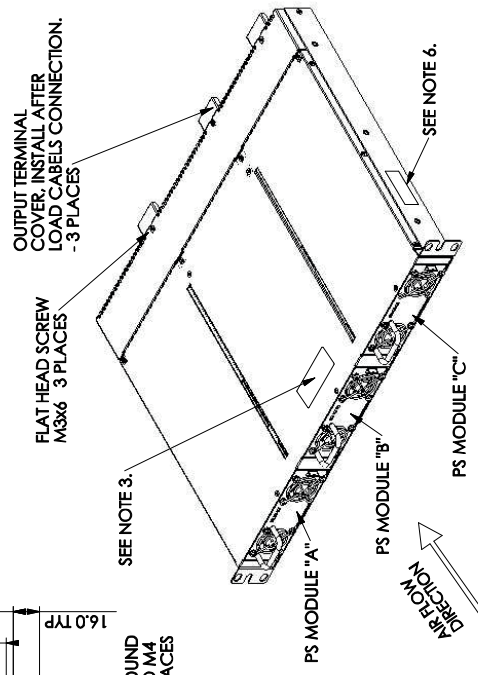
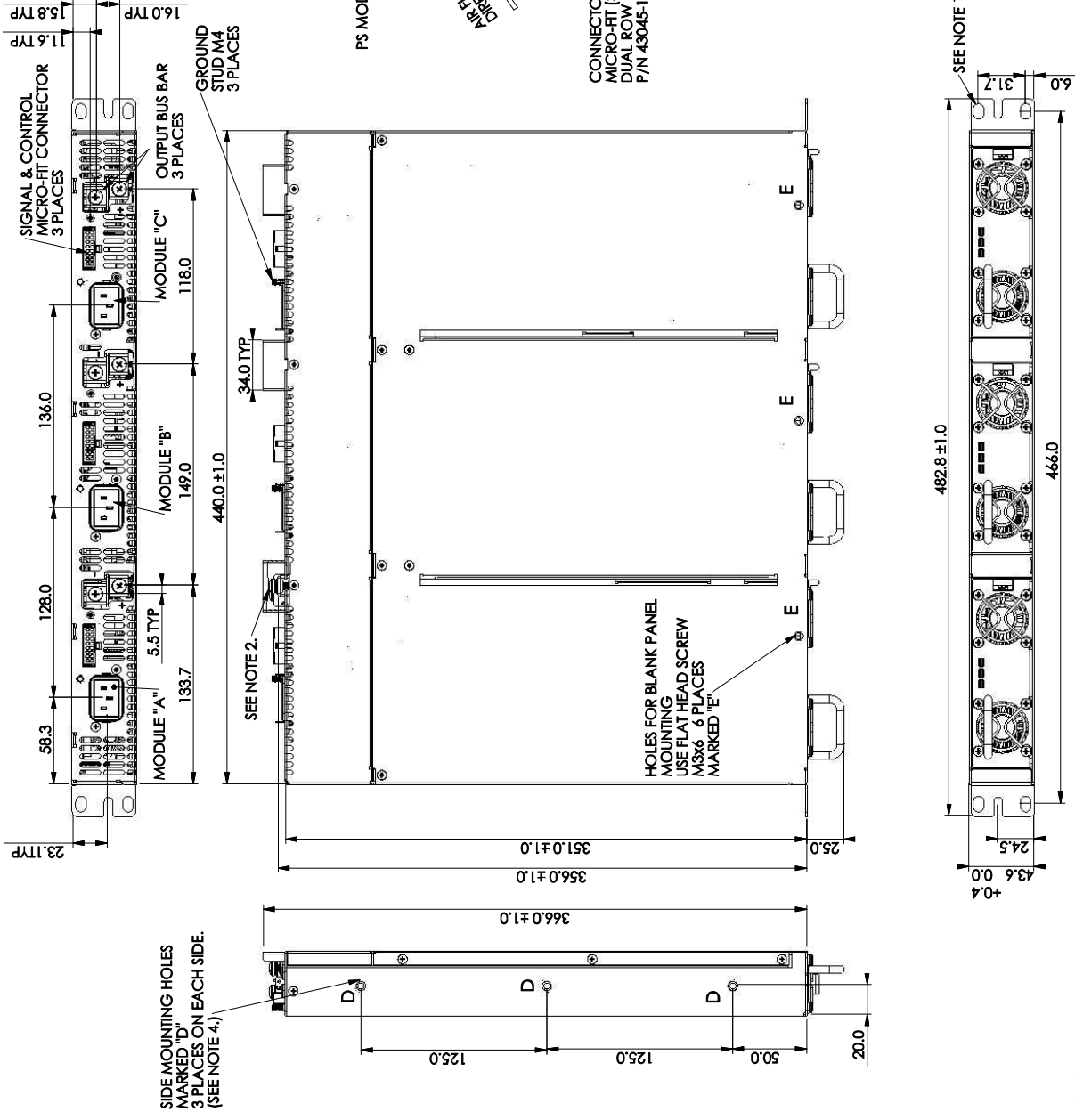
### J1(A), J2(B), J3(C) CONECTOR DESCRIPTION

MALE HEADER: P/N-43045-1600 (MOLEX)  
 FEMALE HOUSING (PLUG): P/N-43025-1600 (MOLEX)  
 FEMALE TERMINAL: P/N-43030 (MOLEX)

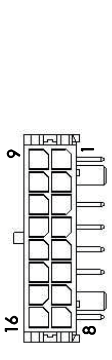
### CONNECTOR PINOUT (REAR PANEL VIEW)



# FPS-T1U Outline Drawing

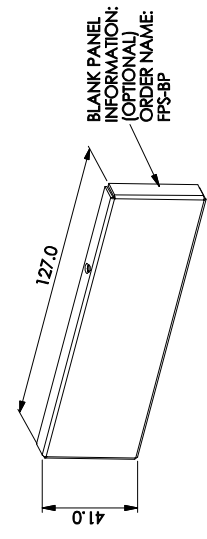


## SIGNALS & CONTROL CONNECTOR PINS ASSIGNMENT



CONNECTOR DESCRIPTION:  
 MICRO-FIT (3.0)  
 DUAL ROW RIGHT ANGLE 16 PINS  
 P/N 43045-1600 (MOLEX)

