



INSTRUCTION MANUAL



7610A Tissue Bath Cooler

for use with

**7000 Mk 2 and 5000 Mk 2
series
Vibrating Microtomes**

EC DECLARATION OF CONFORMITY



Name and address of Manufacturer:

Campden Instruments Limited
PO Box 8148
Loughborough
LE12 7XT
UK

Description of Machine: **Tissue Bath Cooler**

Model number: **7610A**

Serial Number:

The equipment specified above complies with the relevant health and safety requirements of the following:

1. EC Directive(s):

Electromagnetic Compatibility Directive 89/336/EEC
The Low Voltage Directive 73/23/EEC

2. UK Regulations:

Electricity at Work Regulations 1989

3. European Standards

EN 50081-1: 1992 Electromagnetic compatibility generic emissions standard part 1
EN 50082-1: 1992 Electromagnetic compatibility generic immunity standard part 1

Additionally, the health and safety requirements of the following British and harmonised European Standards have been incorporated in the design of the above machine:

BS 2771: part 1:1986 (EN 60 204: Part1: 1985)
BS 5304:1988

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The purpose of this manual is to allow the user to achieve expertise in the use of the Instrument and to give the maintenance technician an insight into maintaining the instrument in peak operating condition. Please read and understand the information contained in this manual before using the instrument. Only competent and capable personnel should use the instrument.

This document should be retained for future reference as it contains the name and address of the manufacturer within the EC

PACKAGING

Please retain the original packaging for future use.

Instruments will not be accepted for service or repair unless the unit has been adequately and properly packaged. Additionally instruments will not be accepted without prior authorisation and have been certified as being uncontaminated with any material that may be hazardous to the health of service personnel. Returns Authorisation and Decontamination Certificate forms can be obtained by contacting Campden Instruments.

1. Introduction

1.1 Safety

Spillage - If the cutting lubricant/preserving liquid, e.g. physiological saline, is spilt over the instrument it is important for electrical safety reasons to ensure that the instrument remains safe to use. To avoid the possibility of electrical shock if a spillage occurs, the unit should be switched off at the mains electrical outlet and disconnected before touching the instrument. The instrument should be inspected and tested if necessary by a suitably qualified technician before it is put into further use.

This instrument must not be operated unless it is adequately earthed (grounded).

All electrical instruments and equipment should be periodically tested to ensure they remain safe to use. In some countries this may be a statutory requirement. Your local Health and Safety Executive (or equivalent) will be able to give advice on this matter.

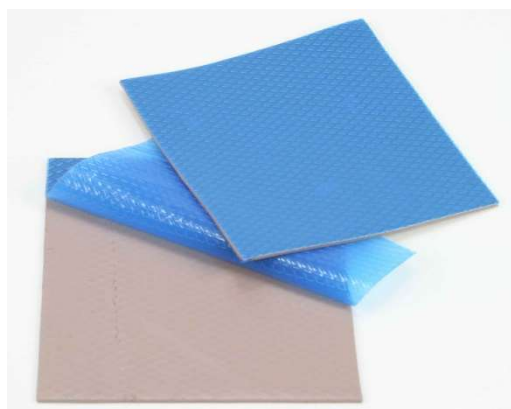
1.2 Overview

The 7610A Tissue Bath Cooler is intended for use with the Campden Instruments range of 7000smz-2 and 5100mz and 5100mz-plus series vibrating microtomes. Unfixed brain slices sectioned at 4°C give better tissue preservation and remain viable longer for in-vitro recordings. Additionally, some enzyme histochemical techniques give better staining results when sectioned at low temperatures.

The 7610A Tissue Bath Cooler comprises a mains operated control unit and a cooling unit. The cooling unit accepts the standard 7000/5100 slicer inner tissue bath. The bath attaches to the cooling unit by magnetic attraction and is autoclavable.

The control unit houses a power supply and the temperature control circuitry. The cooling unit assembly incorporates a thermoelectric 'Peltier' element, temperature feedback sensors and a cold water fed heat exchanger. It has a stainless steel interface plate with embedded magnets enabling the easy attachment/detachment of the tissue bath.

The use of a thermal transfer pad between the cooling unit assembly and tissue bath is recommended. Two such reusable pads are supplied with each 7610A unit. These can have a limited life (depending on treatment, number of bath/cooler separations, etc.) but significantly enhance the efficiency of cooling. Replacement pads (7610-3) are available from Campden Instruments.



Thermal transfer pads 7610-3



7610A Cooling head (left) and fitted with tissue bath (right)

The cooling unit with bath will fit onto any Campden Instruments 7000smz-2 or 5100mz series vibrating microtome without modification. The bath accepts standard (magnetic) tissue mounts from both machines.

Current from the power supply flows through the thermoelectric element, which acts as a heat transfer unit. Heat is drawn off, cooling the solution in the tissue bath. The heat generated by this process is removed by the cold water flowing through the heat exchanger. The unit uses a PID (Proportional Integral Derivative) temperature control algorithm to maintain temperature stability. This will hold the bath temperature to within 0.5°C of the temperature set point. There will naturally be a small variation in temperature vertically through the bath as the distance from the cooling element increases. Experience will show the best temperature to be set for any given requirement and ambient temperature.

