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**MED64**

The most sensitive microelectrode array system  
for *in vitro* extracellular electrophysiology

**Product Manual**

# **MED Heated Connector**

P/N: MED-CP02H



**ALPHA MED SCIENTIFIC**

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# 1. MED Heated Connector Components and Functions

The MED Heated Connector (MED-CP02H) connects the MED Probe to the MED64 Head Amplifier (MED-A64HE1S). Heater and thermocouple are incorporated into the bottom unit (heater unit), and warms the bath temperature in the MED Probe. Temperature is controlled and maintained by ThermoClamp™ -1 (manufactured by AutoMate Scientific).

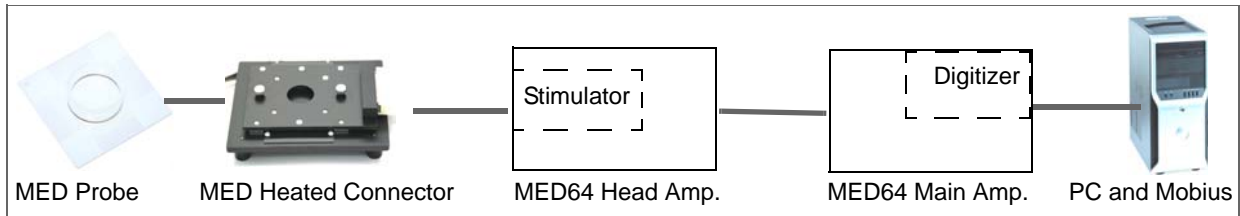


Figure 1. System diagram for the MED64 System.

## 1-1. Components and their functions

### Connector unit (top unit)

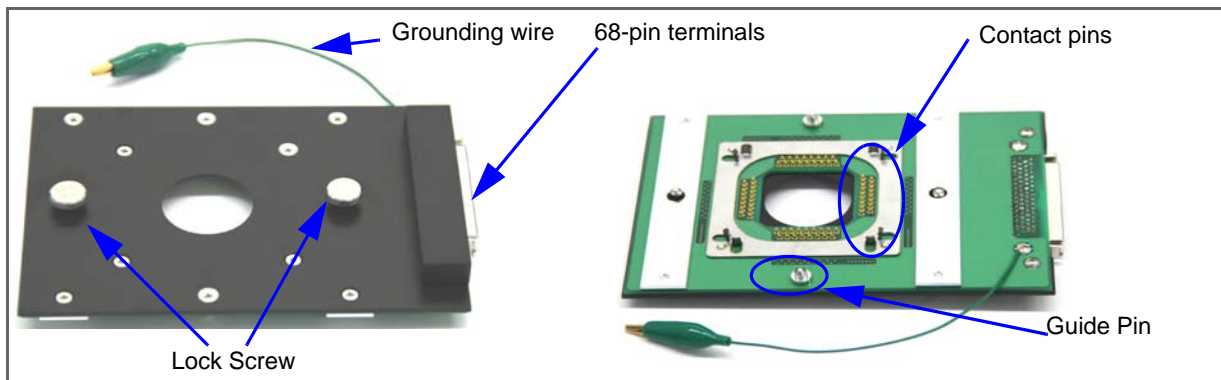
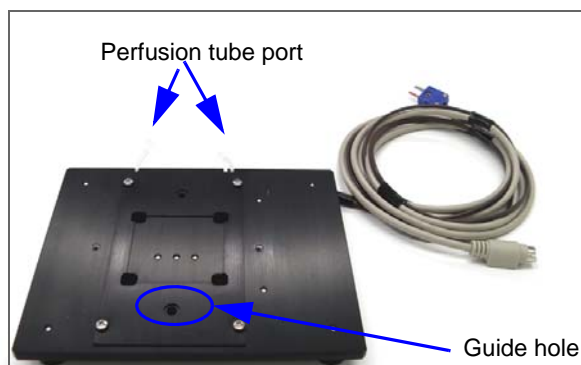


Figure 2. Connector unit. Top view (left) and bottom view (right).

