MED64

A low-noise multi-electrode array system
for *in vitro* electrophysiology

Product Manual

MED Heated Connector

P/N: MED-CP02H

For the serial# smaller than 2013CD01034

ALPHA MED SCIENTIFIC

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MED Heated Connector Components and Functions

The MED Heated Connector (MED-CP02H) functions to connect the MED Probe to the MED64 Head Amplifier (64-CHANNEL HEAD AMPLIFIER, MED-A64HE1). Heater and thermocouple are incorporated into the bottom unit (heater unit), which will warm and maintain the bath temperature on the MED Probe controlled by ThermoClamp^{TM} -1 manufactured by AutoMate Scientific.

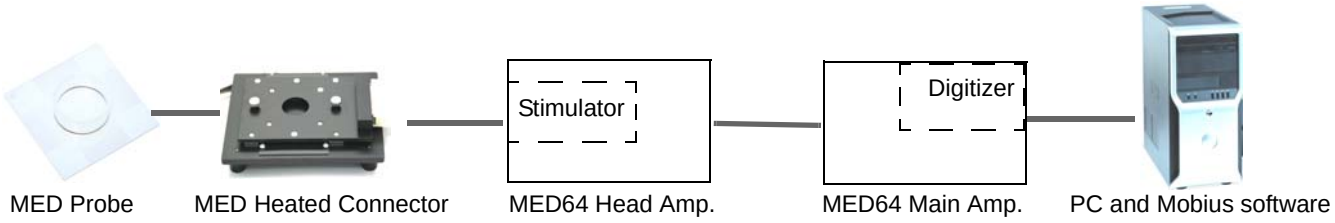


Fig. 1. System diagram for the MED64 System.

Components and their functions

Connector unit (top unit)

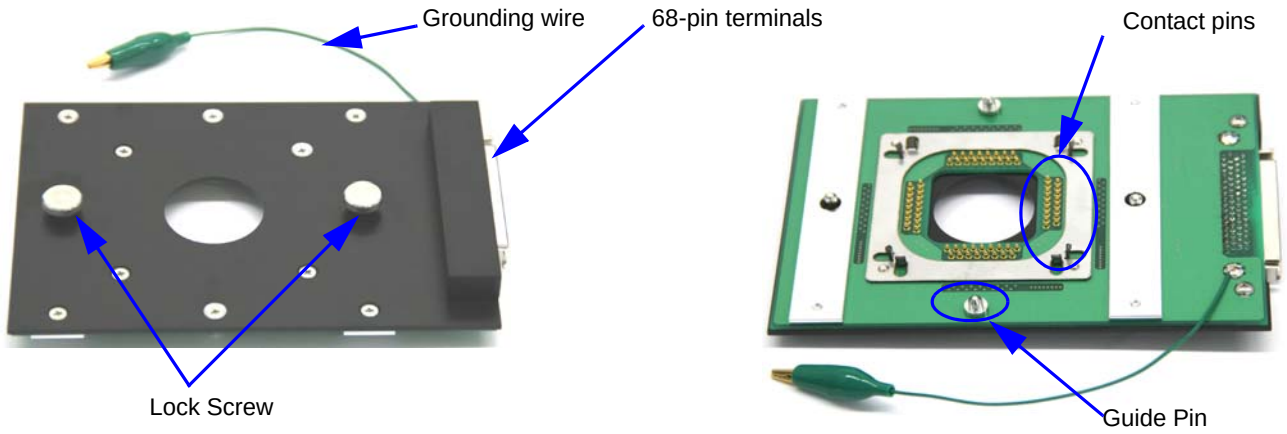


Fig. 2. Connector unit. Top view (left) and bottom view (right).

Heater unit (bottom unit)

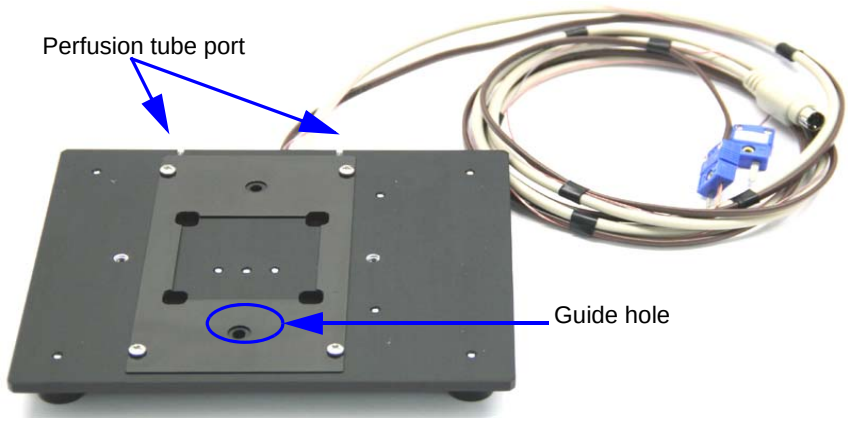


Fig. 3. Heater unit.

