^{3}Prime, ^{3}PrimeX and ^{3}PrimeG

OPERATOR'S MANUAL

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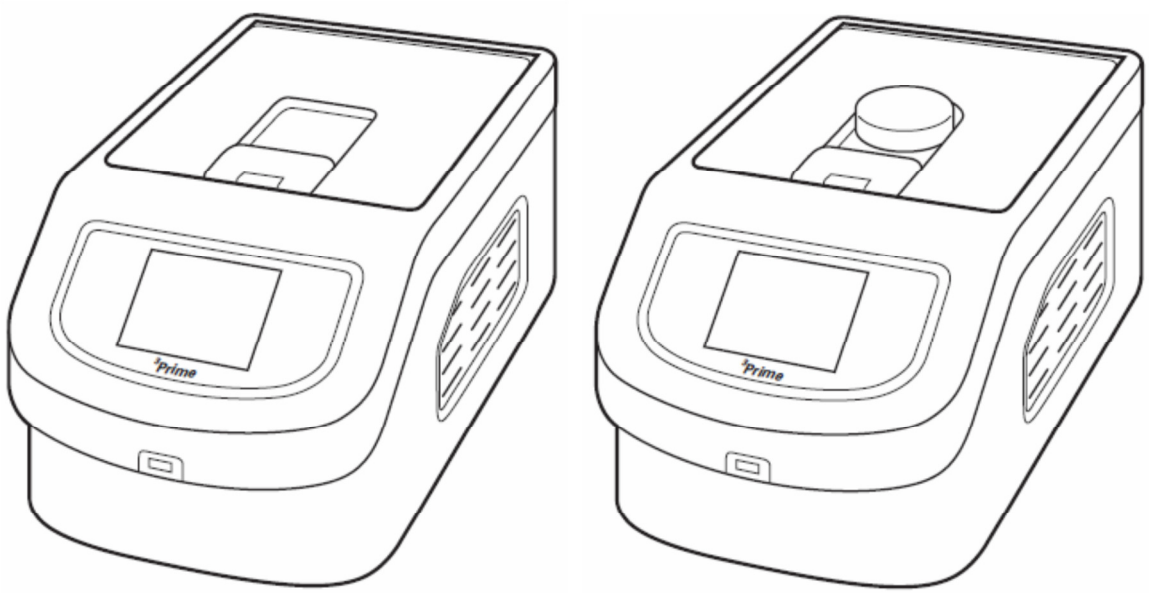
INTRODUCTION

The ^{3}Prime range is a family of personal thermal cyclers designed to accurately control the temperatures of samples between 4ºC and 100ºC. They have many scientific applications including PCR, reverse transcription, ligation and sequencing. The basic ^{3}Prime unit can accommodate 24 x 0.2ml tubes in a flexible 8 x 3 array or 15 x 0.5ml tubes. The ^{3}PrimeX has either a 48 x 0.2ml or 30 x 0.5ml block and can easily be upgraded to the ^{3}PrimeG which incorporates a block gradient function and gradient calculator, allowing for simple and rapid optimisation of reaction conditions. The ^{3}PrimeX and G also have a fully adjustable heated lid to accommodate a wide range of different consumables.

The ^{3}Prime units are programmed via a 3.5” colour VGA LCD touch screen using simple and intuitive software. Programs and run progress can be viewed in real time, allowing the user to readily check the status or position within a run. A USB port on the front of the unit allows transfer of files to and from a USB memory stick for viewing in the Techne Workbench PC software and for the easy update of instrument software.



BEFORE USE

Before using the ^{3}Prime please ensure you have read this manual carefully. If there is any doubt relating to the proper use of this equipment, the staff at Bibby Scientific Ltd. or your supplier will be happy to assist you.

UNPACKING

When unpacking the unit please ensure that the following have been removed from the packaging:

- ^{3}Prime with block
- Mains cables (UK, EU and US)
- Operator's manual
- Warranty Registration card

The user is advised to keep the original packaging in case the instrument ever needs to be returned for service or repair. Bibby Scientific Ltd. accepts no responsibility for damage incurred unless the unit is correctly packed and transported in its original packaging.

SAFETY INFORMATION

Please read all the information in this manual before using the ^{3}Prime.

WARNING

HIGH TEMPERATURES ARE DANGEROUS: they can cause serious burns to operators and ignite combustible material. Users should be aware of the following potential hazards:

- USE CARE AND WEAR PROTECTIVE GLOVES TO PROTECT HANDS
- DO NOT use combustible substances near hot objects
- DO NOT operate the instrument in the vicinity of inflammable liquids or gases
- DO NOT place any liquid directly into the instrument.

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 Bibby Scientific Ltd. the protection provided by the equipment to the operator may be impaired.

All Techne instruments are designed to conform to international safety requirements and are fitted with an over-temperature cut-out. If a safety problem should be encountered, switch off the unit at the mains socket and remove the plug from the electricity supply.

INSTALLATION

The instrument should be carried using both hands. Never move or carry the instrument when in use or connected to the mains electricity supply.

1. All Techne instruments are supplied with a power cable; this may be integral or plug-in.
2.  Before connecting the instrument to the mains electricity supply, check the voltage against the rating plate (located on the back of the unit). **Please note that the unit must be earthed to ensure proper electrical safety**. Connect the mains cable to a suitable plug according to the table below.

Connections	**220/240V, 50/60Hz**	**110V/120V, 50/60Hz**
Live	Brown	Black
Neutral	Blue	White
Earth	Green/yellow	Green

3. UK ONLY: The fused plug supplied with the mains cable is fitted with a 5 amp fuse to protect the instrument and the operator.
4. The units are rated to operate at 100-240V, 50/60Hz.
5. Place the unit on a suitable flat bench or in a fume cupboard if required, ensuring that the air inlet vents on the underside are free from obstruction.
6. Plug the mains cable into the socket on the back of the instrument.
7. Switch on the instrument using the switch located on the back of the unit.

Replacement cable

Should the mains lead need replacement, a cable of 1mm^{2} of harmonized code H05VV-F connected to an IEC320 plug should be used. **IF IN DOUBT CONSULT A QUALIFIED ELECTRICIAN.**

ENVIRONMENTAL CONDITIONS

The ^{3}Prime is designed operate under the following conditions:

- Indoor use
- Ambient temperature range +5ºC to +40ºC
- Altitude to 2000m
- Relative humidity not exceeding 80%
- Mains supply fluctuations not exceeding 10%
- Over voltage category II IEC 60364-4-443
- Pollution degree 2

Note: The control specifications are quoted at an ambient temperature of 20ºC. The specification may deteriorate outside an ambient temperature of between 10ºC and 30ºC.

The instrument has been tested for radio frequency interference and is certified under EN61326.

WARRANTY

Bibby Scientific Ltd warrants this instrument to be free from defects in material and workmanship, when used under normal laboratory conditions for four (4) years. In the event of a justified claim, Bibby Scientific Ltd will replace any defective component or replace the unit free of charge. This warranty does not apply if damage is caused by fire, accident, misuse, neglect, incorrect adjustment or repair, damage by incorrect installation, adaption, modification, fitting of non-approved parts or repair by unauthorised personnel. Bibby Scientific Ltd liability is limited to the cost of repair or replacement of the product and excludes in particular, indirect and consequential loss, damage, costs or expenses, including but not limited to wasted time, materials and expenditure or loss of use, profit, production, revenue, expected savings or goodwill. To make a claim please contact the supplier of the instrument. This warranty is in addition to, and does not affect any statutory rights.

This manual has been prepared for the convenience of Techne's customers and nothing in this manual shall be taken as a warranty, condition or representation concerning the description, merchantability, fitness for purpose or otherwise of the unit or components.

Notwithstanding the description and specification(s) of the instruments contained in the operator's manual, Techne reserves the right to make such changes as it sees fit to the instruments or to any of the components.

L'INFORMATION DE SÛRETÉ

Veuillez lire attentivement toutes les instructions de ce document avant d'utiliser le ^{3}Prime.

AVERTISSEMENT

Les TEMPÉRATURES ÉLEVÉES SONT DANGEREUSES car elles peuvent provoquer de graves brûlures chez l'opérateur et enflammer les matériaux combustibles. Les utilisateurs doivent porter une attention toute particulière aux points suivants :

- PROCEDER AVEC PRUDENCE ET PORTER DES GANTS POUR SE PROTEGER LES MAINS
- NE PAS utiliser de matériaux combustibles auprès d'objets chauds.
- NE PAS utiliser l'appareil à proximité de liquides ou de gaz inflammables
- NE PAS verser de liquides directement dans l'appareil.

SECURITE DE L'OPERATEUR

Tous les utilisateurs de produits Techne doivent avoir pris connaissance des consignes et instructions nécessaires à la garantie de leur sécurité. Important: cet appareil doit impérativement être manipulé par un personnel qualifié et être 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 Bibby Scientific Ltd., 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 de surchauffe. En cas de problème de sécurité, couper l'alimentation électrique au niveau de la prise murale et enlevez la prise connectée à l'appareil.

INSTALLATION

Porter l'appareil à deux mains. Ne jamais déplacer ou transporter l'appareil lorsqu'il est en fonctionnement ou branché à l'alimentation électrique.

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 raccorder l'appareil à l'alimentation électrique sur secteur, vérifier la tension requise indiquée sur la plaque d'identification (située au dos de l'appareil). **Il est important que l'appareil soit relié à la terre pour assurer la protection électrique requise.** Brancher le câble secteur sur une prise appropriée, voir tableau ci-après.

Connexions	**220/240 V, 50/60 Hz**	**110/120 V, 50/60 Hz**
Phase	Marron	Noir
Neutre	Bleu	Blanc
Terre	Vert/jaune	Vert

3. ROYAUME-UNI SEULEMENT: La prise avec fusible intégré fournie avec le câble secteur est munie d'un fusible 5 A destiné à protéger l'appareil et l'utilisateur.
4. Les unités sont évaluées pour fonctionner à 100-240V, 50/60Hz.
5. Placer l'appareil sur une surface plane ou si nécessaire sous une hotte d'aspiration, veiller à ce que les trous d'aération situés sous l'appareil ne soient pas obstrués.
6. Raccorder le câble d'alimentation à la prise située à l'arrière de l'appareil.
7. Allumer l'appareil utilisant le commutateur situé à l'arrière de l'unité.

Câble de rechange
S'il s'avère nécessaire de remplacer le cordon d'alimentation, utiliser un câble de 1 mm² conforme à la norme H05VV-F relié à une prise IEC320. **EN CAS DE DOUTE, CONSULTER UN ELECTRICIEN QUALIFIE.**

CONDITIONS ENVIRONNEMENTALES

Le ^{3}Prime est conçu pour fonctionner dans les conditions suivantes:

- Pour un usage intérieur seulement
- Température ambiante +5°C à +40°C
- Altitude inférieure à 2000m
- Humidité relative ne dépassant pas 80%
- Fluctuations de l'alimentation n'excédant pas 10% de la valeur nominale
- Catégorie II IEC 60364-4-443 de surtension
- Degré de pollution 2

Remarque: Les paramètres sont indiqués pour une température ambiante de 20°C. Ces caractéristiques peuvent se détériorer en dehors d'une température ambiante de 10 à 30°C.

L'appareil a été testé en matière de radiofréquences et est certifié selon la norme EN61326.

GARANTIE

Bibby Scientific Ltd garantit cet instrument contre tout vice de matière et de fabrication, quand il est utilisé dans des conditions normales de laboratoire pendant quatre (4) ans. En cas de réclamation justifiée, Bibby Scientific Ltd procèdera gratuitement au remplacement de tout élément défectueux ou au remplacement de l'appareil. Cette garantie ne s'applique pas aux dommages provoqués par les incendies, accidents, mésusages, négligences, réglages ou réparations incorrects, aux dommages dus à une installation incorrecte, adaption, modification, au montage de pièces non homologuées ou réparation par un personnel non autorisé. La responsabilité de Bibby Scientific Ltd se limite aux coûts de réparation ou de remplacement du produit et exclut, en particulier, les pertes, dommages, coûts ou dépenses indirects et conécutifs, parmi lesquels, mais sans s'y limiter, les pertes de temps, de matériaux et les dépenses ou perte d'utilisation, de profit, de production, de chiffre d'affaires, d'économies escomptées ou écarts d'acquisition. En cas de réclamation, veuillez prendre contact avec le fournisseur de cet appareil. Cette garantie s'ajoute à vos droits légaux et n'affecte en rien ces derniers.

Le présent manuel a été exclusivement rédigé à l'attention des clients de la marque Techne et rien dans son contenu ne doit être pris comme une garantie, une condition ou une affirmation concernant la description, la commercialisation, l'adéquation à un usage particulier de l'appareil ou de ses composants.

Malgré la description et les caractéristiques techniques des appareils données dans le manuel de l'utilisateur, la société Techne se réserve le droit d'apporter les changements nécessaires à l'appareil ou à tout élément qui entre dans sa composition.

SICHERHEITS- INFORMATIONEN

Lesen Sie diese Anleitung vor Verwendung des ^{3}Prime bitte sorgfältig durch.

ACHTUNG

HOHE TEMPERATUREN STELLEN EINE GEFAHRENQUELLE DAR. Sie können schwere Brandverletzung verursachen und brennbare Stoffe entzünden. Der Benutzer sollt sich mit den möglichen Gefahren vertraut machen:

- UMSICHTIG VORGEHEN UND SCHUTZHANDSCHUHE TRAGEN
- KEINE brennbaren Stoffe in der Nähe heißer Gegenstände verwenden
- Das Gerät NICHT in der Nähe entzündlicher Flüssigkeiten oder Gase betreiben
- Flüssigkeiten NICHT direkt auf das Gerät auftragen.

SICHERHEIT DES BEDIENPERSONALS

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. Wenn ein Sicherheitsproblem auftreten sollte, muß das Gerät ausgeschaltet und vom Stromnetz getrennt werden.

INBETRIEBNAHME

Das Gerät mit beiden Händen tragen. Das Gerät unter keinen Umständen transportieren, wenn es in Betrieb ist, oder während das Gerät noch am Netz angeschlossen ist.

1. Alle Geräte von Techne werden mit einem Netzkabel geliefert, das entweder eingesteckt wird oder fest mit dem Gerät verbunden ist.
2.  Vor dem Anschluss bitte kontrollieren, ob die Stromversorgung den Angaben auf dem Typenschild (auf der Geräterückseite) entspricht. **Um die elektrische Sicherheit zu gewährleisten, muss dieses Gerät geerdet werden**. Schließen Sie das Netzkabel entsprechend der folgenden Tabelle an einen geeigneten Stecker an.

Anschluss	**220/240V, 50/60Hz**	**110V/120V, 50/60Hz**
Phase	Braun	Schwarz
Neutral	Blau	Weiß
Erde	Grün/Gelb	Grün

3. NUR FÜR GROSSBRITANNIEN: der mit dem Netzkabel gelieferte Sicherungsstecker enthält eine 5 Amp. Sicherung zum Schutz des Geräts und des Anwenders.
4. Die Maßeinheiten werden veranschlagen, um an 100-240V, 50/60Hz zu funktionieren.
5. Stellen Sie das Gerät auf einen geeigneten ebenen Tisch oder in einem Abzugsschrank auf und sorgen Sie dafür, dass die Lufteinlassschlitze auf der Geräteunterseite nicht blockiert sind.
6. Stecken Sie das Netzkabel in die Buchse auf der Geräterückseite ein.
7. Schalten Sie das Instrument unter Verwendung des Schalters an, der auf der Rückseite der Maßeinheit gelegen ist.

