



# **SUBSTRATE HOLDERS**

**AJA INTERNATIONAL, INC.**

## **GENERAL INFORMATION**

Since 1989 AJA International, Inc. has developed and manufactured a wide variety of UHV and High Vacuum substrate heaters and rapid annealing stations based on quartz lamp technology. All designs are 100% oxygen compatible and engineered with high power lamp elements that are economical, easily serviced and will operate for extended periods of time.

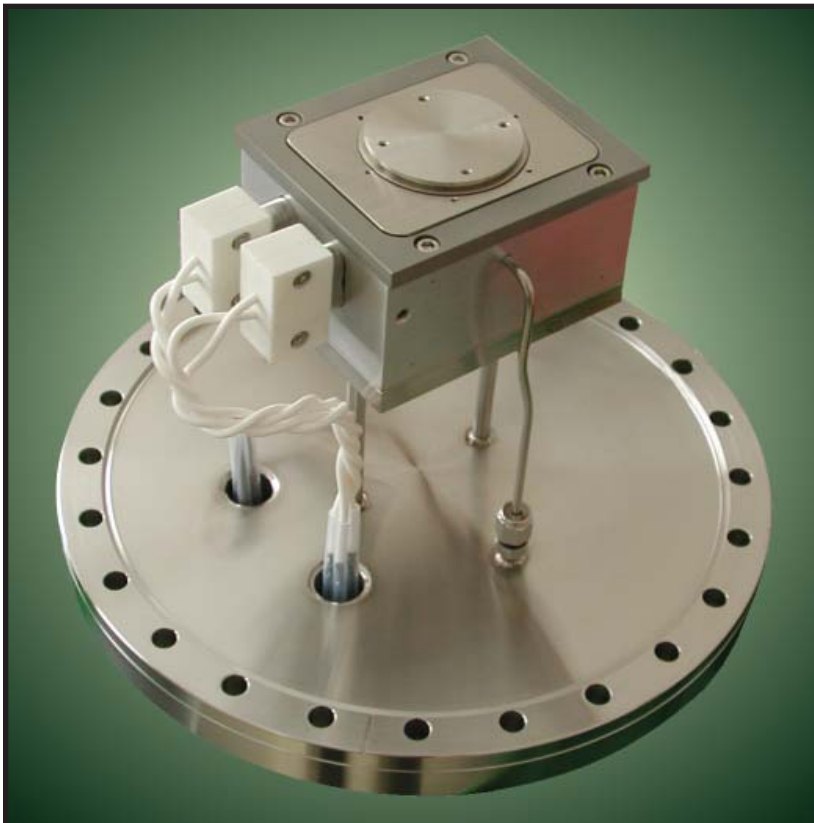
AJA's reliable SHQ-X Series substrate heaters deliver up to 5000 Watts of radiant heat to either fixed or rotating substrate holders and reaching temperatures of up to 1000°C. Models are available for 1" - 12" diameter substrates and squares up to 200 mm x 200 mm. Optional transferable substrate carriers are available which will allow the heaters to accommodate either full size substrates or a number of small samples.

RF (or DC) biasing is optional for fixed and rotating models and permits both substrate pre-cleaning and simultaneous, low energy ion bombardment during deposition to enhance adhesion, film density and film properties. Reactive gas injection rings / distributors and manual / motorized positioning are also available on most units.

For applications requiring a combination of heating and cooling in the same process, AJA International, Inc. offers the unique SHQ-V (0°C to 600°C) and SHQ-C (70°K to 600°C) designs. In applications where cooling only is required, AJA has built numerous substrate coolers with the ability to keep substrates between 70°K and 80°C using either LHe, LN2, water or cool air. Custom engineering is available if a proven design is not already at hand.

Finally, to provide a fully integrated, cost effective solution, AJA builds its own compact SHQ-15A/25A PID power supply / temperature controller units and MXMC (multi axis) and SXMC (single axis) motor controllers.