2. Set-up

2.1 Bath Assembly Set-up

It is essential that the cooling unit assembly is connected to an adequate cold water supply (ground water will be more efficient than water from a storage tank) whenever the unit is in operation. Typically the unit may be connected to a cold-water tap and fed to waste. Alternatively the water may be pumped through the unit from a suitable ice-bath reservoir.

The efficiency of the cooling will depend on three factors:

- a/. temperature of the cooling water in-flow
- b/. rate of flow
- c/. the use of the Thermal transfer pads 7610-3

Minimum requirements:- The flow of water through the heat exchanger should not be less than 400ml/minute and the water temperature should be below 25°C.

See figure 1 for connection ports.

A temperature feedback sensor is built into the assembly and monitors the temperature of the heat exchanger. The power supply to the thermoelectric elements will shut down if the water supply is either inadequate or not present. The unit will give an audible 'beep' and the display read 'Err' to indicate that the thermoelectric element has been shut down due to an inadequate flow of cooling water. Switching the unit off and on will reset this condition.

The tissue bath should be filled with physiological buffer solution pre-cooled to the intended slicing temperature.

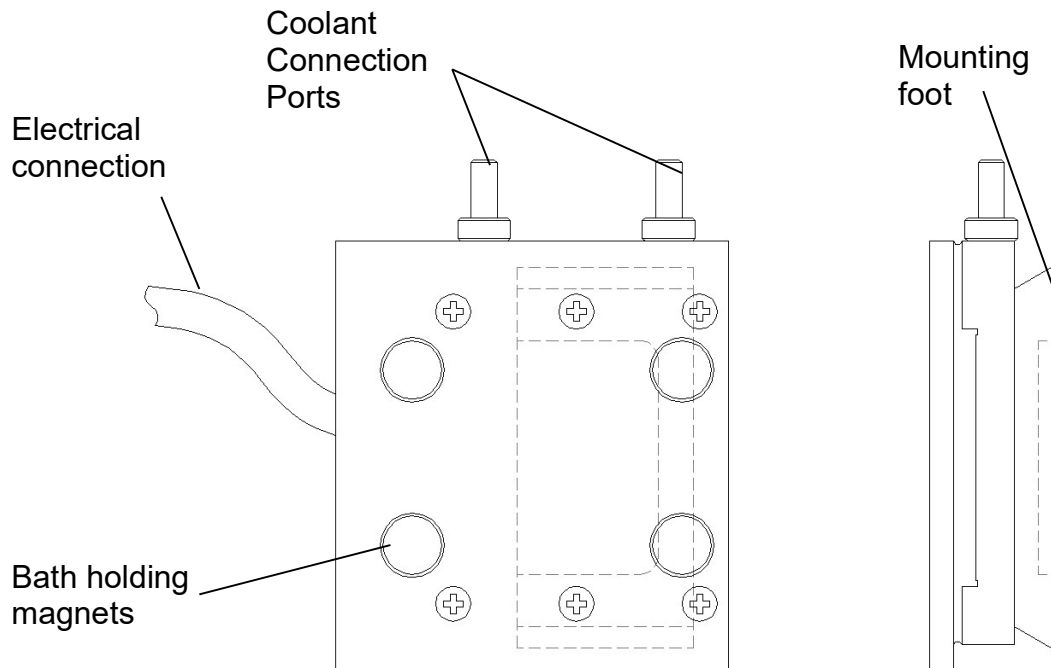


Fig. 1 Cooling head assembly

2.2 Temperature Controller Set-up

Before connecting the temperature controller to a mains supply, the unit must be set for your particular voltage supply.

The voltage is set by prising out the fuse holder drawer and re-inserting it such that the voltage legend for your supply is aligned with the mark on the inlet moulding. See figure 2.

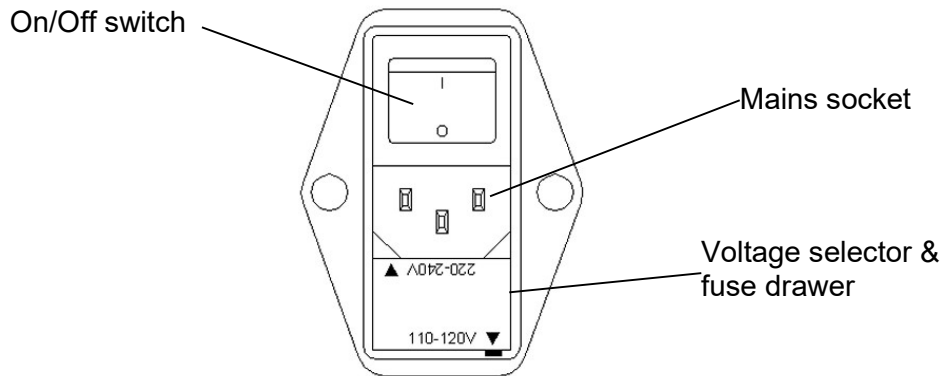


Fig. 2 Mains inlet/voltage selector (example shown is set to 110-120V)

The inlet moulding accepts a standard IEC socket. Where possible a standard mains lead - IEC socket/mains plug – suitable for your local mains outlet will have been supplied with the instrument. The instrument must not be operated unless it is connected to a suitably earthed (grounded) mains supply

Connect the cooling unit to the electrical socket on the rear of the control unit. Switch the controller on at the rear of the unit.