Ersatzkabel
Bei einem eventuellen Austausch des Netzkabels wird ein Kabel vom Typ H05VV-F mit 1 mm^2 Adernquerschnitt und Europastecker (IEC 320) benötigt. **IM ZWEIFELSFALL EINEN ELEKTRO-FACHMANN HINZUZIEHEN.**

UMWELTBEDINGUNGEN

Der ^{3}Prime ist für den Einsatz unter folgenden Bedingungen ausgelegt:

- Gebrauch in Innenräumen
- Umgebungstemperatur zwischen +5ºC to +40ºC
- Höhe: bis zu 2000 m
- Relative Feuchte nicht über 80%
- Netzspannungsschwankungen nicht über 10%
- Überspannungsklasse 2 IEC 60364-4-443
- Verschmutzungsgrad 2

Hinweis: Die Gerätespezifikationen beziehen sich auf eine Umgebungstemperatur von 20ºC und können sich außerhalb des Bereichs 10ºC bis 30ºC verschlechtern.

Das Gerät wurde auf HF-Störeinflüsse geprüft und entspricht den EMV-Bedingungen nach EN61326.

GARANTIE

Bibby Scientific Ltd gewährleistet, dass dieses Gerät vier (4) Jahre lang keine Material- oder Herstellungsfehler aufweist, wenn es unter normalen Laborbedingungen verwendet wird. In einem berechtigten Garantiefall wird Bibby Scientific Ltd alle defekten Komponenten oder das Gerät kostenlos austauschen. Diese Garantie gilt nicht, wenn der Schaden durch ein Feuer, einen Unfall, Missbrauch, Nachlässigkeit, falsche Einstellungen oder Reparaturen, falsche Installation, Adaptierung, Veränderung, den Einbau nicht zugelassener Teile oder die Reparatur durch nicht autorisiertes Personal verursacht wurde. Die Garantie von Bibby Scientific Ltd ist beschränkt auf die Kosten der Reparatur oder den Austausch des Produkts und schließt ausdrücklich indirekte und nachfolgende Verluste, Schäden, Kosten oder Ausgaben aus, einschließlich aber nicht beschränkt auf Zeit-, Material- und Geldverlust oder den Verlust des Gebrauchs, von Gewinn, Produktion, Einkommen, erwarteten Einsparungen und des Firmenwerts. Um einen Garantiefall zu melden, wenden Sie sich bitte an den Vertriebspartner des Geräts. Diese Garantie gilt zusätzlich zu und nicht anstelle von geltendem Recht.

Diese Anleitung wurde zur Information der Kunden von Techne erstellt und stellt in keinster Weise eine Gewährleistung, Bedingung oder Darstellung bezüglich der Beschreibung, Marktgängigkeit oder Zweckdienlichkeit dieser Geräte oder Bauteile dar.

Unabhängig von Beschreibung und Spezifikation(en) des hier beschriebenen Geräts behält sich Techne das Recht vor, Änderungen an diesem Gerät oder dessen Bauteilen vorzunehmen.

INFORMAZIONI DI SICUREZZA

Leggere attentamente il presente manuale prima di usare il ^{3}Prime.

AVVERTENZA

Le ALTE TEMPERATURE SONO PERICOLOSE in quanto possono provocare serie ustioni agli operatori e dare fuoco al materiale combustibile. Gli utenti devono conoscere i seguenti pericoli potenziali:

- PRESTARE ATTENZIONE ED INDOSSARE GUANTI PROTETTIVI PER LE MANI
- NON usare sostanze combustibili vicino ad oggetti caldi
- NON mettere in funzione lo strumento nei pressi di liquidi o gas infiammabili
- NON collocare alcun tipo di liquido direttamente nello strumento.

SICUREZZA DELL'OPERATORE

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

INSTALLAZIONE

Occorre trasportare lo strumento usando entrambe le mani. Non spostare né trasportare lo strumento quando è in funzione o collegato all'alimentazione elettrica di rete.

1. Tutti gli strumenti Techne sono forniti con un cavo di alimentazione; può essere integrale o plugin.
2.  Prima di collegare lo strumento all'alimentazione elettrica di rete, controllare la tensione confrontandola con la targhetta riportante i valori nominali (si trova sul retro dell'unità). **Notare che al fine di garantire la corretta sicurezza elettrica, occorre che l'unità sia messa a terra.** Collegare il cavo di rete ad una presa idonea secondo la tabella riportata alla pagina successiva.

Connessione	**220/240V, 50/60Hz**	**110V/120V, 50/60Hz**
Sotto tensione	Marrone	Nero
Neutro	Blu	Bianco
Terra	Verde/giallo	Verde

3. SOLO REGNO UNITO: la spina con fusibile fornita con il cavo di rete è dotata di un fusibile da 5 Amp per proteggere lo strumento e l'utente.
4. Le unità sono stimate funzionare a 100-240V, 50/60Hz.
5. Collocare l'unità su un banco piano idoneo o in una cappa aspirante se necessario, assicurandosi che gli sfiati delle prese d'aria nella parte inferiore non siano ostruiti.
6. Inserire il cavo di rete nella presa che si trova sul retro dello strumento.

7. Accendere lo strumento per mezzo dell'interruttore situato sulla parte retro dell'unità.

Cavo di ricambio
Qualora occorra sostituire il cavo di rete, si dovrà utilizzare un cavo di 1mm^2 codice armonizzato H05VV-F collegato ad una spina IEC 320. **IN CASO DI DUBBIO, RIVOLGERSI A UN ELETTRICISTA QUALIFICATO.**

CONDIZIONI AMBIENTALI

Il ^{3}Prime è stato progettato per funzionare nelle seguenti condizioni:

- uso interno
- range di temperatura ambiente da +5ºC a +40ºC
- altitudine massima 2000 m.
- umidità relativa non superiore all'80%
- oscillazione dell'alimentazione di rete non superiore al 10%
- categoria di sovratensione II IEC 60364-4-443
- grado di inquinamento 2

Nota: le specifiche di controllo sono indicate ad una temperatura ambiente di 20ºC. Le specifiche potrebbero peggiorare fuori da una temperatura ambiente compresa tra 10ºC e 30ºC.

Lo strumento è stato collaudato per interferenze da radiofrequenze ed è certificato secondo la norma EN61326.

GARANZIA

Bibby Scientific Ltd garantisce che, per un periodo di quattro (4) anni e se utilizzato nelle normali condizioni di laboratorio, questo strumento non presenterà alcun difetto dei materiali o di fabbricazione. In caso di reclamo giustificato, Bibby Scientific Ltd sostituirà qualsiasi componente difettoso o rimpiazzerà l'unità in modo gratuito. Questa garanzia non si applica ai danni causati da incendio, incidenti, utilizzo improprio, negligenza, regolazioni o riparazioni scorrette, danni dovuti a installazione non corretta, adattamenti, modifiche o installazione di parti non approvate oppure riparazioni eseguite da personale non autorizzato. La responsabilità di Bibby Scientific Ltd è limitata al costo della riparazione o della sostituzione del prodotto ed esclude in particolare qualsiasi perdita indiretta o secondaria, danno, costo o spesa, ivi inclusi, a titolo di esempio e in modo non esaustivo, perdite di tempo, materiali e spese oppure perdite di utilizzo, profitto, produzione, ricavo, risparmio atteso o avviamento. Per esporre un reclamo, contattare il fornitore dello strumento. Questa garanzia è in aggiunta ai diritti di legge e non ha alcun effetto su di essi.

Il presente manuale è stato preparato ad uso dei clienti di Techne e niente di quanto in esso contenuto costituisce garanzia, condizione o rappresentanza riguardo la descrizione, la commerciabilità, l'idoneità allo scopo o altrimenti dell'unità o dei componenti.

Nonostante la descrizione e le specifiche dello strumento contenuti nel manuale dell'operatore, Techne si riserva il diritto di apportare le modifiche ritenute opportune agli strumenti o a qualsiasi loro componente.

INFORMACIÓN DE SEGURIDAD

Lea atentamente este manual antes de utilizar el ^{3}Prime.

ADVERTENCIA

LAS ALTAS TEMPERATURAS SON PELIGROSAS, ya que pueden ocasionar quemaduras graves a los operarios y prender el material combustible. Los usuarios deben conocer los posibles riesgos:

- TENGA CUIDADO Y LLEVE GUANTES DE PROTECCIÓN PARA PROTEGERSE LAS MANOS
- NO utilice sustancias combustibles cerca de objetos calientes
- NO utilice el instrumento cerca de líquidos o gases inflamables
- NO coloque un líquido directamente en el instrumento.

SEGURIDAD DEL OPERARIO

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

INSTALACIÓN

El instrumento se debe transportar con las dos manos. No mueva ni lleve el instrumento cuando se utilice o esté conectado al suministro eléctrico principal.

1. Todos los instrumentos Techne se suministran con un cable de alimentación, que puede ser integrado o 'enchufable'.

2. 
Antes de conectar el instrumento al suministro eléctrico, compruebe que el voltaje coincida con el indicado en la placa de régimen (situada en la parte trasera de la unidad). **El instrumento debe disponer de una toma de tierra para garantizar la seguridad eléctrica adecuada.** Conecte el cable de alimentación a un enchufe adecuado según la siguiente tabla.

Conexión	**220/240V, 50/60Hz**	**110V/120V, 50/60Hz**
Con corriente	Marrón	Negro
Neutro	Azul	Blanco
Toma de tierra	Verde/amarillo	Verde

3. SÓLO PARA EL REINO UNIDO: El enchufe suministrado con el cable de alimentación incluye un fusible de 5 amperios para ofrecer protección al instrumento y al usuario.

4. Las unidades se clasifican para funcionar en 100-240V, 50/60Hz.

5. Sitúe la unidad sobre una mesa plana o en una campana de laboratorio si es necesario, y asegúrese de que los orificios de ventilación situados en la parte inferior no tienen ninguna obstrucción.

6. Conecte el cable de alimentación en el enchufe situado en la parte trasera del instrumento.

7. Encienda el instrumento usando el interruptor situado en la parte posterior de la unidad.

Cable de repuesto
Si es necesario sustituir el cable de alimentación, se debe utilizar un cable de 1mm^2 de código armonizado H05VV, conectado a un enchufe IEC320. **EN CASO DE DUDA, PÓNGASE EN CONTACTO CON UN ELECTRICISTA.**

CONDICIONES AMBIENTALES

El ^{3}Prime está diseñado para utilizarse en las condiciones siguientes:

- Uso en interior
- Intervalo de temperatura ambiente +5ºC a +40ºC
- Altitud: hasta 2000 m
- Humedad relativa no superior al 80%
- Fluctuaciones del suministro eléctrico no superiores al 10%
- Categoría de sobrevoltaje II IEC 60364-4-443
- Nivel de contaminación 2

Nota: Las especificaciones de control corresponden a una temperatura ambiental de 20ºC. Las especificaciones pueden empeorar si se utiliza el instrumento fuera del intervalo de temperatura comprendido entre 10ºC y 30ºC.

Se han realizado pruebas para comprobar la interferencia de radiofrecuencia del instrumento, el cual cumple la normativa EN61326.

GARANTÍA

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Este manual se ha preparado con una finalidad informativa para los clientes de Techne y ninguna parte del manual se deberá considerar como una garantía, condición o reflejo con respecto a la descripción, comerciabilidad, idoneidad para un fin determinado o de otro tipo de la unidad o sus componentes.

Con independencia de la descripción y las especificaciones del instrumento que se indican en el manual del operario, Techne se reserva el derecho de realizar cambios en el instrumento o en cualquiera de sus componentes cuando lo estime oportuno.

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^{3}PRIME SPECIFICATION

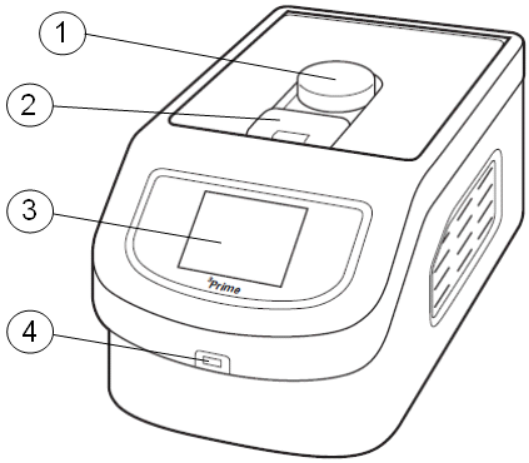
	^{3}Prime	^{3}PrimeX	^{3}PrimeG
Sample capacity: 0.2ml	24	48	48
Sample capacity: 0.5ml	18	30	30
Block temperature range	4ºC (10℃ during cycling) to 100ºC		
Block uniformity (at 50ºC)	<±0.3ºC		
Temperature accuracy (at 50ºC)	<±0.2ºC		
Maximum heating rate	3.0ºC/s		
Maximum cooling rate	2.1ºC/s		
Gradient	-	Can be enabled	Yes
Gradient availability	-	-	30ºC to 80ºC
Maximum gradient range	-	-	14ºC
Minimum gradient range	-	-	1ºC
Type	2 x Peltier element/block	4 x Peltier element/block	4 x Peltier element/block
Pre-run sample cooling	Yes, 4ºC		
Temperature resolution	0.1ºC		
Selectable heated lid temperature	35ºC to 115ºC or off		
Heated lid pressure	Fixed	Adjustable depending on consumable	
Pre-heat lid	Yes		
Program interface	3.5” colour VGA LCD touch screen		
Maximum number of programs	1000		
Maximum number of stages per program	10		
Maximum number of steps per stage	10		
Maximum number of cycles per stage	99		
Programmable ramp rate	Yes, 0.1ºC/s steps		
Maximum hold time	4h 59m 59s		
Minimum hold time	1s		
Gradient calculator	-	-	Yes
Oligonucleotide T_m calculator	Yes, based on the Nearest-Neighbour method[1]		
Incremented/decremented temperature	Yes		
Incremented/decremented time	Yes		
Pause facility	Yes		
Program naming	Alpha numeric plus symbols		
Password protection	Yes		
Run completion time	Yes		
Auto resume on power failure	Yes, always or never		
Data transfer	USB port		
Software updates	Free of charge from www.techne.com		
Dimensions (L x W x H)	350 x 210 x 180mm		
Weight	6kg		
Voltage	100-230V, 50/60Hz		
Power	155W		

[1]Breslauer, K.J.; Frank, R.; Blocker, H. and Marky, L.A. (1986) Proc. Natl. Acad. Sci. USA 83, pp 3746-3750.

