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2260B Series

360W and 720W Multi-Range Programmable DC Power Supplies

Quick Start Guide

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A Greater Measure of Confidence

KEITHLEY
A Tektronix Company

Series 2260B

360W and 720W Multi-Range Programmable DC Power Supplies

QUICK START GUIDE

ISO-9001 CERTIFIED MANUFACTURER

The information in this manual was correct at the time of printing. However, we continue to improve our products and reserve the rights to change specification, equipment, and maintenance procedures at any time without notice.

Table of Contents

SAFETY INSTRUCTIONS

This chapter contains important safety instructions that you must follow during operation and storage. Read the following before any operation to insure your safety and to keep the instrument in the best possible condition.

Safety Symbols

These safety symbols may appear in this manual or on the instrument.

 WARNING	Warning: Identifies conditions or practices that could result in injury or loss of life.
 CAUTION	Caution: Identifies conditions or practices that could result in damage to the instrument or to other properties.
	DANGER High Voltage
	Attention Refer to the Manual
	Protective Conductor Terminal
	Earth (ground) Terminal

Do not dispose electronic equipment as unsorted municipal waste. Please use a separate collection facility or contact the supplier from which this instrument was purchased.

Safety Guidelines

General Guideline

CAUTION

- Do not place any heavy object on the instrument.
- Avoid severe impact or rough handling that leads to damaging the instrument.
- Do not discharge static electricity to the instrument.
- Use only mating connectors, not bare wires, for the terminals.
- Do not block the cooling fan opening.
- Do not disassemble the instrument unless you are qualified.

(Measurement categories) EN 61010-1:2001 specifies the measurement categories and their requirements as follows. This instrument falls under category II.

- Measurement category IV is for measurement performed at the source of low-voltage installation.
- Measurement category III is for measurement performed in the building installation.
- Measurement category II is for measurement performed on the circuits directly connected to the low voltage installation.
- Measurement category I is for measurements performed on circuits not directly connected to Mains.

Power Supply

WARNING

- AC Input voltage range: 85VAC~265VAC
- Frequency: 47Hz~63Hz
- To avoid electrical shock connect the protective grounding conductor of the AC power cord to an earth ground.

Cleaning the Instrument	• Disconnect the power cord before cleaning. • Use a soft cloth dampened in a solution of mild detergent and water. Do not spray any liquid. • Do not use chemicals containing harsh material such as benzene, toluene, xylene, and acetone.
Operation Environment	• Location: Indoor, no direct sunlight, dust free, almost non-conductive pollution (Note below) • Relative Humidity: 20%~ 85% • Altitude: < 2000m • Temperature: 0°C to 50°C (Pollution Degree) EN 61010-1:2001 specifies the pollution degrees and their requirements as follows. The Instrument falls under degree 2. Pollution refers to "addition of foreign matter, solid, liquid, or gaseous (ionized gases), that may produce a reduction of dielectric strength or surface resistivity". • Pollution degree 1: No pollution or only dry, non-conductive pollution occurs. The pollution has no influence. • Pollution degree 2: Normally only non-conductive pollution occurs. Occasionally, however, a temporary conductivity caused by condensation must be expected. • Pollution degree 3: Conductive pollution occurs, or dry, non-conductive pollution occurs which becomes conductive due to condensation which is expected. In such conditions, equipment is normally protected against exposure to direct sunlight, precipitation, and full wind pressure, but neither temperature nor humidity is controlled.
Storage environment	• Location: Indoor • Temperature: -25°C to 70°C • Relative Humidity: <90%
Disposal 	Do not dispose this instrument as unsorted municipal waste. Please use a separate collection facility or contact the supplier from which this instrument was purchased. Please make sure discarded electrical waste is properly recycled to reduce environmental impact.

Power cord for the United Kingdom

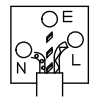
When using the instrument in the United Kingdom, make sure the power cord meets the following safety instructions.

NOTE: This lead/appliance must only be wired by competent persons

WARNING: THIS APPLIANCE MUST BE EARTHED

IMPORTANT: The wires in this lead are coloured in accordance with the following code:

Green/ Yellow:	Earth
Blue:	Neutral
Brown:	Live (Phase)



As the colours of the wires in main leads may not correspond with the coloured marking identified in your plug/appliance, proceed as follows:

The wire which is coloured Green & Yellow must be connected to the Earth terminal marked with either the letter E, the earth symbol ⏚ or coloured Green/Green & Yellow.