PIN NUMBER	FUNCTION	PIN NUMBER	FUNCTION
1	SDA (I <sup>2</sup> C)	9	+12V_AUX
2	SCL (I <sup>2</sup> C)	10	CS
3	SIGNAL_RIN	11	AC_FAIL
4	ON / OFF 2	12	ON / OFF 1
5	DC_OK	13	ON / OFF LOGIC_SELECT
6	V_TRIM	14	TEMP_ALARM
7	-S	15	-LS
8	+S	16	+LS



- NOTES**
1. MOUNTING HOLES FOR 19" RACK. USE M6x12 TO FIX THE UNIT TO A RACK.
  2. M5x12 SCREWS FOR LOAD WIRES FIXING. USE M5 LUG FOR THE LOAD WIRES. RECOMMENDED TIGHTENING TORQUE 24-31 Kgf.cm.
  3. MODEL NAME, VOLTAGE AND CURRENT RATING AND SAFETY APPROVAL SYMBOLS WILL BE SHOWN HERE ACCORDING TO THE SPECIFICATIONS.
  4. MOUNTING HOLES M5 FOR MOUNTING BRACKETS. USE M5x8 SCREWS TO FIX THE BRACKETS TO THE CHASSIS. SCREWS MUST NOT PENETRATE THE CHASSIS MORE THAN 6 mm.
  5. THE FPS-T1U RACK IS SHOWN WITH 3 FPS1000 UNITS INSTALLED.
  6. EU REPRESENTATIVE ADDRESS LABEL.

## FPS-T1U RACK SAFETY INSTRUCTIONS

### SAFETY APPROVALS

UL 60950-1 and CSA22.2 No.60950-1 - UL Recognized. C-UL for Canada.

IEC 60950-1 - CB Report and Certificate.

EN 60950-1 - CE mark.

Marking by the CE Symbol indicates compliance to the Low Voltage Directive of the European Union.

A "Declaration of Conformity" in accordance with the preceding directives and standards has been made and is on file at our EU representative: TDK-Lambda Germany GmbH, Karl-Bold-Str. 40, D-77855 Achem.

A "Declaration of Conformity" may be accessed via company website [www.emea.tdk-lambda.com/manual](http://www.emea.tdk-lambda.com/manual)

### SAFETY INSTRUCTIONS

**CAUTION:** The following safety precaution must be observed during all phases of operation, service and repair of this equipment. Failure to comply with the safety precautions or warnings in this document violates safety standards of design, manufacture and intended use of this equipment and may impair the built-in protections within. TDK Lambda shall not be liable for user's failure to comply with these requirements.

**Vorsicht:** Die folgenden Sicherheitsvorschriften müssen vor Inbetriebnahme und in jedem Betriebszustand bei Service oder Reparatur beachtet werden. Missachtung der Sicherheitsvorschriften und Warnhinweise aus diesem Handbuch führen zur Verletzung der bestehenden Sicherheitsstandards. Bei Betrieb des Gerätes ausserhalb dem bestimmungsgemässen Einsatz können die im Gerät integrierten Schutzfunktionen beeinträchtigt werden. TDK-Lambda ist nicht haftbar für Schäden, die durch Missachtung dieser Sicherheitsvorschriften entstehen können.

**CAUTION:** FPS-T1U units are not authorized for use as critical component 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.

**Vorsicht:** Dieses Produkt ist nicht für die Verwendung als kritische Komponente in nuklearen Steuerungssystemen, lebenserhaltenden Systemen oder Geräte für den Einsatz in gefährlichen Umgebungen, ohne die ausdrückliche schriftliche Genehmigung durch TDK-Lambda zugelassen.

### INSTALLATION (OVERVOLTAGE) CATEGORY & ENVIRONMENTAL CONDITIONS

The FPS-T1U units have been evaluated to Overvoltage category II.

The FPS-T1U units intended for use in the following operation conditions:

\* Indoor use

\* Pollution degree 2

\* Max. operational altitude: 3000m above sea level

\* Ambient temperature: -10°C-50°C at 100% load, up to 70°C with output de-rating applied (See Specification)

### GROUNDING

FPS-T1U units are Class I product. To minimize electrical shock hazard, the FPS-T1U units must be connected to an electrical ground. The instruments must be connected to the AC power supply mains through a three conductor power cable, with the ground wire firmly connected to an electrical ground (safety ground) at the power outlet. For instruments designed to be hard-wired to the supply mains, the protective earth terminal must be connected to the safety electrical ground before any other connection is made. Any interruption of the protective ground conductor or disconnection of the protective earth terminal will cause a potential shock hazard that might cause personal injury.

**Erdungskonzept:** Dieses Produkt ist ein Gerät der Schutzklasse 1. Zur Vermeidung von gefährlichen Energieinhalten und Spannungen, ist das Gehäuse an eine Schutzterde anzuschliessen. Der PE-Anschluss ist an einen festen Erder anzuschliessen. Bei Festverdrahtung des Gerätes ist sicherzustellen, dass der PE Anschluss als erstes angeklemt wird. Jede mögliche Unterbrechung des PE-Leiters oder Trennung der PE Verbindung kann einen möglichen elektrischen Schlag hervorrufen, der Personenschäden zur Folge hätte.

### LIVE CIRCUITS

Operating personnel must not remove the FPS-T1U units cover.

No internal adjustment or component replacement is allowed by non-TDK Lambda qualified service personnel. Never replace components with power cable connected. To avoid injuries, always disconnect power, discharge circuits and remove external voltage sources before touching components.

### Spannungsführende Teile

Die Geräteabdeckung darf nicht durch Endanwender geöffnet werden. Interne Modifikationen, sowie Bauteilaustausch ist nur durch TDK-Lambda qualifiziertes Personal erlaubt. Vor Austausch von Bauteilen ist das Netzkabel bzw. die Versorgungsspannung zu trennen. Energieversorgungsanschlüsse sind immer zu trennen, um Personenschäden durch gefährliche Energieinhalte und Spannungen auszuschliessen. Die Stromkreise sind zu entladen, externe Spannungsquellen sind zu entfernen, bevor auf Bauteile bzw. Komponenten Ebene gearbeitet wird.



## PARTS SUBSTITUTIONS & MODIFICATIONS

Parts substitutions and modifications are authorized TDK Lambda service personnel only. For repairs or modifications, the instrument must be returned to TDK Lambda service facility.