INSTALLATION

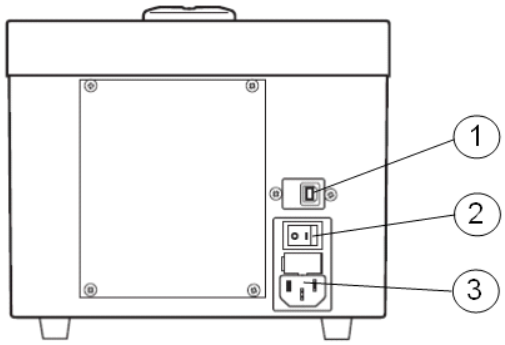
See also the Safety Information sections on pages 5 to 14.

Front view



1. Lid adjustment knob (^{3}PrimeX and G only).
2. Lid release latch.
3. 3.5” colour VGA LCD touch screen display.
4. USB port for memory stick.

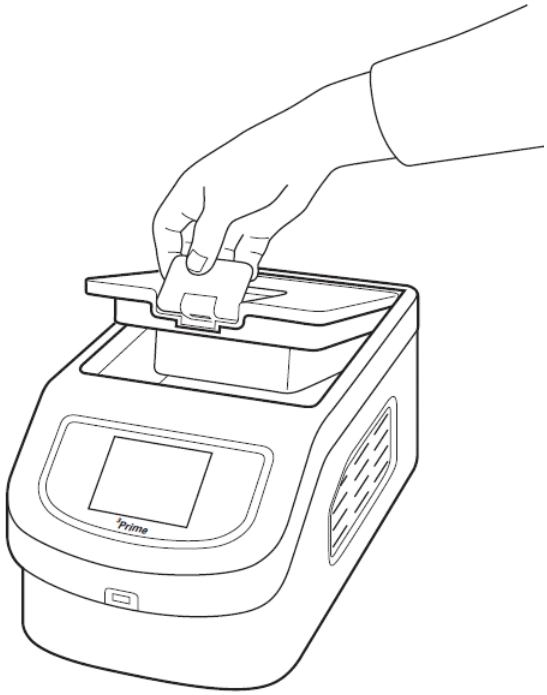
Rear view



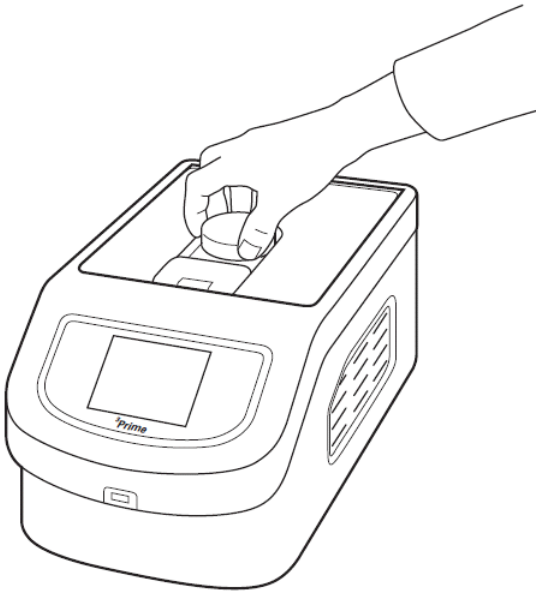
1. USB port for service and calibration only.
2. On/Off rocker switch.
3. Mains cable inlet.

Installation

1. Place the unit on a suitable flat bench, ensuring that the air inlet vents on the sides are free from obstruction.
2. Plug the mains cable into the socket on the back of the instrument.
3. Connect to the mains electricity supply with the plug provided or one wired correctly for the supply. Switch the power ON using the switch located on the rear of the unit. The front display will then light up.
4. Release the heated lid by lifting the latch forward and use it to lift the lid. To close the lid, lower the lid onto the block and press the latch to secure in place.
5. Place the samples in the block. If individual tubes or strip tubes are being used, space these out evenly across the block to equalise the pressure from the heated lid.



6. With the ^{3}PrimeX and G, the heated lid has a rotating knob to adjust the lid pressure on the samples, allowing for a variety of consumables to be used. To adjust the pressure:



   a. Place the samples in the block and place the lid in the down position.

   b. Adjust the orange rotating knob anticlockwise to give the least pressure then close the lid fully.

   c. Gently rotate the knob clockwise until you can feel pressure beginning to be applied.

   d. Rotate the knob a further quarter of a turn and this will give the correct pressure. Do not over-tighten.

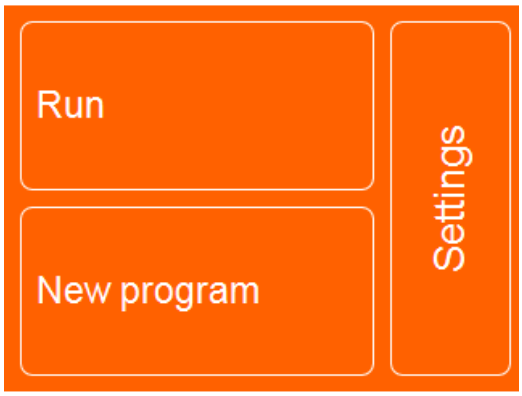
7. Once the pressure has been set it does not need to be adjusted unless a different block or consumable is used.

GENERAL SOFTWARE FEATURES

INTRODUCTION

The [3]Prime software allows the user to quickly and easily create thermal cycling programs using a simple and clear touch screen format. The software is structured into three modules which are accessed from the Home Screen. These allow the user to:

- Run an existing program, selecting from templates or programs saved on the unit.
- Create a new program.
- Set the instrument and program defaults and preferences. Includes calculator tools.



TEMPLATE PROGRAMS

To help with programming, a number of program templates are installed on the unit which are available to copy and edit or can be run directly without changes. Details of the installed program templates are given below.

Instrument and program defaults

Parameter	2 Step Template	3 Step Template	RT-PCR Template
Heated Lid	105ºC	105ºC	105ºC
Heated lid before program	On	On	On
Sample cooling	On	On	On
Pause before program	Off	Off	Off
Initial denaturation	94ºC, 05m00s	94ºC, 05m00s	94ºC, 05m00s
Hot start	Off	Off	Off
Final extension	72ºC, 05m00s	72ºC, 05m00s	72ºC, 07m00s
Final hold	10ºC	10ºC	10ºC

Thermal cycling conditions

	2 Step Template	3 Step Template	RT-PCR Template
Stage 1			
Number of cycles	30	30	1
Step 1	94.0ºC, 00m30s	94.0ºC, 00m30s	45.0ºC, 40m00s
Step 2	60.0ºC, 01m00s	55.0ºC, 00m30s	94.0ºC, 05m00s
Step 3		72.0ºC, 00m30s	
Stage 2			
Number of cycles			40
Step 1			94.0ºC, 01m00s
Step 2			55.0ºC, 00m50s
Step 3			72.0ºC, 01m00s

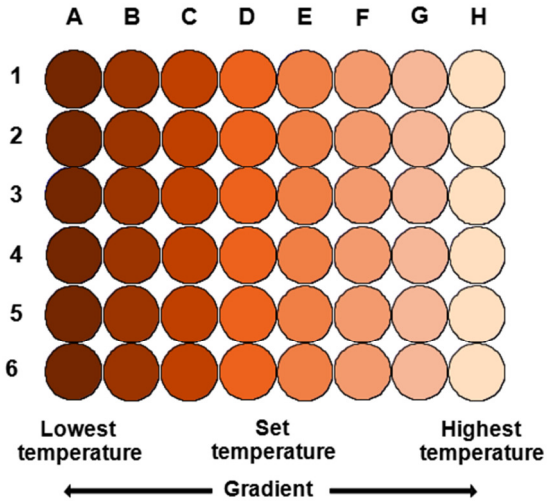
The Ice Bucket and Ligation programs are simple temperature holds, with the former having an infinite hold at 10ºC and the latter at 15ºC. In both of these programs the heated lid is switched off and the initial denaturation, hot start and final extension functions disabled.

INCREMENTED/DECREMENTED TIME AND TEMPERATURE

The software allows the user to either increment or decrement the time and/or temperature of a step within a cycling stage. These features are used with applications such as touchdown PCR where the annealing temperature is gradually decreased during the cycling process and long PCR, where due to the size of the product, long annealing/extension times are required and the extension time is increased by 15 to 20s per cycle during the final stages of the reaction.

GRADIENT (^{3}PRIMEG ONLY)

The gradient feature of the ^{3}PrimeG can be useful in optimising the annealing conditions for primers. A gradient can be set around a temperature in any step of a program. The set temperature is the temperature in the middle columns of the block and the gradient is the variation at the two extremes of the block; the left hand columns being the coolest and the right hand columns the hottest.



The maximum temperature gradient range which can be set is 14ºC and the minimum is 1ºC; the lowest temperature is 30ºC and the hottest temperature is 80ºC. Examples showing approximate temperatures are given in the table below:

Lowest temperature (ºC)	Set temperature (ºC)	Highest temperature (ºC)	Gradient (ºC)
50	55	60	10
30	37	44	14
66	73	80	14

A gradient calculator is included in the **Settings** module so the user can obtain an accurate estimation of the temperature of each column during the gradient stage. The temperatures for any particular gradient are calculated from an algorithm stored in the block firmware.

OLIGONUCLEOTIDE T_M CALCULATOR

One of the most important parameters in a PCR is the annealing temperature of the reaction. This can be determined theoretically using various software programmes to calculate the melting temperature (T_m) of the primers.

The T_m is defined as the temperature at which half the DNA strands are single stranded and half are double stranded when base paired to a complimentary strand. Using annealing temperatures that are well below the T_m of the primers can result in mismatching, false priming and may lead to primer-dimer artefacts. Annealing temperatures that are significantly higher than the primer T_m may result in reduced priming or prevent priming altogether.

The [3]Prime uses the Nearest-Neighbour method for calculating the T_m of an oligonucleotide[1].

The T_m is calculated using the following equation:

$$T_m = \{(\Delta H^\circ \times 1000)/(A + \Delta S^\circ + R \ln(C/4))\} - 273.15 + 16.6 \times \log[Na^+]$$

Where:

ΔH°	=	The sum of the Nearest-Neighbour enthalpy changes (Kcal/mol)
A	=	Helix initiation correction constant
ΔS°	=	The sum of the Nearest-Neighbour entropy changes (cal $K^{-1}mol^{-1}$)
R	=	The Gas Constant (1.99 cal $K^{-1}mol^{-1}$)
C	=	Concentration of the oligo (M)
[Na+]	=	Concentration of monovalent ions (M)

[1]Breslauer, K.J.; Frank, R.; Blocker, H. and Marky, L.A. (1986) Proc. Natl. Acad. Sci. USA 83, pp 3746-3750.

The Oligonucleotide T_m calculator can be found in the **Settings** module where the user can input the oligonucleotide sequence, its concentration in the reaction and the salt concentration of the reaction mix.

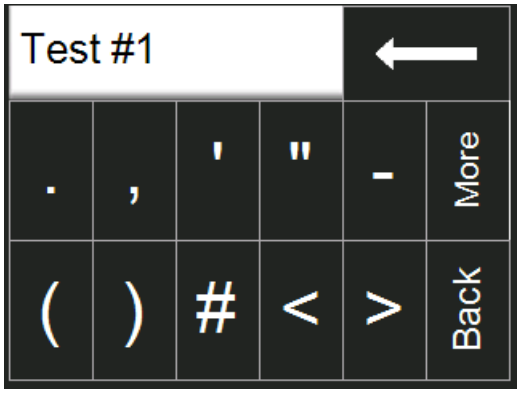
PROGRAMMING TEXT, TEMPERATURE AND TIME

This section gives instructions for the basic programming of text, temperature and time which are required in later sections.

TEXT ENTRY

When giving a name to a program or stage a text entry screen will be opened.

- Touch a character/numerical button repeatedly to cycle through the characters. Touch and hold for numerals.
- Touch **shift** for upper case characters.
- Touch the **1**/**space bar** button to enter spaces between characters.
- To delete the last character touch the **left arrow**.



- Touch **More** for commonly used symbols.
- Touch **More** again to return to characters and numerals.

Once the name is complete, touch **Back**.

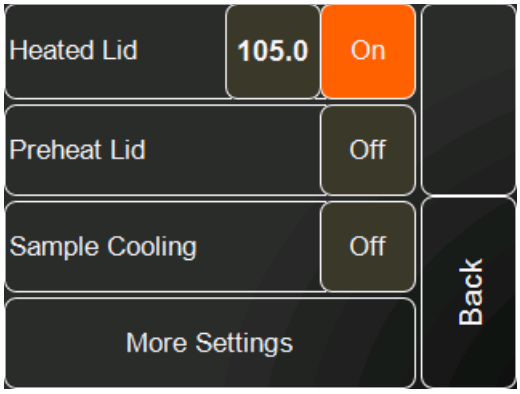
TEMPERATURE ENTRY

When touching a temperature parameter a temperature entry screen will open. There are two forms of temperature entry screen:

- A **simple** form for adjusting the temperature of the instrument parameters such as the heated lid and program parameters such as initial denaturation and final extension.
- An **advanced** form when programming step temperatures within a cycling stage that includes the options for introducing an incremented/decremented step temperature, for example in touchdown PCR, or a temperature gradient if using the ^{3}PrimeG.

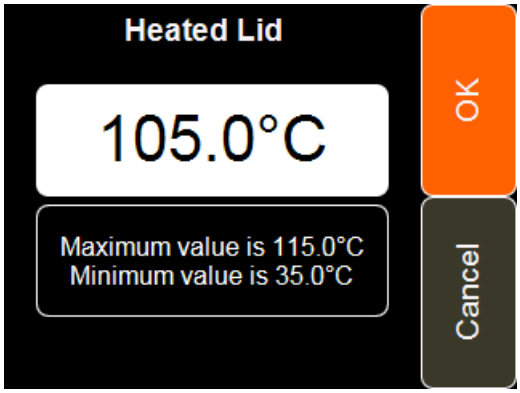
Simple temperature entry

- If necessary, first touch the button next to the parameter (e.g. Heated Lid) to turn it **ON**.
- Next touch the **Temp** button.

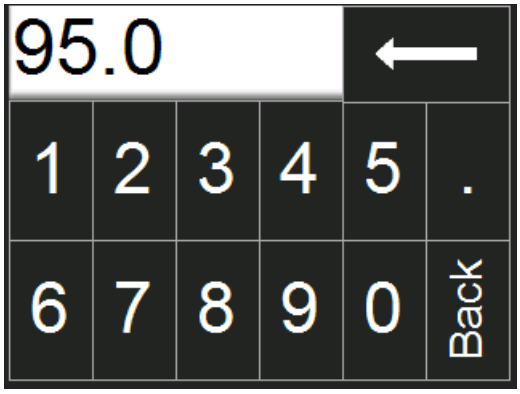


A screen similar to that shown opposite is opened. The maximum and minimum allowed values are indicated depending on the parameter being set.

- Touch the white temperature area to open the temperature entry screen.

