WARNER INSTRUMENTS
A Harvard Apparatus Company

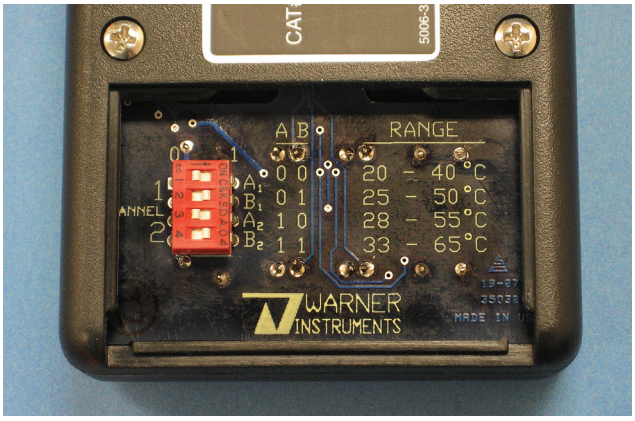
Instructions for the TC-144 Dual Channel Miniature Temperature Controller

The Warner **TC-144** Dual Channel Temperature Controller is designed to bring heating, in a small footprint, to a variety of Warner products. Accurate temperature control from ambient to 60°C can be achieved using this small and efficient device.

The **TC-144** has two independently operating heating channels and can be used to connect to and regulate an expanding line of Warner products. These including the OW Series Objective Warmers, SW Series Syringe Warmers, and the Warmed Inserted Stage. The **TC-144** can also be used to simultaneously power two similar instruments (such as two objective warmers). The device is simple to operate.

ASSEMBLY AND OPERATION

1. Make all necessary connections between the **TC-144** and the device(s) to be heated.
2. Connect the wall adaptor to a power source and plug the power cable into the **TC-144**. This will power the unit *on*.
3. Within the controller the *SET TEMPERATURE* of each channel can be adjusted by pressing the respective HEAT UP or HEAT DOWN buttons. Adjusting the set temperature causes the display to momentarily report the *set temperature* for that channel. (In general, the display reports the *actual* temperature of the heated device.) In addition, pressing a VIEW SET button will report that channel's set temperature for as long as the button is pressed.
4. The temperature range of the **TC-144** is factory-set 25-50°C. Other temperature ranges can be selected by setting the dip switches located inside the rear panel to the appropriate values. The maximum allowed temperature is 65 °C.



Temperature range setting is straightforward. The top two dip-switches are for channel 1 and the bottom two are for channel 2. Moving any switch to the *left* sets its value to *0* and moving it to the *right* sets its value to *1*.

The AB chart shows the possible combinations of settings for the switch pair and each AB corresponds to a temperature range setting. For example, setting switch A_1 to the right gives it a

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value of 1 and setting switch B_1 to the right also gives it a value of 1. Therefore the AB pair for *CHANNEL 1* is *11* and corresponds to a temperature range of 33-65°C. The same logic applies to the switch pair A_2 and B_2 of CHANNEL 2.

Note: Following any adjustments to the **TC-144** default settings, the temperature of the sample should be independently verified using a separate measuring device.

SPECIFICATIONS

Input Voltage Range	9 to 16 VDC
Maximum Output Current	1.2 A (per channel)
Maximum Output Power	13 W (per channel)
Temperature Ranges (4)	Set by DIP switch: ambient to +65C
Meter Resolution	0.1 °C
Display	LED, 3 digit, 10 mm (0.4 in) high
Panel Indicators	Red: heat-up condition Green: heat-down condition Yellow: displaying set-temperature or view-temperature
Features	Pushbutton entry of modes, dust-proof, splash-proof case
Physical Dimensions:	
Case Size	2.1 x 6.6 x 11.1 cm (H x W x D)
Shipping Weight	0.5 kg
Warranty	One year, parts & labor

Declaration of Conformity

CE MARKING (EMC)

Application of Council Directive: 89/336/EEC

Standards To Which Conformity Is Declared:	EN55022 Class A EN61000-3-2 EN61000-3-3 EN50082-1:1992 EN61000-4-2 EN61000-4-3 ENV50204 EN610000-4-4 EN610000-4-8 EN610000-4-11
Manufacturer's Name:	Warner Instruments, LLC
Manufacturer's Address:	1125 Dixwell Avenue Hamden, CT 06514 Tel: (203) 776-0664
Equipment Description:	Power Controller
Equipment Class:	ITE-Class A
Model Numbers:	TC-144

I the undersigned, hereby declare that the equipment specified above, conforms to the above Directive(s) and Standard(s).

Place: Hamden, Connecticut USA

Signature:

Full Name: Ralph Abate

Position: Director of Operations

Declaration of Conformity

CE MARKING (LVD)

Application of Council Directive: 73/23/EEC

Standards To Which Conformity Is Declared:	EN61010-1:2001
Manufacturer's Name:	Warner Instruments, LLC
Manufacturer's Address:	1125 Dixwell Avenue Hamden, CT 06514 Tel: (203) 776-0664
Equipment Description:	Power Controller Safety requirements for electrical equipment for measurement and laboratory use
Equipment Class:	Class I
Model Numbers:	TC-144

I the undersigned, hereby declare that the equipment specified above, conforms to the above Directive(s) and Standard(s).

Place: Hamden, Connecticut USA

Signature: 

Full Name: Ralph Abate

Position: Director of Operations

WEEE/RoHS Compliance Statement

EU Directives WEEE and RoHS

To Our Valued Customers:

Harvard Apparatus is committed to being a good corporate citizen. As part of that commitment, we strive to maintain an environmentally conscious manufacturing operation. The European Union (EU) has enacted two Directives, the first on product recycling (Waste Electrical and Electronic Equipment, WEEE) and the second limiting the use of certain substances (Restriction on the use of Hazardous Substances, RoHS). Over time, these Directives will be implemented in the national laws of each EU Member State.

Once the final national regulations have been put into place, recycling will be offered for those Harvard Apparatus products which are within the scope of the WEEE Directive. Products falling under the scope of the WEEE Directive available for sale after August 13, 2005 will be identified with a "wheelie bin" symbol.

Two Categories of products covered by the WEEE Directive are currently exempt from the RoHS Directive – Category 8, medical devices (with the exception of implanted or infected products) and Category 9, monitoring and control instruments. Most of Harvard Apparatus' products fall into either Category 8 or 9 and are currently exempt from the RoHS Directive. Harvard Apparatus will continue to monitor the application of the RoHS Directive to its products and will comply with any changes as they apply.

- **Do Not Dispose Product with Municipal Waste.**
- **Special Collection/Disposal Required.**

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