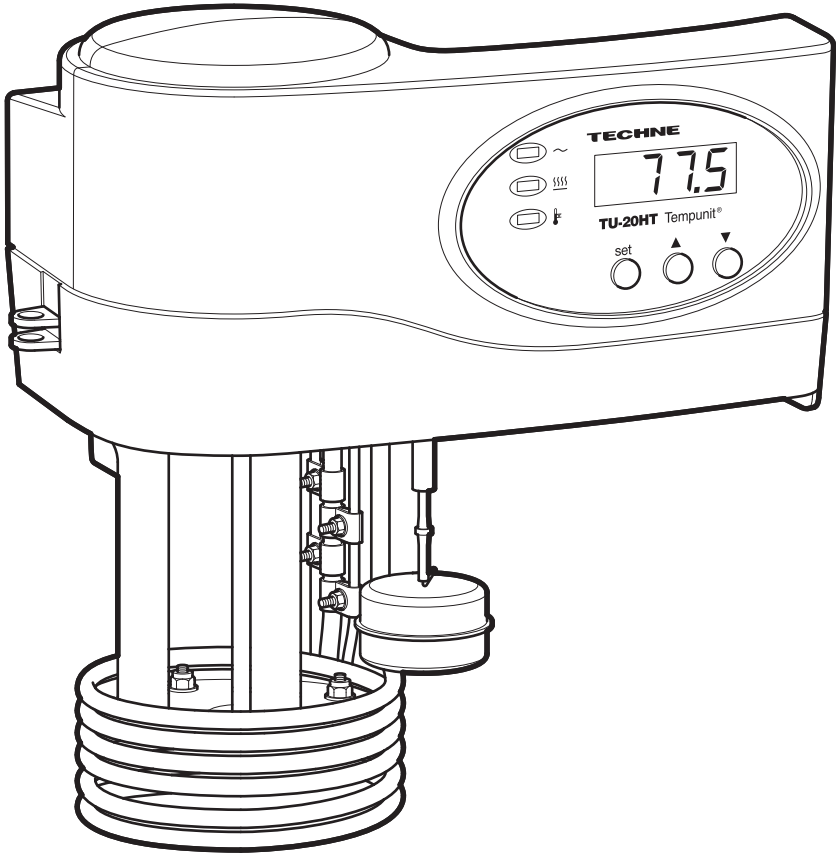




Thermoregulator TE-10D, TU-20D and TU-20HT



Instruction Manual TECH0001 / Version 1.0

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Introduction

Thank you for purchasing this Techne product. To get the best performance from the equipment, and for your own safety, please read these instructions carefully before use.

Before discarding the packaging check that all parts are present and correct.

When unpacking the unit, check that the following have been removed from the packing:

- ❖ Thermoregulator
- ❖ Clamp kit
- ❖ Instruction manual
- ❖ Warranty card
- ❖ UK and EU mains cables (not 120V models)
- ❖ Certificate of calibration
- ❖ Pipe connectors (not TU-20HT models)
- ❖ 'O' ring for thermometer
- ❖ TechneWorks CD and interface cable (TU-20HT models only)

This equipment is designed to operate under the following conditions:

- ❖ For indoor use only
- ❖ Use in a well ventilated area
- ❖ Ambient temperature range 5°C to 40°C (41°F to 104°F)
- ❖ Altitude to 2000 m (6500 ft)
- ❖ Relative humidity not exceeding 80%
- ❖ Mains supply fluctuations not exceeding 10% of nominal
- ❖ Overvoltage category II IEC60364-4-443
- ❖ Pollution degree 2 IEC664

If the equipment is not used in the manner described in this manual and with accessories other than those recommended by the manufacturer, the protection provided may be impaired.

General Description

The Techne thermoregulators are designed to be used with any Techne unheated bath, liquid calibration bath or refrigerated bath although they can also be fitted to most standard laboratory baths using the supplied clamp. They will heat, circulate and safely control the temperature of the liquid in the bath within precise limits. In a suitable bath, the thermoregulators will control the temperature of the liquid within the range -40°C to 250°C depending on model and specification (see TECHNICAL SPECIFICATION, page 31). Note that temperatures from -40°C to 5°C above ambient will require an additional cooling system such as a Techne Dip or Flow Cooler.

The thermoregulator consists of the following main parts:

- ❖ The base moulding in PPS plastic.
- ❖ The pump assembly in either PPS plastic (TE-10D and TU-20D) or VICTREX™ PEEK (TU-20HT). The pump can circulate liquid externally (TE-10D and TU-20D only) under pressure via its support tubes.
- ❖ A heater assembly in 316 Stainless Steel.
- ❖ A base plate made from stainless steel to which are mounted the motor, over-temperature cut-out, mains switch, fuse holder and PCB assembly.
- ❖ A cover made from Tolelina PPS 40% which is fitted over the main controls.

For all models, bath temperature is monitored and controlled by a PRT in conjunction with a 3 term controller. Protection in all the units is provided by means of an adjustable over-temperature cut-out. The pump motor and the transformer are also fitted with thermal fuses.

Techne Baths

Techne manufacture a range of unheated baths from 8 to 48 litre capacity which can be fitted with any of the thermoregulators. The B-8, B-12, B-18, and B-26 bath inner containers are manufactured from stainless steel for maximum corrosion resistance and are deep drawn with large easy clean corner radii. The B-48 inner is also manufactured from stainless steel but is of welded construction. These baths are suitable for use up to 200°C.

For higher temperatures (up to a maximum of 250°C) Techne has a range of liquid calibration baths of capacities 5, 7 or 12 litres. These baths are fully insulated providing excellent temperature retention and stability and are ideal for calibration purposes.

In addition, Techne offer a range of refrigerated baths of 7, 12 or 22 litre capacity. These have a built-in refrigeration system for temperatures down to -35°C.

For further information, please contact cpinfo@coleparmer.com.

Safety and Installation

Introduction

Please read all the information in this booklet before using the unit.



Safety Advice

Techne have taken great care in the design of these units to protect operators from hazards, but operators should pay attention to the following points:

- ❖ HIGH TEMPERATURES ARE DANGEROUS: they can cause serious burns to operators and ignite combustible material.
- ❖ USE CARE AND WEAR PROTECTIVE GLOVES TO PROTECT HANDS.
- ❖ DO NOT use combustible substances near hot objects.
- ❖ DO NOT operate the unit in the vicinity of flammable liquids or gases.
- ❖ NEVER lift or carry the unit until it has been switched off and allowed to cool for at least 30 minutes.
- ❖ The unit should be carried using both hands.
- ❖ NEVER move or carry the unit when in use or connected to the mains electricity supply.
- ❖ DO NOT position the unit so that it is difficult to disconnect from the mains supply using the mains plug.
- ❖ The mains outlet socket used should be located close to the equipment and readily identifiable and accessible to users.

Operator Safety

All operators of Techne equipment must have available the relevant literature needed to ensure their safety. It is important that only suitably trained personnel operate this equipment, in accordance with the instructions contained in this manual and with general safety standards and procedures. If the equipment is used in a manner not specified by Techne the protection provided by the equipment to the operator may be impaired.

All Techne units have been designed to conform to international safety requirements and are fitted with an over-temperature cut-out. On some models, the cut-out is adjustable and should be set to suit the application. On all other models the cut-out is pre-set to protect the unit.

If a safety problem should be encountered, switch off at the mains socket and remove the plug from the supply.

Installation



Note that the unit must be earthed to ensure proper electrical safety.

1. All Techne units are supplied with a power cable. This may be integral or plug-in.
2. Before connecting the mains supply, check the voltage against the rating plate. The rating plate is on the rear of the unit. Connect the mains cable to a suitable plug according to the table below.

Connections	220V-240V	110V-120V
Live	Brown	Black
Neutral	Blue	White
Earth	Green/yellow	Green

The fused plug supplied with the mains lead for use in the UK is fitted with the following value fuse to protect the cable: 10AMP.

The fuse in the unit protects the unit and the operator.

Note that units marked 230V on the rating plate work at 220V; units marked 120V work at 110V. In both cases, however, the heating rate will degrade by approximately 8%.

3. Plug the mains cable into the socket on the rear of the unit.
4. Do not switch on until the unit is fully installed, see page 19.
5. Note that the following symbols may be next to the indicator lamps on the front panel of the units and have the following meanings:

 the power indicator

 the heater indicator

 the over-temperature indicator

6. Symbols on or near the power switch of the unit have the following meanings:

I mains switch On

O mains switch Off

Warranty

Techne warrants this equipment to be free from defects in material and workmanship when used under normal laboratory conditions for the period specified on the enclosed warranty card. In the event of a justified claim, Techne will replace any defective component or replace the unit free of charge.

This warranty does NOT apply if:

- ❖ Any repair has been made or attempted other than by the manufacturer or its agent.
- ❖ Any minor coating chips or scratches occur during normal use (i.e., wear and tear).
- ❖ Damage is caused by fire, accident, misuse, neglect, incorrect adjustment or repair, damage caused by installation, adaptation, modification or fitting of non-approved parts.

Operator maintenance

NOTE: THAT THIS EQUIPMENT SHOULD ONLY BE DISMANTLED BY PROPERLY TRAINED PERSONNEL. REMOVING THE SIDE, FRONT OR REAR PANELS EXPOSES POTENTIALLY LETHAL MAINS VOLTAGES. THERE ARE NO OPERATOR MAINTAINABLE PARTS WITHIN THE EQUIPMENT.

In the unlikely event that you experience any problems with your unit which cannot easily be remedied, you should contact your supplier and return the unit if necessary. Please include any details of the fault observed and remember to return the unit in its original packing. Techne accept no responsibility for damage to units which are not properly packed for shipping: if in doubt, contact your supplier. See the Decontamination Certificate supplied with your unit.

Cleaning

- ❖ Before cleaning your unit ALWAYS disconnect it from the power supply and allow it to cool below 50°C.
- ❖ Your unit can be cleaned by wiping with a damp soapy cloth. Care should be exercised to prevent water from running inside the unit. Do not use abrasive cleaners.

Over-temperature cut-out

- ❖ In the event of no heater power, check the mains plug and lead.
- ❖ Repeated operation of the cut-out indicates a serious fault: you may need to return the unit to your supplier for repair.

Fuses

- ❖ Your unit is protected by one or two fuses.
- ❖ These should only be changed by suitably qualified personnel.
- ❖ Replace fuses only with the type listed in the Technical Specification (page 31).
- ❖ If the fuses blow persistently, a serious fault is indicated and you may need to return the unit to your supplier for repair.