The wire which is coloured Blue must be connected to the terminal which is marked with the letter N or coloured Blue or Black.

The wire which is coloured Brown must be connected to the terminal marked with the letter L or P or coloured Brown or Red.

If in doubt, consult the instructions provided with the equipment or contact the supplier.

This cable/appliance should be protected by a suitably rated and approved HBC mains fuse: refer to the rating information on the equipment and/or user instructions for details. As a guide, a cable of 0.75mm^2 should be protected by a 3A or 5A fuse. Larger conductors would normally require 13A types, depending on the connection method used.

Any exposed wiring from a cable, plug or connection that is engaged in a live socket is extremely hazardous. If a cable or plug is deemed hazardous, turn off the mains power and remove the cable, any fuses and fuse assemblies. All hazardous wiring must be immediately destroyed and replaced in accordance to the above standard.

GETTING STARTED

This chapter describes the power supply in a nutshell, including its main features and front / rear panel introduction. After going through the overview, please read the theory of operation to become familiar with the operating modes, protection modes and other safety considerations.

2260B Series Overview

Series lineup

The 2260B series consists of 4 models, divided into 2 different model types covering 2 power capacities: 360W models and 720W models.

Model name	Type	Voltage rating	Current rating	Power
2260B-30-36	360W models	0~30V	0~36A	360W
2260B-80-13	360W models	0~80V	0~13.5A	360W
2260B-30-72	720W models	0~30V	0~72A	720W
2260B-80-27	720W models	0~80V	0~27A	720W

Apart from the differences in output, each unit differs in size. The 720 W models are larger than the 360 W models to accommodate the increase in power.

360W models

720W models

Main Features

Performance

- High performance/power
- Power efficient switching type power supply
- Low impact on load devices
- Fast transient recovery time of 1ms
- Fast output response time

Features

- OVP, OCP and OTP protection
- Adjustable voltage and current slew rates
- User adjustable bleeder control to quickly dissipate the power after shutdown to safe levels.
- Extensive remote monitoring and control options
- Support for serial and parallel connections
- Power on configuration settings.
- Web server monitoring and control

Interface	• Ethernet port • Analog connector for analog voltage and current monitoring • USB host and device port

Accessories

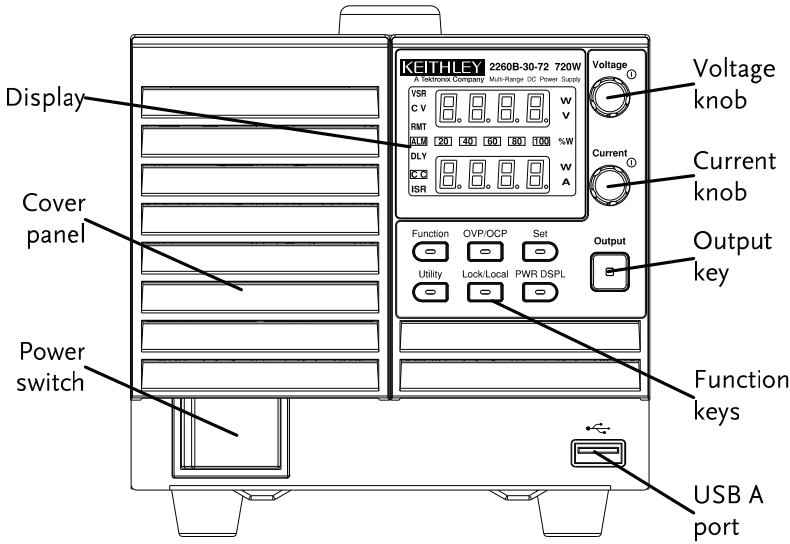
Standard Accessories	Part number	Description
	196353000	Test Leads x1
	174627900	USB Cable
	020312300	Basic Accessories Kit: M4 terminal screws and washers x2, M8 terminal bolts, nuts and washers x2, Air filter x1, Analog control protection dummy x1, Analog control lock lever x1, Output terminal cover (top & bottom)
	063453400	CD-R 2260B Manuals & Drivers
	071305501	Quick Start Guide
	PWRKI A*_	Power cord
	071305700	China RoHS Declaration
	001163200	Calibration of Traceable Certificate
	001163300	Packing Check List
Optional Accessories	Part number	Description
	2260B-EXTERM	Extended terminal
	2260B-RMK-JIS	Rack mount adapter (JIS)
	2260B-RMK-EIA	Rack mount adapter (EIA)
	2260B-GPIB-USB	GPIB to USB adapter
Download	Name	Description