### Heater unit (bottom unit)



### Accessories

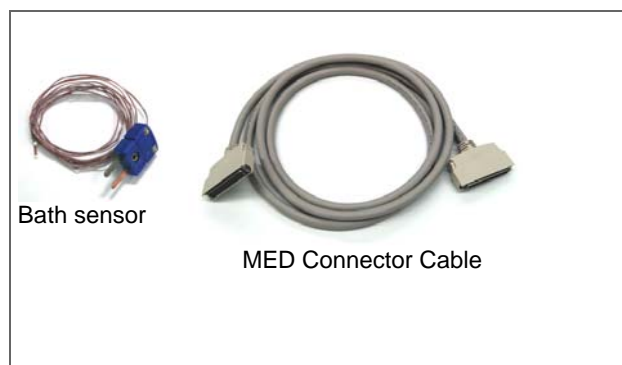


Figure 3. Heater unit (left) and its accessories (right).

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## 2. Installation

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The MED Heated Connector is compatible with a “**modified version of the ThermoClamp™-1**” manufactured by AutoMate Scientific. Please refer to the product manual (<http://autom8.com/pdfs/temperature/ThermoClamp%20Manual.pdf>) for instructions for the ThermoClamp™-1.

**CAUTION:**

“The modified version of the ThermoClamp™-1” is calibrated for use with the MED Heated Connector only and thus CANNOT be used with the pencil or any other equipment provided by AutoMate Scientific.”



**Figure 4.** The MED Heated Connector connected to the ThermoClamp™-1 (left), and the label on the ThermoClamp™-1. This ThermoClamp™-1 can be used ONLY with the MED Heated Connector.

### 2-1. Orientation of the MED Heated Connector

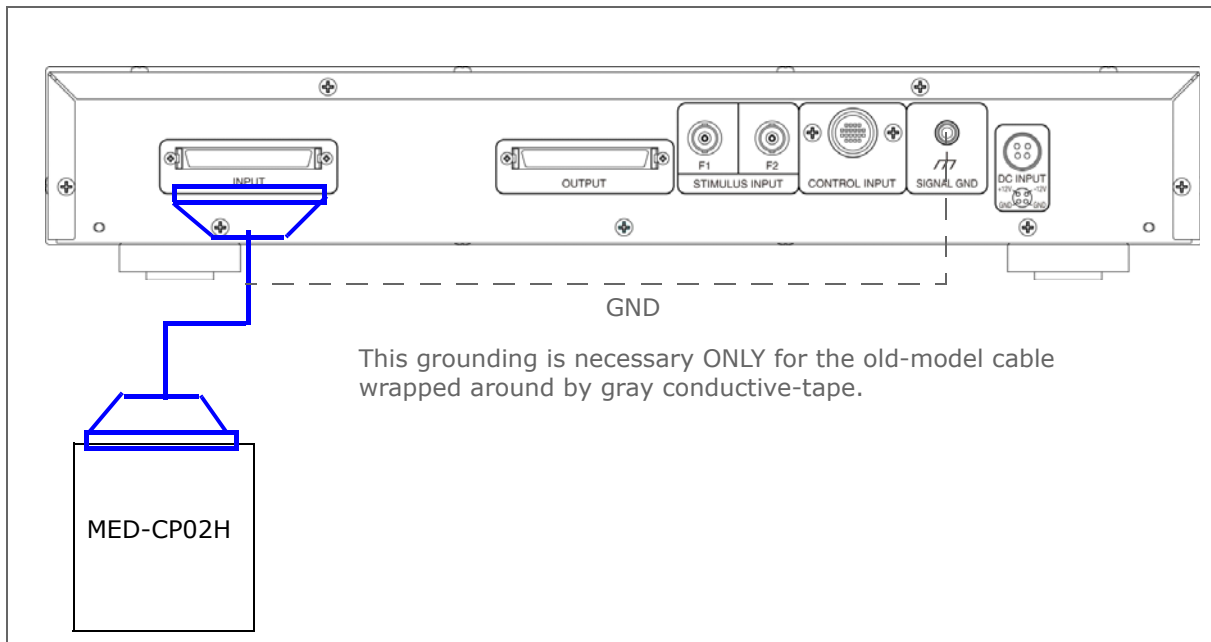
Place the MED Heated Connector with its terminal oriented towards the right side. Channel 1 is assigned to the top-left while channel 64 is assigned to the bottom-right on the MED Heated Connector.



**Figure 5.** Orientation of the MED Heated Connector.

## 2-2. Connecting the MED Heated Connector to the MED64 Head Amplifier

Connect the MED Heated Connector to the [INPUT] terminal on the MED64 Head Amplifier (MED-A64HE1S) with the MED Connector Cable.