Introduction

Veuillez lire attentivement toutes les instructions de ce document avant d'utiliser l'appareil.



Consignes de sécurité

Techne a apporté un soin tout particulier à la conception de ces appareils de façon à assurer une protection maximale des opérateurs, mais il est recommandé aux utilisateurs de porter une attention spéciale aux points suivants :

- ❖ DANGER DE TEMPERATURES ELEVEES : les opérateurs peuvent subir de graves brûlures et les matériaux combustibles risquent de prendre feu.
- ❖ PROCEDER AVEC SOIN ET PORTER DES GANTS POUR SE PROTEGER LES MAINS.
- ❖ NE PAS utiliser de substances inflammables près d'objets ou appareils chauds.
- ❖ NE PAS faire fonctionner l'appareil à proximité de liquides ou de gaz inflammables.
- ❖ NE JAMAIS soulever ou transporter l'appareil jusqu'à ce qu'il soit éteint et laissé refroidir pendant au moins 30 minutes.
- ❖ L'unité doit être transportée en se servant des deux mains.
- ❖ NE JAMAIS déplacer ou transporter l'appareil en cours d'utilisation ou étant connecté à la principale source d'électricité.
- ❖ NE PAS placer l'appareil dans un endroit où il est difficile de le débrancher du secteur en utilisant la fiche secteur.
- ❖ La prise de courant utilisée doit être située à proximité de l'équipement, facilement identifiable et accessible aux utilisateurs.

Sécurité de l'opérateur

Tous les utilisateurs de produits Techne doivent avoir pris connaissance des manuels et instructions nécessaires à la garantie de leur sécurité.

Important : cet appareil doit impérativement être manipulé par un personnel qualifié et utilisé selon les instructions données dans ce document, en accord avec les normes et procédures de sécurité générales. Dans le cas où cet appareil ne serait pas utilisé selon les consignes précisées par Techne, la protection pour l'utilisateur ne serait alors plus garantie.

Tous les appareils Techne sont conçus pour répondre aux normes de sécurité internationales et sont dotés d'un coupe-circuit en cas d'excès de température. Sur certains modèles, ce coupe-circuit est réglable pour s'adapter à l'application désirée. Sur d'autres modèles, il est pré-réglé en usine pour assurer la protection de l'appareil.

Dans le cas d'un problème de sécurité, coupez l'alimentation électrique au niveau de la prise murale et enlevez la prise connectée à l'appareil.

Installation

Il est important que l'appareil soit relié à la terre pour assurer la protection électrique requise.

1. Tous les appareils Techne sont livrés avec un câble d'alimentation qui peut être intégré à l'appareil ou à raccorder.
2. Avant de brancher l'appareil, vérifiez la tension requise indiquée sur la plaque d'identification. Raccordez le câble électrique à la prise appropriée en vous reportant au tableau ci-dessous.

Connexions	220V-240 V	110V-120 V
Phase	marron	noir
Neutre	bleu	blanc
Terre	vert/jaune	vert


Le fusible à l'intérieur de l'appareil est destiné à assurer la protection de l'appareil et de l'opérateur.

Remarque : les appareils dont la plaque indique 230 V peuvent fonctionner sur 220 V, et ceux dont la plaque indique 120 V peuvent fonctionner sur 110 V. Dans les deux cas cependant, la capacité de chauffage diminuera d'environ 8 %. La plaque d'identification se trouve à l'arrière de l'appareil.

3. Raccordez le câble d'alimentation à la prise située à l'arrière de l'appareil.
4. Placez l'appareil sur un plan de travail ou surface plane, ou le cas échéant, dans une hotte d'aspiration, en s'assurant que les trous d'aération situés sous l'appareil ne soient pas obstrués.
5. Les symboles ci-dessous situés à côté des témoins lumineux sur la face avant de l'appareil ont la signification suivante :

 : témoin d'alimentation

 : témoin de chauffage

 : témoin d'excès de température

6. Les symboles situés sur ou à côté de l'interrupteur de l'appareil ont la signification suivante :

O : arrêt

I : marche

Garantie

TECHNE garantit que cet appareil est exempt de défauts de matériaux et de fabrication lorsqu'il est utilisé dans des conditions normales de laboratoire pendant la période spécifiée sur la carte de garantie ci-jointe. En cas de réclamation justifiée, TECHNE remplacera tout composant défectueux ou remplacera l'appareil gratuitement durant la période de garantie spécifiée.

Cette garantie ne s'applique pas si:

- ❖ Toute réparation a été faite ou tentée autrement que par le fabricant ou par une personne non habilitée.
- ❖ En cas d'usure normale de l'appareil dans le cadre d'un usage normal en laboratoire, c'est-à-dire en cas de rayures et/ou égratignures mineures du revêtement.
- ❖ Les dommages sont causés par un incendie, un accident, une mauvaise utilisation, une négligence, un mauvais réglage ou une réparation par une personne non habilitée, des dommages causés par l'installation, l'adaptation, la modification ou l'installation de pièces non agréées.

Entretien Utilisateur

IMPORTANT : CET APPAREIL NE PEUT ETRE DEMONTE QUE PAR DU PERSONNEL QUALIFIE. LORSQUE LES PANNEAUX AVANT, ARRIERE ET LATERAUX SONT DEMONTES, L'OPERATEUR EST EXPOSE A DES TENSIONS QUI PEUVENT ETRE MORTELLES. CET APPAREIL NE CONTIENT AUCUN ELEMENT QUI DEMANDE UN ENTRETIEN DE LA PART DE L'UTILISATEUR.

Dans le cas peu probable où votre appareil présente un défaut de fonctionnement auquel il est difficile de remédier, il est alors préférable de contacter votre fournisseur et, le cas échéant, de renvoyer le matériel. Veuillez inclure une description détaillée du problème constaté et retourner l'appareil dans son emballage d'origine. Techne ne sera pas tenu responsable des dommages subis par tout appareil dont l'emballage est inadéquat pour le transport. Pour plus de sûreté, contactez votre fournisseur.

Nettoyage

- ❖ Avant de nettoyer l'appareil, assurez-vous TOUJOURS que le câble d'alimentation est déconnecté et laissez la température redescendre en dessous de 50°C.
- ❖ Utilisez un chiffon imprégné d'eau savonneuse pour nettoyer l'appareil. Veillez à ne pas introduire d'eau dans l'appareil. N'utilisez pas de produits abrasifs.

Coupe-circuit d'excès de température

- ❖ En l'absence de puissance de chauffe, vérifiez la prise et le câble d'alimentation puis réglez la commande du coupe-circuit (si votre appareil est doté de ce mécanisme).
- ❖ Si la sécurité se déclenche trop souvent, il s'agit d'un problème plus sérieux. Nous vous conseillons dans ce cas de prendre contact avec votre fournisseur pour réparation.

Fusibles

- ❖ La protection de l'appareil est assurée par un ou deux fusibles.
- ❖ Dont le remplacement ne peut être effectué que par un personnel qualifié.
- ❖ Les fusibles ont été remplacés par d'autres fusibles que ceux listés les Spécifications Techniques (page 31).
- ❖ Si les fusibles sautent sans arrêt, il s'agit d'un problème sérieux. Nous vous conseillons dans ce cas de prendre contact avec votre fournisseur pour réparation.

Einleitung

Bitte lesen Sie diese Bedienungsanleitung komplett bevor Sie dieses Gerät benutzen.



Sicherheitshinweise

Techne hat bei der Konstruktion dieses Gerätes sehr darauf geachtet, daß der Bediener vor Gefahren geschützt ist. Dennoch sollten Sie auf die folgenden Punkte achten:

- ❖ HOHE TEMPERATUREN SIND GEFÄHRLICH: sie können dem Bediener ernsthafte Verletzungen zufügen und brennbare Materialien können sich leicht entzünden.
- ❖ SEIEN SIE VORSICHTIG UND TRAGEN SIE SCHUTZHANDSCHUHE
- ❖ KEINE entflammabaren Stoffe in der Nähe von heißen Objekten verwenden.
- ❖ Das Gerät NICHT in der Nähe von entflammabaren Flüssigkeiten und Gasen betreiben.
- ❖ Das Gerät NIEMALS heben oder bewegen, bis es sich nach dem Ausschalten mindestens 30 Minuten lang abgekühlt hat.
- ❖ Das Gerät sollte mit beiden Händen getragen werden.
- ❖ Das Gerät NIEMALS bewegen oder tragen, wenn es in Betrieb ist oder noch mit der Stromquelle verbunden ist.
- ❖ Stellen Sie das Gerät NIEMALS so auf, dass es schwierig wäre, es durch Herausziehen des Steckers von der Stromquelle zu trennen.
- ❖ Die Steckdose, die zum Betrieb verwendet wird, sollte in der Nähe des Gerätes liegen und von den Nutzern leicht zu erkennen und gut zugänglich sein.

Sicherheit Des Anwenders

Alle Benutzer von Techne Geräten müssen Zugang zu der entsprechenden Literatur haben, um ihre Sicherheit zu gewähren.

Es ist wichtig, daß diese Geräte nur von entsprechend geschultem Personal betrieben werden, das die in dieser Gebrauchsanweisung enthaltenen Maßnahmen und allgemeine Sicherheitsbestimmungen und -vorkehrungen beachtet. Wenn das Gerät anders eingesetzt wird als vom Hersteller empfohlen, kann dies die persönliche Sicherheit des Anwenders beeinträchtigen. Die Geräte von Techne entsprechen den internationalen Sicherheitsbestimmungen und sind mit einem automatischen Übertemperaturabschalter ausgestattet. Bei einigen Modellen ist der Übertemperaturabschalter verstellbar und sollte je nach Anwendung entsprechend eingestellt werden. Bei allen anderen Modellen ist der Temperaturschutz voreingestellt um Schäden am Gerät zu vermeiden. Wenn ein Sicherheitsproblem auftreten sollte, muß das Gerät ausgeschaltet und vom Stromnetz getrennt werden.

Installation


Achtung: Das Gerät muß geerdet sein, um die elektrische Sicherheit zu gewährleisten!


