U6000AT+

Ultrasonic Nebulizer/ Membrane Desolvator

The U6000AT+ adds a membrane desolvation module to the U5000AT+ for reduction of solvent-based interferences, particularly for volatile organic solvents.

The Ultrasonic Nebulizer is placed directly on top of the membrane module, conserving valuable laboratory bench space.

NEBULIZERS

The CETAC U6000AT+ Ultrasonic Nebulizer/ Membrane Desolvator is designed for the reduction of sample solvent loading (volatile organic or aqueous) to an ICP-AES or ICP-MS instrument. For ICP-AES the U6000AT+ is used primarily for the analysis of volatile organic solvents. These solvents can cause a number of serious problems in ICP-AES: loss of plasma, plasma instability, high carbon emission background, and carbon buildup on the ICP torch. For ICP-MS the U6000AT+ can be used for both volatile organics and aqueous samples.

SENSITIVE

Benefits are very similar to those for ICP-AES but include reduction of solvent-based mass spectroscopic interferences (e.g. C_2^+ interference on $^{24}Mg^+$). Analyte signal enhancement with the U6000AT+ is typically 2 to 5 times greater than a standard pneumatic nebulizer.

STABLE

Short-term (60 min.) and long-term (8 hour) stability is excellent, with %RSDs typically <1%.

The U6000AT+ has an auto-tuned power supply for stable operation. No adjustment is necessary between different sample types.

COMPACT DESIGN

The U6000AT+ consists of the standard CETAC U5000AT+ Ultrasonic Nebulizer and a modular membrane desolvator. The Ultrasonic Nebulizer (USN) is placed on top of the membrane desolvator. A general schematic of the U6000AT+ is shown on the on the next page.

The U6000AT+ features a compact footprint with a width of only 35.6 cm and a depth of 34.9 cm. These dimensions allow placement of the U6000AT+ on a benchtop or laboratory cart, conserving valuable laboratory bench space. The membrane desolvator module can be easily disconnected from the Ultrasonic Nebulizer if membrane desolvation is not necessary. This allows stand-alone operation of the Ultrasonic Nebulizer.

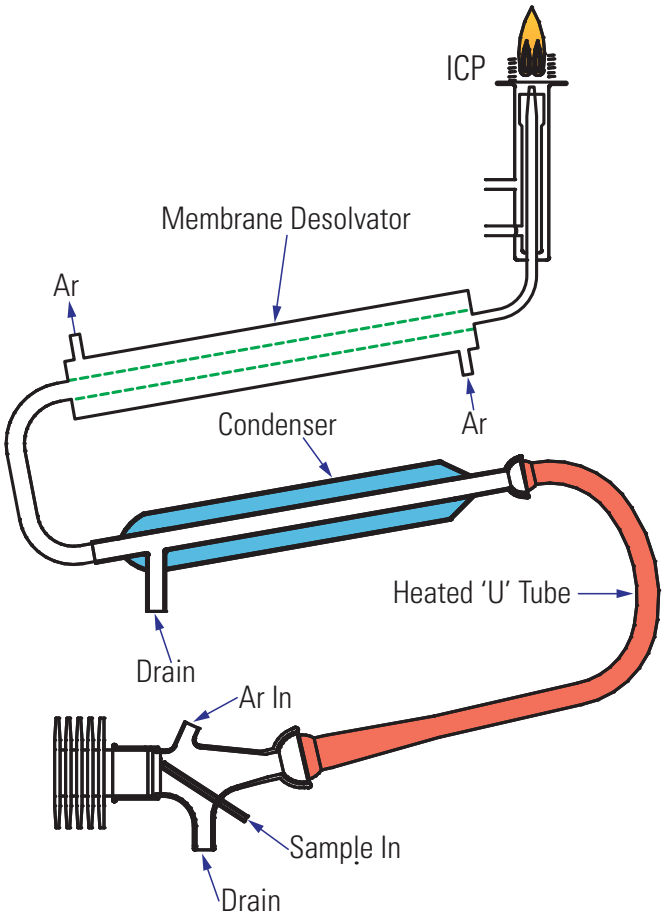
EASY SETUP

Each U6000AT+ is provided with an interface kit for the customer's ICP-AES or ICP-MS instrument. This kit includes a nebulizer gas line and a sample out line with adapters to the host ICP-AES or ICP-MS instrument. Interface kits are available for all ICP-AES and ICP-MS instruments. Each U6000AT+ also includes a rinse kit for cleaning the membrane desolvator.