### AC INPUT

#### CAUTION

Risk of electrical shock and energy hazard. Disconnecting one power supply line disconnects only one power supply module. To isolate the unit completely, disconnect all power supply lines. Terminal blocks should only be used by professional workers to connect AC cables.

#### ACHTUNG

Spannungsfuehrende Teile - Gefahr durch elektrischen Schlag oder hohe Energieinhalte. Alle Netzstecker der einzelnen Komponenten bzw. der Einschuebe muessen getrennt werden, damit das System "spannungsfrei" ist.  
Die Eingangsklemme der Stromversorgung ist nur innerhalb eines Gesamtsystemes zu verwenden.

#### ATTENTION

Risque de choc et de danger e'lectriques. Le de'branchement d'une seule alimentation stabilise'e ne de'branche uniquement qu'un module "Alimentation Stabilise'e". Pour isoler completement le module en cause, il faut de'brancher toutes les alimentations stabilise'es.

Do not connect FPS-T1U units to mains supply exceeding the input voltage and frequency rating. The input voltage and frequency rating is: 100-240V~, 50/60Hz. For safety reasons, the mains supply voltage fluctuations should not exceed +/-10% of nominal voltage. The leakage current of the end use equipment not exceed 3.5mA.

### ENERGY HAZARD

The main outputs of FPS-T1U units are capable of providing hazardous energy. Due to hazardous energy level the output and connections therefore must not be user accessible. Manufacturer's final equipment must provide protection to service personnel against inadvertent contact with output bus bars.

### SERIAL OPERATION

The FPS-T1U product is capable of providing hazardous voltage (more than 60VDC) output in case of the serial connection of two or more FPS1000 units in the rack. Therefore if the output sets such that hazardous voltage occurs the manufacturer final equipment must provide protection to service personnel against inadvertent contact with output terminals. Moreover if the output(s) sets such that hazardous voltage occurred it must not be user accessible.

### FUSE

There are no fuses in the FPS-T1U rack.

### OVERCURRENT PROTECTION:

A readily accessible branch circuit over-current protective device rated 20A max. per each input must be incorporated in the building wiring.

**Überstromschutz:** Eine leicht zugängliche Vorsicherung mit 20A max. pro Eingang muss in der Hausinstallation vorgesehen werden

### SYMBOLS



CAUTION Risk of Electrical Shock.



Instruction manual symbol. The instrument will be marked with this symbol when it is necessary for the user to refer to the instruction manual.



Indicates hazardous voltage.



Indicates ground terminal.



Protective Ground Conductor Terminal

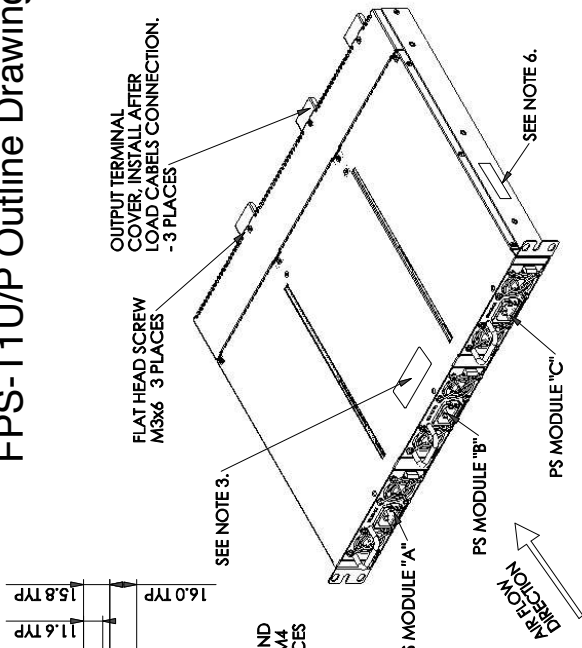
**WARNING**

Denotes hazard. An attention to a procedure is called. Not following the procedure correctly could result in personal injury. A WARNING sign should not be skipped and all indicated conditions must be fully understood and met.

**CAUTION**

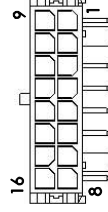
Denotes hazard. An attention to a procedure is called. Not following the procedure correctly could result in damage to the equipment.

