Agilent UltrAA Boosted Lamp Supply

User's Guide

Agilent Technologies

Notices

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Errata Statement

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Safety Notices

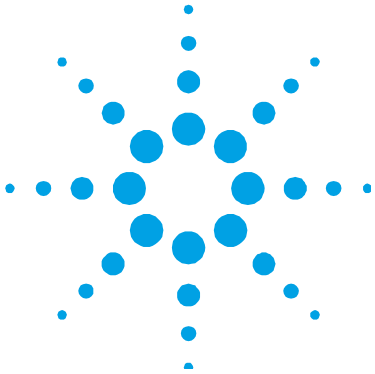
CAUTION

A **CAUTION** notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in damage to the product or loss of important data. Do not proceed beyond a **CAUTION** notice until the indicated conditions are fully understood and met.

WARNING

A WARNING notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in personal injury or death. Do not proceed beyond a WARNING notice until the indicated conditions are fully understood and met.

Contents



1. Safety Practices and Hazards

General

This section should be read in conjunction with the Safety Practices and Hazards section in your spectrometer manual.

To maintain safety protection, only connect this accessory to an Agilent AA Series spectrometer with the UltrAA lamp connector provided for this purpose, refer to the ‘Introduction’ section.

Appropriate safety practices have been included in this operation manual and your spectrometer operation manual, to help you operate the equipment safely. Read all safety practices thoroughly before attempting to operate your system.

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

Do not position the equipment so that it is difficult to operate the disconnecting device.

Verifying Safe State

The following general safety precautions must be observed during all phases of operation, maintenance and service of this instrument.

To ensure continued safety of the instrument after maintenance or service procedures verify the instrument is returned to a safe state for the user. This includes running performance checks to verify the instruments safety systems are functioning correctly. Check the general condition of the instrument during operation for wear or signs of corrosion that are likely to inhibit function or safety.

Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture, and intended use of the instrument. Agilent Technologies assumes no liability for the customer's failure to comply with these requirements.

Hazard Warnings

In addition to the hazard warnings specified in your spectrometer operation manual, specific hazard warnings have been included in this operation manual. These warnings state the hazard, describe how to avoid it and specify the possible consequences of not following the instructions. Read all warnings carefully and observe them at **all** times.

Electrical Hazards

The UltrAA boosted lamp supply contains electrical circuits, devices and components operating at dangerous voltages. Contact with these circuits, devices and components can cause death, serious injury or painful electric shock. Covers which are retained by screws on the lamp supply may be opened only by an Agilent field service engineer.

The lamp supply MUST be switched off at the power switch, and the mains cable disconnected from the mains supply BEFORE any attempt is made to remove or replace a lamp, or the cables connecting the supply to the spectrometer.

Use of the wrong supply voltage, connection of the accessory to an incorrectly wired supply outlet, or lack of proper electrical grounding can create a fire hazard or a shock hazard which can cause death, serious injury, or serious damage to equipment.

Always use a three-wire outlet with ground connection which is adequately rated for the load.

The installation must comply with local, state, and national safety regulations.

A blown fuse should be replaced with one of the size and rating stipulated in the text adjacent to the fuse holder. Always ensure the accessory is turned off and disconnected from the mains supply before attempting any replacement.

Notes and Tips

NOTE A Note or Tip message is used to give advice or additional information.

Warning Symbols

The following is a list of symbols that appear in conjunction with warnings in this manual and on the ETC. The hazard they describe is also shown.

A triangular symbol indicates a warning. The meanings of the symbols that may appear alongside warnings in the documentation or on the instrument itself are as follows:

Electrical shock

Fire hazard

Hot surface

Heavy weight (danger to feet)

Heavy weight (danger to hands)

The following symbol may be used on warning labels attached to the instrument. When you see this symbol, refer to the relevant operation or service manual for the correct procedure referred to by that warning label.

Information Symbols

The following symbols appear on the instrument for your information.

I	Mains power on
0	Mains power off
	Fuse
	Single phase alternating current
	Direct current

"On" for part of equipment.

"Off" for part of equipment.

Caution, disconnect all supplies, risk of electric shock

Color Coding

The various indicator lights appearing on the instrument and any associated accessories have been color coded to represent the status of the instrument or accessory:

- A green light indicates the instrument is in normal standby condition.
- A blue light indicates that operator intervention is required.
- An orange light indicates a potential hazard.
- A red light indicates danger or an emergency.

CAUTION An orange light indicates that the boost is active.