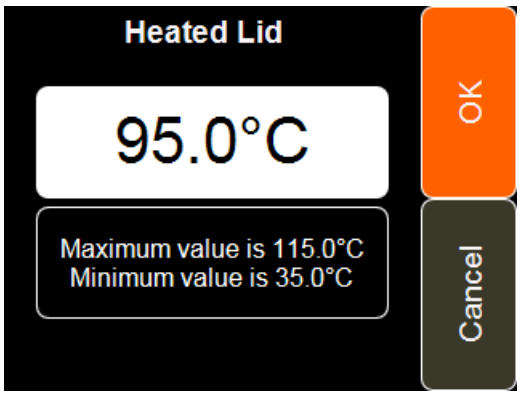


- Enter the temperature using the numerical keys. The resolution is one decimal place.
- Use the arrow key to delete the last character.
- Once the temperature is correct, touch **Back** to return to the previous screen.



This screen will now display the set temperature.

- Touch **OK** to return to the parameter screen.
- Touch **Cancel** to return to the parameter screen if no changes are required.



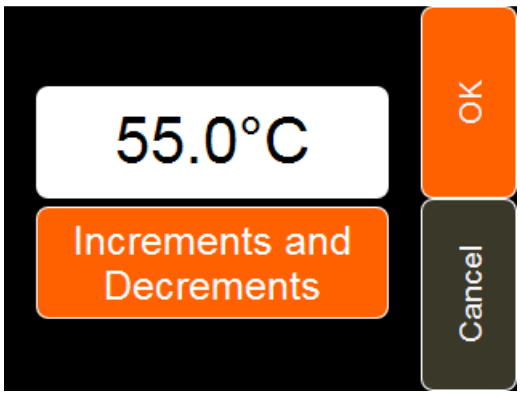
Advanced temperature entry

- First ensure the number of cycles for the stage has been set then enter the required hold temperature as described above.

Note: **Increments and Decrements** will be inactive unless the number of cycles set is greater than 1.

To increase or decrease the step temperature per cycle:

- Touch the step **Temp** button. This will open the temperature screen as shown opposite.
- Touch **Increments and Decrements**.

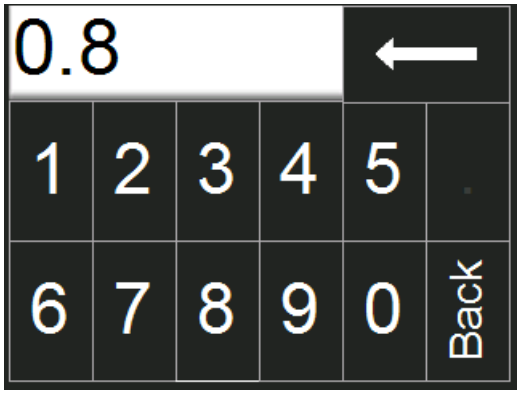


The increment, decrement and gradient (^{3}PrimeG only) screen will open.

- Touch the button next to the required parameter to turn it **ON**.
- Next touch the temperature button to set the increment or decrement per cycle.

A new screen will open which is similar to the simple temperature entry screen.

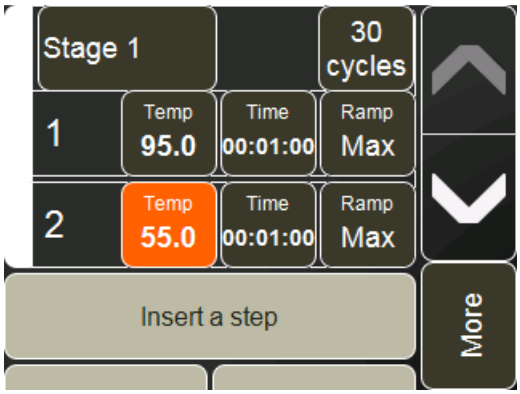
- Enter the required value followed by **Back**.
- If an entered temperature value is invalid, a prompt will indicate the acceptable range.



- Touch **Accept** to return to the previous screen.
- Touch **OK** to accept the modification and return to the program.
- Touch **Cancel** to return to the programming screen if no changes are required.

The temperature value will now appear orange in the programming screen indicating that it contains a modified function.

Note: It is not possible to both increase and decrease the temperature of the same step.



To enter a temperature gradient on a step ([3]PrimeG only):

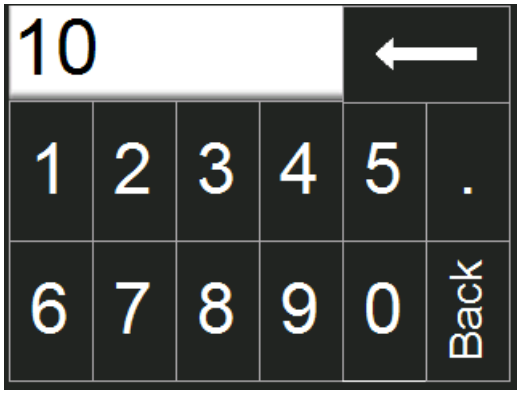
On the [3]PrimeG an additional **Temperature Gradient** button is available.

- Touch the step **Temp** button to open the temperature screen.
- Touch **Increments and Decrements**.

The increment, decrement and gradient screen will open.

- Touch the button next to the gradient parameter to turn it **ON**.
- Next touch the temperature button to set the gradient range.

A new screen will open which is similar to the simple temperature entry screen.

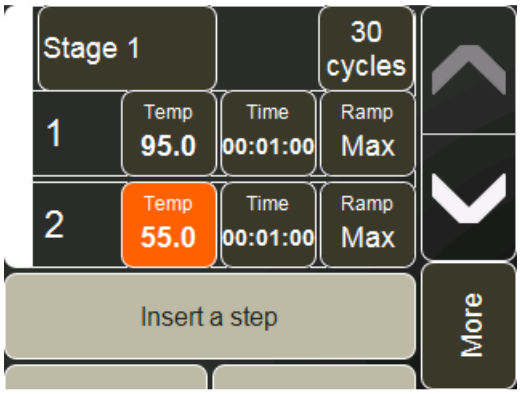


- Enter the required value followed by **Back**.
- If an entered temperature value is invalid, a prompt will indicate the acceptable range.

- Touch **Accept** to return to the previous screen.
- Touch **OK** to accept the modification and return to the program.
- Touch **Cancel** to return to the programming screen if no changes are required.

The temperature value will now appear orange in the programming screen indicating that it contains a modified function.

Note: It is not possible to have both a gradient and an increment or decrement temperature in the same step.



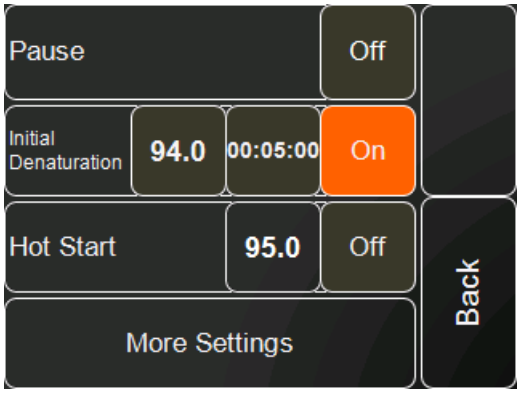
TIME ENTRY

When touching a time parameter a time entry screen will open. There are two forms of time entry screen:

- A **simple** form for adjusting the time of the program parameters such as initial denaturation and final extension.
- An **advanced** form when programming step hold times within a cycling stage that includes the options for introducing incremented/decremented time, for example in long PCR.

Simple time entry

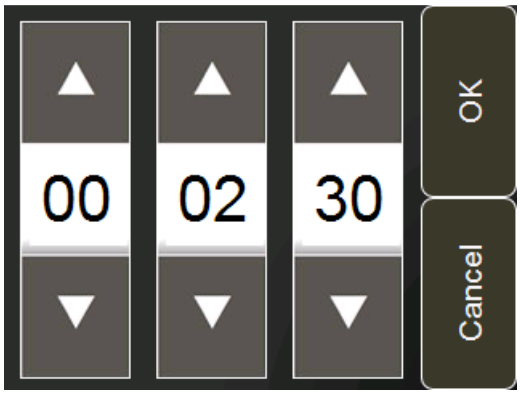
- If necessary, first touch the button next to the parameter (e.g. Initial denaturation) to turn it **ON**.
- Next touch the **Time** button.



A screen similar to that shown opposite is opened. The maximum and minimum allowed values are indicated depending on the parameter being set.

- Touch the white time area to open the time entry screen.

- Enter the time using the up and down arrow keys (h, m, s).
- Once the time is correct, touch **OK** to return to the previous screen.



This screen will now display the set time.

- Touch **OK** to return to the parameter screen.
- Touch **Cancel** to return to the parameter screen if no changes are required.

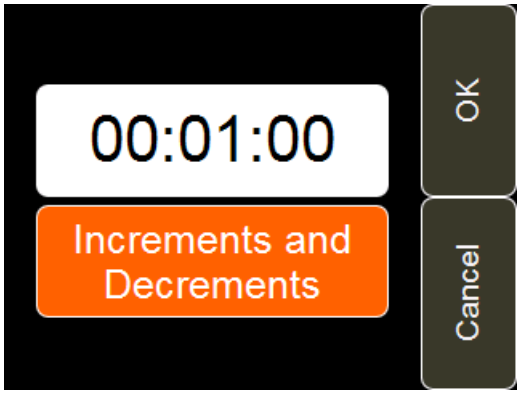
Advanced time entry

- First ensure the number of cycles for the stage has been set then enter the required hold time as described above.

Note: **Increments and Decrements** will be inactive unless the number of cycles set is greater than 1.

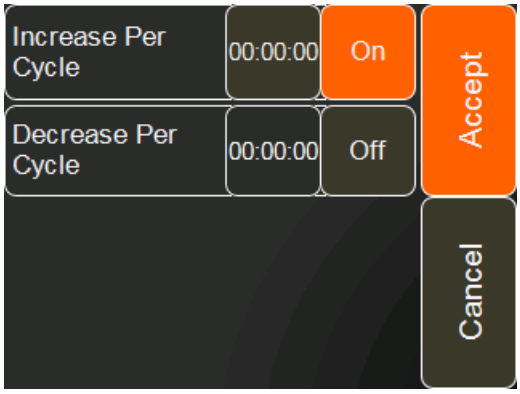
To increase or decrease the step hold time per cycle:

- Touch the step **Time** button. This will open the time screen as shown opposite.
- Touch **Increments and Decrements**.



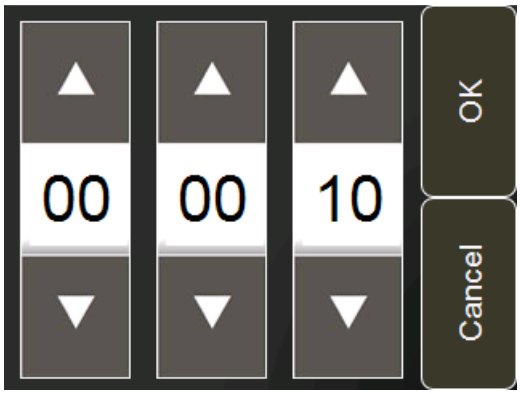
The increment and decrement time screen will open.

- Touch the button next to the required parameter to turn it **ON**.
- Next touch the time button to set the increment or decrement per cycle.

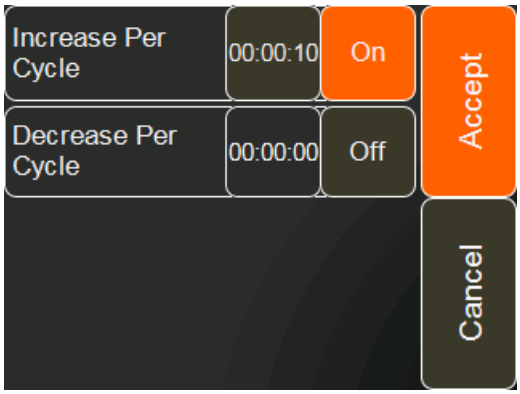


A new screen will open which is similar to the simple time entry screen.

- Enter the required value (h, m, s) followed by **OK**.
- If an entered time value is invalid, a prompt will indicate the acceptable range.

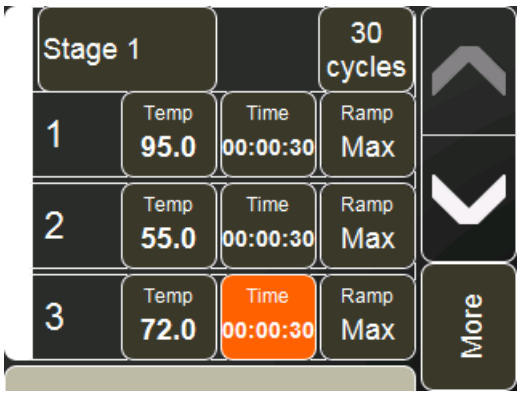


- Touch **Accept** to return to the previous screen.
- Touch **OK** to accept the modification and return to the program.
- Touch **Cancel** to return to the programming screen if no changes are required.



The time value will now appear orange in the programming screen indicating that it contains a modified function.

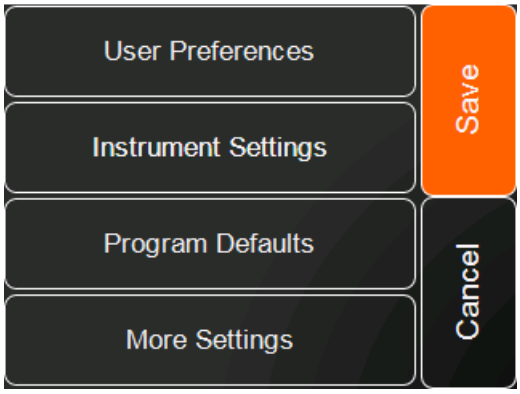
Note: It is not possible to both increase and decrease the time of the same step.



INSTRUMENT SETTINGS AND DEFAULTS

Touch the **Settings** button to access the instrument Settings menu.

- Touch any of the buttons to view and edit the settings.
- Touch **More Settings** to access further options.
- Once all the settings and defaults have been set as required, touch **Save** to save the changes and return to the Home Screen.
- If you do not wish to change any settings, touch **Cancel** to return to the Home Screen.



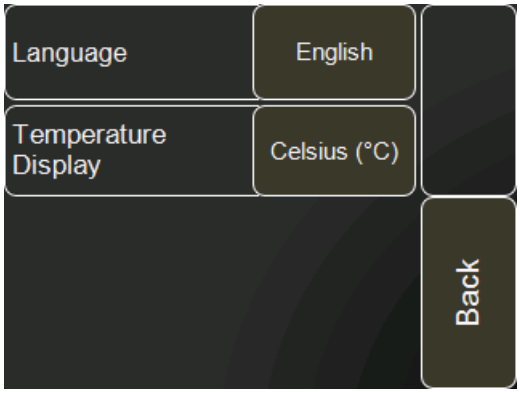
USER PREFERENCES

Language

- Touch the language button to set the required language. The options are English, French, Spanish, Italian and German.

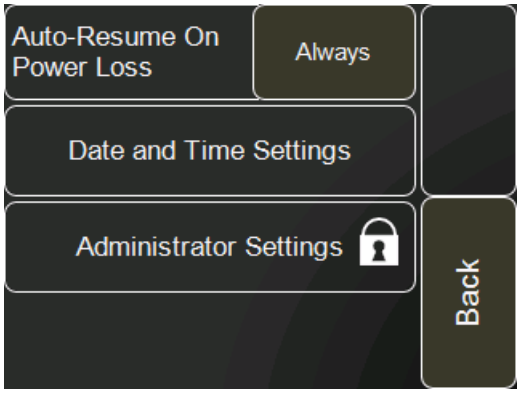
Temperature Display

- Touch the temperature button to set the required temperature units. The options are ºC and ºF.
- When set, touch **Back** to return to the Settings menu.