## FPS-T1U/P Outline Drawing

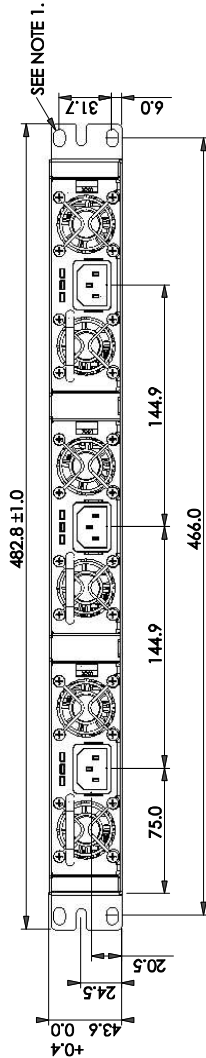
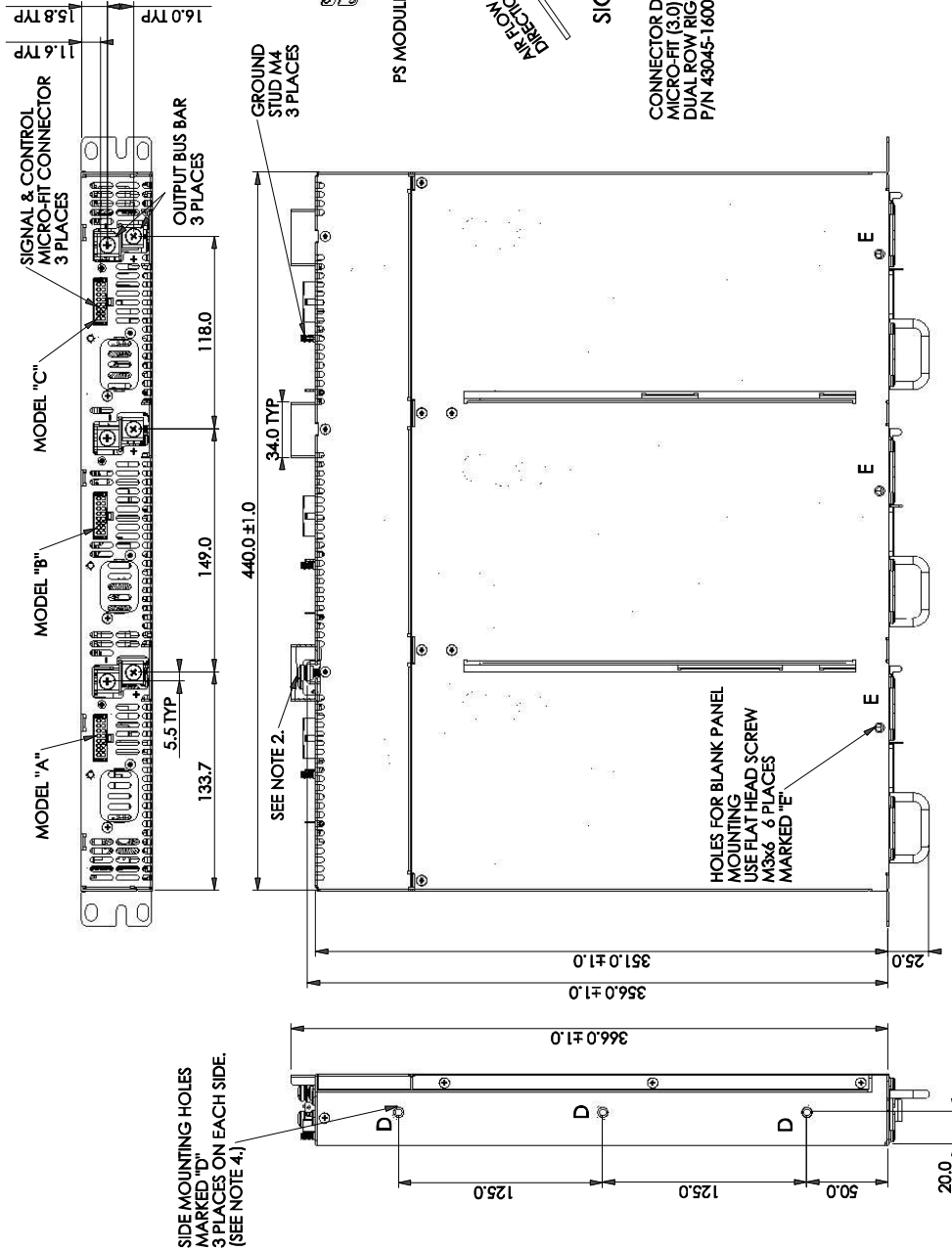
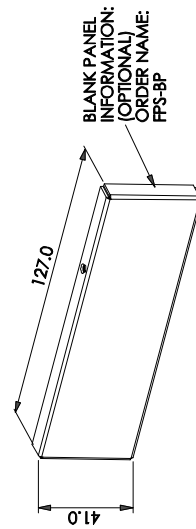


### SIGNALS & CONTROL CONNECTOR PINS ASSIGNMENT

CONNECTOR DESCRIPTION:  
MICRO-FIT (3.0)  
DUAL ROW RIGHT ANGLE 16 PINS  
P/N 43045-1600 (MOLEX)



PIN NUMBER.	FUNCTION	PIN NUMBER.	FUNCTION
1	SDA (I <sup>2</sup> C)	9	+12V_AUX
2	SCL (I <sup>2</sup> C)	10	CS
3	SIGNAL/IN	11	AC_FAIL
4	ON / OFF.2	12	ON / OFF.1
5	DC_OK	13	ON / OFF LOGIC SELECT
6	V_TRIM	14	TEMP_ALARM
7	-S	15	-LS
8	+S	16	+LS



### NOTES

1. MOUNTING HOLES FOR 19" RACK. USE M6x12 TO FIX THE UNIT TO A RACK.
2. M5x12 SCREWS FOR LOAD WIRES FIXING. USE M5 LUG FOR THE LOAD WIRES. RECOMMENDED TIGHTENING TORQUE 24-31 Kgf.cm.
3. MODEL NAME, VOLTAGE AND CURRENT RATING AND SAFETY APPROVALS SYMBOLS WILL BE SHOWN HERE ACCORDING TO THE SPECIFICATIONS.
4. MOUNTING HOLES M5 FOR MOUNTING BRACKETS. USE M5x8 SCREWS TO FIX THE BRACKETS TO THE CHASSIS. SCREWS MUST NOT PENETRATE THE CHASSIS MORE THAN 6 mm.
5. THE FPS-T1U RACK IS SHOWN WITH 3 FPS1000 UNITS INSTALLED.
6. EU REPRESENTATIVE ADDRESS LABEL.

