Campden Instruments Ltd.
A Lafayette Instrument Company

INSTRUCTION MANUAL

7600 series Tissue Bath Coolers
for use with all
Campden Instruments Vibrating Microtomes

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EC DECLARATION OF CONFORMITY

CE

Name and address of Manufacturer:

CAMPDEN INSTRUMENTS LIMITED
PO BOX 8148
LOUGHBOROUGH
LE12 7XT
ENGLAND

Description of Machine:

Tissue Bath Cooler

Model number: **7600, 7600S**

Serial Number: .....

The machine 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

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

1.0 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).

7600 controller with alternative standard and sterilisable cooled tissue baths

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 advise on this matter.

1.1 Overview

The 7600 Tissue Bath Cooler Unit is intended for use with the Campden Instruments Range of vibrating microtomes. Unfixed brain slices sectioned at 4^{o}C give better tissue preservation and are viable for longer in-vitro recordings. Additionally, some enzyme histochemical techniques give better staining results when sectioned at low temperatures.

The 7600 series coolers use 'Peltier' thermoelectric elements and are available in two versions: 7600 (standard tissue bath) and 7600S (sterilisable/autoclavable tissue bath). The equipment comprises of a mains operated control unit, tissue bath and specimen holder.

The control unit houses a power supply and temperature control circuitry. The standard tissue bath assembly has a tissue bath with a stainless steel bottom plate, permanently attached to the cooling elements. The autoclavable specimen bath is manufactured from a special grade of Nickel-Aluminum Bronze, a material with excellent corrosion resistance properties.

This is removable from the cooling elements, which cannot be autoclaved. The cooling

element assembly consists of thermoelectric 'Peltier' elements, temperature feedback sensors and a cold water fed heat exchanger.

7600S Tissue bath with removable, autoclavable piece,

The bath assembly will fit onto any Campden Instruments tissue cutter without modification and the bath chamber has the same volume as the standard Campden Instruments tissue bath (752/2B). The tissue holder is the standard Campden Instruments tissue holder (752/2A).

Current from the power supply flows through the thermoelectric elements, which act as heat transfer units. Heat is drawn off, cooling the solution in the tissue bath. The heat generated by this process is removed by the water supply fed 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 0.5ºC of the temperature set point. There will, however, be a small variation in temperature vertically through the bath. 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 bath assembly be connected to an adequate cold water supply 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 reservoir. The flow of water through the heat exchanger should not be less than 400ml/minute and the water temperature should be below 25ºC. See figure 1 for connection ports.

A temperature feedback sensor is built into the bath 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 elements have been shut down due to inadequate flow of cooling water. Switching the unit on and off will reset this condition.

The tissue bath should be filled with physiological buffer solution prepared at the intended slicing temperature.

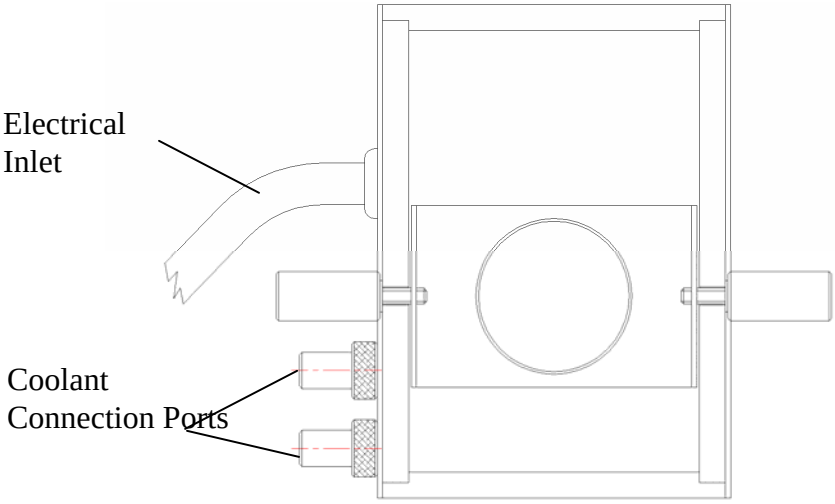

Fig. 1 Tissue bath assembly

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.

