GENESYS™ Series

Programmable DC Power Supplies

Power System Series

GSPS30kW 0-600V / 0-3000A

GSPS45kW 0-600V / 0-4500A

GSPS60kW 0-600V / 0-6000A

Built in LXI compliant LAN, USB, RS-232 & RS-485 Interface

Optional Interface: IEEE488.2 (GPIB), MODBUS TCP or EtherCAT

SAFETY & INSTALLATION MANUAL

Manual Supplements

The full user manual is available on TDK-Lambda website or can be ordered, refer to User manual IA761-04-02_.

For units equipped with MODBUS TCP interface option, refer to MODBUS TCP User manual IA761-04-04_.

For units equipped with EtherCAT interface option, refer to EtherCAT User manual IA761-04-05_.

IA979-04-01A

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This Manual Covers Models:

30kW:

GSPS10-3000*	GSPS100-300	GBSPS10-3000*	GBSPS100-300
GSPS20-1500	GSPS150-204	GBSPS20-1500	GBSPS150-204
GSPS30-1020	GSPS200-150	GBSPS30-1020	GBSPS200-150
GSPS40-750	GSPS300-102	GBSPS40-750	GBSPS300-102
GSPS50-600	GSPS400-78	GBSPS50-600	GBSPS400-78
GSPS60-510	GSPS500-60	GBSPS60-510	GBSPS500-60
GSPS80-390	GSPS600-51	GBSPS80-390	GBSPS600-51

45kW:

	GSPS100-450		GBSPS100-450
GSPS20-2250	GSPS150-306	GBSPS20-2250	GBSPS150-306
GSPS30-1530	GSPS200-225	GBSPS30-1530	GBSPS200-225
GSPS40-1125	GSPS300-153	GBSPS40-1125	GBSPS300-153
GSPS50-900	GSPS400-117	GBSPS50-900	GBSPS400-117
GSPS60-765	GSPS500-90	GBSPS60-765	GBSPS500-90
GSPS80-585	GSPS600-76.5	GBSPS80-585	GBSPS600-76.5

60kW:

GSPS10-4500**	GSPS100-600	GBSPS10-4500**	GBSPS100-600
GSPS20-3000	GSPS150-408	GBSPS20-3000	GBSPS150-408
GSPS30-2040	GSPS200-300	GBSPS30-2040	GBSPS200-300
GSPS40-1500	GSPS300-204	GBSPS40-1500	GBSPS300-204
GSPS50-1200	GSPS400-158	GBSPS50-1200	GBSPS400-158
GSPS60-1020	GSPS500-120	GBSPS60-1020	GBSPS500-120
GSPS80-780	GSPS600-102	GBSPS80-780	GBSPS600-102

*Refer to GSPS30kW Specifications for de-rating.

**Refer to GSPS60kW Specifications for de-rating.

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GENERAL INFORMATION

Documentation (including this Manual) is subject to change without notice. Refer to TDK-Lambda Technical Data web page for an up-to-date documentation and optional communication interfaces user manuals (including MODBUS-TCP and EtherCAT):

https://www.emea.lambda.tdk.com/uk/technical-data/data.aspx?resource=Installation-Manuals

Drivers and GUIs are updated periodically to support new features. Refer to TDK-Lambda Technical Centre web page for up-to-date drivers and GUIs:

https://www.emea.lambda.tdk.com/uk/technical-centre/software-tools.aspx

Further technical assistance, if needed, for this equipment may be obtained from TDK-Lambda Technical Centre.

https://www.emea.lambda.tdk.com/uk/contact/tdk-lambda-global/

WARRANTY

This TDK-Lambda product is warranted against defects in materials and workmanship for a period of five years from date of shipment. During the warranty period, TDK-Lambda will, at its option, either repair or replace products, which prove to be defective.

Limitation of Warranty

The warranty shall not apply to defects resulting from improper or inadequate usage or maintenance by the buyer, buyer supplied products or interfacing. The warranty shall not apply to defects resulting from unauthorized modifications or from operation exceeding the environmental specifications of the product or if the QA seal has been removed or altered by anyone other than TDK-Lambda authorized personnel. TDK-Lambda does not warrant the buyers' circuitry or malfunctions of TDK-Lambda products resulting from the buyers' circuitry. Furthermore, TDK-Lambda does not warrant any damage occurring as a result of the buyer's circuitry or the buyer's - supplied products. No other warranty is expressed or implied.

Warranty Service

This product must be returned to an authorized TDK-Lambda service facility for repairs or other warranty service. For products returned to TDK-Lambda for warranty service, the buyer shall prepay shipping charges to TDK-Lambda and TDK-Lambda shall pay the shipping charges to return the product to the buyer. Refer to section 4.11 for Repackaging for Shipment.

Disclaimer

The information contained in this document is subject to change without notice. TDK-Lambda shall not be liable for errors contained in this document or for incidental or consequential damages in connection with the furnishing, performance or use of this material. No part of this document may be photocopied, reproduced or translated into another language without the prior written consent of TDK-Lambda.

ENVIRONMENTAL COMPLIANCE

TDK-Lambda recognizes its duty and responsibilities towards promoting a sustainable environment. Our policy is to comply with applicable global legislation and to follow TDK Corporation Environmental Policy which goes beyond mandatory International laws.

For additional environmental information, refer to the TDK-Lambda environmental compliance web page at https://www.emea.lambda.tdk.com/uk/support/environmental-compliance.aspx. This page contains the environmental regulations ad directives with which TDK-Lambda complies, as well as other environmental information not included in this document.

Waste Electrical and Electronic Equipment (WEEE)

EU Customers: At the end of the product life cycle, all products must be sent to a WEEE recycling center.

INTENDED USE

This product is a professional equipment intended for use within industrial or laboratory environment, for generating DC output power within the limits of each model's input and output specifications.
It is NOT intended for home use or for use with children.
This equipment is intended for use by a professional person, trained person, or informed person who received satisfactory training to be qualified to use this equipment.
This equipment must be operated within its designated rated environmental conditions to ensure optimal functioning.
Any breach or violations of INTENDED USE could lead to malfunction and/or impairment of the protection provided by the equipment, in which case the manufacturer is not responsible for any of the damages caused.

LIFTING AND CARRYING

This equipment is not intended for lifting or carrying, as it is a heavy equipment and can weight up to ~200Kg (~440 pounds). Please use the castors on the equipment for all mobility.

NORMAL POSITION USE

The normal position use of the equipment is on a level, steady floor. The castors must be on lock position, with the adjustable feet on the ground at all times unless when it is being moved to another location.

INSULATION REQUIREMENTS

All wires and cables connected to the power system must have adequate insulation capable of withstanding the elevated temperatures, current through conductors, and all mechanical and electrical stresses applied by the power system or the end application. The ambient temperature of the specific connection must also be taken into account, in accordance with local electricity standards, rules and regulations.

LONG-TERM STORAGE METHOD AND LONG-TERM STORAGE PERIOD

1. Please keep the product in its packing box.
2. Please do not apply excessive vibration, shock or mechanical stress applied directly on the product.
3. Please keep away from direct sunlight.
4. For long-term storage temperature and humidity, the following conditions shall be used as a guideline:

   Temperature range: 5°C ~ 30°C.

   Humidity range: 40% ~ 60% RH.

Please keep away from places where temperature and humidity can change extremely. It can cause condensation on the product or deterioration.

5. For long-term storage period, we recommend to use within 2 years after receiving the product.

There is tendency that the leakage current of an aluminum electrolytic capacitor may increase when stored without usage for a long time.

This phenomenon can be minimized by applying voltage to the aluminum electrolytic capacitor to reduce the increased leakage current through the self-recovery effect of the electrolyte.

For reference, before using products that have been stored for a very long time, please warm-up first for 30 minutes or more without load.

1. Implementation period: 1 year or above after delivery.
2. Electrical continuity condition:

Input voltage: Rated.

Load: 0 Amperes (no load condition).

Ambient temperature: according to product specifications.

Time: 30 minutes or more.

中华人民共和国中国电子行业标准 SJ/T11364-2014（中国RoHS2）

People's Republic of China Electronic Industry Standard SJ/T 11364 -2014 (China RoHS2)

产品 / Product:	Genesys+ Power System: GSPS 30kW, GSPS 45kW, GSPS 60Kw Series, GBSPS 30kW, GBSPS 45kW, GBSPS 60Kw Series.

零件名称 / Part Name	有毒有害物质或元素 / Hazardous Substances					
	铅 Pb	汞 Hg	镉 Cd	六价铬 Cr6+	多溴联苯 PBB	多溴二苯醚 PBDE
电路模块 / PCB Assembly	X	O	O	O	O	O
机箱（如适用）/ Enclosure (if applicable)	X	O	O	O	O	O
配件 / Accessories	O	O	O	O	O	O

此表依照**SJ/T11634-2014**规定制定

This table is prepared in accordance with the provisions of SJ/T 11364-2014

O =	指明产品所有均质材料包含的有害物质要低于GB/T26572限定的要求 Indicates that said hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement of GB/T 26572.
X =	指明产品所用的至少一种均质材料包含的有害物质高于GB/T26572限定的要求 Indicates that said hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement of GB/T 26572.

SAFETY & EMC APPROVALS

SAFETY/EMC Approvals

IEC 61010-1 - CB Test Report and Certificate.

EN 61010-1 - CE Mark.

IEC/EN 61204-3 - Industrial environment.

Marking of the CE symbol indicates compliance to the EMC Directive, the Low Voltage Directive and RoHS Directive of the European Union.

CE "Declaration of Conformity" in accordance with the preceding directives and standards has been made and is available on a file at our EU representative TDK-Lambda Germany GmbH, Karl-Bold-Str. 40, Achern.

UKCA Marking, when applied to a product covered by this handbook, indicates compliance with the Electrical Equipment (safety) Regulations 2016, Electromagnetic Compatibility Regulations 2016 and Restriction of the Use of Certain Hazardous Substances in Electrical & Electronic Equipment regulation 2012.

UKCA "Declaration of Conformity" in accordance with the preceding directives and standards has been made and is available on a file at our UK representative TDK-Lambda UK Limited, Kingsley Avenue, Ilfracombe, Devon EX34 8ES.

Declarations may be accessed via company web site:
https://www.emea.lambda.tdk.com/uk/technical-data/data.aspx?resource=Safety-Certification

WARNING

This product is designed for an industrial environment. In a residential, commercial or light industrial environment it may cause radio interference. The user may be required to take adequate measures to reduce interference.

NOTE

This product is a professional equipment, which is not intended for sale to generic public.

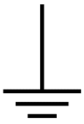
GENERAL SAFETY INFORMATION

READ SAFETY INSTRUCTIONS

The following safety precautions must be observed during all phases of operation, service and repair of this equipment. Failure to comply with the safety precautions or warnings presented 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.

SYMBOLS AND MARKING ON EQUIPMENT

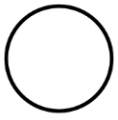
Caution, risk of danger. When this symbol appears on the equipment, it is important to consult the safety manual to preserve safe operation of the equipment and avoid any potential injury or hazard.



Earth (ground) terminal.

Protective conductor terminal. This is the terminal which is intended for connection to an external conductor for protection against electric shock in case of a fault.

Switch ON position. Powers ON the power system.



Switch OFF position. Powers OFF the power system. IMPORTANT: This is NOT the main disconnect device of the equipment. Refer to "DISCONNECT DEVICE" section to learn about the main disconnect device.

Direct current (DC). Indicates that the value next to this symbol is of DC nature.

Alternate current (AC). Indicates that the value next to this symbol is of AC nature.

SERVICING

These products are not customer serviceable. Parts substitutions and modifications are by authorized TDK-Lambda service personnel only. For repairs or modifications, the product must be returned to TDK-Lambda service facility.

CRITICAL COMPONENTS

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

PRODUCT USAGE

These products are designed for use as standalone equipment within the limits described in the safety and installation manual. They are not designed for general home or consumer use, and are designed for indoor use.

ENVIRONMENTAL

These products are IP20, and therefore chemicals/solvents, cleaning agents and other liquids must not be used.

ENVIRONMENT

These products are designed for use within a Pollution Degree 2, Overvoltage Category II environment, and must be operated within the environmental conditions (temperature, altitude, etc.) specified in the safety and installation manual.

OUTPUT LOADING

The output power taken from the product must not exceed the rating stated on the product label, except as stated in the safety and installation manual. The insulation of the wire connected to the DC output should be in accordance with the output load current and voltage.

INPUT PARAMETERS

These products must be operated within the input parameters stated in the safety and installation manual. The means of connecting this equipment to the supply must only be according to the instructions specified in the safety and installation manual to reduce risk of hazard.

END OF LIFE DISPOSAL

The product 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.

EQUIPMENT OPERATION AND OPERATING CONTROLS

Identification and description of operating controls and their use in all operating modes are stated in the user manual. Operating of the equipment is explained in detail in the user manual.

VENTILATION

The ventilation openings on these products must not be covered. Ensure that there is at least 10cm spacing between any obstruction and the ventilation openings.

INPUT AND OUTPUT CABLES

Must use cables with the appropriate voltage and temperature ratings to ensure safe, reliable operation.

ACCESSORIES

Only accessories which meet the manufacturer's specifications shall be used. For identification and instructions for connection of accessories, refer to the safety and installation manual.

HANDLING, LIFTING AND CARRYING

Handling, lifting and carrying of the equipment shall be made only according to the instructions specified in the safety and installation manual to avoid potential personal injury.

INSTALLATION

Installation of the equipment or the system incorporating the equipment must be in accordance with the installation instructions provided by the manufacturer. The safety of any system incorporating the equipment is the responsibility of the assembler.

IMPROPER USAGE OF THE EQUIPMENT

If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

USERS

This equipment must be operated by qualified personnel only, who understand the instructions and safety manuals provided with the equipment. If the equipment must be operated by an unqualified personnel, then he/she must be supervised by a qualified personnel.

RISK OF ELECTRIC SHOCK

HIGH VOLTAGE WARNING

Dangerous voltages are present within the power system. To avoid injuries, always disconnect power, discharge circuits and remove external voltage sources before touching components.

CLASS I WARNING

The unit is Class I product. To minimize electrical shock hazard, the unit must be reliably earthed and professionally installed. 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. Energy Hazards Warning: The main output of the unit is hazardous energy (240VA) and must not be user accessible in the end application.

HAZARDOUS OUTPUT WARNING

There is a potential shock hazard when using a power system with an output voltage greater than 60VDC. Do not turn ON power system when output voltage is above 60VDC without output cover slots and rear panel assembled. Turn OFF power system or disconnect power system from AC mains before making or changing any rear panel connection.

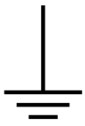
INFORMAZIONI GENERALI DI SICUREZZA

LEGGERE LE ISTRUZIONI DI SICUREZZA

Le seguenti precauzioni di sicurezza devono essere osservate durante tutte le fasi del funzionamento, della manutenzione e della riparazione di questa apparecchiatura. Una mancanza a rispettare gli avvertimenti o le precauzioni di sicurezza presentati in questo documento viola gli standard di sicurezza della progettazione, della fabbricazione e della destinazione d'uso di questa apparecchiatura e può danneggiare le protezioni integrate al suo interno. TDK-Lambda non sarà responsabile per un mancato rispetto di questi requisiti da parte dell'utente.

SIMBOLI E MARCHI SULL'APPARECCHIATURA

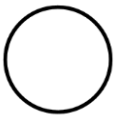
Attenzione, possibilità di un pericolo. Quando appare questo simbolo sull'apparecchiatura, è importante consultare il manuale di sicurezza per un funzionamento sicuro dell'apparecchiatura e per evitare una ferita o pericolo potenziali.



Terminale di terra.

Terminale conduttore protettivo. Questo è il terminale che è destinato al collegamento a un conduttore esterno per protezione contro scossa elettrica in caso di guasto.

Posizione ON dell'interruttore. Accende l'alimentatore.



Posizione OFF dell'interruttore. Spegne l'alimentatore. IMPORTANTE: Questo NON è il dispositivo di disattivazione principale dell'apparecchiatura. Vedere la sezione "DISPOSITIVO DI DISATTIVAZIONE" per informazioni sul dispositivo di disattivazione principale.

Corrente continua (CC). Indica che il valore a fianco di questo simbolo è di tipo CC.

Corrente alternata (CA). Indica che il valore a fianco di questo simbolo è di tipo CA.

MANUTENZIONE

La manutenzione di questi prodotti non può essere eseguita dal cliente. Le sostituzioni e le modifiche delle parti possono essere eseguite solo da personale di servizio autorizzato di TDK-Lambda. Per riparazioni e modifiche, il prodotto deve essere restituito alla struttura di manutenzione di TDK- Lambda.

COMPONENTI CRITICI

Non è autorizzato l'uso di questi prodotti come componenti critici in sistemi di controllo nucleari, sistemi di supporto vitale o apparecchiatura da usare in ambienti pericolosi senza l'approvazione scritta esplicita dell'amministratore delegato di TDK-Lambda Ltd.

USO DEL PRODOTTO

Questi prodotti sono progettati per essere usati come apparecchiatura autonoma nei limiti descritti nel manuale di sicurezza e di installazione. Non sono progettati per uso del consumatore o domestico generale, e sono progettati per uso in ambienti interni.

AMBIENTALE

Questi prodotti sono IP20, e di conseguenza non devono essere usati prodotti chimici/solventi, detergenti e altri liquidi.

AMBIENTE

Questi prodotti sono progettati per uso in un ambiente con livello di inquinamento 2, categoria di sovratensione II, e devono essere azionati nelle condizioni ambientali (temperatura, altitudine, etc.) specificate nel manuale di sicurezza e di installazione.

CARICO DI USCITA

La potenza di uscita dal prodotto non deve superare la potenza nominale indicata sulla targhetta del prodotto, fatto salvo come specificato nel manuale di sicurezza e di installazione. L'isolamento del cavo collegato all'uscita CC deve essere conforme alla corrente e alla tensione del carico di uscita.

PARAMETRI DI ALIMENTAZIONE

Questi prodotti devono essere azionati nei limiti dei parametri di alimentazione indicati nel manuale di sicurezza e di installazione. I mezzi per collegare questa apparecchiatura all'alimentazione devono essere solo in conformità con le istruzioni specificate nel manuale di sicurezza e di installazione per ridurre il rischio di pericolo.

SMALTIMENTO A FINE VITA

Il prodotto contiene componenti che richiedono uno smaltimento speciale. Accertarsi che l'unità sia smaltita adeguatamente alla fine della sua vita utile e in conformità con le normative locali.

AZIONAMENTO DELL'APPARECCHIATURA E COMANDI

L'identificazione e la descrizione dei comandi e il loro uso in tutte le modalità operative sono specificate nel manuale dell'utente. L'azionamento dell'apparecchiatura è spiegato nei dettagli nel manuale dell'utente.

VENTILAZIONE

Le aperture di ventilazione su questi prodotti non devono essere coperte. Assicurarsi che ci siano almeno 10 cm di spazio fra un'ostruzione e le aperture di ventilazione.

CAVI DI ALIMENTAZIONE E DI USCITA

È necessario utilizzare cavi con la tensione e la temperatura nominale appropriati per assicurare un funzionamento sicuro e fidato.

ACCESSORI

Devono essere usati solo accessori che sono conformi alle specifiche del produttore. Per identificazione e istruzioni per la connessione di accessori, vedere il manuale di sicurezza e di installazione.

MOVIMENTAZIONE, SOLLEVAMENTO E TRASPORTO

La movimentazione, il sollevamento e il trasporto dell'apparecchiatura devono essere eseguiti solo in conformità con le istruzioni specificate nel manuale di sicurezza e di installazione per evitare una potenziale ferita personale.

INSTALLAZIONE

L'installazione dell'apparecchiatura o del sistema che incorpora l'apparecchiatura deve essere eseguita in conformità con le istruzioni di installazione fornite dal produttore. La sicurezza di un sistema che incorpora l'apparecchiatura è responsabilità dell'assemblatore.

USO IMPROPRIO DELL'APPARECCHIATURA

Se l'apparecchiatura è usata in un modo non specificato dal produttore, la protezione fornita dall'apparecchiatura può essere compromessa.

UTENTI

Questa apparecchiatura deve essere azionata solo da personale qualificato che capisce le istruzioni e i manuali di sicurezza forniti con l'apparecchiatura. Se l'apparecchiatura deve essere azionata da personale non qualificato, questo deve essere sotto la supervisione di personale qualificato.

RISCHIO DI SCOSSA ELETTRICA

AVVERTIMENTO DI ALTA TENSIONE

Nell'alimentatore sono presenti tensioni pericolose. Per evitare ferite, staccare sempre l'elettricità, scaricare i circuiti e rimuovere fonti esterne di tensione prima di toccare componenti.

AVVERTIMENTO DI CLASSE I

L'unità è un prodotto di Classe I. Per ridurre al minimo il pericolo di scossa elettrica, l'unità deve essere collegata a terra in modo affidabile e installata in modo professionale. Qualsiasi interruzione del conduttore di messa a terra di protezione o scollegamento del terminale di terra di protezione causerà un pericolo potenziale di scossa elettrica che può causare una ferita personale. Avvertimento di rischi elettrici: L'uscita principale dell'unità è energia pericolosa (240VA) e non deve essere accessibile all'utente nell'applicazione finale.

AVVERTIMENTO DI USCITA PERICOLOSA

C'è un pericolo potenziale di scossa quando si usa un alimentatore con una tensione in uscita superiore a 60 VCC. Non accendere l'alimentatore quando la tensione in uscita è superiore a 60 VCC senza una protezione con sbarre collettrici o connettori di uscita montati. Spegnere l'alimentatore o staccarlo dall'alimentazione CA prima di fare o modificare un collegamento del pannello posteriore.

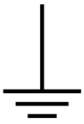
INFORMACIÓN GENERAL DE SEGURIDAD

LEA LAS INSTRUCCIONES DE SEGURIDAD

Se deben observar las siguientes precauciones de seguridad durante todas las fases de operación, servicio y reparación de este equipo. El incumplimiento de las precauciones de seguridad o advertencias presentadas en este documento viola los estándares de seguridad de diseño, fabricación y uso previsto de este equipo y puede afectar las protecciones integradas en su interior. TDK-Lambda no se hace responsable por el incumplimiento de estos requisitos por parte del usuario.

SÍMBOLOS Y MARCAS EN EL EQUIPO

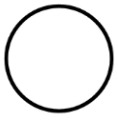
Precaución, riesgo de peligro. Cuando aparece este símbolo en el equipo, es importante consultar el manual de seguridad para preservar la operación segura del equipo y evitar posibles lesiones o peligros.



Terminal de tierra.

Terminal conductor de protección. Este es el terminal que está designado para la conexión de un conductor externo para protección contra descargas eléctricas en caso de falla.

Posición de encendido. Enciende la fuente de alimentación.



Posición de apagado. Apaga la fuente de alimentación. IMPORTANTE: Este NO es el dispositivo de desconexión principal del equipo. Consulte la sección "DISPOSITIVO DE DESCONEXIÓN" para familiarizarse con el dispositivo de desconexión principal.

Corriente continua (CC). Indica que el valor junto a este símbolo es de naturaleza de CC.

Corriente alterna (CA). Indica que el valor junto a este símbolo es de naturaleza de CA.