# FPS1000 FPS-T1U CONNECTIONS FOR OPERATION

## 1. REMOTE SENSING\*

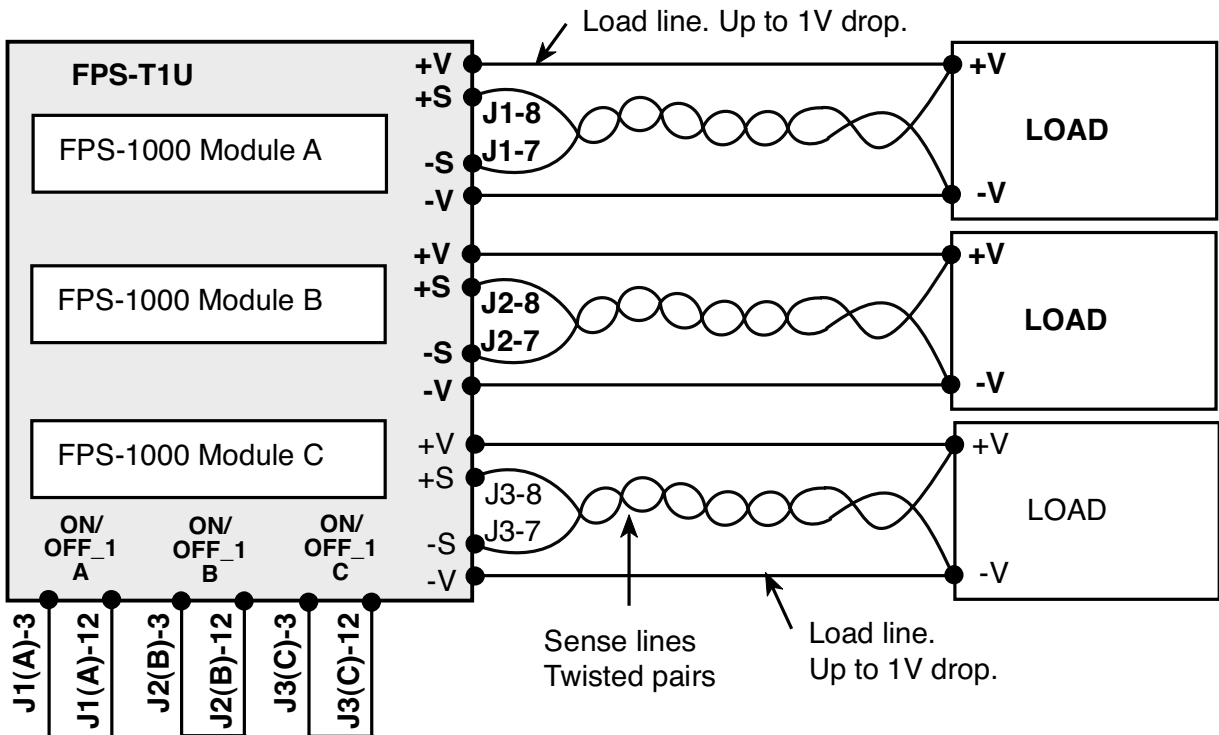


Fig 1-1

\* In Local sense applications, the +/- sense have to be connected to the +/-Local Sense terminals of the FPS-T1U prior to operating the FPS1000 units plugged in.

## 2. ON/OFF CONTROL

### ON/OFF Control\_1

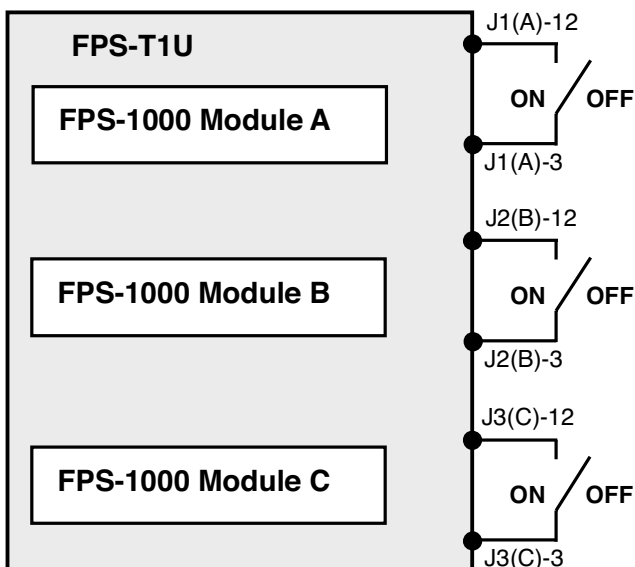


Fig 2-1

### ON/OFF Control\_2

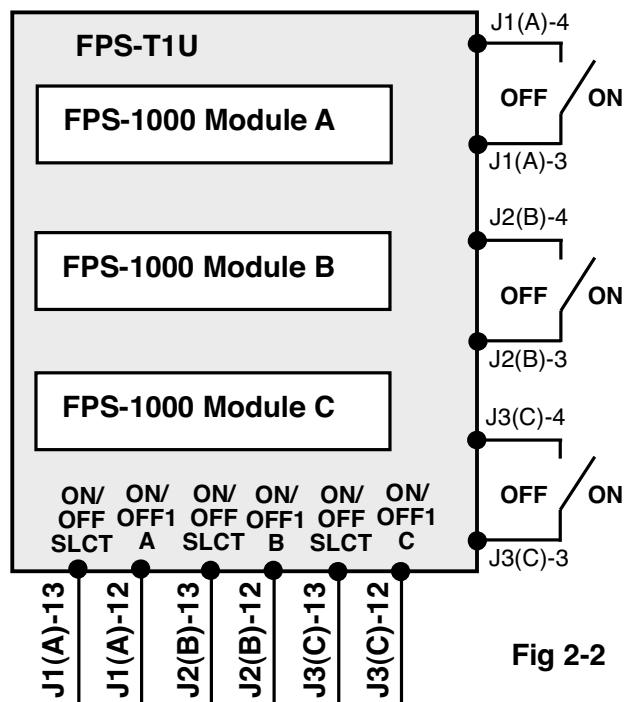


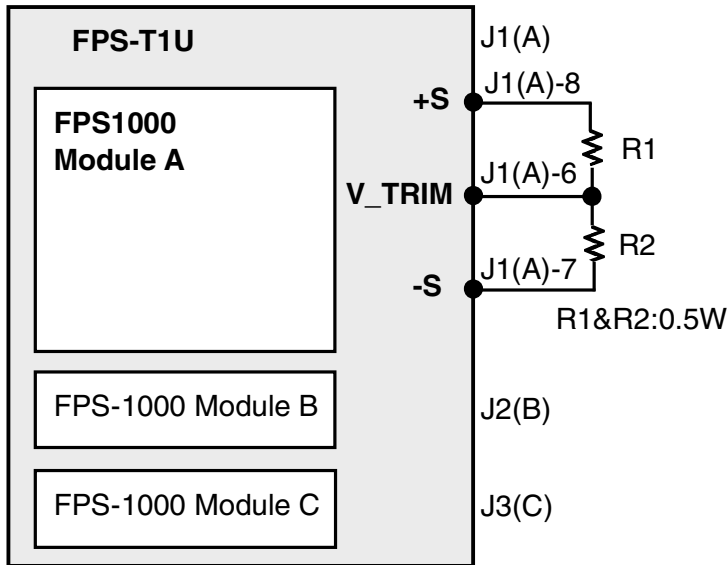
Fig 2-2

Connection for negative logic:  
 Closed: On    Open: Off  
 Factory default: ON/OFF Control\_1

Connection for positive logic:  
 Closed: Off    Open: On

### 3. OUTPUT VOLTAGE TRIMMING

Fig 3-1 shows typical connection for FPS1000 unit 'A' inside the rack. Units 'B' and 'C' connections - Refer to Table 1.



