TECHNE

Genius

OPERATOR'S MANUAL

CONTENTS

Issue 8. Date of issue: 7th September 1999
For use with units with Serial Number/19 onwards

Notes

Techne (Cambridge) Ltd
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CE

Declaration of Conformity

Techne Unit Genius has been designed to comply with the following European Standards:

EN 50081-1:1992 Electromagnetic Compatibility; Generic emission standard.

EN 50082-1:1992 Electromagnetic Compatibility; Generic immunity standard (Performance criterion B).

EN 61010-1:1993 Safety requirements for electrical equipment for measurement, control and laboratory use.

EN 61010-2-010:1995 Particular requirements for laboratory equipment for the heating of materials.

I have made all reasonable enquiries regarding the unit stated and its conformance to the following EU directives:

Low Voltage directive, 73/23/EEC and amendment 93/68/EEC, and

EMC Directive 89/336/EEC and amendments 91/263/EEC 92/31/EEC and 93/68/EEC.

To the best of my knowledge and belief these units conform to these directives.

ISO 9001 CERTIFIED

This Declaration is controlled under an ISO 9001:1994 system certificated by BSI Quality Assurance, certificate number FM13585.

Signature	
Name	B C Coombes
Position	Quality Manager
Issue 3	29/07/98

Introduction

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

Warning

HIGH TEMPERATURES ARE DANGEROUS: they can cause serious burns to operators and ignite combustible material.

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

- USE CARE AND WEAR PROTECTIVE GLOVES TO PROTECT HANDS;
- DO NOT put hot objects on or near combustible objects;
- DO NOT operate the unit close to inflammable liquids or gases;
- DO NOT place any liquid directly in your unit;
- At all times USE COMMON SENSE.

Operator Safety

All users 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 user may be impaired.

All Techne units have been designed to conform to international safety requirements and are fitted with an overtemperature 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 preset 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

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. Connect the mains cable to a suitable plug according to the table below. **Note that the unit must be earthed to ensure proper electrical safety.**

Connections	*220/240V*	*110/120V*
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:

230V UK 10 AMP

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%. The rating plate is on the rear of the unit.

3. Plug the mains cable into the socket on the rear of the unit.
4. Place the unit on a suitable bench or flat workspace, or in a fume cupboard if required, ensuring that the air inlet vents on the underside are free from obstruction.
5. Note that the folowing 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

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

I : mains switch On

O : mains switch Off

After use

When you have finished heating samples, remember that parts of the unit – the tubes, blocks and associated accessories – may be very hot. Take the precautions listed earlier.

Guarantee

The unit is guaranteed against any defect in material or workmanship for the period specified on the enclosed guarantee card. This period is from the date of purchase, and within this period all defective parts will be replaced free of charge provided that the defect is not the result of misuse, accident or negligence. Servicing under this guarantee should be obtained from the supplier.

Notwithstanding the description and specification(s) of the units contained in the Operator's Manual, Techne (Cambridge) Limited hereby reserves the right to make such changes as it sees fit to the units or to any component of the units.

This Manual has been prepared solely for the convenience of Techne (Cambridge) Limited customers and nothing in this Instruction Book shall be taken as a warranty, condition or representation concerning the description, merchantability, fitness for purpose or otherwise of the units or components.

User maintenance

NOTE THAT THIS EQUIMENT SHOULD ONLY BE DISMANTALED BY PROPERLY TRAINED PERSONNEL.

REMOVING THE SIDE, FRONT OR REAR PANELS EXPOSES POTENTIALLY LETHAL MAINS VOLTAGES.

THERE ARE NO USER 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 responsibilty for damage to units which are not properly packed for shipping: if in doubt, contact your supplier. See the De-contamination Certificate supplied with your unit.

1. Cleaning

Before cleaning your unit ALWAYS disconnect from the power supply and allow 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.

2. Fuses

Your unit is protected by one or two fuses. These should only be changed by suitably qualified personnel.

If the fuses blow persistently, a serious fault is indicated and you may need to return the unit to your supplier for repair.

Contact Information

For technical, sales or servicing information, contact your local Techne dealer or,

Techne (Cambridge) Limited,
Duxford, CAMBRIDGE, CB2 4PZ, United Kingdom.
Telephone: 01223 832401
Telefax: 01223 836838
Service: 24 hour answer machine, telephone or fax 01223 836950
E-Mail: sales@techneuk.attmail.com

or,

Techne Incorporated, University Park Plaza,
743 Alexander Road, Princeton, New Jersey,
08540-6328, USA.
Telephone: (609) 452-9275
Toll free: 1-800-225-9243
Telefax: (609) 987-8177
E-Mail: techneusa@worldnet.att.net

Joint Web site: http://www.techneuk.co.uk/

Introduction

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

Avertissement

DANGER DE TEMPERATURES ELEVEES : les opérateurs peuvent subir de graves brûlures et les matériaux combustibles risquent de prendre feu.

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 :

- PROCEDER AVEC SOIN ET PORTER DES GANTS POUR SE PROTEGER LES MAINS.
- NE PAS poser d'objets chauds sur ou près de matériaux combustibles.
- NE PAS utiliser l'appareil à proximité de liquides ou de gaz inflammables.
- NE PAS verser de liquide directement dans l'appareil.
- FAIRE TOUJOURS PREUVE DE BON SENS.

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-réglée 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

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

Connexions	220/240 V	110/120 V
Phase	Marron	Noir
Neutre	Blue	Blanc
Terre	Vert/juane	Vert

Le fusible de la prise fournie avec le câble électrique pour une utilisation au Royaume-Uni est destiné à la protection du câble:

230 V Royaume-Uni 5 A

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, le 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 sont 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

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

Après utilisation

Lorsque vous avez fini de chauffer les échantillons, n'oubliez pas que certaines parties de l'appareil - les éprouvettes, leurs supports et autres accessoires - risquent d'être très chaudes. Il est donc recommandé de toujours prendre les précautions citées plus haut.

Garantie

L'appareil est garanti contre tout défaut ou vice de fabrication pour la durée figurant sur la carte de garantie, à compter de la date d'achat de l'appareil. Au cours de cette période, toutes les pièces défectueuses seront remplacées gratuitement, dans la mesure où la défaillance n'est pas due à une mauvaise utilisation, un accident ou une négligence. Toute réparation sous garantie sera effectuée par le fournisseur.

Malgré la description et les spécifications de l'appareil données dans le manuel de l'utilisateur, Techne (Cambridge) Limited se réserve le droit d'effectuer les changements nécessaires à l'appareil ou à tout élément qui entre dans sa composition.

Ce manuel a été exclusivement rédigé à l'attention des clients de Techne (Cambridge) Limited, et aucun élément de ce guide d'instructions ne peut être utilisé comme garantie, condition ou représentation concernant la description, commercialisation, adaptation aux conditions d'utilisation ou autre des appareils ou de leurs composants.

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. Voir le certificat de décontamination livré avec le produit.

1. 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.

2. 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.

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.

Warnung

HOHE TEMPERATUREN SIND GEFÄHRLICH: sie können dem Bediener ernsthafte Verletzungen zufügen und brennbare Materialien können sich leicht entzünden.

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:

- SEIEN SIE VORSICHTIG UND TRAGEN SIE SCHUTZHANDSCHUHE
- Legen Sie heiße Gegenstände NICHT auf oder in die Nähe von leicht brennbaren Materialien; vermeiden Sie Arbeiten in der Nähe von leicht entzündbaren Flüssigkeiten oder Gasen.
- Bringen sie KEINE Flüssigkeiten direkt in Ihr Gerät.
- Benutzen Sie immer den normalen Menschenverstand

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

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

Verbindungen	*220/240V*	*110/120V*
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 Entlüftungsrippen an der Geräteunterseite immer frei zugänglich sind.
5. Wenn die Anzeigenlämpchen an der Vorderseite leuchten, hat dies folgende Bedeutung:

   ~ : Gerät ist eingeschaltet

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

   I : An

   O : Aus

Nach dem Gebrauch

Vergessen Sie nicht, daß Teile des Gerätes (die Gefäße, die Blöcke und andere Zubehörteile) nach dem Erhitzen von Proben noch sehr heiß sein können. Bitte beachten Sie die oben genannten Vorsichtsmaßnahmen.

Garantie

Die Garantiedauer des Gerätes ist auf der beiliegenden Garantiekarte angegeben und schließt Fehler im Material oder der Verarbeitung ein. Die Garantiedauer beginnt am Tag des Einkaufs. Sämtliche defekte Teile werden innerhalb dieses Zeitraumes kostenlos ersetzt unter der Voraussetzung, daß dem Defekt keine unsachgemäße Handhabung, Fahrlässigkeit oder ein Unfall zugrundeliegt. Der unter diese Garantie fallende Service wird vom Lieferanten geleistet.

Ungeachtet der in dieser Gebrauchsanweisung enthaltenen Beschreibungen und Spezifikationen, behält sich Techne (Cambridge) Limited hiermit das Recht vor, Änderungen an den Geräten bzw. an einzelnen Geräteteilen durchzuführen.

Diese Gebrauchsanleitung wurde ausschließlich dazu erstellt, um Kunden die Handhabung der Techne-Geräte zu erleichtern. Nichts in dieser Gebrauchsanleitung darf als Garantie, Bedingung oder Voraussetzung verstanden werden, sei es die Beschreibung, Marktgängigkeit, Zweckdienlichkeit oder sonstiges bezüglich der Geräte oder deren Bestandteile.

