

Precautions for Use

WARNING

- Do not modify, disassemble, or open this product. Failure to do so can cause electric shock hazard. TDK-Lambda cannot be held responsible for damage caused by modifications to this product.
- Internal voltage can be retained inside the product. Do not touch any parts inside the product because there can be high-voltage and high-temperature parts even when the electric current is not applied. This can cause an electric shock hazard or burn injury.
- There can be high-voltage and high-temperature parts even in products without a cover. Do not touch them. Touching them can cause an electric shock hazard or burn injury.
- While electric current is being applied, keep your hands and face away from it. This may cause injury or an unexpected accident.

CAUTION

- Be sure to read the catalogue and instruction manual before using this product. For strictly accurate information, request the specifications of the delivered product to check the information. Incorrect usage could lead to an electric shock, damage to the product or a fire hazard.
 - If there are differences between the specific information given for your product and this document, the specific information given for your product has priority.
 - Use this product within the specified input voltage, output power, output voltage, output current, and range of ambient temperature/ambient humidity. Using this product in conditions beyond the specification limits can shorten the lifetime of the product, or can cause, damage to the product, electric shock, or a fire hazard.
Also, measure the temperature inside the device to check that there are no problems.
 - Check the direction the product should face and the conditions for ventilation in the specifications of the delivered product, and use the product in the correct manner.
 - Disconnect the power input before connecting inputs and outputs.
 - If an internal fuse becomes burned out, do not use the unit by replacing the fuse. This can cause trouble inside the unit. Be sure to request us to repair the unit.
 - Insert fuses in the input circuit for products in which protection circuits (elements, fuses, etc.) are not installed, to prevent smoking or burning. Also, for products with protection circuits installed inside, an appropriate use of protection circuits is recommended as there is a possibility that the internal protection circuit may not operate depending on the usage conditions.
 - Use only the fuses specified or recommended by TDK-Lambda for external fuses.
 - This product is designed and manufactured as a component part to be installed in electronic devices. Attach the warning label to the unit and insert the notes in the instruction manual.
 - Malfunction and failure may be caused if this product is used in a strong electromagnetic field.
 - Failure may be caused in the power supply unit due to corrosion if used in environments with corrosive gas (hydrogen sulfide, sulfur dioxide, etc.).
 - Malfunction and failure may be caused if this product is used in environments with conductive substances or dust.
 - Be sure to take protective measures against the surge voltage caused by lightning, etc. Damage to the unit may be caused due to irregular voltage.
 - Connect the frame ground terminal of the power supply unit to the earth terminal of the device, for safety and to reduce noise. If grounding is not made, it may cause an electric shock hazard.
 - It may be necessary to periodically replace certain parts that have a limited lifetime, for example fans. Set an appropriate overhaul interval period for the performance of maintenance. There may be some cases where overhaul maintenance cannot be conducted due to unavailability of parts due to production discontinuation.
 - This product might fail accidentally or through unexpected conditions. When using this product with application devices, in which an extremely high reliability is required (Nuclear-related devices, traffic control devices, medical devices, etc.), be sure to ensure that a fail-safe condition is designed into the system.
- * EMI or immunity are measured in TDK-Lambda's standard conditions. It is not guaranteed that this product meets industry standards or regulations when used in different conditions of mounting and wiring. Assess and evaluate in the end system before use.
 - * To export this product, follow the necessary procedures of application for the export license by the government complying with their regulations.
 - * The information in this catalogue is subject to change without prior notice.

Additional Safety Precautions

Introduction

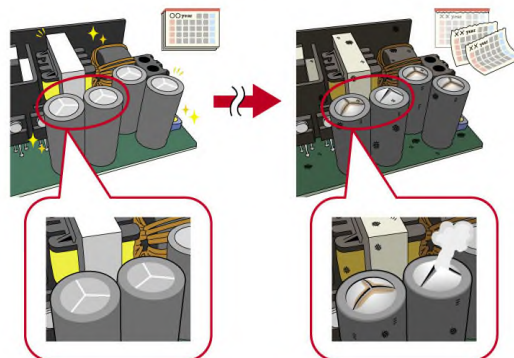
Power supplies convert an AC input to a regulated, isolated DC output or DC outputs using high voltage switching circuits. They are designed, tested to international standards and manufactured to ensure they are safe and provide reliable operation. If the power supply is installed incorrectly, operated above the recommended ratings or exposed to contamination, damage may occur and lead to early failures.