1. Alle Techne Geräte werden mit einem Stromanschlußkabel geliefert. Dieses ist entweder fest mit dem Gerät verbunden oder zum Einstecken.
2. Vergleichen Sie, ob die Spannung Ihrer Stromversorgung mit den Angaben auf dem Typenschild des Geräte übereinstimmen. Verbinden Sie das Stromanschlußkabel mit einer geeigneten Stromversorgung gemäß der nächstehenden Tabelle.


Verbindungen	220V-240V	110V-120V
Stromführend	Braun	Schwarz
Neutral	Blau	Weiß
Erde	Grün/Gelb	Grün

Geräte, die für 230 Volt ausgelegt sind, können auch bei 220 Volt arbeiten, Geräte für 120 Volt auch bei 110 Volt. In beiden Fällen verringert sich die Aufheizrate um ca. 8%. Das Typenschild befindet sich hinten am Gerät.

3. Stecken Sie das Stromkabel in die vorgesehene Buchse hinten am Gerät.
4. Stellen Sie das Gerät auf eine ebene Arbeitsfläche bzw. (falls erforderlich) unter einen Laborabzug. Beachten Sie, daß die Entlüftungsrillen an der Geräteunterseite immer frei zugänglich sind.
5. Wenn die Anzeigenlämpchen an der Vorderseite leuchten, hat dies folgende Bedeutung:

 : Gerät ist eingeschaltet

 : Gerät heizt

 : Übertemperaturschutz ist ausgelöst

6. Die Symbole auf oder neben dem EIN/AUS-Schalter an der Geräterückseite bedeuten:

I : An

O : Aus

Garantie

TECHNE garantiert die Fehlerfreiheit des Gerätes bei Material und Verarbeitung, wenn es unter normalen Labor-Bedingungen im Laufe des Zeitraums, der in der beiliegenden Garantiekarte angegeben ist, verwendet wird. Bei einem berechtigten Garantieanspruch wird TECHNE jedes defekte Teil oder das ganze Gerät kostenfrei ersetzen.

Die Garantie VERFÄLLT bei:

- ❖ Jeglichem Reparaturversuch durch jemand anderen als den Hersteller oder seinen Vertreter.
- ❖ Auftreten jeglicher kleiner Schadstellen und Kratzer (z.B. Abnutzung und Verschleiß) bei normalem Gebrauch.
- ❖ Schäden durch Feuer, Unfälle, falschen Gebrauch, inkorrekte Modifikation oder Reparatur; Schäden durch Installation, Modifikation oder Anpassung von nicht zugelassenen Teilen.

Wartung Durch Den Bediener

BEACHTEN SIE, DASS DIESES GERÄT NUR VON TECHNISCHEN FACHKRÄFTEN GEÖFFNET UND DEMONTIERT WERDEN DARF.

DURCH ENTFERNEN DES GERÄUSES ODER GEHÄUSETEILEN SIND BAUTEILE MIT LEBENGEFÄHRLICHEN SPANNUNGEN FREI ZUGÄNGLICH.

IM INNERN DES GERÄTES BEFINDEN SICH KEINE TEILE, DIE VOM ANWENDER GEWARTET WERDEN MÜSSEN.

Falls Ihr Gerät nicht ordnungsgemäß arbeitet, wenden Sie sich an Ihren Lieferanten oder senden Sie das Gerät wenn nötig zurück. Fügen Sie eine genaue Beschreibung des Defektes bei. Verpacken Sie das Gerät möglichst im Originalkarton. Bitte beachten Sie, daß Techne und thermo-DUX keine Haftung bei Transportschäden aufgrund unzureichender Verpackung übernehmen. Setzen Sie sich im Zweifelsfall mit Ihrem Lieferanten in Verbindung.

Reinigen

- ❖ Bevor Sie Ihr Gerät reinigen, sollten Sie zuerst den Netzstecker ziehen das Gerät unter 50°C abkühlen lassen.
- ❖ Ein feuchtes Tuch mit Seifenlösung reinigt Ihr Gerät am besten. Achten Sie darauf, daß kein Wasser in das Gerät gelangt. Verwenden Sie keine Scheuermittel.

Übertemperaturabschalter

- ❖ Der Übertemperaturschutz ist ein empfindliches mechanisches Teil. Schon eine Erschütterung kann diesen aus lösen.
- ❖ Falls die Heizung nicht funktioniert, überprüfen Sie zuerst Netzstecker und Kabel. Setzen Sie dann den Übertemperaturabschalter (an der Rückseite des Gerätes) wieder zurück, indem Sie den roten Knopf einmal bis zum Anschlag drücken.
- ❖ Wenn der Übertemperaturabschalter wiederholt auslöst, liegt ein größerer Defekt vor. Das Gerät muß zur Reparatur an Ihren Lieferanten eingesandt werden.

Sicherungen

- ❖ Die Stromzuleitung ist durch ein oder zwei Sicherungen geschützt.
- ❖ Diese sollten nur durch qualifiziertes Fachpersonal ausgetauscht werden.
- ❖ Ersetzen Sie die Sicherungen ausschließlich mit dem in den technischen Spezifikationen angegebenen Typ (Seite 31).
- ❖ Wenn die Sicherung wiederholt durchbrennt, liegt ein größerer Defekt vor. Das Gerät muß zur Reparatur an Ihren Lieferanten eingesandt werden.

Introducción

Le rogamos lea cuidadosamente la información contenida en este folleto antes de manipular el aparato.



Consejos de seguridad

Techne ha puesto gran cuidado en el diseño de estos aparatos para proteger al usuario de cualquier peligro; aún así se deberá prestar atención a los siguientes puntos:

- ❖ LAS TEMPERATURAS ELEVADAS SON PELIGROSAS: pueden causarle graves quemaduras y provocar fuego en materiales combustibles.
- ❖ EXTREME LAS PRECAUCIONES Y UTILICE GUANTES PARA PROTEGERSE LAS MANOS;
- ❖ NO utilice sustancias combustibles cerca de objetos calientes.
- ❖ NO maneje la unidad cerca de gases o líquidos inflamables.
- ❖ NUNCA levante ni lleve la unidad hasta que no haya sido desactivada y dejado enfriar al menos 30 minutos.
- ❖ La unidad debería llevarse usando ambas manos.
- ❖ NUNCA mueva ni lleve la unidad cuando esté en uso o conectada al suministro eléctrico.
- ❖ NO coloque la unidad de forma que sea difícil desconectar el suministro eléctrico usando el enchufe.
- ❖ El enchufe de la red eléctrica debería estar situado cerca del equipo y fácilmente identificable y accesible para los usuarios.

Seguridad Del Usuario

Todos los usuarios de equipos Techne deben disponer de la información necesaria para asegurar su seguridad.

De acuerdo con las instrucciones contenidas en este manual y con las normas y procedimientos generales de seguridad, es muy importante que sólo personal debidamente capacitado opere estos aparatos. De no ser así, la protección que el equipo le proporciona al usuario puede verse reducida.

Todos los equipos Techne han sido diseñados para cumplir con los requisitos internacionales de seguridad y traen incorporados un sistema de desconexión en caso de sobretemperatura. En algunos modelos el sistema de desconexión es variable, lo que le permite elegir la temperatura según sus necesidades. En otros, el sistema de desconexión viene ya ajustado para evitar daños en el equipo.

En caso de que surgiera un problema de seguridad, desconecte el equipo de la red.

Instalación

El equipo debe estar conectado a tierra para garantizar la seguridad eléctrica.

1. Todos los aparatos Techne se suministran con un cable de alimentación. Puede ser fijo o independiente del aparato.
2. Antes de conectarlo, compruebe que el voltaje corresponde al de la placa indicadora. Conecte el cable de alimentación a un enchufe adecuado según la tabla expuesta a continuación.

Conexiones	220V-240V	110V-120V
Línea	Marrón	Negro
Neutro	Azul	Blanco
Tierra	Verde/amarillo	Verde

Asegúrese de que los equipos marcados 230V en la placa indicadora funcionan a 220V y de que los equipos marcados 120V funcionan a 110V. No obstante, en ambos casos la velocidad de calentamiento se verá reducida en un 8% aproximadamente. La placa indicadora está situada en la parte posterior del equipo.

3. Conecte el cable a la toma de tensión en la parte posterior del equipo.
4. Sitúe el aparato en un lugar apropiado tal como una superficie de trabajo plana, o si fuera necesario incluso en una campana con extractor de humos, asegurándose de que las entradas de aire en la parte inferior no queden obstruidas.
5. Los símbolos, que pueden aparecer junto a las luces indicadoras en el panel frontal del equipo, tienen los siguientes significados:



: Indicador de potencia



: Indicador del calor



: Indicador de sobretemperatura

6. Los símbolos que se encuentran en o cerca del interruptor de alimentación tienen los siguientes significados:

I : Interruptor principal encendido

O : Interruptor principal apagado

Garantía

TECHNE garantiza que este equipo no tiene defectos de material o mano de obra cuando se utiliza bajo condiciones de laboratorio normales durante el periodo especificado en la tarjeta de garantía adjunta. En caso de una reclamación justificada, TECHNE cambiará cualquier componente defectuoso o reemplazará la unidad sin coste alguno.

Esta garantía NO se aplicará si:

- ❖ Se ha realizado o intentado cualquier reparación por otra persona distinta al fabricante o sus agentes.
- ❖ Aparece cualquier arañazo o esquirla menor en el recubrimiento durante el uso normal (p.ej. desgaste).
- ❖ El daño es provocado por incendio, accidente, mal uso, negligencia, reparación o ajuste incorrecto, daños provocados por la instalación, adaptación, modificación o ajuste de piezas no aprobadas.

Mantenimiento

ESTE APARATO DEBE SER DESMONTADO SOLO Y EXCLUSIVAMENTE POR PERSONAL DEBIDAMENTE CAPACITADO. EL RETIRAR LOS PANELES LATERALES, FRONTALES O TRASEROS SUPONE DEJAR AL DESCUBIERTO TENSION DE LA RED PELIGROSA.

EL EQUIPO NO CONSTA DE NINGUNA PIEZA DE CUYO MANTENIMIENTO SE PUEDA ENCARGAR EL USUARIO.

En el caso improbable de que experimentara algún problema con su aparato que no pudiera resolver con facilidad, debería ponerse en contacto con su proveedor y devolverlo si fuera necesario. Indique de forma detallada todos los defectos que haya notado y devuelva el equipo en su embalaje original. Techne no aceptará responsabilidad alguna por daños causados en equipos que no estuvieran debidamente embalados para su envío; si tuviera alguna duda, póngase en contacto con su proveedor.