Installation

The MED Heated Connector is compatible with 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.

Fig. 4. The MED Heated Connector connected to the ThermoClamp™-1.

1. Orientation of the MED Heated Connector

Place the MED Heated Connector with its connector terminal and connector cable 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.

Fig. 5. Orientation for the MED Connector.

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

Connect 3 plugs to the ports on the ThermoClamp™-1 Temperature Controller.
Connect the blue plug with thin copper cable to the "Bath TC" port (left), the blue plug with thick brown cable to the "Pencil TC" port (right), and the PS/2 plug to the "Heater Power" port. (Refer to Fig. 6)

For the MED Heated Connector which serial number is smaller than 2012LB01020:
Connect the blue plug with thin copper cable to the "Pencil TC" port (right), the blue plug with thick brown cable to the "Bath TC" port (left).

CAUTION:

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

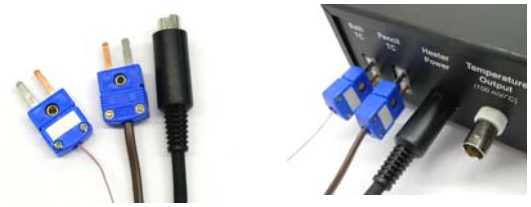


Fig. 6. Connecting the MED Heated Connector to the ThermoClamp™-1.

Grounding of the ThermoClamp™-1

Connect the power cable (3 pins) of the ThermoClamp™-1 to the same power strip where the MED 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-64HE1).

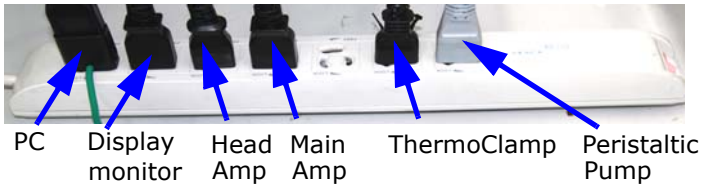


Fig. 7. Grounding with the power cables.

3. 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.

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

Fig. 8. Installing the MED Probe onto the Heated Connector.

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.

4. 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-A64HE1) with the MED Connector Cable. The side of the connector cable that has a long ground cable should be connected to the Head Amplifier so that the cable can be grounded.