CE Compliance

Your UltrAA boosted lamp supply has been designed to comply with the requirements of the Electro-magnetic Compatibility (EMC) Directive and the Low Voltage (electrical safety) Directive (commonly referred to as the LVD) of the European Union. Agilent has confirmed that each product complies with the relevant Directives by testing a prototype against the prescribed EN (European Norm) standards.

Proof that a product complies with the Directives is indicated by:

- The CE Marking appearing on the rear of the product.
- The documentation package that accompanies the product, containing a copy of the Declaration of Conformity. This Declaration is the legal declaration by Agilent that the product complies with the Directives, and also shows the EN standards to which the product was tested, to demonstrate compliance.

Electromagnetic Compatibility

EN55011/CISPR11

Group 1 ISM equipment: group 1 contains all ISM equipment in which there is intentionally generated and/or used conductively coupled radio- frequency energy which is necessary for the internal functioning of the equipment itself.

Class A equipment is equipment suitable for use in all establishments other than domestic and those directly connected to a low voltage power supply network which supplies buildings used for domestic purposes.

This device complies with the requirements of CISPR11, Group 1, Class A as radiation professional equipment. Therefore, there may be potential difficulties in ensuring electromagnetic compatibility in other environments, due to conducted as well as radiated disturbances.

Operation is subject to the following two conditions:

1 This device may not cause harmful interference.

2 This device must accept any interference received, including interference that may cause undesired operation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try one or more of the following measures:

1 Relocate the radio or antenna.

2 Move the device away from the radio or television.

3 Plug the device into a different electrical outlet, so that the device and the radio or television are on separate electrical circuits.

4 Make sure that all peripheral devices are also certified.

5 Make sure that appropriate cables are used to connect the device to peripheral equipment.

6 Consult your equipment dealer, Agilent Technologies, or an experienced technician for assistance.

Changes or modifications not expressly approved by Agilent Technologies could void the user's authority to operate the equipment.

ICES/NMB-001

This ISM device complies with Canadian ICES- 001.

Cet appareil ISM est conforme à la norme NMB-001 du Canada.

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2. Introduction

The UltrAA boosted lamp supply powers UltrAA hollow cathode lamps placed in suitably wired lamp positions of compatible Agilent AA Series spectrometers.

Agilent 280Z AA spectrometers have an internal UltrAA boosted lamp supply, such that, lamp positions 1 and 3 wired to use this built-in supply.

NOTE If you need to use more than two UltrAA lamps within a 280Z AA spectrometer, an external UltrAA boosted lamp supply can also be used to power lamp positions 5 and 7, which are wired for the use of an external supply.

Agilent 240Z AA spectrometers can be fitted with an internal UltrAA lamp power supply as an option, such that, lamp positions 1 and 2 are wired to use the built-in supply.

All other Agilent AA Series spectrometers require an external UltrAA boosted lamp supply to be connected to the instrument. This manual describes how to connect the external supply to the instrument and operation of UltrAA lamps.

NOTE All Agilent AA Series spectrometers, and Varian labeled AA instruments with serial numbers EL96123XXX or later, will automatically operate UltrAA lamps if the required wiring is installed.

Depending on the model and options ordered, your spectrometer may be fitted with one or two connectors in the back panel of the instrument to facilitate the connection of an external UltrAA boosted lamp supply. Such spectrometers will already have the necessary looms installed inside the instrument to support UltrAA lamp operation.

If an UltrAA lamp option was not specified at the time of ordering the instrument, the required components are available in an upgrade kit. An Agilent field service engineer can install the kit on site within the lamp turret of your spectrometer.

NOTE Operation of the UltrAA lamp as a normal hollow cathode lamp (i.e., without the boost active) is NOT recommended. This has been shown to reduce the lamp life. For maximum lamp life and the best performance from the lamp, always operate an UltrAA lamp with the boost applied.

3. Specifications

Environmental

Your accessory is designed for indoor use only. In addition, this accessory is suitable for the following categories:

- Installation category II
- Pollution degree 2
- Equipment class I

Condition	Altitude	Temp t (°C)	Humidity (%RH) non-condensing
Non-operating (transport)	0–2133 m (0-7000 ft)	5–45	20–80
Operating within performance specifications	0–853 m (0–2800 ft) 853–2133 m (2800–7000 ft)	10–35 10–25	8–80

Power

Power for an internal UltrAA boosted lamp supply is provided by the 240Z/280Z AA spectrometer.