Several potential issues are detailed below and how best to counter them.

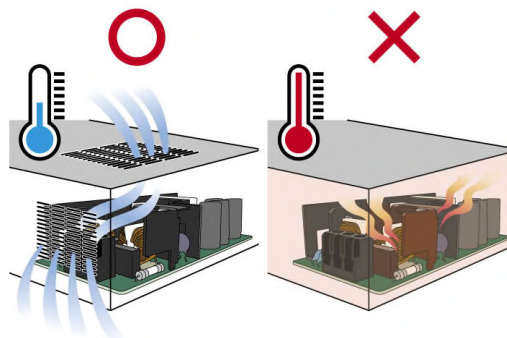
Excessive Heat and Managing Product Life

High voltage electrolytic capacitors are used to store energy to avoid an output loss during brief interruptions of AC power. Lower voltage capacitors on the DC output help filter ripple voltages and reduce transients that may occur during rapid changes in load.

These capacitors contain small amounts of electrolyte which will gradually evaporate over time, depending upon its operating temperature. Generally, for every 10°C rise in temperature, the capacitor lifetime halves. At the end of its life, internal pressure may cause the capacitor to vent through engineered weak points in the can. As there is very little or no free electrolyte left in the can, the release is typically gaseous and unlikely to cause a short circuit; however it will be hot.



The countermeasure is during the system design, to ensure that there is sufficient distance around the power supply to allow free air to circulate. If a fan is being used to cool the product, the airflow should be directed across the power supply as detailed in the installation manual. Temperature measurements of key components should be performed inside the end system.



Furthermore, inspection of the power supply should be carried out during routine servicing of the end equipment to visually check the condition of the capacitors. Estimated capacitor life data can be found in the reliability reports posted on the website. This can be used to determine if a product needs to be replaced as part of a preventative maintenance program.

The Operating Environment

If the power supply is being operated in a dirty environment, ensure that no airborne pollutants, particularly those that are conductive, can enter the enclosure. Such particles include metal filings from machining or even particles from equipment that processes bank note payments. In sufficient amounts, the spacing between high voltage traces can be breached, causing sparks and power supply failure.

Similarly, moisture during high humidity (or dew) can cause even dust to become conductive.

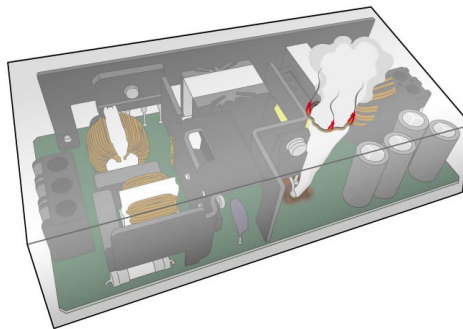
Corrosive gases should be avoided, and damage can occur from vehicle or generator exhausts and or even cooling oils vapors.

Countermeasures include replacing system fan filters, specifying power supplies with circuit board protection and internal cleaning with air pressure.

Placement of Flammable Materials

If relatively thin paper or plastic combustible materials are placed close to the power supply, these may catch fire during an abnormal condition. Such events are rare but may include surges from electrical storms.

The countermeasure is to avoid the use of combustible materials, even during system servicing. If a plastic sheet is temporarily placed over the power supply to prevent the technician from receiving an electrical shock, it may cause the power supply to generate excessive internal temperatures. Use flame retardant materials.



Excessive Mechanical Stress

Flexing or bending a power supply, particularly an open frame model, can cause stress and failure of surface mount components or printed wiring board traces. A small fracture to a component can worsen over time as natural expansion and contraction occurs. A high voltage ceramic capacitor may burn as a result.

Although our products are subjected to shock and vibration testing during development, resonance inside the end system can cause higher levels of vibration to be present.

As a countermeasure, do not use power supplies that have been mishandled or dropped. Avoid flexing the boards during installation and applying pressure to the components during handling of the product. During system vibration testing, monitor levels on the power supply too.