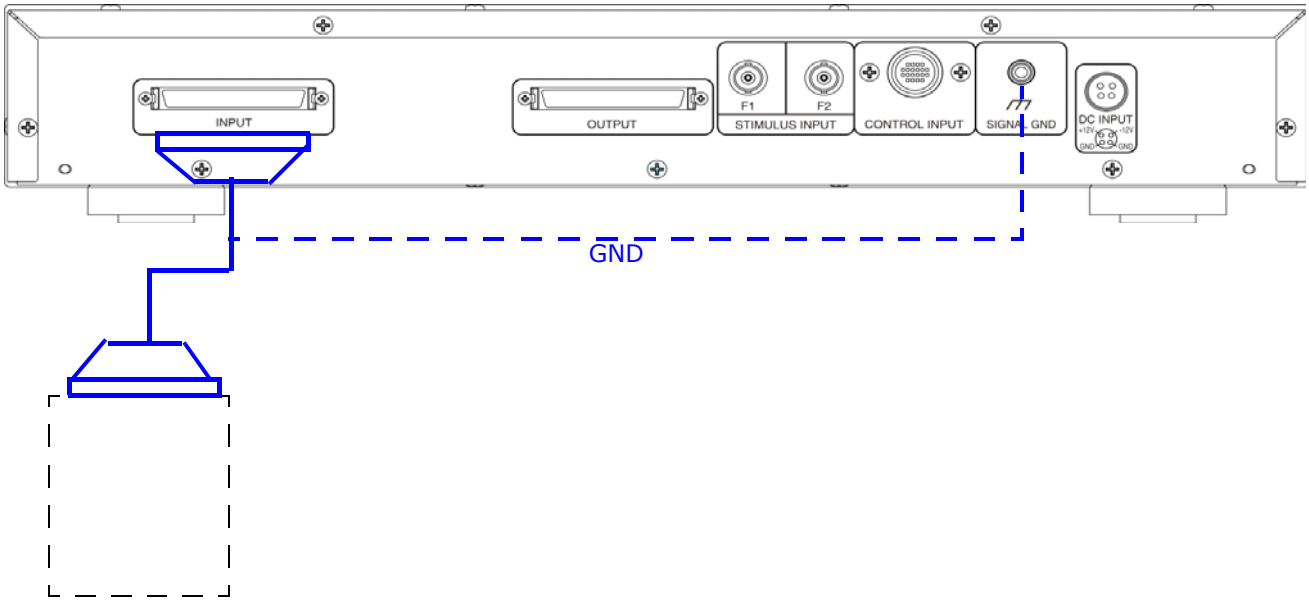


Fig. 9. Connection between the MED Heated Connector and MED64 Head Amplifier.

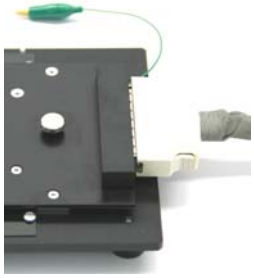


Fig. 10. (Left) Connection of the MED Heated Connector to the MED Connector Cable.
Fig. 11. (Right) Back side of the MED64 Amplifiers. The MED Connector Cable is grounded to the GND terminal on the MED64 Head Amplifier.

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 Fig. 12.) Clean the tube with double distilled water after each experiment.

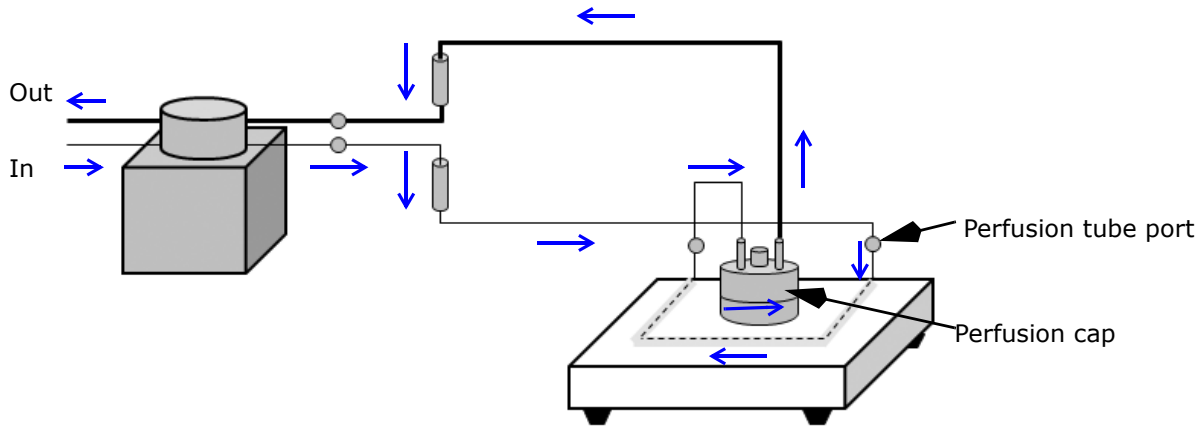


Fig. 12. Connection for the perfusion tubes.

Connect the grounding wire (green wire) attached to the connector unit to the platinum wire incorporated into the perfusion cap for grounding. (Refer to Fig. 13)

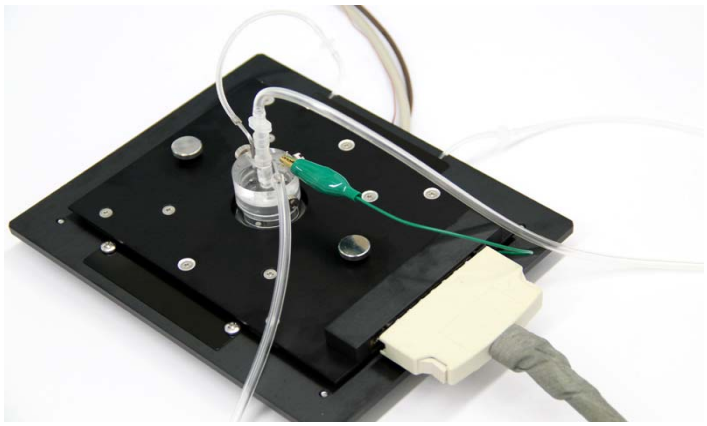


Fig. 13. Perfusion cap placed onto the MED Probe. The platinum wire incorporated into the Perfusion cap is grounded to the connector unit.

Instructions for use

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 temperature controller 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 and hold it until the SV light (red) turns on. Now the controller displays the set-point value.