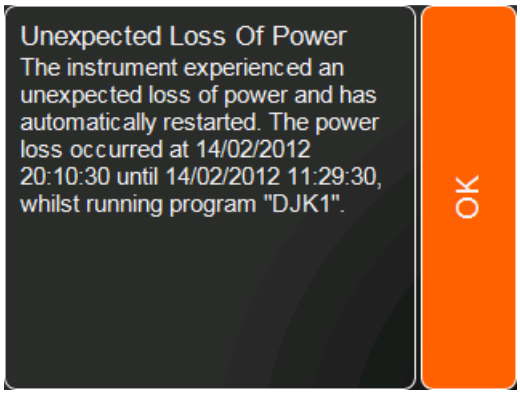
INSTRUMENT SETTINGS

Auto Resume On Power Loss
This determines whether the unit will restart after a power failure. Setting Auto Resume to **Always** will always allow the unit to re-start irrespective of the length of the power failure.



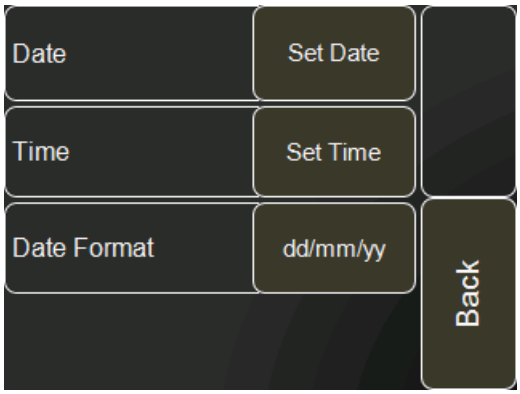
If Auto Resume is set to **Always** and the power is interrupted, on return of the power supply, a message will be displayed on the screen giving details of when the power was lost, when it was restored and the name of the program running at the time.

- Touch **OK** to return to the Run Screen.



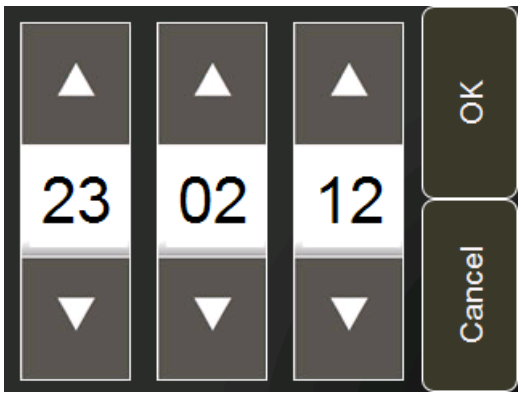
Date and Time Settings
Use these settings to set the current date, time and date format on the unit.

- When set, touch **Back** to return to the Settings menu.



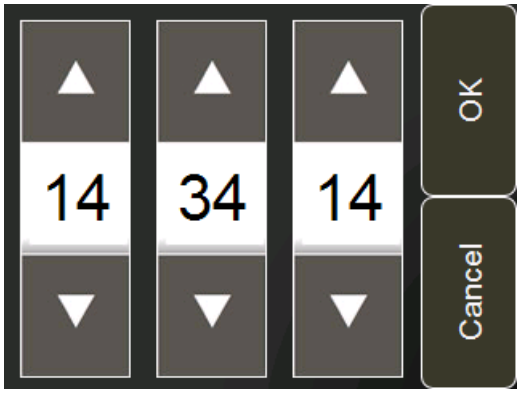
Date

- Touch **Set Date** followed by the white date button in order to enter the current date.
- Use the **up** and **down** keys to set the date values (dd/mm/yy).
- When the correct date has been set, touch **OK** to return to the previous screen.
- Touch **Cancel** to return to the previous screen if no changes are required.



Time

- Touch **Set Time** followed by the white time button in order to enter the current time using the 24 hour clock.
- Use the **up** and **down** keys to set the time values (h, m, s).
- When the correct time has been set, touch **OK** to return to the previous screen.
- Touch **Cancel** to return to the previous screen if no changes are required.



Date Format
Touch the date button to set the required date format.

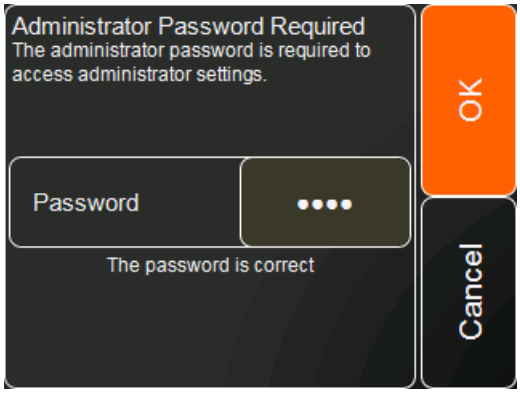
The options are dd/mm/yy or mm/dd/yy.

- Touch **Back** to return to the Instrument Settings main menu.
- Touch **More Settings** for further Instrument Settings.

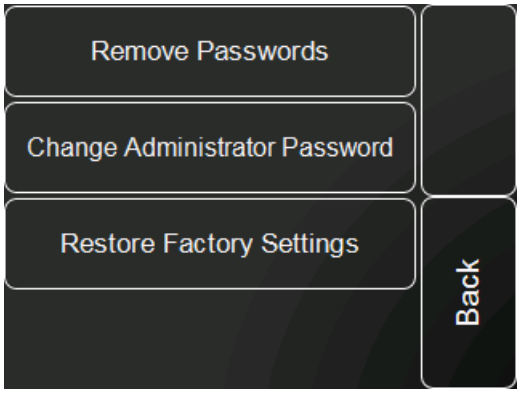
Administrator Settings
This allows an administrator to remove passwords from password-protected programs, change the Administrator password and restore the unit to its factory settings.

- Touch **None** and enter the administrator password followed by **Back**.

The default password is 1234.



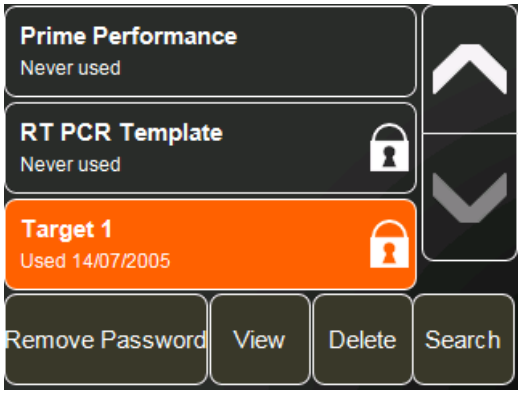
- Touch **OK** to enter the Administrator Settings menu.
- Touch **Cancel** to return to the menu without making any changes.



Remove Passwords
- From the Administrator menu touch **Remove Passwords**.
- Touch the file with the password to be removed.
- Touch **Remove Password**.

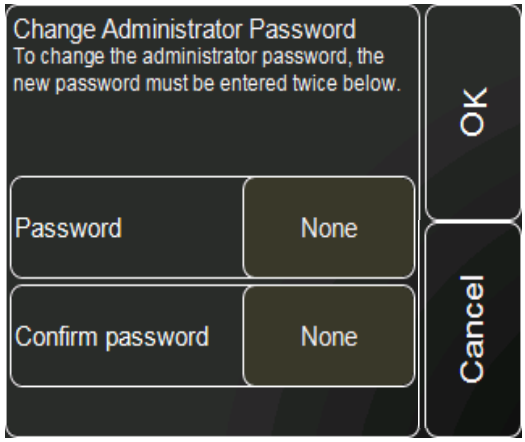
The password will now be removed and the program can be deleted if required.

- De-select the program then touch **Close** to return to the Administrator menu.



Change Administrator Password
This allows the administrator to change the default password (1234).

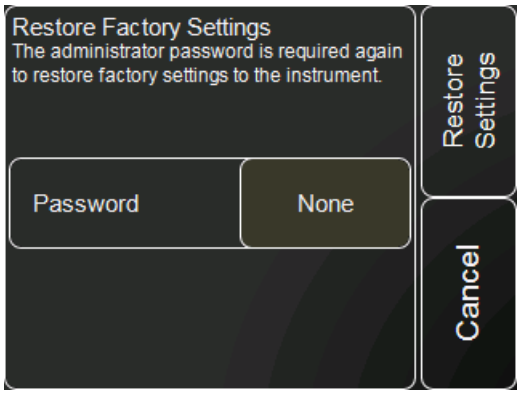
- From the Administrator menu touch **Change Administrator Password**.
- Touch the upper **None** button and enter the new password.
- Touch the lower **None** button to confirm the new password.



Note: It is recommended that the administrator keeps a record of the new password.

- Touch **OK** to return to the Administrator menu or **Cancel** to return without making any changes.

Restore Factory Settings
All changes to the instrument defaults and settings can be removed and the unit returned to its factory settings.

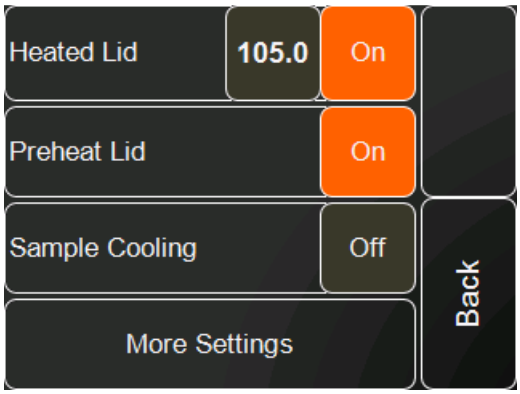


- From the Administrator menu touch **Restore Factory Settings**.
- Touch the **None** button and enter the administrator password followed by **Back**.
- Touch **Restore Settings** and the unit will be reset to factory defaults.
- Touch **Cancel** to return to the Administrator menu without making any changes.
- Touch **Back** to return to the Settings menu.

PROGRAM DEFAULTS

The program default settings will apply to every new program created on the ^{3}Prime. However individual programs can be edited as required.

Heated Lid
Use this to set the heated lid temperature to approximately 10ºC higher than the hottest block temperature in the program.



- Touch **On**/**Off** to toggle between settings.
- Touch the temperature button to set the required lid temperature (35 to 115ºC).

Preheat lid
Set to On to pre-heat the lid before the thermal cycling program begins. The lid will pre-heat for 2 minutes before the program starts.

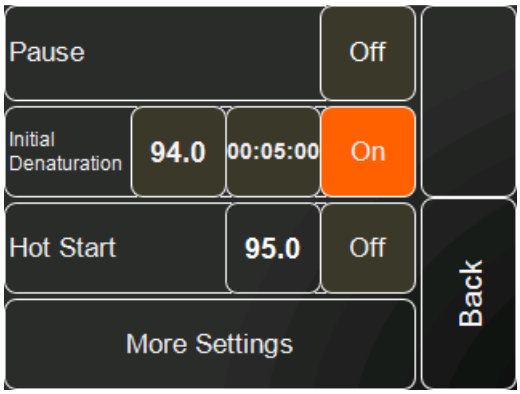
- Touch **On**/**Off** to toggle between settings.

Sample Cooling
Set to On to cool the block to 4ºC while the lid preheats.

- Touch **On**/**Off** to toggle between settings.
- Touch **More Settings** for further program defaults or **Back** to return to the Settings menu.

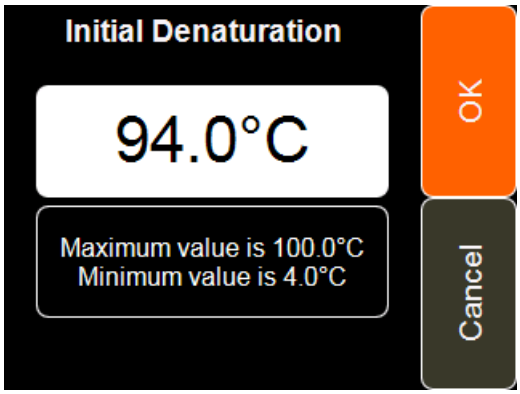
Pause
This will cause the unit to pause before the program starts at the ambient temperature of the block (unless Sample Cooling has been set to **On** when the unit will pause with the block held at 4ºC). The program will not commence until the unit is manually un-paused.

- Touch **On**/**Off** to toggle between settings.



Initial Denaturation
Use this to denature the sample and/or activate the enzyme before the thermal cycling program begins.

- Touch **On**/**Off** to toggle between settings.
- Touch the time button to set the required hold time.
- Touch the temperature button to set the required temperature.

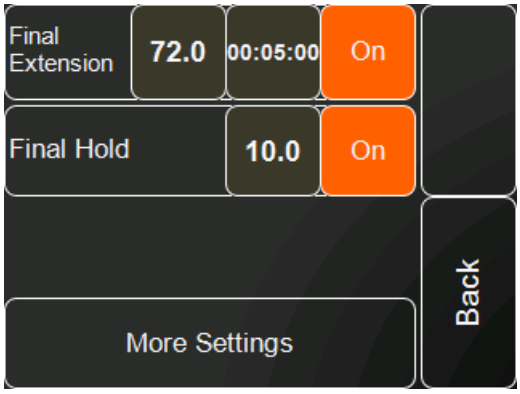


Hot Start
This will cause the unit to pause at the set temperature. The program will not continue until the unit is manually un-paused.

- Touch **On**/**Off** to toggle between settings.
- Touch the temperature button to set the required temperature.
- Touch **More Settings** for further program defaults or **Back** to return to the Settings menu.

Final Extension
Use this to add a final extension step to the program to ensure complete amplification of the products.

- Touch **On**/**Off** to toggle between settings.
- Touch the time button to set the required hold time.
- Touch the temperature button to set the required temperature.

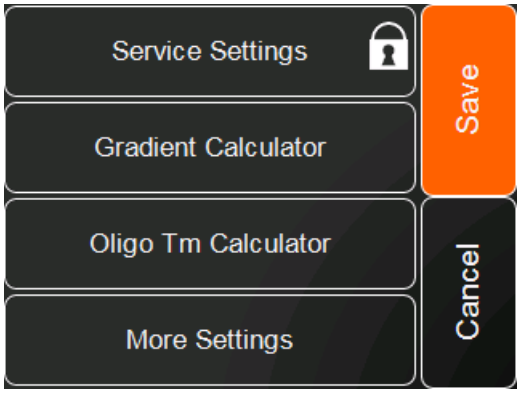


Final Hold
This will hold the block at the set temperature at the end of a program until the user manually stops the unit.

- Touch **On**/**Off** to toggle between settings.
- Touch the temperature button to set the required temperature.
- Touch **More Settings** to return to the top of the Program Defaults menu or **Back** to return to the Settings menu.

SERVICE SETTINGS

The service settings are for the use of authorised service engineers only. A service engineer's password is required to access these settings.