#### FPS1000-12

$$R_2 = 0.0324 \cdot V_{out}^2 - 1.1298 \cdot V_{out} + 9.9342$$

$$R1(K\Omega) = 5(K\Omega) - R2(K\Omega)$$

#### FPS1000-24

$$R_2 = 0.0785 \cdot V_{out}^2 - 5.819 \cdot V_{out} + 105.132$$

$$R1(K\Omega) = 20(K\Omega) - R2(K\Omega)$$

#### FPS1000-32

$$R_2 = 0.0463 \cdot V_{out}^2 - 4.5805 \cdot V_{out} + 109.49$$

$$R1(K\Omega) = 20(K\Omega) - R2(K\Omega)$$

#### FPS1000-48

$$R_2 = 0.0497 \cdot V_{out}^2 - 7.2795 \cdot V_{out} + 259.04$$

$$R1(K\Omega) = 50(K\Omega) - R2(K\Omega)$$

Fig 3-1

### 4. SUPERVISORY SIGNALS

Signals are accessible at the J1(A), J2(B), J3(C) connectors on the rear panel of the rack. Fig 4-1 shows typical connection for FPS1000 unit 'A' inside the rack. Units 'B' and 'C' connections - Refer to Table 1.

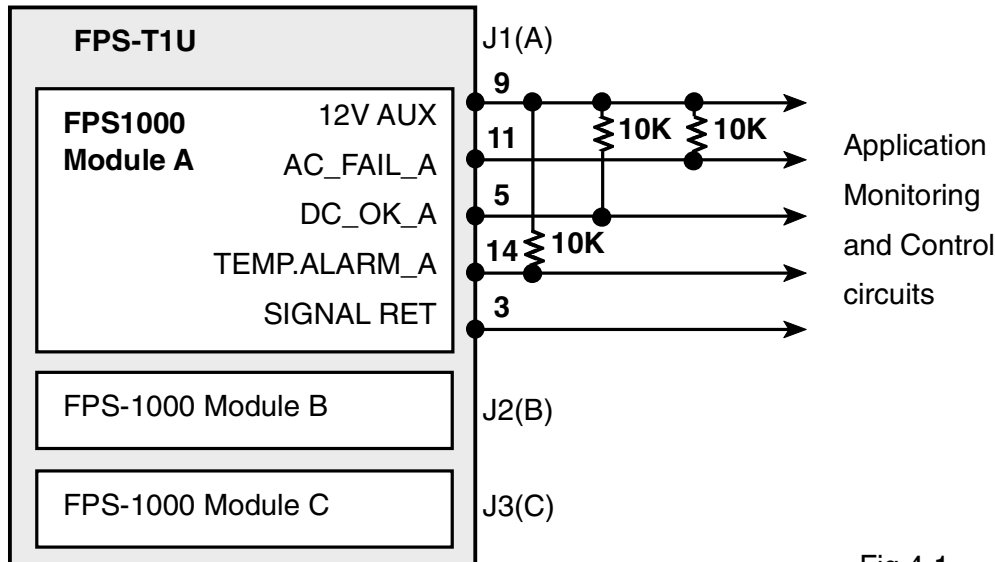


Fig 4-1

Note: AC\_FAIL, DC\_OK and TEMP.ALARM are open collector signals.

## 5. PARALLEL OPERATION

### 5.1. Remote sensing and current balance

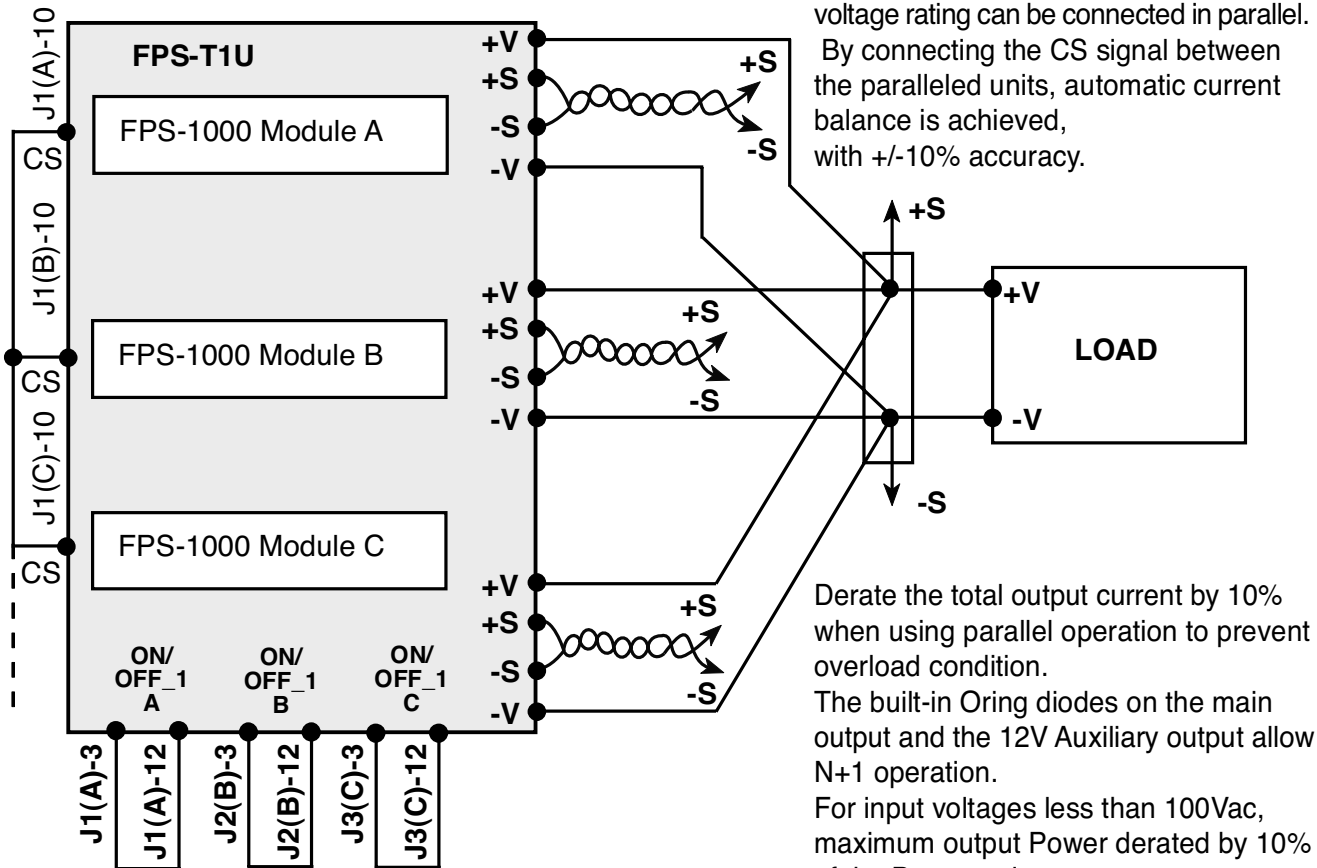


Fig 5-1

## 6. SERIES OPERATION

Up to 3 units of the same voltage and current rating can be used for increased output voltage. It is recommended that diodes be connected in parallel with each unit output to prevent reverse voltage. Each diode should be rated to at least the power supply rated output voltage and output current.