Wartung durch den Bediener

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

DURCH ENTFERNEN DES GEHÄUSES 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 übernnehmen. Setzen Sie sich im Zweifelsfall mit Ihrem Lieferanten in Verbindung. Bitte beachten Sie die Entgiftungsbescheinigung, die Sie mit dem Gerät erhalten haben.

1. 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.

2. Sicherungen

Die Stromzuleitung ist durch ein oder zwei Sicherungen geschützt. Diese sollten nur durch qualifiziertes Fachpersonal ausgetauscht werden. 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.

Aviso

LAS TEMPERATURAS ELEVADAS SON PELIGROSAS: pueden causarle graves quemaduras y provocar fuego en materiales combustibles.

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:

- EXTREME LAS PRECAUCIONES Y UTILICE GUANTES PARA PROTEGERSE LAS MANOS;
- NO coloque objetos calientes encima o cerca de objetos combustibles;
- NO maneje el aparato cerca de líquidos inflamables o gases;
- NO introduzca ningún líquido directamente en el aparato;
- UTILICE EL SENTIDO COMUN en todo momento.

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

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

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

El enchufe suministrado con el cable de alimentación viene equipado con un fusible del siguiente valor para proteger el cable:

230V Reino Unido 5AMP

El fusible una vez instalado protege tanto al equipo como al usuario.

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

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

Después de su uso

Cuando haya finalizado el calentamiento de muestras, recuerde que las piezas del equipo, tales como tubos, bloques y demás accesorios, pueden estar muy calientes. Tome las precauciones mencionadas anteriormente.

Garantía

Este aparato está garantizado contra cualquier defecto material o de fabricación durante el periodo especificado en la tarjeta de garantía adjunta. Este plazo inicia a partir de la fecha de compra, y dentro de este periodo todas las piezas defectuosas serán reemplazadas gratuitamente siempre que el defecto no sea resultado de un uso incorrecto, accidente o negligencia. Mientras se encuentre bajo garantía las revisiones las debe llevar a cabo el proveedor.

A pesar de la descripción y las especificaciones de los aparatos contenidas en el Manual del Usuario, Techne (Cambridge) Limited se reserva por medio de este documento el derecho a efectuar los cambios que estime oportunos tanto en los aparatos como en cualquier componente de los mismos.

Este manual ha sido preparado exclusivamente para los clientes de Techne (Cambridge) Limited y nada de lo especificado en este folleto de instrucciones se tomará como una garantía, condición o aseveración de la descripción, comerciabilidad o adecuación para cualquier fin específico de los aparatos o sus componentes.

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. Sírvase consultar el Certificado de Descontaminación suministrado con su aparato.

1. 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 parae evitar que caiga agua dentro del mismo. No utilice limpiadores abrasivos.

2. Fusibles

Su aparato está protegido por uno o dos fusibles. Sólo deben cambiarlos personal debidamente capacitado.

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.

THE GENIUS

Before using the Genius make sure you have read this manual carefully. If there is any doubt relating to the proper use of this equipment, the staff at Techne or your supplier will be pleased to assist you.

The Genius provides the researcher with the means of accurately controlling the temperature profile of samples. It has many scientific applications, including DNA amplification and sequencing. The Genius can cycle samples between 4°C (39°F) and 99°C (210°F).

The Genius is programmed by means of an integral keypad and LCD display. A programme, which can be recalled from memory, consists of:

- a series of specified temperatures in °C
- the times for which each specified temperature will be held (Hold Times)
- the desired heating or cooling rates, in °C/min, between each specified temperature
- whether the times and/or the temperatures are to increase or decrease when a programme is repeated.

The memory can store up to 99 programmes which can be:

- linked together
- repeated a number of times in sequence.

Unpacking

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

The Genius unit; a Power cable; a Guarantee card; a De-contamination Certificate; a Genius Reference Card.

Within the guarantee period, shown on the Guarantee Card, we undertake to supply replacements free of charge for parts which may on examination prove to be defective, provided that the defect is not the result of misuse, accident or negligence. Any instrument requiring service under this guarantee should be sent to the supplier through whom it was purchased, or, in the case of difficulty, it should be carefully packed in its original packing and consigned, carriage paid, to us. Techne takes no responsibility for returned goods damaged in transit.

Returned goods will not be processed without a Returns Authorisation Number. Call + (44) (0)1223 832401 for a number. On all correspondence, please quote the Serial Number in full and/or the Sales Order Number. **Please write the Returns Number on the outside of any packing.**

Specification

Temperature control precision	±0.1°C
Maximum Hold Time	99 hrs 59 min
Temperature accuracy	±1°C
96 x 0.2 ml micro tubes or multiwell plates*	
Typical heat up rate between 55°C and 90°C	2.3°C/sec
Maximum	2.6°C/sec
Typical Cool down rate between 90°C & 55°C	1.3°C/sec
Maximum	1.6°C/sec

40 x 0.5ml microcentrifuge tubes*	
Typical Heat up rate between 55°C and 90°C	2.5°C/sec
Maximum	2.8°C/sec
Typical Cool down rate between 90°C & 55°C	1.6°C/sec
Maximum	1.8°C/sec
Block uniformity (over full range)	± 0.6°C
Programmable ramp rate (heat or cool)	from 1°C/min to 60°C/min
Programmable ramp rate resolution	1°C
Incremental/decremental Segment Hold Time	-99 to +99sec, 1sec intervals
Incremental/decremental Temperature	-5.5°C to +5.6°C
Temperature range	4°C to 99°C
Number of Programmes	99
Number of segments per programme	50
Maximum total number of segments	247
Number of repeat cycles per programme	99
Programme to programme linking	Yes
End of programme alarm	Yes
Pause button	Yes
Auto restart	Yes
Power consumption	500W

* The Heat up and Cool down rates given are for two typical blocks with the Heated Lid switched off. For heat up and cool down rates for other blocks please contact Techne Sales Department.

Dimensions

Height	260 mm	Width	220 mm
Length	420 mm	Weight	11.3 kg

Parallel Port

An 80-column PC-compatible printer is required to print out profile data. A Centronics printer socket is provided at the rear of the unit for this purpose. When the printer is connected, profile information is printed out as the run progresses.

Serial Port

This socket is provided as an RS232 communication link. With the appropriate software you can also select programmes and remote start or stop them from a PC.

Specification for the Integral Heated Lid

Temperature range	Fixed control, at the top of the tubes, 105°C
Temperature stability	±1°C
Over-temperature cutout	Fixed at 160°C (plate temperature of 105°C, top of the tubes 105°C)
Temperature sensor	Thermistor
Heater Type	Silicone rubber mat
Heater Power	132W
Warm up time	3 min approx.

The Heated Lid only comes on if the set temperature is above 35°C

Voltage

The units marked 100V will work at any voltage between 90V and 110V.
The units marked 120V will work at any voltage between 110V and 130V.
The units marked 230V will work at any voltage between 210V and 260V.
However, the performance may not meet the above specification at the extremes of voltage.

Working conditions

The Genius is designed to work safely under the following conditions:

Ambient temperature range	5°C to 40°C
Humidity	Up to 95% relative humidity, non-condensing

Note: The control specifications are quoted at an ambient temperature of 20°C. The specification may deteriorate outside an ambient temperature range of 10°C to 30°C.

Radio frequency interference tested and passed to EN50081-1.
Immunity Tested and passed to EN50082-1

Uses of the Genius

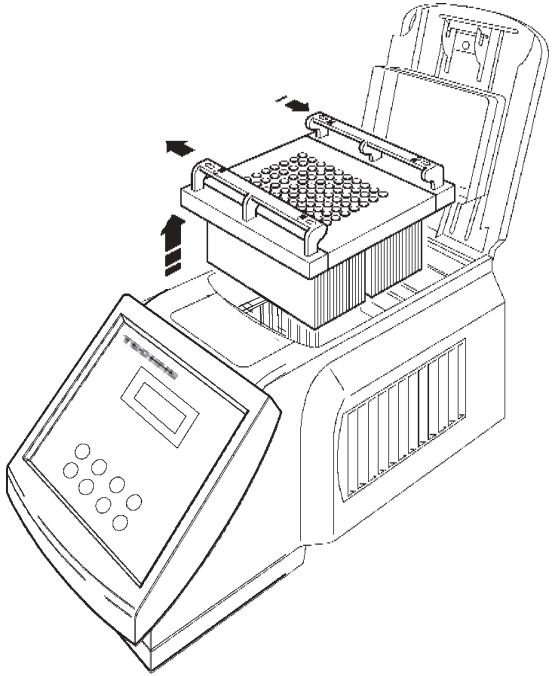
The Genius has many scientific laboratory applications, including DNA sequencing and PCR. Aspects of the PCR process are claimed in U.S. Patent Nos. 4,683,195, 4,683,202, and 4,965,188. Use of the Genius in such processes does not convey a licence to practice the processes themselves.

Block removal

The blocks can be removed for a more detailed cleaning.

Ensure that the unit is disconnected from the mains for removal of block.