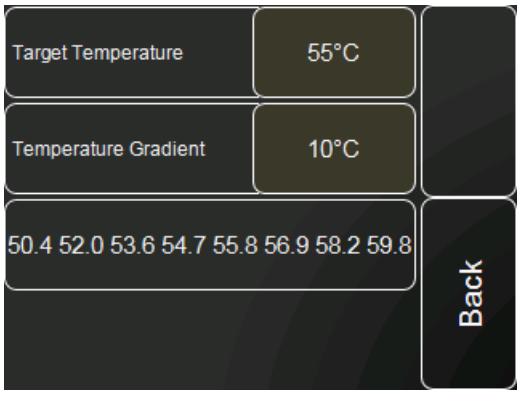
GRADIENT CALCULATOR (^{3}PRIMEG ONLY)

The Gradient Calculator can be used to calculate the temperature for each column of the block for a user-specified temperature and gradient range.

- Touch the **Target Temperature** button and enter the required temperature.
- Touch **OK**.
- Touch the **Temperature Gradient** button and enter the required gradient range followed by **OK**.
- Touch **OK**.

The calculated temperatures for each of the columns of the block will now be displayed.

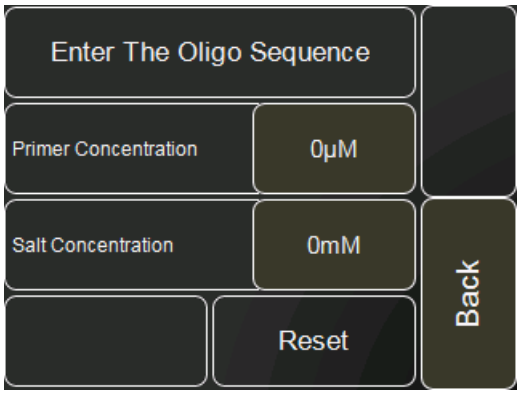
- Touch **Back** to return to the main menu



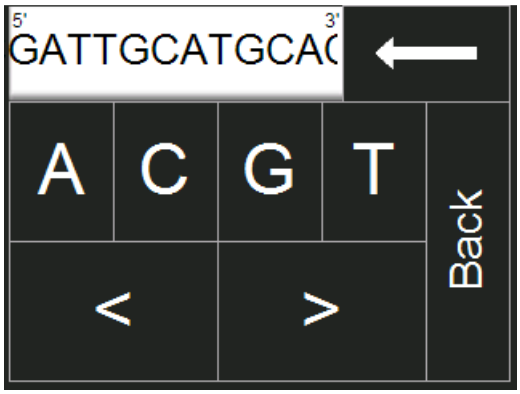
OLIGO T_M CALCULATOR

The oligo T_m calculator can be used to estimate the T_m of the PCR primers and help in selecting an appropriate annealing temperature for the thermal cycling program.

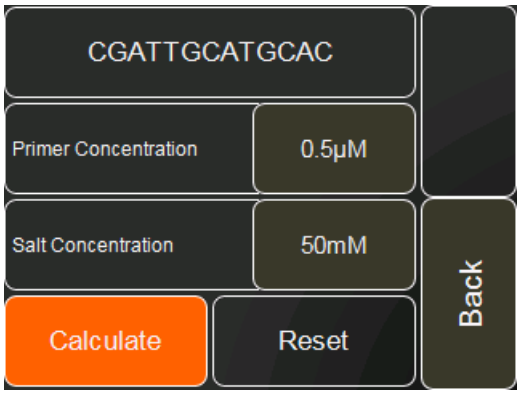
- Touch **Enter The Oligo Sequence** in order to input the sequence of the primer.
- Touch the white **DNA Base Entry** button.



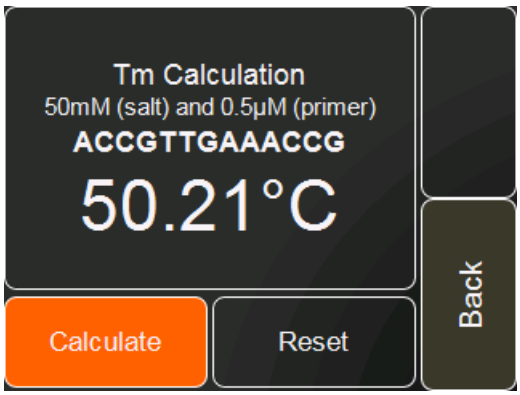
- Touch the **A C G T** buttons to enter the primer sequence.
- Touch the arrow to delete the last character.
- Use the **<** and **>** keys to scroll through the sequence.
- Touch **Back** to return to the previous screen followed by **OK**.



- Enter the final primer concentration in the PCR mix.
- Enter the final monovalent salt concentration of the PCR mix.
- Touch **Calculate** to calculate the T_m of the primer.



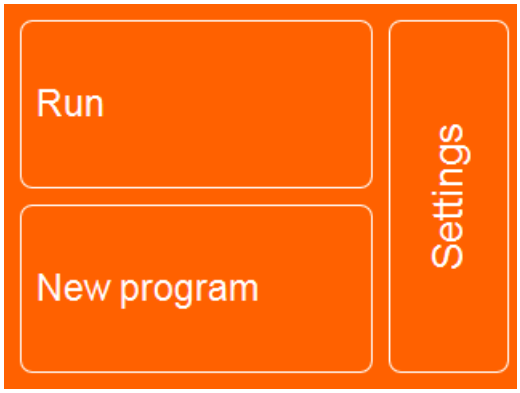
- To check the T_m of another primer with the same primer and salt concentrations, touch **Back** and enter the new primer sequence.
- Touch **Reset** to clear the entries.
- Touch **Back** to return to the Settings menu.



- Once all the settings and defaults have been set as required, touch **Save** to save the changes and return to the Home Screen.
- If you do not wish to change any settings, touch **Cancel** to return to the Home Screen.

CREATE A NEW PROGRAM

From the Home Screen, touch the **New Program** button. This will open a screen where you can build a program by adding stages and steps and define the temperatures and hold times.

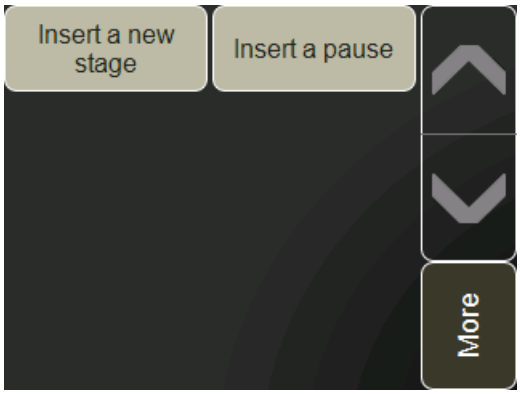


INSERT/DELETE A STAGE

A **stage** is a section of a program that consists of a number of individual steps that can be cycled (repeated) a defined number of times.

Insert a new stage

- To insert a stage in a program, touch **Insert a new stage**. A stage with one step will be inserted.

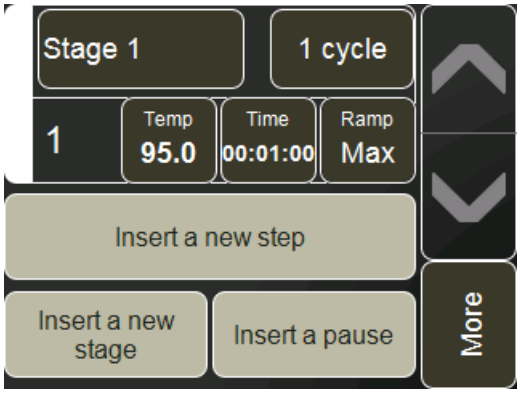


Stage 1

- Touch this to give the stage a name (optional). Enter the name using the text entry screen.

1 cycle

- Touch this to edit the number of cycles (repeats) for the stage. Enter the required number of cycles then touch **Back**.



Temp

- Touch the temperature button to edit the temperature of the step and add any increment/decrement or gradient features.

Note: The minimum step temperature that can be programmed during cycling stages is 10°C. If the step temperature is above or below the valid gradient range (^{3}PrimeG only) then the gradient function is disabled.

Time

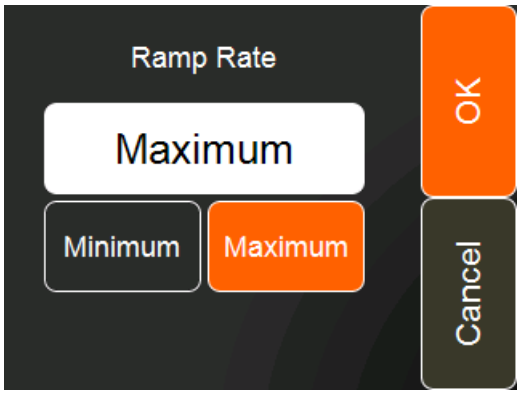
- Touch the time button to edit the hold time of the step and to add any increment/decrement time features.

Ramp rate

- Touch the ramp rate setting to adjust the ramp rate.

The range is 0.1ºC/s (minimum) to 3.0ºC/s maximum for heating and 2.1ºC/s for cooling. The value can be entered to 1 decimal place. Ramp rate will affect the heating or cooling rate from the previous step to the current step.

- Once set, touch **OK** to return to the Programming Screen.



Delete a stage

- To delete a stage, touch the stage area to highlight it and then touch **Delete**.

INSERT/DELETE A STEP

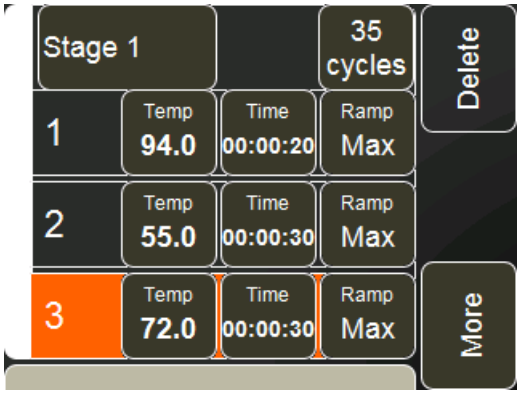
Insert a new step

- Touch **Insert a new step** to insert the next step in the current stage.

- Edit the new step temperature, hold time and ramp rate as required.

Delete a step

- To delete a step, touch the area near to the step number to highlight it and then touch **Delete**. More than one step can be selected at a time.



INSERT/DELETE A PAUSE

Insert a pause

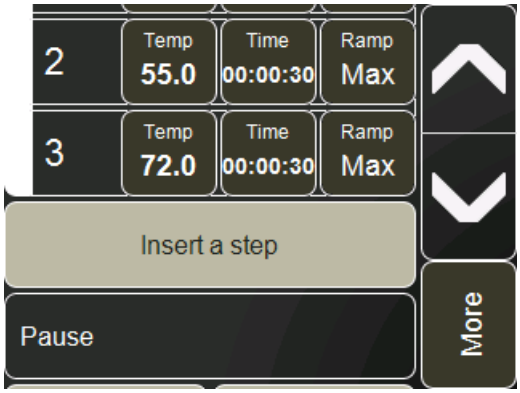
- To insert a pause between stages, touch **Insert a pause**.

The hold temperature will be that of the previous step. The unit will not continue with the remainder of the program until it is manually un-paused by the user.

Delete a pause

- To delete a pause, touch the pause button to highlight it and then touch **Delete**.

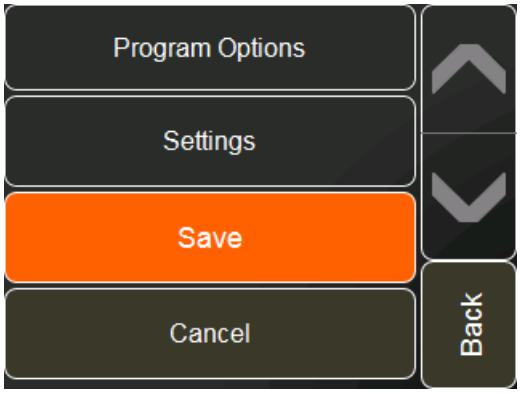
Note: To insert a pause between two previously programmed stages, it is necessary to first delete the later stages to where the pause is required.



Continue adding stages and steps as required. Use the **up and down arrow** buttons to scroll through the program as necessary.

THE MORE BUTTON

The **More** button can be used to access the **Program Options** and **Instrument Settings** defaults for editing in the current program.



Program Options

- Touch this to view the program defaults as set up in the Settings module. Use this also to name the program and add a password to protect it from editing by other users.

Settings

- Touch this button to view the instrument defaults as set up in the instrument Settings module.

Save

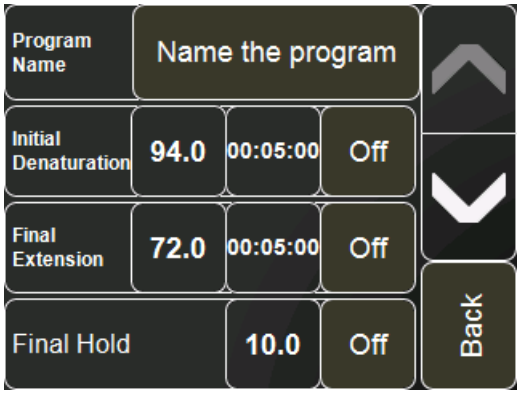
- Touch this to save the program.

Cancel

- Touch this to cancel changes to the program and return to the Home Screen.

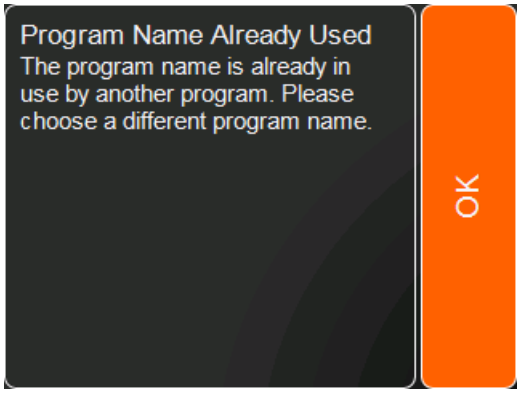
PROGRAM OPTIONS

Program Name



- Touch **Name the program** to give the program a name.
- Type in the required name using the text entry screen.
- Once the name is complete, touch **Back** to return to the Program Options screen.
- Touch **Back** to return to the Program Options and Settings screen.
- Touch **Back** again to return to the programming screen.

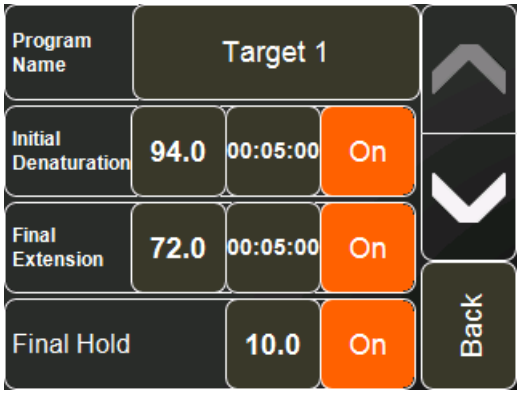
When saving the program, if the chosen name has already been used for another program, the message box shown opposite will appear.



