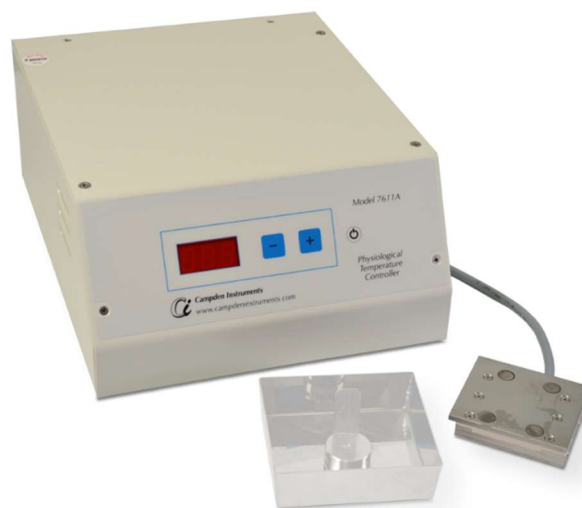


INSTRUCTION MANUAL

**7611A Tissue Bath for Physiological Temperature
for use with
7000smz-2 series and 5100mz series Vibrating Microtomes**



Stainless steel bath and tissue mount from
Campden 7000smz-2 or 5100mz Vibrotome,
not included with 7611A

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: **7611A**

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 7611A Tissue Bath Warmer 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 physiological temperature can give better tissue preservation and remain viable longer for in-vitro recordings. (Uusisaari et al)

Additionally, some enzyme histochemical techniques give better staining results when sectioned at low temperatures.

The 7611A Tissue Bath Warmer comprises a mains operated control unit and a warming unit. The warming unit accepts the standard 7000smz/5100mz slicer inner tissue bath. The bath attaches to the warming unit by magnetic attraction and is autoclavable.

The control unit houses a power supply and the temperature control circuitry.

The warming unit assembly incorporates a thermoelectric 'Peltier' element and temperature feedback sensors. 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 warming unit assembly and tissue bath is recommended. Two such reusable pads are supplied with each 7611A unit. These can have a limited life (depending on treatment, number of bath/warmer separations, etc.) but significantly enhance the efficiency of warming. Replacement pads (7610-3) are available from Campden Instruments.



Thermal transfer pads 7610-3



7611A Warming head (left) and fitted with tissue bath (right)

The warming 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, warming the solution in the tissue bath. 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 heating element increases.

The efficiency of the temperature control will depend on four factors:

- a/. temperature of the water in-flow
- b/. rate of flow
- c/. the use of the Thermal transfer pads 7610-3
- d/. the level and stability of local laboratory temperature

Experience will show the best temperature to be set for any given requirement and ambient temperature.

The temperature range is the 7611A is from ambient to 50Celsius.

However minimum temperature can be as low as 10Celsius, for example if the unit is placed in a cooled cabinet environment