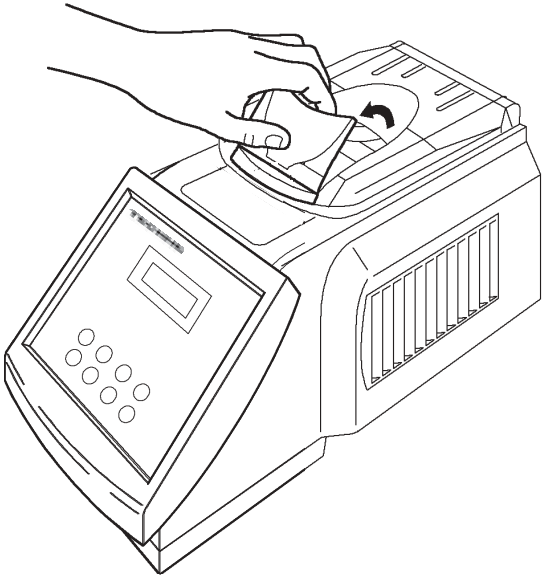
Slide the quick release handles in the direction shown above and lift the assembly out of the unit. Never lift or carry the block by one quick release handle, always use both handles or support the block underneath. When refitting the block, slide the quick release handles in the opposite direction to the above arrows to lock the block assembly into the unit.

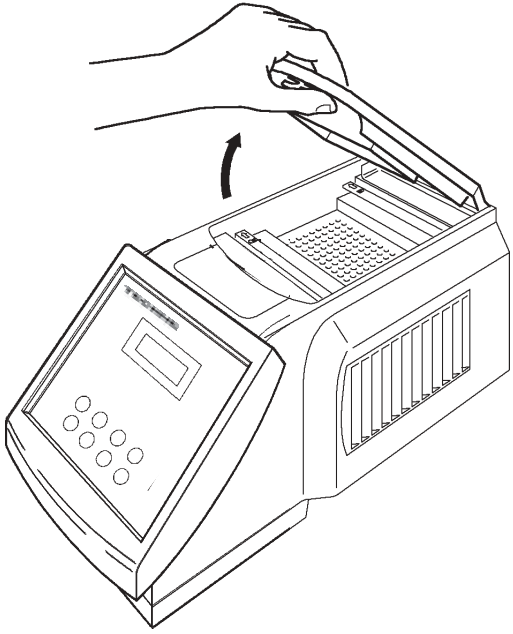


The Heated Lid

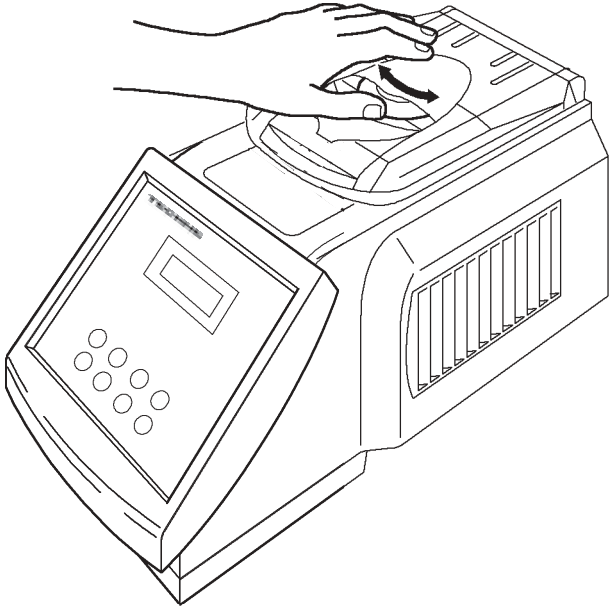
The heated lid is an integral part of the Genius. It can be switched “On” or “Off”, see ‘Program Defaults’ or ‘Editing screen’.

To open the lid lift the back of the handle as shown and use it to lift the lid. To close the lid lower the lid onto the block with the samples in and press the handle shut.





To adjust the pressure on the samples: Adjust the red rotating knob anticlockwise to give the least pressure, shut the lid and latch it. Gently rotate the knob clockwise until you can just feel pressure begining to be applied. Rotate the knob a further quarter of a turn and this will give the correct pressure. Do not over-tighten the knob as this will cause deformation of the silicone rubber membrane and reduce the effectiveness of the lid. Once the pressure has been set it does not need to be adjusted unless a different block, and hence a different type of sample holder, is used.



Tubes or Reaction Vessel

Techne does not recommend any specific tube or reaction vessel other than those described in this Manual. We recommend using reaction volumes between 10 and 200µl. The tubes must withstand a pressure of 1 atmosphere at 100°C.

To test your tubes, put 25µl of water in each of 5 tubes and subject them to a typical thermal cycling protocol. At the end of the cycle, measure the volume remaining, using a micropipet. A loss of more than 1 or 2µl indicates a vapour leak.

The amount of volume loss you observe and the change in reactant concentrations you can tolerate determine the minimum volume that can be used. Typical volume losses of 1µl in 30 cycles allow the use of samples of 10µl or less.

During the final cooldown, a ring of condensation may form above the liquid level but below the top of the sample block. This is not usually a cause for concern, as the condensation does not form during cycling.

Cleaning your Genius

Disconnect your unit from the power supply and allow it to cool to below 50°C before cleaning it.

The heat/cool block, including wells and flat surfaces, should be cleaned regularly to ensure optimum heat transfer to the samples. Always clean the block if there has been a spillage. Use a cloth or cotton buds dipped in a fresh, 50:50 water/isopropanol solution, and make sure that no deposits are left in the wells.

In the case of radioactive spillages, Techne recommend that you use a proprietary cleaning agent. Carefully follow the cleaning agent manufacturer's instructions. The heat/cool block is made of aluminium. Therefore,

an agent such as Neutracon (from Decon Laboratories Ltd.), suitable for nonferrous metals should be used but remember other parts of the unit are made of ferrous materials and may be damaged by spillage onto them.

You can clean the case of the Genius with a cloth dipped in water or ethanol (methanol or formaldehyde can also be used). No part of the case or cover should be immersed in the solvents. Do not use aggressive solvents such as acetone, or abrasive cleaners.

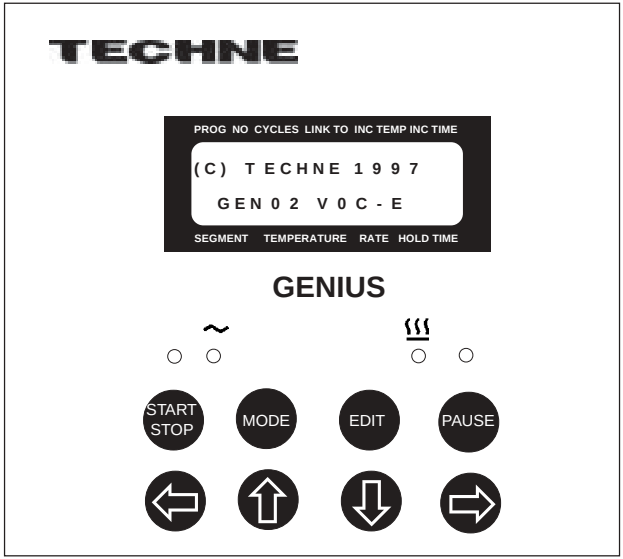
Front Panel Controls

The control panel of the Genius consists of a keypad, an alphanumeric LCD panel and four status LEDs.

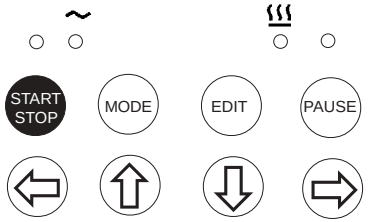
The LCD panel can display two lines of 16 characters each and shows the programmed parameters for the selected mode, or the options available for each function. In Operating mode, the top line gives the Programme data (the Header line) and the bottom line shows the Segment data (the Segment line).

The keypad consists of eight keys which 'click' when pressed. Four of these are function keys (**START/STOP**, **MODE**, **EDIT**, **PAUSE**); the others are cursor keys (**LEFT ARROW**, **UP ARROW**, **DOWN ARROW** and **RIGHT ARROW**).

A diagram of the control panel is shown here:

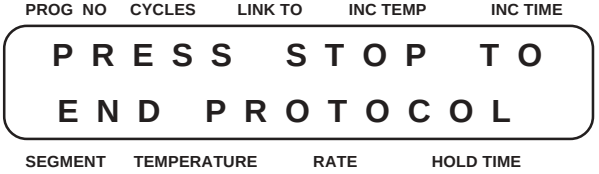


START/STOP Key



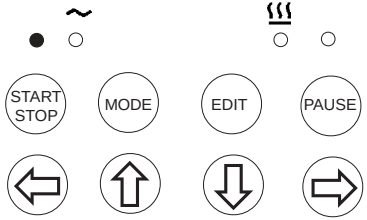
Press the START STOP key to start running the currently displayed programme.

If you press this key while a program is running, the following message appears on the screen:



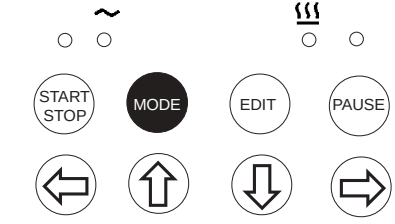
If you again press the START STOP key, the unit cancels the current function and returns to ambient temperature with the main cooling fan switched on. If you press any other key, the unit returns to the program, pressing the key once does not stop the program runnning. The double press is to ensure that you do not stop the unit inadvertantly.

The LED indicator associated with the START STOP key lights up when the programme starts; a second key press stops the programme and switches off the LED. The fan switches off automatically after five minutes.