Electrical Supply

The power requirements associated with an external UltrAA boosted lamp supply are:

Voltage, AC	
100 V	100 V
120 V	120 V
220 V	230 V
240 V	230 V
Frequency	50–60 Hz
Power Rating	150 VA maximum
Electrical Output	Typical
Boost Run Current	150 mA +10%/–5%
Boost Run Voltage	40 VDC ±10 VDC
Boost Strike Voltage	400 VDC ±60 VDC
Filament Voltage	1.2 VDC ±10% (lamp off) 12 VDC ±10% (prior lamp strike) 5 VDC ±10% (lamp run)

External Connections

The external UltrAA boosted lamp supply also requires external connections:

AC Power	IEC type, panel-mounted 6A 250 VAC
Mains Power Cord	
Australia	7.5 A 250 VAC CMA E711
USA	10 A 125 VAC Electricord
Europe	Europe 6 A 250 VAC Schuko CEE 10/16A
Lamp Supply	Circular type on flying lead (approximately 1.3 m)

Do not position the equipment so that it is difficult to operate the disconnecting device. Do not replace power cord with one of a lower rating than specified. Use only an Agilent supplied power cord for your country or equivalent.

WARNING

Electrical Shock
To maintain safety, the external UltrAA boosted lamp supply is to be connected only to instruments installed with the UltrAA lamp option.

Weights and Dimensions

These weights and dimensions are for the external UltrAA boosted lamp supply.

Weight

Packed	12 kg (26 lb)
Unpacked	7.5 kg (16.5 lb)

Dimensions (W × D × H)

Packed	420 × 510 × 310 mm (17 × 20 × 12 in.)
Unpacked	240 × 355 × 150 mm (10 × 14 × 6 in)

Performance

Drift

Less than eight percent change in intensity per hour, after a 25-min warm-up.

Lamp Lifetime

Not less than 5000 mAh at recommended operating lamp current.

NOTE The typical lifetime of an UltrAA lamp exceeds 8000 mAh.

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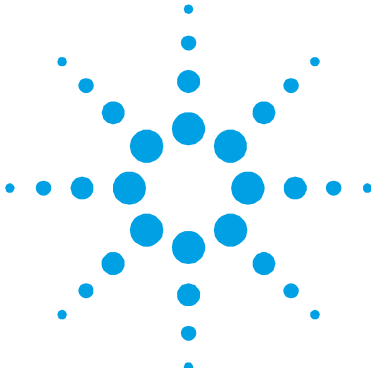

4. Getting Started

NOTE If you are using an internal UltrAA boosted lamp supply[1], the supply is built into the instrument and you will not need to refer to this section.

Inspection and Unpacking

WARNING

Heavy Weight

The external UltrAA boosted lamp supply weighs 7.5 kg (16.5 lb) and may cause injury or damage if dropped. Always use care when installing or lifting the external UltrAA boosted lamp supply.

External Damage Check

Before accepting delivery, check the shipping carton for any external signs of damage. If the carton shows any sign of damage, contact the carrier immediately. Any damage should be noted on the carrier's waybill.

[1]Agilent 280Z AA or 240Z AA with the internal UltrAA boosted lamp supply option

Unpacking

Store the spare fuses and select the appropriate power cord from those supplied.

Remove the control module from the packaging. The UltrAA boosted lamp supply should be placed near the instrument, for example, on top of the power supply for the graphite tube atomizer (GTA).

NOTE Please keep the packaging, as it may be necessary to repack and return the equipment in its original shipping carton during the warranty period.

Installation

Before proceeding with the installation, you must be familiar with the 'Safety Practices and Hazards' section and the correct power requirements must be available (refer to the 'Power' section, Page 15).

WARNING

Fire Hazard — Electrical Shock

Application of the wrong supply voltage, connection of the accessory to an incorrectly wired supply outlet, or lack of proper electrical grounding can create a fire or shock hazard that can cause death, serious injury, or serious damage to equipment.

Selecting the Voltage

Consult the table immediately above the selector switches or refer to and set the switches as required. For example, if the accessory is connected to 240 volts, the table tells you that the switch setting should be 'AD'. This means the left switch should be up (i.e., position 'A') and the right switch should be down (i.e., position 'D').

Table 1 Positions of selector switches for different mains power supplies

		Switch Positions	
Mains Power Supply	**Switch Setting**	**Left**	**Right**
240 V	AD	Up	Down
230 V	AD	Up	Down
230 V	BD	Down	Down
220 V	BD	Down	Down
120 V	AC	Up	Up
100 V	BC	Down	Up

Connecting the UltrAA Boosted Lamp Supply

WARNING

Electrical Shock

The lamps operate at dangerous voltages. To avoid death or electric shock, never touch the pins in the seven-pin connectors. Always check that the mains power is switched off before connecting or disconnecting the seven-pin plug.

