



Tecal 100
Operator's Manual

Issue 4 Date of issue: 18th December 2003.

Techne is a trade mark

© Techne, 1999.

CONTENTS

Tecal 100 Operator's Manual

	<i>page</i>
SAFETY and INSTALATION	
CE Declaration of Conformity	3
English	4
Français	6
Deutsch	8
Español	10
THE TECAL 100	12
Specification	13
Front Panel Keys	14
Programming Parameters	16
TEMPERATURE MEASUREMENT	
Connections	19
Temperature Measurement	20
RDT SIMULATION	
Connections	21
Use as an RTD Simulator	22
Ramp Function	23
ADDITIONAL INFORMATION	
Operator maintenance	24
Trouble Shooting	25



Tecne
Duxford
Cambridge
CB2 4PZ



Declaration of Conformity

Tecne Unit Tecal 100 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.

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.

This Declaration is controlled under an ISO 9001:2000 system certificated by BSI Quality Assurance, certificate number FM13585.

Signature

A handwritten signature in black ink that reads "B C Coombes".

Name B C Coombes

Position Quality Manager

Issue 2 18/12/2003

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 Operators 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;
- At all times USE COMMON SENSE.

Operator Safety

All Operators of Techne equipment must have available the relevant literature needed to ensure their safety.

It is important that only suitably trained personnel operate this equipment, in accordance with the instructions contained in this manual and with general safety standards and procedures. If the equipment is used in a manner not specified by Techne the protection provided by the equipment to the Operator may be impaired.

All Techne units have been designed to conform to international safety requirements.

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

After use

When you have finished heating samples, remember that parts of the sensor 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 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 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.

Operator maintenance

NOTE: THAT THIS EQUIPMENT SHOULD ONLY BE DISMANTLED BY PROPERLY TRAINED PERSONNEL.

THERE ARE NO OPERATOR MAINTAINABLE PARTS WITHIN THE EQUIPMENT.

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

Cleaning

Before cleaning your unit ALWAYS disconnect it from the power supply .

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.

Contact Information

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

Veillez 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.
- 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. 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.

Après utilisation

Lorsque vous avez fini de chauffer les échantillons, n'oubliez pas que certaines parties de l'appareil 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 visde 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 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, 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 leurs composants.

Entretien utilisateur

IMPORTANT : CET APPAREIL NE PEUT ETRE DEMONTE QUE PAR DU PERSONNEL QUALIFIE.

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.

Nettoyage

Avant de nettoyer l'appareil, assurez-vous TOUJOURS que le câble d'alimentation est déconnecté.

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.

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.
- 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
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 Gerätes übereinstimmen. Verbinden Sie das Stromanschlußkabel mit einer geeigneten Stromversorgung gemäß der nächstehenden Tabelle.

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 Techn hiermit das Recht vor, Änderungen an den Geräten bzw. an einzelnen Geräteteilen durchzuführen.

Diese Gebrauchsanleitung wurde ausschließlich dazu erstellt, um Kunden die Handhabung der Techn-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.

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 Techn keine Haftung bei Transportschäden aufgrund unzureichender Verpackung übernehmen. Setzen Sie sich im Zweifelsfall mit Ihrem Lieferanten in Verbindung. Bitte beachten Sie die Entgiftungsbescheinigung, die Sie mit dem Gerät erhalten haben.

Reinigen

Bevor Sie Ihr Gerät reinigen, sollten Sie zuerst den Netzstecker ziehen.

Ein feuchtes Tuch mit Seifenlösung reinigt Ihr Gerät am besten. Achten Sie darauf, daß kein Wasser in das Gerät gelangt. Verwenden Sie keine Scheuermittel.

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;
- 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.

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. La placa indicadora está situada en la parte posterior del equipo.

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 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 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 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.