Limpieza

- ❖ Antes de limpiar su aparato, desconéctelo SIEMPRE de la fuente de alimentación y permita que se enfríe por debajo de los 50°C.
- ❖ Este aparato se puede limpiar pasándole un paño húmedo enjabonado. Hágalo con cuidado para evitar que caiga agua dentro del mismo. No utilice limpiadores abrasivos.

Desconexión en caso de sobretemperaturas

- ❖ El sistema de desconexión en caso de sobretemperaturas es un dispositivo mecánico sensible (una sacudida mecánica podría desconectarlo).
- ❖ Si el calefactor no recibiera alimentación, compruebe el enchufe y el cable de la toma de corriente; a continuación vuelva a ajustar el control del dispositivo (si su equipo lo lleva montado).
- ❖ Una desconexión repetida indicaría una avería grave; puede que tenga que devolverle el aparato a su proveedor para su reparación.

Fusibles

- ❖ Su aparato está protegido por uno o dos fusibles.
- ❖ Sólo deben cambiarlos personal debidamente capacitado.
- ❖ Reemplace los fusibles solo con el tipo enumerado en la Especificación técnica (página 31).
- ❖ Si los fusibles se fundieran repetidamente, esto indicaría una avería grave y puede que tuviera que devolverle el aparato a su proveedor para su reparación.

Introduzione

Prima di utilizzare l'apparecchio, leggere tutte le informazioni contenute in questo manuale.



Avviso di sicurezza

La Techne ha posto particolare cura nel progettare questo strumento, al fine di proteggere gli operatori da eventuali pericoli, ma gli utilizzatori devono prestare attenzione ai seguenti punti:

- ❖ LE ALTE TEMPERATURE SONO PERICOLOSE: possono causare ustioni gravi all'utilizzatore e possono causare la combustione di materiale infiammabile.
- ❖ UTILIZZARE CON ATTENZIONE E INDOSSARE GUANTI PROTETTIVI;
- ❖ NON utilizzare combustibili in prossimità di oggetti roventi.
- ❖ NON mettere in funzione l'unità in vicinanza di liquidi o gas infiammabili.
- ❖ MAI sollevare o trasportare l'unità finché non è stata spenta e lasciata raffreddare per almeno 30 minuti.
- ❖ L'unità deve essere trasportata utilizzando entrambe le mani.
- ❖ MAI spostare o trasportare l'unità quando è in uso o connessa alla rete di energia elettrica.
- ❖ NON posizionare l'unità in modo tale che risulti difficile disconnetterla dalla rete di energia elettrica utilizzando le apposite spine di alimentazione.
- ❖ Le prese di corrente utilizzate devono trovarsi in prossimità dell'apparecchiatura e prontamente identificabili e accessibili agli utenti.

Sicurezza Per L'utilizzatore

Il personale che utilizza l'apparecchiatura Techne deve avere a disposizione la documentazione necessaria al fine di assicurare la loro incolumità.

È importante che solo personale adeguatamente addestrato utilizzi questo apparecchio, in conformità alle istruzioni contenute in questo manuale e nel rispetto delle normative e procedure generali di sicurezza. Se l'apparecchio è utilizzato in modo non specificato da Techne, la protezione fornita dall'apparecchiatura all'utilizzatore potrebbe essere a rischio.

Tutte le unità Techne sono state progettate in conformità ai requisiti internazionali di sicurezza e sono equipaggiate con un interruttore anti surriscaldamento. Su alcuni modelli, l'interruttore è regolabile e dovrebbe essere impostato secondo l'utilizzo. In tutti gli altri modelli l'interruttore è preregolato per proteggere l'unità.

Se si dovesse verificare qualche problema di sicurezza, disconnettere l'apparecchio dalla rete.

Installazione

L'apparecchio deve essere collegato alla messa a terra per assicurare la giusta sicurezza elettrica.

1. Tutti gli apparecchi Techne sono forniti di un cavo di alimentazione. Questo può essere integrato nell'apparecchio o separato.
2. Prima di collegare l'apparecchio alla presa di alimentazione, controllare il voltaggio indicato sulla targhetta. La targhetta identificativa si trova sul retro dell'apparecchio. Collegare il cavo di alimentazione in una presa appropriata secondo la tabella seguente.

Connessioni	220V-240V	110V-120V
Tensione	Marrone	Nera
Neutro	Blu	Bianco
Terra	Verde/Giallo	Verde


Il fusibile all'interno dell'apparecchio protegge l'apparecchiatura e l'utilizzatore.

Tenere presente che gli apparecchi riportanti sulla targhetta 230 V funzionano a 220V. Gli apparecchi riportanti 120V funzionano a 110V. Comunque, in entrambi i casi la velocità di riscaldamento diminuirà approssimativamente dell'8%.

3. Collegare il cavo elettrico alla presa di corrente sul retro dell'unità.
4. Posizionare l'unità su un luogo adeguato, su una superficie di lavoro piana oppure, se necessario, sotto una cappa aspiratrice, assicurandosi che le prese di aria sulla parte inferiore siano libere da ostruzione.
5. I simboli seguenti, che possono essere collocati in prossimità delle luci di indicazione sul pannello anteriore dell'apparecchio, hanno i seguenti significati:

 indicatore di potenza

 indicatore di riscaldamento

 indicatore di surriscaldamento

6. I simboli sopra o vicino l'interruttore di accensione dell'apparecchio hanno i significati seguenti:

I Acceso

O Spento

Garanzia

TECHNE garantisce che la presente apparecchiatura sia priva di difetti materiali e di fabbricazione quando viene utilizzata in condizioni normali d'impiego per il periodo specificato nella scheda di garanzia allegata. In caso di reclamo ragionevole, TECHNE sostituirà qualsiasi componente difettoso o sostituirà l'unità senza spese aggiuntive.

La presente garanzia NON si applica in caso di:

- ❖ Riparazioni effettuate o tentate da operatori diversi dal produttore o dai propri agenti.
- ❖ Lesioni o graffi minori sul rivestimento che compaiano in condizioni normali d'impiego (ad es. danni da usura).
- ❖ Danni provocati da incendio, incidente, uso improprio, abbandono, taratura o riparazione non corrette o danni causati da installazione, adattamento, modifica o inserimento di componenti non approvati.

Manutenzione

Questo apparecchio dovrà essere aperto esclusivamente da Personale adeguatamente addestrato. La rimozione dei pannelli laterali, frontali o posteriori può esporre potenzialmente a voltaggi di corrente letali. All'interno dell'apparecchio non ci sono parti manutenibili da parte dell'utilizzatore.

Nell'eventualità che si riscontri un problema con l'apparecchio che non può essere facilmente risolto, si dovrà contattare il proprio fornitore e restituire, se necessario, l'apparecchio. Si prega di specificare nel dettaglio i difetti riscontrati e di ricordare di restituire l'apparecchio nel suo involucro originale. La Techne non si fa carico di alcuna responsabilità per danni subiti dall'apparecchio che non sia stato propriamente imballato per il trasporto; in caso di dubbio, rivolgersi al fornitore.

Pulizia

- ❖ Prima di pulire il vostro apparecchio, disconnettere sempre la presa di alimentazione e lasciare raffreddare sotto i 50°C.
- ❖ Questo apparecchio può essere pulito passando un panno inumidito con sapone. Si deve prestare attenzione onde prevenire l'ingresso dell'acqua all'interno dell'apparecchio. Non utilizzare per la pulizia sostanze abrasive.

Disconnessione in caso di surriscaldamento

- ❖ In caso di non funzionamento dell'apparecchio, controllare la spina elettrica e il relativo cavo collegati alla rete.
- ❖ Ripetute interruzioni del funzionamento dell'apparecchio indicano un serio malfunzionamento: in questo caso restituire l'apparecchio al fornitore per la riparazione.

Fusibili

- ❖ L'apparecchio è protetto da uno o due fusibili.
- ❖ Questi dovrebbero essere sostituiti solo da personale qualificato.
- ❖ Sostituire i fusibili soltanto con quelli di tipologia elencata nelle Specifiche Tecniche (pagina 31).
- ❖ Se i fusibili si bruciano frequentemente ciò indica un malfunzionamento serio e in questo caso si consiglia di contattare il fornitore per le riparazioni.

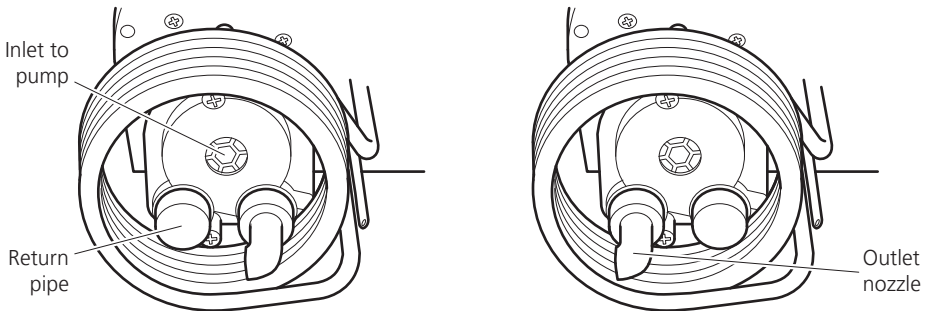
Before Use

TE-10D And TU-20D Only

1. There are two modes of operation for the pump; circulation internal to the bath; circulation external to the bath. For internal circulation the blanking caps on the top of the outlet and return pipes should be securely in place. They screw on and, for safety, they may be tight. For external circulation these need to be removed.

The outlet nozzle is supplied fitted to the bottom of the pump housing in the internal circulation position. In this position and with the blanking cap on the outlet pipe the pump will circulate internally.

If maximum external flow is required: Remove the outlet nozzle from the pump base and reposition it on the bottom of the return pipe. Remove the blanking cap from the return pipe and screw it onto the hole from which the nozzle was taken. This redirects the full flow externally. Screw the pipe connectors supplied with the unit to connect the appropriate pipe to the unit.