CAUTION To avoid damaging the module, always switch off the lamps before connecting or disconnecting the seven-pin plug.

Allow at least 50 mm (2 in.) of space on the sides, and 150 mm (6 in.) at the rear of the system to permit free air circulation.

To install the UltrAA boosted lamp supply, plug the seven-pin plug from the supply into the seven-pin socket at the rear of the spectrometer. It is necessary to lift the cover on the socket at the rear of the spectrometer while pushing the connector into place.

The seven-pin plugs are keyed, and will only connect when the keyways align. Hold the plugs so the keys align, push the plugs together and then rotate the metal collar clockwise until it locks into position.

When the supply is connected to the instrument, connect the UltrAA boosted lamp supply to the mains power supply and turn on the mains power.

The power switch is located on the lower left side of the lamp controller.

Refer to your instrument operation manual for details on how to install hollow cathode lamps.

5. Operation

WARNING

Hot Surface
An UltrAA lamp becomes hot in use, and contact with it could cause severe burns. To avoid burns from an UltrAA lamp, turn it off and allow it to cool for a few minutes before touching it.

Turning On UltrAA Lamps

External UltrAA Boosted Lamp Supply

To use an UltrAA lamp in boosted mode, switch the external UltrAA boosted lamp supply on, then ‘strike’ the UltrAA lamp by pushing the lever of the appropriate switch to its ‘on’ position (i.e., ⊙). Wait three seconds; in some cases this alone will start the boost discharge. If necessary, push the lever to `Strike' and then release it; the lever will return to the ‘on’ position.

Instrument parameters are set in the normal way.

NOTE To use an UltrAA lamp in boosted mode, you must strike the lamp manually before it is used (for example, before an unattended autorun) otherwise it will act as a normal hollow cathode lamp.

Internal UltrAA Boosted Lamp Supply

If you are using an Agilent 280Z AA or 240Z AA with the internal UltrAA boosted lamp supply option, the software will automatically strike the lamp for you when you have enabled the UltrAA lamp option on the **Options** page of the **Methods** dialog.

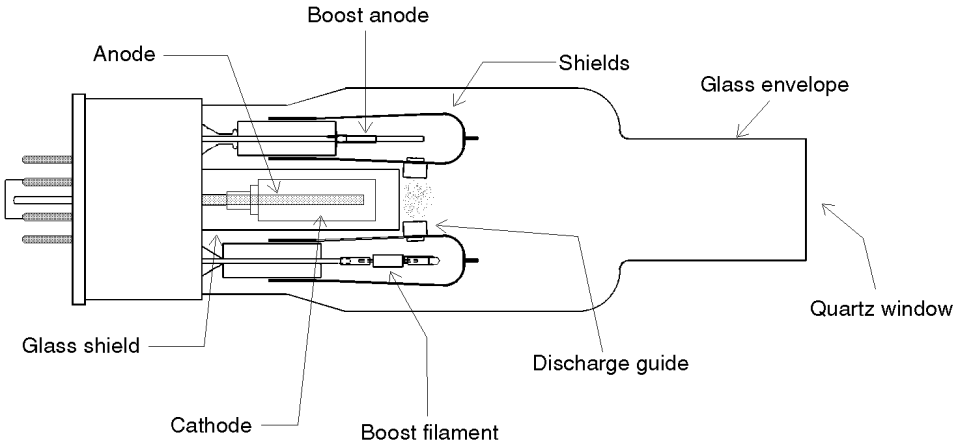

Figure 1 Diagram of an UltrAA lamp showing the boost discharge

Turning Off UltrAA Lamps

External UltrAA Boosted Lamp Supply

To turn off the boost discharge, push the lever of the appropriate switch to its 'off' position (i.e., ○).

NOTE You must turn the boost discharge off manually. The software turns off the normal lamp discharge automatically.

Internal UltrAA Boosted Lamp Supply

If you are using an Agilent 280Z AA or 240Z AA with the internal UltrAA boosted lamp supply option, the software will turn off all of the lamps at the end of an automated run.