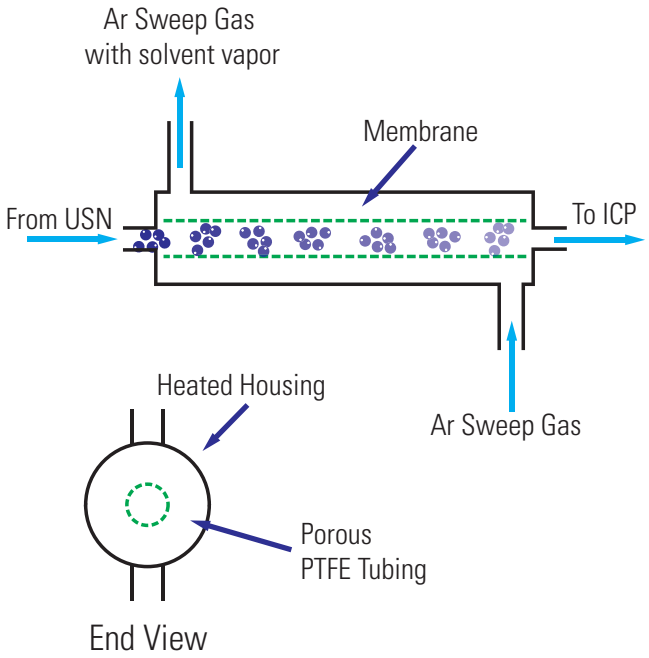
PRINCIPLE OF OPERATION

The USN incorporates a condenser that removes much of the sample solvent. However, any escaping solvent vapor (especially organic) can cause some of the problems previously listed. The outlet of the condenser is attached to the inlet of the membrane module. The membrane consists of a microporous PTFE (polytetrafluoroethylene) tube that is placed inside a heated oven. The sample aerosol from the USN (carried by the argon nebulizer gas) passes into the membrane, and the high temperature of the oven (160 °C) maintains the sample solvent as a vapor. A second countercurrent flow of argon gas (the sweep gas) flows outside the porous membrane wall and removes any volatile solvent vapor to vent. Nonvolatile sample components do not pass through the membrane wall and continue to the ICP-AES or ICP-MS.

The membrane desolvator has a number of important features: the membrane is chemically inert and it can remove water vapor and both polar and non-polar volatile organic solvents. In addition, the membrane desolvator incorporates a dedicated gas control unit for the argon sweep gas, which can be easily teed from the main ICP argon supply.



Schematic of U6000AT+



Membrane Schematic

Technical Specifications

Sample Uptake Rate: 0.5 to 2.5 mL/min

Nebulizer Gas Flow: 0.5 to 1.5 L/min

Sweep Gas Flow: 0 to 5.0 L/min

Heater Temperature: 120 °C to 160 °C

Cooler Temperature: -20 °C to +10 °C

Membrane Oven Temp: 80 °C to 160 °C

Voltage

Ultrasonic Nebulizer: 100-120 VAC, 50/60 Hz, 4.5A
220-240 VAC, 50/60 Hz, 2.5A

Membrane Desolvator: 100-240 VAC, 50/60 Hz, 4A/2A

Dimensions:

Height: 38.7 cm (15¼")

Width: 35.6 cm (14")

Depth: 34.9 cm (13¾")

Weight: 13.6 kg (29.9 lbs)

Warranty: 12 month limited

U6000AT+

BGX-100

Blend Gas Accessory

The CETAC BGX-100 Blend Gas Accessory can be used to add a low flow of oxygen (10 to 50 mL/min) between the U6000AT+ Ultrasonic Nebulizer / Membrane Desolvator and the ICP-AES or ICP-MS. This capability is especially useful for the analysis of organic solvents.