SERVICIO

Estos productos no pueden ser reparados por el cliente. Las sustituciones y modificaciones de piezas son realizadas únicamente por personal de servicio autorizado de TDK-Lambda. Para efectuar reparaciones o modificaciones, el producto debe devolverse al centro de servicio de TDK-Lambda.

COMPONENTES CRÍTICOS

Estos productos no están autorizados para ser usados como componentes críticos en sistemas de control nuclear, sistemas de soporte vital o equipos para uso en entornos peligrosos, sin la aprobación expresa por escrito del Director Gerente de TDK-Lambda Ltd.

USO DEL PRODUCTO

Estos productos están diseñados para usarse como equipo autónomo dentro de los límites descriptos en el manual de seguridad e instalación. No están diseñados para uso doméstico o de consumo general, y están diseñados para uso en interiores.

MEDIOAMBIENTAL

Estos productos son IP20 y, por lo tanto, no deben utilizarse productos químicos/solventes, agentes de limpieza y otros líquidos.

AMBIENTE

Estos productos están diseñados para su uso en un entorno de Grado de Contaminación 2, Categoría de Sobretensión II, y deben utilizarse dentro de las condiciones ambientales (temperatura, altitud, etc.) especificadas en el manual de seguridad e instalación.

CARGA DE SALIDA

La potencia de salida tomada del producto no debe exceder el valor nominal indicado en la etiqueta del producto, excepto por lo indicado en el manual de seguridad e instalación. El aislamiento del cable conectado a la salida de CC debe estar de acuerdo con la corriente y el voltaje de carga de salida.

PARÁMETROS DE ENTRADA

Estos productos deben operarse dentro de los parámetros de entrada indicados en el manual de seguridad e instalación. Los medios para conectar este equipo al suministro deben ser únicamente de acuerdo con las instrucciones especificadas en el manual de seguridad e instalación para reducir el riesgo de peligro.

ELIMINACIÓN AL FINAL DE LA VIDA ÚTIL

El producto contiene componentes que requieren una eliminación especial. Asegúrese de que la unidad se deseche correctamente al final de su vida útil y de acuerdo con las normas locales.

OPERACIÓN DEL EQUIPO Y CONTROLES DE OPERACIÓN

La identificación y descripción de los controles de operación y su uso en todos los modos operativos se indican en el manual del usuario. El funcionamiento del equipo se explica en detalle en el manual del usuario.

VENTILACIÓN

Las aberturas de ventilación de estos productos no deben cubrirse. Asegúrese de que haya al menos 10 cm de espacio entre cualquier obstrucción y las aberturas de ventilación.

CABLES DE ENTRADA Y SALIDA

Debe utilizar cables con los valores de voltaje y temperatura adecuados para garantizar un funcionamiento seguro y confiable.

ACCESORIOS

Solo se utilizarán accesorios que cumplan con las especificaciones del fabricante. Para la identificación e instrucciones para la conexión de accesorios, consulte el manual de seguridad e instalación.

MANIPULACIÓN, ALZADO Y TRANSPORTE

La manipulación, alzado y transporte del equipo debe realizarse únicamente de acuerdo con las instrucciones especificadas en el manual de seguridad e instalación para evitar posibles lesiones personales.

INSTALACIÓN

La instalación del equipo o del sistema que incorpora el equipo debe realizarse de acuerdo con las instrucciones de instalación proporcionadas por el fabricante. La seguridad de cualquier sistema en el cual el equipo es incorporado es responsabilidad del ensamblador.

USO INADECUADO DEL EQUIPO

Si el equipo se utiliza de una manera no especificada por el fabricante, la protección proporcionada por el equipo puede verse afectada.

USUARIOS

Este equipo debe ser operado únicamente por personal calificado que comprenda las instrucciones y los manuales de seguridad proporcionados con el equipo. Si el equipo debe ser operado por personal no calificado, entonces éste deberá ser supervisado por personal calificado.

RIESGO DE DESCARGA ELÉCTRICA

ADVERTENCIA DE ALTO VOLTAJE

Hay voltajes peligrosos dentro de la fuente de alimentación. Para evitar lesiones, siempre desconecte la energía, descargue los circuitos y retire las fuentes de voltaje externas antes de tocar los componentes.

ADVERTENCIA DE CLASE I

La unidad es un producto de Clase I. Para minimizar el riesgo de descarga eléctrica, la unidad debe estar conectada a tierra de manera confiable e instalada por un profesional. Cualquier interrupción del conductor de tierra de protección o desconexión del terminal de tierra de protección, causará un riesgo potencial de descarga eléctrica que podría causar lesiones personales. Advertencia de peligros energéticos: La salida principal de la unidad constituye energía peligrosa (240 VA) y no debe ser accesible al usuario en la aplicación final.

ADVERTENCIA DE SALIDA PELIGROSA

Existe un riesgo potencial de descarga eléctrica cuando se utiliza una fuente de alimentación con un voltaje de salida superior a 60 V CC. No encienda la fuente de alimentación cuando el voltaje de salida sea superior a 60 VCC sin que las barras colectoras de salida o la protección de los conectores de salida estén ensamblados. Apague la fuente de alimentación o desconecte la fuente de alimentación de la red de CA antes de realizar o cambiar cualquier conexión del panel trasero.

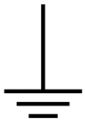
INFORMATIONS GÉNÉRALES DE SÉCURITÉ

LIRE LES INSTRUCTIONS DE SÉCURITÉ

Les précautions de sécurité suivantes doivent être observées durant toutes les phases de fonctionnement, d'entretien et de réparation de cet équipement. Le non-respect des précautions de sécurité ou des avertissements présentés dans ce document enfreint les normes de sécurité de conception, de fabrication et d'utilisation prévue de cet équipement et peut altérer les protections qui y sont intégrées. TDK-Lambda ne pourra être tenu responsable en cas de non-respect de ces exigences par l'utilisateur.

SYMBOLES ET MARQUAGE SUR L'ÉQUIPEMENT

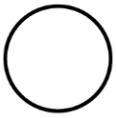
Avertissement, risque de danger. Lorsque ce symbole apparaît sur l'équipement, il est important de consulter le manuel de sécurité pour préserver un fonctionnement sûr de l'équipement et éviter toute blessure ou danger potentiel.



Mise à la terre ; masse.

Borne du conducteur de protection. Il s'agit de la borne destinée au raccordement à un conducteur externe pour la protection contre les chocs électriques en cas de défaillance.

Position de mise en marche (ON). Met sous tension l'alimentation électrique.



Position d'arrêt (OFF). Coupe l'alimentation électrique. IMPORTANT: Ceci n'est PAS le dispositif de déconnexion principal de l'équipement. Consultez la section « DISPOSITIF DE DÉCONNEXION » pour en savoir plus sur le dispositif principal de déconnexion.

Courant continu (CC). Indique que la valeur à côté de ce symbole est de nature CC.

Courant alternatif (CA). Indique que la valeur à côté de ce symbole est de nature CA.

ENTRETIEN

Ces produits ne sont pas réparables par le client. Seul le personnel de service autorisé de TDK-Lambda peut procéder au remplacement ou au changement des pièces. Pour les réparations ou les changements, le produit doit être retourné au centre de service TDK-Lambda.

COMPOSANTS CRUCIAUX

Ces produits ne sont pas autorisés pour une utilisation en tant que composants cruciaux dans les systèmes de contrôle nucléaire, les systèmes de survie ou les équipements destinés à être utilisés dans des environnements dangereux sans l'autorisation écrite expresse du directeur général de TDK-Lambda Ltd.

UTILISATION DU PRODUIT

Ces produits sont conçus pour être utilisés en tant qu'équipement autonome dans les limites décrites dans le manuel d'installation et de sécurité. Ils ne sont pas destinés à un usage domestique général ou à une consommation courante, et sont conçus pour une utilisation en intérieur.

ENVIRONNEMENTAL

Ces produits sont IP20, et par conséquent, les produits chimiques/solvants, les produits de nettoyage et autres liquides ne doivent pas être utilisés.

ENVIRONNEMENT

Ces produits sont conçus pour être utilisés dans un environnement de degré de pollution 2, catégorie de surtension II, et doivent être utilisés dans les conditions environnementales (température, altitude, etc.) spécifiées dans le manuel d'installation et de sécurité.

CHARGE DE SORTIE

La puissance de sortie provenant du produit ne doit pas dépasser la valeur nominale indiquée sur l'étiquette du produit, sauf indication contraire dans le manuel d'installation et de sécurité. L'isolation du fil connecté à la sortie CC doit être conforme au courant et à la tension de charge de sortie.

PARAMÈTRES D'ENTRÉE

Ces produits doivent être utilisés dans le respect des paramètres d'entrée indiqués dans le manuel d'installation et de sécurité. Les moyens de connexion de cet équipement à l'alimentation électrique doivent être conformes aux instructions spécifiées dans le manuel d'installation et de sécurité afin de réduire les risques de danger.

ÉLIMINATION EN FIN DE VIE

Le produit contient des composants nécessitant une élimination spéciale. Veillez à ce qu'il soit éliminé comme il se doit à la fin de sa durée de vie et conformément aux règlements locaux.

FONCTIONNEMENT DE L'ÉQUIPEMENT ET COMMANDES DE FONCTIONNEMENT

L'identification et la description des commandes de fonctionnement ainsi que leur utilisation dans tous les modes d'exploitation sont décrites dans le manuel d'utilisation. Le fonctionnement de l'équipement est expliqué en détail dans ce manuel.

VENTILATION

Les orifices de ventilation de ces produits ne doivent pas être couverts. Veillez à ce qu'il y ait un espace d'au moins 10 cm entre toute entrave et les orifices de ventilation.

CÂBLES D'ENTRÉE ET DE SORTIE

Les câbles doivent être utilisés avec la tension et la température nominales appropriées pour assurer un fonctionnement sûr et fiable.

ACCESSOIRES

Seuls des accessoires conformes aux spécifications du fabricant seront utilisés. Pour l'identification et les instructions de connexion des accessoires, consultez le manuel d'installation et de sécurité.

MANIPULATION, LEVAGE ET TRANSPORT

La manipulation, le levage et le transport de l'équipement seront effectués uniquement conformément aux instructions spécifiées dans le manuel d'installation et de sécurité afin d'éviter d'éventuelles blessures.

INSTALLATION

L'installation de l'équipement ou du système intégrant l'équipement doit être conforme aux instructions d'installation fournies par le fabricant. La sécurité de tout système intégrant l'équipement est de la responsabilité du monteur.

UTILISATION INAPPROPRIÉE DE L'ÉQUIPEMENT

Une utilisation de l'équipement non conforme aux spécifications du fabricant comporte un risque d'altérer la protection fournie par l'équipement.

UTILISATEURS

Cet équipement ne doit être utilisé que par du personnel qualifié comprenant les instructions et les manuels de sécurité fournis avec l'équipement. Si l'équipement doit être utilisé par du personnel non qualifié, celui-ci doit être supervisé par du personnel qualifié.

RISQUE DE CHOC ÉLECTRIQUE

AVERTISSEMENT HAUTE TENSION

Des tensions dangereuses sont présentes dans l'alimentation électrique. Pour éviter les blessures, débrancher toujours l'alimentation, décharger les circuits et retirer les sources de tension externes avant de toucher les composants.

AVERTISSEMENT CLASSE I

L'unité est un produit de Classe I. Pour réduire les risques de choc électrique, l'unité nécessite une mise à la terre fiable et une installation professionnelle. Toute interruption du conducteur de protection ou déconnexion de la borne de protection entraînera un risque potentiel de choc électrique pouvant entraîner des dommages corporels. Avertissement de risques énergétiques: la sortie principale de l'unité est une énergie dangereuse (240 VA) et ne doit pas être accessible à l'utilisateur dans l'application finale.

AVERTISSEMENT SORTIE DANGEREUSE

Un risque de choc électrique existe lors de l'utilisation d'une alimentation électrique avec une tension de sortie supérieure à 60 V CC. Ne pas mettre l'alimentation électrique sous tension lorsque la tension de sortie est supérieure à 60 V CC sans barres omnibus de sortie/ou protection des connecteurs de sortie assemblés. Éteindre l'alimentation électrique ou couper l'alimentation électrique du secteur AC avant d'effectuer ou de changer une connexion du panneau arrière.

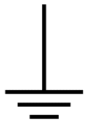
ALLGEMEINE SICHERHEITSHINWEISE

LESEN SIE DIE SICHERHEITSHINWEISE

Die folgenden Sicherheitsvorkehrungen müssen in allen Phasen des Betriebs, der Wartung und der Reparatur dieses Geräts eingehalten werden. Die Nichteinhaltung der in diesem Dokument aufgeführten Sicherheitsvorkehrungen oder Warnhinweise verstößt gegen die Sicherheitsstandards bei der Konstruktion, Herstellung und dem bestimmungsgemäßen Gebrauch dieses Geräts und kann die eingebauten Schutzvorrichtungen beeinträchtigen. TDK-Lambda haftet nicht für die Nichteinhaltung dieser Anforderungen durch den Benutzer.

SYMBOLE UND KENNZEICHNUNGEN AUF GERÄTEN

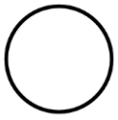
Vorsicht, Risiko einer Gefahr. Wenn dieses Symbol auf dem Gerät erscheint, ist es wichtig, das Sicherheitshandbuch zu konsultieren, um den sicheren Betrieb des Geräts zu erhalten und mögliche Verletzungen oder Gefahren zu vermeiden.



Schutzleiterklemme (Erdung).

Schutzleiterklemme. Dies ist die Klemme, die für den Anschluss an einen externen Leiter zum Schutz gegen elektrischen Schlag im Falle eines Fehlers vorgesehen ist.

Schalterstellung EIN. Schaltet die Spannungsversorgung EIN.



Schalterstellung AUS. Schaltet die Spannungsversorgung aus. WICHTIG: Dies ist NICHT die Haupttrennvorrichtung des Geräts. Lesen Sie den Abschnitt "TRENNVORRICHTUNG", um mehr über die Haupttrennvorrichtung zu erfahren.

Gleichstrom (DC). Zeigt an, dass der Wert neben diesem Symbol Gleichstromcharakter hat.

Wechselstrom (AC). Zeigt an, dass der Wert neben diesem Symbol Wechselstromcharakter hat.

WARTUNG

Diese Produkte sind nicht vom Kunden zu warten. Der Austausch von Teilen und Änderungen dürfen nur von autorisiertem TDK-Lambda Servicepersonal vorgenommen werden. Für Reparaturen oder Änderungen muss das Produkt an die TDK-Lambda-Servicestelle geschickt werden.

KRITISCHE KOMPONENTEN

Diese Produkte sind ohne ausdrückliche schriftliche Genehmigung des Geschäftsführers von TDK-Lambda Ltd. nicht zur Verwendung als kritische Komponenten in nuklearen Kontrollsystemen, lebenserhaltenden Systemen oder Geräten für den Einsatz in gefährlichen Umgebungen zugelassen.

PRODUKTVERWENDUNG

Diese Produkte sind für die Verwendung als eigenständige Geräte innerhalb der im Benutzerhandbuch beschriebenen Grenzen konzipiert. Sie sind nicht für den allgemeinen Heim- oder Verbrauchergebrauch und für die Verwendung in Innenräumen vorgesehen.

UMWELT

Diese Produkte entsprechen der Schutzart IP20, daher dürfen keine Chemikalien/Lösungsmittel, Reinigungsmittel und andere Flüssigkeiten verwendet werden.

UMGEBUNG

Diese Produkte sind für den Einsatz in einer Umgebung des Verschmutzungsgrads 2, Überspannungskategorie II, ausgelegt und müssen innerhalb der im Benutzerhandbuch angegebenen Umgebungsbedingungen (Temperatur, Höhe usw.) betrieben werden.

AUSGANGSBELASTUNG

Die vom Produkt entnommene Ausgangsleistung darf die auf dem Produktetikett angegebene Nennleistung nicht überschreiten, es sei denn, dies ist im Benutzerhandbuch angegeben. Die Isolierung der an den DC-Ausgang angeschlossenen Leitung sollte dem Ausgangslaststrom und der Ausgangsspannung entsprechen.

EINGABEPARAMETER

Diese Produkte müssen innerhalb der im Sicherheits- und Installationshandbuch angegebenen Eingangsparameter betrieben werden. Der Anschluss dieses Geräts an die Stromversorgung darf nur gemäß den Anweisungen im Sicherheits- und Installationshandbuch erfolgen, um das Gefahrenrisiko zu verringern.

ENTSORGUNG AM LEBENSENDE

Das Produkt enthält Komponenten, die eine spezielle Entsorgung erfordern. Stellen Sie sicher, dass das Gerät am Ende seiner Lebensdauer ordnungsgemäß und in Übereinstimmung mit den örtlichen Vorschriften entsorgt wird.

GERÄTEBEDIENUNG UND BETRIEBSKONTROLLEN

Kennzeichnung und Beschreibung der Bedienelemente und deren Verwendung in allen Betriebsarten sind im Benutzerhandbuch angegeben. Die Bedienung des Geräts wird im Benutzerhandbuch ausführlich erklärt.

LÜFTUNG

Die Lüftungsöffnungen an diesen Produkten dürfen nicht abgedeckt werden. Stellen Sie sicher, dass ein Abstand von mindestens 10 cm zwischen einem Hindernis und den Lüftungsöffnungen besteht.

EINGANGS- UND AUSGANGSKABEL

Sie müssen Kabel mit den entsprechenden Spannungs- und Temperaturwerten verwenden, um einen sicheren und zuverlässigen Betrieb zu gewährleisten.

ZUBEHÖR

Es darf nur Zubehör verwendet werden, das den Spezifikationen des Herstellers entspricht. Die Kennzeichnung und die Hinweise zum Anschluss von Zubehör finden Sie im Benutzerhandbuch.

HANDHABUNG, HEBEN UND TRAGEN

Die Handhabung, das Heben und Tragen des Geräts darf nur gemäß den Anweisungen im Benutzerhandbuch erfolgen, um mögliche Personenschäden zu vermeiden.

EINBAU

Der Einbau des Geräts oder der Anlage, in die das Gerät eingebaut ist, muss in Übereinstimmung mit den vom Hersteller bereitgestellten Installationsanweisungen erfolgen. Die Sicherheit eines Systems, das das Gerät enthält, liegt in der Verantwortung des Monteurs.

NICHT BESTIMMUNGSGEMÄSSE VERWENDUNG DES GERÄTS

Wenn das Gerät auf eine Weise verwendet wird, die nicht vom Hersteller angegeben ist, kann der vom Gerät gebotene Schutz beeinträchtigt werden.

BENUTZER

Dieses Gerät darf nur von qualifiziertem Personal bedient werden, das die mit dem Gerät gelieferten Anweisungen und Sicherheitshandbücher versteht. Wenn das Gerät von unqualifiziertem Personal bedient werden muss, dann muss dieses von qualifiziertem Personal beaufsichtigt werden.

GEFAHR EINES ELEKTRISCHEN SCHLAGES

WARNUNG VOR HOCHSPANNUNG

Innerhalb der Spannungsversorgung liegen gefährliche Spannungen an. Um Verletzungen zu vermeiden, schalten Sie vor dem Berühren von Bauteilen immer die Stromversorgung ab, entladen Sie Stromkreise und entfernen Sie externe Spannungsquellen.

KLASSE I WARNUNG

Das Gerät ist ein Produkt der Klasse I. Um die Gefahr eines elektrischen Schlages zu minimieren, muss das Gerät zuverlässig geerdet und fachgerecht installiert werden. Jede Unterbrechung des Schutzleiters oder Abtrennung der Schutzerdungsklemme führt zu einer potenziellen Stromschlaggefahr, die zu Verletzungen führen kann. Energiegefahren Warnung: Der Hauptausgang des Geräts stellt gefährliche Energie dar (240VA) und darf in der Endanwendung nicht für den Benutzer zugänglich sein.

GEFÄHRLICHE AUSGÄNGE WARNUNG

Bei Verwendung eines Netzteils mit einer Ausgangsspannung von mehr als 60 VDC besteht die Gefahr eines Stromschlags. Schalten Sie die Stromversorgung nicht ein, wenn die Ausgangsspannung über 60 VDC liegt, ohne dass die Ausgangssammelschienen und/oder der Schutz der Ausgangsanschlüsse montiert sind. Schalten Sie die Stromversorgung aus oder trennen Sie sie vom Stromnetz, bevor Sie Anschlüsse an der Rückseite vornehmen oder ändern.

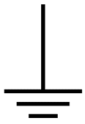
INFORMAÇÕES GERAIS DE SEGURANÇA

LEIA AS INSTRUÇÕES DE SEGURANÇA

As seguintes precauções de segurança deverão ser estritamente observadas durante todas as fases de operação, serviço e reparação deste equipamento. O não cumprimento das instruções ou avisos de segurança apresentados neste documento viola os padrões de segurança, conceção, fabrico e a utilização pretendida deste equipamento, e poderá afetar as proteções nele incorporadas. A TDK-Lambda não poderá ser responsável pelo não cumprimento destes requisitos por parte do utilizador.

SÍMBOLOS E MARCAÇÕES NO EQUIPAMENTO

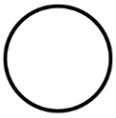
Cuidado, perigo. Quando este símbolo aparece no equipamento, torna-se importante consultar o manual de segurança, de forma a preservar a sua operação segura e evitar qualquer dano ou perigo.



Terminal de Terra.

Terminal condutor de proteção. Este é o terminal destinado a ser conectado a um condutor externo, para proteção contra choques elétricos em caso de uma falha.

Interrutor na posição LIGADO. Liga a fonte de alimentação.



Interrutor na posição DESLIGADO. Desliga a fonte de alimentação. IMPORTANTE: Este NÃO é o dispositivo principal que desconecta o equipamento. Consulte a secção “DISPOSITIVO DE DESCONEXÃO” para saber mais acerca do dispositivo principal de desconexão.

Corrente contínua (DC). Indica que o valor junto deste símbolo é de natureza DC.

Corrente alternada (AC). Indica que o valor junto deste símbolo é de natureza AC.

MANUTENÇÃO

A manutenção destes produtos não deve ser efetuada pelo cliente. As substituições de peças e modificações deverão ser efetuadas apenas por pessoal de manutenção autorizado da TDK-Lambda. Quando os produtos necessitarem de reparações ou modificações, deverão ser enviados para um local de manutenção da TDK- Lambda.

COMPONENTES CRÍTICOS

Não é permitida a utilização destes produtos como componentes críticos em sistemas de controlo nuclear, sistemas de suporte de vida, ou equipamento para utilização em ambientes perigosos, sem a expressa autorização escrita do Diretor-Geral da TDK-Lambda Ltd.

UTILIZAÇÃO DOS PRODUTOS

Estes produtos foram concebidos para utilização como equipamento autónomo, dentro dos limites descritos no manual do utilizador e para utilização em espaços interiores. Os produtos não foram concebidos para serem utilizados pelo consumidor em geral.

AMBIENTAL

Estes produtos são IP20 e, portanto, químicos/solventes, agentes de limpeza e outros líquidos, não deverão ser usados.