- Touch **OK** to return to the Program Options and Settings screen.
- Open **Program Options**, touch the program name and enter a different name.
- Once the name is complete, touch **Back** twice to return to the programming screen.

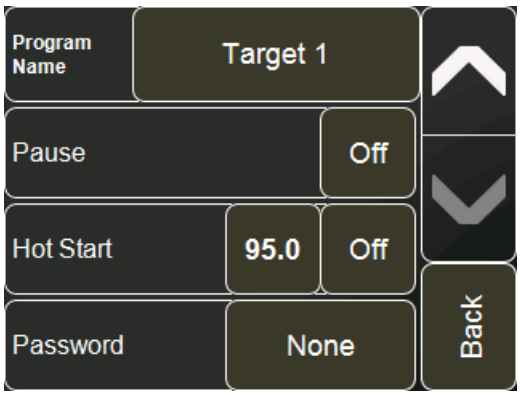
Initial denaturation, Final Extension and Final Hold

- Touch the time and temperature buttons to edit these if required.
- Use the **Down** arrow to scroll to further options.



Pause and Hot Start

- Touch **On**/**Off** to toggle between settings.
- Set the temperature for Hot Start if required.

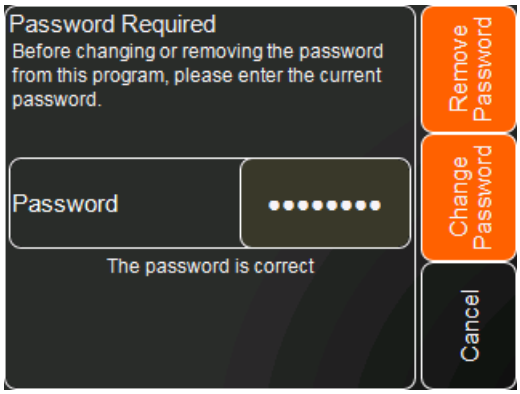


Password
A password can be created to protect the program from being edited and deleted by other users. The password will be requested if a user attempts to edit or delete the program.

- To create a password, touch the **None** button next to Password.
- Enter the required password then touch **Back** to return to the Program Options.

Note: The password is case-sensitive.

- To change or remove the password, from the Program Options screen, touch the button next to **Password**.
- On the Password Editing screen, touch the **None** button and enter the password.
- To remove the password, touch **Remove Password**.
- To change the password, touch **Change Password** and type in the new password, followed by **Back**.
- Touch **Cancel** to return to the Program Options screen if no change is required.

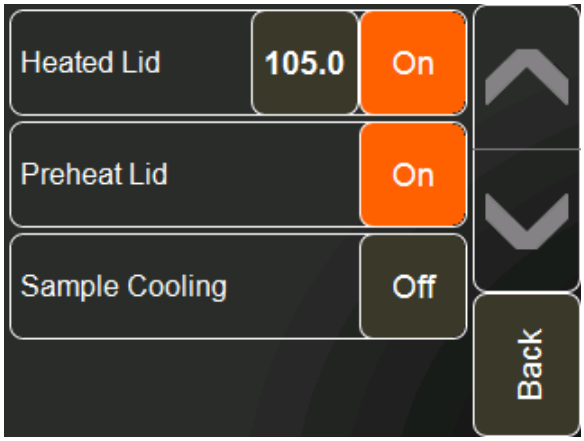


SETTINGS

- Touch the **Settings** button to view the instrument defaults as set up in the instrument Settings module.

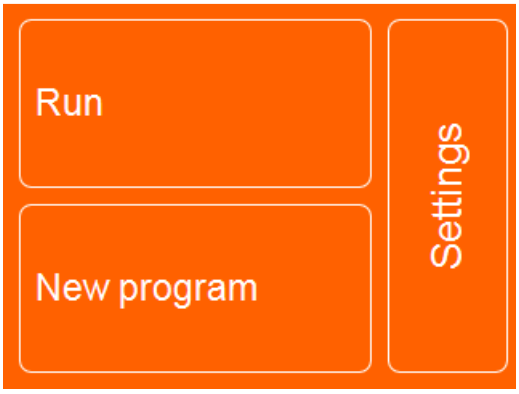
Any of these parameters can be edited by touching the appropriate button and will be saved for the current program only.

- Touch **Back** twice to return to the programming screen.

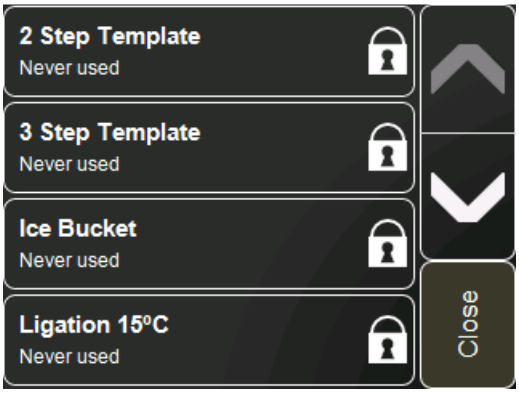


RUN A PROGRAM

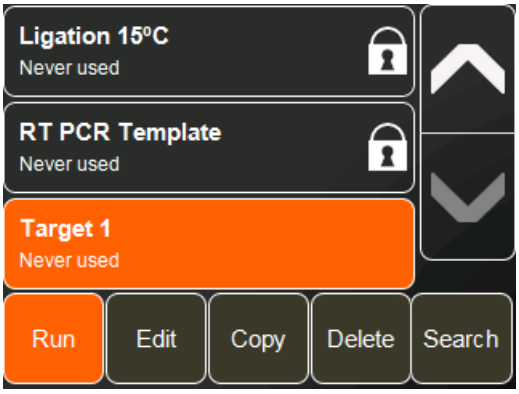
From the Home Screen, touch the **Run** button. This will open a screen where you can select a program to run, edit, copy or delete.



- Touch a program to select it. Use the arrow buttons to scroll down the list of stored programs.



Once a program is selected, a series of options are displayed across the bottom of the screen:



- Touch **Run** to send the program to the unit and proceed to the pre-run screen.
- Touch **Edit** to open the program and allow editing.
- Touch **Copy** to make a copy of the program before editing.
- Touch **Delete** to delete the selected program.
- Touch **Search** to search for a program in the list.

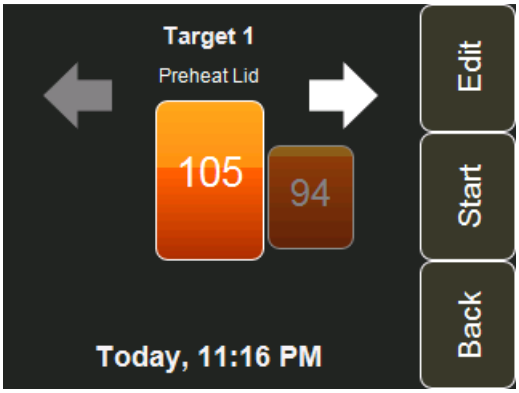
Each of these is discussed in more detail below.

To return to the Home Screen, de-select the program and touch **Close**.

RUN

Touching the Run button sends the selected program to the ^{3}Prime, ready to start the run.

The Pre-run screen
This screen shows a step-by step representation of the program in a tile format. The program name is given at the top of the screen followed by the stage name.



The first step tile is highlighted and enlarged in the centre of the screen.

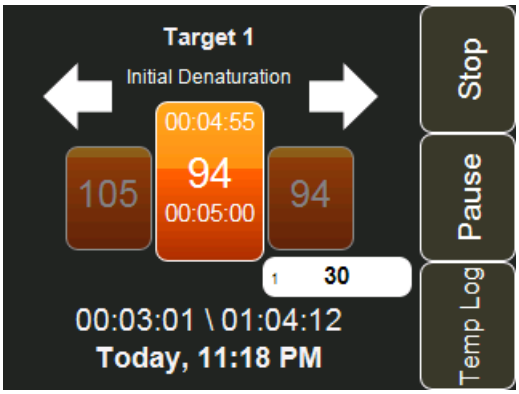
- Touch the **arrows** to scroll forwards and backwards through the program, or drag a finger across the screen.

The step tiles show the set incubation temperature. The white bar underneath shows the stage number and number of cycles within the stage.

The bottom of the screen shows the expected end time if the program was started immediately.

- Touch **Start** to start the program.
- Touch **Edit** to edit the program.
- Touch **Back** to return to the previous screen.

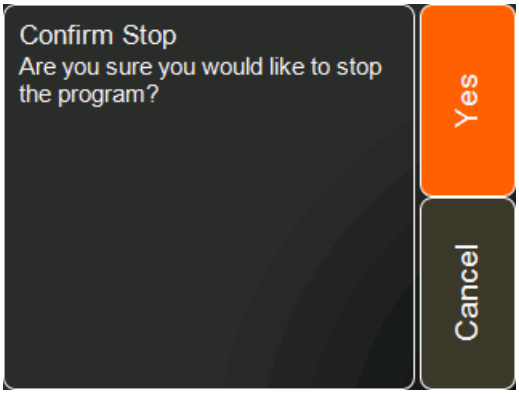
The Run Screen
Once the program has been started, the current step is shown by the central highlighted step tile. The tile shows the set temperature, the incubation time and the status i.e. ramping to temperature, paused or the count down time of the step.



The white bar underneath shows the current cycle number within the stage.

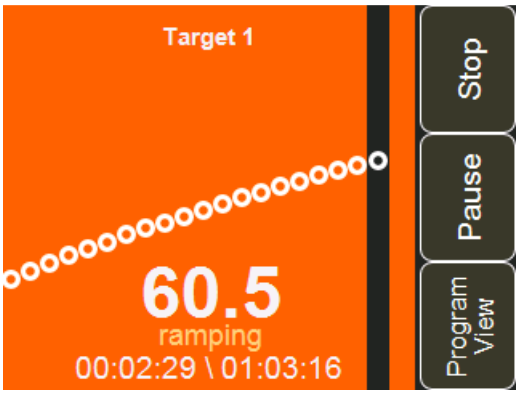
Timers at the bottom of the screen indicate how long the program has been running and give an estimate of the total run time to completion. Total run time is recalculated throughout the run.

- Touch **Stop** to stop the program. A prompt will ask you to confirm the stop. Touch **Yes** to confirm or **Cancel** to continue with the run.
- Touch **Pause** to pause the program. If paused, touch **Continue** to un-pause the program.
- At the end of a run, if the program is in a final hold, touch **Finish** to end the program.



- Touch **Temperature log** to view the block temperatures. The previous two minutes of temperature readings can be viewed by scrolling across the screen using a finger.

Note: Touch **Program View** to return to the program status.



EDIT

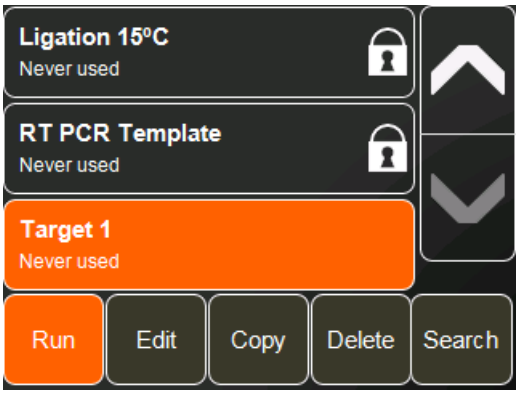
Editing existing programs

- First select the required program and touch **Edit**.

Any of the Program Options, Settings or thermal cycling parameters can be edited.

- Once all the required changes have been made, touch **Save**.

Note: this will overwrite the existing program.



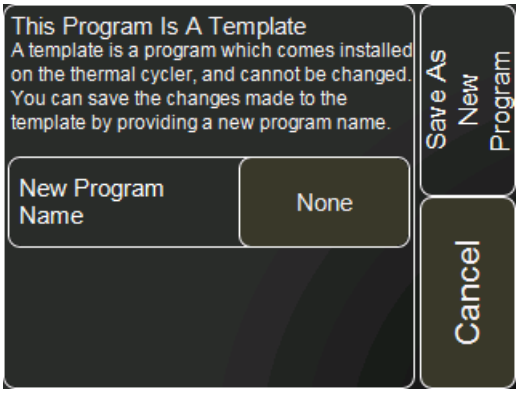
Editing templates

Editing templates can be a quick method of creating a program by just changing a few key parameters. However it is not possible to save changes to the templates installed on the thermal cycler.

If the edited program is a template, touching **Save** will open the message box shown opposite.

- Touch the **None** button next to **New Program Name** and enter a name for the edited program.
- Touch **Save As New Program** to save the changes.

The re-named program will now be listed in the program list.



Editing password protected programs
If the edited program is password protected, touching **Save** will open the message box shown opposite. To save the changes either:

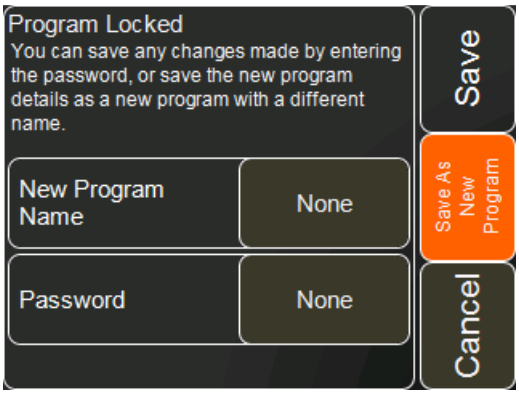
- Touch the **None** button next to Password and enter the correct password followed by **Save**.

Note: this will overwrite the existing program.

or

- Touch the **None** button next to **New Program Name** and enter a new name for the edited program, followed by **Save as a New Program**.

The re-named program will now be listed as a separate program in the program list.

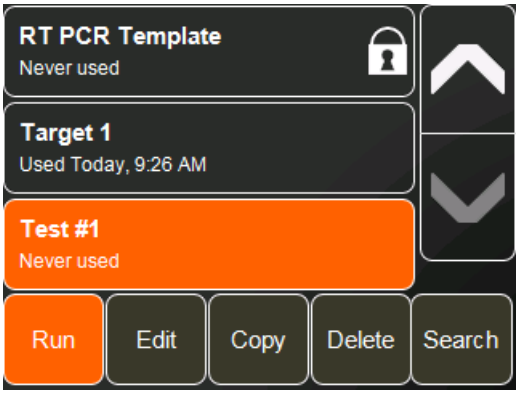


COPY

Program files can either be copied for editing, or to and from the unit using a USB memory stick.

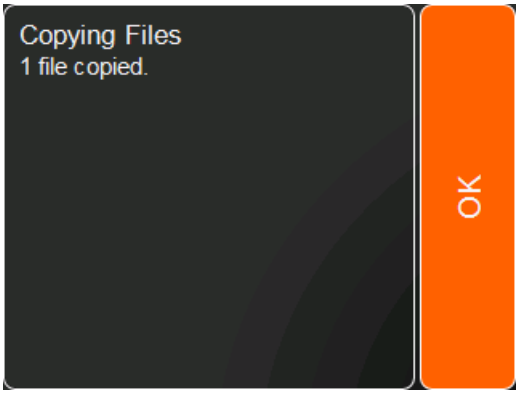
To copy a program file to the unit:

- Select a file to copy by touching to highlight it.
- Touch **Copy**.



