

*SHQ15 A, 25 A*  
*HEATER CONTROLLERS*

**With OGDEN Control  
OPERATION MANUAL**

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**NOTE:** Information and data in this manual are subject to periodic amendments, revisions and additions. Please consult factory for the most current information and revision.



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## **SECTION 1 – WARNINGS !!**

### **WARNINGS !!**

**FAILURE TO PROPERLY INSTALL OR OPERATE THIS PRODUCT CAN RESULT IN PRODUCT DAMAGE, RF INTERFERENCE, ELECTROCUTION, BURNS, EYE INJURY OR DEATH. PLEASE EXERCISE EXTREME CAUTION IN OPERATION OR MODIFICATION OF THIS EQUIPMENT AND BE CERTAIN ALL PERSONNEL COMING INTO CONTACT WITH THE EQUIPMENT ARE AWARE OF THE FOLLOWING HAZARDS:**

**PLEASE BE AWARE OF THE FOLLOWING HAZARDS:**

#### **HIGH VOLTAGE:**

**THIS PRODUCT REQUIRES CONNECTION TO A 208 - 240 VAC SOURCE.**

#### **GROUNDING:**

**IT IS ABSOLUTELY ESSENTIAL THAT THE HEATER CONTROLLER AND THE VACUUM CHAMBER BE PROPERLY GROUNDED AND ALL PARTS OF THE SUBSTRATE HEATER BE AT THE SAME POTENTIAL..**

#### **COOLING WATER:**

**THE QUARTZ HALOGEN BULBS GENERATE SUBSTANTIAL HEATING. OPERATING THE HEATER WITHOUT THE MINIMUM COOLING WATER FLOW 3.0LPM@ 50-60PSI, 10-25 C COULD RESULT IN SEVERE DAMAGE THE ALUMINUM HEATER BLOCK ASSEMBLY. THE USE OF A COOLING FLOW INTERLOCK DEVICE IS REQUIRED. IN LOCATIONS WHERE COOLING WATER LINES EXHIBIT SIGNIFIGANT MINERAL DEPOSITS (WHICH WILL EVENTUALLY CLOG COOLING LINES), A FILTER OR CLOSED LOOP CHILLER IS RECOMMENDED. CONDENSATION AROUND COOLING LINES SHOULD BE AVOIDED. THEREFORE, THE COOLING TEMPERATURE MUST BE KEPT ABOVE THE POINT WITHIN THE OPERATING RANGE THAT AVOIDS CONDENSATION.**

#### **HOT!:**

**SUBSTRATE HOLDERS UNDER VACUUM CAN REMAIN HOT FOR A VERY LONG TIME. ALLOW THE HOLDER TO COOL BEFORE HANDLING.**

#### **RETURN OF CONTAMINATED EQUIPMENT:**

**NEVER SHIP OR RETURN A SUBSTRATE HEATER ASSEMBLY CONTAMINATED WITH HAZARDOUS MATERIALS TO AJA INTERNATIONAL. ALL RETURNS REQUIRE FULL DISCLOSURE OF MATERIALS USED AND THE POTENTIAL HEALTH RISKS THEREOF, PRIOR TO THE ISSUANCE OF A RETURN AUTHORIZATION NUMBER.**

## **SECTION 2 – UNPACKING**

The shipping container should be inspected for obvious signs of shipping damage. If damage is noticed contact the shipper immediately.

Carefully unpack the SHQ15A or SHQ25A heater controller and compare contents to the packing list. Inspect the contents and contact your shipper if there are any signs of shipping damage. If a discrepancy exists between what was ordered, the packing list or what has been shipped, contact AJA International immediately.

## SECTION 3 – ELECTRICAL CONNECTIONS

### WARNING !!

**HIGH VOLTAGE:** THIS PRODUCT REQUIRES CONNECTION TO A 208-240 VAC SOURCE. IT IS ABSOLUTELY ESSENTIAL THAT THE HEATER CONTROLLER, VACUUM CHAMBER AND ALL PARTS OF THE SUBSTRATE HEATER ASSEMBLY ARE PROPERLY GROUNDED AND AT THE SAME POTENTIAL.