Troubleshooting

Boost Does Not Strike

If the boost discharge does not start, check that the UltrAA lamp is fitted in the correct position. For four-lamp instruments, the UltrAA lamps may use positions 1, 2, 3, and 4. For eight-lamp instruments, only positions 1, 3, 5 and 7 may be used. Check the labels on the rear panel for external UltrAA lamp control module connection. If necessary, refit the lamp into the correct position.

If the lamp is in an appropriate position, try another UltrAA lamp in the same position. If the second UltrAA lamp works, you may need to replace the first lamp. If the second lamp does not work, you should check the fuses. If the fuses are intact, then you should contact your local Agilent field service engineer for further assistance.

"Lamp Not Recognized" Message Appears

Some older Varian labeled AA instruments do not recognize coded UltrAA lamps. You should check that the lamp position and lamp current specified in the message are correct and ignore the error message.

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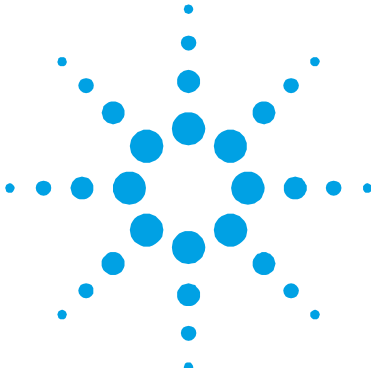


6. Maintenance and Spare Parts

Cleaning

Always clean up any liquid spills immediately. The UltrAA boosted lamp supply should be cleaned daily with a soft cloth. If necessary, use a cloth dampened with water.

Fuses

Fuse Specifications

External UltrAA module

220–240 V	FS1, FS2: T3.15 AH 250 V, IEC60127-2 Sheet 5, 5x20 mm, Littelfuse 0215315*
100–120 V	FS1, FS2: T4 AH 250 V, IEC60127-2 Sheet 5, 5x20 mm, Littelfuse 0215004*
Anodes	FS10: F1 AL 250 V, IEC60127-2 Sheet 2, 5x20 mm, Littelfuse 0217001*
Strike Voltage	FS9: F0.315 AL 250 V, IEC60127-2 Sheet 2, 5x20 mm, Littelfuse 0217315*
Filament 1	FS4: T6-3 AL 150 V, IEC60127-2 Sheet 3, 5x20 mm, Littelfuse 021806.3
Filament 2	FS6: T6-3 AL 150 V, IEC60127-2 Sheet 3, 5x20 mm, Littelfuse 021806.3

Internal UltrAA Module (240Z/280Z AA only)

All mains voltages	FS1, FS2: T3.15 AH 250 V, IEC60127-2 Sheet 5, 5x20 mm, Littelfuse 0215315*
Control	FS3, FS4: F0.8 AL 250V, IEC60127-2 Sheet 2, 5x20 mm Littelfuse 0217800*
Anodes	FS5: F1 AL 250 V, IEC60127-2 Sheet 2, 5x20 mm, Littelfuse 0217001*
Strike Voltage	FS6: F0.315 AL 250 V, IEC60127-2 Sheet 2, 5x20 mm, Littelfuse 0217315*
Filament 1	FS7: T6-3 AL 150 V, IEC60127-2 Sheet 3, 5x20 mm, Littelfuse 021806.3
Filament 2	FS8: T6-3 AL 150 V, IEC60127-2 Sheet 3, 5x20 mm, Littelfuse 021806.3

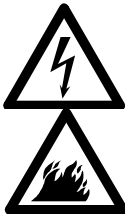
*or equivalent

NOTE Fuse information on the rear of the equipment is the most up to date.

CAUTION Any other internal fuse or circuit breaker is not operator-accessible and should be replaced only by an Agilent field service engineer.

Replacing a Fuse

WARNING



Electrical Shock – Fire Hazard
To prevent reduced safety protection or unwanted fusing, always ensure that the marking on the fuse matches the value screen-printed next to the fuseholder.

To check a fuse:

1. Disconnect the accessory from the mains power supply.
2. Undo the fuse cap by pressing the cap and turning it counter-clockwise.
3. Pull the cap out carefully; the fuse should be held in the fuseholder in the fuse cap.
4. Check that the fuse is the correct type and is not damaged. If necessary, replace the fuse in the holder.
5. Place the fuse into the cap, push the cap in, then turn the cap clockwise.
6. Reconnect the accessory to the mains power supply.

Always ensure both fuses are of the same type and rating before operation.

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In This Book

The manual describes the following:

- Safety Practices and Hazards
- Introduction
- Specifications
- Getting Started
- Operation
- Maintenance

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Issue 8

Agilent Technologies