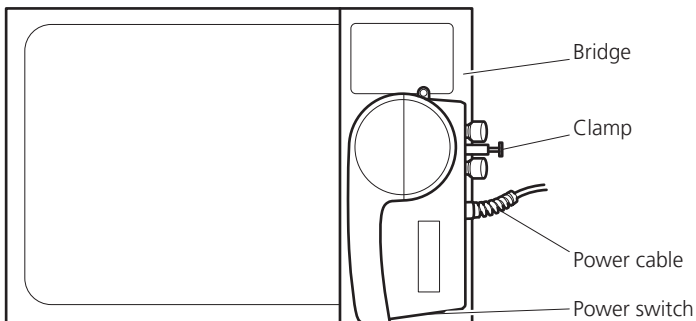
Set for internal circulation

Set for external circulation

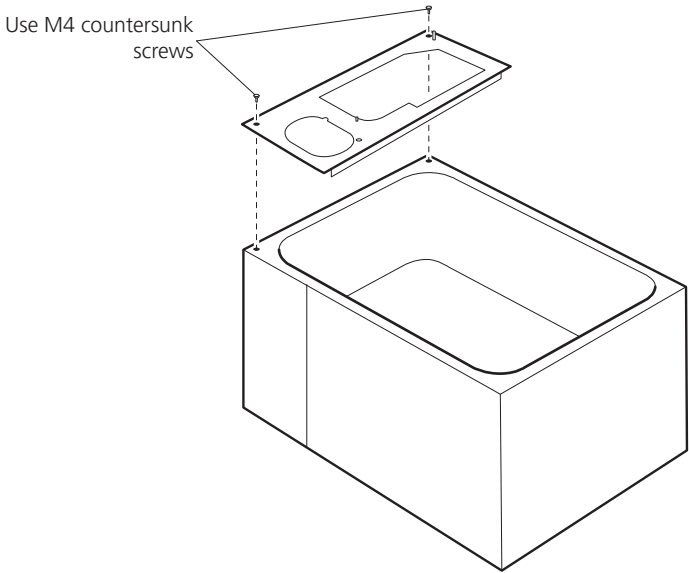
2. **CAUTION: DO NOT SWITCH THE THERMOREGULATOR ON UNLESS EITHER THE BLANKING PLUGS ARE FITTED TO THE TOP OF THE PIPES OR AN EXTERNAL CIRCUIT IS FULLY CONNECTED. NEVER SET THE UNIT SO THAT THE FLOW IS SPLIT INTERNALLY AND EXTERNALLY.**

All Models

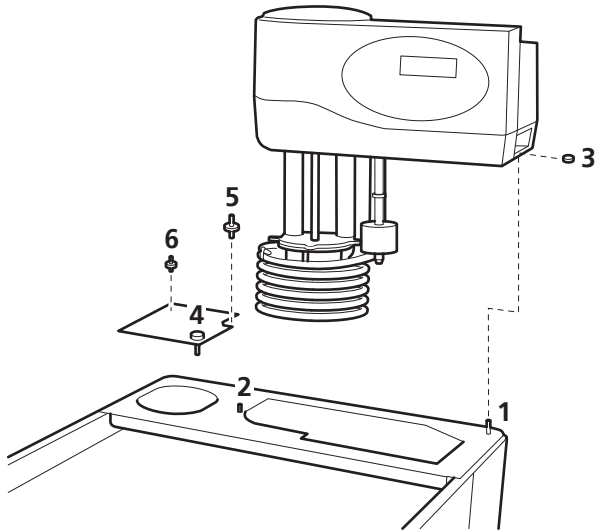
3. Ensure that the bath is set up on a flat level surface.
4. Fit the unit securely to the bath using the correct bridge piece for the unit/bath or a portable clamp, see the list of accessories. THE UNIT MUST ALWAYS BE MOUNTED WITH THE BACK AND THE SWITCH END OUTSIDE THE AREA OF THE BATH. This will reduce the infiltration of hot vapours into the cooling system of the thermoregulator. Ensure that at all times the air inlet and outlet remain clear of obstructions. Free circulation of air inside the unit is essential for proper cooling of the electronics and pump motor.



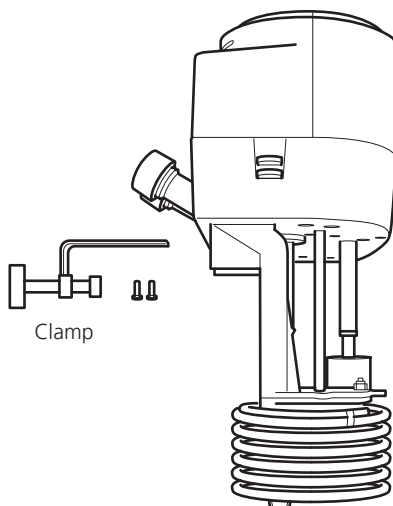
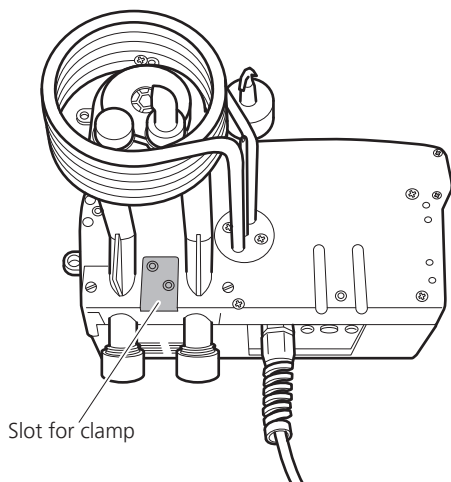
5. Begin by securing the bridge piece to the bath. Use the two M4 countersunk stainless screws and screw into the holes in the corners of the bath.



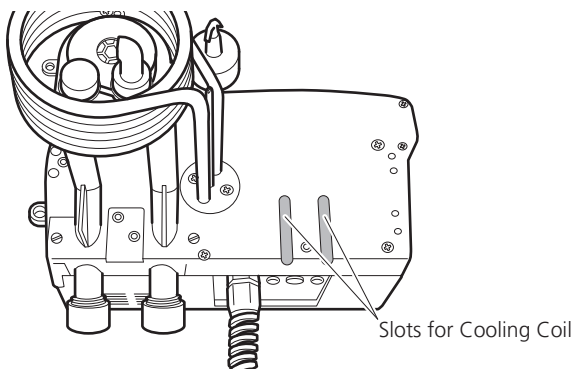
6. Locate the thermoregulator above the bridge piece. Toggle the heating element carefully through the clearance hole. Lower the thermoregulator onto the M4 threaded stud (1) and 3mm diameter stud (2). Use the half-turn plastic fastener (3) to clamp down the thermoregulator.



- Use the thumb screw (4) to secure the cover plate to the bridge. Bungs (5 and 6) are provided to seal off the holes in the bridge piece. It is necessary to fit the bungs to reduce heat losses and prevent steam or other vapours getting to the thermoregulator.
- If you do not want to use a bridge piece to secure the unit to a bath then you must use a clamp. The clamp bracket fits between the pump legs in the slot provided. Slide the bracket into the slot and use the two screws in the clamp kit to secure the clamp to the unit.



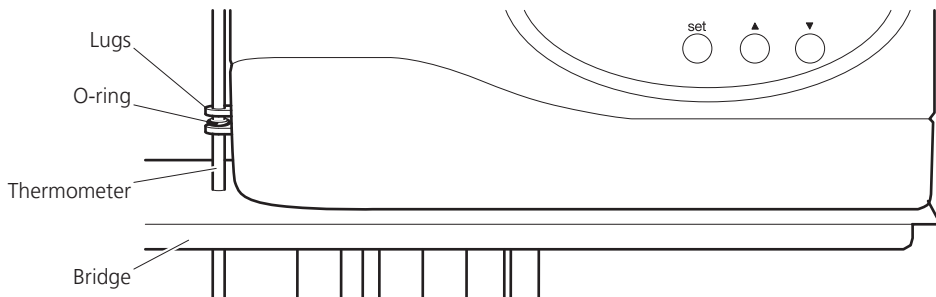
- A cooling coil, which is an optional accessory, will give control for temperatures between 5°C above ambient and 5°C above the temperature of the water supply. See the list of accessories on page 36. The cooling coil is fitted to the thermoregulator just below the over-temperature cut-out switch. You will find a rubber moulding screwed to the base and filling two slots. Remove the screw and moulding and use the screw to fit the cooling coil in the slots. Keep the moulding in a safe place in case you need to replace it.



Connect a hose from a tap to one end of the coil and from the other end of the coil to drain. Adjust the water flow to give the required cooling. Note that the liquid calibration baths are fitted with their own cooling coil.

- For lower temperatures, a Dip Cooler such as a Techne RU-200 or RU-500 or a Flow Cooler such as the FC-200 or FC-500 is required. Note that model TU-20HT is not suitable for use with flow coolers. Alternatively a refrigerated bath can be used. See the individual instruction manuals for installation information.

11. If a thermometer is to be used, it may be fitted in the end of the top cover of the thermoregulator between the two lugs, using the O-ring supplied with the unit. If a bridge piece is fitted, it is necessary to remove the bung (5) to insert the thermometer through the plate into the bath.



12. Fill the bath to between the minimum and maximum levels stated in the specification. If water is used, demineralised water is preferred to reduce the formation of scale. Ultra-pure deionised or RO water with a resistivity of $> 1 \text{ Mohm}$ should not be used, as this can leach the iron from the stainless steel and lead to corrosion. If necessary, add a little tap water to the pure water in the bath. If scale should form, use only mild de-scaling agents to remove it. DO NOT attempt to hammer, chip or scrape the deposits from the surface of the bath.

13. Recommended liquids:

Temperature	Liquid
-40°C to 0°C	40% water, 40% ethylene glycol and 20% alcohol
-20°C to 30°C	50% water and 50% ethylene glycol
5°C to 95°C	Water, preferably de-ionised with neutral pH
10°C to 150°C	Dow Corning Silicone Oil 200 series*
10°C to 250°C	Dow Corning Silicone Oil 210H/100cs series*

*Warning: check gel life at top end of range.

Extraction may be necessary at high temperatures; always check the manufacturer's data and safety sheets before using any of the liquids.