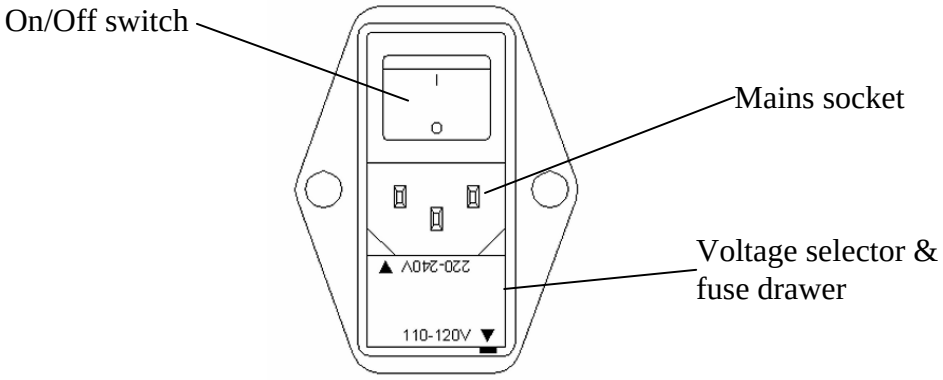

Figure 2. Mains inlet/voltage selector (example shown is set to 110-120V)

The inlet moulding accepts a standard IEC socket. Where possible a standard mains lead - IEC socket/mains plug – suitable for your 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 tissue bath to the electrical socket on the rear of the control unit. Switch the controller on at the rear of the unit.

3. Operation

Ensure the cooling water is flowing through the bath before pressing standby to switch on the control unit. Press the standby key and the LED display will illuminate. The actual temperature of the tissue bath is displayed. The unit is now operational and power is being supplied to the tissue bath cooling head. 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 bath temperature a few seconds after the last key press.

Standby

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

The temperature feedback sensor is mounted in the floor of the cooled bath. The temperature at this point will obviously be different from the temperature at the specimen holder. Over time this temperature difference will settle to between 1ºC and 2ºC above that of the measured temperature (depending on conditions).
For the users convenience the set temperature and actual temperature displayed are offset by 1ºC.i.e. A displayed plate temperature of 5ºC will actually be 4ºC.

4. Cleaning & Maintenance

The 7600 Control unit contains no user-serviceable parts and requires no maintenance.
The standard bath assembly requires only cleaning after use. **It must not be sterilised by autoclaving methods nor must it be immersed in water.**

The autoclavable specimen bath is manufactured from a special grade of Nickel-Aluminium Bronze, a material with excellent corrosion resistance properties. The cooling assembly must not be autoclaved therefore the bath unit must be separated from it before autoclaving. The bath is secured to the cooling assembly with 4 stainless steel screws M3 x 35 long. When fitting the bath to the cooling assembly, the underside of the bath should be smeared with heat-conducting compound (Campden Instruments model 7600-HTP). The bath should be then 'wrung' onto the cooling head to ensure a good heat transfer path and the screws fitted

and tightened evenly. Do not over-tighten the screws. The heat-conducting compound should be applied in an even layer sufficiently thick to ensure full area contact. (A thin layer of compound will transfer heat more efficiently than a thick layer).

The bath may be autoclaved at 140 degrees Celsius for 30 minutes.

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 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 material; typically seawater, which is generally considered to be quite corrosive, has a chloride concentration of 19000ppm. A.c.s.f has a much higher concentration. This concentration will increase due to evaporation and the passive oxide layer will break down. For this reason it is essential that the bath and heat sink blocks be 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 advise on this matter.

Order codes

Description	Order code
Standard Tissue Bath Cooler (complete)	7600
Autoclavable Tissue Bath Cooler (complete)	7600S
Control Unit	7600/1
Standard Tissue bath assembly	7600/2
Autoclavable Tissue bath assembly	7600/3
Autoclavable tissue bath only	7600/4
Heat transfer Paste	765-HTP

Specification

Display Resolution	0.1 ºC
Temperature Accuracy	+/- 1 ºC
Temperature Range	+8ºC to 0ºC
(Note that the actual temperatures achievable will be dependent upon the solutions used and local temperature conditions)	
Voltage requirements	230V 50Hz or 115V 60Hz
Power Rating	60W
Inlet Fuse Rating	T1.25A

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