A message box will confirm that the file has been copied.

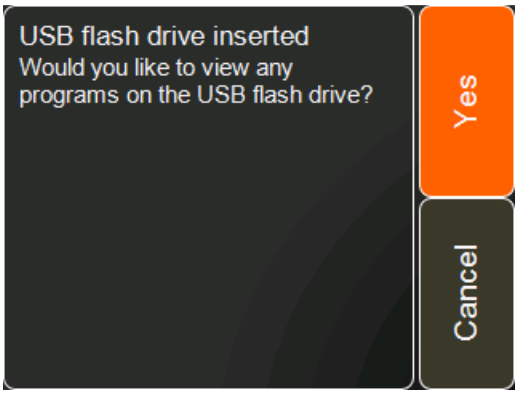
The copied file will now be highlighted and listed as Copy of… and can be edited as required.



To copy a program file to or from a USB memory stick:

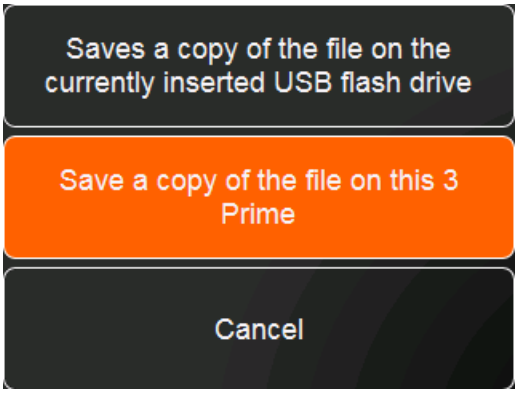
- Insert a USB memory stick into the port on the front of the unit.

A message screen will appear confirming that the USB memory stick has been inserted.



- Touch **Yes** to view the files on the USB memory stick or touch **Cancel** to view the files saved on the ^{3}Prime.
- Select a file to copy by touching the appropriate file button to highlight it.
- Touch **Copy**.

A message screen will appear giving the option of saving the file to the unit or to the USB memory stick.

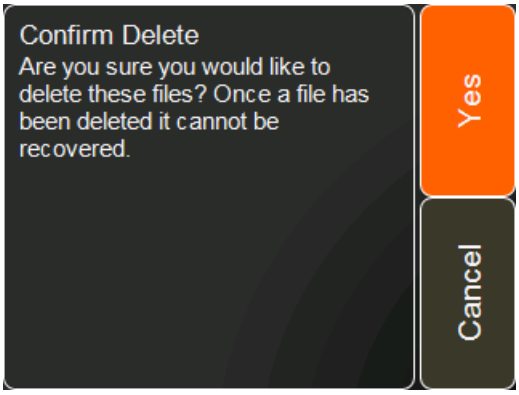


- Touch the upper button to save the file to the USB memory stick.
- Touch the lower button to save a copy of the file on the ^{3}Prime unit.
- Touch **Cancel** to return to the program list screen.

The file will be saved on the USB memory stick in a folder called FileSystem as a .cyclerprogram file and can be opened in the Techne Workbench PC software.

DELETE

Unused or old files can be permanently deleted from the unit or a USB memory stick.



- Select the file to delete by touching the appropriate file button.
- Touch **Delete**. A message box will appear asking for confirmation of delete.
- Touch **Yes** to confirm the delete.
- Touch **Cancel** to abort the delete.

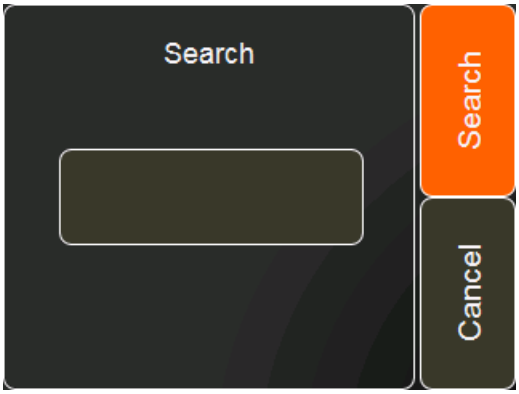
If the delete is confirmed, a message box will confirm that the files have been deleted.

- Touch **OK**.

SEARCH

Programs saved on the unit can be searched by program name.

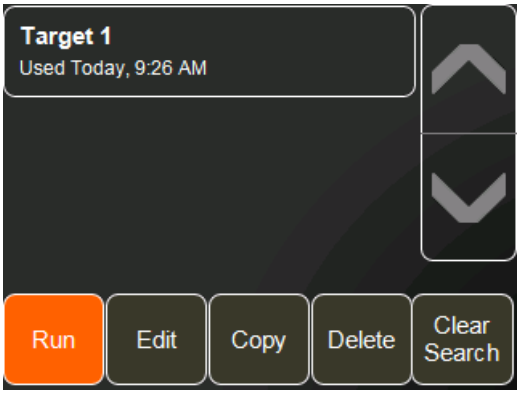
- Touch **Search** followed by the button on the Search screen.



- Enter a search term using the Text Entry screen. The first few characters of the program name are sufficient.
- Touch **Back** to return to the previous screen followed by **Search**.

All programs containing the search term will be listed.

- Touch Clear Search to remove the search term.



UPDATING THE ^{3}PRIME SOFTWARE

The ^{3}Prime software can be updated by downloading the latest version from the Techne website www.techne.com. You will need a USB memory stick on which to save the update.

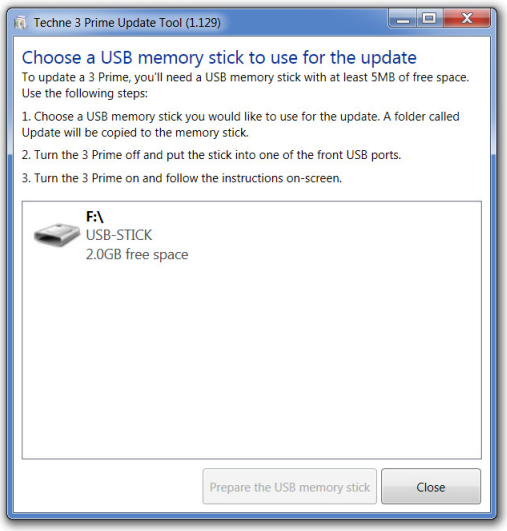
Note that the update tool requires at least Windows XP SP2 and the Microsoft .Net Framework 3.5 SP1, which, if needed, can be downloaded from:

http://www.microsoft.com/downloads/details.aspx?familyid=AB99342F-5D1A-413D-8319-81DA479AB0D7&displaylang=en

- From the website, click on **Support** followed by **Software Downloads**.
- Select the **^{3}Prime Update** and choose the option to run the file.
- Insert a USB memory stick into the PC and click to select.
- Click on **Prepare the USB memory stick**.

This will copy the update to the USB memory stick.

- Turn the ^{3}Prime off and insert the USB stick into the front USB port.
- Turn the ^{3}Prime on and follow the instructions on the screen.



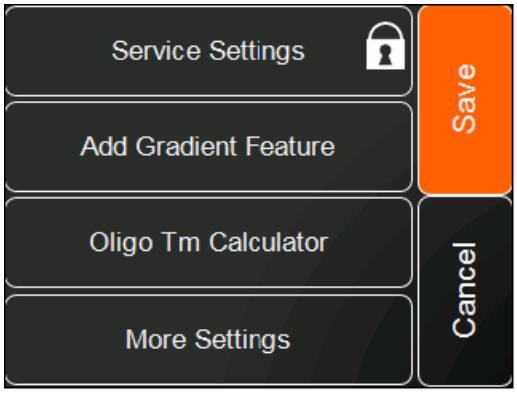
UPGRADING FROM ^{3}PRIMEX TO ^{3}PRIMEG

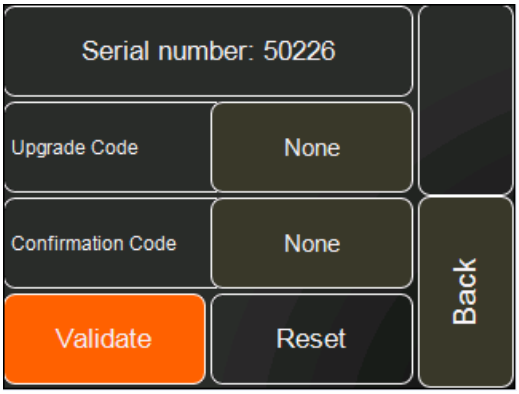
The ^{3}PrimeX thermal cycler can be easily and quickly upgraded to the gradient ^{3}PrimeG version by purchasing the 3PRIMEX/USB upgrade. The upgrade consists of a license certificate printed with a unique upgrade code which allows gradient functionality to be installed on any non-gradient Techne ^{3}PrimeX thermal cycler.

Purchase of this license certificate authorises the owner of any non-gradient Techne ^{3}PrimeX thermal cycler to lawfully utilise the gradient capability of that thermal cycler in all European and American geographies. The license is machine-specific and non-transferable.

Gradient upgrade procedure:

- Turn on the ^{3}PrimeX unit.
- On the home screen, touch **Settings** and then **More Settings**, followed by **Add Gradient Feature**.
- Go to the address www.techne.com. Click on **Support** then **Technical Support**. Under **Further Information** click on **Thermal Cycler Gradient Upgrade**.
- Insert the serial number from the ^{3}PrimeX into the website **twice** as instructed.
- Insert the upgrade code printed on the certificate into the website.
- Click **Show confirmation number**.
- Insert the upgrade code and confirmation number into the ^{3}PrimeX and touch **Validate**.
- The ^{3}PrimeX is now upgraded.





FAQS

Q1 How do I adjust the pressure of the heated lid for my tubes or plates?

A1 For thermal cyclers with lid adjustment knobs, rotate the knob anticlockwise until there is no pressure on the consumable, then close the lid and latch it. To obtain the correct pressure gently rotate the knob clockwise until it is possible to just feel the pressure being applied. Finally, rotate the knob a further quarter of a turn; the lid is now at the correct pressure for use with the consumable. Ensure that all consumables used in the block are of the same height and are spread evenly across the block. Insert empty “dummy” tubes if necessary to spread the pressure of the heated lid evenly.

Q2 What is the '”Pause” function at the start of the program used for?

A2 Some users prefer to preheat the heated lid before placing the samples into the unit. The pause feature is used to pause the unit after the 2 minute heated lid preheat step.

Q3 What is “Sample Cooling”?

A3 Sample cooling can be applied during the lid pre-heat phase. This maintains the block at 4ºC while the lid is heating to temperature and avoids any increase in sample temperature due to the heated lid before the thermal cycling program begins.

Q4 What is "Hot start"?

A4 The Hot Start step is used to pause the machine at a specific temperature, typically around 70°C, after the initial template denaturation. The reason is to allow the manual addition of unmodified *Taq* DNA polymerase which may lose activity if added during the initial denaturation step. Heat-activated *Taq* or Hot Start enzymes do not require this step.

Q5 What is the incremented time and temperature function for?

A5 Incremented/decremented time and temperature are used to increase or decrease either the time or temperature incrementally over the number of cycles in a stage. Incrementation of extension time is used with 'Long PCR' which is when large template fragments are to be amplified (e.g. 27kb lambda DNA, 40kb genomic DNA). Decremented temperature is used for protocols such as 'Touchdown PCR' where the first cycle starts with a high annealing temperature and over the number of cycles in the stage there is a gradual decrease in the temperature. This ensures that only the specific product is amplified.

Q6 What is a gradient thermal cycler?

A6 Gradient blocks enable a particular temperature step in a protocol to be programmed so that the temperature varies across the block. By specifying a temperature and the gradient to be applied, each column will achieve a different temperature. The set temperature is in the middle of the block, the lowest on the left and the highest on the right. The gradient is the total difference across the block, for example if the set temperature was 60°C and the gradient 10°C then the temperatures would range from approximately 55°C to 65°C from left to right.

Q7 Why is a temperature gradient required?

A7 The annealing temperature of the specific primers used in DNA amplification often requires optimisation. Instead of running multiple experiments with different annealing temperatures the gradient thermal cycler (^{3}PrimeG) allows the testing of up to 8 different annealing temperatures simultaneously.

TECHNICAL SUPPORT AND SERVICING

If you require further technical or application assistance please contact Techne at:

E-mail: technehelp@bibby-scientific.com.
Phone: +44 (0)1785 810433
Fax: +44 (0)1785 810405

For servicing information please contact:

Service Department
Bibby Scientific Ltd.
Beacon Road
Stone
Staffordshire
ST15 0SA
E-mail: service@bibby-scientific.com.
Phone: +44 (0)1785 810475
Fax: +44 (0)1785 810405

In the USA please contact service@techneusa.com or call +1 609 589 2560.

We are continually striving to improve our products and software. If you have any comments and suggestions on how we can do things better please send them to us at: techne@bibby-scientific.com.

ADDITIONAL INFORMATION

USER MAINTENANCE

Before cleaning your unit, disconnect it from the power supply. The outer case of the ^{3}Prime may be cleaned with a cloth dipped in water or ethanol (hexane or 50% methanol 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. The block may be wiped with water, ethanol or propan-2-ol and may be decontaminated by wiping with 2% Neutracon or 1% bleach solution.

Before using any cleaning or decontamination method except those recommended here, the responsible person should check with Techne that the proposed method will not damage the equipment.

FAULT FINDING

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.

Should you have any problems with your ^{3}Prime unit 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. Bibby Scientific Ltd. accepts 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.

FUSES

If the display on the front panel is not 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 and 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.

ACCESSORIES

The following accessories can be obtained from Bibby Scientific Ltd. or your Techne distributor:

Product code	Description
3PRIMEX/USB	^{3}PrimeX gradient upgrade

REPLACEMENT PARTS

The following replacement parts can be obtained from Bibby Scientific Ltd. or your Techne distributor:

Product code	Description
3PRIMEBASE/02/B	^{3}Prime block, 24 x 0.2ml
3PRIMEBASE/05/B	^{3}Prime block, 18 x 0.5ml
3PRIMEX/02/B	^{3}PrimeX block, 48 x 0.2ml
3PRIMEX/05/B	^{3}PrimeX block, 30 x 0.5ml
HH179(S)	UK 230V mains lead with plug
HH180(S)	European mains lead with plug
FCABLEUS	US mains lead with plug

Note: Exchange of thermal cycler blocks must be carried out by a trained service engineer.

Declaration of Conformity

Thermal Cycler Models ³Prime, Prime, Prime Elite, Prime Elite Satellite

These products comply with the requirements of the EU Directives listed below:

2004/108/EC **EMC Directive.**
2006/95/EC **Low voltage Directive (LVD)**

Compliance with the requirements of these Directives is claimed by meeting the following standards:

EN 61326-1:2006 (Electrical Equipment for Measurement, Control and Laboratory use).

EN 61010-1: 2001 (Safety Requirements Electrical Equipment for Measurement, Control and Laboratory use)

EN 61010-2-010: 2003 (Particular Requirements for Laboratory Equipment for Heating of Materials).

CE mark affixed 2012.

Signed: _____ (Mr S. Marriott)

Date: 6/11/12

Authority: Technical Director
Bibby Scientific Ltd

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