2. With UP and DOWN keys, adjust the temperature to the desired value.

3. Press and hold the SEL key again until the SV light turns off. Now the controller displays the measured temperature.

Fig. 14. ThermoClamp™-1 (left) and the control panel (right).

Recommended temperature and Important notice to achieve a stable temperature

In order to avoid the fluctuation in temperature, please make sure to cover the MED Probe during your experiments. (The plastic cap which comes with the Heated Connector or perfusion cap could be used.) Place the MED Heated Connector away from the direct stream of an air-conditioning.

Our evaluation test has verified that <1.0 °C accuracy can be achieved in the following ranges of temperatures with 1) the room temperature of 25 °C and 2) MED Probe covered from the top.

- Without perfusion: 30-37 °C (RT:25 °C with top-cover)
- With perfusion: 30-32 °C (RT:25 °C with top-cover)

*The top of MED Probe must be covered to achieve the accuracy.

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

Loosen the four screws and remove the aluminum plate from the heater base. (Fig. 15)

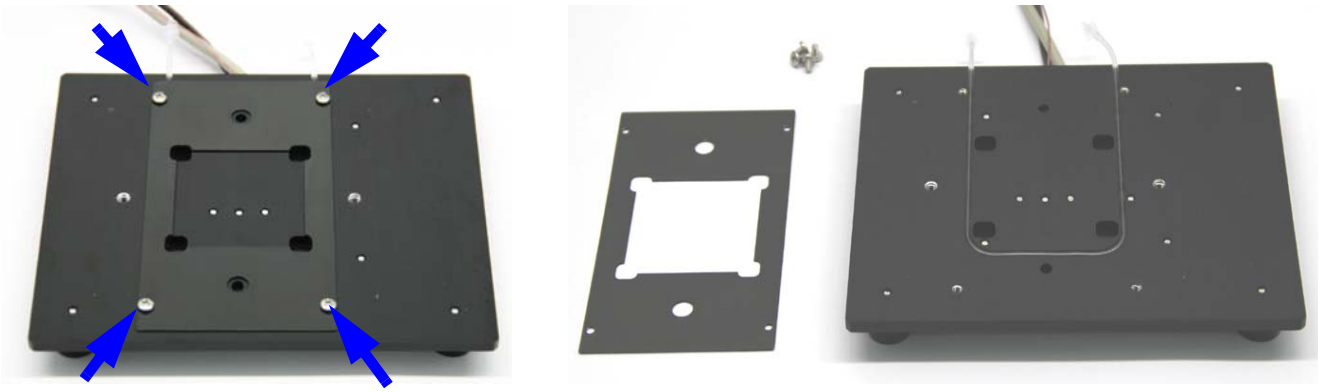


Fig. 15. Removing the aluminum plate from the heater base.

Remove the tube.

Fig. 16. Removing the tube.

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. Check whether solution flows smoothly with the new tube before starting your experiment.

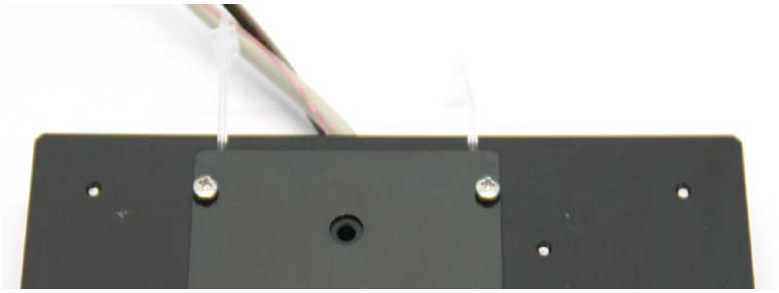


Fig. 17. The aluminum plate returned.

Cleaning of 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, contact your local distributor or our technical support team.

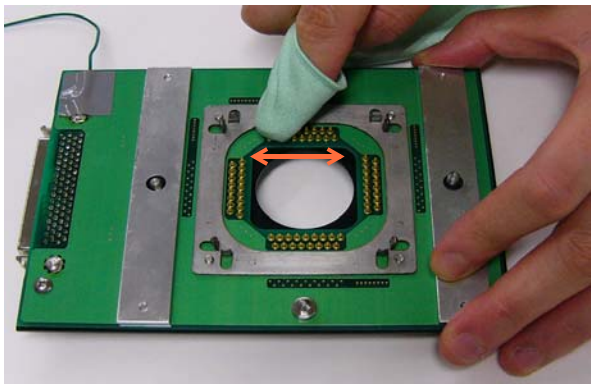


Fig. 18. Cleaning the contact pins.