Limpieza

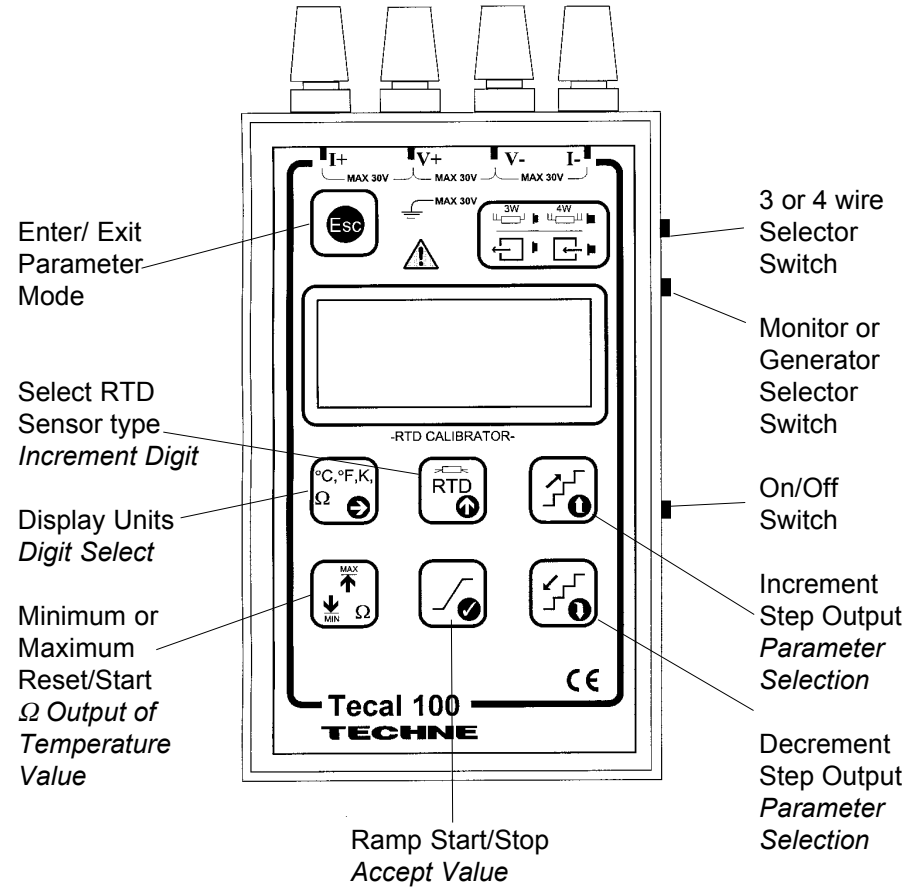
Antes de limpiar su aparato, desconéctelo SIEMPRE de la fuente de alimentación.

Este aparato se puede limpiar pasándole un paño húmedo enjabonado. Hágalo con cuidado para evitar que caiga agua dentro del mismo. No utilice limpiadores abrasivos.

THE TECAL 100

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

The Tecal 100 calibrator is a microprocessor based instrument for use in the process control industry to perform a check of the calibration of resistance thermometer input instruments.



The Battery

The Tecal 100 contains a rechargeable NiCad Battery pack.

However we recommend that you use the power pack which Techne supply with the unit. Connect the 12V DC, 100mA Power Pack to the Tecal 100 via the 1.3mm internal diameter, centre positive, charger socket.

For battery recharging see 'Operator Maintenance' later in this manual.

Specification

Element	Alpha Coeff	Centigrade		Fahrenheit	
		Range	Error	Range	Error
Pt 100 DIN	0.003850	-196 to 250	0.05	-320 to 482	0.09
		250 to 850	0.07	482 to 1562	0.13
Pt 200 DIN	0.003850	-200 to 250	0.05	-330 to 482	0.09
		250 to 850	0.07	482 to 1562	0.13
Pt 500 DIN	0.003850	-200 to -50	0.07	328 to -88	0.13
		-50 to 158	0.30	-88 to 316	0.54
		158 to 850	0.50	316 to 1562	0.90
Pt 1000 DIN	0.003850	-200 to -150	0.07	-330 to -238	0.13
		-150 to -50	0.30	-238 to -88	0.54
		-50 to 443	0.50	-88 to 829	0.90
Pt 100 US	0.003916	-100 to 250	0.05	-178 to 482	0.09
		250 to 457	0.07	482 to 855	0.13
Pt 500 US	0.003916	-100 to -50	0.07	-178 to -88	0.13
		-50 to 154	0.30	-88 to 279	0.54
		154 to 457	0.50	279 to 855	0.90
Ni 120	0.006180	-50 to 180	0.10	-88 to 326	0.18
Ni 1000	0.006180	-50 to 180	0.50	-88 to 326	0.90

Resistance

	Monitor	Generation
Range Ω	Error	Error
20 to 400	0.03 Ω	0.03 Ω
400 to 800	0.10 Ω	0.10 Ω
800 to 2620	0.20 Ω	0.20 Ω

Accuracy: Error \pm 1 digit

Battery Life: > 30 hours (NiCad rechargeable)

Size: 157 x 90 x 45mm (6" x 3 1/2" x 1 3/4")

Weight: 0.55 Kg (19oz)

Front Panel Keys

Enter or Exit the Parameter Mode

The 'Esc' key enables you to move from the normal operating mode to the Parameter mode. The Parameter mode is used to change the stored operating parameters of the Tecal 100.