**Figure 6.** Connection between the MED Heated Connector and MED64 Head Amplifier.



**Figure 7.** (Left) Connection of the MED Heated Connector to the MED Connector Cable.

**Figure 8.** (Right) Back side of the MED64 Amplifier.

- After the MED64 System is installed, it is suggested that one check the noise WITHOUT connecting the Heated Connector to the ThermoClamp<sup>TM</sup>-1. Connect them after confirming that the noise level is appropriate without the ThermoClamp<sup>TM</sup>-1, and then check the noise again.

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### 2-3. Connecting the MED Heated Connector to the ThermoClamp™-1

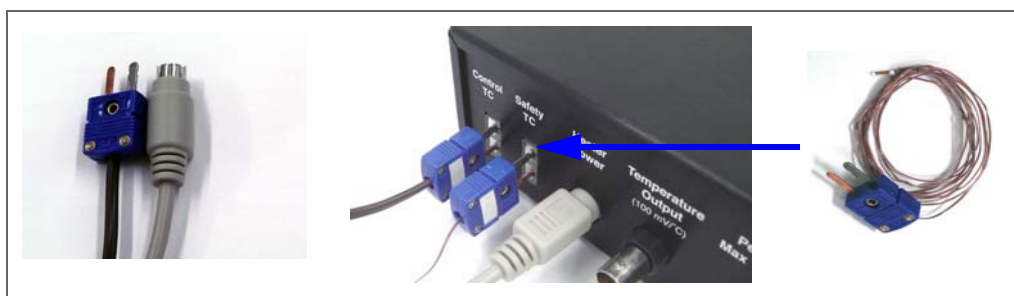
Connect the 2 plugs from the Heated Connector to the ports on the ThermoClamp™-1.

- 1) The blue plug (with thick copper cable) to the "Control TC" (the most-Left port).
- 2) the white PS2 cable to the "Heater Power".

Connect the "Bath sensor" to the "Safety TC" (the middle port, refer to Figure 9). The **MED Heated Connector does not work properly WITHOUT this connection.**

**CAUTION:**

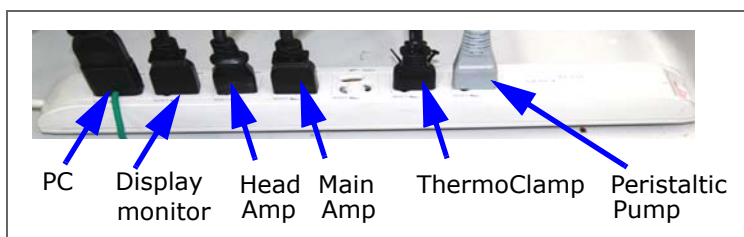
Place the ThermoClamp™-1 **AWAY** from the MED Heated Connector or MED Connector Cable to avoid generation of noise.



**Figure 9.** Connecting the MED Heated Connector to the ThermoClamp™-1.

### Grounding of the ThermoClamp™-1

Connect the power cable (3 pins) of the ThermoClamp™-1 to the same power strip where the MED64 Head Amplifier and Main Amplifier are connected. When power plugs without a GND terminal are used, connect the GND terminal of the ThermoClamp™-1 to the GND terminal for the MED64 Head Amplifier (MED-64HE1S).



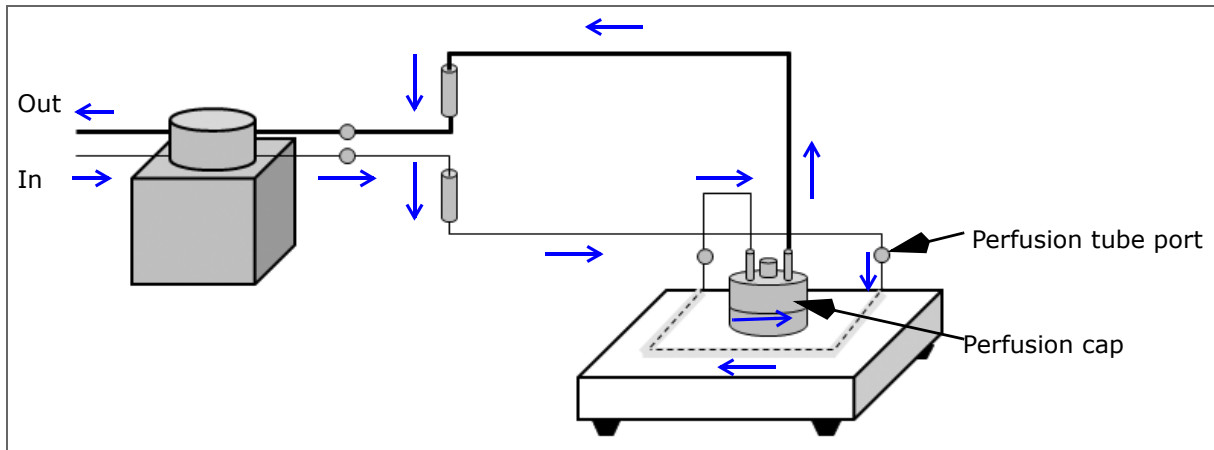
**Figure 10.** Grounding with the power cables.