AMBIENTE

Estes produtos foram concebidos para uma utilização em ambientes de Categoria de Sobretensão II, Poluição de Grau 2 e deverão ser operados em condições ambientais (temperatura, altitude, etc.) especificadas no manual do utilizador.

POTÊNCIA DE SAÍDA

A potência de saída obtida do produto não deverá exceder a classificação mencionada no rótulo do produto, exceto se mencionado no manual do utilizador. O isolamento do cabo conectado à saída DC deverá estar de acordo com a corrente e tensão da carga de saída.

PARÂMETROS D ENTRADA

Estes produtos deverão ser operados em observação dos parâmetros de entrada mencionados no manual do utilizador. Os meios de conexão deste equipamento à fonte de alimentação deverão estar de acordo com as instruções especificadas no manual do utilizador, para reduzir os riscos de perigo.

ELIMINAÇÃO EM FIM DE VIDA

O produto contém componentes que requerem condições especiais para eliminação. Assegure-se que a unidade é apropriadamente descartada no fim da sua vida útil e de acordo com os regulamentos locais.

OPERAÇÃO DO EQUIPAMENTO E CONTROLOS DE OPERAÇÃO

A identificação e descrição dos controlos de operação e sua utilização em todos os modos de operação estão descritos no manual do utilizador. A operação do equipamento encontra-se detalhadamente explicada no manual do utilizador.

VENTILAÇÃO

As aberturas de ventilação nestes produtos não deverão ser cobertas. Assegure-se que há um espaço de pelo menos 10cm entre as aberturas de ventilação e qualquer obstrução.

CABOS DE ENTRADA E SAÍDA

Deverão ser utilizados cabos com classificação de tensão e temperatura apropriadas, para assegurar uma operação segura e fiável.

ACESSÓRIOS

Somente acessórios em conformidade com as especificações do fabricante deverão ser utilizados. Consulte o manual do utilizador, para obter instruções sobre conexão de acessórios e sua identificação.

MANUSEAMENTO, ELEVAÇÃO E TRANSPORTE

O manuseamento, elevação e transporte do equipamento deverá ser efetuado somente de acordo com as instruções especificadas no manual do utilizador, para evitar danos pessoais potenciais.

INSTALAÇÃO

A instalação do equipamento ou do sistema que incorpora o equipamento deverá ser efetuada de acordo com as instruções de instalação fornecidas pelo fabricante. A segurança de qualquer sistema que incorpore o equipamento é da responsabilidade do profissional que procedeu à sua instalação.

UTILIZAÇÃO IMPRÓPRIA DO EQUIPAMENTO

Se o equipamento for utilizado de forma não especificada pelo fabricante, a proteção proporcionada pelo equipamento poderá ser afetada.

SAFETY/EMC APPROVALS UTILIZADORES

Este equipamento deverá ser operado apenas por pessoal qualificado, que entenda os manuais de instruções e segurança fornecidos com o equipamento. Se o equipamento puder ser operado por pessoal sem qualificações especificas, este deverá estar sob a supervisão de um profissional qualificado.

RISCO DE CHOQUE ELÉTRICO

AVISO DE ALTA TENSÃO

Tensões perigosas estão presentes na fonte de alimentação. De forma a evitar ferimentos/danos, desconecte sempre a alimentação e os circuitos de descarga e remova as fontes externas de tensão, antes de tocar em qualquer componente.

AVISO CLASSE I

A unidade é um produto de Classe I. Para minimizar o perigo de choque elétrico, a unidade deverá possuir uma ligação a terra eficaz, instalada por um profissional. Qualquer seccionamento ou desconexão do condutor de ligação ao terminal de terra causa um perigo potencial de choque elétrico e pode ocasionar ferimentos pessoais. Aviso de Perigo de Tensão: A saída principal da unidade possui tensão perigosa (240VA) e não deve ser acessível pelo utilizador final.

AVISO DE TENSÃO DE SAÍDA PERIGOSA

Existe um risco potencial de choque elétrico, quando se utiliza uma fonte alimentação com uma tensão de saída maior do que 60VDC. NÃO LIGUE a fonte de alimentação, quando a tensão de saída é superior a 60VDC, sem que esteja montada proteção de barramentos ou conectores de saída. DESLIGUE a fonte de alimentação ou desconecte a alimentação AC antes de fazer ou alterar qualquer conexão do painel traseiro.

PRODUCT SAFETY INSTRUCTIONS

CAUTION

The following safety precautions must be followed 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.

OVERVOLTAGE CATEGORY AND ENVIRONMENTAL CONDITIONS

The ***GENESYS™*** Power System series have been assigned to Overvoltage category II.

The ***GENESYS™*** Power System series units are intended for use in the following operation conditions:

- Indoor use
- Pollution degree 2
- Max. Operational altitude: 3000m above sea level (Refer to product Spec. for operating conditions).
- Ambient temperature: 0° C – 50 °C (Refer to product Spec. for operating conditions).

GROUNDING

This product is a Safety Class1 instrument. To minimize shock hazard, the instrument chassis must be connected to an electrical ground. The instrument must be connected to the AC power system mains through a four-conductor power cable (L1, L2, L3, PE) 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 another 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.

WARNING

In order to prevent inadvertent disconnection of the PE/Ground wire, if the input connection is made by a jacketed cord, then the PE/Ground wire must be minimum 10 mm longer than all of the other MAINS current-carrying conductors connected to the equipment. If input connection is made by separate wires, then an appropriate conduit in accordance with local electricity standards, rules and regulations that stretches from the MAINS outlet supply source up to the entry of the Power System must be used.

LIVE CIRCUITS

Operating personnel must not remove the instrument cover.

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

PARTS SUBSTITUTIONS & MODIFICATIONS

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

AC INPUT

The ***GENESYS™*** Power System series is designed for use in TN and TT power distribution systems. Do not use AC supply, which exceeds the input voltage and frequency rating of this instrument. The input voltage and frequency ratings of the ***GENESYS™*** Power System series are: 190-240V~, 47/63Hz for **Three Phase 200V models**, 380-480V~, 47/63Hz for **Three Phase 480V models**. For safety reasons, the mains supply voltage fluctuations should not exceed +/-10% of the nominal voltage. Ensure that under heavy load, the AC voltage supplied to the power system does not fall below the specifications.

ENERGY HAZARD

The output of ***GENESYS™*** Power System series units is capable of providing the hazardous energy. Therefore, the output and connections must not be user accessible. Customer's final equipment needs to provide adequate protection for service personnel against inadvertent contact with output wires.

WARNING

There is an electric shock hazard when the power system output is adjusted at or above 60VDC. Ensure it is not possible to touch simultaneously both output terminals or one of the output terminals and earth (including the power system's metal enclosure). Ensure it is not possible to touch simultaneously one of the output terminals and metal parts of any external products supplied by the power system when the output is adjusted at or above 60VDC.

WARNING

There is a potential electrical shock hazard when using a power system with output voltage greater than 60VDC. Do not turn ON power system when output voltage is above 60VDC without output cover slots and rear panel assembled. Turn OFF power system or disconnect power system from AC mains before making or changing any rear panel connection.

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CHAPTER 1: GENERAL INFORMATION

1.1 User Manual Content

This safety & installation manual contains the operating instructions and installation instructions of the ***GENESYS™*** Power System series. The instructions refer to the standard & Blank Panel power supplies, including the built-in USB, LAN and RS232/485 serial communication. For information related to operation with the optional IEEE communication interface, refer to User manual, IEEE Option chapter. For information related to operation with the optional MODBUS TCP or EtherCAT communication interfaces, refer to MODBUS TCP or EtherCAT manuals.

1.2 Introduction

1.2.1 General Description

GENESYS™ Power System series power supplies are wide output range, high performance switching power supplies. The ***GENESYS™*** Power System series is power factor corrected and operates from worldwide AC voltage range continuously. Output voltage and current are continuously displayed and indicators show the complete operating status of the power system (in the standard master unit). The Front Panel controls allow the user to set the output parameters, the protection levels (Over-Voltage protection, Under-Voltage protection and Foldback) and preview the settings (in the standard units). The rear panel includes the necessary connectors to control and monitor the power system operation by remote analog signals or by the built-in serial communications RS232/485, USB and LAN. IEEE, MODBUS TCP and EtherCAT are optional.

1.2.2 Control via Communication Ports

The following basic functional parameters can be programmed via communication ports:

- Output voltage setting.
- Output current setting.
- Output voltage measurement.
- Output current measurement.
- Output on/off control.
- Foldback protection setting.
- Over-voltage protection setting and readback.
- Under-Voltage protection setting and readback.
- Under-Voltage limit setting and read back.
- Power-supply start up mode (last setting or safe mode).

1.2.3 Analog Voltage Programming and Monitoring

Analog inputs and outputs are provided at the rear panel for analog control of the power system. The output voltage and the current limit can be programmed by analog voltage or by resistor, and can be monitored by analog voltage. The power system output can be remotely set to On or Off and analog signals monitor the proper operation of the power system and the mode of operation (CV/CC).

1.2.4 Parallel Operation

GENESYS™ Power System series of the same output voltage and current rating can be paralleled in master-slave configuration with automatic current sharing to increase available power. Refer to User Manual (IA761-04-02_) for operation instructions.

1.2.5 Output Connections

Output connections are made to output bus bars. Either the positive or negative terminal may be grounded or the output may be floated. Models up to 100VDC rated output shall not float outputs more than +/- 200VDC above/below chassis ground. Models up to 600VDC rated output shall not float outputs more than +/- 600VDC above/below chassis ground. Contact factory for assistance with higher float voltage applications. Local or remote sense may be used.

WARNING

If power system output reaches 60VDC or above, system output bus-bars are hazardous.

1.2.6 Cooling and Mechanical Construction

The ***GENESYS™*** Power System series is cooled by an each power supply unit internal fans. At installation, care must be taken to allow free airflow into the power system via the front panel, and out of the power system via the rear panel.

1.3 Accessories

1.3.1 Accessories Provided With Power System

1.3.1.1 Misc. Hardware

- DB-26 Connector P/N: 10090769-P264ALF (FCI).
- DB-15 Backshell (used for DB-26 Connector) P/N: 86303638BLF (FCI).
- Sems Screw M3X8 Fe Ni - 2 Pcs.
- Power system 45kW & 60kW series, with AC Input 3P200: Hex Key 6mm (45Kw),
- Hex Key 8mm (60Kw).
- Safety & Installation Manual.

1.3.1.2 Bus Bars Screws Kits

Bus bars kits accessories are provided according to Table 1-1: Bus bars Screws Kits Definition.

kW / V	30	45	60
10 - 20	Kit-1	Kit-1	Kit-1
30 - 40	Kit-2	Kit-2	Kit-2
50 - 100	Kit-3	Kit-3	Kit-3
150 - 600	Kit-4	Kit-4	Kit-4

Table 1-1: Bus bars Screws Kits Definition

Bus bars Kit-1

- Hex Screw M12x35-A4-70, Type DIN933, 24 Pcs.
- Hex. Nut M12 St. St., Type DIN439B, 24 Pcs.
- Flat washer M12 St. St., Type DIN125A, 48 Pcs.
- Spring washer M12 St. St., Type DIN127B, 24 Pcs.

Bus bars Kit-2

- Hex. Screw M12x30-A4-70, Type DIN933, 24 Pcs.
- Hex. Nut M12 St. St., Type DIN439B, 24 Pcs.
- Flat washer M12 St. St., Type DIN125A, 48 Pcs.
- Spring washer M12 St. St., Type DIN127A, 24 Pcs.

Bus bars Kit-3

- Hex. Screw M10x30-A4-70, Type DIN933, 24 Pcs.
- Hex. Nut M10 St. St., Type DIN439B, 24 Pcs.
- Flat washer M10 St. St., Type DIN125A, 48 Pcs.
- Spring washer M10 St. St., Type DIN127B, 24 Pcs.

Bus bars Kit-4

- Hex. Screw M8x25-A4-70, Type DIN933, 8 Pcs.
- Hex. Nut M8 St. St., Type DIN439B, 8 Pcs.
- Flat washer M8 St. St., Type DIN125A, 16 Pcs.
- Spring washer M8 St. St., Type DIN127A, 8 Pcs.
-

1.3.2 Optional Accessories

1.3.2.1 Printed User Manual

- For ordering printed User Manual, the P/N is: G/M

1.3.2.2 Serial Port Cables

- For ordering serial port cables, refer to the User Manual.
- USB/LAN cables are not provided with the power system.

1.3.2.3 Paralleling Cable

- For ordering paralleling cables, please contact the TDK-Lambda sales.

1.3.2.4 Dust Filter option:

The Air Filter Kit is supplied separately from the power supply packing according to order.
The usage of the air filter is according to customers' needs.
When using the air filter kit, all the specifications of the power supply remain the same as for standard power supply, with the exceptions specified in AIR FILTER KIT MANUAL – IA857-04-01.
There are two dust filter options, for full panel (with display and front panel control) and blank panel,
In Table 2-1 below there is description for dust filter type and amount for different systems.

Filter / System	Full Panel 15kW (P/N: GSP15kW-AFK)	Blank Panel 15kW (P/N: GBSP15kW-AFK)
GSPS30kW	1	1
GBSPS30kW	-	2
GSPS45kW	1	2
GBSPS45kW	-	3
GSPS60kW	1	3
GBSPS60kW	-	4

Table 1-2: Dust filters quantity for system

NOTE

Optional accessories will be sent separately from the power system packing according to order.

1.3.2.5 AC Cables

AC Cables are not provided with the Power System. For recommended AC input cables (customer applied), refer to Table 1-3: Recommended AC Input Cables for 30kW, Table 1-4: Recommended AC Input Cables for 45kW or Table 1-5: Recommended AC Input Cables for 60kW.

AC Input Range	AC Input Cable
190-240~, Three phase	(**111A**) Min. 4 X 35mm^2 (Three wires plus Safety ground), stranded copper, 300V, 105°C minimum, 3m max. length, outer diameter 33mm.
380-480~, Three phase	(**55.2A**) Min. 4 X 10mm^2 (Three wires plus Safety ground), stranded copper, 600V, 105°C minimum, 3m max. length, outer diameter 21mm.

Table 1-3: Recommended AC Input Cables for 30kW

AC Input Range	AC Input Cable
190-240~, Three phase	(**166.5A**) Min. 4 X 70mm^2. Three wires plus Safety ground, stranded copper, 300V, 105°C minimum, 3m max. length, outer diameter 39mm.
380-480~, Three phase	(**82.8A**) Min. 4 X 25mm^2. Three wires plus Safety ground, stranded copper, 600V, 105°C minimum, 3m max. length, outer diameter 30mm.

Table 1-4: Recommended AC Input Cables for 45kW

AC Input Range	AC Input Cable
190-240~, Three phase	(**222A**) Min. 4 X 100mm^2. Three wires plus Safety ground, stranded copper, 300V, 105°C minimum, 3m max. length, outer diameter 48mm.
380-480~, Three phase	(**110.4A**) Min. 4 X 35mm^2. Three wires plus Safety ground, stranded copper, 600V, 105°C minimum, 3m max. length, outer diameter 33mm.

Table 1-5: Recommended AC Input Cables for 60kW

WARNING

In order to prevent inadvertent disconnection of the PE/Ground wire, if the input connection is made by a jacketed cord, then the PE/Ground wire must be minimum 10 mm longer than all of the other MAINS current-carrying conductors connected to the equipment. If input connection is made by separate wires, then an appropriate conduit in accordance with local electricity standards, rules and regulations that stretches from the MAINS outlet supply source up to the entry of the Power System must be used.

CHAPTER 2: FRONT/REAR PANEL CONTROLS AND CONNECTORS

2.1 Introduction

The ***GENESYS™*** Power System series has a full set of controls, indicators (in the standard units) and connectors that allow the user to set up and operate the unit. Before starting to operate the unit, please read the following sections for an explanation of the functions, controls and connector terminals.

- Section 2.2: First unit Front Panel Controls.
- Section 2.4: Front Panel Display and Indicators
- Section 2.4: First unit Blank Front Panel.
- Section 2.5: First Unit Rear Panel Connections and Connectors.

2.2 First unit Front Panel Controls

Refer to Figure 2-1 and Table 2-1 for description of the Front panel controls.

Figure 2-1: Front Panel Controls and Indicators

No.	Control/Indicator	Description
1	Power Switch	POWER ON/OFF control.
2	Manufacturer logo	TDK-Lambda logo.
3	Voltage Encoder and Button	Encoder: A high-resolution detent rotary Encoder adjusting the output voltage and navigating menu. Button: An auxiliary function to accept the voltage-setting value in Preview mode.
4	Voltage Display	4-digit 16-segment Voltage display. Normally displays the output voltage. In Preview mode, the display indicates the setting of the output voltage. In Menu navigation, the display indicates the selected function.
5	Operation Mode Indicator	CV/CC/CP Operation mode indicator.
6	Current Display	4-digit 16-segment Current display. Normally displays the output current. In Preview mode, the display indicates the setting of the output current. In menu navigation, the display indicates the selected parameter.
7	Indicators Bar	Refer to the User Manual for description of the front panel Indicators bar.
8	Current Encoder and Button	Encoder: A high-resolution detent rotary Encoder adjusting the output current and navigating menu. Button: An auxiliary function to accept the current-setting value, select menu level, and set parameter value.
9	BACK Button	Return one step back in menu navigation mode.

No.	Control/Indicator	Description
10	PROG Button / Indicator	Activates the Program / Sequencer menu. The Program menu provides Sequencer function control, Trigger function control, and loads a sequence stored inside the power system memory. Green LED lights when Program menu is active. If Program menu is active, press PROG button to exit to the main display. *
11	SYST / Lock Front Panel Button / Indicator	Activates the System menu. The System menu provides output sensing point selection (Local / Remote sense), Interlock function control, Enable function control, Power Supply OK signal control, SAVE/RECALL power system configuration, Programmable Signals control, Preload function control, Display brightness & dimming function control, and reset power system settings. Green LED lights when System menu is active. If System menu is active, press the SYST button to exit to the main menu. Lock / Unlock Front Panel buttons by pressing the SYST button, followed by current encoder press. *
12	CONF Button / Indicator	Activates the Configuration menu. The Configuration menu provides power system start mode control, Voltage & Current source control, Analog Programming / Monitoring range selection, Internal Resistance function, Constant power limit function, and Slew-Rate control function. Green LED lights when the Configuration menu is active. If Configuration menu is active, press the CONF button to exit to the main menu. *
13	PROT Button / Indicator	Activates the Protection menu. The Protection menu provides OVP setting, UVL setting, UVP function control, Foldback function control, and OCL function ON/OFF control. Green LED lights when the Protection menu is active. If Protection menu is active, press the PROT button to exit to the main menu. *
14	COMM Button / Indicator	Activates the Communication menu. The Communication menu provides communication interface selection, power system address selection, LAN settings control, communication baud-rate selection, communication language selection, and software revision information. Green LED lights when Communication menu is active. If Communication menu is active, press the COMM button to exit to the main menu. *
15	FINE Button / Indicator	Voltage/Current Fine/Coarse adjustment control. Operates as a toggle switch. In the Fine mode, Voltage and Current encoders operate in high-resolution mode. In the Coarse mode, Voltage and Current encoders operate in standard-resolution (approx. 3 turns for full voltage/current rated scale). Green LED lights when the unit is in Fine mode.

No.	Control/Indicator	Description
16	PREV Button / Indicator	Press the PREV button to display the Output Voltage and Current Limit settings. The display shows the settings for 5 seconds. If buttons are not pressed for 5 seconds, the display returns back to show actual output voltage and current. If Voltage or Current values are changed, and there is no keypress for 15 seconds, the display returns back to show actual output Voltage and Current. Green LED lights when PREV mode is active.
17	OUT Button / Indicator	Output ON/OFF control. Press OUTPUT to set the output ON or OFF. Green LED lights when DC Output is enabled. Red LED blinks in case of an alarm. Refer to User Manual, Alarms and Protective Functions section.

Table 2-1: Front Panel Controls

NOTE

* If a menu is active, and there is no key press within 15 seconds, power system returns to the main display (OFF or actual Voltage and Current display).

2.3 Front Panel Display and Indicators

Refer to **Figure 2–2** and **Table 2-2** for description of the Front Panel display and indicators.

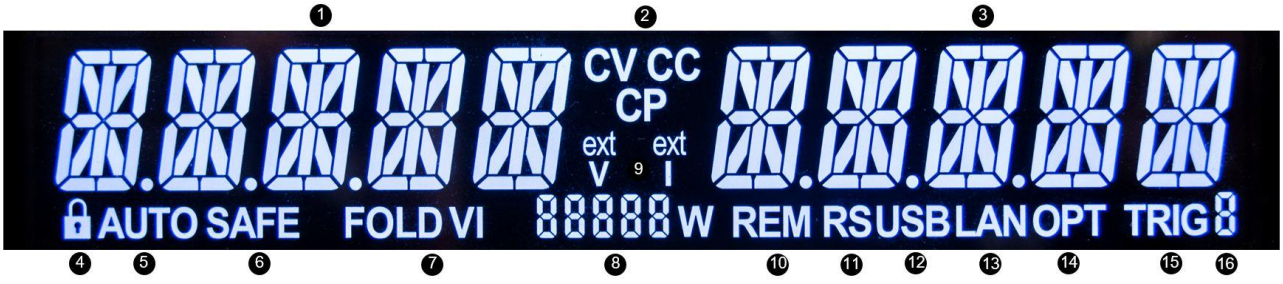


Figure 2–2: Front Panel Display and Indicators

No.	Control/Indicator	Description
1	Voltage Display	4-digit 16-segment Voltage display. Normally displays the output voltage. In preview mode, the display indicates the program setting of the output voltage. In menu navigation, the display indicates the selected function.
2	Operation Mode Indicator	CV/CC/CP operation mode indicator.

No.	Control/Indicator	Description
3	Current Display	4-digit 16-segment Current display. Normally displays the output current. In preview mode, the display indicates the program setting of the output current. In menu navigation, the display indicates the selected parameter.
4	LFP Indicator	Locked Front Panel indicator. LFP is on if the Front Panel is locked.
5	AUTO Indicator	AUTO-Start indicator. AUTO is on if the Auto-Start mode is active.
6	SAFE Indicator	SAFE-Start indicator. SAFE is on, if the Safe-Start mode is active.
7	FOLD VI Indicator	Foldback indicator. FOLD V is on if Foldback CV is active. FOLD I is on if Foldback CC is active.
8	Power / Address Indicator	If power supply output is ON, actual output power is displayed. If power supply output is OFF, power supply address is displayed. * The address is displayed while Communication menu is active, regardless of the power supply output state.
9	ext V / ext I Indicators	External Voltage / External Current Analog Programming Indicators. ext V is on if Analog Voltage Programming channel is active. ext I is on if Analog Current Programming channel is active.
10	REM Indicator	REMOTE indicator. REM is on if power supply is controlled by a remote communication (RS232/485, USB, LAN, OPTional).
11	RS Indicator	Recommended Standard indicator. RS232 or RS485 communication type is selected.
12	USB Indicator	Universal Serial Bus indicator. USB communication type is selected.
13	LAN Indicator	Local Area Network indicator. LAN communication type is selected.

