



PowerDirect

# SAFETY RULES

Description General

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### **Technical Support Site**

If you encounter any installation or operational issues with your product, check the pertinent section of this manual to see if the issue can be resolved by following outlined procedures.

Visit <https://www.vertiv.com/support/> for additional assistance.

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## Admonishments Used in this Document



**DANGER!** Warns of a hazard the reader **will** be exposed to that will **likely** result in death or serious injury if not avoided. (ANSI, OSHA)



**WARNING!** Warns of a potential hazard the reader **may** be exposed to that **could** result in death or serious injury if not avoided. This admonition is not used for situations that pose a risk only to equipment, software, data, or service. (ANSI)



**CAUTION!** Warns of a potential hazard the reader **may** be exposed to that **could** result in minor or moderate injury if not avoided. (ANSI, OSHA) This admonition is not used for situations that pose a risk only to equipment, data, or service, even if such use appears to be permitted in some of the applicable standards. (OSHA)



**ALERT!** Alerts the reader to an action that **must be avoided** in order to protect equipment, software, data, or service. (ISO)



**ALERT!** Alerts the reader to an action that **must be performed** in order to prevent equipment damage, software corruption, data loss, or service interruption. (ISO)



**FIRE SAFETY!** Informs the reader of fire safety information, reminders, precautions, or policies, or of the locations of fire-fighting and fire-safety equipment. (ISO)



**SAFETY!** Informs the reader of general safety information, reminders, precautions, or policies not related to a particular source of hazard or to fire safety. (ISO, ANSI, OSHA)

# 1 Introduction

During work with electric equipment, refrigeration and pressurized pipe systems, precautions shall be taken to ensure sufficient safety for personnel and property.

During installation, testing, maintenance, repair, and removal of power, cooling, and supervision equipment, the safety guidelines in this document shall be followed.

Local standards and safety codes overrule the guidelines in this document.

## 2 Authorization

For recommended authorization, refer also to the MAINTENANCE INSTRUCTIONS of the respective equipment. If possible, the equipment cabinet/room shall normally be locked. The key, if any, shall be kept by the person responsible for the power/cooling equipment.

### 2.1 User/Operator

A user/operator that has no training for the equipment in question is authorized only to handle the equipment under normal operation, and to take the first measures in case of alarm according to the MAINTENANCE INSTRUCTIONS of the equipment.

### 2.2 Trained User/Operator (Skilled Person)

A user/operator who has been trained for the equipment in question is authorized to have the responsibility for this equipment, to perform tests, fault tracing, exchange of units and repairs of the said equipment.

Intervention in live equipment may be performed by a trained user/operator only.

### 2.3 Installer

The installation person shall be responsible for the installation and the test of the equipment in question according to the installation and test documents in force.

The installer is also liable for using the correct cable to and from the equipment and for protecting it with the adequate fuses or circuit breakers.

Local authorization regulations for work with electric equipment shall always be observed.

## 3 Hight Energy and High Voltage



**DANGER!** High energy and high voltage up to 480 V AC are used in the operation of power and cooling equipment. This high voltage poses a significant risk of shock or electrocution. Batteries can store large amounts of energy. Direct contact with battery terminals or any indirect contact via cables or damp items can result in dangerously rapid discharge of this energy, resulting in fires or personal injury.

- The work shall be performed and supervised only by personnel knowledgeable about the risks involved, and trained in the safety measures that must be followed.
- Metal objects such as rings, watches, bracelets, etc. that may cause short circuits in the equipment, must not be worn when working on or around any live equipment.