In all cases the OVER-TEMPERATURE CUT-OUT must be set correctly for the liquid being used and the temperature at which it is to operate

14. A bath that is fitted with a lid or insulating ball blanket gives the best operating conditions. A lid or ball blanket will prevent vapour loss, heat loss and give better temperature control. See the section on accessories for further information on available lids. If an open bath is used above 80°C (i.e. where steam or other readily condensing vapours are present) the operation of the unit, particularly the digital display, may be affected. Below about 80°C a cover becomes less important but will still give better temperature control.
15. The symbols next to the indicator lamps on the front panel of the thermoregulators have the following meanings:

~ : the power indicator

⋈ : the heater indicator

⊕ : the over-temperature indicator

16. Symbols on the switch have the following meanings:

I : mains switch On

O : mains switch Off

TE-10D And TU-20D Only

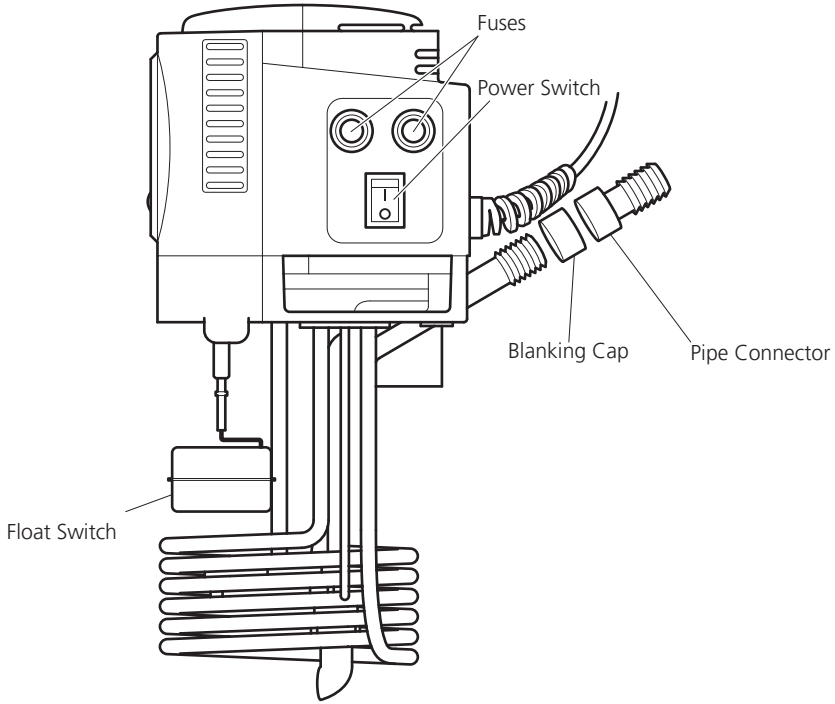
17. If the pump has been set correctly for external circulation, suitable hoses should be fitted to the outlet and return pipes. A suitable hose must be capable of withstanding both the temperature of operation and the liquid being used. Always securely clip the hoses in place.

Hose material	Allowable temperature range	Comments
PVC	10°C to 60°C (50°F to 140°F)	For water only
Silicone	-40°C to 200°C (-40°F to 362°F)	NOT for silicone oil
Viton	-20°C to 250°C (-4°F to 482°F)	

Operation

Ensure that either the outlet and return pipes have their caps on or an external system is properly set up.

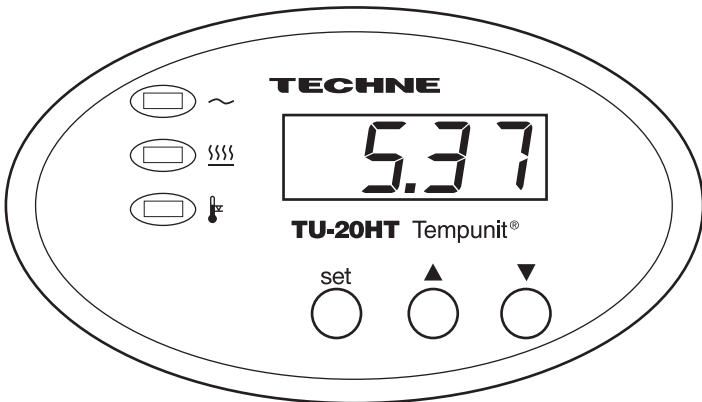
Switch the unit on by pressing the power switch. The switch and the POWER indicator on the front will light up.



When Switching On The Thermoregulator

When first switched on the display will show the edition of the software currently installed.

For example software issue "5.37" would be shown as follows:

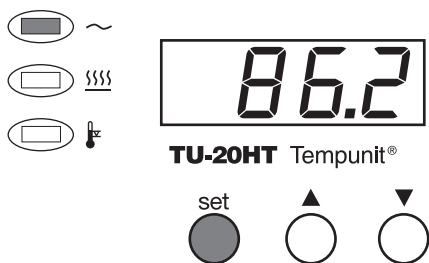


It will display this for 1 second, then the actual temperature of the bath will be indicated.

The Front Panel Controls

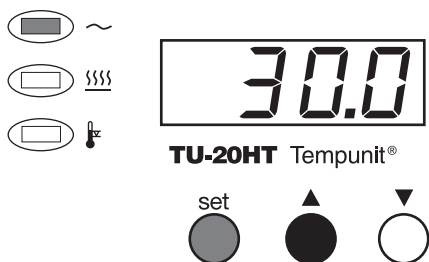
The front panel controls consist of three buttons for controlling the display, a four digit LED display and three indicators.

The SET temperature button



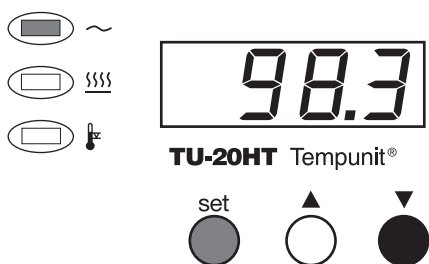
The SET temperature button displays the set temperature when pressed.

The UP ARROW button



When the SET temperature button is held down and the UP ARROW button is pressed, the set temperature is increased.

The DOWN ARROW button

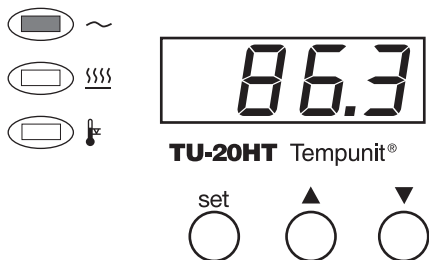


When the SET temperature button is held down and the DOWN ARROW button is pressed, the set temperature is decreased.

Speed of change of set temperature

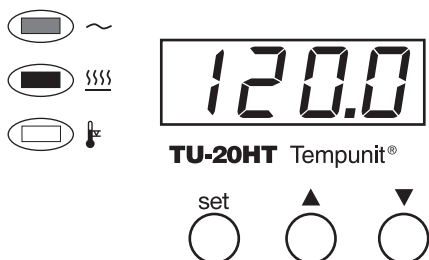
Each press of the UP ARROW or DOWN ARROW buttons will increase or decrease the set temperature by 0.1°C. If the buttons are held down the temperature change will accelerate to 5°C per second.

Power indicator



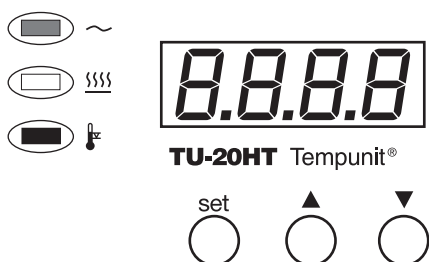
The top indicator shows that there is power to the unit.

Heater indicator



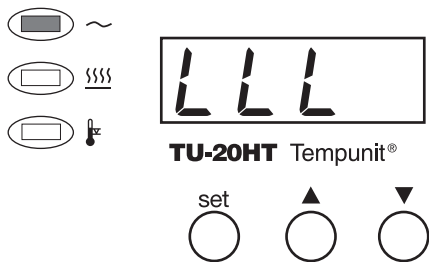
The middle indicator shows when the heater is heating. When the temperature is being set and the new set temperature is higher than the temperature already in the unit, the heater indicator will light as the unit tries to follow the set temperature. If the light is on continuously the heater is getting constant power. The only exception is described under "Over-temperature indicator". As the temperature approaches the set temperature the heater indicator will flash. When the set temperature is reached the indicator will stay on for shorter periods. If the bath temperature is above the set temperature then the indicator will be off, as the heater is not getting any power.

Over-temperature indicator



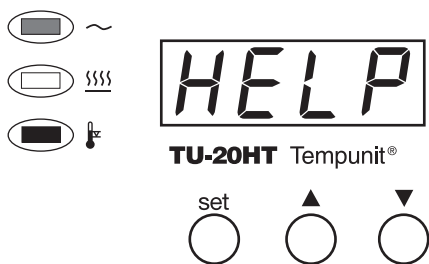
If the unit should, for any reason, exceed the temperature set for the over-temperature cut-out, the over-temperature indicator will light. The heater will have been switched off and the unit will begin to cool even if the heater light is on (the light staying on or not depends on which circuit has sensed an over-temperature).

Low liquid level



The float switch will trip if the liquid gets below a safe level; the display will change to “LLL”. The heater will be switched off. Fill the bath to above the minimum level and the display will return to the ‘present’ temperature; the unit will again work.

Sensor fault indicator



If there should, for any reason, be a sensor fault, the bottom indicator will light. The power to the heater will have been switched off and the unit will begin to return to ambient even if the heater light is on (the light staying on or not depends on which circuit has sensed a fault).



After Use

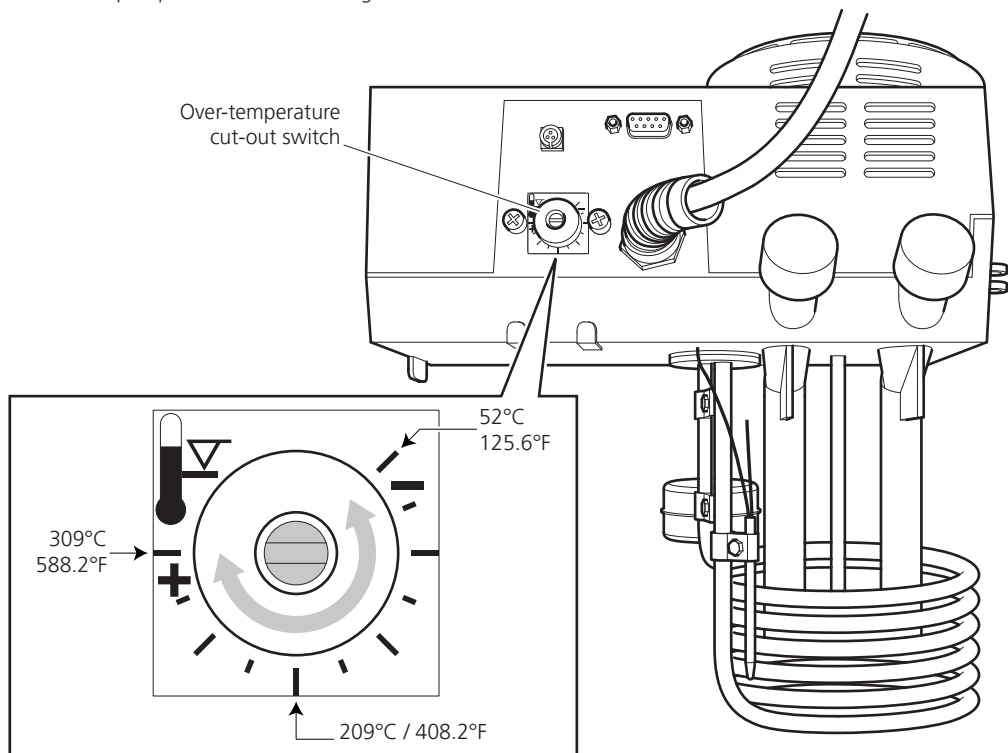
When you have finished heating samples, remember that parts of the unit and the samples may be very hot. Take the precautions listed earlier. We recommend that the samples should be allowed to cool to 50°C before being removed from the bath. They will still have to be handled with care.