No.	Control/Indicator	Description
14	OPT Indicator	Optional communication type indicator. Optional communication type is selected.
15	TRIG Indicator	Trigger Indicator. TRIG is on if the trigger-in is enabled and initialized. Power supply is ready to receive trigger-in signal.
16	Active Memory-Cell Indicator	Display active memory cell. 1,2,3,4 – A sequence is loaded from cells 1,2,3 or 4 _ - A sequence is loaded from a PC The Indicator is blinking if a sequence is running.

Table 2-2: Front Panel Display and Indicators

2.4 First unit Blank Front Panel

Refer to

Figure 2– and Table 2- for description of the Blank Front Panel controls and Indicators.

Figure 2–3: Blank Front Panel Controls

No.	Connection	Description
1	Power Switch	POWER ON/OFF control.
2	Manufacturer logo	TDK-Lambda logo.
3	Power LED	Power system ON/OFF status LED. Green LED lights when Power system is ON (Power Switch ON).
4	REM LED	REMOTE status LED. Green LED lights if power system is controlled by a remote communication (RS232/485, USB, LAN, OPTional).
5	OUT LED	Output ON/OFF status LED. Green LED lights when DC Output is enabled. Red LED blinks in case of an alarm. Refer to User Manual, Alarms and Protective Functions Section.

Table 2-3: Blank Front Panel Controls

2.5 First Unit Rear Panel Connections and Connectors

Refer to Figure 2- and Table 2- for description of the Rear Panel connectors.

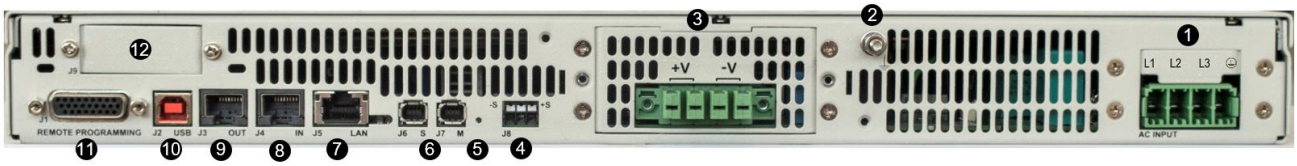


Figure 2-4: Rear Panel Connectors and Controls

No.	Connection	Description
1	AC Input Connector	Not accessible for end-user.
2	Ground Stud	Functional Ground connection M4x15 Stud
3	DC output	Not accessible for end-user.
4	Remote sense connector	Connector for remote sensing connections. Connect to the load for regulation of the load voltage and compensation of load wire drop.
5	Reset button	Set default Power Supply settings.
6	Paralleling Connectors	Master/Slave connectors, mini I/O type.
7	LAN Connector + Indicators	LAN interface connector, RJ-45 type + LXI indicators. Connector type: UDE P/N: 26-31024KB91-1.
8	Serial In connector	RJ-45 type connector, used for connecting power supplies to RS232 or RS485 port of a computer for remote control purposes. When using several power supplies in a power system, the first unit Serial-In is connected to the computer and the remaining units are chained, Remote-Out to Remote-In. Connector type: Molex 95540-2881.
9	Serial Out connector	RJ-45 type connector, used for chaining power supplies to/from a serial communication bus. Connector type: Molex 95540-2881.
10	USB Connector	USB interface connector, type B. Connector type: SAMTEC P/N: USBR-B-S-F-O-TH.
11	Isolated control and signals (J1)	Isolated analog Control and monitoring signals, isolated from the output potential. Connector type: WE P/N: 618026325223.
12	Optional Interface	Position for optional communication interface.
	Service Port	Service port for factory use. USB interface connector, type B. Connector type: SAMTEC P/N: USBR-B-S-F-O-TH. Located on Booster units only (same location as J2 connector in first unit).

Table 2-4: Rear Panel Connectors and Controls

NOTE

* LAN Connector LEDs (Green & Amber) and Red Status Indicators might lit in Power Switch OFF state.

WARNING

Refer to the Safety & Installation Manual for any connect/disconnect of any connector on the rear panel.

2.6 J1 Connector Terminal and Function

Control and monitoring signals are SELV.

Connector Technical Information:

Connector type: 618026325223, WURTH

DB26HD Receptacle type: 10090769-P264ALF, FCI

Wire: AWG 24-28

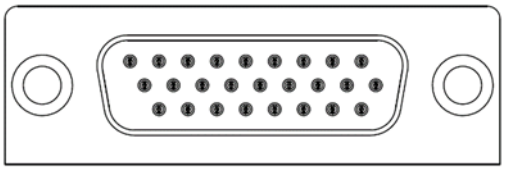


Figure 2–3: J1 Connector Terminals and Functions

No.	Connection	Description
1	Daisy In / SO	Input for Series Operation / Input for Shut Off control of the power supply output.
2	Daisy Out / PS_OK #2	Output for Series Operation / Output #2 for indication of power supply status. High level is OK.
3	PS_OK #1	Output #1 for indication of power supply status. Open Collector type, low level is OK.
4	CV/CC	Output for Constant-Voltage / Constant-Current mode indication.
5	LOC/REM MON	Output for indicating if the unit is in Local (digital) or Remote (analog) programming mode.
6	LOC/REM SELECT	Input for selecting between Local (digital) or Remote (analog) programming of the output Voltage and Current.
7	IPGM	Input for Remote (analog) voltage/resistance programming of the Output Current.
8	VPGM	Input for remote (analog) voltage/resistance programming of the Output Voltage.
9	NOT USED	
10	ENA_IN	Enable / Disable the power supply output by dry-contact (short / open) or voltage source. Selectable signal polarity.
11	COM	COMMON. Return for all signals.
12	COM	COMMON. Return for all signals.
13	COM	COMMON. Return for all signals.
14	COM	COMMON. Return for all signals.

No.	Connection	Description
15	NOT USED	
16	NOT USED	
17	COM	COMMON. Return for all signals.
18	COM	COMMON. Return for all signals.
19	ILC	Enable / Disable the power supply output by dry-contact (short / open) or voltage source.
20	Programmed Signal 2	General Purpose Open Drain Port 2.
21	Programmed Signal 1	General Purpose Open Drain Port 1
22	Trigger In	Power supply trigger input for sequencer operations. Positive edge triggered, pulse width: min. 10usec.
23	Trigger Out	Trigger output, positive edge, pulse width: min. 100usec.
24	NOT USED	
25	I_MON	Output for monitoring the power supply output Current.
26	V_MON	Output for monitoring the power supply output Voltage.

Table 2-3: J1 Connector Terminals and Functions

CAUTION

To prevent ground loops and to maintain the isolation of the power system when programming from J1, use an ungrounded programming source.

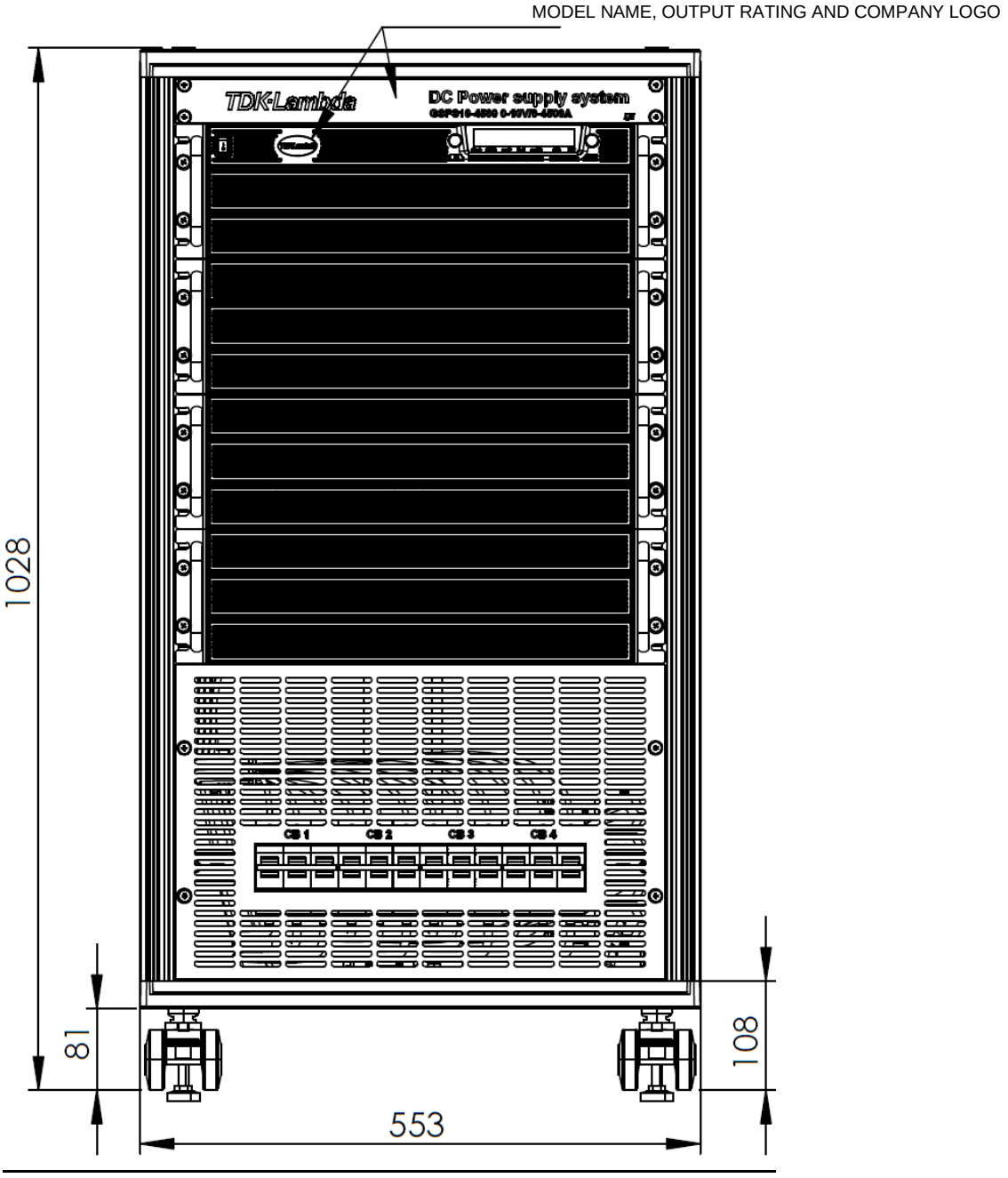
WARNING

There is a potential shock hazard at the output when using a power system with an output greater than 60VDC. Use wires with minimum insulation rating equivalent to the maximum output voltage of the power system.

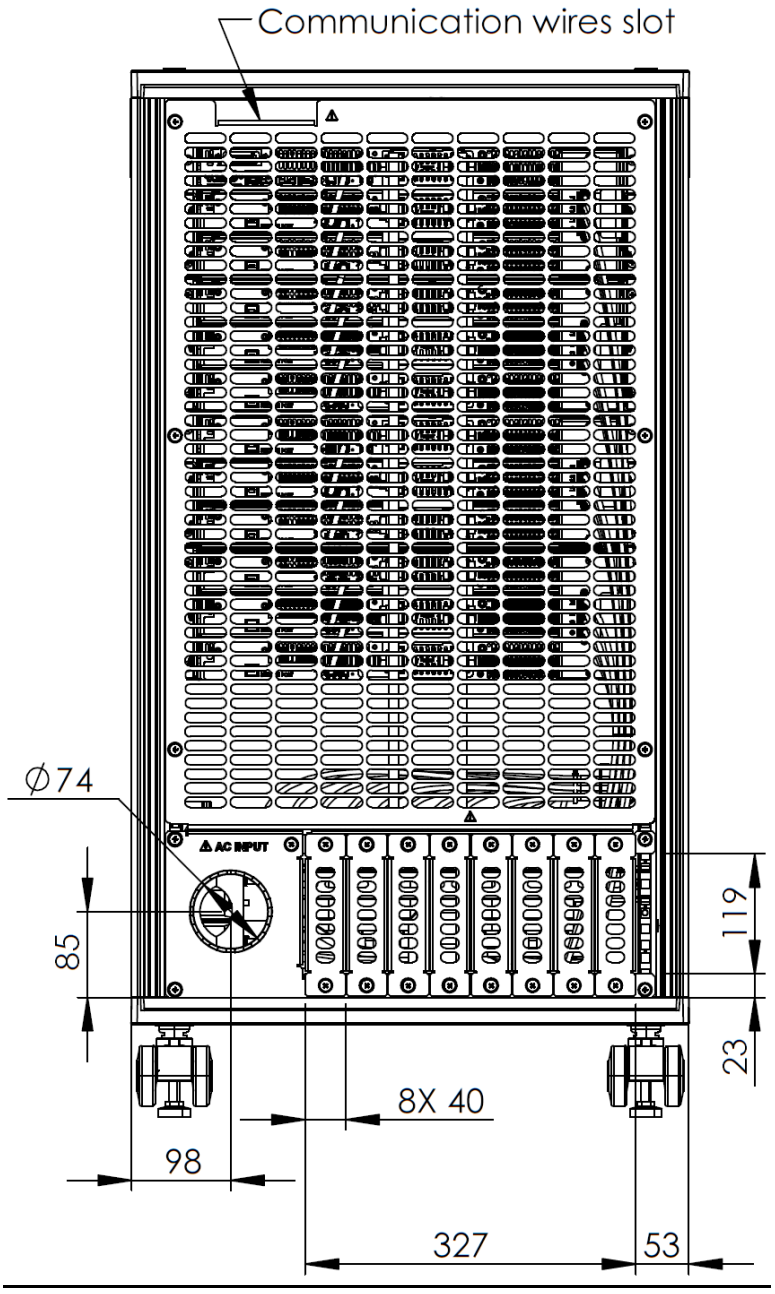
CHAPTER 3: OUTLINE

3.1 Power System Outline

Power System Front View:

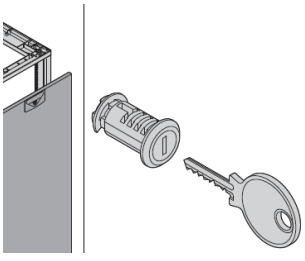


Power System Rear View:



NOTE

A locking key (2233x locking) that suitable for 2 side panels, is attached to rear panel grid with tie-wrap.



Power System Internal Rear Panel Connections:

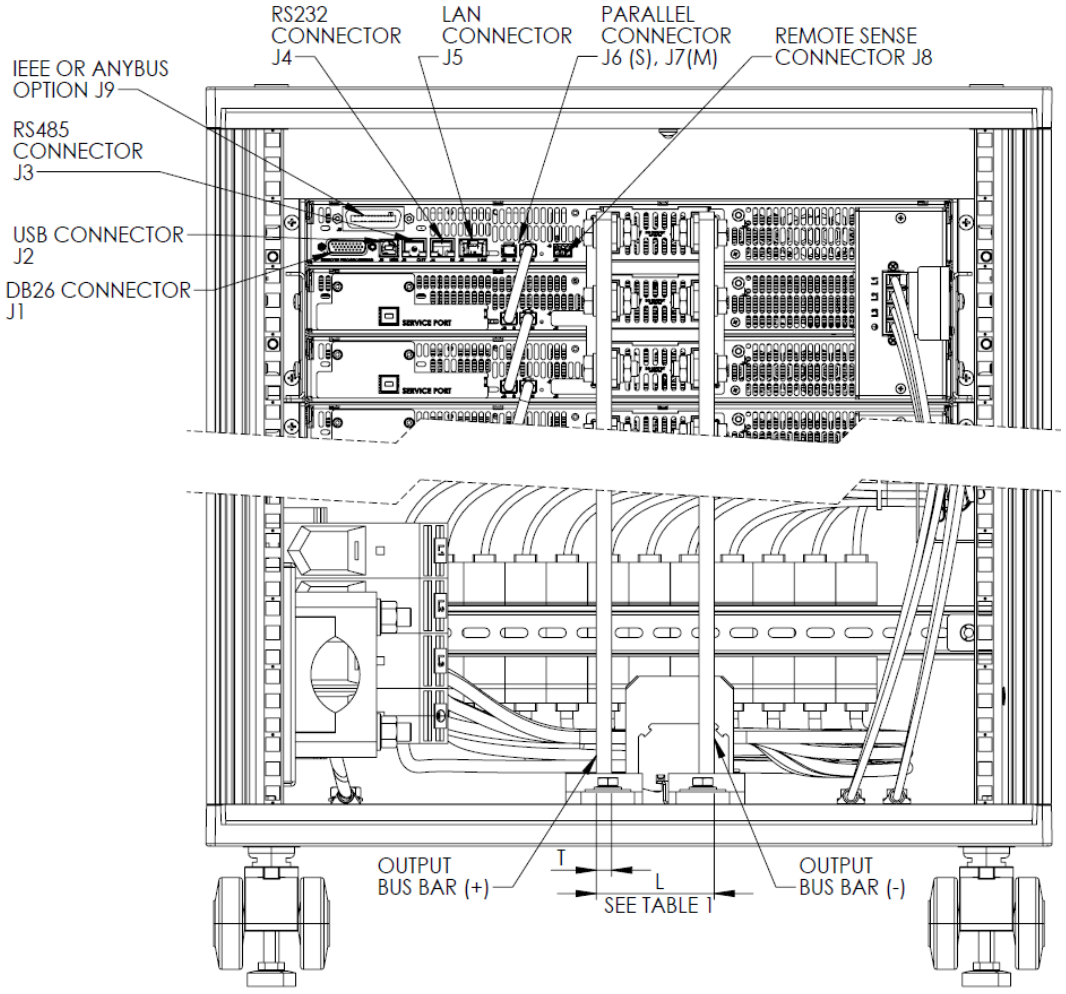
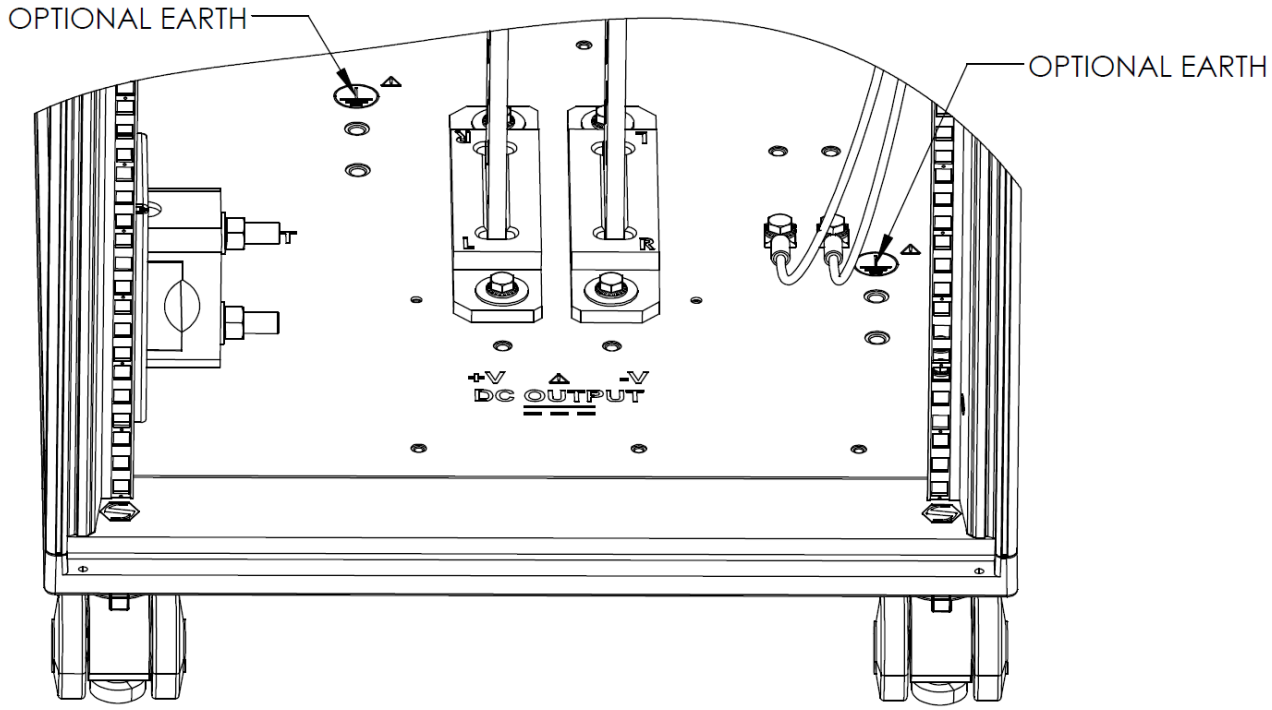


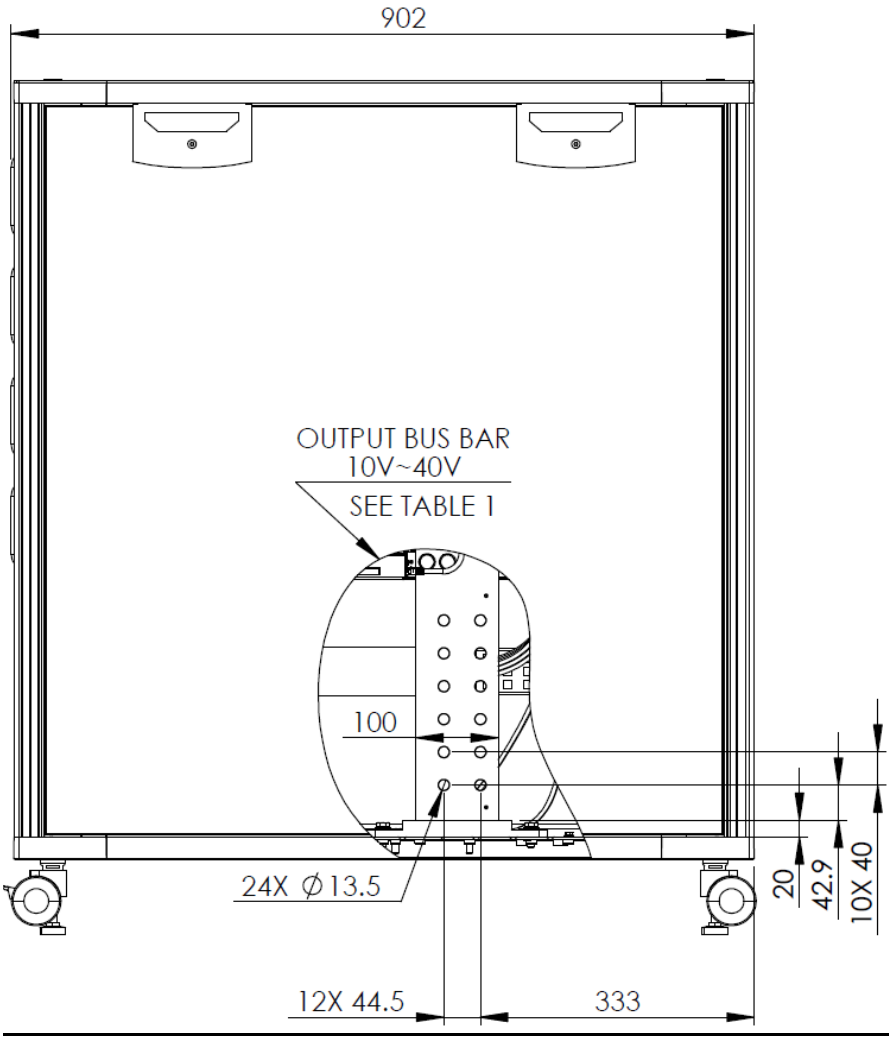
TABLE 1		
BUSBAR VOLTAGE	THICKNESS (T)	L
10V~20V	10mm	77mm
30V~40V	5mm	67mm
50V~100V	5mm	67mm
150V~600V	3.5mm	67mm

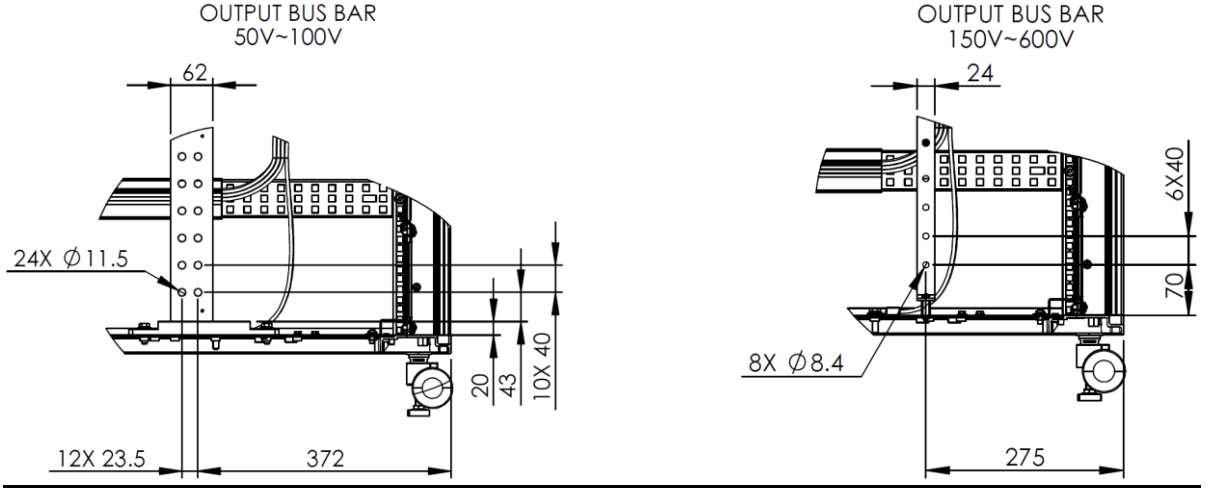
Power System Optional Earth (Ground) Connection:

OPTIONAL EARTH (GROUND) FOR THE SYSTEM



Power System Side View and Output Bus-bars Dimensions:





All Dimensions are in mm.