## **SHQ-F - FIXED SUBSTRATE HEATERS / RAPID ANNEAL / OXYGEN FURNACE**



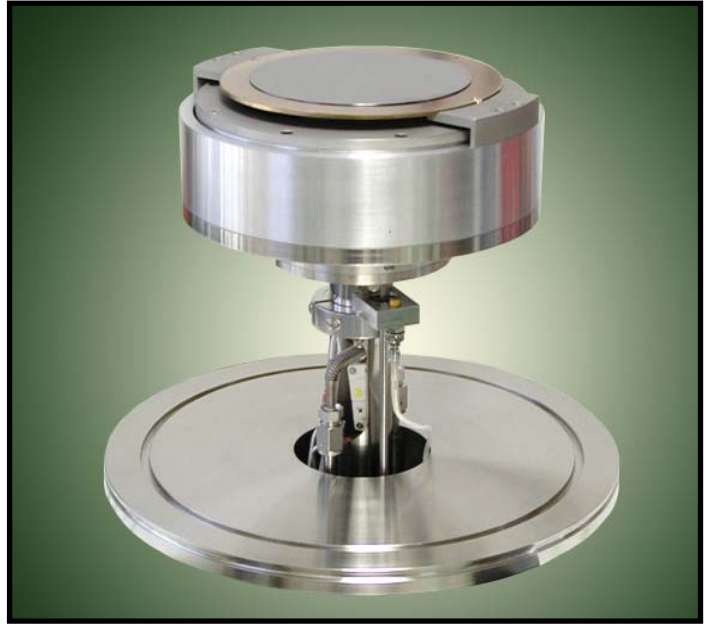
For applications where the substrate is fixed in front of one or two quartz lamps, AJA builds 1" and 2" diameter HV and UHV heaters which reach 1000°C. For 3" to 8" fixed substrates, substrate heaters, annealing stations and oxygen furnaces are available which can achieve 500°C to 900°C depending on requirements and design constraints.



## SHQ-X - ROTATING SUBSTRATE HEATERS



Substrate rotation in front of AJA's unique quartz lamp array optimizes both temperature and thin film deposition uniformity. SHQ-3X (up to 3" dia. substrates) and SHQ-4X (up to 4" diameter substrates) will achieve temperatures up to 850°C. SHQ-6X, SHQ-8X, SHQ-10X and SHQ-12X accommodate substrates from 6" to 12" diameter and can reach temperatures of up to 800°C. RF / DC biasing is optional.

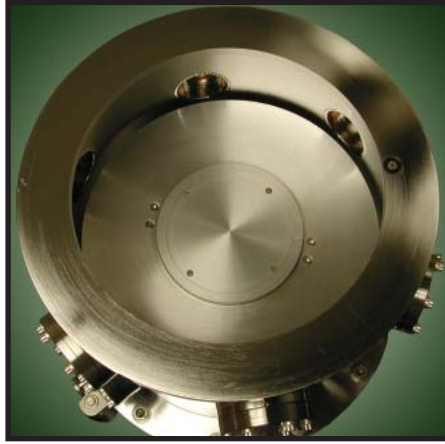


## SHQ-V/C - COMBINATION HEATING COOLING



In applications where substrate heating and cooling is required in the same process, AJA has developed the unique SHQ-V (0°C to 600°C) and SHQ-C (70°C to 600°C). These units are designed for 4", 6" and 8" substrates and utilize quartz lamps and either LHe, LN<sub>2</sub>, or cool air. This "dry" cooling thus eliminates the need to drain the system when in the heating mode. A ferrofluid seal and motorized rotation system facilitate both uniform deposition, uniform heating and a well protected cooling delivery system. Motorized "Z" motion and RF / DC bias are available options on certain models.

## SHQ-C - COOLED SUBSTRATE HOLDERS



AJA International, Inc. also manufactures a variety of substrate cooling stages. Optional features include rotation, RF/DC biasing, motorized Z motion, LHe, LN<sub>2</sub>, water cooling or air cooling. Substrate sizes from 1" - 12" diameter can be accommodated depending on the specific design. Custom engineered solutions are often required to meet the specific application.

## SHQ-CES - CUSTOM ENGINEERED SOLUTIONS



AJA International, Inc. has custom engineered dozens of special substrate heater solutions since 1989. Versions include heaters for square substrates, heaters with a transverse magnetic field, in-situ motorized tilt (shadow depositions) and mask exchange systems (combinatorial chemistry and general patterning). If a custom design is required, please provide details and a sketch if possible and e-mail or fax your requirement to AJA for a prompt quotation.

## SHQ-15A/25A - PID POWER SUPPLY / TEMPERATURE CONTROLLER



AJA International, Inc. manufactures two PID temperature controller / power supply units, the SHQ-15A (up to 2500 Watts) and the SHQ-25A (up to 5000 Watts). Both require 190 V - 240 V single phase power input and deliver +/- 1°C temperature stability and feature auto-tuning, over-temp alarm, external interlock and local/remote selector switch. Both models are half rack width x 3U.

## SHQ-SXMC/MXMC - SINGLE AND MULTI AXIS MOTION CONTROLLER



The SXMC (single axis motor controller) is used in "rotation only" designs. The MXMC (multi axis motor controller) is used to rotate the substrate and to control a motorized bellows for Z motion. Z motion is useful for adjusting working distances in deposition systems and in transfer and/or analysis. The SXMC has a single SPEED potentiometer with LED. The MXMC adds a 4 position joystick (Up / Down / Jog CW / Jog CCW) which controls both the rotation and the Z motion motors. The MXMC features a momentary limit bypass on the front panel and both units can be ordered with a remote control interface. These controllers require a 190 V - 240 V single phase power input and are designed to drive 12 VDC gearmotors.