- The tools that are used on live equipment shall be factory insulated to IEC 900 standards for insulated hand tools. (Tools insulated with insulating tape are not acceptable under any circumstances.) The tools shall be inspected for damage prior to the start of each shift. Do not try to repair a faulty tool yourself.
- All battery cables shall have both ends marked to prevent unintentional short circuits.
- It must be possible to disconnect the load, the AC- and the DC-supplies from the power supply/cooling system, should this be necessary.  
The AC-disconnector must be designed so that all the phases can be cut off with one manipulation.  
Local rules must be adhered to.
- The unit in question shall if possible, be de-energized before the work starts applying established procedures.  
Note that there might be more than one feeding to the unit and that filters of the unit may be charged even if the supply voltage is disconnected.
- Charged cells in a battery have a short circuit effect. A short circuit between the poles may cause dangerous burns and a spark formation may cause bursting of cells. Therefore, do not place any units of uninstalled metal in the vicinity of the batteries and protect the battery terminals from physical contact.
- Switch off the power supply if the equipment is damp inside.
- Prevent moisture from entering the equipment.
- Before the power supply to the equipment is switched on (before testing or after repair) all tools and other objects not associated with the equipment must be removed.
- To avoid static build-up while working on batteries, maintenance personnel should periodically have contact with ground.

## 4 Thunderstorms



**DANGER!** Avoid working with electrical installations or being close to towers during thunderstorms.

- Thunderstorms generate strong electric fields that may result in lightning strokes. It is essential that equipment and facilities be properly earthed to minimize the risks of personal injury and equipment damage.

## 5 Explosive Gases



**DANGER!** The batteries contain potentially explosive gases, which may be released during charging or on abnormal operating conditions, such as rectifier malfunction or high temperature

- Fire in any form, spark formation, or smoking is not allowed in battery rooms or in the vicinity of batteries.
- The battery manufacturer's safety recommendations shall be followed.

## 6 Explosive Gases



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- The battery manufacturer's safety recommendations shall be followed.

## 7 Acid



**WARNING!** The batteries contain sulphuric acid, which is very corrosive and can cause severe burns. Impact can cause the battery case to rupture.

- Protect eyes and skin from splash (ventilated cells) with protective goggles and protective clothing. In case of skin contact with electrolyte, remove contaminated clothing and flush affected areas thoroughly with water. If eye contact has occurred, flush for a minimum of 15 minutes with large amounts of running water and seek immediate medical attention.
- Keep batteries of ventilated type upright.
- The battery manufacturer's safety recommendations shall be followed.

## 8 Poisonous Material



**WARNING!** Batteries and some electronic components contain lead and other poisonous material.

- Use gloves when handling poisonous material.
- Always wash your hands after the work is finished.

## 9 Drilling



**WARNING!** When drilling, the drill can come into contact with live wires. Holes must not be drilled in power or cooling equipment.

- Always use insulated protective gloves when drilling where live wires may be hidden.
- Always use protective goggles when drilling. Flying chips and dust may get into your eyes.

## 10 Radio Frequency Radiation



**WARNING!** The radio frequency radiation from antenna systems can endanger your health.

- Co-ordinate with all mast users to switch off the transmitters when working near antennas.

## 11 Handling of Heavy Goods



**WARNING!** Overloading, or improper use of lifting devices in any way, can have catastrophic consequences.

- Use tested and approved lifting devices only. Only trained personnel must use them.
- Always check that all parts of the lifting devices are intact.
- Give clear and consistent command signals, for example for:

Lifting

Lowering

Stopping

- If using lifting straps or cables make sure that there is never an angle of more than 90 degrees between the lifting straps/cables at the point where they are attached to the lifting hook. Too large an angle between the lifting straps/cables increases the strain on them and may cause them to snap.
- Never walk under hoisted loads.

## 12 The Use of Ladders



**WARNING!** When using ladders, the risk of falling down should be observed, and the following precautions should also be taken:

- Make sure that the cabinets and equipment are secured before stepping on a ladder that is propped against the object in question.
- Metal ladders can cause short circuit against an unprotected conductor. For use in an environment of electric equipment, use only wooden ladders or similar.
- Do not put any tools on ladders. They can fall down and cause damage and short circuits.

## 13 Electrostatic Discharge



**WARNING!** Integrated circuits can be damaged by electrostatic discharge. Electrostatic discharge is a transient event that is high in magnitude but short in duration. It frequently occurs in dry weather when a person, walking across a carpet or moving in a chair, touching plastic parts etc., acquires a charge resulting from friction.

- Always use an ESD wrist-strap connected to the chassis or the earth when working with printed board assemblies and components.
- Store and transport components and printed board assemblies in their original packing. As an alternative, use conductive materials or special IC circuit containers that either short circuit all leads and contacts or insulates them from external contact.