Should you want to remove the unit from the bath, it too should be allowed to cool to 50°C before being removed.

Remember the bridge, the lid (if used), the bath and all other parts close to the bath will be hot while it is in use.

Setting The Over-Temperature Cut-Out

An adjustable over-temperature cut-out switch is fitted. When the cut-out operates, the heater will stop working and the 'over-temperature cut-out indicator' will illuminate. On the TU-20D and TU-20HT an audible alarm will sound. The pump will continue working on all units.



The over-temperature cut-out should be set to approximately 10°C ABOVE THE OPERATING TEMPERATURE. This can be done in one of two ways; the first is more accurate and the second quicker (and better if you do not want to overheat the liquid). For both, first turn the cut-out switch fully clockwise then:

1. Heat the bath to the desired cut-out temperature and turn the cut-out switch anticlockwise until the cut-out just trips.

Either: Switch off at the mains power. Remove the unit from the liquid, the heater will cool and reset (you will hear an audible click). Return the unit to the liquid, switch on the mains power. The heater will work again.

Or: Allow the liquid to cool, may be as much as 40°C, the heater will cool and reset (you will hear an audible click). The heater will work again.

2. Heat the bath to the required maximum operating temperature and turn the reset button anticlockwise until the cut-out just trips. Turn the reset button clockwise one small division on the label.

Either: Switch off at the mains power. Remove the unit from the liquid, the heater will cool and reset (you will hear an audible click). Return the unit to the liquid, switch on the mains power. The heater will work again.

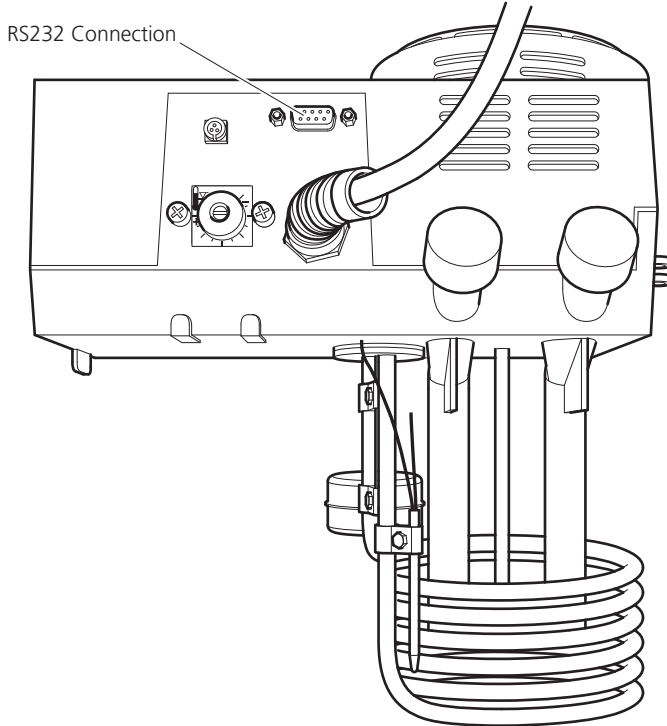
Or: Allow the liquid to cool, may be as much as 40°C, the heater will cool and reset (you will hear an audible click). The heater will work again.

An alarm will sound on the TU-20D and TU-20HT when the over-temperature cut-out is activated. Reset the over-temperature cut-out, by removing the unit from the liquid or allow the liquid to cool, to stop the alarm.

RS232 Serial Interface

The TU-20D and TU-20HT may send data logging information to a compatible computer by connecting the unit and the PC via an RS232 cable and installing the TechneWorks PC Software (available to download free of charge from <http://www.techne.com/Software.asp>).

The RS232 cable must be fitted to both the unit and the PC before either unit is powered up, otherwise data integrity cannot be guaranteed. Once the cable is fitted, it does not matter which unit is powered up first.



The following tables indicate the cable specifications for a 9-way PC serial port:

Thermoregulator		PC
9-way female D type	9-way female D	type
Pin	signal	pin
Case	F.GND	Case
3	TxD	3
2	RxD	2
7	RTS	7
8	CTS	8
6	DSR	6
1	CD	1
4	DTR	4
5	S.GND	5

For further information, please refer to the TechneWorks PC Software Instruction Manual.

Calibration Of The Thermoregulator

Remember that if you change the calibration from that set at the factory you may change the calibration at all temperatures. You may get different calibration with different baths and/or liquids.

In order to ensure that the calibration you are setting is correct, you will need to use an independent calibrated probe or thermometer.

Set the temperature display to the particular temperature at which you require to control. Measure the actual temperature of the bath liquid using a calibrated probe or thermometer.

If the calibration is not correct then you can follow this procedure.

1. Hold down the Up and Down buttons and then press the Set button at the same time for 5 seconds.
2. The display will change from the bath temperature to "EEEE".
3. Press the 'SET' button and either the 'UP' or the 'DOWN' button to adjust the display to the same temperature as the measured value.
4. Press 'UP' and 'DOWN' together to confirm the value. The display will return to the bath temperature and the unit will control with the new calibration parameters.

Servicing And Repair



NOTE THAT THIS EQUIPMENT SHOULD ONLY BE DISMANTLED BY PROPERLY TRAINED PERSONNEL.
REMOVING THE TOP CASE EXPOSES POTENTIALLY LETHAL MAINS VOLTAGE.

This product range does not require any routine servicing.

NOTE: There are no internal user replaceable parts.

In the event of product failure, it is recommended that any repair is only undertaken by suitably qualified personnel. For advice, please contact Techne quoting the model and serial number. Only spare parts supplied by the manufacturer or its agent should be used. Fitting of non-approved parts may affect the performance of the safety features of the instrument.

If in doubt, please contact Techne.

For Technical or Application assistance please contact: Email: cptechsupport@coleparmer.com

For Warranty, Repair or Service assistance please contact: Email: cpSERVICE@coleparmer.com

Tel: +44 (0)1785 812121

Technical Specification

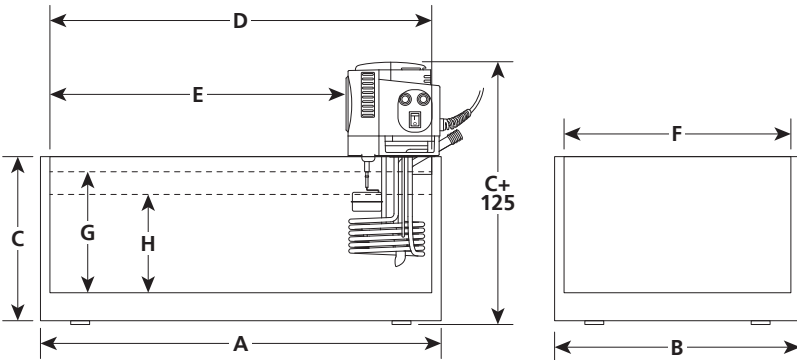
	TE-10D	TU-20D	TU-20HT
Operating temperature range	-40 to 120°C	-40 to 200°C	-40 to 250°C
Working temperature range	Ambient +5 to 120°C	Ambient +5 to 200°C	Ambient +5 to 250°C
Temperature selection	Digital	Digital	Digital
Temperature display	Digital LED	Digital LED	Digital LED
Temperature stability	±0.01°C	±0.005°C	±0.005°C
Set point accuracy	±1°C	±1°C	±1°C
Method of control	PID	PID	PID
Temperature sensor	PRT	PRT	PRT
Nominal heater power			
230V	1000W	1800W	1800W
120V	1000W	1500W	1500W
Maximum watts density	7.6 W/cm ²	6.2 W/cm ²	6.2 W/cm ²
Pump capacity			
Maximum flow	10 l/min	10 l/min	Not applicable
Maximum pressure	145 mbar	145 mbar	
Audible alarm for over-temperature	No	Yes	Yes
Communications	No	RS232	RS232
Protection against hazards	IP30	IP30	IP30
Safety device classification	2	2	2
Fuses	230V: 2 x F5A 120V: 2 x F10A	230V: 2 x F10A 120V: 2 x T16A	230V: 2 x F10A 120V: 2 x T16A

Bath Dimensions

Unheated Bath Dimensions

Nominal Dimensions

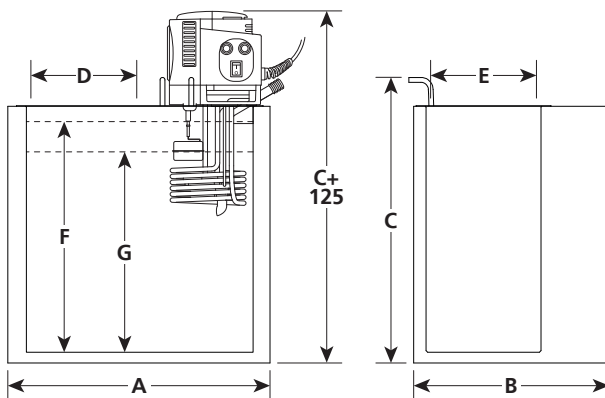
Bath		B-8	B-12	B-18	B-26	B-48
Overall length	A	265 mm	354 mm	530 mm	530 mm	594 mm
Overall width	B	325 mm	325 mm	325 mm	325 mm	365 mm
Overall height	C	172 mm	172 mm	172 mm	222 mm	298 mm
Internal						
Maximum length	D	240 mm	329 mm	505 mm	505 mm	560 mm
Working length	E	115 mm	205 mm	380 mm	380 mm	430 mm
Width	F	300 mm	300 mm	300 mm	300 mm	330 mm
Maximum working depth	G	130 mm	130 mm	130 mm	180 mm	255 mm
Minimum working depth	H	100 mm	100 mm	100 mm	150 mm	224 mm
Maximum capacity		8.0 l	11.6 l	18.0 l	26.0 l	48.5 l
Minimum capacity		6.0 l	8.4 l	13.2 l	20.5 l	42.5 l



