Atomic Emission Detector – AED III

Site Preparation and System Hardware

jas AED

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Typical Work Station

A typical **JAS AED III** installation requires the space, power and physical support listed in the sections below. If any components are different than those below, make sure that enough resources are allocated for proper GC-AED installation.

A complete **JAS AED III** system typically consists of:

1. JAS AED III
2. Heated Transfer Line
3. Automatic Liquid Sampler (ALS)
4. 8890/7890 GC
5. Monitor
6. PC
7. Printer

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GC-AED Space Requirements

The overall bench requirements of the complete GC-AED system are as follows:

Space:	100 cm high x 220 cm wide* x 87 cm deep (39 x 87 x 34 in.)	
	*GC-AED:	120 cm (48 in.)
	PC, monitor, printer:	100 cm (39 in.)
Weight capacity:	about 120 kg (265 lb) plus computer and keyboard (weight depends on the exact system configuration)	

Other Space Requirements

The **JAS AED III** requires the use of four to six gas cylinders for the makeup and reagent gases, as well as space for a nitrogen purge supply (dewar or generator) and a helium purifier.

At least 5 cm (2 in.) must be allowed for the transfer line between the GC and AED. Space considerations for a complete AED system must take into account the injector/sampler, GC, data system, printer and clearances for maintenance. Allows 340 cm width x 87 cm depth x 100 cm high (132 x 35 x 37 in.). Total system weight is about 160 kg (350 lb).

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Physical Dimensions & Power Requirements of the AED III

H x W x D:		40.5 x 51 x 63.5 cm (16 x 20.2 x 24.3 in.)
Power:		100 VAC (6A) - 240 VAC (2.5A) (50 - 60 Hz)
Weight:	about	37 kg (80 lb)
Required clearance:	left:	2.5 cm (1 in.)
	right:	5 cm (2 in.)
	behind:	25 cm (10 in.)

One outlet is required. One or more 10 amp circuits are required for the computer and peripherals. Consult the GC and ALS documentation for their power requirements.

The clearances listed above for the **JAS AED III** ensure adequate ventilation and access for maintenance. Please see the GC and Automatic Liquid Sampler (ALS) manuals for physical dimensions, space requirements and power requirements of these instruments.

Note that the **JAS AED III** is designed to operate at a specific voltage. Make sure your **AED III's** voltage setting is appropriate for your lab. Referring to uncrating your **AED III** in the Service Manual on the hardware information CD-ROM.

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Gas Requirements

The **JAS AED III** requires the pure gases listed below:

Gas	Function	Purity
Helium	GC carrier gas and AED plasma. This purity can be achieved by using 99.9990 % gas with a gas purifier. The flow rate required is about 90 mL/min. Some elements require a higher flow rate of about 240 mL/min.	6.0 or 99.9999 %
Nitrogen	Spectrometer purge gas (must be dry), The user is advised to provide a hydrocarbon and a moisture trap. The purge gas flow requirements are nominally 100 mL/min.	5.0 or 99.9990 %
Hydrogen	AED reagent gas	5.0 or 99.9990 %
Oxygen	AED reagent gas	5.0 or 99.9990 %
Auxiliary Gas (10 % CH_4 / 90 % N_2)	AED reagent gas - typically used for oxygen analysis. Purity requirement is on original gases for reagent gas mixture.	4.7 or 99.997 %
Methane	AED reagent gas-typically used for nitrogen (388 nm only) and nitrogen-15 analysis	4,7 or 99.997%

JAS AED III requires 99.9999 % helium. An optional method of obtaining that level of purity is to use 99.999% helium and a helium purifier. A helium purifier is recommended to help ensure helium gas purity. Do not use filters on the helium line.

For nitrogen (spectrometer purge), the user is advised to provide a moisture trap (Part No. 5060-9084) and a hydrocarbon trap (Part No. 5060-9096).

The **JAS AED III** can only be plumbed for three reagent gases. Each reagent gas flows in typically 20 mL/min. The user must decide whether to plumb for 10% CH_4 / 90% N_2 (to detect oxygen 171) or methane (to detect nitrogen 388 nm and nitrogen-15).

To plumb the AED for the reagent gases use 1/8" SWAGELOK fittings!

The pre-pressure of all gases must be between 5 to 7 bar.
The nitrogen pressure for spectrometer purge may not exceed 1 bar! Damage of spectrometer is possible!