If you wish to stop momentarily before continuing, press the PAUSE key, see below.

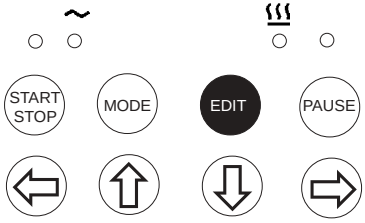
MODE Key



When you first power up the Genius, you are automatically placed in Operating mode.

Press the MODE key to switch to Options mode; press it again to return to Operating mode.

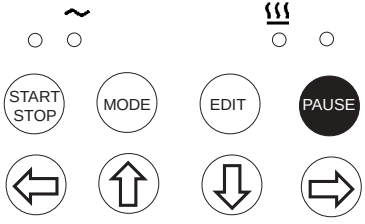
EDIT Key



The EDIT key is used in combination with the ⇧ and ⇩ keys to move between the Segment and Programme sections in Operating mode. Once you are programming a segment or programme, the EDIT key is used in combination with the ⇨ and ⇦ keys to insert or delete segments or programmes.

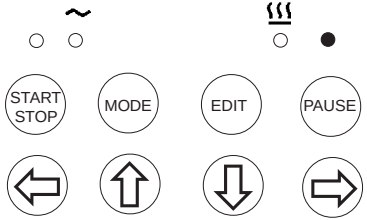
You are also sometimes prompted to press the EDIT key to confirm data you have entered.

PAUSE Key



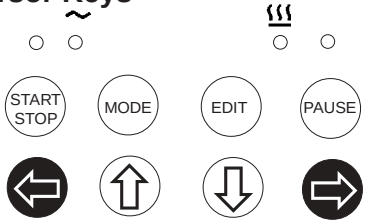
The PAUSE key is only active while a programme is running. When you press this key, the unit temporarily stops and maintains the block at its current temperature, until you press PAUSE again to resume.

Note that you may only use this key in Operating mode while a programme is running.



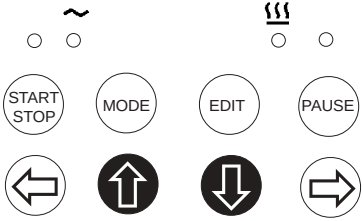
The LED indicator associated with the PAUSE key lights up when the key is first pressed. A second key press cancels the action and switches off the LED.

Cursor Keys



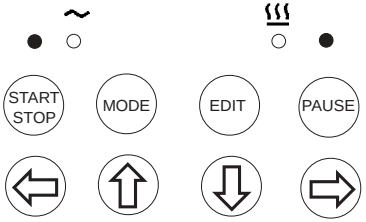
Press the ⇦ and ⇨ keys to move between fields.

Press the ⇧ and ⇩ keys to select a required value. A single key press increases/decreases the value by one. A three speed scroll is used on each digit except the programme number, so hold the key down to move through the numbers more quickly. The programme number can only be increased one at a time.

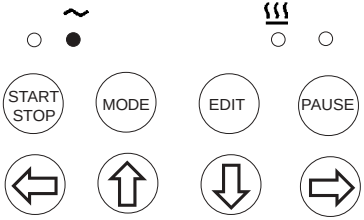


LEDs

There are two red indicators to show that the START STOP or the PAUSE keys have been pressed.

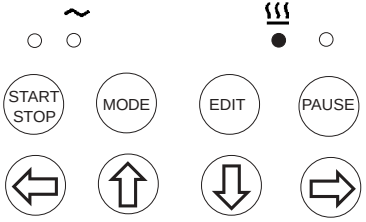


There are two other LED's.



A green one to show that the power is on.

The other to show that the unit is heating (yellow) or that the unit is cooling (green).

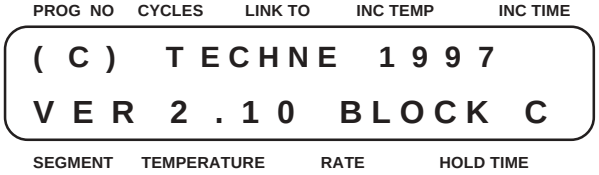


Sounder

The Genius is fitted with a sounder to give audible warnings of errors. A 'beep' is heard whenever an illegal key-press is made. If the unit discovers a fatal error, a long beep is emitted. (See the section on Warnings and Messages.)

Switching On

When the power is switched on, a copyright/version notice similar to the one below is displayed:



The version and suffix ‘C’ will vary depending upon the version of the software and the block type.

Note: The version number must always be quoted, together with the unit serial number, when contacting Techne for service.

The Genius may be used in one of two main modes: Operating and Options.

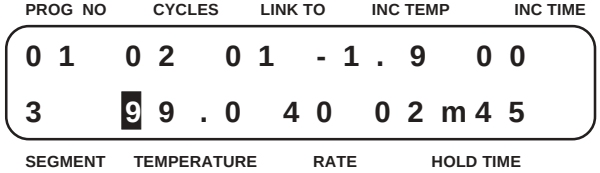
The information displayed on the LCD panel tells you the state of the unit, whether it is currently running a programme, or waiting for you to press a key from the keypad.

When the unit is switched on it is automatically placed in Operating mode and displays the last used programme on the LCD panel. You can move to the Options mode, provided a programme is not running, by pressing the MODE key. (See the section headed ‘Options mode’ later in this manual.)

OPERATING MODE

In Operating mode, the user writes programmes which control the block. When you switch on the Genius, you are automatically put into Operating mode.

The panel displays the last used programme and will look something like this:



The top line of the LCD display shows the Programme data (the Header line) and the bottom line shows the Segment data (the Segment line).

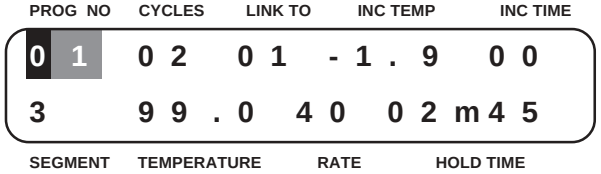
You can run this programme as it stands or alter any of its components, or you can select another programme.

Programmes

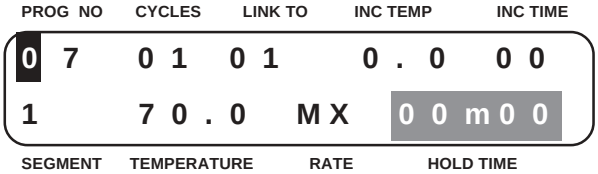
A programme may contain up to 50 segments. Each Segment can be assigned its own Set Point Temperature, Ramp Rate and Hold Time. The Hold Time and Temperature of each segment may be automatically incremented or decremented between consecutive Cycles. A programme can be made to run a group of segments in sequence, for a specified number of Cycles, before linking to another programme, or finishing.

Creating a programme involves editing both Segment data and Programme Header data. First choose a programme you wish to edit, then set up the segments, followed by the Header.

To choose a programme number you need to place the cursor on the Programme Number field. Hold down the EDIT key then press the ⇧ key. Use the ⇩ key to move between adjacent fields until you are on the Programme number field.



Once in the Programme Number field use the ⇧ or ⇩ key to move through the programmes until you reach the one you wish to edit. If you wish to move to the next free programme, choose one with a Segment 1 Hold Time of **00m00**. This is the next available programme. For example:



The next sections detail how to edit Segments and Headers.

Programming the Segments

For each segment you must put in the Set Point Temperature, the Heating or Cooling Rate and the length of time to hold (the Hold Time) at the Set Point Temperature. Note that if you exceed the preset maximum or minimum the value will simply roll round to the next valid number.

Segment Number

If the cursor is not on the segment line hold down the EDIT key and press the ⇩ key.

If the cursor is not on the segment number press the ⇦ key to move to it.

The first segment number is always set as 1. After you have completed all the fields, the next segment number is generated automatically by the software.

Press the ⇨ key to move on to the next field.

Set Point Temperature

When programming a new segment, the default is set at 70°C.

To change the number, use the ⇧ or ⇩ keys as appropriate.

Press the ⇨ key to move on to the next field.

Delayed Start Facility

As you scroll round, you will find that between 4.0 and 99.0 the field is filled with 'DLAY'.

This gives you the ability to delay the start of the program to allow the Heated Lid to get to temperature before the sample is heated. In segment 1, set the Temperature to 'DLAY' and add a hold time, see a following section. When you press the START STOP button, the unit will switch on the Heated Lid for the time you set, the block will not be switched on. The program will go on to segment 2 when the time has elapsed.

Press the ⇨ key to move on to the next field.

Ramp Rate

Ramp rate is the term used to denote the heating or cooling rate in degrees per minute. When programming a new segment, the default is set at **MX** (maximum rate).

To change the number, use the ⇧ or ⇩ keys as appropriate.

Press the ⇨ key to move on to the next field.

Hold Time

Before you can get a programme to run you must set a valid time the programme should hold the Set Point Temperature once it has been reached. When programming a new segment, the default is set at 00m00.

For Hold Times of less st second and the display shows minutes and seconds (s

For Hold Times of more est minute and the display will show only hours and mi curate to one second:

When the Hold Time reduces to less than one hour, the display changes back to show minutes and seconds.

Press the ⇧ or the ⇩ key to select the appropriate Time.

If you require Increment/Decrement Time or Increment/Decrement Temperature follow the next sections.

If not press the ⇨ key to accept the set values for the Segment. Then follow the section ‘Further Segments’.