CHAPTER 4: INSTALLATION

CAUTION

Observe all torque guidelines within this manual. Over torque may damage unit or accessories. Such damage is not covered under manufacturer's warranty.

4.1 General

This chapter contains instructions for initial inspection, preparation for use Connection to PC, setting the communication port and linking ***GENESYS™*** Power System is described in the User manual.

NOTE

GENESYS™ Power System's supplies generate magnetic fields, which might affect the operation of other instruments. If your equipment is susceptible to magnetic fields, do not position it adjacent to the power system.

4.2 Preparation for Use

In order to be operational, the Power System must be connected to an appropriate AC main. The AC mains voltage should be within the Power System specification. Do not apply power before reading the safety instructions and Section 4.7.

Follow the instructions in Table 4-1 in the sequence given to prepare the Power System for use.

Step no.	Item	Description	Reference
1	Inspection	Initial physical inspection of the power system.	Section 4.3
2	Packing Box	Packing Box Unpack.	Section 4.4
3	Installation	Installing the power system, Ensuring adequate ventilation.	Section 4.5
4	AC mains	AC mains requirements. Connecting the Power System to the AC mains.	Section 4.7
5	Test	Turn-on checkout procedure.	Section 4.8
6	Load connection	Wire size selection. Local / Remote sensing. Single or multiple loads.	Section 4.9
7	Default setting	The Power System's power system setting at shipment.	User Manual

Table 4-1: Basic Setup Procedure

4.3 Initial Inspection

Prior to shipment this power system was inspected and found free of mechanical or electrical defects. Upon unpacking of the power system, inspect for any damage which may have occurred in transit. The inspection should confirm that there is no exterior damage to the power system such as broken knobs or connectors and that the front panel and meter faces are not scratched or cracked. Keep all packing material until the inspection has been completed. If damage is detected, file a claim with carrier immediately and notify the TDK-Lambda sales or service facility nearest you.

4.4 GSPS Power System Packing Box Unpack

GSPS Power System considered as a very heavy unit. Follow unpack instructions carefully to avoid injury and/or GSPS unit damage.

1. Open the packing box as instructed in Figure 4-1 by remove the straps from the packaging box.
2. Unscrew fixing screw to disassemble the top box cover.
3. Gently remove the accessories box.

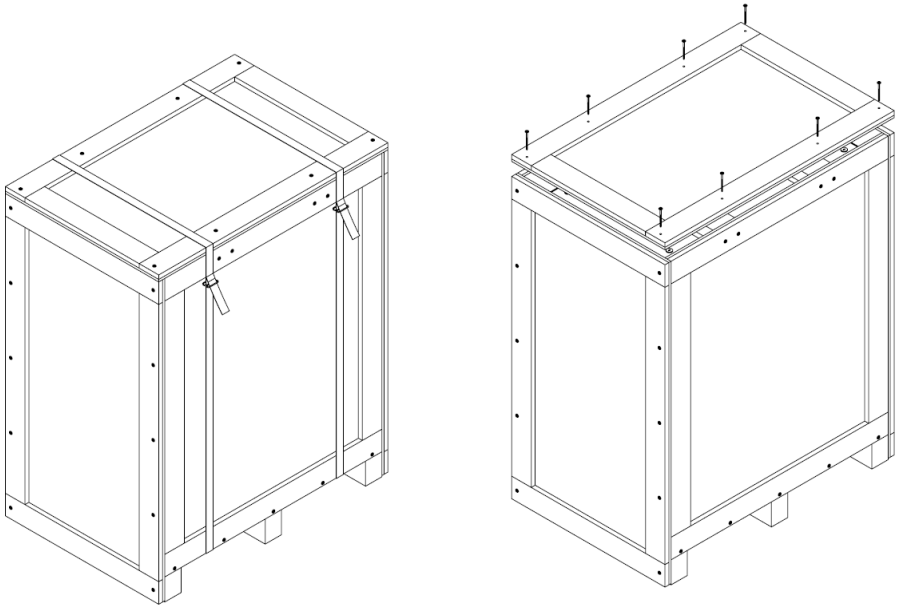


Figure 4-1: GSPS Unpack – Disassemble Top Cover, Accessories Box

4. Unscrew screws to disassemble the reinforcing beams as shown in Figure 4-2 and Figure 4-3.

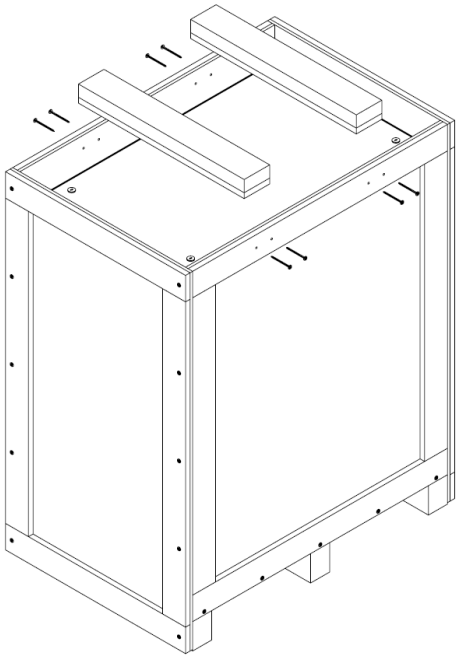


Figure 4-2: GSPS Unpack – Disassemble the reinforcing beams

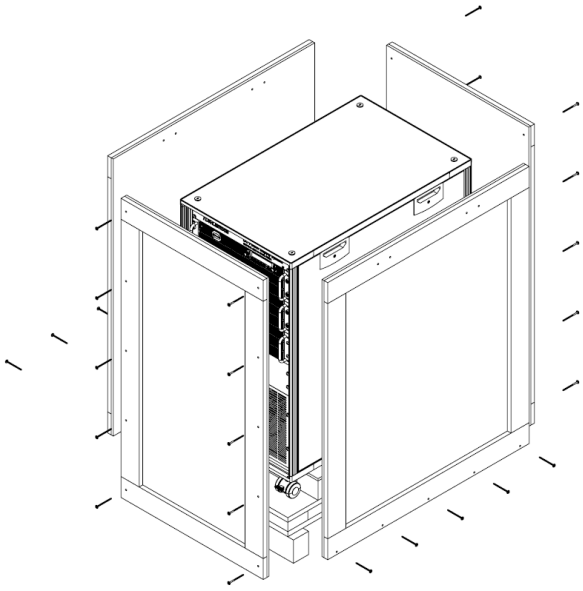


Figure 4-3: GSPS Unpack – Disassemble the side reinforcing beams

5. The Power System is ready to transport for placement Figure 4-4.

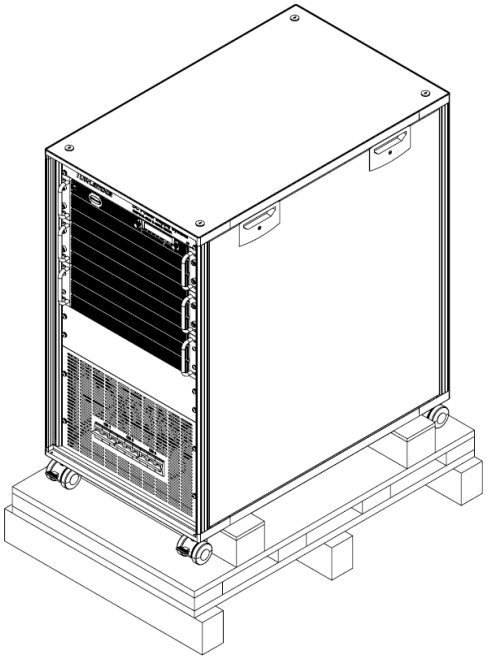


Figure 4-4: GSPS Power System

4.5 Location, Mounting and Cooling

This power system is fan cooled. The air intake is at the front panel and the exhaust is at the rear panel. Upon installation allow cooling air to reach the front panel ventilation inlets.

CAUTION

Allow minimum 10cm (4”) of unrestricted air space at the front and the rear of the unit. The power system should be used in an area where the ambient temperature does not exceed +50°C (refer to product Spec. for operating conditions).

4.6.1 Preparing the Power System for AC Input and Output Connections

1. Unscrew fixing screw to remove the rear panel of the cabinet as shown in Figure 4-5.

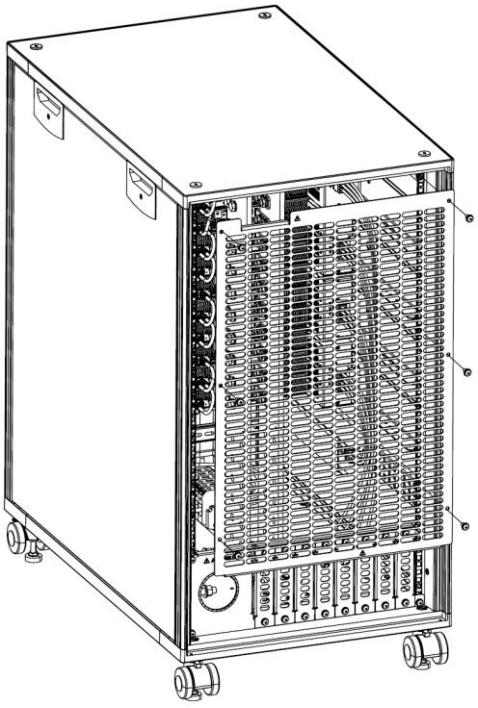


Figure 4-5: Rear Panel Disassembly

2. Unscrew the fixing screw to remove the rear panel slots of the cabinet as shown in Figure 4-6.

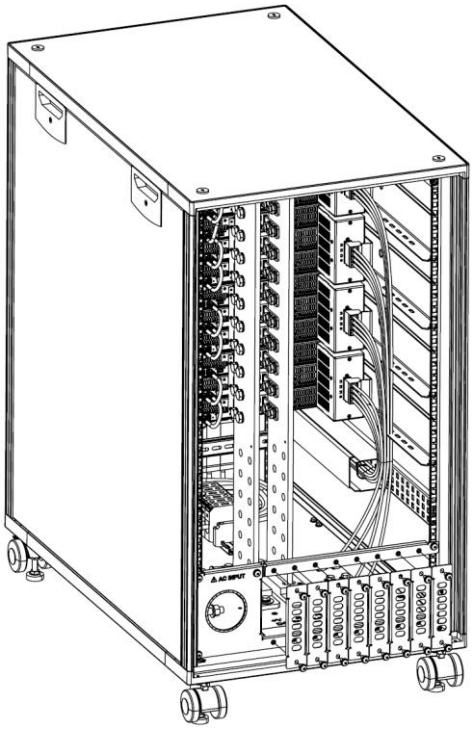


Figure 4-6: Rear Panel Output Slots Disassembly

3. Disassemble the beam to allow easy access into the cabinet as shown in Figure 4-7.

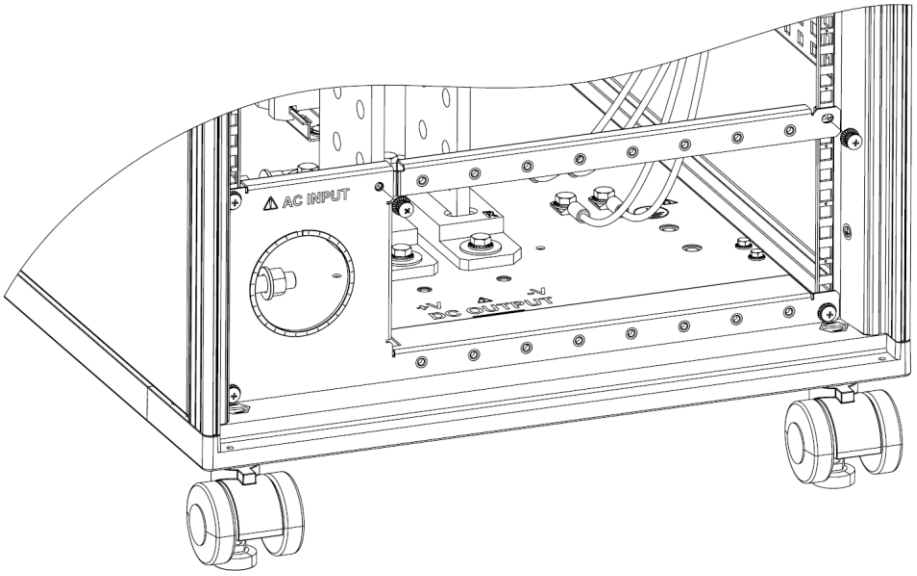


Figure 4-7: Rear Panel Disassembly

4.7 AC Input Power Connection

This Power System has protective device (circuit breaker) which disconnect each current-carrying conductors with the following ratings:

- 2x 80A for 30kW 3-Phase 208Vac.
- 3x 80A for 45kW 3-Phase 208Vac.
- 4x 80A for 60kW 3-Phase 208Vac.
- 2x 40A for 30kW 3-Phase 480Vac.
- 1 X 80A and 1 X 40A for 45kW 3-Phase 480Vac.
- 2x 80A for 60kW 3-Phase 480Vac.

CAUTION

The Power System shall be electrically connected to a supply by either means of permanent connection, which can be detached only by the use of a tools or by connector meeting the requirements of IEC 60309. Connection of this Power System to an AC mains should be made by an electrician or other qualified personnel in accordance with local electricity standards, rules and regulations.

CAUTION

There is a potential shock hazard if the power system is not connected to an electrical safety ground via the safety ground terminal in the AC input connector.

WARNING

Some components inside the Power System are at AC voltage even when the On/Off switch is in the ”Off” position. To avoid electric shock hazard, disconnect the AC cord and load, and wait two minutes before removing cover.

CAUTION

AC Input Wires No Conductor Pretreatment: All kinds of copper conductors can be clamped without pretreatment (Solid, Flexible, with ferrule, with/without plastic sleeve). It is forbidden to solder the conductors. The solder tin yields and fractures under high pressure. The result is an increased contact resistance and an excessive temperature rise. In addition, corrosion caused by pickling or fluxes has been observed on soldered conductor ends. Notch fractures at the transition point from the rigid to the flexible conductor area are also possible.

CAUTION

The Power System ON/OFF switch is not the main "disconnect device" and does not completely disconnect all the circuits from the AC mains. The Power System has circuit breakers are disconnecting all supply lines simultaneously. It is prohibited to position the equipment so that it is difficult to operate the disconnecting device.

WARNING

There is a potential shock hazard if the Power System's rear cover are not assembled and fixed with screws. The AC input cover panel and output slots covers must be assembled during the AC mains and system operation.

		Cross Sections	
Power Rating	I_{max}	**Clamp Specification**	**Min. Recommended Cable**
30kW 3P208	3x 125A	KOZ CABLE CLAMP ST 26-38	3x 35mm^2
45kW 3P208	3x 185A	KOZ CABLE CLAMP ST 36-52	3x 70mm^2
60kW 3P208	3x 250A	KOZ CABLE CLAMP ST 36-52	3x 120mm^2
30kW 3P480	3x 63A	KOZ CABLE CLAMP ST 18-26	3x 10mm^2
45kW 3P480	3x 95A	KOZ CABLE CLAMP ST 26-38	3x 25mm^2
60kW 3P480	3x 125A	KOZ CABLE CLAMP ST 26-38	3x 35mm^2

Table 4-2: AC Input Wire Connection

1. Loose tightening nut on cable clamp in order to place AC cable through as shown in Figure 4-8.

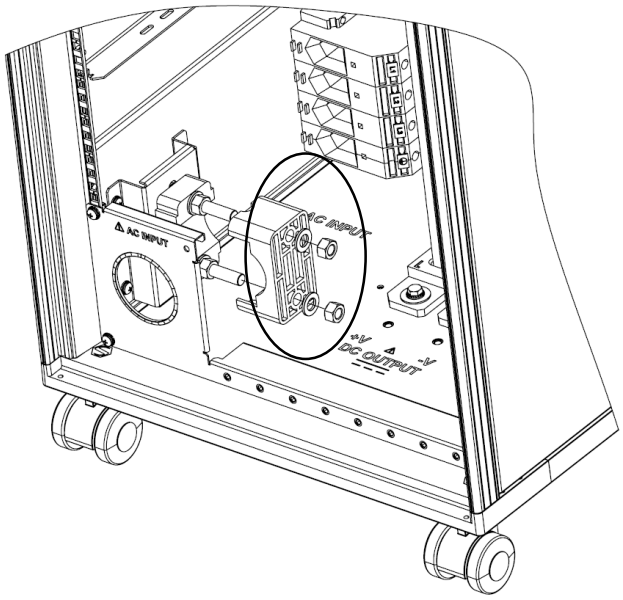


Figure 4-8: Loose Tightening Screw

2. Insert the AC wires into the AC input connector UKH as shown in Figure 4-9.
3. Tighten the connector UKH50/95/240 screws:
4. Input Connection for 30KW 3P208/480, 45KW 3P480, 60KW 3P480 System Models: tightening torque: 65~70 lbf-in. (7.3-8.5Nm).
5. Input Connection for 45KW 3P208 System Models: tightening torque: 165~177 lbf-in. (18.5-20Nm).
6. Input Connection for 60KW 3P208 System Models: tightening torque: 250~265 lbf-in. (28.3-30Nm).
7. Tighten the cable clamp's screw nuts.

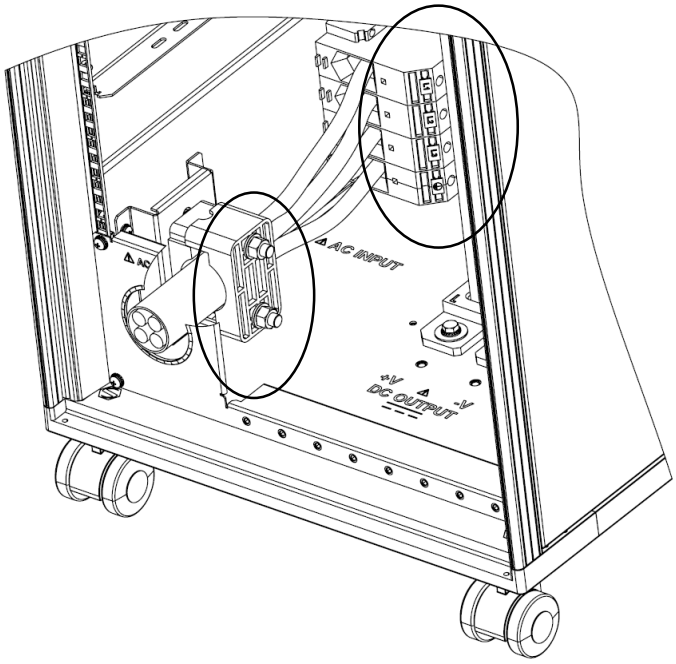


Figure 4-9: AC Wire Inserted Through and Fixed to the AC Connector

4.8 Turn-On Check Procedure

WARNING

There is a potential electrical shock hazard when using a power system without output protection. Do not turn ON power without output protection properly assembled. Turn OFF power system or disconnect power system from AC mains before making or changing any rear panel connection.

WARNING

The doors (on both the left and the right side) must be in LOCK position at all times to prevent access to hazardous parts and sections.

4.8.1 General

The following procedure ensures that the power system is operational and may be used as a basic incoming inspection check. Refer to Figure 2-1 and Figure 2- for the location of the controls indicated in the procedure. Please note that this procedure is valid for standard units. For blank units, all the parameters settings and status reading can be made by using communication interfaces. Refer to the User manual for further information.

4.8.2 Prior to Operation

1. Power On/Off switch at Off position.
2. Ensure that the protection of output terminals is mounted and properly assembled.
3. Connect the unit to an AC mains as described in Section 4.7.
4. Connect a DVM with appropriate cables for the rated voltage to the output terminals.
5. Turn the front panel Power switch to On.
6. Ensure that the power supply is configured to the default setting (refer to User Manual IA761-04-02_, Parameter Setting Memory section).
7. When power system is turned ON and all LCD Display segments and LEDs illuminate momentarily, then the LCD display shows: "OUT OFF" (not applicable to Blank Panel master power supply).
8. The power system operating status is then displayed (not applicable to Blank Panel master power supply).

4.8.3 Constant Voltage Check (Standard Master Power Supply)

1. Turn on the output by pressing OUT button so the OUT LED illuminates.
2. Observe the power system Voltage display and rotate the Voltage encoder.
3. Ensure that the output voltage varies while the Voltage encoder is rotated. The minimum control range is from zero to the maximum rated output for the power system model.
4. Compare the DVM reading with the front panel Voltage display to verify the accuracy of the Voltage display.
5. Ensure that the front panel CV indication on the LCD screen is active.
6. Turn off the front panel Power switch.