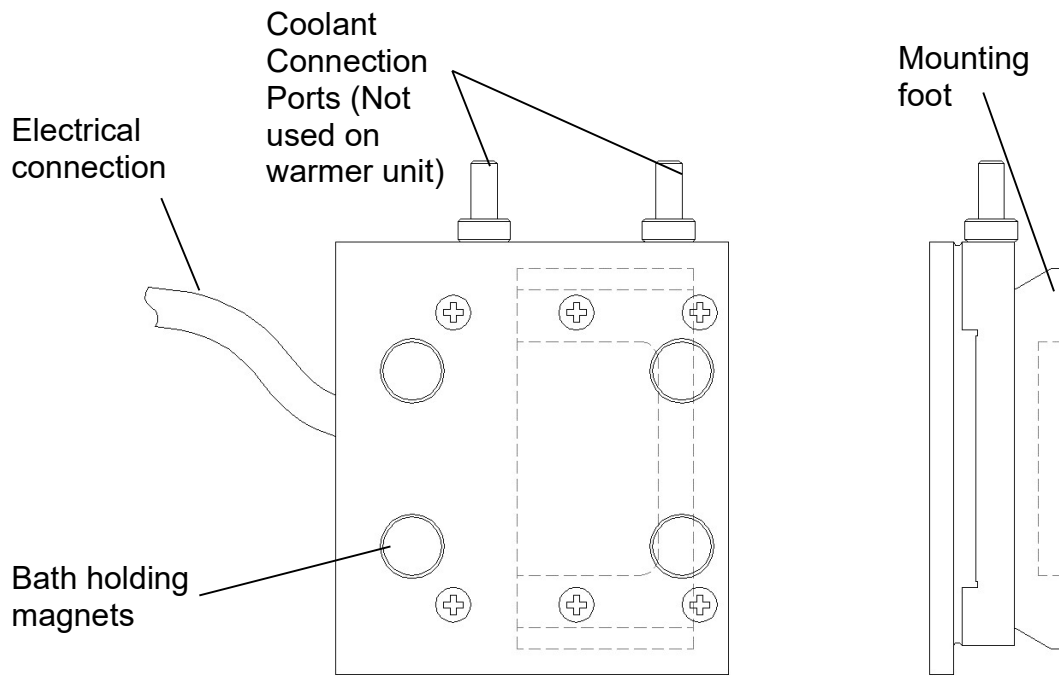


Fig. 1 Warming head assembly

2. 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.

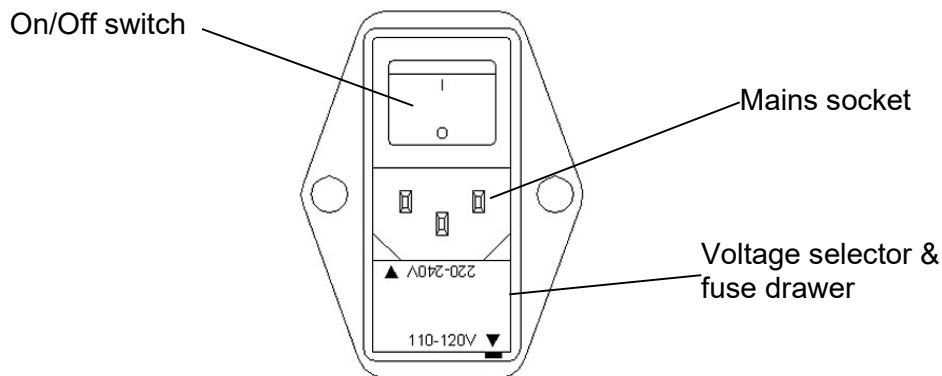


Fig. 2 Mains inlet/voltage selector (example shown is set to 110-120V)

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

3. Operation

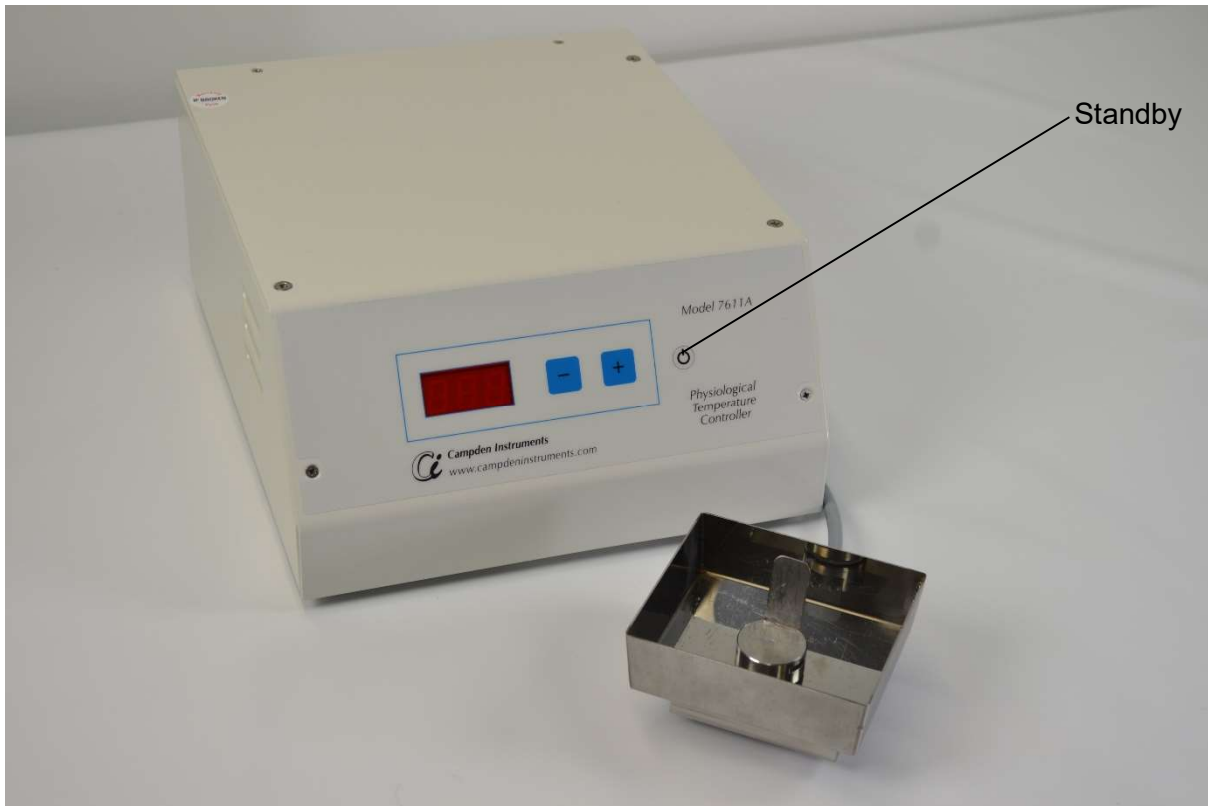
Remove the protective coating from one side of a heat transfer pad and place the pad on the top plate of the warming unit, exposed side towards the warming unit. Lightly press the pad into place, carefully smoothing out any entrapped air bubbles. Remove the protective coating from the other side of the pad. Fit the tissue bath over the warming 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 warming plate – ensure that the flange running across the bath is fitted furthest from the electrical connection cable on the warming unit. The bath will be retained on the warming plate by magnetic attraction.