**Display Units*****Digit Select***

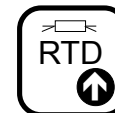
The Display Units key allows the user to select the units of measurement or generation.

In Parameter mode this key is used to select the digit of the parameter value that is to be changed. This function operates in a wrap round fashion so that the cursor will return to the beginning of the number if operated continuously.

**RTD Sensor Type*****Increment Digit***

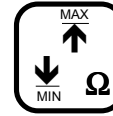
The Sensor Type key allows you to select the element and alpha of the sensor being used. 8 programmable elements and 4 factory set alphas are included.

In parameter mode this key is used to increment the digit that has been selected. This function operates in a wrap round fashion so that the digit value will return to the beginning if operated continuously.



In Monitor mode this key initialises the MIN/MAX function, setting the starting values to the current measured value. If any key is operated the Tecal 100 will drop out off the MIN/MAX mode

In Generator mode this key allows you to inspect the ohms value of the current output.



Ramp

Accept Value

In Generator mode this key starts or stops the ramp function

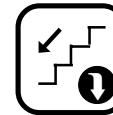
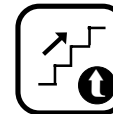
In Parameter mode this key is used to accept the programmed value of the parameter.



Increment & Decrement *Parameter Selection*

In Generator mode these keys are used to increment and decrement the output in 5 steps from 0% to 100%.

In Parameter mode these keys allow you to scroll through the parameters so that you can select the parameter to change. This function operates in a wrap round fashion so that the digit value will return to the beginning if operated continuously.



Programming Parameters

- Set the Monitor or Generator selector to Generator, ie the switch should

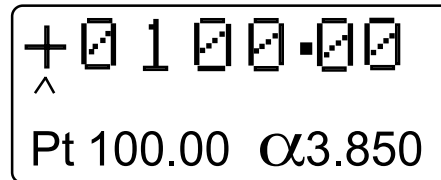
Programming Parameters

The Tecal 100 is fitted with a nonvolatile memory to store calibration data and user parameters. The user parameters include:

Sensor Element Value	0% of Generator Output
Ramp Rate	100% of Generator Output
Ramp Dwell Period	

Element Parameter

- Set the Monitor or Generator selector to Monitor, ie the switch should be 'out'.
- Press the 'Esc' key to enter the Parameter Mode.
- The display shows the current element value and a ^ cursor under the first digit.
- Use the 'Digit Select' key to move the cursor to a position underneath the digit to be changed.
- Use the 'Increment Digit' key to change the digit value.
- When the parameter is set to the value you require, store the data with the 'Accept Parameter' key.
- To return to the normal operational mode without accepting the changed values, press the 'Esc' key.



Generator Parameters

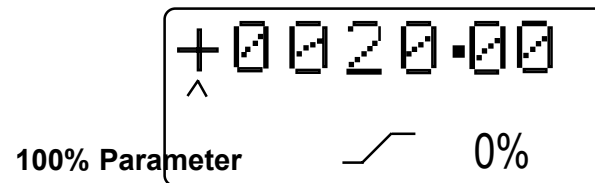
When you enter the Parameter Mode, the display will first show the 0% value. To move to other Generator parameters press the 'Increment' or 'Decrement' keys. The screens will scroll round to 0% again. Each parameter that is changed must be accepted by pressing the 'Accept' key before moving on to another parameter.

The 0% and 100% values are used for both the ramp and stepped output function. In stepped mode, 5 equal steps are computed from the 0% value to the 100% value. For example if the 0% value is 20 and the 100% value is 500 then the five steps will be:

$$0\% = 20\Omega; \quad 25\% = 140\Omega; \quad 50\% = 260\Omega; \quad 75\% = 380\Omega; \quad 100\% = 500\Omega$$

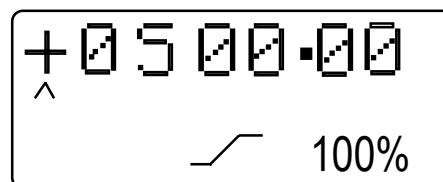
be 'in'.