4.8.4 Constant Voltage Check (Blank Panel Master Power Supply)

1. Connect a USB cable from a PC to J2 (USB interface connector). Refer to Table 2-4: Rear Panel Connectors and Controls.
2. Run terminal communication software and send the following commands to turn power system output ON:

   INST:NSEL 6

   OUTP 1

   * Remember to use Carriage Return character (ASCII 13, 0x0D) after each command.
3. Ensure that the output voltage varies while sending VOLT <XX> command *. The control range is from zero to the maximum rated output for the power system model.

   * XX – Programmed voltage value.
4. Compare the DVM reading with the power system readback voltage to verify the accuracy of the voltage readback. Send MEAS:VOLT? command to read power system output voltage.
5. Turn off the front panel Power switch.

4.8.5 Constant Current Check (Standard Master Power Supply)

1. Ensure that the front panel Power switch is at Off position and the DVM connected to the output terminals shows zero voltage.
2. Connect a DC shunt across the output terminals.
3. Ensure that the shunt and the wires current ratings are higher than the power system rating.
4. Connect a DVM to the shunt.
5. Turn the front panel Power switch to On position.
6. Turn on the output by pressing the OUT button so the OUT LED illuminates.
7. Observe the power system Current display and rotate the Current encoder.
8. Ensure that the output current varies while the Current encoder is rotated. The minimum control range is from zero to the maximum rated output for the power system model.
9. Compare the DVM reading with the front panel Current display to verify the accuracy of the Current display.
10. Ensure that the front panel CC indication on the LCD screen is active.
11. Turn off the front panel Power switch.
12. Remove the shunt from the power system output terminals.

4.8.6 Constant Current Check (Blank Panel Master Power Supply)

1. Ensure that the front panel Power switch is at Off position and the DVM connected to the output terminals shows zero voltage.
2. Connect a DC shunt across the output terminals.
3. Ensure that the shunt and the wires current ratings are higher than the power system rating.
4. Connect a DVM to the shunt.

5. Connect a USB cable from a PC to J2 (USB interface connector). Refer to Table 2-4: Rear Panel Connectors and Controls.
6. Turn the front panel Power switch to On position.
7. Run terminal communication software and send the following commands to turn power system output ON:

   INST:NSEL 6

   OUTP 1

   * Remember to use Carriage Return character (ASCII 13, 0x0D) after each command.
8. Ensure that the output current readback varies while sending CURR <YY> command *. The control range is from zero to the maximum rated output for the power system model. Send MEAS:CURR? command to read power system output current.

   * YY – Programmed current value.
9. Compare the DVM reading with the readback current to verify the accuracy of the digital readback.
10. Turn off the front panel Power switch.
11. Remove the shunt from the power system output terminals.

4.9 Connecting the Load

1. Turn off the AC input power before making or changing any rear panel connection.
2. Ensure that all connections are securely tightened before applying power.

WARNING

There is a potential shock hazard when using a power system with an output voltage greater than 60VDC. Turn off the AC input power before making or changing any rear panel connection.

Ensure that the protection of output plug is mounted and properly assembled for power supplies when output voltage exceed 60VDC. Ensure that all connections are securely tightened before applying power.

4.9.1 Load Wiring

The following considerations should be made to select wiring for connecting the load to the power system:

- Current carrying capacity of the wire (refer to Section 4.9.2)
- Insulation rating of the wire should be at least equivalent to the maximum output voltage of the power system.

4.9.2 Current Carrying Capacity

Two factors must be considered when selecting the wire size:

- Wires should have enough current carrying capacity to prevent overheat while carrying the power system load current at the rated load, or the current that would flow in the event the load wires were shorted, whichever is greater.
- Wire size should be selected to enable voltage drop per lead to be less than 1V at the rated current. Although units will compensate higher voltage drop in each load wire (refer to the specifications), it is recommended to minimize the voltage drop (1V maximum) to prevent excessive output power consumption from the power system and poor dynamic response to load changes. Please refer to Table 4-3 for the recommended wires types to limit voltage drop in American and European dimensions respectively.

Output current	Recommended wires (mm^2)	Recommended wires (AWG/°C)	Recommended lugs/Connector
50A - 60A	10 For 30kW: 600V	6 AWG/105°C minimum	For 1kW - 5kW: 6 AWG Panduit LCMA10-8-C Or equivalent.
60A - 80A	16 For 30kW: 400V, 500V For 45kW: 600V	4 AWG/105°C minimum	4 AWG Panduit LCMA16-8-C Or equivalent
80A - 100A	25 For 45kW: 500V	2 AWG/105°C minimum	2 AWG Panduit LCMA25-8-C Or equivalent
100A - 160A	50 For 60kW: 400V~600V	"0" AWG/105°C minimum	"0" AWG Panduit LCMA50-8-L Or equivalent

Output current	Recommended wires (mm²)	Recommended wires (AWG/°C)	Recommended lugs/Connector
160A - 260A	95 For 30kW: 150V For 45kW: 200V For 60kW: 300V	4/0 = 0000/105°C minimum	4/0 = 0000 Panduit LCMA95-8-L Or equivalent
260A - 500A	95 For 45kW: 150V For 60kW: 150V, 200v 3 wires per terminal	4/0 = 0000/105°C minimum	4/0 = 0000 Panduit LCMA95-8-L Or equivalent
300A - 1000A	95 For 30kW: 40V~100V For 45kW: 50V~100V For 60kW: 80V, 100V 5 wires per terminal	4/0 = 0000/105°C minimum	4/0 = 0000 (2 In Parallel) Panduit LCC4/0-12-X Or equivalent
1000A - 1500A	120 For 30kW: 30V For 45kW: 40V For 60kW: 50V~60V 6 wires per terminal	4/0 = 0000/105°C minimum	4/0 = 0000 Panduit LCC4/0-12-X (two-hole, long barrel Lug) Or equivalent
1500A - 2000A	185 For 30kW: 20V For 45kW: 30V For 60kW: 40V 6 wires per terminal	400 kcmil/105°C minimum	400 kcmil Panduit LCC400-12-6 (two-hole, long barrel Lug) Or equivalent
2000A - 3000A	150 X 2 In Parallel per bus-bar hole For 30kW: 10V For 45kW: 20V For 60kW: 20V, 30V 12 wires per terminal	300 kcmil/105°C minimum	300 kcmil Panduit LCC300-12-6 (two-hole, long barrel Lug) Or equivalent
3000A - 4500A	240 X 2 In Parallel per bus-bar hole For 60kW: 10V 12 wires per terminal	500 kcmil/105°C minimum	300 kcmil Panduit LCC500-12-6 (two-hole, long barrel Lug) Or equivalent

Table 4-3: Recommended Cable Size for Output Connection

WARNING

The output bus bars are capable of providing hazardous energy and hazardous voltages may exist at the outputs. To protect personnel against accidental contact with the hazardous voltages or/and hazardous energy, ensure that output protective slots are installed in the output protection assembly in any case of operation, except if separately permitted in other sections in this manual.

WARNING

There is a potential shock hazard if the Power System's rear cover are not assembled and fixed with screws. The AC input cover panel and output cover slots must be assembled during the AC mains and the system operation.

4.9.3 Wire Termination

The wires should be properly terminated with terminals securely attached. DO NOT use non-terminated wires for load connection at the power system.

4.9.4 Inductive Loads

Inductive loads can produce voltage spikes that may be harmful to the power system. A diode should be connected across the output. The diode voltage and current rating should be greater than the power system maximum output voltage and current rating. Connect the cathode to the positive output and the anode to the negative output of the power system.

Where positive load transients such as back EMF from a motor may occur, connect a surge suppressor across the output to protect the power system. The breakdown voltage rating of the suppressor must be approximately 10% higher than the maximum output voltage of the power system.

4.9.5 Making the Load Connections

WARNING

Hazardous voltages exist at power outputs with output greater or equal to 60Vdc. To protect personnel against accidental contact with the hazardous voltages, ensure that the load and its connections have no accessible live parts. Ensure that the load wiring insulation rating is greater than, or equal to, the maximum output voltage of the power system. Ensure that the output protective slots are properly assembled.

CAUTION

Ensure that the load wiring mounting hardware does not short the output terminals. Heavy connecting cables must have some form of strain relief to prevent loosening the connections or bending the bus bars.

CAUTION

For high current outputs, it is very important to make the output connections properly, and follow the instructions. Improper connections may result in excessive temperature rise or power system going into protection mode (if voltage drop on load wires is higher than specified in the specifications).

WARNING

There is a potential shock hazard if the Power System's rear cover are not assembled and fixed with screws. The AC input cover panel and output cover slots must be assembled during the AC mains and the system operation.

For LV 10V ~ 100V Models:

1. Fix the wires to the Bus bars as shown in Figure 4-10 and Figure 4-11.

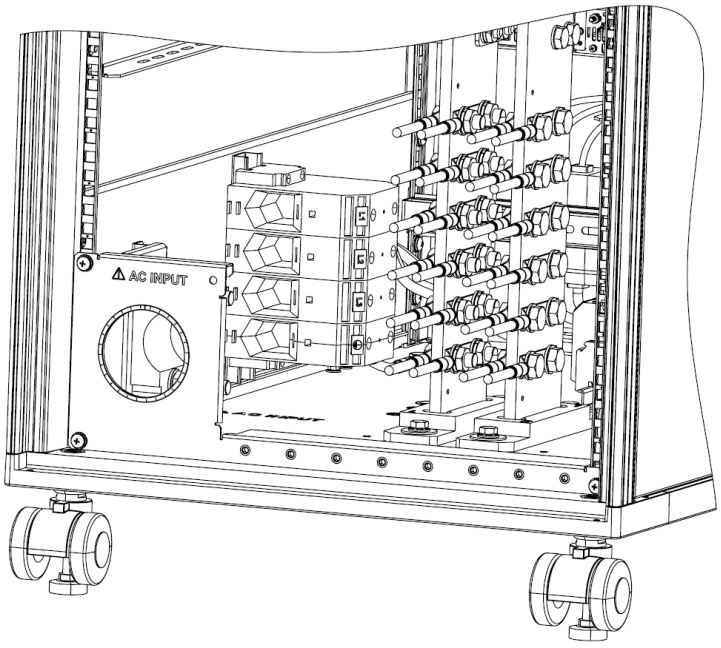


Figure 4-10: Output Wires Assembly

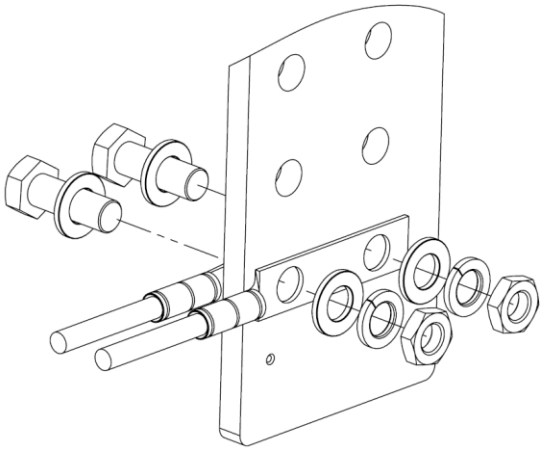


Figure 4-11: 10V-100V Wires Assembly

NOTE

All bus bars must be tightened by screw and nut, even if load wire (lug) is not connected.

2. Assembly the output protection slots as shown in Figure 4-12.

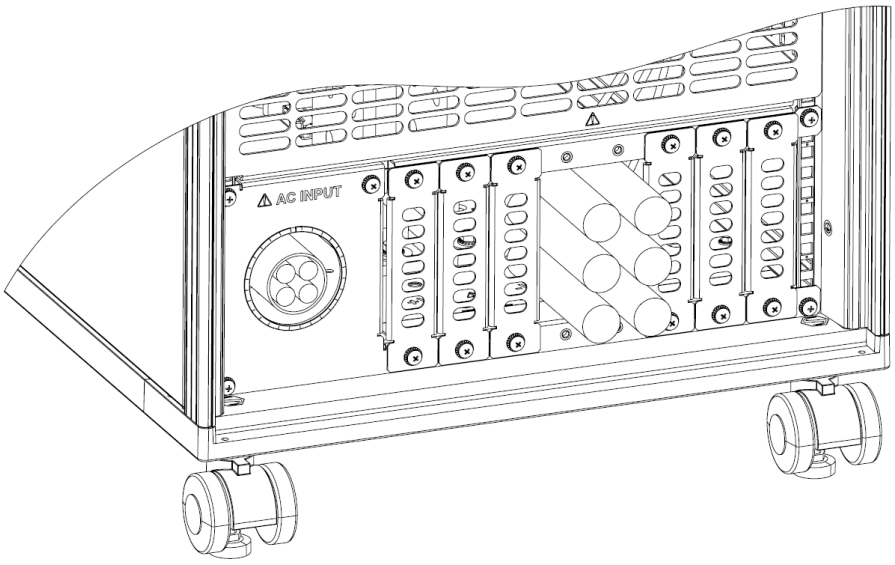


Figure 4-12: Assembly of Output Protection Slots

WARNING

The output bas burs are capable of providing hazardous energy, when using a power system with output voltage rated from 10VDC up to 100VDC. To protect personnel against accidental contact with the hazardous energy, ensure that the rear slot covers are installed on the output protection assembly in any case of operation, except if separately permitted in other sections in this manual.

WARNING

There is a potential shock hazard when using a power system with an output voltage greater than 60VDC. Do not turn ON power system without output protection slots assembled. Ensure that the output protection slots are mounted and properly assembled.

WARNING

There is a potential shock hazard if the Power System's rear cover are not assembled and fixed with screws. The AC input cover panel and output cover slots must be assembled during the AC mains and the system operation.

For HV 150V ~ 600V Models:

1. Before first operation, ensure that the M6 screws that connect power supply output to bus-bars are not loss (general tightening Torque is 45~48 lbf.inch) – refer to Figure 4-13.

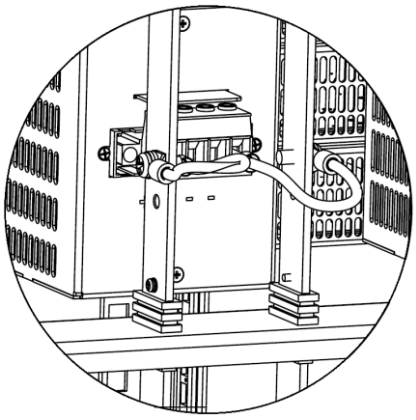


Figure 4-13: power supply output screw connection

2. Fix the wires to the Bus bars as shown in Figure 4-14 and Figure 4-1515.

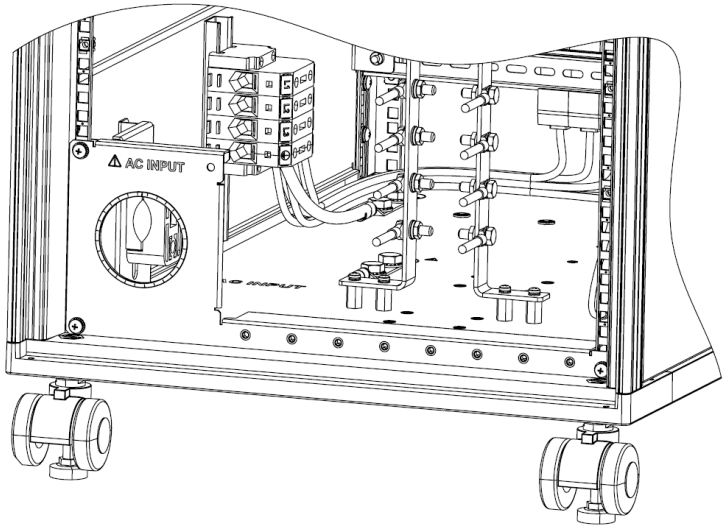


Figure 4-14: Fixing Bus Bars Cover to the Rear Panel

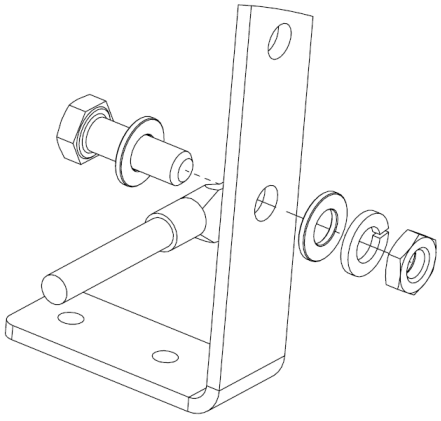


Figure 4-15: 150V-600V Wires Assembly

NOTE

All bus bars must be tightened by screw and nut, even if load wire (lug) are not connected.

3. Assembly the output protection slots as shown in Figure 4-16.

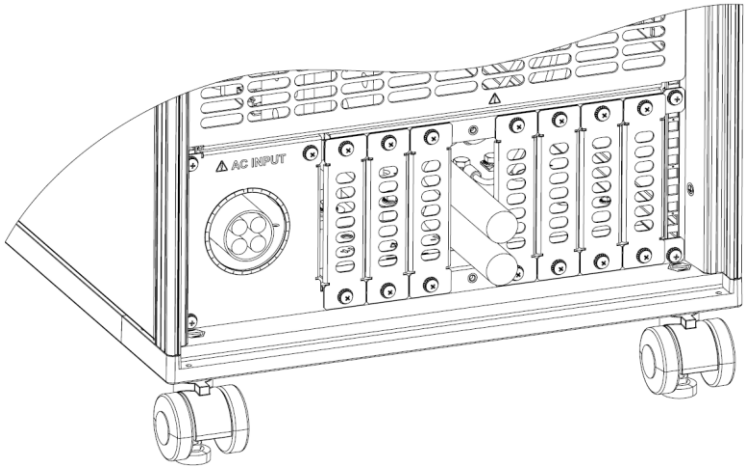


Figure 4-16: Assembly of Output Protection Slots

WARNING

There is a potential shock hazard when using a power system with an output voltage greater than 60VDC. Do not turn ON power system without output protection slots assembled. Ensure that the output protection slots are mounted and properly assembled.

CAUTION

Output Wires No Conductor Pretreatment: All kinds of copper conductors can be clamped without pretreatment (Solid, Flexible, with ferrule, with/without plastic sleeve). It is forbidden to solder the conductors. The solder tin yields and fractures under high pressure. The result is an increased contact resistance and an excessive temperature rise. In addition, corrosion caused by pickling or fluxes has been observed on soldered conductor ends. Notch fractures at the transition point from the rigid to the flexible conductor area are also possible.

WARNING

There is a potential shock hazard if the Power System's rear cover are not assembled and fixed with screws. The AC input cover panel and output cover slots must be assembled during the AC mains and the system operation.

4.9.6 Grounding Outputs

Either the positive or negative output terminals can be grounded. To avoid noise problems caused by common-mode current flowing from the load to ground, it is recommended to ground the output terminal as close as possible to the power system chassis ground.

Always use two wires to connect the load to the power system regardless of how the system is grounded.

WARNING

There is a potential shock hazard at the RS232/485, LAN, USB and the IEEE ports when using power supplies in series with combined voltage greater than 600V, and the Positive Output of the Power system is grounded.

4.10 Local and Remote Sensing

The rear panel J8 sense connector may be used for remote sensing of the output voltage. Refer to Figure 2- for Master power supply's sense connector location.
For Output Bus-bar's sense connection location refer to Figure 4-17 and Figure 4-18.

4.10.1 Sense Wiring

WARNING

There is a potential shock hazard at the sense connector when using a power system with an output voltage greater than 60VDC. Remote sense wires should have a minimum insulation rating equivalent or greater than the maximum output voltage of the power system. Ensure that the connections at the load end are shielded to prevent accidental contact with the hazardous voltages.

4.10.2 Local Sensing

The power system is shipped with unconnected J8 sense connector. In this configuration, the unit is sensing the output voltage at the output terminals. Refer to Table 4-4 for J8 terminals assignment. This method does not compensate for voltage drop on the load wires, therefore it is recommended only for low load current applications or where the load regulation is less critical.

4.10.3 Remote Sensing

CAUTION

Reversing the sense wires might cause damage to the power system in local and remote sensing. (Do not connect -S to +V or +S to -V.)

CAUTION

When using shielded sense wires, ground the shield in one place only. The location can be the power system chassis or one of the output terminals.

Terminal	Function
J8 - Negative	Remote negative sense (-S).
J8 - Positive	Remote positive sense (+S).

Table 4-4: J8 Terminals

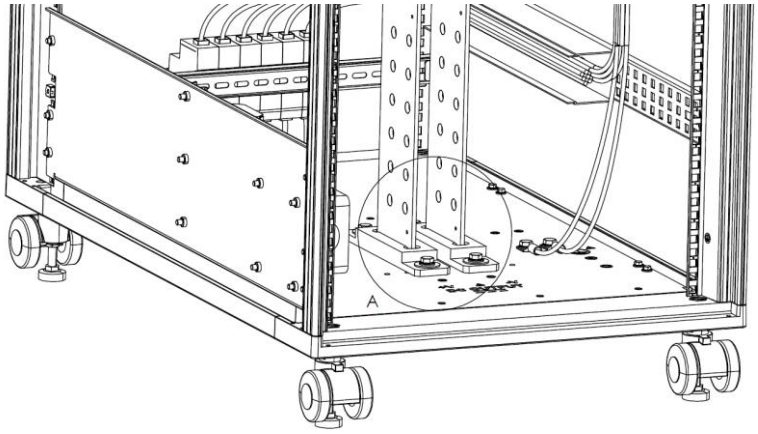


Figure 4-17: Output Bus-bars Terminals Location

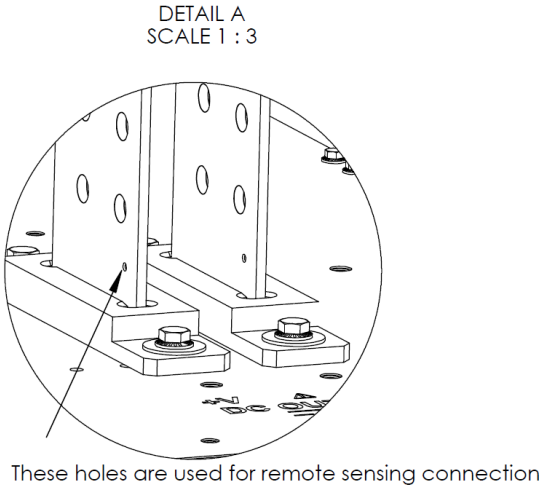


Figure 4-18: Output Bus-bars Terminals

Use remote sense where the load regulation at the load end is critical. In remote sense, the power system will compensate for voltage drop on the load wires.
Refer to the specifications for the maximum allowable voltage drop on load wires.
The voltage drop is subtracted from the total voltage available at the output. Follow the instructions below to configure the power system for remote sensing:

1. Ensure that the Power system AC connection is Off.
2. Connect the negative sense lead to terminal J8 (-S) and the positive sense lead to terminal J8 (+S).
3. Set voltage sensing setting to remote sense via front panel or communication.
4. Turn On the power system.

NOTE

In order to ensure correct operation in remote sense mode, ensure that the voltage drop on the sensing wires meets product specifications.