keithley_2260B.inf USB driver

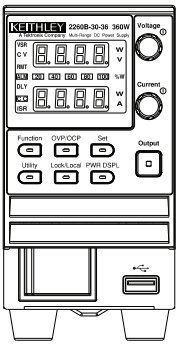
Appearance

2260B Front Panel

2260B-80-27, 2260B-30-72 (720W)

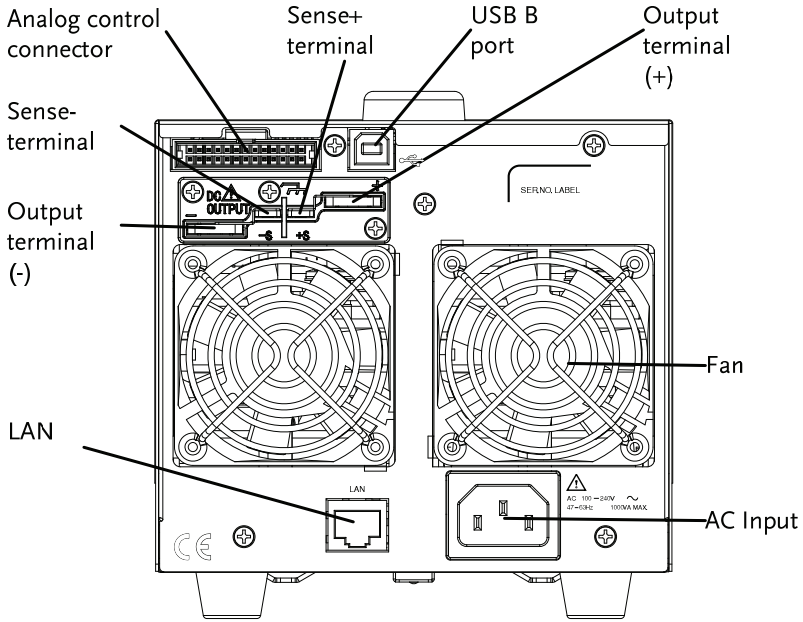


2260B-80-13, 2260B-30-36 (360W)

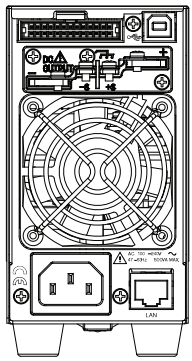


Rear Panel

2260B-80-27, 2260B-30-72 (720W)



2260B-80-13, 2260B-30-36 (360W)



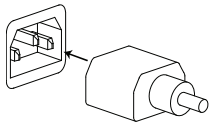
OPERATION

Set Up

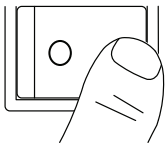
Power Up

Steps

1. Connect the power cord to the rear panel socket.



2. Press the POWER key. If used for the first time, the default settings will appear on the display, otherwise The 2260B recovers the state right before the power was last turned OFF.



CAUTION

The power supply takes around 8 seconds to fully turn on and shutdown.

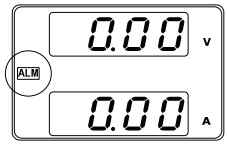
Do not turn the power on and off quickly. Please wait for the display to fully turn off.

Basic Operation

Setting OVP/OCP Levels

The OVP level has a selectable range of 10% to 110% of the rated output voltage. The OCP level has a selectable range 10%~ 110% of the rated output current, alternatively the OCP level can also be turned off. The OVP and OCP level is set to 110% by default.

When one of the protection measures are on, ALM is shown on the panel display. By default, the power switch will turn off when any of the protection levels are tripped.



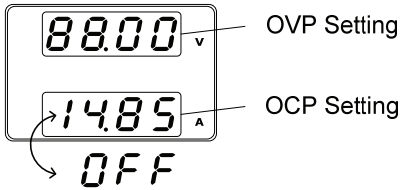
Before setting the OVP or OCP level:

- Ensure the load is not connected.
- Ensure the output is set to off.