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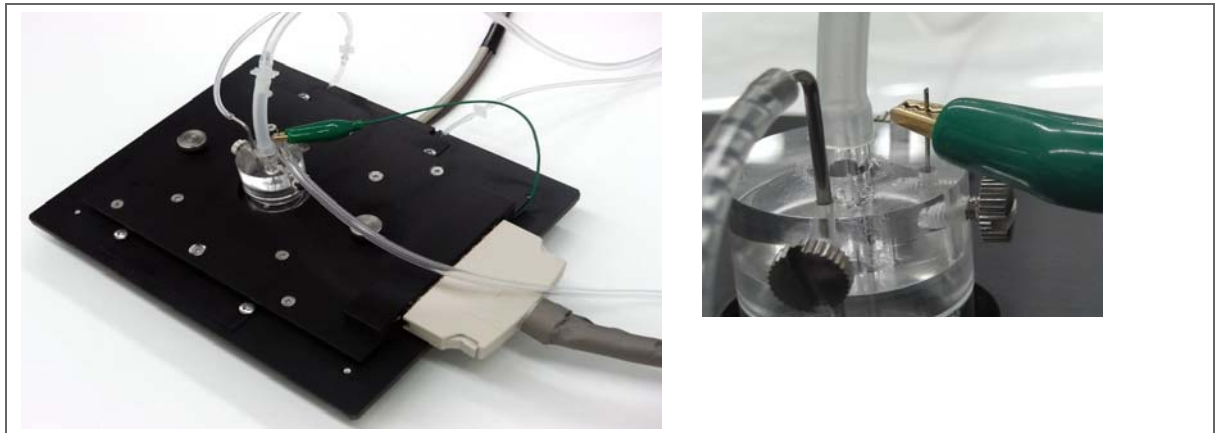
## With perfusion system

When the MED Heated Connector is used with perfusion system, connect perfusion inlet-outlet tubes to the "Perfusion tube ports" so that solution can be warmed before being sent to the MED Probe. (Refer to Figure 11.) Clean the tube with double distilled water after each experiment.



**Figure 11.** Connection for the perfusion tubes.

Connect the grounding wire (green wire attached to the connector unit) to the platinum wire incorporated into the perfusion cap for grounding. (Refer to Figure 12)



**Figure 12.** Perfusion cap placed onto the MED Probe. The platinum wire incorporated into the Perfusion Cap is grounded to the connector unit.

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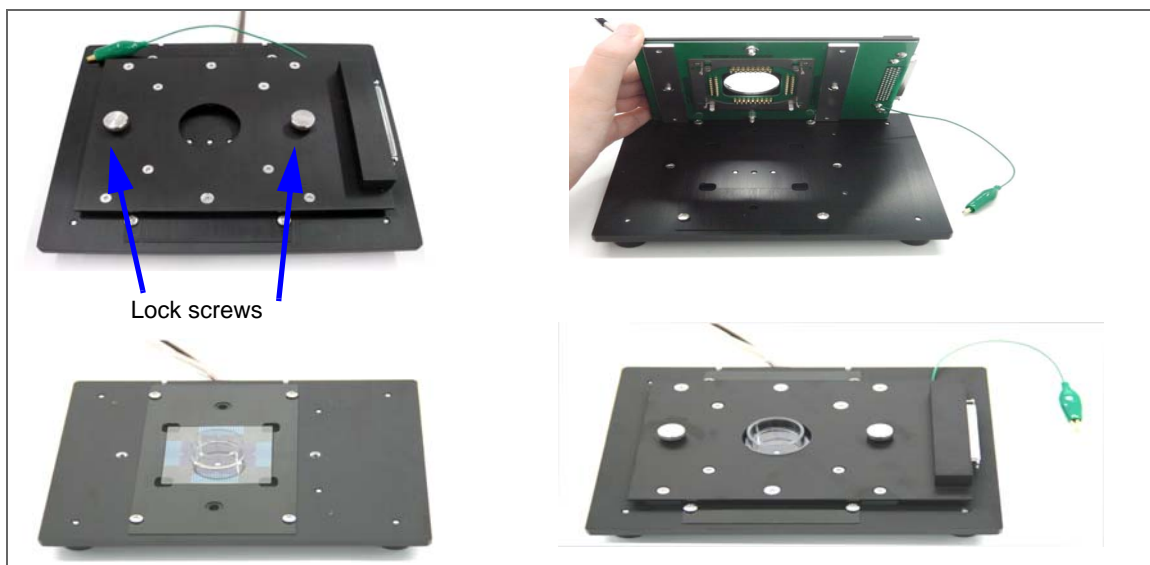
## 3. Instructions for use