4.10.4 J8 Sense Connector Technical Information

- J8 connector type: SPT-THR 1, 5/ 3-H-3, 5 P26, Phoenix contact.
- Wire AWG: 24 up to 18.
- Wire type: Solid, Flexible conductor or conductor with ferrule without plastic sleeve: up to 1.5mm².
- Conductor with ferrule with plastic sleeve: up to 0.75mm².

In order to connect the wires to the sense connector, strip up to 8mm of wire insulation. Insert the wire into the terminal, while pressing on the white pusher. After full insertion, release the white pusher for wire locking inside the terminal.

4.11 Repackaging for Shipment

To ensure safe transportation of the instrument, contact the TDK-Lambda sales or service facility near you for Return Authorization and shipping information.
Please attach a tag to the power system describing the problem and specifying the owner, model number and serial number of the power system. Refer to Warranty Information for further instructions.

CHAPTER 5: SPECIFICATIONS

5.1 60kW Series Specifications

Unless otherwise noted, specifications are warranted over the ambient temperature range of 0° to 50° Celsius.

OUTPUT RATING		10-4500	20-3000	30-2040	40-1500	50-1200	60-1020	80-780	100-600	150-408	200-300	300-204	400-156	500-120	600-102
1.Rated output voltage (*1)	V	10	20	30	40	50	60	80	100	150	200	300	400	500	600
2.Rated output current (*2)	A	4500 (*3)	3000	2040	1500	1200	1020	780	600	408	300	204	156	120	102
3.Rated output power	W	45000	60000	61200	60000	60000	61200	62400	60000	61200	60000	61200	62400	60000	61200

INPUT CHARACTERISTICS		V	10	20	30	40	50	60	80	100	150	200	300	400	500	600
1.Input voltage/freq. 3 phase, 3 wire+ground (*4)		---	3-Phase, 200V models: 170~265Vac, 47~63Hz (Covers 200/230Vac).													
			3-Phase, 480V models: 342~528Vac, 47~63Hz (Covers 380/400/415/440/460/480Vac).													
2.Maximum Input current at 100% load	3-Phase, 200V models:	---	212A @ 200Vac.													
	3-Phase, 480V models:		110.4A @ 380Vac.													
3.Power Factor (Typ.)		---	0.94 @ 200/380Vac, rated output power.													
4.Efficiency (minimum) (*5)		%	87		88	89		90								

CONSTANT VOLTAGE MODE		V	10	20	30	40	50	60	80	100	150	200	300	400	500	600
1.Max. Line regulation (*6)		---	0.01% of rated output voltage.													
2.Max. Load regulation (*7)		---	0.01% of rated output voltage +5mV.													
3.Temperature coefficient		---	50PPM/^{O}C from rated output voltage, following 30 minutes warm-up.													
4.Temperature stability		---	0.01% of rated Vout over 8hrs. interval following 30 minutes warm-up. Constant line, load & temperature.													
5.Warm-up drift		---	Less than 0.05% of rated output voltage +2mV over 30 minutes following power on.													
6.Remote sense compensation/wire (*8)		V	2	2	5	5	5	5	5	5	5	5	5	5	5	5
7.Up-prog. response time (*9)		mS	30	30	30	30	50	50	50	50	50	50	50	100	100	100
10.Down-prog. response time	Full load (*9)	mS	50	50	80	80	80	80	100	100	100	100	100	150	200	200
	No load (*10)		300	600	800	900	950	1000	1200	1900	2000	2500	3000	4000	4000	3000
11.Transient response time		---	Time for output voltage to recover within 0.5% of its rated output for a load change 10~90% of rated output current. Output set point: 10~100%, Local sense. Less than 1mS for models up to and including 100V. 2mS for models above 100V.													

CONSTANT CURRENT MODE	V	10	20	30	40	50	60	80	100	150	200	300	400	500	600
1.Max. Line regulation (*6)	---	0.05% of rated output current.													
2.Max. Load regulation (*11)	---	0.08% of rated output current.													
3.Temperature coefficient	---	10V~100V models: 100PPM/^{O}C from rated output current, following 30 minutes warm-up.													
		150V~600V models: 70PPM/^{O}C from rated output current, following 30 minutes warm-up.													
4.Temperature stability	---	0.01% of rated Iout over 8hrs. interval following 30 minutes warm-up. Constant line, load & temperature.													
5.Warm-up drift	---	10V~100V models: Less than +/-0.25% of rated output current over 30 minutes following power on.													
		150V~600V models: Less than +/-0.15% of rated output current over 30 minutes following power on.													

ANALOG PROGRAMMING AND MONITORING (ISOLATED FROM THE OUTPUT)

1.Vout voltage programming	---	0~100%, 0~5V or 0~10V, user selectable. Accuracy and linearity: +/-0.15% of rated Vout.
2.Iout voltage programming (*12)	---	0~100%, 0~5V or 0~10V, user selectable. Accuracy and linearity: +/-0.4% of rated Iout.
3.Vout resistor programming	---	0~100%, 0~5/10KΩ full scale, user selectable. Accuracy and linearity: +/-0.5% of rated Vout.
4.Iout resistor programming (*12)	---	0~100%, 0~5/10KΩ full scale, user selectable. Accuracy and linearity: +/-0.5% of rated Iout.
5.Output voltage monitor (*19)	---	0~5V or 0~10V, user selectable. Accuracy: +/-0.5% of rated Vout.
6.Output current monitor (*12) (*19)	---	0~5V or 0~10V, user selectable. Accuracy: +/-0.5% of rated Iout.

SIGNALS AND CONTROLS (ISOLATED FROM THE OUTPUT)

1.Power supply OK #1 signal	---	Power supply output monitor. Open collector. Output On: On. Output Off: Off. Maximum Voltage: 30V. Maximum Sink Current: 10mA.
2.CV/CC signal	---	CV/CC Monitor. Open collector. CC mode: On. CV mode: Off. Maximum Voltage: 30V. Maximum Sink Current: 10mA.
3.LOCAL/REMOTE Analog control	---	Enable/Disable analog programming control by electrical signal or dry contact. Remote: 0~0.6V or short. Local: 2~30V or open.
4.LOCAL/REMOTE Analog signal	---	Analog programming control monitor signal. Open collector. Remote: On. Local: Off. Maximum Voltage: 30V. Maximum Sink Current: 10mA.
5.ENABLE/DISABLE signal	---	Enable/Disable PS output by electrical signal or dry contact. 0~0.6V or short, 2~30V or open. User selectable logic.
6.INTERLOCK (ILC) control	---	Enable/Disable PS output by electrical signal or dry contact. Output ON: 0~0.6V or short. Output OFF: 2~30V or open.
7.Programmed signals	---	Two open drain programmable signals. Maximum voltage 25V. Maximum sink current 100mA (shunted by 27V zener).
8.TRIGGER IN / TRIGGER OUT signals	---	Maximum low level input voltage = 0.8V. Minimum high level input voltage = 2.5V. Maximum high level input = 5V positive edge trigger: tw = 10us minimum. Tr,Tf = 1us maximum. Min delay between 2 pulses 1ms.
9.DAISY_IN/SO control signal	---	By electrical Voltage: 0~0.6V/2~30V or dry contact.
10.DAISY_OUT/PS_OK #2 signal	---	4~5V = OK, 0V (500Ω impedance) = Fail.

FUNCTIONS AND FEATURES

1.Parallel operation	---	Consult with manufacturer.
2.Constant power control	---	Limits the output power to a programmed value. Programming via the communication ports or the front panel.
3.Output resistance control	---	Emulates series resistance. Resistance range: 1~1000mΩ. Programming via the communication ports or the front panel.
4.Slew rate control	---	Programmable Output rise and Output fall slew rate. Programming range: 0.0001~999.99 V/mS. or A/mS. Programming via communication ports or front panel.
5.Arbitrary waveforms	---	Profiles of up to 100 steps can be stored in 4 memory cells. Activation by command via communication ports or front panel.

PROGRAMMING AND READBACK (USB, LAN, RS232/485, Optional (*19) (*20) Interfaces)

	V	10	20	30	40	50	60	80	100	150	200	300	400	500	600
1.Vout programming accuracy (*13)	---	0.05% of rated output voltage.													
2.Iout programming accuracy (*12)	---	0.3% of rated output current.													
3.Vout programming resolution	---	0.002% of rated output voltage.													
4.Iout programming resolution	---	0.002% of rated output current.													
5.Vout readback accuracy	---	0.05% of rated output voltage.													
6.Iout readback accuracy (*12)	---	0.2% of rated output current.													
7.Vout readback resolution	% of rated output voltage	0.011%	0.006%	0.004%	0.003%	0.003%	0.002%	0.002%	0.011%	0.007%	0.005%	0.004%	0.003%	0.003%	0.002%
8.Iout readback resolution	% of rated output current	0.003%	0.004%	0.005%	0.007%	0.01%	0.01%	0.0013%	0.002%	0.003%	0.004%	0.005%	0.007%	0.009%	0.01%

PROTECTIVE FUNCTIONS	V	10	20	30	40	50	60	80	100	150	200	300	400	500	600
1.Foldback protection	---	Output shut-down when power supply changes mode from CV or Power Limit to CC mode or from CC or Power Limit to CV mode. User presetable. Reset by AC input recycle in autostart mode, by Power Switch, by OUTPUT button, by rear panel or by communication.													
2.Over-voltage protection (OVP)	---	Output shut-down. Reset by AC input recycle in autostart mode, by Power Switch, by OUTPUT button, by rear panel or by communication.													
3.Over-voltage programming range	V	0.5~12	1~24	2~36	2~44.1	5~55.125	5~66.15	5~88.2	5~110.25	5~165.37	5~220.5	5~330.75	5~441	5~551.25	5~661.5
4.Over-voltage programming accuracy	---	+/-1% of rated output voltage.													
5.Output under voltage limit (UVL)	---	Prevents from adjusting Vout below limit. Does not apply in analog programming. Preset by front panel or communication port.													
6.Over temperature protection	---	Shuts down the output. Auto recovery by autostart mode.													
7.Output under voltage protection (UVP)	---	Prevents adjustment of Vout below limit. P.S output turns Off during under voltage condition. Reset by AC input recycle in autostart mode, by Power Switch, by OUTPUT button, by rear panel or by communication.													

FRONT PANEL

1.Control functions	---	Multiple options with 2 Encoders.
	---	Vout/Iout/Power Limit manual adjust.
	---	OVP/UVL/UVP manual adjust.
	---	Protection Functions - OVP, UVL, UVP, Foldback, OCL, ENA, ILC.
	---	Communication Functions - Selection of LAN, RS232, RS485, USB or Optional communication interface.
	---	Output ON/OFF. Front Panel Lock.
	---	Communication Functions - Selection of Baud Rate, Address, IP and communication language.
	---	Analog Control Functions - Selection Voltage/resistive programming 5V/10V, 5KΩ/10KΩ programming.
	---	Analog Monitor Functions - Selection of Voltage/Current Monitoring 5V/10V.
2.Display	---	Vout: 4 digits, accuracy: 0.05% of rated output voltage +/-1 count.
	---	Iout: 4 digits, accuracy: 0.2% of rated output current +/-1 count.
3.Front Panel Buttons Indications	---	OUTPUT ON, ALARM, PREVIEW, FINE, COMMUNICATION, PROTECTION, CONFIGURATION, SYSTEM, SEQUENCER.
4.Front Panel Display Indications	---	Voltage, Current, Power, CV, CC, CP, External Voltage, External Current, Address, LFP Autostart, Safetstart, Foldback V/I, Remote (communication), RS/USB/LAN/Optional communication interface, Trigger, Load/Store Cell.
5.Circuit breaker	---	The AC supply for the Power System unit is protected by 80A circuit breakers. The CB's are accessible on the front panel of the cabinet.

ENVIRONMENTAL CONDITIONS

1.Operating temperature (*3)	---	0~50^{O}C, 100% load.
2.Storage temperature	---	-25~65^{O}C.
3.Operating humidity	---	20~90% RH (no condensation).
4.Storage humidity	---	10~95% RH (no condensation).
5.Altitude (*14)	---	Operating: 10000ft (3000m), output current derating 2%/100m or Ta derating 1^{O}C/100m above 2000m. Non-operating: 40000ft (12000m).

MECHANICAL

1.Cooling	---	Forced air cooling by power supply internal fans. Airflow direction: From cabinet front panel to rear.
2.Weight	Kg	Less than 200Kg.
3.Dimensions (WxHxD)	mm	W: 553, H: 1028 (With Castors; Without casrors cabinet hight is 947), D: 902.
4.Vibration (Package transportation)	---	ISTA 1H: 2014, Method: ASTM D4728 Random vibration test.
5.Shock & Drop (Package transportation)	---	ISTA 1H: 2014, Drop test Method: ASTM D5276 free fall; Rotation edge drop test: ASTM D6179 Rotational drop.

SAFETY/EMC

1.Safety standards	---	IEC 61010-1:2010, IEC 61010-1:2010/AMD1:2016
1.1.Interface classification	---	Vout≤50V Models: Output, J1, J2, J3, J4, J5, J6, J7, J8 (sense) and J9 (communication options) are Non Hazardous.
		60≤Vout≤600V Models: Output and J8 (sense) are Hazardous. J1, J2, J3, J4, J5, J6, J7 and J9 (communication options) are Non Hazardous.
1.2.Withstand voltage	---	Vout≤50V Models: Input – Output & J8 (sense), J1, J2, J3, J4, J5, J6, J7 & J9 (communication options): 4242VDC 1min. Input – Ground: 2835VDC 1min.
		60V≤Vout≤100V Models: Input – Output & J8 (sense), J1, J2, J3, J4, J5, J6, J7 & J9 (communication options): 4242VDC 1min. Output & J8 (sense) – J1, J2, J3, J4, J5, J6, J7 & J9 (communication options): 850VDC 1min. Output & J8 (sense) – Ground: 1500VDC 1min. Input – Ground: 2835VDC 1min.
		100V<Vout≤600V Models: Input – Output & J8 (sense), J1, J2, J3, J4, J5, J6, J7 & J9 (communication options): 4242VDC 1min. Output & J8 (sense) – J1, J2, J3, J4, J5, J6, J7 & J9 (communication options): 1275VDC 1min. Output & J8 (sense) – Ground: 2500VDC 1min. Input – Ground: 2835VDC 1min.
2.EMC standards (*15) (*18)	---	IEC/EN61204-3 Industrial environment
2.1.Conducted emission (*18)	---	IEC/EN61204-3 Industrial environment, Annex H table H.1, FCC Part 15-A, VCCI-A.
2.2.Radiated emission (*18)	---	IEC/EN61204-3 Industrial environment, Annex H table H.3 and H.4, FCC Part 15-A, VCCI-A.

REVISION:
IA979-01-01

NOTES:
*1: Minimum voltage is guaranteed to maximum 0.1% of rated output voltage.
*2: Minimum current is guaranteed to maximum 0.2% of rated output current.
*3: Model: 10V – Max. ambient temperature is 40°C.
*4: For cases where conformance to various safety standards (IEC, etc…) is required, to be described as 190-240Vac (50/60Hz) for 3-Phase 200V models and 380~480Vac (50/60Hz) for 3-Phase 480V models.
*5: 3-Phase 200V models: At 200Vac input voltage, 3-Phase 480V: At 380Vac input voltage. With rated output power.
*6: 3-Phase 200V models: 170~265Vac, 3-Phase 480V models: 342~528Vac. Constant load.
*7: From No-Load to Full-Load, constant input voltage. Measured at the sensing point in Remote Sense.
*8: The maximum voltage on the power system terminals must not exceed the rated voltage.
*9: From 10% to 90% of Rated Output Voltage at rated resistive load.
*10: From 90% to 10% of Rated Output Voltage.
*11: For load voltage change, equal to the unit voltage rating, constant input voltage.
*12: The Constant Current programming, readback and monitoring accuracy do not include the warm-up and Load regulation thermal drift.
*13: Measured at the sensing point.
*14: For 10V model, Ta derating 2°C/100m.
*15: Signal and control ports interface cables length: Less than 3m, DC output power port cables length: Less than 30m.
*16: Max. ambient temperature for IEEE is 40C.
*17: For 10V model only: Max. output current for IEEE is 4500A up to 40C
*18: EMC specs based on GSP15kW single unit.
*19: For steady state only.

5.2 45kW Series Specifications

Unless otherwise noted, specifications are warranted over the ambient temperature range of 0° to 50° Celsius.

OUTPUT RATING		20-2250	30-1530	40-1125	50-900	60-765	80-585	100-450	150-306	200-225	300-153	400-117	500-90	600-76.5
1.Rated output voltage (*1)	V	20	30	40	50	60	80	100	150	200	300	400	500	600
2.Rated output current (*2)	A	2250	1530	1125	900	765	585	450	306	225	153	117	90	76.5
3.Rated output power	W	45000	45900	45000	45000	45900	46800	45000	45900	45000	45900	46800	45000	45900

INPUT CHARACTERISTICS		V	20	30	40	50	60	80	100	150	200	300	400	500	600
1.Input voltage/freq. 3 phase, 3 wire+ground (*3)		---	3-Phase, 200V models: 170~265Vac, 47~63Hz (Covers 200/230Vac).												
			3-Phase, 480V models: 342~528Vac, 47~63Hz (Covers 380/400/415/440/460/480Vac).												
2.Maximum Input current at 100% load	3-Phase, 200V models:	---	160A @ 200Vac.												
	3-Phase, 480V models:		84.3A @ 380Vac.												
3.Power Factor (Typ.)		---	0.94 @ 200/380Vac, rated output power.												
4.Efficiency (minimum) (*4)		%	87	88	89				90						

CONSTANT VOLTAGE MODE		V	20	30	40	50	60	80	100	150	200	300	400	500	600
1.Max. Line regulation (*5)		---	0.01% of rated output voltage.												
2.Max. Load regulation (*6)		---	0.01% of rated output voltage +5mV.												
3.Temperature coefficient		---	50PPM/^{O}C from rated output voltage, following 30 minutes warm-up.												
4.Temperature stability		---	0.01% of rated Vout over 8hrs. interval following 30 minutes warm-up. Constant line, load & temperature.												
5.Warm-up drift		---	Less than 0.05% of rated output voltage +2mV over 30 minutes following power on.												
6.Remote sense compensation/wire (*7)		V	2	5	5	5	5	5	5	5	5	5	5	5	5
7.Up-prog. response time (*8)		mS	30	30	30	50	50	50	50	50	50	50	100	100	100
10.Down-prog. response time	Full load (*8)	mS	50	80	80	80	80	100	100	100	100	100	150	200	200
	No load (*9)		600	800	900	950	1000	1200	1900	2000	2500	3000	4000	4000	3000
11.Transient response time		---	Time for output voltage to recover within 0.5% of its rated output for a load change 10~90% of rated output current. Output set point: 10~100%, Local sense. Less than 1mS for models up to and including 100V. 2mS for models above 100V.												

CONSTANT CURRENT MODE	V	20	30	40	50	60	80	100	150	200	300	400	500	600
1.Max. Line regulation (*5)	---	0.05% of rated output current.												
2.Max. Load regulation (*10)	---	0.08% of rated output current.												
3.Temperature coefficient	---	20V~100V models: 100PPM/^{O}C from rated output current, following 30 minutes warm-up.												
		150V~600V models: 70PPM/^{O}C from rated output current, following 30 minutes warm-up.												
4.Temperature stability	---	0.01% of rated Iout over 8hrs. interval following 30 minutes warm-up. Constant line, load & temperature.												
5.Warm-up drift	---	20V~100V models: Less than +/-0.25% of rated output current over 30 minutes following power on.												
		150V~600V models: Less than +/-0.15% of rated output current over 30 minutes following power on.												

ANALOG PROGRAMMING AND MONITORING (ISOLATED FROM THE OUTPUT)

1.Vout voltage programming	---	0~100%, 0~5V or 0~10V, user selectable. Accuracy and linearity: +/-0.15% of rated Vout.
2.Iout voltage programming (*11)	---	0~100%, 0~5V or 0~10V, user selectable. Accuracy and linearity: +/-0.4% of rated Iout.
3.Vout resistor programming	---	0~100%, 0~5/10KΩ full scale, user selectable. Accuracy and linearity: +/-0.5% of rated Vout.
4.Iout resistor programming (*11)	---	0~100%, 0~5/10KΩ full scale, user selectable. Accuracy and linearity: +/-0.5% of rated Iout.
5.Output voltage monitor (*16)	---	0~5V or 0~10V, user selectable. Accuracy: +/-0.5% of rated Vout.
6.Output current monitor (*11) (*16)	---	0~5V or 0~10V, user selectable. Accuracy: +/-0.5% of rated Iout.

SIGNALS AND CONTROLS (ISOLATED FROM THE OUTPUT)

1.Power supply OK #1 signal	---	Power supply output monitor. Open collector. Output On: On. Output Off: Off. Maximum Voltage: 30V. Maximum Sink Current: 10mA.
2.CV/CC signal	---	CV/CC Monitor. Open collector. CC mode: On. CV mode: Off. Maximum Voltage: 30V. Maximum Sink Current: 10mA.
3.LOCAL/REMOTE Analog control	---	Enable/Disable analog programming control by electrical signal or dry contact. Remote: 0~0.6V or short. Local: 2~30V or open.
4.LOCAL/REMOTE Analog signal	---	Analog programming control monitor signal. Open collector. Remote: On. Local: Off. Maximum Voltage: 30V. Maximum Sink Current: 10mA.
5.ENABLE/DISABLE signal	---	Enable/Disable PS output by electrical signal or dry contact. 0~0.6V or short, 2~30V or open. User selectable logic.
6.INTERLOCK (ILC) control	---	Enable/Disable PS output by electrical signal or dry contact. Output ON: 0~0.6V or short. Output OFF: 2~30V or open.
7.Programmed signals	---	Two open drain programmable signals. Maximum voltage 25V. Maximum sink current 100mA (shunted by 27V zener).
8.TRIGGER IN / TRIGGER OUT signals	---	Maximum low level input voltage = 0.8V. Minimum high level input voltage = 2.5V. Maximum high level input = 5V positive edge trigger: tw = 10us minimum. Tr,Tf = 1us maximum. Min delay between 2 pulses 1ms.
9.DAISY_IN/SO control signal	---	By electrical Voltage: 0~0.6V/2~30V or dry contact.
10.DAISY_OUT/PS_OK #2 signal	---	4~5V = OK, 0V (500Ω impedance) = Fail.

FUNCTIONS AND FEATURES

1.Parallel operation	---	Consult with manufacturer.
2.Constant power control	---	Limits the output power to a programmed value. Programming via the communication ports or the front panel.
3.Output resistance control	---	Emulates series resistance. Resistance range: 1~1000mΩ. Programming via the communication ports or the front panel.
4.Slew rate control	---	Programmable Output rise and Output fall slew rate. Programming range: 0.0001~999.99 V/mS. or A/mS. Programming via communication ports or front panel.
5.Arbitrary waveforms	---	Profiles of up to 100 steps can be stored in 4 memory cells. Activation by command via communication ports or front panel.