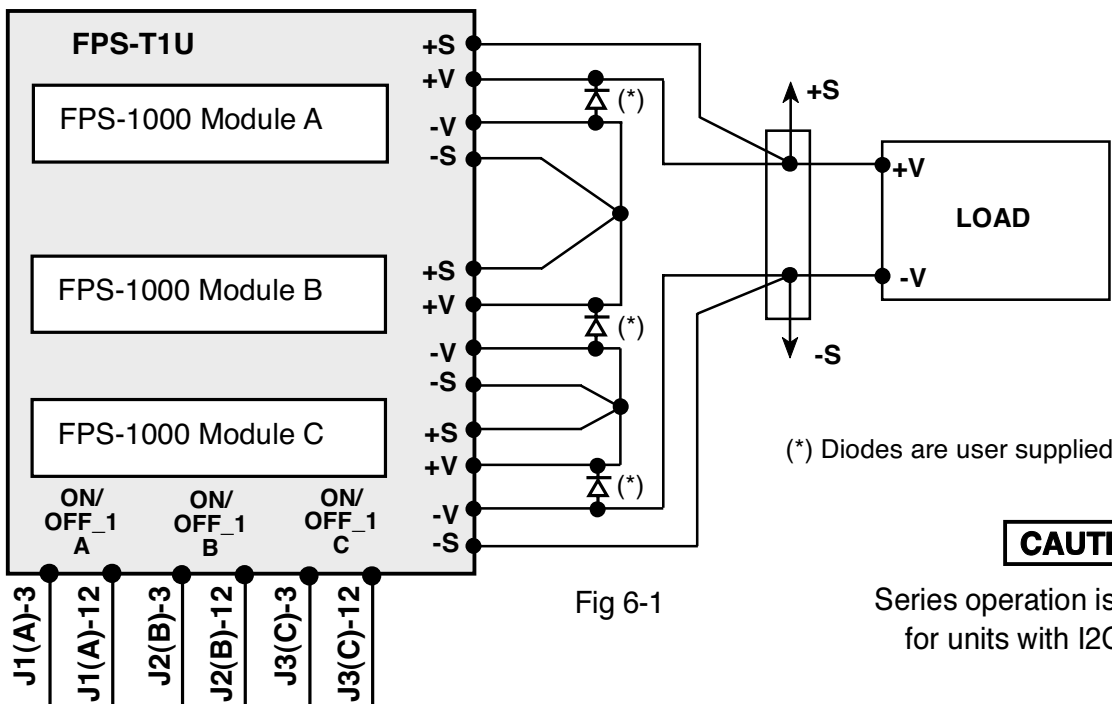


Fig 6-1

**CAUTION**

Series operation is not applicable for units with I2C bus option.

## FPS-T1U I<sup>2</sup>C BUS INTERFACE OPTION

### MODULES LOCATION

Up to three FPS1000 modules can be plugged into the FPS-T1U rack.

Module 'A' is on the left ,module 'C' is on the right  
For modules location refer to Fig. 7-1

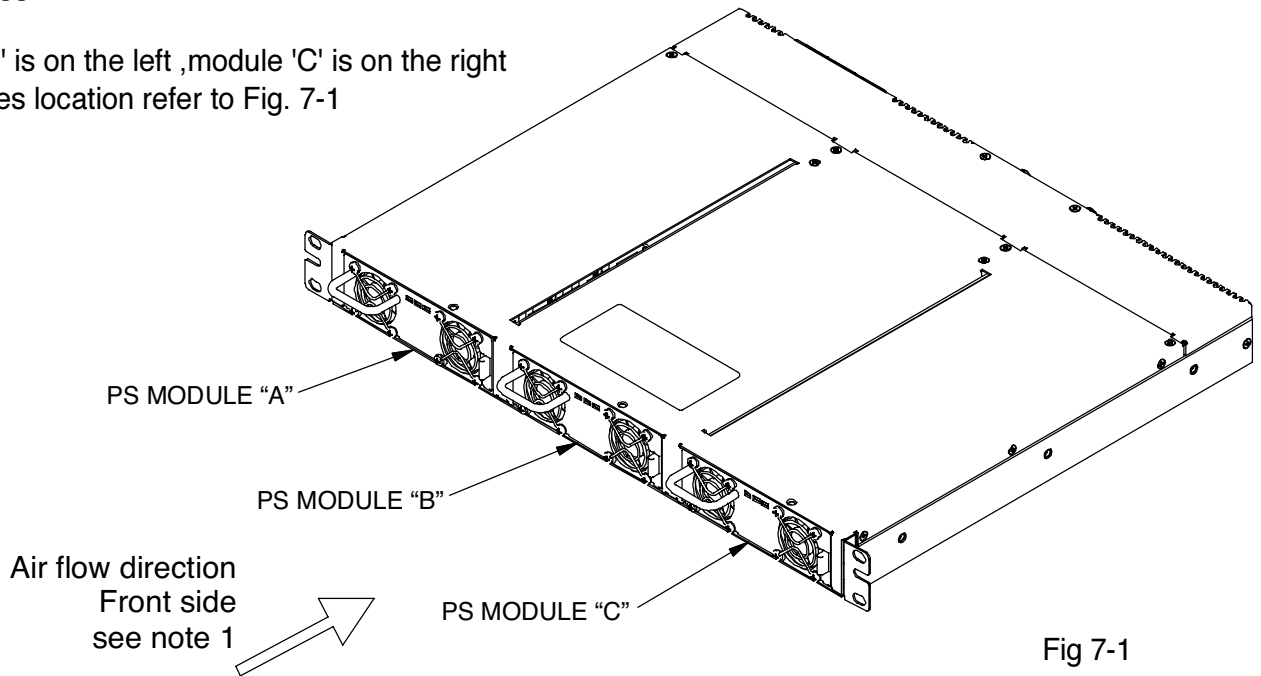


Fig 7-1

Note1: Forced air cooling allow minimum 50mm of unrestricted air space at the rear of the unit.  
Do not obstruct air flow to the unit front panel

### ADDRESSING (A0, A1, A2).

The address line of the FPS1000 units installed in the FPS-T1U rack are internally fixed.  
Refer to the following table for details:

	A0	A1	A2
Module "A"	1	1	1
Module "B"	0	1	1
Module "C"	1	0	1

Note: Address are applicable when modules FPS1000/S (I2C option) are used

## I<sup>2</sup>C BUS INTERFACE OPTION

### INTRODUCTION

The I<sup>2</sup>C interface option includes facilities to monitor operating parameters of the power supply. The parameters are then transferred to the host PC if demanded, over a standard I<sup>2</sup>C bus.