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### 3-1. Installing the MED Probe onto the Heated Connector

Loosen the lock screws on the connector unit (top unit) and remove it. Place the MED Probe filled with solution in the square guide on the heater unit. Clean the terminal for the MED Probe with a Kim wipe before mounting.

Place the connector unit back on the heater unit (bottom unit) by aligning guide pins with their guide holes, and tighten the lock screws.



**Figure 13.** Installing the MED Probe onto the Heated Connector.



**Figure 14.** Cleaning the MED Probe's terminal.

**CAUTION:**

- DO NOT touch the contact pins with your bare hands or finger tips. This may cause rust and adversely affect conduction.
- Spilling liquid onto the pins will cause rust and adversely affect conduction. Be extremely careful not to get the pins wet, especially with saline solution.
- Avoid over-tightening the lock screws and pressing the spring-loaded contact pins or probe guide too tightly.

## 3-2. Setting temperature

- Temperature is set and controlled by the ThermoClamp™-1. Please read the manual before using it with the MED Heated Connector.

Turn on the power switch of the ThermoClamp™-1 which is connected to the MED Heated Connector. The C1 button is colored green and the control panel on the ThermoClamp™-1 will display the measured temperature (present temperature).

Change the set-point to the desired one with following procedure:

1. Press the SEL key to turn on the SV light (red). Now the controller displays the set-point value.
2. With UP and DOWN keys, adjust the temperature to the desired value.
3. Wait for a few seconds and then press the SEL key again to turn off the SV light (red). Now the controller displays the measured temperature.
  - Display with the SV light (red) turned on shows set-point value.
  - Display with the SV light turned off shows measured temperature.



Figure 15. ThermoClamp™-1 (left) and the control panel (right).

## 3-3. Recommended temperature and important notice to achieve a temperature stability

In order to avoid the changes and fluctuations in temperature, please **make sure that the MED Probe is covered during your experiments.** (Perfusion Cap or MED Connector Cover is available for this purpose.) **Place the MED Heated Connector away from the direct stream from air-conditioning or any other environment regulation system.**

Our evaluation test has verified:

- <1.0 °C accuracy (for solution in the MED Probe chamber compared to the “measured temperature” displayed in the ThermoClamp™-1.
- <0.1 °C fluctuation (for the solution in the MED Probe chamber in a stable measured temperature).

Conditions to achieve above are:

- Without perfusion: 30-37 °C (RT:25 °C, with top-cover, away from any direct stream)
- With perfusion: 30-32 °C (RT:25 °C with top-cover, away from any direct stream)

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## 4. Maintenance

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### 4-1. Replacement of the tubes incorporated into the heater unit

Replace the tube regularly according to following procedures.

#### Specification

Tygon(R) R3603 AAC00001 (ID:1/32 inches, OD:3/32 inches), 30 Cm long

1. Loosen the four screws and remove the aluminum plate from the heater base. (Figure 16)



**Figure 16.** Removing the aluminum plate from the heater base.

2. Remove the tube. (Left in the Figure 17.)
3. Embed the new tube into the groove. Make sure that the tube is NOT twisted within the groove. Return the aluminum plate onto the heater base and then tighten the screw. (Right in the Figure 17). Check whether solution flows smoothly with the new tube before starting your experiment.