PROGRAMMING AND READBACK (USB, LAN, RS232/485, Optional (*14) Interfaces)

	V	20	30	40	50	60	80	100	150	200	300	400	500	600
1.Vout programming accuracy (*12)	---	0.05% of rated output voltage.												
2.Iout programming accuracy (*11)	---	0.3% of rated output current.												
3.Vout programming resolution	---	0.002% of rated output voltage.												
4.Iout programming resolution	---	0.002% of rated output current.												
5.Vout readback accuracy	---	0.05% of rated output voltage.												
6.Iout readback accuracy (*11)	---	0.2% of rated output current.												
7.Vout readback resolution	% of rated output voltage	0.006%	0.004%	0.003%	0.003%	0.002%	0.002%	0.011%	0.007%	0.005%	0.004%	0.003%	0.003%	0.002%
8.Iout readback resolution	% of rated output current	0.005%	0.007%	0.009%	0.0012%	0.002%	0.002%	0.003%	0.004%	0.005%	0.007%	0.009%	0.0012%	0.0014%

PROTECTIVE FUNCTIONS	V	20	30	40	50	60	80	100	150	200	300	400	500	600
1.Foldback protection	---	Output shut-down when power supply changes mode from CV or Power Limit to CC mode or from CC or Power Limit to CV mode. User presetable. Reset by AC input recycle in autostart mode, by Power Switch, by OUTPUT button, by rear panel or by communication.												
2.Over-voltage protection (OVP)	---	Output shut-down. Reset by AC input recycle in autostart mode, by Power Switch, by OUTPUT button, by rear panel or by communication.												
3.Over-voltage programming range	V	1~24	2~36	2~44.1	5~55.125	5~66.15	5~88.2	5~110.25	5~165.37	5~220.5	5~330.75	5~441	5~551.25	5~661.5
4.Over-voltage programming accuracy	---	+/-1% of rated output voltage.												
5.Output under voltage limit (UVL)	---	Prevents from adjusting Vout below limit. Does not apply in analog programming. Preset by front panel or communication port.												
6.Over temperature protection	---	Shuts down the output. Auto recovery by autostart mode.												
7.Output under voltage protection (UVP)	---	Prevents adjustment of Vout below limit. P.S output turns Off during under voltage condition. Reset by AC input recycle in autostart mode, by Power Switch, by OUTPUT button, by rear panel or by communication.												

FRONT PANEL

1.Control functions	---	Multiple options with 2 Encoders.
	---	Vout/Iout/Power Limit manual adjust.
	---	OVP/UVL/UVP manual adjust.
	---	Protection Functions - OVP, UVL, UVP, Foldback, OCL, ENA, ILC.
	---	Communication Functions - Selection of LAN, RS232, RS485, USB or Optional communication interface.
	---	Output ON/OFF. Front Panel Lock.
	---	Communication Functions - Selection of Baud Rate, Address, IP and communication language.
	---	Analog Control Functions - Selection Voltage/resistive programming 5V/10V, 5KΩ/10KΩ programming.
	---	Analog Monitor Functions - Selection of Voltage/Current Monitoring 5V/10V.
2.Display	---	Vout: 4 digits, accuracy: 0.05% of rated output voltage +/-1 count.
	---	Iout: 4 digits, accuracy: 0.2% of rated output current +/-1 count.
3.Front Panel Buttons Indications	---	OUTPUT ON, ALARM, PREVIEW, FINE, COMMUNICATION, PROTECTION, CONFIGURATION, SYSTEM, SEQUENCER.
4.Front Panel Display Indications	---	Voltage, Current, Power, CV, CC, CP, External Voltage, External Current, Address, LFP Autostart, Safetstart, Foldback V/I, Remote (communication), RS/USB/LAN/Optional communication interface, Trigger, Load/Store Cell.
5.Circuit breaker	---	The AC supply for the Power System unit is protected by 3x80A circuit breakers for 200Vac Input & 1x40A+1x80A circuit breakers for 380Vac Input. The CB's are accessible on the front panel of the cabinet.

ENVIRONMENTAL CONDITIONS

1.Operating temperature	---	0~50^{O}C, 100% load.
2.Storage temperature	---	-25~65^{O}C.
3.Operating humidity	---	20~90% RH (no condensation).
4.Storage humidity	---	10~95% RH (no condensation).
5.Altitude	---	Operating: 10000ft (3000m), output current derating 2%/100m or Ta derating 1^{O}C/100m above 2000m. Non-operating: 40000ft (12000m).

MECHANICAL

1.Cooling	---	Forced air cooling by power supply internal fans. Airflow direction: From cabinet front panel to rear.
2.Weight	Kg	Less than 177Kg.
3.Dimensions (WxHxD)	mm	W: 553, H: 1028 (With Castors; Without casrors cabinet hight is 947), D: 902.
4.Vibration (Package transportation)	---	ISTA 1H: 2014, Method: ASTM D4728 Random vibration test.
5.Shock & Drop (Package transportation)	---	ISTA 1H: 2014, Drop test Method: ASTM D5276 free fall; Rotation edge drop test: ASTM D6179 Rotational drop.

SAFETY/EMC

1.Safety standards	---	IEC 61010-1:2010, IEC 61010-1:2010/AMD1:2016
1.1.Interface classification	---	Vout≤50V Models: Output, J1, J2, J3, J4, J5, J6, J7, J8 (sense) and J9 (communication options) are Non Hazardous. 60≤Vout≤600V Models: Output and J8 (sense) are Hazardous. J1, J2, J3, J4, J5, J6, J7 and J9 (communication options) are Non Hazardous.
1.2.Withstand voltage	---	Vout≤50V Models: Input – Output & J8 (sense), J1, J2, J3, J4, J5, J6, J7 & J9 (communication options): 4242VDC 1min. Input – Ground: 2835VDC 1min. 60V≤Vout≤100V Models: Input – Output & J8 (sense), J1, J2, J3, J4, J5, J6, J7 & J9 (communication options): 4242VDC 1min. Output & J8 (sense) – J1, J2, J3, J4, J5, J6, J7 & J9 (communication options): 850VDC 1min. Output & J8 (sense) – Ground: 1500VDC 1min. Input – Ground: 2835VDC 1min. 100V<Vout≤600V Models: Input – Output & J8 (sense), J1, J2, J3, J4, J5, J6, J7 & J9 (communication options): 4242VDC 1min. Output & J8 (sense) – J1, J2, J3, J4, J5, J6, J7 & J9 (communication options): 1275VDC 1min. Output & J8 (sense) – Ground: 2500VDC 1min. Input – Ground: 2835VDC 1min.
2.EMC standards (*13) (*15)	---	IEC/EN61204-3 Industrial environment
2.1.Conducted emission (*15)	---	IEC/EN61204-3 Industrial environment, Annex H table H.1, FCC Part 15-A, VCCI-A.
2.2.Radiated emission (*15)	---	IEC/EN61204-3 Industrial environment, Annex H table H.3 and H.4, FCC Part 15-A, VCCI-A.

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NOTES:
*1: Minimum voltage is guaranteed to maximum 0.1% of rated output voltage.
*2: Minimum current is guaranteed to maximum 0.2% of rated output current.
*3: For cases where conformance to various safety standards (IEC, etc…) is required, to be described as 190-240Vac (50/60Hz) for 3-Phase 200V models and 380~480Vac (50/60Hz) for 3-Phase 480V models.
*4: 3-Phase 200V models: At 200Vac input voltage, 3-Phase 480V: At 380Vac input voltage. With rated output power.
*5: 3-Phase 200V models: 170~265Vac, 3-Phase 480V models: 342~528Vac. Constant load.
*6: From No-Load to Full-Load, constant input voltage. Measured at the sensing point in Remote Sense.
*7: The maximum voltage on the power system terminals must not exceed the rated voltage.
*8: From 10% to 90% of Rated Output Voltage at rated resistive load.
*9: From 90% to 10% of Rated Output Voltage.
*10: For load voltage change, equal to the unit voltage rating, constant input voltage.
*11: The Constant Current programming, readback and monitoring accuracy do not include the warm-up and Load regulation thermal drift.
*12: Measured at the sensing point.
*13: Signal and control ports interface cables length: Less than 3m, DC output power port cables length: Less than 30m.
*14: Max. ambient temperature for IEEE is 40C.
*15: EMC specs based on GSP15kW series.
*16: For steady state only.

5.3 30kW Series Specifications

Unless otherwise noted, specifications are warranted over the ambient temperature range of 0° to 50° Celsius.

OUTPUT RATING		10-3000	20-1500	30-1020	40-750	50-600	60-510	80-390	100-300	150-204	200-150	300-102	400-78	500-60	600-51
1.Rated output voltage (*1)	V	10	20	30	40	50	60	80	100	150	200	300	400	500	600
2.Rated output current (*2)	A	3000(*3)	1500	1020	750	600	510	390	300	204	150	102	78	60	51
3.Rated output power	W	30000	30000	30600	30000	30000	30600	31200	30000	30600	30000	30600	31200	30000	30600

INPUT CHARACTERISTICS		V	10	20	30	40	50	60	80	100	150	200	300	400	500	600
1.Input voltage/freq. 3 phase, 3 wire+ground (*4)		---	3-Phase, 200V models: 170~265Vac, 47~63Hz (Covers 200/230Vac).													
			3-Phase, 480V models: 342~528Vac, 47~63Hz (Covers 380/400/415/440/460/480Vac).													
2.Maximum Input current at 100% load	3-Phase, 200V models:	---	106.8A @ 200Vac.													
	3-Phase, 480V models:		56.2A @ 380Vac.													
3.Power Factor (Typ.)		---	0.94 @ 200/380Vac, rated output power.													
4.Efficiency (minimum) (*5)		%	87		88	89		90								

CONSTANT VOLTAGE MODE		V	10	20	30	40	50	60	80	100	150	200	300	400	500	600
1.Max. Line regulation (*6)		---	0.01% of rated output voltage.													
2.Max. Load regulation (*7)		---	0.01% of rated output voltage +5mV.													
3.Temperature coefficient		---	50PPM/^{O}C from rated output voltage, following 30 minutes warm-up.													
4.Temperature stability		---	0.01% of rated Vout over 8hrs. interval following 30 minutes warm-up. Constant line, load & temperature.													
5.Warm-up drift		---	Less than 0.05% of rated output voltage +2mV over 30 minutes following power on.													
6.Remote sense compensation/wire (*8)		V	2	2	5	5	5	5	5	5	5	5	5	5	5	5
7.Up-prog. response time (*9)		mS	30	30	30	30	50	50	50	50	50	50	50	100	100	100
10.Down-prog. response time	Full load (*9)	mS	50	50	80	80	80	80	100	100	100	100	100	150	200	200
	No load (*10)		300	600	800	900	950	1000	1200	1900	2000	2500	3000	4000	4000	3000
11.Transient response time		---	Time for output voltage to recover within 0.5% of its rated output for a load change 10~90% of rated output current. Output set point: 10~100%, Local sense. Less than 1mS for models up to and including 100V. 2mS for models above 100V.													

CONSTANT CURRENT MODE	V	10	20	30	40	50	60	80	100	150	200	300	400	500	600
1.Max. Line regulation (*6)	---	0.05% of rated output current.													
2.Max. Load regulation (*11)	---	0.08% of rated output current.													
3.Temperature coefficient	---	10V~100V models: 100PPM/^{O}C from rated output current, following 30 minutes warm-up.													
		150V~600V models: 70PPM/^{O}C from rated output current, following 30 minutes warm-up.													
4.Temperature stability	---	0.01% of rated Iout over 8hrs. interval following 30 minutes warm-up. Constant line, load & temperature.													
5.Warm-up drift	---	10V~100V models: Less than +/-0.25% of rated output current over 30 minutes following power on.													
		150V~600V models: Less than +/-0.15% of rated output current over 30 minutes following power on.													

ANALOG PROGRAMMING AND MONITORING (ISOLATED FROM THE OUTPUT)

1.Vout voltage programming	---	0~100%, 0~5V or 0~10V, user selectable. Accuracy and linearity: +/-0.15% of rated Vout.
2.Iout voltage programming (*12)	---	0~100%, 0~5V or 0~10V, user selectable. Accuracy and linearity: +/-0.4% of rated Iout.
3.Vout resistor programming	---	0~100%, 0~5/10KΩ full scale, user selectable. Accuracy and linearity: +/-0.5% of rated Vout.
4.Iout resistor programming (*12)	---	0~100%, 0~5/10KΩ full scale, user selectable. Accuracy and linearity: +/-0.5% of rated Iout.
5.Output voltage monitor (*19)	---	0~5V or 0~10V, user selectable. Accuracy: +/-0.5% of rated Vout.
6.Output current monitor (*12) (*19)	---	0~5V or 0~10V, user selectable. Accuracy: +/-0.5% of rated Iout.

SIGNALS AND CONTROLS (ISOLATED FROM THE OUTPUT)

1.Power supply OK #1 signal	---	Power supply output monitor. Open collector. Output On: On. Output Off: Off. Maximum Voltage: 30V. Maximum Sink Current: 10mA.
2.CV/CC signal	---	CV/CC Monitor. Open collector. CC mode: On. CV mode: Off. Maximum Voltage: 30V. Maximum Sink Current: 10mA.
3.LOCAL/REMOTE Analog control	---	Enable/Disable analog programming control by electrical signal or dry contact. Remote: 0~0.6V or short. Local: 2~30V or open.
4.LOCAL/REMOTE Analog signal	---	Analog programming control monitor signal. Open collector. Remote: On. Local: Off. Maximum Voltage: 30V. Maximum Sink Current: 10mA.
5.ENABLE/DISABLE signal	---	Enable/Disable PS output by electrical signal or dry contact. 0~0.6V or short, 2~30V or open. User selectable logic.
6.INTERLOCK (ILC) control	---	Enable/Disable PS output by electrical signal or dry contact. Output ON: 0~0.6V or short. Output OFF: 2~30V or open.
7.Programmed signals	---	Two open drain programmable signals. Maximum voltage 25V. Maximum sink current 100mA (shunted by 27V zener).
8.TRIGGER IN / TRIGGER OUT signals	---	Maximum low level input voltage = 0.8V. Minimum high level input voltage = 2.5V. Maximum high level input = 5V positive edge trigger: tw = 10us minimum. Tr,Tf = 1us maximum. Min delay between 2 pulses 1ms.
9.DAISY_IN/SO control signal	---	By electrical Voltage: 0~0.6V/2~30V or dry contact.
10.DAISY_OUT/PS_OK #2 signal	---	4~5V = OK, 0V (500Ω impedance) = Fail.

FUNCTIONS AND FEATURES

1.Parallel operation	---	Consult with manufacturer.
2.Constant power control	---	Limits the output power to a programmed value. Programming via the communication ports or the front panel.
3.Output resistance control	---	Emulates series resistance. Resistance range: 1~1000mΩ. Programming via the communication ports or the front panel.
4.Slew rate control	---	rogrammable Output rise and Output fall slew rate. Programming range: 0.0001~999.99 V/mS. or A/mS. Programming via communication ports or front panel.
5.Arbitrary waveforms	---	Profiles of up to 100 steps can be stored in 4 memory cells. Activation by command via communication ports or front panel.

PROGRAMMING AND READBACK (USB, LAN, RS232/485, Optional (*19) (*20) Interfaces)

	V	10	20	30	40	50	60	80	100	150	200	300	400	500	600
1.Vout programming accuracy (*13)	---	0.05% of rated output voltage.													
2.Iout programming accuracy (*12)	---	0.3% of rated output current.													
3.Vout programming resolution	---	0.002% of rated output voltage.													
4.Iout programming resolution	---	0.002% of rated output current.													
5.Vout readback accuracy	---	0.05% of rated output voltage.													
6.Iout readback accuracy (*12)	---	0.2% of rated output current.													
7.Vout readback resolution	% of rated output voltage	0.011%	0.006%	0.004%	0.003%	0.003%	0.002%	0.002%	0.011%	0.007%	0.005%	0.004%	0.003%	0.003%	0.002%
8.Iout readback resolution	% of rated output current	0.004%	0.008%	0.01%	0.0014%	0.002%	0.002%	0.003%	0.005%	0.005%	0.001%	0.001%	0.0014%	0.002%	0.002%

PROTECTIVE FUNCTIONS	V	10	20	30	40	50	60	80	100	150	200	300	400	500	600
1.Foldback protection	---	Output shut-down when power supply changes mode from CV or Power Limit to CC mode or from CC or Power Limit to CV mode. User presetable. Reset by AC input recycle in autostart mode, by Power Switch, by OUTPUT button, by rear panel or by communication.													
2.Over-voltage protection (OVP)	---	Output shut-down. Reset by AC input recycle in autostart mode, by Power Switch, by OUTPUT button, by rear panel or by communication.													
3.Over-voltage programming range	V	0.5~12	1~24	2~36	2~44.1	5~55.125	5~66.15	5~88.2	5~110.25	5~165.37	5~220.5	5~330.75	5~441	5~551.25	5~661.5
4.Over-voltage programming accuracy	---	+/-1% of rated output voltage.													
5.Output under voltage limit (UVL)	---	Prevents from adjusting Vout below limit. Does not apply in analog programming. Preset by front panel or communication port.													
6.Over temperature protection	---	Shuts down the output. Auto recovery by autostart mode.													
7.Output under voltage protection (UVP)	---	Prevents adjustment of Vout below limit. P.S output turns Off during under voltage condition. Reset by AC input recycle in autostart mode, by Power Switch, by OUTPUT button, by rear panel or by communication.													

FRONT PANEL

1.Control functions	---	Multiple options with 2 Encoders.
	---	Vout/Iout/Power Limit manual adjust.
	---	OVP/UVL/UVP manual adjust.
	---	Protection Functions - OVP, UVL, UVP, Foldback, OCL, ENA, ILC.
	---	Communication Functions - Selection of LAN, RS232, RS485, USB or Optional communication interface.
	---	Output ON/OFF. Front Panel Lock.
	---	Communication Functions - Selection of Baud Rate, Address, IP and communication language.
	---	Analog Control Functions - Selection Voltage/resistive programming 5V/10V, 5KΩ/10KΩ programming.
	---	Analog Monitor Functions - Selection of Voltage/Current Monitoring 5V/10V.
2.Display	---	Vout: 4 digits, accuracy: 0.05% of rated output voltage +/-1 count.
	---	Iout: 4 digits, accuracy: 0.2% of rated output current +/-1 count.
3.Front Panel Buttons Indications	---	OUTPUT ON, ALARM, PREVIEW, FINE, COMMUNICATION, PROTECTION, CONFIGURATION, SYSTEM, SEQUENCER.
4.Front Panel Display Indications	---	Voltage, Current, Power, CV, CC, CP, External Voltage, External Current, Address, LFP Autostart, Safetstart, Foldback V/I, Remote (communication), RS/USB/LAN/Optional communication interface, Trigger, Load/Store Cell.
5.Circuit breaker	---	The AC supply for the Power System unit is protected by 2x80A circuit breakers for 200Vac & 2x40A circuit breakers for 380Vac. The CB's are accessible on the front panel of the cabinet.

ENVIRONMENTAL CONDITIONS

1.Operating temperature (*3)	---	0~50^{O}C, 100% load.
2.Storage temperature	---	-25~65^{O}C.
3.Operating humidity	---	20~90% RH (no condensation).
4.Storage humidity	---	10~95% RH (no condensation).
5.Altitude (*14)	---	Operating: 10000ft (3000m), output current derating 2%/100m or Ta derating 1^{O}C/100m above 2000m. Non-operating: 40000ft (12000m).

MECHANICAL

1.Cooling	---	Forced air cooling by power supply internal fans. Airflow direction: From cabinet front panel to rear.
2.Weight	Kg	Less than 153Kg.
3.Dimensions (WxHxD)	mm	W: 553, H: 1028 (With Castors; Without casrors cabinet hight is 947), D: 902.
4.Vibration (Package transportation)	---	ISTA 1H: 2014, Method: ASTM D4728 Random vibration test.
5.Shock & Drop (Package transportation)	---	ISTA 1H: 2014, Drop test Method: ASTM D5276 free fall; Rotation edge drop test: ASTM D6179 Rotational drop.

SAFETY/EMC

1.Safety standards	---	IEC 61010-1:2010, IEC 61010-1:2010/AMD1:2016
1.1.Interface classification	---	Vout≤50V Models: Output, J1, J2, J3, J4, J5, J6, J7, J8 (sense) and J9 (communication options) are Non Hazardous.
		60≤Vout≤600V Models: Output and J8 (sense) are Hazardous. J1, J2, J3, J4, J5, J6, J7 and J9 (communication options) are Non Hazardous.
1.2.Withstand voltage	---	Vout≤50V Models: Input – Output & J8 (sense), J1, J2, J3, J4, J5, J6, J7 & J9 (communication options): 4242VDC 1min. Input – Ground: 2835VDC 1min.
		60V≤Vout≤100V Models: Input – Output & J8 (sense), J1, J2, J3, J4, J5, J6, J7 & J9 (communication options): 4242VDC 1min. Output & J8 (sense) – J1, J2, J3, J4, J5, J6, J7 & J9 (communication options): 850VDC 1min. Output & J8 (sense) – Ground: 1500VDC 1min. Input – Ground: 2835VDC 1min.
		100V<Vout≤600V Models: Input – Output & J8 (sense), J1, J2, J3, J4, J5, J6, J7 & J9 (communication options): 4242VDC 1min. Output & J8 (sense) – J1, J2, J3, J4, J5, J6, J7 & J9 (communication options): 1275VDC 1min. Output & J8 (sense) – Ground: 2500VDC 1min. Input – Ground: 2835VDC 1min.
2.EMC standards (*15) (*18)	---	IEC/EN61204-3 Industrial environment
2.1.Conducted emission (*18)	---	IEC/EN61204-3 Industrial environment, Annex H table H.1, FCC Part 15-A, VCCI-A.
2.2.Radiated emission (*18)	---	IEC/EN61204-3 Industrial environment, Annex H table H.3 and H.4, FCC Part 15-A, VCCI-A.

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NOTES:
*1: Minimum voltage is guaranteed to maximum 0.1% of rated output voltage.
*2: Minimum current is guaranteed to maximum 0.2% of rated output current.
*3: Model: 10V – Max. ambient temperature is 30°C. Output current derate 30A / 1°C
*4: For cases where conformance to various safety standards (IEC, etc…) is required, to be described as 190-240Vac (50/60Hz) for 3-Phase 200V models and 380~480Vac (50/60Hz) for 3-Phase 480V models.
*5: 3-Phase 200V models: At 200Vac input voltage, 3-Phase 480V: At 380Vac input voltage. With rated output power.
*6: 3-Phase 200V models: 170~265Vac, 3-Phase 480V models: 342~528Vac. Constant load.
*7: From No-Load to Full-Load, constant input voltage. Measured at the sensing point in Remote Sense.
*8: The maximum voltage on the power system terminals must not exceed the rated voltage.
*9: From 10% to 90% of Rated Output Voltage at rated resistive load.
*10: From 90% to 10% of Rated Output Voltage.
*11: For load voltage change, equal to the unit voltage rating, constant input voltage.
*12: The Constant Current programming, readback and monitoring accuracy do not include the warm-up and Load regulation thermal drift.
*13: Measured at the sensing point.
*14: For 10V model, Ta derating 2°C/100m.
*15: Signal and control ports interface cables length: Less than 3m, DC output power port cables length: Less than 30m.
*16: Max. ambient temperature for IEEE is 40C.
*17: For 10V model only: Max. output current for IEEE is 4500A up to 40C
*18: EMC specs based on GSP15kW single unit.
*19: For steady state only.