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

Fit the warming unit and bath to the microtome by moving the locking lever on the microtome to the left and sliding the warming 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.

Press the standby key and the LED display will illuminate. The actual temperature of the upper

surface of the warming element is displayed. The unit is now operational and power is being supplied to the warming 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 warming 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 warming element.

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

4. Cleaning & Maintenance

The 7611A Control unit contains no user-serviceable parts and requires no maintenance. The warming 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.

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.

5. Tips for a Low Z-axis Deflection measurement

Using the Hot Slice method detailed by Huang & Uusisaari, (2013) the Z-axis deflection must be calibrated below $0.4\mu\text{m}$. This is often difficult for first time users, thus we have compiled this tip list:

- Check for obvious sources of instability:
 - Is the table or bench stable?
 - Are all screws in the mounts tight?
- Use the white blade handling tool when fitting the blade, as any dust or finger grease can affect the reading:
 - If the blade is dirty (with grease) it can be cleaned with ethanol/water and a soft paint brush, brushing from the back of the blade towards the cutting edge
 - If it is just dust then a gentle exhalation can be enough to dislodge it
- Ensure the blade is fitted tight against the stops on the blade holder
- The white acetyl washers of the holder are easily deformed when attaching the blade, check if there are scratches or other imperfections:
 - If you see any imperfections, flip the washers upside down so that the smooth side is facing the blade, or change the washers
 - In future when changing the blade, it is a good idea to clean the screw and the screw hole of possible salt deposits
- Ensure the “Opti-Cal” windows are clean using ethanol and tissue
- The difference between e.g. $0.6/0.7\mu\text{m}$ and $<0.4\mu\text{m}$ is quite small and can take a very delicate touch; fine movement may often only be felt rather than seen:
 - If you are struggling, it is often a good idea to overshoot in a known direction and correct back.
- Is the blade adjustment screw stiff/has stiff points, causing you to use a large amount of force? This is due to the coating on the screw threads which, particularly in new blade holders, can be tight.
 - The best way to remedy this is to remove the blade from the blade holder and turn the adjustment screw rapidly in either direction to remove a thin layer of the coating.

Order codes

Description	Order code
Tissue Bath Warmer (excluding bath)	7611A
Control Unit	7611-1
Warming unit assembly (excluding bath)	7611-2
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	+10°C to 50°C
Note that the actual temperatures achievable will be dependent on the following:-	
a/. temperature of the water in-flow	
b/. rate of flow	
c/. the use of the Thermal transfer pads 7610-3	
d/. the level and stability of local laboratory temperature	
Voltage requirements	230V 50Hz or 115V 60Hz
Power Rating	60W
Inlet Fuse Rating	T1.25A

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