Steps

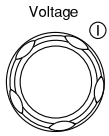
1. Press the OVP/OCP key. The OVP/OCP key lights up.

2. The OVP setting will be displayed on the top and the OCP setting (or OFF) will be displayed on the bottom.



OVP Level

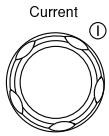
3. Use the Voltage knob to set the OVP level.



Range	10%~110% of rated output voltage.

OCP Level

4. Use the Current knob to set the OCP level.



Range	10%~110% of rated output current, OFF.

5. Press OVP/OCP again to exit. The OVP/OCP indicator will turn off.

Power switch trip

Set F-95 (Power switch trip) to 1 (to disable the power switch trip) or to 0 (to enable the power switch trip) and save.

F-95	1 (Disable) or 0 (Enable)

Clear OVP/OCP protection

The OVP or OCP protection can be cleared after it has been tripped by holding the OVP/OCP button for 2 seconds.
(Only applicable when the power switch trip setting is disabled [F-95 = 1])

Set to CV (Constant voltage) Mode

When setting the power supply to CV mode, a current limit must also be set to determine the crossover point. When the current exceeds the crossover point, the mode switches to CC mode. CC and CV mode have two selectable slew rates: High Speed Priority and Slew Rate Priority. High Speed Priority will use the fastest slew rate for the instrument while Slew Rate Priority will use a user-configured slew rate.

Background

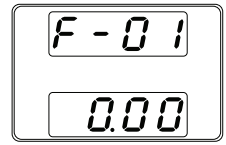
Before setting the power supply to CV mode, ensure:

- The output is off.
- The load is connected.

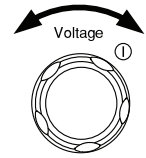
Steps

1. Press the Function key. The Function key will light up.

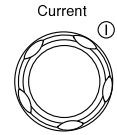
2. The display should show F-01 on the top and the configuration setting for F-01 on the bottom.



3. Rotate the Voltage knob to change the F setting to F-03 (V-I Mode Slew Rate Select).



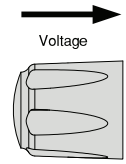
4. Use the Current knob to set the F-03 setting.



Set F-03 to 0 (CV High Speed Priority) or 2 (CV Slew Rate Priority).

F-03	0 = CV High Speed Priority
	2 = CV Slew Rate Priority

5. Press the Voltage knob to save the configuration setting. ConF will be displayed when successful.

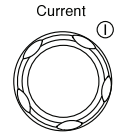


6. If CV Slew Rate Priority was chosen as the operating mode in steps 3~5, set F-04 (Rising Voltage Slew Rate) and F-05 (Falling Voltage Slew Rate) and save.

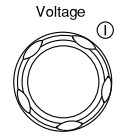
   F-04 / F-05 0.1V/s~60V/s (2260B-30-XX)
   0.1V/s~160V/s (2260B-80-XX)

7. Press the Function key again to exit the configuration settings. The function key light will turn off.

8. Use the Current knob to set the current limit (crossover point). Push in the knob to highlight a digit. Turn the knob to the desired digit to adjust. Rotate the knob to the desired current.



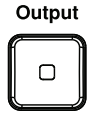
9. Use the Voltage knob to set the voltage.
   Push in the knob to highlight a digit. Turn the knob to the desired digit to adjust. Rotate the knob to the desired voltage.

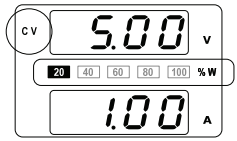


Note

Notice the Set key becomes illuminated when setting the current or voltage. If the Voltage or Current knobs are unresponsive, press the Set key first.

10. Press the Output key. The Output key becomes illuminated.





CV and the Power Bar will become illuminated (top left & center)

Note

Only the voltage level can be altered when the output is on. The current level can only be changed by pressing the Set key.

Set to CC (Constant current) Mode

When setting the power supply to CC mode, a voltage limit must also be set to determine the crossover point. When the voltage exceeds the crossover point, the mode switches to CV mode. CC and CV mode have two selectable slew rates: High Speed Priority and Slew Rate Priority. High Speed Priority will use the fastest slew rate for the instrument while Slew Rate Priority will use a user-configured slew rate.