3. Operation

Remove the protective coating from one side of a heat transfer pad and place the pad on the top plate of the cooling unit, exposed side towards the cooling unit. Lightly press the pad into place, carefully smoothing out any entrapped air bubbles. Remove the protective coating from the other side of the pad. Fit the tissue bath over the cooling unit top plate/heat transfer pad; the tissue bath has 3 flanges on its underside – these are designed to locate the bath correctly on the cooling plate – ensure that the flange running across the bath is fitted furthest from the electrical connection cable on the cooling unit. The bath will be retained on the cooling plate by magnetic attraction.

To remove the bath, simply pull it up and away from the cooling unit.

Fit the cooling unit and bath to the microtome by moving the locking lever on the microtome to the left and sliding the cooling unit's dovetail mounting foot into the corresponding shoe on the microtome. Slide the foot into the shoe as far as it will travel and release the locking lever. Connect the cooling unit to the water supply and ensure the cooling water is flowing through the cooling unit before pressing the standby key to switch on the control unit.

Press the standby key and the LED display will illuminate. The actual temperature of the upper surface of the cooling element is displayed. The unit is now operational and power is being supplied to the cooling element. Pressing either the '+' or '-' keys once will display the set temperature. Continuing to press the '+' or '-' keys will change the set temperature.



The displayed temperature will revert back to the actual temperature a few seconds after the last key press.

If the cooling element is not connected or the equipment has a fault the unit will display 'Err'. In this situation no power will be applied to the cooling element.

The temperature feedback sensor is mounted in the upper surface of the cooling unit. The temperature at this point will obviously be different from the temperature at the specimen holder. The temperature offset between the specimen holder and the cooling unit will vary depending on conditions, however once this offset has been found then the cooling unit temperature can be set accordingly to obtain and retain the required temperature at the specimen holder.

4. Cleaning & Maintenance

The 7610 Control unit contains no user-serviceable parts and requires no maintenance. The cooling unit assembly requires only cleaning after use. It must not be sterilised by autoclaving methods nor must it be immersed in water.

The tissue bath is manufactured from a magnetic grade of stainless steel, this material does not have the higher corrosion resistance properties of some (non-magnetic) stainless steels; it should be washed with clean water frequently to avoid the build up of chloride concentrates (see the paragraph below on stainless steels). The magnet that retains the tissue holder is ceramic so corrosion is not an issue. The tissue bath can be autoclaved using normal procedures.

The heat transfer mat should not be autoclaved.

The tissue holders are also manufactured from a magnetic stainless steel and so the above comments also apply.

All steels, including the so-called 'stainless' steels, will corrode (rust) if left immersed in physiological saline/a.c.s.f./buffer solutions, the rate of corrosion will increase as the water in the solution evaporates and the corroding concentrate increases. Stainless steels rely on a thin, protective oxide layer on their surface to give corrosion resistance. Corrosion occurs when this passive film breaks down. The main factor causing corrosion is the chloride content of the liquid in contact with the metal. This concentration will increase during evaporation and the passive oxide layer of the steel will break down. For this reason it is essential that the bath is regularly and thoroughly cleaned with clean water after use to remove chloride concentrates.

Spillage - If the cutting lubricant/preserving liquid, e.g. physiological saline, is spilt over the instrument or the Campden vibrating microtome it is important for electrical safety reasons to ensure that the instrument remains safe to use. To avoid the possibility of electrical shock if a spillage occurs, the unit should be switched off at the mains electrical outlet and disconnected before touching the instrument. The instrument should be inspected and tested if necessary by a suitably qualified technician before it is put into further use.

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Order codes

Description	Order code
Tissue Bath Cooler (excluding bath)	7610A
Control Unit	7610-1
Cooling unit assembly (excluding bath)	7610-2
Heat transfer pad (pack of 2)	7610-3
Tissue bath	7000-3-2
Mk2 Specimen holder (standard)	7000-4-1
Mk2 Specimen holder (adjustable)	7000-4-2

Specification

Display Resolution	0.1 °C
Temperature Accuracy	+/- 1 °C
Temperature Range	+8°C to 0°C
Note that the actual temperatures achievable will be dependent upon the following :-	
a/. temperature of the cooling water in-flow	
b/. rate of flow	
c/. the use of the Thermal transfer pads 7610-3	
d/. local lab. temperature conditions	
Voltage requirements	230V 50Hz or 115V 60Hz
Power Rating	60W
Inlet Fuse Rating	T1.25A

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