Sterilization

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

CAUTION:

- Do NOT autoclave as it may damage the MED Connector.
- Do NOT wipe the contact pins with a cloth soaked with ethanol.

Storage

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

Cautions

- DO NOT touch the contact pins on the connector unit with bare hands or fingertips. This may cause rust and adversely affect conduction.
- DO NOT spill medium or any other liquid on the contact pins.

  If you spill medium or any other liquid on the contact pins, immediately wipe them 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.
- 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.

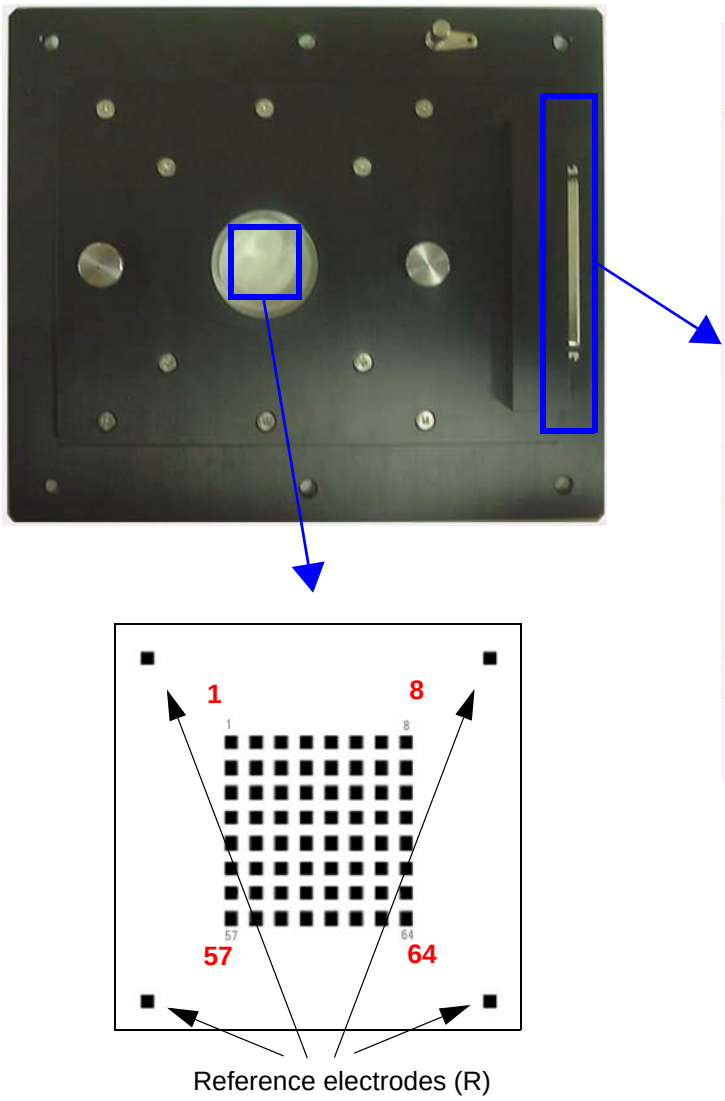
The terminal arrangement of electrodes on the MED probe and the MED Heated Connector

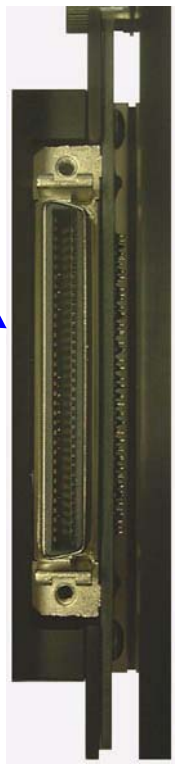
Electrode Orientation

Once the MED Probe is set in the MED Heated Connector, 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 below). This channel arrangement is the same even if the probe is rotated 90 or 180 degrees, since the channel number is relative to it's location in the MED Heated Connector.

Reference electrodes

Four reference electrodes are connected to the terminal connector separately.





60	52
36	44
53	61
45	59
54	62
63	51
64	55
56	43
47	46
48	58
39	38
40	(R) bottom-left
32	37
31	(R) upper-left
24	30
23	(R) bottom -right
15	16
8	(R) upper-right
19	9
18	1
27	17
26	10
28	25
33	2
35	34
41	11
49	42
50	3
7	57
22	20
6	14
21	12
5	13
29	4

68-pin terminals layout

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

Warranty

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.

Specifications

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

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.

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Manufactured by **Alpha MED Scientific Inc.**