Background

Before setting the power supply to CC mode, ensure:

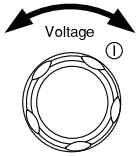
- The output is off.
- The load is connected.

Steps

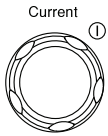
1. Press the Function key. The Function key will light up.

2. The display should show F-01 on the top and the configuration setting for F-01 on the bottom.

3. Rotate the Voltage knob to change the F setting to F-03 (V-I Mode Slew Rate Select).



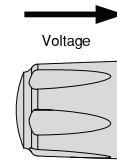
4. Use the Current knob to set the F-03 setting.

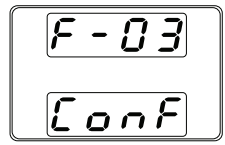


Set F-03 to 1 (CC High Speed Priority) or 3 (CC Slew Rate Priority) and save.

F-03 1 = CC High Speed Priority
3 = CC Slew Rate Priority

5. Press the Voltage knob to save the configuration setting. ConF will be displayed when successful.



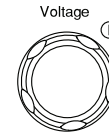


6. If CC Slew Rate Priority was chosen as the operating mode, set F-06 (Rising Current Slew Rate) and F-07 (Falling Current Slew Rate) and save.

F-06 / F-07	0.01A/s~72.00A/s (2260B-30-36)
	0.01A/s~144.0A/s (2260B-30-72)
	0.01A/s~27.00A/s (2260B-80-13)
	0.01A/s~54.00A/s (2260B-80-27)

7. Press the Function key again to exit the configuration settings. The function key light will turn off.

8. Use the Voltage knob to set the voltage limit (crossover point). Push in the knob to highlight a digit. Turn the knob to the desired digit to adjust. Rotate the knob to the desired voltage.

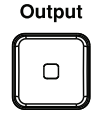


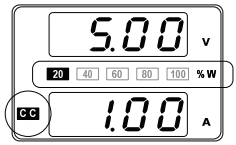
9. Use the Current knob to set the current.
Push in the knob to highlight a digit. Turn the knob to the desired digit to adjust. Rotate the knob to the desired current

Note

Notice the Set key becomes illuminated when setting the current or voltage. If the Voltage or Current knobs are unresponsive, press the Set key first.

10. Press the Output key. The Output key becomes illuminated.





CC and the Power Bar will become illuminated (bottom left & center)

Note

Only the current level can be altered when the output is on. The voltage level can only be changed by pressing the Set key.

Display Modes

The 2260B power supplies allow you to view the output in three different modes: voltage and current, voltage and power or current and power.

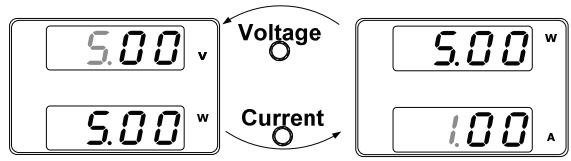
Steps

1. Press the PWR/DSPL key. The PWR DSPL key lights up.

2. The display changes to voltage and power (V/W).

3. To switch between displaying A/W and V/W, simply press the corresponding Voltage or Current knob.

   For example: when in A/W mode, press the Voltage knob to display V/W. Conversely when in V/W mode, press the Current knob to display A/W.



- When V/W is displayed, the Voltage knob can still be used to change the voltage level.
- When A/W is displayed, the Current knob can still be used to change the current level.

Exit

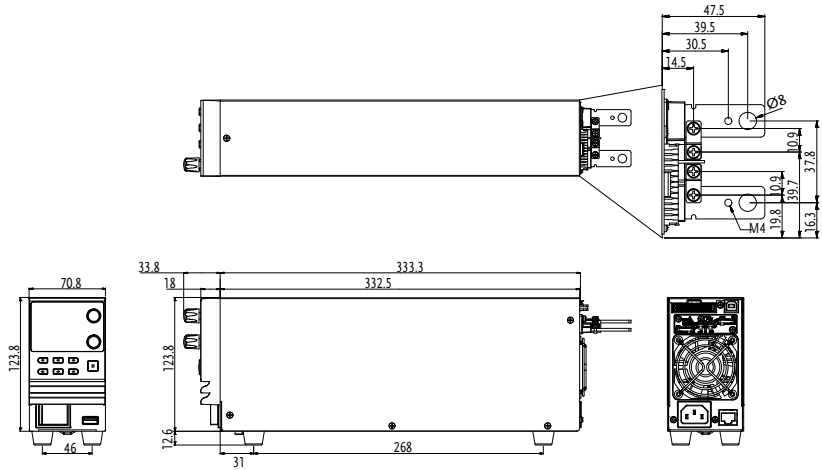
Press the PWR/DSPL key again to return to normal display mode. The PWR DSPL light will turn off.