- Press the 'Esc' key to enter the Parameter Mode.
- The display shows the 0% value and a ^ cursor under the first digit.
- Use the 'Digit Select' key to move the cursor to a position underneath the digit to be changed.
- Use the 'Increment Digit' key to change the digit value.
- When the parameter is set to the value you require, store the data with the 'Accept Parameter' key.
- To return to the normal operational mode without accepting the changed values, press the 'Esc' key.



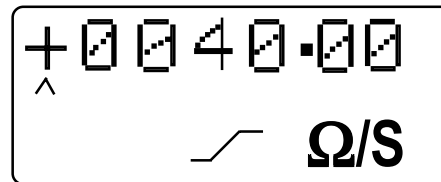
- Set the Monitor or Generator selector to Generator, ie the switch should be 'in'.
- Press the 'Esc' key to enter the Parameter Mode.
- The display shows the 0% value and a ^ cursor under the first digit.
- Use the 'Digit Select' key to move the cursor to a position underneath the digit to be changed.
- Use the 'Increment Digit' key to change the digit value.
- When the parameter is set to the value you require, store the data with the 'Accept Parameter' key.
- To return to the normal operational mode without accepting the changed values, press the 'Esc' key.

Ramp Rate

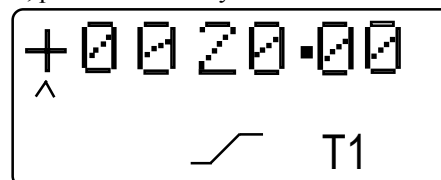


Ramp Rate

- Set the Monitor or Generator selector to Generator, ie the switch should be 'in'.
- Press the 'Esc' key to enter the Parameter Mode.
- The display shows the 0% value and a ^ cursor under the first digit.
- Use the 'Digit Select' key to move the cursor to a position underneath the digit to be changed.
- Use the 'Increment Digit' key to change the digit value.
- When the parameter is set to the value you require, store the data with the 'Accept Parameter' key.
- To return to the normal operational mode without accepting the changed values, press the 'Esc' key.

**Ramp Dwell**

- Set the Monitor or Generator selector to Generator, ie the switch should be 'in'.
- Press the 'Esc' key to enter the Parameter Mode.
- The display shows the 0% value and a ^ cursor under the first digit.
- Use the 'Digit Select' key to move the cursor to a position underneath the digit to be changed.
- Use the 'Increment Digit' key to change the digit value.
- When the parameter is set to the value you require, store the data with the 'Accept Parameter' key.
- To return to the normal operational mode without accepting the changed values, press the 'Esc' key.