Some ICP-AES or ICP-MS instruments may not be equipped with an oxygen addition capability. If organic solvents are to be analyzed, oxygen addition to the central channel of the ICP can help prevent carbon build-up on the ICP torch and on the ICP-MS sampling cones (sampler and skimmer).

The CETAC BGX-100 Blend Gas Accessory incorporates a mass flow controller for oxygen addition up to 50 mL/min ± 1 mL/min. A flow adjustment knob and a digital readout display of gas flow are provided.

Oxygen gas is usually teed into the sample out line that is connected between the nebulizer/membrane desolvator system (U6000AT+) and the host ICP torch; typical oxygen flow rates range from 10 to 30 mL/min.

The BGX-100 completion kit includes an external 24V power supply, power cord, and gas connection tubing.

Technical Specifications

Voltage: 24 VDC Power Supply

Power Supply: 100-240V, 50/60 Hz, 2.2A

O_2 Flow Range: 0 to 50 mL/min

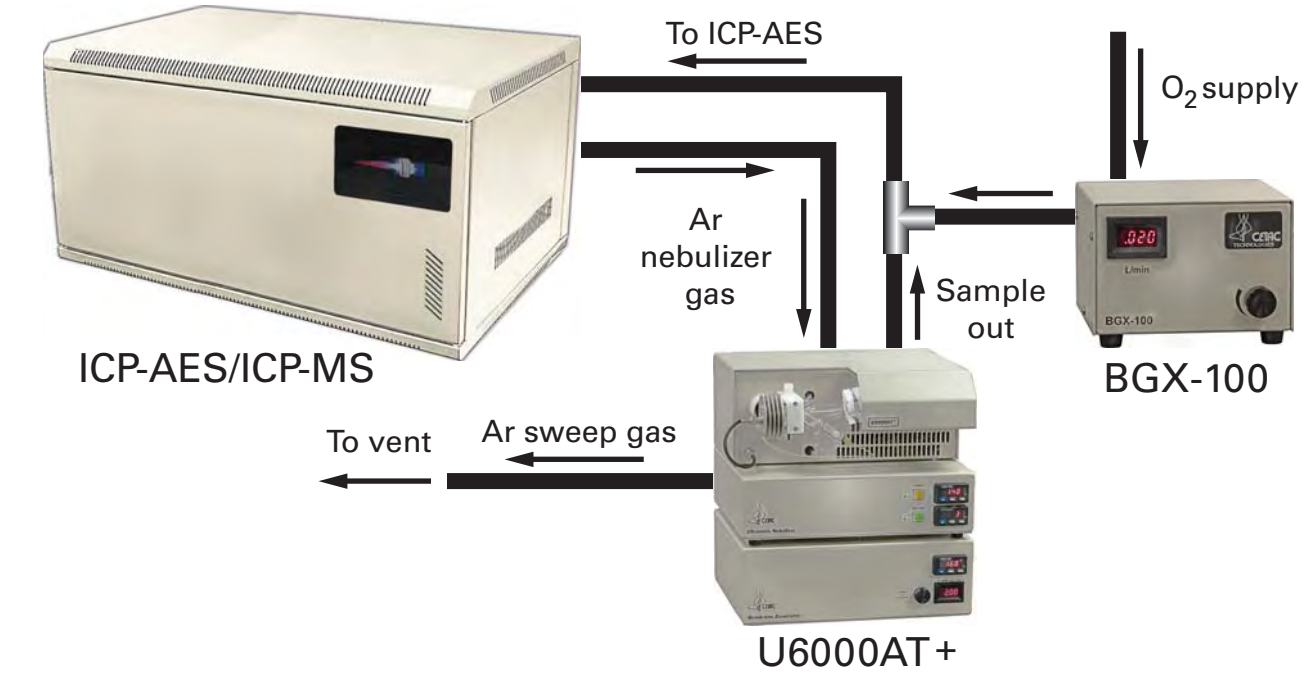
Dimensions:

Height: 11.2 cm (4½")
Width: 16.0 cm (6½")
Depth: 18.9 cm (7½")

Weight: 1 kg (2.2 lbs)

Warranty: 12 month limited

Schematic of BGX-100 Setup with U6000AT+



NEBULIZERS