#### A. MAIN INPUT POWER

1. Electrical Requirements
  - a. The SHQ15A and the SHQ25A operate on 208 – 240VAC single phase only.
  - b. The SHQ15A requires a 15 Amp or 20 Amp service.
  - c. The SHQ25A requires a 30 Amp service.
2. Electrical Connection: The 6' black SJ/SO cable with flying leads is used for POWER IN. Attach a connector with the proper electrical rating to the flying leads. Use a connector that matches your power outlet. Note: A connector end is not provided unless otherwise specified.

#### B. LAMP(S) POWER CONNECTION AND INTERLOCK

1. A gray colored custom type cable for POWER TO HEATER is used to connect the AJA heater controller to the atmosphere side of the lamp/heater feedthrough . On the SHQ15A or 25A heater controllers this cable is attached to a Bulgin “Buccaneer” connector. This connector plugs into the receptacle marked POWER TO HEATER at the back of the controller. The other end of this cable will have a 2-pin, 4-pin or 6-pin “amphenol” connector.

#### **IMPORTANT**

Be sure the atmosphere side ground wire is properly attached.

Attach the 2, 4 or 6-pin amphenol connector end to the feedthrough of your substrate lamp/heater. It is "keyed" and can only fit one way. Be sure it is fully threaded onto the feedthrough connector. Strain relief support of this cable is strongly recommended

2. Interlock: There is a 2-pin micro connector marked 2RECPT INTERLOCK is located at the back of the controller to prevent output of the lamp power unless this interlock is satisfied. This connection is rated 24 VAC, 95mA.

#### **IMPORTANT**

A COOLING FLOW DEVICE THAT MONITORS THE MINUM FLOW REQUIREMENT IS REQUIRED WHEN OPERATING AN AJA HEATER.

## SECTION 4 – OPERATION

### A. MAIN POWER

1. Turn the heater controller POWER ON / POWER OFF switch to ON.  
Be sure the rotary HEAT switch is in the OFF position before turning the power switch on.

The Ogden ETR-9300 will display all lights and LED's in a test mode.

When the test is complete the display will show the temperature in the top line of the display and the set point temperature in the lower line.

### B. TEMPERATURE SETPOINT TC1

1. On the Ogden controller, pressing either the up or down *Arrow keys* will adjust the set point temperature.

**NOTE:** On most AJA heater assembly designs the temperature of the substrate holder is measured indirectly by the thermocouple. This thermocouple is located between or next to the quartz heater lamp(s) and is shielded to simulate, as close as possible, the temperature of the substrate holder plate. It is recommended to soak for at least 10 - 15 minutes at the temperature set point to allow the substrate holder plate to achieve equilibrium. A direct contact method of temperature measurement should be used on your substrate when it is mounted to the substrate holder plate to establish an offset calibration curve for your system. A movable thermocouple and or temperature "buttons" can be used to take temperature measurements of your substrate. These measurements can then be plotted and this data can be used for reference when the most accurate temperature readings are required

### C. POWERING THE HEATER LAMPS

#### **IMPORTANT**

**BE SURE THE PROPER COOLING WATER FLOW REQUIREMENTS ARE SATISFIED BEFORE OPERATING THE HEATER LAMPS.**

IMPORTANT: If your heater assembly is equipped with rotation it must be ON when heating otherwise, at high temperatures, warping of the substrate holder plate and rotation rod may occur.

1. Local / Front Panel Control
  - a. Turn the rotary HEAT switch from OFF to ON. This actuates a contactor and applies power to the heater lamps AND WILL TURN THE LAMPS ON.
  - b. On the Ogden controller, pressing either the up or down *Arrow keys* will adjust the set point temperature. The top line display reading will rise as the temperature of the thermocouple in the substrate heater assembly rises. Note: The upper set point is limited at the factory. Once the set point is reached the temperature reading will remain steady in approx 1 minute.
2. Remote Operation
  - a. Heater Contactor only: Turn the HEAT switch from OFF to REM. This allows the heaters contactor only to be remotely controlled. The set point control on the Ogden display remains active.
  - b. Heater contactor and remote setpoint control (Ogden remote mode setup):
    - i. Press the scroll up and down arrow key together for five seconds. The display should change to setup
    - ii. Press the scroll key ~ twenty eight times. The SPMD parameter should be displayed with a value of SP1.2. (Note: the setpoint mode will look like: S p ñ d )
    - iii. Press the up arrow key four times. The value will change to PV2.
    - iv. Press the up and down arrow keys together for two seconds. The setting will be saved and the display will return back to normal.