Programmable Pause

This gives you the facility to program a 'Pause' into a program, for example if you need to add, change or remove something for the protocol.

If you set the Hold Time to 'Pause' the unit will reach the set temperature for the segment and it will hold that temperature.

When the block is at the set temperature the unit will 'Bleep' once every four seconds. Press the PAUSE key once and the 'Bleep' will stop. Do whatever the protocol calls for and press the PAUSE key again. The unit will now continue on to the next segment of the program.

If you set the Hold Time to 'Hold' the unit will reach the segment set temperature and then hold that temperature. Press any button and the unit will allow the block to return to ambient temperature naturally and the display will return to the first screen of the program. Any further segments will be ignored, a 'Hold' is the end of the program.

If you have chosen DLAY in the Temperature field you will not be able to choose 'Pause' or 'Hold' in the Time field. That would mean that you had set the unit to delay the start for an indefinite time which would mean that it would never start. If you choose 'Pause or 'Hold' in the Time field you cannot then set Delay in the Temperature field for the same reason.

If you require Increment/Decrement Time or Increment/Decrement Temperature follow the appropriate sections.

If not press the ⇨ key to accept the set values for the Segment. Then follow the section 'Further Segments'.

Increment/Decrement Temperature

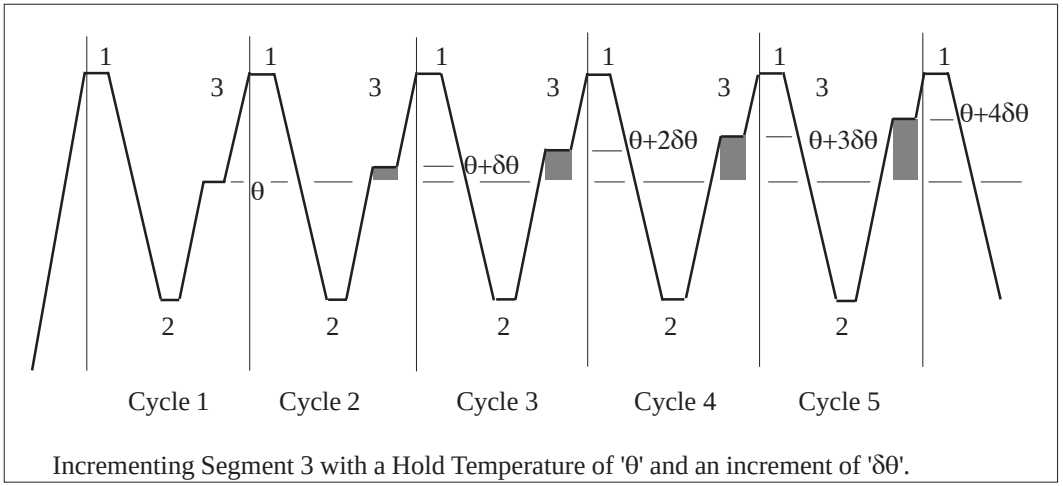
Under normal circumstances, the Hold Temperature of all segments is constant. However, it is possible to automatically increment or decrement the temperature of a specified segment of a programme by indicating an increment/decrement value in tenths of a degree in this field.

If you require Increment/Decrement Temperature, hold down the EDIT key and press the ⇧ key.

Press the ⇦ key to move onto the Inc Temp field.

Press the ⇧ or ⇩ keys as appropriate to give the increment or decrement required.

The Hold Temperature of the incremented/decremented segment is the defined Hold Temperature plus the summation of the increments/decrements. The first cycle is never incremented/decremented, only subsequent Cycles. If you select a decrement, the Hold Temperature is prevented from falling below 4°C. If you select an increment, the Hold Temperature is prevented from rising above 99°C.



Incrementing Segment 3 with a Hold Temperature of 'θ' and an increment of 'δθ'.

Increment/Decrement Time

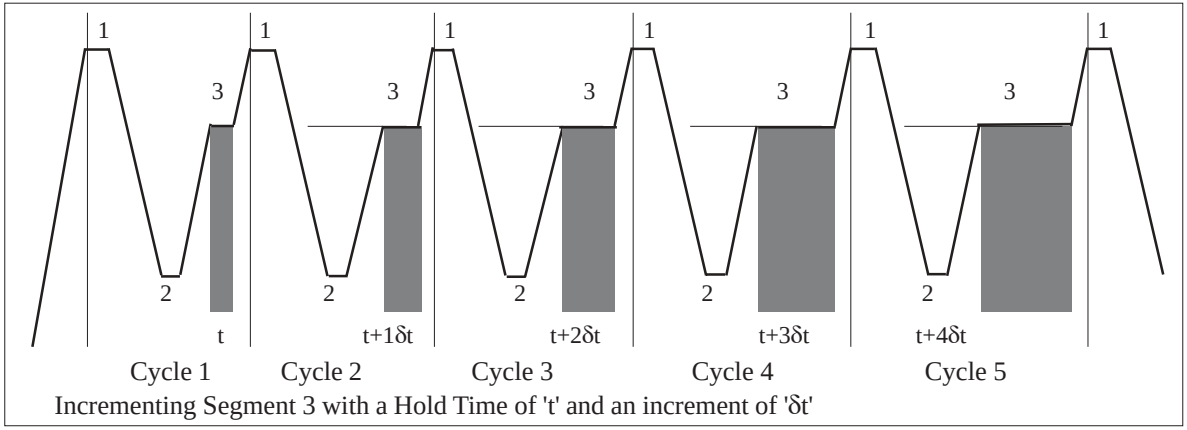
Under normal circumstances, the Hold Time of all segments is constant. However, it is possible to automatically increment or decrement the duration of a specified segment of a programme by indicating an increment/decrement value in seconds in this field.

Press the ⇨ key to move onto the Inc Time field.

PROG NO	CYCLES	LINK TO	INC TEMP	INC TIME
0 1	0 1	E	0 . 0	0 0

Press the ⇧ or ⇩ keys as appropriate to give the increment or decrement required.

The Hold Time of the incremented/decremented segment is the defined Hold Time plus the summation of the increments/decrements. The first cycle is never incremented/decremented, only subsequent Cycles. If you select a decrement, the Hold Time is prevented from falling below one second.

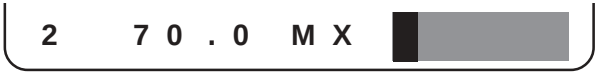


Incrementing Segment 3 with a Hold Time of 't' and an increment of 'δt'

Hold down the EDIT key and press the ⇩ key to move the cursor to the Hold Time field. Press the ⇨ key to accept the Segment with the values set, then follow the next section.

Further Segments

Follow the procedure described above to set values for as many segments as necessary (up to nine). To indicate the final segment in any programme, accept the default value of 0 as the Hold Time by pressing the ⇨ key when you get to this fie



It is important to note, however, that if the time field is altered, you cannot use the ⇧ or ⇩ keys to get it back to 0. This is a safety feature that has been included to avoid accidentally ending a programme. If you make a mistake or you wish to insert or delete segments in a programme, follow the instructions below.

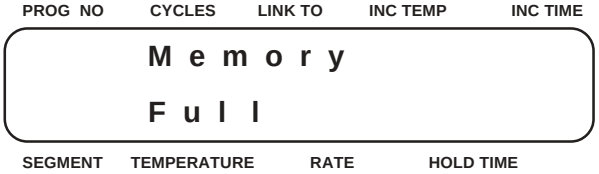
If you require more than fifty segments, follow the procedure above but when you edit the Header put Link To a second programme. Then set up the second programme. See Page 40.

Adding a Segment

To insert a segment into an existing programme, make sure you are in Operating mode with the cursor on the segment number immediately before the one you wish to insert.

For example, if the cursor is on segment number 3, the new segment will be numbered 3 and the former 3 becomes 4. You may only insert a new segment prior to one that has already been programmed.

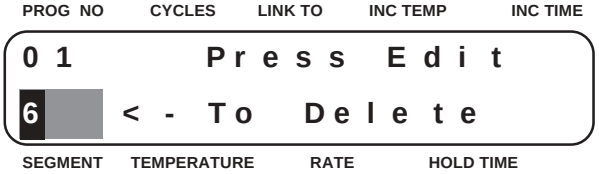
Hold down the EDIT key, then press the ⇨ key to insert the new segment. Follow the normal procedure to programme it. If you make a mistake or change your mind, follow the procedure described below to delete the segment. If you try to insert a new segment and the maximum number of segments already exists, a beep is heard and the following error message is displayed:



You must delete an existing segment before inserting a new one. Press any key to clear the screen.

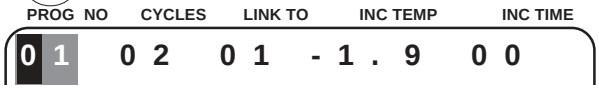
Deleting a Segment

To delete a segment from an existing programme, make sure you are in Operating mode and the cursor is on the Segment Number you wish to delete. Hold down the EDIT key, then press the ⇦ key. A message appears asking you to confirm the deletion:



Press the EDIT key to delete the segment. If you have made a mistake or change your mind, press any other key to clear the display and continue.

Hold down the EDIT key and then press the ⇧ key to move to the Header line. If the cursor is not on the programme number use the ⇦ key to get there.



A Programme Header consists of a Programme Number, the number of Cycles to run and the number of the programme to which it should be linked (if any).