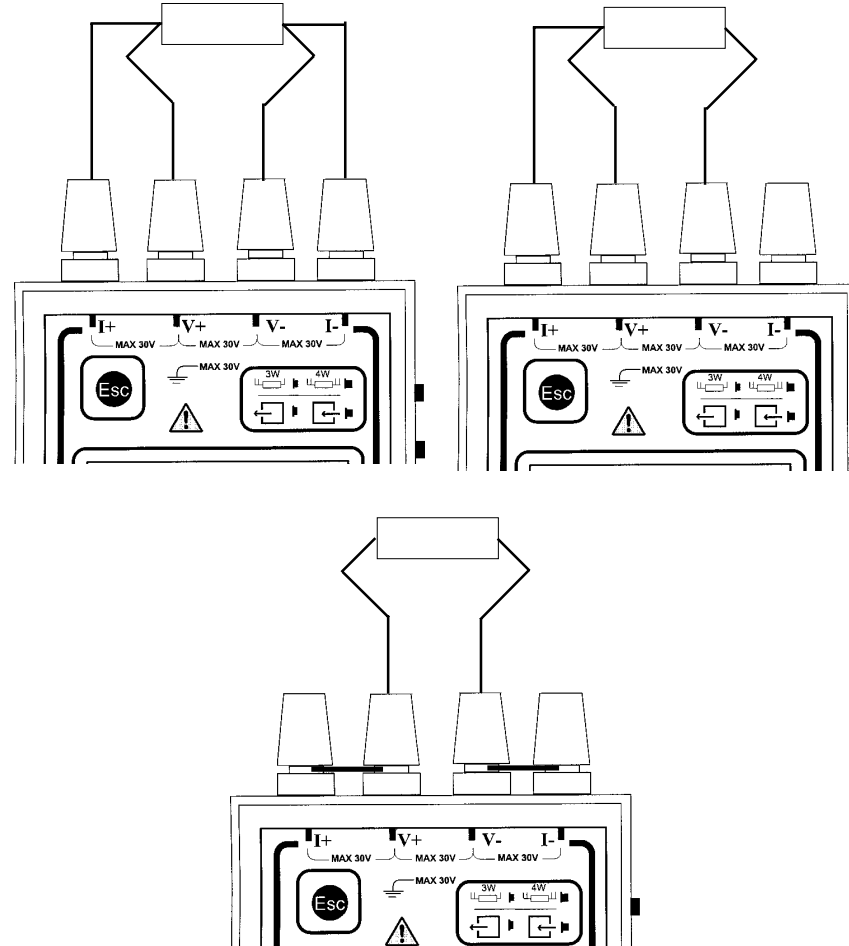
TEMPERATURE MEASUREMENT

Connections

For accurate temperature measurement a 4-wire Pt100 sensor should be used. These are widely available, with a range of accuracies. 4-wire connection provides the best arrangement for compensation of the connecting leads and is highly recommended for accurate temperature measurement. Ensure the 3 or 4 wire switch is "out".

3-wire sensors may be used for less critical measurements. 2-wire systems are not recommended but if it must be used, short out the terminals as shown below. Ensure the 3 or 4 wire switch is "in".

Connect the wires as follows:



Temperature Measurement

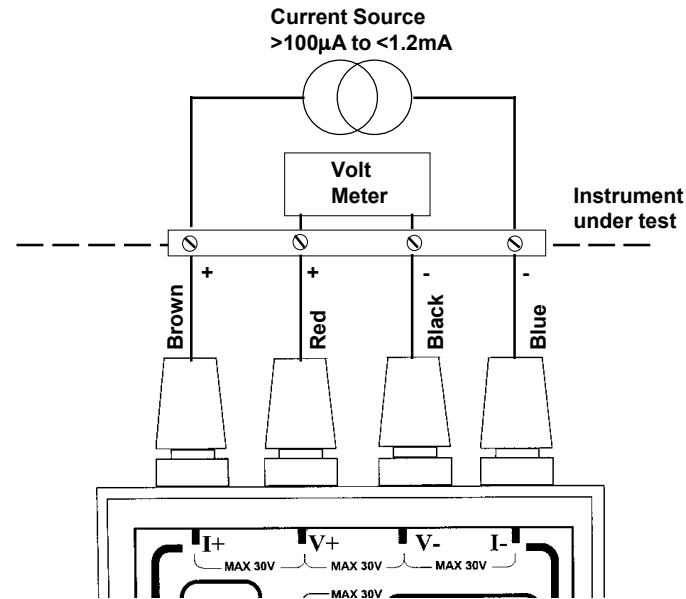
- Set the Monitor or Generator selector to Monitor, ie the switch should be 'out'.
- Switch the instrument on.
- Press the 'Select RTD Sensor Type' key to select the desired element and alpha. If the element you are using is not shown, select an element with the correct 'alpha' and adjust the resistance to suit the exact value of the element used at 0°C. See the "Programming Parameters" section for details of how to change these settings.
- Press the 'Display Units' key to select the units you want the display to show and the instrument to work in.

The display will now show the measured temperature of the sensor in the units selected.

RTD SIMULATION

Connections

To use the Tecal 100 to simulate a 4 terminal resistor/sensor the polarity of the connections is critical. In 4-wire resistance measurement a constant current is driven through the resistor via one pair of wires, whilst the voltage which is developed across the resistor is measured with a second pair of wires. This technique eliminates any connection or line resistance from the measurement. The connections are shown in the diagram. For 2 or 3 wire connections, short out the outside pairs of terminals as required.



The Tecal 100 may have difficulty working with Auto-ranging or multiplexing instruments. These functions should be disabled before connecting the Tecal 100 to the instrument. It should be connected to a simple DC resistance meter as shown.