**NOTE: Refer to section B6 for remote control logic. Also refer to the OGDEN ETR-9300 temperature control manual pages 9 and 11 for this setup information.**

## SECTION 5 – AUTOTUNE

**NOTE:** If you are unsure of your location within the Ogden menu then it is best to exit the menu and return to the main display. Do this by pressing the up and down arrows keys together or cycling the power to the controller.

Contact AJA if you still have questions regarding heater output tuning.

- A.** The OGDEN controller must be set for local operation to use autotune.
1. Leave the HEAT OFF and set a temperature using the arrow keys. In general, set a temperature that you will use most often or a temperature that is near the midpoint of the temperature range specs for your heater.
  2. Press PAGE and the DOWN ARROW together for ~ 3 seconds, SET will display.
  3. Press PAGE and the DOWN ARROW together again, HAND will display.
  4. Press Press PAGE and the DOWN ARROW together again, A\_t will display.
  5. Press the PAGE button only for ~ 3 seconds. The main display will return and the temperature reading will start blinking. This indicates the Ogden controller is in AUTO-TUNE mode.
  6. Immediately turn the HEAT ON. The temperature will rise and fall as the controller performs the autotune. When the autotune is complete the temperature will stop blinking. The controller should maintain the temperature within +/- 1 C. If the temperature is not stable then refer to the OGDEN manual for further information regarding tuning.

## SECTION 6 – HIGHTEMP SETPOINT ALARM

**NOTE:** The HIGHTEMP ALARM A1 is factory set. Before changes are made to this setting careful consideration should be given to the operating conditions of your substrate heater assembly. Damage to the heater block assembly may occur if this setting is too high.

Contact AJA with questions regarding the HIGHTEMP ALARM set point.

### A. WHEN A HIGHTEMP ALARM CONDITION OCCURS.

1. The Ogden will display an alarm A1.sp condition. Power to the lamps will shut off.

### B. TO ACKNOWLEDGE A HIGHTEMP ALARM.

1. Cycle power to the heater controller by switching the POWER OFF and then POWER ON.

**NOTE:** The alarm condition will occur again until the temperature is below the alarm set point.

**IMORTANT**  
**IF AN OVERTEMP CONDITION OCCURS, BE SURE TO CHECK FOR PROPER COOLING FLOW AND OR DAMAGE TO THE HEATER ASSEMBLY BEFORE OPERATING THE HEATER AGAIN.**



## SECTION 7 – REMOTE CONTROL LOGIC

### A. THE HEATER CONTROL HAS A DB9 MALE CONNECTOR ON THE BACK FOR REMOTE CONTROL

PIN# 1.	1 24VDC remote select,
PIN# 2.	24VDC common remote select
PIN# 3.	N/A
PIN# 4.	Analog 0-10VDC remote setpoint.
PIN# 5.	Analog common remote setpoint.
PIN# 6.	N/A
PIN# 7.	Analog 0-10VDC retransmit of actual temp.
PIN# 8.	Analog com retransmit of actual temp.
PIN# 9.	Ground

### A. TO RUN THE HEATER CONTROL IN REMOTE MODE DO THE FOLLOWING.

1. Turn the selector switch to the REM position.
2. A continuous 24vdc signal on pins 1 & 2 will pull in the output power contactor.
3. To control the setpoint from a 0-10vdc analog signal (pins 7 & 8) a parameter in the OGDEN temp control will need to be changed. The parameter is called Setpoint Mode.
4. When SPMD = PV2 the setpoint can be changed with a 0-10vdc analog signal on pins 7 & 8 of the DB male connector.

**NOTE:** When SPMD = SP1.2 the setpoint can be changed from the up down arrow keys on the Ogden controller. See section 4C-2 for instructions on how to change this parameter.