If, at any time, you do not want to change anything else in the Header but you need to programme more segments, hold the EDIT key down and press the ⇩ key. Then continue as for programming a segment.

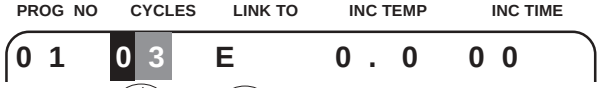
The Programme Number

If the programme selected is new, the Header is preset for one unlinked cycle. For simple programmes, this means that it is not necessary to programme the Header.

Change the number by pressing the ⇧ or ⇩ keys. Should you have pressed the ⇦ key too often when getting onto the programme number, you may not be able to change the programme number. In this case press the ⇨ key and you should be able to continue. If you increase the number beyond 99, the Programme Number rolls back round to 1. In the same way, if you decrease the number below 1, the Programme Number rolls back round to 99. When you have the correct number, press the ⇨ key to move to the next field.

Cycles

The default is 1; the maximum number of Cycles possible is 99.



Change the number by pressing the ⇧ or ⇩ keys.

When you have the correct number of cycles, press the ⇨ key to move to the next field.

Link To Programme

Once a programme has run for the correct number of Cycles, it may be linked to another programme by specifying its number in the Link To field.

To link one programme to another, enter the number of the next programme to run by pressing the ⇧ or ⇩ keys. Any number between 1 and 99 may be entered, provided the corresponding programme exists.

Programmes may also be linked to themselves to create an endless loop. The programme will run indefinitely. To do this, enter the current programme number in the Link To field.

The final programme of a linked list of programmes should be set to Link To **'E'** in the Header to finish the run.

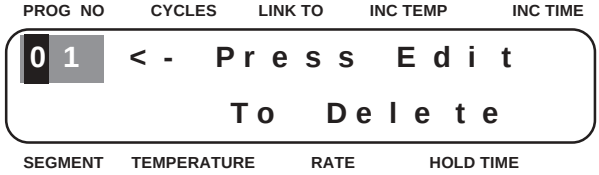
If linking is not necessary, accept the default of **E** by pressing the ⇨ key to move to the Increment field.

The Increment Temperature and Increment Time are described as part of the segment, see pages 35 and 36.

If you have finished programming the unit go to the section 'Running a Programme' below.

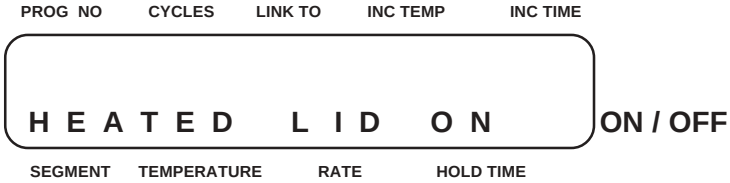
Deleting a Programme

To delete an existing programme, make sure you are in Operating mode, and the cursor is on the programme number you wish to delete. Hold down the EDIT key and press the ⇦ key. A message appears asking you to confirm the deletion:

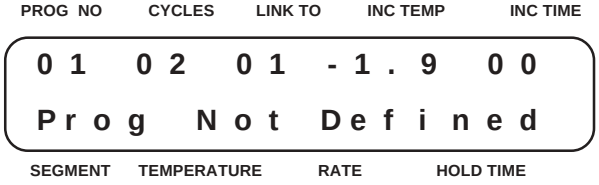


Press the EDIT key to delete the programme. The deleted programme will return to default values of 1 segment and 1 unlinked cycle with an increment/decrement of 0.

If you want to run a particular programme have the programme number on display then press the START STOP key. The following message appears on the display:



If the selected programme has no defined segments, the following error message appears on the display.

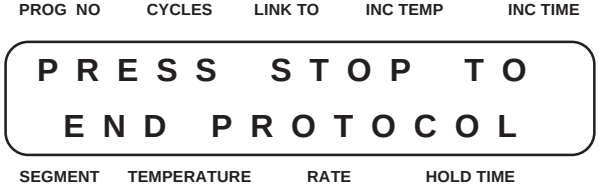


Press any key to clear the screen. Move to the Programme Number field and use the ⇧ and ⇩ keys to select an existing programme to run.

As the unit runs, the programme line shows the number of the current programme, the number of remaining Cycles, the next programme to Link To (or ‘E’nd) and the increment/decrement temperature and the increment/decrement time for the specified segment. The segment line shows the current sample temperature, the current Heating Rate and the time remaining before the end of the segment.

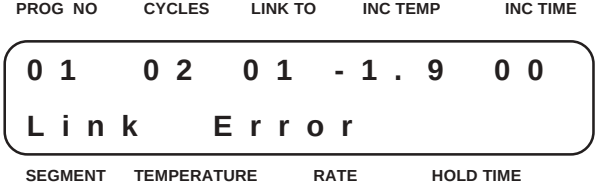
The Hold Time will start to count down when the sample temperature gets to within 0.5°C of the Set Point temperature. When the Hold Time reaches zero, the segment ends. The unit will then run the next segment (if any), the next cycle (if any), the linked-to programme (if any), or the run will end.

If you do not wish to continue the run, you may stop it at any time by pressing the START STOP key. The following message is displayed and the unit is brought back to ambient temperature.

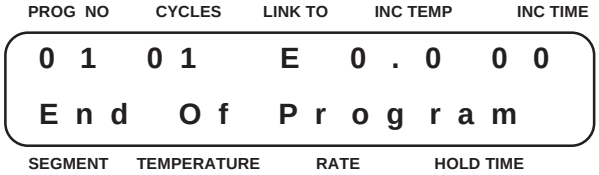


Press the START STOP key to stop the unit, see page 24. The unit remains in Operating mode.

When all the segments have been run, the programme links to the programme specified in the Header, if any. If this programme has no segments, the following message appears, the unit automatically stops and the programme run ends.



A programme is completed when all the segments have been run and no link is found to another programme. At this point, the sounder beeps fifty times and the LCD displays the message:



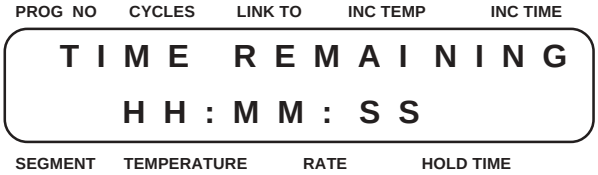
Press any key to stop the beeps and clear the message. The unit then cools to near ambient temperature. If the Genius is required to run at ambient temperature, note that the minimum temperature obtainable will be within 1°C of ambient after six minutes. The unit remains in Operating mode.

The fan remains on for five minutes and then switches off automatically.

Time to Complete

The calculation of the program run time, either to the program end or to the first programmed pause, is made as soon as the START STOP key is pressed. This is done by adding together the hold times for all these segments in the program and calculating the ramp times by adding the total temperature excursion, up and back, during the cycle. This assumes an average ramp rate of one degree per second. This gives a time for each program cycle which is stored and allows a total run time to be calculated The function provides the time to complete for all linked programs.

Pressing the MODE key brings up a display similar to this



This will display for approximately 5 seconds and then the display reverts to the normal running screen.

As the Genius runs, profile information is sent to the parallel printer port. This information defines the times and temperatures at various points during the run. A range of events creates data which is used to create a profile of the run.

If you require printed output, make sure that the printer is plugged in and set on line *before* pressing the START STOP key.

If the printer subsequently goes off line, the Genius will attempt to send data to the printer but will not succeed. A short time-out of about three seconds will elapse before the Genius gives up trying. The remainder of that event's data is then discarded. The Genius will attempt to communicate with the printer on the next event. Each event that cannot be printed causes the sounder to beep, giving the user an indication that the printer is off line.

If a printer is *not* connected or is *off-line* when the START STOP key is pressed, then the unit does not attempt to output to it even if a printer is subsequently plugged in. If the printer is unable to accept the incoming profile data for any reason, the data is lost. However, the operation of the Genius is not impeded by a non-functioning printer.

Note that profiles cannot be printed out during calibration.

The events which are used to generate profile information are:

Start key	A Start of programme event is generated on first pressing the START STOP key.
Stop key	A subsequent press of the START STOP key stops a run prematurely. This event generates a printer form feed.

Start of programme	Whenever a new programme starts. This event generates a Start of cycle event.
Start of cycle	Whenever the current programme starts a new cycle. This event generates a Start of Segment event.
Start of segment	Whenever a new segment starts.
Start of Hold Time	Whenever the current segment reaches the Hold Time window.
End of programme	Whenever the run ends due to the programme finishing. This event generates a printer form feed.
Pause on	Whenever the PAUSE key is first pressed to pause a running programme.
Pause off	Whenever the PAUSE key is subsequently pressed to end a pause period.
Link error	When the run comes to an end due to a Link error. This event generates a printer form feed.
O R or U R	When a fatal error is detected, due to either the temperature sensor going open circuit or short circuit, or if the unit goes over the maximum permissible temperature.

A printed profile is 80 columns wide and uses only standard characters in the ASCII range 1 to 127: thus all common dot matrix, pin fed, continuous stationery printers can be used.