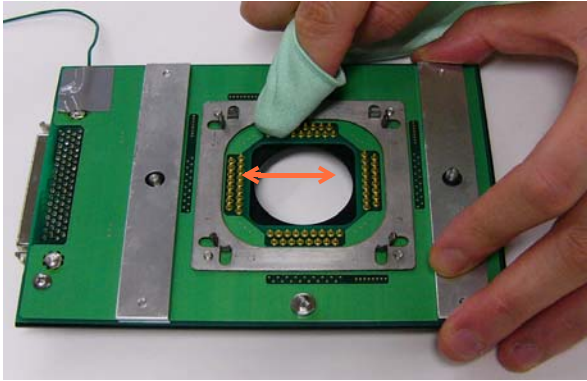


**Figure 17.** Removing the tube (left) and the aluminum plate returned (right).

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## 4-2. Cleaning of the contact pins

Wipe the contact pins several times while pushing them with a lint-free cloth. (e.g. Lens cloth for glasses). If some contact pins are stuck and unmovable, your connector needs to be repaired. Contact your local distributor or our technical support team.



**Figure 18.** Cleaning the contact pins.

## 4-3. Sterilization

Wipe it with a lint-free cloth soaked in 70% ethanol, and allow to dry.

- Cleaning with ethanol is only for outside connector, but NOT for the gold contact pins.

### **CAUTION:**

- Do NOT autoclave as it may damage the MED Connector.
- Do NOT wipe the contact pins with a cloth soaked with ethanol. Alcohol may remove the lubricant which is necessary for the pins to move.

## 4-4. Storage

Store in a cool dry area. Avoid exposure to high temperatures or humidity.

## 5. Cautions

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- DO NOT touch the contact pins on the connector unit with bare hands or fingertips. This may cause rust and adversely affect conduction.
- Clean the terminal for the MED Probe with a Kimwipe before mounting onto the Heated Connector. Particularly, clean it with a kimwipe wet with ethanol when the MED Probe is removed from a humidified incubator.
- DO NOT spill medium or any other liquid on the contact pins.
- Do NOT press the contract pins and probe guide excessively. It may damage and affect conduction.
- DO NOT give strong mechanical shock by putting heavy material on the unit or dropping the unit.
- DO NOT tighten the lock screws excessively to avoid damaging them. (The torque of the screw should not exceed 8kg.cm.)
- Make sure to cover the MED Probe to achieve the <1.0 °C accuracy when used.