Liquid Calibration Bath Dimensions

Nominal Dimensions

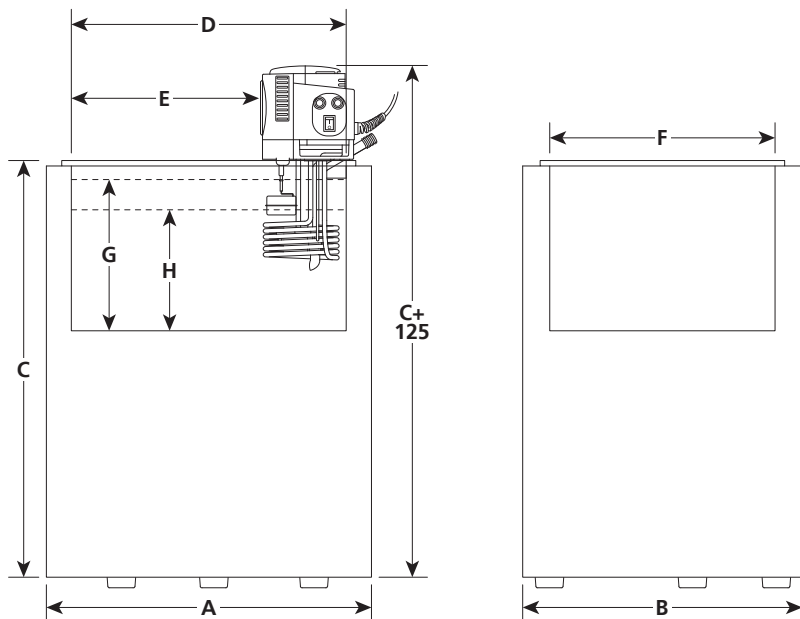
Bath		LCB-5	LCB-7	LCB-12
Overall Length	A	351 mm	351 mm	351 mm
Overall Width	B	260 mm	260 mm	260 mm
Overall Height	C	183 mm	233 mm	358 mm
Opening length	D	140 mm	140 mm	140 mm
Opening width	E	140 mm	140 mm	140 mm
Maximum working depth	F	130 mm	140 mm	305 mm
Minimum working depth	G	90 mm	90 mm	265 mm
Maximum capacity		5.0 l	6.5 l	12.0 l
Minimum capacity		4.0 l	5.5 l	11.0 l



Refrigerated Bath Dimensions

Nominal Dimensions

Bath		RB-5A	RB-12A	RB-22A
Overall length	A	430 mm	430 mm	430 mm
Overall width	B	250 mm	370 mm	395 mm
Overall height	C	566 mm	610 mm	565 mm
Internal				
Maximum length	D	192 mm	208 mm	360 mm
Working length	E	224 mm	224 mm	250 mm
Width	F	151 mm	300 mm	295 mm
Maximum working depth	G	180 mm	130 mm	200 mm
Minimum working depth	H	135 mm	85 mm	160 mm
Maximum capacity		7.0 l	11.6 l	22.0 l
Minimum capacity		5.5 l	9.6 l	18.0 l



Replacement Parts

The following parts may be purchased if replacements or alternatives are required:

Part number	Description
6007349	O ring (thermometer)
6103913	Cap seal
6103475	Cap
6103804	Pipe connection seal
6103771	Pipe connection nozzle
6103460	Bottom outlet nozzle
I/FCLAMP	Clamp for TE-10D
I/FCLAMP2	Clamp for TU-20D and TU-20HT
6104266	Interface cable
6008052	Fuse F5A
6009843	Fuse F10A
6106042	Fuse T16A

Accessories

The following accessories are available for use with the Techne baths and thermoregulators.

Unheated baths

Ideal for use for general applications up to 200°C. Supplied with a bridge plate on which to mount the thermoregulator.

Product Code	Description
FBATH08	B-8 stainless steel bath, 8 litre capacity
FBATH12	B-12 stainless steel bath, 12 litre capacity
FBATH18	B-18 stainless steel bath, 18 litre capacity
FBATH26	B-26 stainless steel bath, 26 litre capacity
FBATH48	B-48 stainless steel bath, 48 litre capacity

Lids to fit unheated baths

Bath Size	Flat Lid Part Code	Gabled Lid Part Code
8 litre	FFLAT08	FGABLE08
12 litre	FFLAT12	FGABLE12
18 and 26 litre	FFLAT18	FGABLE18
48 litre	FFLAT48	FGABLE48

Adjustable Trays

Supported by a ball chain and clip, the stainless steel trays can be used to alter the depth of the unheated baths.

Bath Size	Part Code
8 litre	FADJ08
12 litre	FADJ12
18 litre	FADJ18
26 litre	FADJ26
48 litre	FADJ48

Polypropylene Spheres

A ball blanket is an effective way of reducing evaporation and loss of heat from a water bath. It acts as effectively as a lid whilst providing instant access to the bath. The 25mm diameter spheres are supplied in packs of 250.

Part Code	Description
F840D	250 x 25mm diameter polypropylene spheres

High Temperature Cooling Coil

Designed for assisting in cooling a hot bath more rapidly by flowing tap water or chilled liquid through it, this simple coiled tube attaches to the base of all Techne thermoregulators. This cooling coil can be used to cool a bath to 5°C above the cooling liquid supply temperature.

Part Code	Description
FCC01	Cooling coil

Liquid Calibration Baths

Insulated baths ideal for calibration of thermal sensors. Can be used up to 250°C.

Product Code	Description
FBCAL05D	LCB insulated liquid calibration bath with cooling coil, 5 litre capacity
FBCAL07D	LCB insulated liquid calibration bath with cooling coil, 7 litre capacity
FBCAL12D	LCB insulated liquid calibration bath with cooling coil, 12 litre capacity

Dip coolers

Used with an unheated bath and thermoregulator, a dip cooler offers a flexible refrigeration option. The cooling coil fits in the bath bridge mounting plate next to the thermoregulator and can be removed when not required.

Product Code	Description
FRU2D	RU-200 dip cooler, -20°C (230V)
FRU2P	RU-200 dip cooler, -20°C (115V)
FRU5D	RU-500 dip cooler, -35°C (230V)
FRU5P	RU-500 dip cooler, -35°C (115V)

Flow coolers

Used with unheated or liquid calibration baths, flow coolers circulate the bath liquid through the refrigeration unit which continually extracts heat from the bath fluid by means of the built-in heat exchanger. Note that Flow Coolers are not suitable for use with the TU-20HT models.

Product Code	Description
FFC2D	FC-200 flow cooler, -20°C (230V)
FFC2P	FC-200 flow cooler, -20°C (115V)
FFC5D	FC-500 flow cooler, -35°C (230V)
FFC5P	FC-500 flow cooler, -35°C (115V)

Refrigerated baths

Used in conjunction with a thermoregulator, the refrigerated baths have a built-in refrigeration system allowing temperatures as low as -35°C to be maintained.

Product Code	Description
FRB5D	RB-5A refrigerated bath, 7 litre capacity, - 20°C to 100°C (230V, 50-60Hz)
FRB5P	RB-5A refrigerated bath, 7 litre capacity, - 20°C to 100°C (120V, 50-50Hz)
FRB2D	RB-12A refrigerated bath, 12 litre capacity, - 35°C to 100°C (230V, 50-50Hz)
FRB2P	RB-12A refrigerated bath, 12 litre capacity, - 35°C to 100°C (120V, 50-50Hz)
FRB22D	RB-22A refrigerated bath, 22 litre capacity, - 30°C to 100°C (230V, 50-50Hz)
FRB22P	RB-22A refrigerated bath, 22 litre capacity, - 30°C to 100°C (120V, 50-50Hz)

PC software

TechneWorks PC software is compatible with the Techne TU-20D and TU-20HT thermoregulators. It allows the user to create, open and save programs with up to 20 set points; specify ramp rates and hold times; log data from the instrument while connected to the computer and export the data to an Excel spreadsheet.

Part Code	Description
FTWORKS	TechneWorks software CD



This product meets the applicable EC harmonized standards for radio frequency interference and may be expected not to interfere with, or be affected by, other equipment with similar qualifications. We cannot be sure that other equipment used in its vicinity will meet these standards

and so we cannot guarantee that interference will not occur in practice. Where there is a possibility that injury, damage or loss might occur if equipment malfunctions due to radio frequency interference, or for general advice before use, contact the manufacturer.



EU Declaration of Conformity

Product	Laboratory Equipment	File Number	P225
Manufacturer	Cole-Parmer Ltd Beacon Road Stone, Staffordshire ST15 0SA United Kingdom		

This declaration of conformity is issued under the sole responsibility of the manufacturer

Object of Declaration Thermoregulator
(reference the attached list of catalogue numbers)

The object of the declaration described above is in conformity with the relevant Union Harmonisation Legislation:

Low Voltage Directive	2006/95/EC
EMC Directive	2004/108/EC
RoHS Directive	2011/65/EC

References to the relevant harmonised standards used or references to the other technical specifications in relation to which conformity is declared:

IEC/EN 61010-1:2001	Safety requirements for electrical equipment for measurement, control and laboratory use. Part 1: General requirements.
IEC/EN 61010-2-010:2003	Particular requirements for laboratory equipment for the heating of materials.
IEC/EN 61326-1:2006	Electrical equipment for measurement, control and laboratory use. EMC requirements. Part 1: General requirements (Class A).

Signed for and on behalf of the above manufacturer

Additional Information	Year of CE Marking: 1996
Place of Issue	Stone, Staffordshire, UK
Date of Issue	October 2009. Revised 30 January 2017
Authorised Representative	Carl Warren
Title	Technical Manager
Signature	



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