An example of a typical printed profile is shown here:

TECHNE GENIUS
BLOCK TYPE B VERSION GEN 01V04
11th September 1996

TEMPERATURE UNITS: deg C

PROGRAM: 3
CYCLES: 20
LINK TO: 1

CYCLE 1

SEG. NO	START TIME	START TEMP	RATE	TEMP INC.	HOLD TIME INC.	HEATING COOLING TIME	SET PT START TEMP.	HOLD TIME	SET PT. END TEMP.
1	00:00:00	31.3	+60	0.0	00	00:01:11	98.5	00:00:30	99.0
2	00:01:41	99.0	-50	+1.0	10	00:00:56	55.5	00:00:30	55.0
END	00:02:07								

Events other than End of programme would produce the following type of lines:

PAUSE	00:03:34								
STOP	00:03:45								

and so on.

Note the following:

- The second line shows the block type detected and the software version number.
- At the start of every programme (i.e. when the start button is pressed or due to a link), the programme header data is displayed. This consists of the programme number, the programmed number of cycles and the link to programme number.
- At the start of each cycle, the cycle number is shown.
- The start time is the total elapsed time since the start key was pressed. Therefore, the first start time is always zero.
- The heating time is the time calculated from the start of the segment until the sample temperature reaches the Hold Time window.
- The Hold Time is the time calculated from the start of the hold until the start of the next segment or the end of the programme.
- The Rate is prefixed with either a '+' or '-' to indicate a heating (+) or cooling (-) segment.

Communicating with the Genius via a Computer

A "Gensoft" software package is available that enables the Genius to be connected to a computer via an RS232 port. "Gensoft" offers:

A Daisy chaining a number of units together to a maximum of 32 units

B Creation of thermal cycling protocols through as easy to use Microsoft Windows user interface and transmitting them to one or more units.

C Selection of units to start and stop a program

D Diagrammatic status of all units connected, including information on the current position in the protocol of each individual unit and the time remaining.

F Print out of the protocol in a diagrammatic format together with associated notes page.

If you are driving one unit only you will need:

FGEN232 An RS232 cable set which includes; a cable, the software on disc and an instruction sheet.

If you are driving two or more units then you will need:

FGEN485D A 230V UK power pack set.

FGEN485E A 230V European power pack set.

FGEN485P A 120/100V USA power pack set.

A power pack set includes: the connection to a computer which also converts to RS485; a power pack; the necessary cables; a termination box; and the software on disc with an instruction sheet.

and one or more of the following:

FGENTWO A two unit set which incudes: Two connectors for the Genius's and a cable to connect them.

FGENFIVE A five unit set which includes: Five connectors for the Genius's and four cables to connect them.

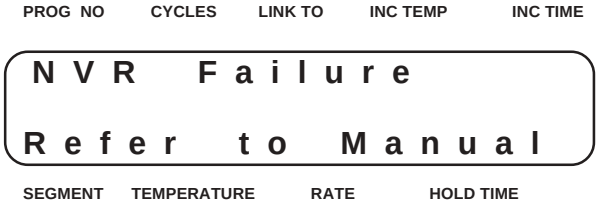
FGENTEN A ten unit set which includes: Ten connectors for the Genius's and nine cables to connect them.

FGENONE A one unit set for extending the daisy chain which includes: One connector for the Genius and one cable for connecting it to the daisy chain.

Messages are displayed on the LCD screen to give users prompts and warnings, or advise of errors or incorrect operation. There are two main sources of errors which cause a message to be displayed: incorrect user input (non-fatal errors) and system failure (fatal errors).

User Errors

These errors occur if you accidentally press the wrong key. In some cases, a beep is sounded to warn of the error. In others, a message is displayed. For example:



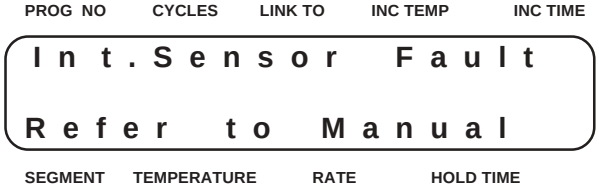
You must switch off and switch back on to clear the LCD screen and continue.

System Messages

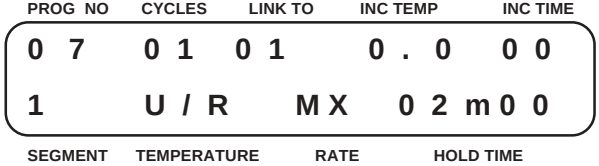
These messages inform you that certain events have taken place, for example when the end of a programme has been reached. Simply press any key to clear the message and continue.

Run Time Tests

Certain parameters are continuously checked while the Genius is running, including: Temperature sensor open circuit, temperature sensor short circuit, or a fault in the circuitry will cause the unit to stop and the following message will appear.

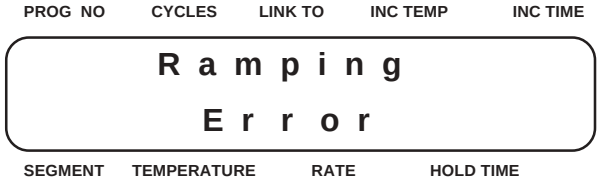


A long beep is heard and the keyboard becomes inactive. The unit is inoperative and the Genius attempts to return to ambient temperature. Switch off the unit and allow it to cool down.
If the message:



appears it means that the sensor has sensed a temperature which is 'under range'. Another message shows O/R meaning 'over range'. If either of these messages appear, switch the unit off. Press and hold the **RUN**, **EDIT** and **MODE** buttons whole you switch the unit on. Follow the instructions on the screen. If the message does not disappear send the unit to your Techne dealer or to Techne Service Department see page 61.

An additional error function will detect if the block is ramping in the wrong direction. This can occasionally happen if there is a fault on the PCB or in the block. After a fixed delay of 5 seconds from the start of a segmant running, the software will measure the difference between the starting temperature and the actual temperature. An error will be flagged if the temperature has increased by more than 2 degrees if the segment is programmed for cooling, or if it has decreased by more than 2 degrees if the segment is programmed for heating



A long beep is heard and the keyboard becomes inactive. The unit is inoperative and the Genius attempts to return to ambient temperature.

Any of these messages could mean that the sensor in the block has gone wrong or there is a fault on the PCB. If you have a spare block try, first of all, swapping the blocks except with the U/R or O/R message. If the message reappears it is likely that there is a fault on the PCB. If the message disappears then it is likely that there is a fault on the first block. Return either the block or the unit to your Techne dealer, see Page 61.

Over-temperature Cutout

Your Genius is fitted with a circuit to protect it from overheating. The unit constantly checks that the block temperature does not exceed its maximum. If for some reason this temperature is exceeded, all power to the block is cut.

You should immediately switch off the unit and allow it to cool. The unit then resets itself automatically. Check for any obvious causes of overheating before switching it back on.

Repeated cutouts indicate a serious fault and you should return the unit to your supplier for repair.

Thermal Fuse

The block is also fitted with a thermal fuse. Should the temperature rise so that this blows the unit will still indicate that it is calling for heat but the block temperature will fall.

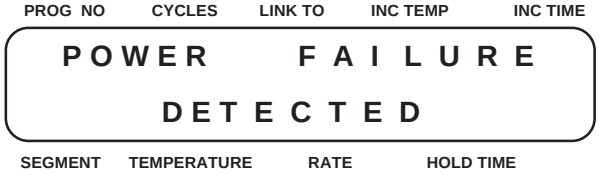
If this happens you should switch off the unit and allow it to cool. Check for obvious causes of overheating. If you have a spare block try, first of all, swapping the blocks. If the message reappears it is likely that there is a fault on the PCB. If the message disappears then it is likely that there is a fault on the first block. Return either the block or the unit to your Techne dealer or to Techne, see Page 61.

The Heated Lid Over-temperature Cutout

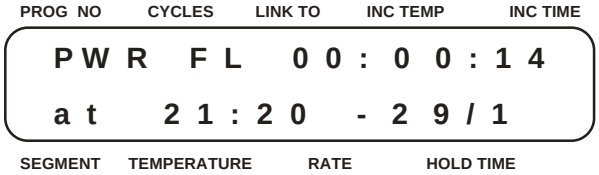
Your Heated Lid is fitted with an independent circuit to protect it from overheating. In the unlikely event of an Over-temperature problem with the lid, the unit is fitted with two thermal fuses which remove power to the heater plate should the temperature exceed 105°C.

Auto restart

If the mains supply is interrupted while a program is running the program will restart automatically when the supply returns, continuing from the point at which it was interrupted. First of all the following screen will appear temporarily:



When the restart occurs the screen display will show the date and time of the interruption, the date and time of the restart, and the duration of the break. A typical restart screen is shown below:



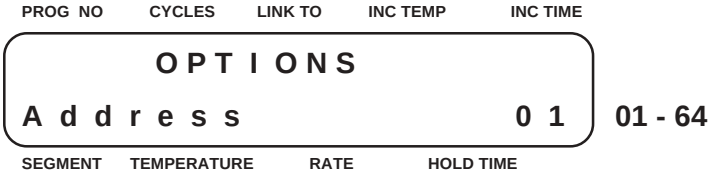
This display will remain on the screen until the MODE key is pressed. It will then revert to the Monitoring screen and show the current state of the system (the program will be running or will have completed).

To advance to the Editing menu press the MODE key.

OPTIONS MODE

Options mode allows you to set additional features, such as Printer port, printing out the 'current' programme, Date Format, Time, Date, resetting the defaults, and whether the Heated Lid is on or off.