APPENDIX

2260B Dimensions

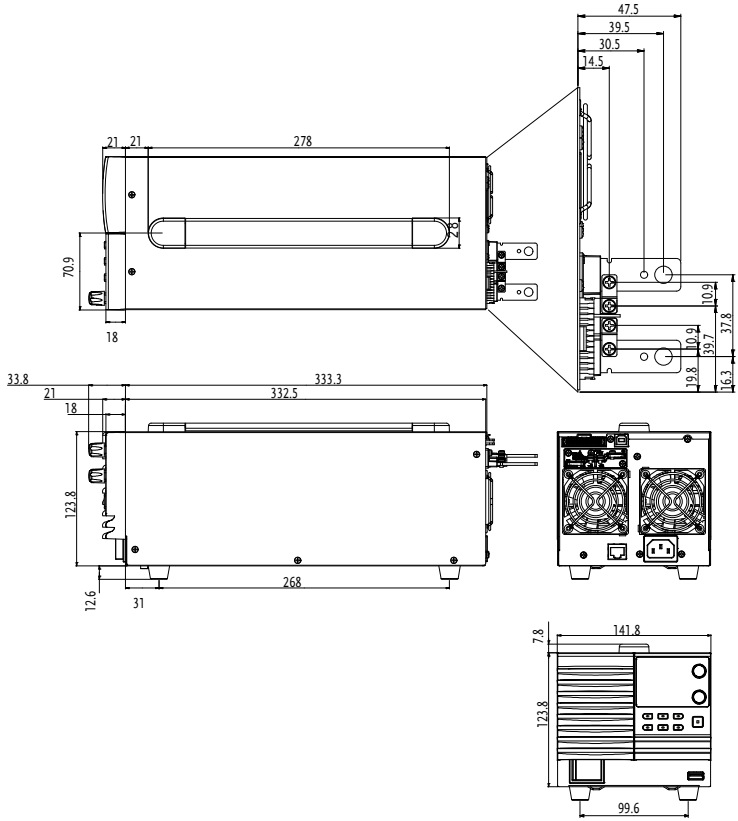
360W models

2260B-80-13/2260B-30-36 (mm)



360W models

2260B-80-27/2260B-30-72 (mm)



Declaration of Conformity

We declare that the below mentioned product

Type of Product: Multi-Range DC Power Supply
Model Number: 2260B-30-36, 2260B-80-13, 2260B-30-72, 2260B-80-27
are herewith confirmed to comply with the requirements set out in the Council Directive on the Approximation of the Law of Member States relating to Electromagnetic Compatibility (2004/108/EC) and Low Voltage Directive (2006/95/EC).
For the evaluation regarding the Electromagnetic Compatibility and Low Voltage Directive, the following standards were applied:

◎ **EMC**	
EN 61326-1: EN 61326-2-1:	Electrical equipment for measurement, control and laboratory use –– EMC requirements (2006)
Conducted & Radiated Emission EN 55011: 2009+A1:2010	Electrostatic Discharge EN 61000-4-2: 2009
Current Harmonics EN 61000-3-2: 2006+A1: 2009+A2: 2009	Radiated Immunity EN 61000-4-3: 2006+A1:2008+A2:2010
Voltage Fluctuations EN 61000-3-3: 2008	Electrical Fast Transients IEC 61000-4-4: 2004+A1:2010
----------	Surge Immunity EN 61000-4-5: 2006
----------	Conducted Susceptibility EN 61000-4-6: 2009
----------	Power Frequency Magnetic Field EN 61000-4-8: 2010
----------	Voltage Dip/ Interruption EN 61000-4-11: 2004

Low Voltage Equipment Directive 2006/95/EC	
Safety Requirements	EN 61010-1: 2010 EN 61010-2-030: 2010

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