The following data can be monitored for the individual units connected to the I<sup>2</sup>C bus:

1. Status of the unit.
2. Actual output voltage, output current and internal temperature of the unit.
3. Manufacturing related data (model, serial number, manufacturing date etc...).

### ADDRESSING (A0, A1, A2).

The address of each FPS1000 unit is internally fixed.  
Refer to the addressing table for details.

### SERIAL CLOCK

This line is clocked by the processor which controls the I<sup>2</sup>C bus. It should be connected to +5V (referenced to -Sense) via a pull-up resistor of 2K $\Omega$ . The I<sup>2</sup>C interface is designed to run with a serial clock speed of 100KHz.

### SERIAL DATA

This line is a bidirectional data line. It should be connected to +5V (referenced to -Sense) via a pull-up resistor of 2K $\Omega$ .

## OPERATION AND FUNCTIONS

### 1. DIGITAL STATUS

Digital status functions are provided by a PCF8574, 8-bit Register. It provides a single 8-bit word when read by the I<sup>2</sup>C controller.

Fault is indicated by "1" and Good level is indicated by "0". The register information is as follows:

BIT	FUNCTION	MEANING
0	Output Fail	Output voltage is < 80% +/-5% of Vo rated
1	Over Temperature Protection	Internal temperature is over 80°C. Supply turns off.
2	Temperature Alarm	Internal temperature is over 70°C. Supply is on.
3	Fan Fail	Failure of an internal fan.
4	AC Input Fail	Input voltage < 85Vac
5	Not Used	Always "0".
6	Not Used	Always "0".
7	Not Used	Always "0".

PCF8574 slave address:

Bit	7	6	5	4	3	2	1	0
Value	0	1	0	0	A2	A1	A0	R/W

### 2. EEPROM FUNCTIONS

A 256 bytes EEPROM is included in the I<sup>2</sup>C option. The EEPROM type is AT24C02 and it is programmed at the factory with the following data:

ADDRESS	BYTES	DATA
0	4	Number of fields
4	16	Manufacturer
20	20	Serial number
40	16	Revision
56	16	Country of manufacture
72	16	Model name
88	16	Output voltage
104	16	Date of manufacture
254	2	Checksum

The slave EEPROM address is:

Bit	7	6	5	4	3	2	1	0
Value	1	0	1	0	A2	A1	A0	R/W

### 3. ANALOG FUNCTIONS

Analogue functions are provided by a single PCF8591, 4-channel 8-bit A/D converter. When this device is read by the serial bus controller it provides an 8-bit word with the following information:

Channel 1: Output voltage, channel 2: Output current, channel 3: Internal temperature.

The PCF8591 slave address is:

Bit	7	6	5	4	3	2	1	0
Value	1	0	0	1	A2	A1	A0	R/W

The PCF8591 device initially requires a control byte to be written to the configuration register. The control byte is as follows:

Bit	7	6	5	4	3	2	1	0
Value	0	A	0	0	0	B	C	D

When a single channel is to be read, A,B,C and D should be determined as follows:

A/D channel	A	B	C	D
Voltage	0	0	0	0
Current	0	0	0	1
Temperature	0	0	1	0

To read all channels with a single control byte, A and B have to be "1", C and D have to be "0". This control byte sets the A/D so that on every read data from each channel is read. Note that on each read, a conversion is started for a particular channel and the result which will be displayed and will be of the previous read. (i.e. the previous channel).

Thus second read cycle gives result of the actual channel.

Note: the first result from a sequence of reads should not be considered.

### A/D SCALING

The A/D readback has to be scaled to obtain a correct value for the voltage, current and the temperature. Note that the voltage reading is made inside the power supply unit before the "Oring" diode and is typically 0.5V higher than the actual output voltage.

The following scaling should be employed:

$$\text{VALUE} = \text{BYTE VALUE} \times \text{RESOLUTION}$$

Refer to the following table for the scaling of the A/D channels:

FPS1000-12/S	Range	Resolution	Accuracy
Voltage	0~15V	0.0586 V/Bit	+/-2% of full scale
Current	0~80A	0.312 A/Bit	+/-10% of full scale
Temperature	0~100°C	0.391°C/Bit	+/-3°C of full scale

FPS1000-24/S	Range	Resolution	Accuracy
Voltage	0~30V	0.1171V/Bit	+/-2% of full scale
Current	0~50A	0.1953A/Bit	+/-10% of full scale
Temperature	0~100°C	0.391°C/Bit	+/-3°C of full scale

FPS1000-32/S	Range	Resolution	Accuracy
Voltage	0~40V	0.1563V/Bit	+/-2% of full scale
Current	0~50A	0.1953A/Bit	+/-10% of full scale
Temperature	0~100°C	0.391°C/Bit	+/-3°C of full scale

FPS1000-48/S	Range	Resolution	Accuracy
Voltage	0~60V	0.2344V/Bit	+/-2% of full scale
Current	0~25A	0.0977A/Bit	+/-10% of full scale
Temperature	0~100°C	0.391°C/Bit	+/-3°C of full scale

The measurement range is from 0 to the maximum value listed in the range column. The resolution or scale of reading is linear over the entire range and provides a linear output on the A/D converter.

Model: FPS1000-48 /S

Measurements and calculation examples

Output voltage readback

1. Output voltage (at the output terminals): 48.0V
2. Voltage before the "Oring" diode: 48.0V+0.5V=48.5V
3. Hex readback: CE (1100 1110).
4. Convert the hex readback to decimal: 206
5. Calculate measured Vout:  $V_{out} = 206 \times 0.2344 = 48.286V$

### CAUTION

**Series operation is not applicable for units with I<sup>2</sup>C bus option.**