Use as an RTD Simulator

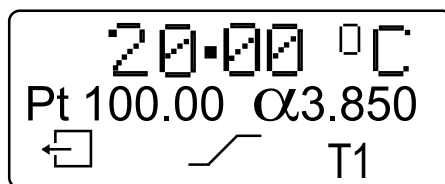
- Set the Monitor or Generator selector to Generator, ie the switch should be "in". Switch the instrument on.
- Press the 'Select RTD Sensor Type' key to select the desired element and alpha. If the element you want to use is not shown, select an element with the correct 'alpha' and adjust the resistance to suit the exact value of the element used, at 0°C. See the 'Programming Parameters' section for details of how to change these settings.
- Press the 'Display Units' key to select the units you want the display to show and the instrument to work in.
- Press the 'Increment' key or the 'Decrement' key to select the % step and output value. See the "Programming Parameters" section to change these settings.

Once the step value has been selected the Tecal 100 will ramp at high speed to the desired value. Any instability in the load will be seen as an unsteady output reading.

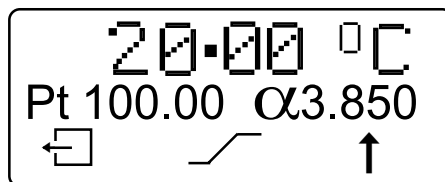
To inspect the ohms value of a given output press and hold down the 'Ohms Value' key.

Ramp Function

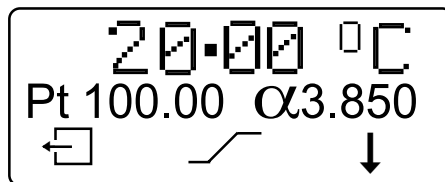
- The output of the Tecal 100 can be ramped between 0% and 100%. To set the upper and lower values and the ramp rate see the "Programming Parameters" section.
- Press the 'Ramp Start/Stop' key to start the instrument ramping. The ramp function will delay for a period set by the Dwell parameter. Then it will ramp between 0% and 100%. There it will again dwell for the time set before returning to 0%.
- This cycle will repeat continuously until the 'Ramp Start/Stop' key is pressed again.
- The ramp mode may be forced to the next stage at any time by pressing the 'Increment' or 'Decrement' keys.



Ramp Display in Dwell mode



Ramp Output increasing



Ramp Output decreasing

ADDITIONAL INFORMATION

Operator Maintenance

NOTE THAT THIS EQUIPMENT SHOULD ONLY BE DISMANTLED BY PROPERLY TRAINED PERSONNEL. THERE ARE NO OPERATOR MAINTAINABLE PARTS WITHIN THE EQUIPMENT.

In the unlikely event that you experience any problems with your Tecal 100 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. Tecal accept no responsibility for damage to units which are not properly packed for shipping: if in doubt, contact your supplier.

Cleaning

Before cleaning your unit ALWAYS disconnect from the power supply. Your Tecal 100 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.

The Battery

The Tecal 100 is powered by a rechargeable NiCad Battery pack. The battery compartment cover gives access to the battery but it is fixed into the unit and cannot be removed.

The Tecal 100 contains the battery charger electronics so that any available 12V DC power source may be used, including a car battery.

To recharge the battery, connect a 12V DC, 100mA supply to the Tecal 100 via the 1.3mm internal diameter charger socket.

Full battery recharge will take approximately 14 hours with the instrument switched off. With the instrument switched on the recharge will take approximately 20 hours.

Trouble Shooting

The following information may be helpful to solve problems when the instrument is in use. Should the instrument still not give the performance expected please contact your dealer or Techne Sales Office.

In Monitor mode the Display shows $^{^^}.^{^^}$

Possible cause	Solution
Incorrect RTD type selected	Select the correct RTD type See "Temperature Measurement".
Incorrect wire connections	Correct wiring See "Connections"
Sensor open circuit	Check sensor and replace if necessary.
Measured temperature is outside range	See "Specification"

In Generator mode the Display shows $^{^^}.^{^^}$ or Output Fails to Settle

Passible cause	Solution
Incorrect wire connections	Correct wiring and check polarity See "Connections"
Excitation current from the circuit under test is too high or too low	Check circuit. Minimum 100 μ A Minimum 3mA Dependant upon RTD type
Circuit under test is multiplexer type	Cannot be used