### ***What should I do if medium spilled on the contact pins?***

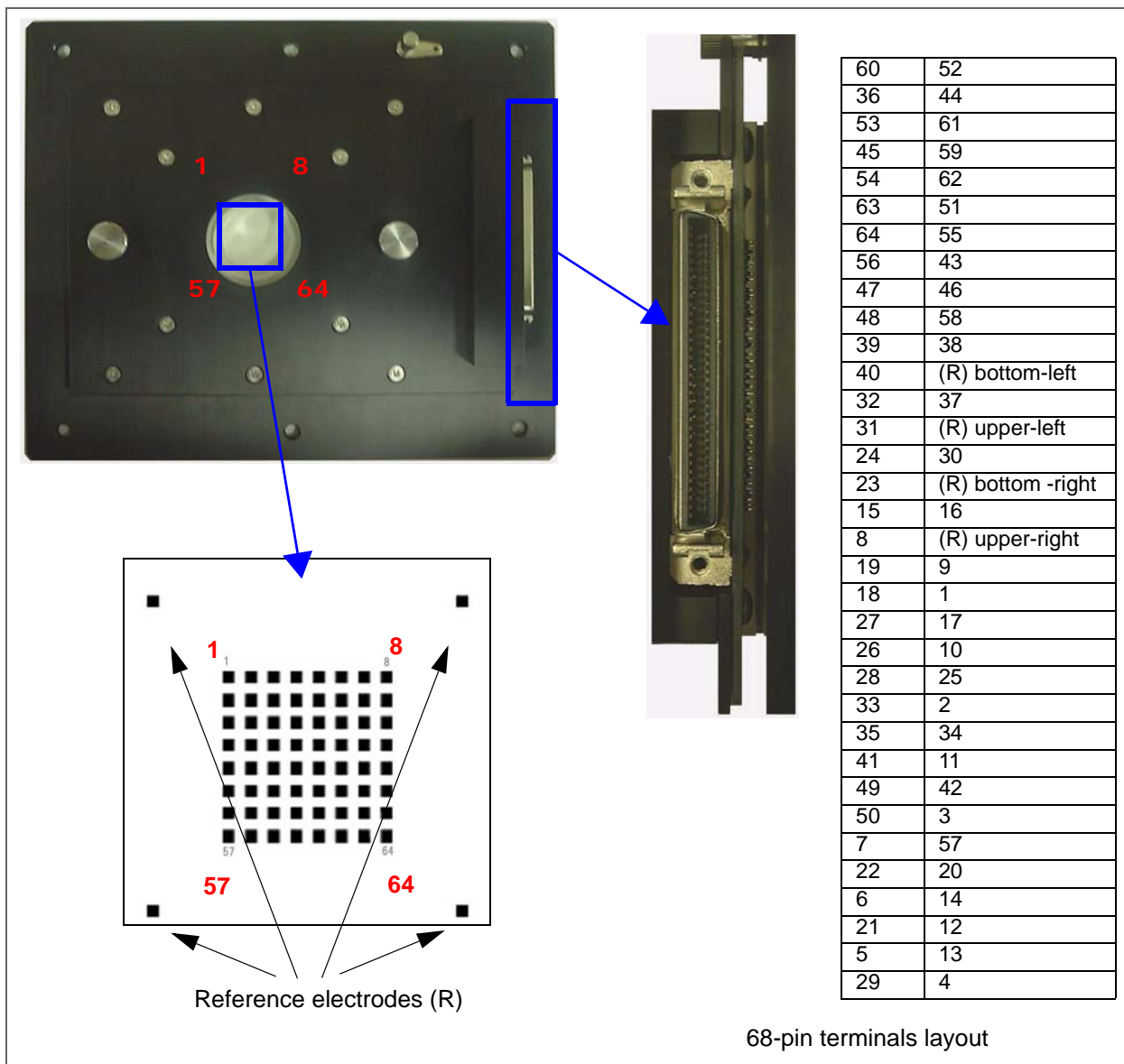
Stop the perfusion immediately and clean the contact pins gently with a clean cloth soaked with double-distilled water to remove any sediment or salts, and then allow to dry.

Avoid using alcohol. Alcohol may remove the lubricant which is necessary for the pins to move.

## 6. The terminal arrangement of electrodes on the MED Probe and the MED Heated Connector

The MED Probe does not have orientation while the MED Heated Connector does. Channel 1 is located on the top left and channel 64 on the bottom right when the connector terminal is located on the right hand side (as shown in the Figure 19). This channel arrangement is the same even if the probe is rotated 90 or 180 degrees, since the channel number is relative to its location in the MED Heated Connector.

Figure 19 shows the terminal arrangement for the MED Heated Connector. MED Probe has 4 reference electrodes as well as 64 (or 61) recording electrodes. The four reference electrodes are connected to the terminal connector separately.



**Figure 19.** Electrode orientation on the MED probe (left) and 68 pin terminals layout (right)

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## 7. Warranty

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This product will be repaired with new or refurbished parts, free of charge, for one (1) year from the date of original purchase in the event of a defect in materials or workmanship.

The product warranty covers failures due to defects in materials or workmanship which occur during normal use. It does NOT cover damage incurred during shipment or problems which are caused by products not supplied by Alpha MED Scientific. In addition, this warranty does not cover problems resulting from alteration, accident, misuse, neglect, faulty installation, maladjustment of user controls, improper maintenance, modifications or service by anyone other than AMS or damage attributable to acts of God.

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## 8. Specifications

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### Connector unit

MED Probe securing mechanism	Screw down
Out put	68-pin terminals
Printed circuit board	4 layers (The 1st and 4th layers are ground, and 2nd and 3rd layers contain signal line)
Contact resistance	< 30mΩ

### Heater unit

Heater devise	Transistor
Temperature accuracy (for solution in the MED probe)	<1.0 °C
Range of verified <1.0 °C accuracy	30-37 °C (RT:25°C without perfusion / with top covered) 30- 32 °C (RT:25°C with perfusion/ with top covered)

### General

Material	Aluminum. Gold plate for contact pins
Cables length	80 Cm
Weight	700 g
Dimensions	W174 x H38 x D150 mm

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*Specifications may not be satisfied depending upon the type of computer or operating environments used. Only for use in animal studies research. Specifications and external appearance are subject to change without notice. ThermoClamp™-1 is a trade mark for AutoMate Scientific, Inc.*





September 1, 2014



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