When the unit is switched on, it automatically goes into Operating mode. Press the MODE key to move into Options mode. The following screen appears:



In Options mode, pressing the ⇨ and ⇦ keys moves you between the available features. Since it has only two lines, the display scrolls down to show the other options one at a time, in the following order:

Printer Prog YES	YES / NO
Date Format DMY	D M Y or M D Y
Time 00:00	hours : mins
DATE 01/01/97	
Reset NO	YES / NO
Heated Lid OFF	OFF / ON

In general, pressing the ⇧ and ⇩ keys toggles between available settings.

Address

This is used to set the destination address when using “Gensoft” Software, see page 50.

Printer Prog

This option allows you to print out the programme which was on the screen when you changed to Options Mode. It will print out all the settings for each of the segments of the ‘current’ programme. You must have a printer fitted before the Genius will switch between Yes or No.

Date Format

This option allows you to choose which format the date is presented in, UK dd:mm:yy or USA mm:dd:yy.

Time

This allows you to set the time.

Date

This allows you to set the date in whichever format you chose earlier.

Reset to Default Values

Warning: If you choose this option all the existing programmes and segments are erased.

All the system parameters are then reset to their original defaults values, i.e. Increment Segment to 1, and last used programme to 1.

The reset process takes several seconds, as all the existing segments and programmes must be returned to the original default values. The display indicates which programme or segment is currently being reset.

It is important not to switch off the unit during the reset process, to avoid data corruption. If the unit is accidentally switched off, switch it on and select Reset Defaults again.

When all the segments and programmes have been reset, the unit automatically restarts, as though the Genius had been switched off and then on again.

Default Values

The default values for all the fields are automatically set, and it is not possible to enter values outside the predetermined range, as listed in the following table:

Programme Header	Minimum	Maximum	Default
Programme No.	01	99	01
Cycles	01	99	01
Link To	01	99	‘E’nd
Increment/decrement Temp	-5.5°C	5.6°C	00
Increment/decrement time	-99sec	99sec	00

Segment	Minimum	Maximum	Default
Segment No.	01	50	01
Temperature	4.0°C	99°C	70°C
Heating Rate	1°C/min	60°C/min	MX
Hold Time	00m01(sec)	99h59(min)	00m00
Temperature resolution		0.1°	
Heating Rate resolution		1°/min	
Hold Time resolution (running)		1sec	
Hold Time resolution (programming)		1sec	
– Hold Time less than one hour		1sec	
– Hold Time greater than one hour		1min	
Programme capacity		247 segments	

Default values are programmed in a loop, so if you attempt to increment or decrement beyond the upper or lower limit, the values simply ‘roll’ round.

Heated Lid

This allows you to choose if the Heated Lid is on or off. The Heated Lid is automatically off if the target temperature is less than 35°C. If you have a flat block for slide applications you must choose Heated Lid OFF.

Operating Mode

To return to the Operating Mode, press the MODE key again.

ADDITIONAL INFORMATION

Brief fault finding notes and a list of replacement parts are given in this section.

NOTE THAT THIS EQUIPMENT SHOULD ONLY BE DISMANTLED BY PROPERLY TRAINED PERSONNEL. **REMOVING THE OUTER COVER EXPOSES POTENTIALLY LETHAL MAINS VOLTAGES.**
THERE ARE NO USER SERVICEABLE PARTS WITHIN THIS EQUIPMENT.

Fault Finding

Should you have any problems with your Genius which cannot be easily remedied, you should contact your supplier and return the unit if necessary. Please include 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, giving the full serial number of the unit and software version number (shown when the unit is first switched on).

Fuses

If neither the power light nor displays on the front panel are lit, one of the two fuses may have blown. Check that there is no external cause, such as a faulty plug or lead. Check both fuses and replace the faulty fuse with a new one of the correct value. (Fuse values are given on the label next to the power inlet.) Note that fuses should only be replaced by a qualified electrician.

The holder for the two fuses is built into the mains input socket. First remove the power cable, then gently prise the fuse drawer open with a flat-bladed screwdriver or similar tool.

Each fuse can be removed by using the screwdriver as a lever.

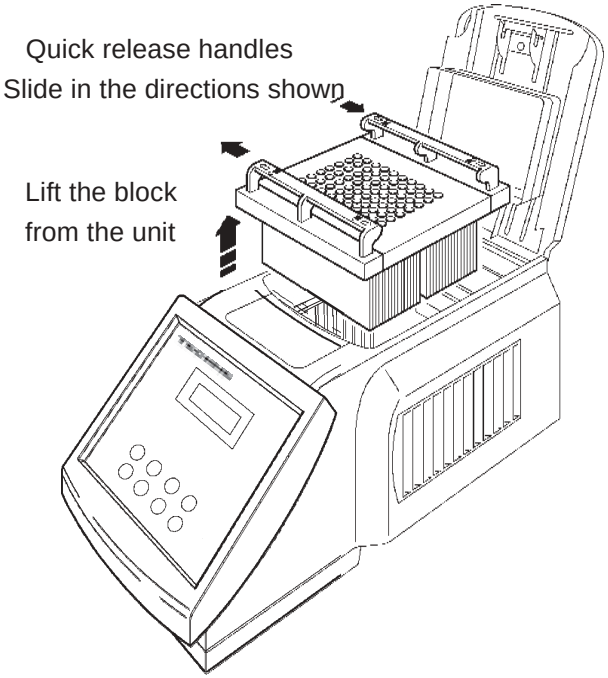
Exchange the faulty fuse in the fuse holder for a working fuse of the correct value. Finally, replace the fuse drawer in the fuse compartment and push the drawer shut.

Fuses which blow repeatedly indicate a serious fault and you should return the unit to your supplier for repair.

Insulation Testing

This equipment is fitted with RFI suppression circuitry. Any check of the electrical insulation by means of high voltage dielectric testing (for example as in BS EN 61010-1) must be carried out using only a DC voltage.

This unit contains semiconductor components which may be damaged by electric field effects.



Block removal

The blocks can be removed and exchanged for another of the same sort or of a different sort. Slide the quick release handles in the direction shown above and lift the assembly out of the unit.

Never lift or carry the block by one quick release handle, always use both handles or support the block underneath.

When refitting the block, or fitting a new one, slide the quick release handles in the opposite direction to the above arrows to lock the block assembly into the unit. The software will register the change and calibrate the unit for the new block.

Remember to adjust the options in the Options Menu for the new application.

If you have fitted the flat block for slide applications you must choose Heated Lid OFF. See the section headed Options Menu.

Accessories

The following accessories can be obtained from Techne or your Techne dealer:

Item No	Description	Quantity
FMW11	HI-TEMP 96™ Microplate	box of 25
FMITUBC	0.2ml micro tubes	125 strips of 8
FMICAPC	0.2ml micro tube caps	125 strips of 8
F96T02	0.2ml micro tubes in 96 format	pack of 25
FTG0296R	Block 0.2ml x 96 tube Robbins	1
FTG0296T	Block 0.2ml x 96 tube Techne	1
FTG0540T	Block 0.5ml x 40 tube	1
FTG02192	Block 192 well	1
FTG384WL	Block 384 well AB	1
FTG384AB	Block 384 well PF	1
FTG96WHT	Block 96 well Hi-Temp®	1
FTGFLATP	Block Flat plate (Slide plate)	1

Please Note that these blocks are for units with Serial Number/19 onwards. For units with earlier suffixes you need blocks with numbers where the 'TG' is replaced by 'GB'. If you are in any doubt please contact Techne Sales Department or your supplier.

Replacement parts

The following replacement parts can be obtained from Techne or your Techne dealer:

Item Nº	Description	Quantity required
FCABRTUK	Mains cable and plug UK 230V	1
FCABRTEU	Mains cable and Schuko plug 230V	1
FCABRTUS	Mains cable and US 3-pin plug 120V	1
FCABRTUS	Mains cable and US 3-pin plug 100V	1
6500342	Fuse T6.3A, 230V units	2
6008445	Fuse T8A, 120V units	2
6500324	Fuse T10A, 100V units	2

Block temperature	The current temperature of the heat transfer block.
Cooling Rate	The rate at which the temperature of the block decreases in degrees Celsius per minute.
Cursor	The flashing rectangle on the LCD panel which indicates in which field the next character is entered.
Cycle	One cycle is a complete execution of all segments in a programme.
Heating Rate	The rate at which the temperature of the block increases in degrees Celsius per minute.
Hold Time	The duration for which the block is maintained at a given temperature. Note that the clock counter which measures the Hold Time is started when the temperature is within 0.5°C of the Set Point Temperature.
Pause	When you press PAUSE, the programme halts but maintains the block at the temperature reached immediately before the key was pressed. If this happens while maintaining a 'target temperature', the timer is also halted. (Note that it takes several seconds for the temperature of the samples to reach equilibrium.) Press PAUSE again to continue.

Programme	A programme is made up of a sequence of segments. The sequence may be executed once or several times.
Ramp Rate	The term used to denote the heating or cooling rate in degrees per minute.
Sample temperature	The current temperature of the sample which is displayed on the LCD panel while a programme is running.
Segment	A segment is comprised of a target temperature, a Heating or Cooling Rate and a time to hold the target temperature.
Set Point Temperature	The temperature which must be reached as indicated in a programmed segment.

Programme Record Sheet

PROG NO		CYCLES		LINK TO	
SEGMENT	TEMPERATURE	RATE	HOLD TIME	INC TEMP	INC TIME
1					
2					
3					
4					
5					
6					
7					
8					
9					

Photocopying this page makes it possible to use it for several sets of programmes.