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Environmental Conditions

The **JAS AED III** is capable of operating under the following environmental conditions:

Condition	Operating Range
Temperature	10 °C to 40 °C (recommended ambient temperature is 15 °C to 30 °C)
Relative humidity	50 % at 40 °C 80 % at 31 °C
Altitude	up to 2000 m
Mains voltage fluctuations	not to exceed ±10% of the nominal voltage

For optimum instrument performance and maximum instrument lifetime, the temperature and humidity levels should be as constant as possible.

Connections

The **JAS AED III** has four external electrical connections:

Connector Type	Location	Function
3-conductor power, standardized by country	rear, upper left	Mains voltage and suitable earth ground
9-pin female, (Agilent proprietary)	rear, middle	Communications for GC remote start
USB B	rear, middle	Communications with PC

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Electrical Requirements

CAUTION: **A proper earth ground is required for JAS AED III operations.**

To protect users, the metal instrument panels and cabinet are grounded through the three-conductor power line cord, in compliance with IEC requirements, when it is plugged into a properly grounded receptacle. A properly grounded receptacle is one connected to a suitable earth ground. Proper receptacle grounding should be verified.

WARNING: **Any interruption of the grounding conductor or disconnection of the power cord could result in a shock personal injury.**

Electrical Supply Summary

Instrument	Circuits	Outlets
GC	1 dedicated	1
AED III	1 dedicated	1
Sampler		via GC
Computer / Monitor	shared	2
Printer	shared	1
Getter	shared	1

Configuring a GC for the JAS AED III

When plumbing a GC for use with the **JAS AED III**, use the following equipment:

- For N_2 and He 1/8" clean copper tubings are recommended
- Use 1/8" stainless steel tubings fot the reagent gases (auxiliary gases O_2, H_2 and CH_4 in N_2)
- Vespel or graphite vespel ferrules in all Swagelok unions and fittings
- Matheson chrome-plated stainless steel diaphram regulators

To avoid leaks and carbon contamination in the gas system, remove all flow measuring devices. Use a He-getter to purify the helium gas supply gas, but avoid other traps in the system. Use stainless steel ferrules on the helium purifier.

CAUTION: Any change on your operating system settings or system/software updates might lead to a non-working JAS AED III system. In case of doubt, consult JAS.

WARNING: **Never use Teflon tubing for plumbing!**

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GC-AED System Requirements

JAS GC-AED III System:

- Configuration on request (e.g. JAS-24919)

The Agilent GC is required to have:

- Split/Splitless inlet, alternatively JAS UNIS 2100 PTV, JAS UNIS 3100 HT or JAS UNIS HT SimDis
- GC-AED interface

Other Agilent GC options may also be ordered, including (but not limited to):

- One other inlet
- Up to two standard Agilent GC detectors

NOTE: **Any customer-supplied GC must be clean, leak-free and in good working conditions. JAS can only guarantee the AED specifications when a complete GC-AED system is supplied. Otherwise, JAS can only guarentee the specifications run at JAS. Please talk to your JAS representative regarding required adjustments at the GC.**

The minimum software and hardware requirements your data system needs to run the JAS AED software are:

- CPU ≥ 3 GH Quadcore (i7 4th Gen. / i5 6th Gen.)
- RAM ≥ 16 Gigabyte
- Hard Drive ≥ 128 Gigabyte SSD + ≥ 2 Terrabyte SATA
- Optical DriveDVD-ROM
- USB 3.0 Dedicated USB 3.0 controller card
- Languages English, Chinese, Japanese, Russian

Software:

- Operating system Windows 7 SP1, Windows 8.1, Windows 10
- JAS AED III Instrument Control Software (Ver. 1.37.204.201 or higher)
- Agilent OpenLAB CDS ChemStation Edition (C.01.07 SR2 or higher)

Although not required, a fully automated system typically includes:

- Automatic liquid sampler
- Headspace sampler
- CTC sampler
- Valve sampling system
- Pyrolysis system
- Printer

About Joint Analytical Systems

Since 1995 JAS has been a Premier Solution Partner and Value Added Reseller of Agilent Technologies. We are an innovative-driven organization that offers customized solutions for GC, GCxGC, µGC, GC-AED, GC-MS, GC-QQQ, LC, LC-MS, LC-QQQ and Q-TOF LC-MS applications.

JAS serves key industries such as

- **Chemical**
- **Petrochemical/HPI**
- **Environmental**
- **Food & Flavor**
- **Forensic**

JAS Products for GC

- Atomic Emission Detector
- UNIS Inlet Systems
- CryoTrap
- EzPrep - Preparative Fraction Collector
- Olfactometer
- Customized Valving Systems
- GICU - Gas Injection Control Unit

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