## 14 SVHC Declaration

SVHC\* information according to Article 33 of REACH 1907/2006

Duty to communicate information on substances in components.

SVHC\* Substance of Very High Concern

Product	Component	Name of SVHC over 0,1% (w/w) in the component	Information to allow safe use of the component
DC Power & Outside Plant Products	Bare boards	4,4'-isopropylidenediphenol (bisphenol A; BPA)	Substances listed in this table do not come into contact with the human body during manipulation, installation and use of the products.
	Chip resistors	Lead monoxide (lead oxide) Diboron trioxide	
	Circuit breakers	Cadmium oxide 1-Methyl-2-Pyrrolidone	
	Contactor	N,N-dimethylacetamide	
	Diode	4,4'-isopropylidenediphenol (bisphenol A; BPA)	
	LED	Hexahydromethylphthalic anhydride 1,3,5-Tris(oxiran-2-ylmethyl)-1,3,5-triazinane-2,4,6-trione (TGIC)	
	Memory chip	4,4'-isopropylidenediphenol (bisphenol A; BPA)	
	Toggle switches	Cadmium oxide	
DC Power & Outside Plant Rectifiers and Converters	Aluminium capacitor	Bis(2-ethylhexyl) phthalate (DEHP)	
	Bare boards	4,4'-isopropylidenediphenol (bisphenol A; BPA)	
	Ceramic disc capacitors	Lead titanium zirconium oxide	
	Ceramic capacitor	Lead monoxide (lead oxide) Diboron trioxide	
	Chip resistors	Lead monoxide (lead oxide) Diboron trioxide	
	Crystal resonator	Diboron trioxide	
	Diode	4,4'-isopropylidenediphenol (bisphenol A; BPA)	
	LED	Hexahydromethylphthalic anhydride 1,3,5-Tris(oxiran-2-ylmethyl)-1,3,5-triazinane-2,4,6-trione (TGIC)	
	Switching transformer	N,N-dimethylacetamide	

## 15 NetPerform™ Optimization Services

At VERTIV, we understand the importance of reliable equipment – it's critical to both your business and your bottom line. That is why we offer a wide array of services to meet all of your network infrastructure needs.

TECHNICAL SUPPORT		
Freedom Care	Vertiv.com	Provides quotes and bid responses, order placement and scheduling for design and deployment and optimization services. Download service & maintenance reports online.
EMEA CUSTOMER SUPPORT CENTER		
Email	<a href="mailto:ServiceWarranty.emea@Vertiv.com">ServiceWarranty.emea@Vertiv.com</a>	Dealing with customer problems related to: <ul style="list-style-type: none"><li>• Product field performance</li><li>• Product quality defects</li><li>• Product deal on arrival</li><li>• Incomplete or incorrect deliveries</li><li>• Quality and product support</li></ul>
Phone	00800 11 55 44 99	
DC POWER & OSP ORDER, ORDER STATUS		
Email	<a href="mailto:EMEA.Order.Management.Group@vertivco.com">EMEA.Order.Management.Group@vertivco.com</a>	Creates and processes orders, provides order shipping information and status of orders.
REQUEST DC POWER REPAIR SERVICE RMA		
Email	<a href="mailto:EMEA.HWServices@Vertiv.com">EMEA.HWServices@Vertiv.com</a>	Creates and processes RMAs, determines lead times and pricing based on warranties/contractual agreements. Provides repair shipping information and status.
Phone	+421.32.7700.733	
SPARE PARTS		
Email	<a href="mailto:EMEA.HWServices@Vertiv.com">EMEA.HWServices@Vertiv.com</a>	Pricing and purchase orders processing for spare parts, including but not limited to breakers, cables, fuses, rectifier fans, misc. breaker and fuse panels, enclosure fans, doors and switches, etc.
Phone	+421.32.7700.733	
DC POWER PRODUCT TRAINING		
Email	<a href="mailto:EMEA.Academy@Vertiv.com">EMEA.Academy@Vertiv.com</a>	Requests for quotes, order placement and scheduling.

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