

GREYBODY SOURCE MODEL 975

User Maintenance Manual/Handbook

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The company is always willing to give technical advice and assistance where appropriate. Equally, because of the programme of continual development and improvement we reserve the right to amend or alter characteristics and design without prior notice. This publication is for information only.



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CE EMC INFORMATION

This product meets the requirements of the European Directive on Electromagnetic Compatibility (EMC) 89/336/EEC as amended by EC Directive 92/31/EEC and the European Low Voltage Directive 73/25/EEC, amended by 93/68/EEC. To ensure emission compliance please ensure that any serial communications connecting leads are fully screened.

The product meets the susceptibility requirements of EN 50082-1, criterion B.

Symbol Identification	Publication	Description
	ISO3864	Caution (refer to manual)
	IEC 417	Caution, Hot Surface

ELECTRICAL SAFETY

This equipment must be correctly earthed.

This equipment is a Class I Appliance. A protective earth is used to ensure the conductive parts cannot become live in the event of a failure of the insulation.

The protective conductor of the flexible mains cable which is coloured green/yellow **MUST** be connected to a suitable earth.

The Blue conductor should be connected to Neutral and the Brown conductor to Live (Line).

Warning: Internal mains voltage hazard. Do not remove the panels.

There are no user serviceable parts inside. Contact your nearest Isotech agent for repair.

Voltage transients on the supply must not exceed 2.5kV.

Conductive pollution, e.g. Carbon dust, must be excluded from the apparatus. EN61010 pollution degree 2.

ENVIRONMENTAL RATINGS

Operating Temperature 0-50°C

Relative Humidity 5-95%, non condensing

HEALTH AND SAFETY INSTRUCTIONS

1. Read this entire manual before use.
2. Wear appropriate protective clothing.
3. Operators of this equipment should be adequately trained in the handling of hot and cold items and liquids.
4. Do not use the apparatus for jobs other than those for which it was designed, i.e. the calibration of thermometers.
5. Do not handle the apparatus when it has hot (or cold), unless wearing the appropriate protective clothing and having the necessary training.
6. Do not drill, modify or otherwise change the shape of the apparatus.
7. Do not dismantle the apparatus.
8. Do not use the apparatus outside its recommended temperature range.
9. If cased, do not return the apparatus to its carrying case until the unit has cooled.
10. There are no user serviceable parts inside. Contact your nearest Isotech agent for repair.
11. Ensure materials, especially flammable materials are kept away from hot parts of the apparatus, to prevent fire risk.

GUARANTEE

This instrument has been manufactured to exacting standards and is guaranteed for twelve months against electrical break-down or mechanical failure caused through defective material or workmanship, provided the failure is not the result of misuse. In the event of failure covered by this guarantee, the instrument must be returned, carriage paid, to the supplier for examination and will be replaced or repaired at our option.

FRAGILE CERAMIC AND/OR GLASS PARTS ARE NOT COVERED BY THIS GUARANTEE

INTERFERENCE WITH OR FAILURE TO PROPERLY MAINTAIN THIS INSTRUMENT MAY INVALIDATE THIS GUARANTEE

RECOMMENDATION

The life of your **ISOTECH** Instrument will be prolonged if regular maintenance and cleaning to remove general dust and debris is carried out.

We recommend that this instrument to be re-calibrated annually.



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INTRODUCTION

The Grey Body is a portable, lightweight temperature source, primarily designed for use with radiation thermometers and thermal imaging systems. The unit has a target area of 70mm in diameter. The unit is capable of maintaining a temperature set by its controller between 50°C and 350°C and can reach its upper ceiling temperature in 35 minutes. The unit achieves an overall stability of $\pm 1^\circ\text{C}$.

The 975 is compact, of rugged construction and is completely self contained. It is controlled by state of the art micro-processor controller, which is easy to use and gives quick, accurate results. The Grey Body is not intended for highly accurate calibration, for a truly dedicated Black Body Source the Gemini R Model 976 should be considered.

The performance will be determined by the method of use. The preferred method is by direct comparison with a calibrated radiation surface thermometer.

FEATURES OF THE INSTRUMENT

DISC ASSEMBLY

The underside of the "calibration" disc is recessed to accommodate a spirally-disposed mineral-insulated ohmic heater, which is enclosed by fitting a supplementary disc beneath it. The whole assembly is contained in a bed of insulating material (Kaowool).

HEAT INPUT AND CONTROL

The front panel holds the mains switch, which incorporates a neon indicator lamp, and the fascia of the Eurotherm 2216 temperature controller used to operate the heating system. The operating parameters of the controller include a pre-set upper limit to the operating temperature.

SPECIFICATION

Operating temperature range:	50°C to 350°C
Power consumption: (mains lead attached)	180W (220/240V or 110/120V, 50/60Hz)
Temperature controller:	Eurotherm 2216. Operated by N-type thermocouple set 3mm below centre of upper surface of disc. Heated disc detail: Mineral-insulated heater internally mounted in 2-disc assembly. Diameter of disc: 70mm Diameter of well for heat transfer medium: 71mm Depth of well: 2mm
Emissivity:	>0.95
Approximate time (from ambient) to reach stability at maximum set-point temperature:	30 minutes
Dimensions of outer casing:	Width: 230mm Height: 115mm Depth: 225mm

INSPECTION ON RECEIPT

Carefully examine the instrument for any signs of damage that may have occurred during transit.

In the event of damage, immediately inform the carrier and the supplier (Isotech or agent) and retain the instrument and packaging material as nearly as possible in its as-received condition, for possible inspection by an insurance assessor.

OPERATION OF THE INSTRUMENT

When first switched on, the controller self-check procedure is initiated.

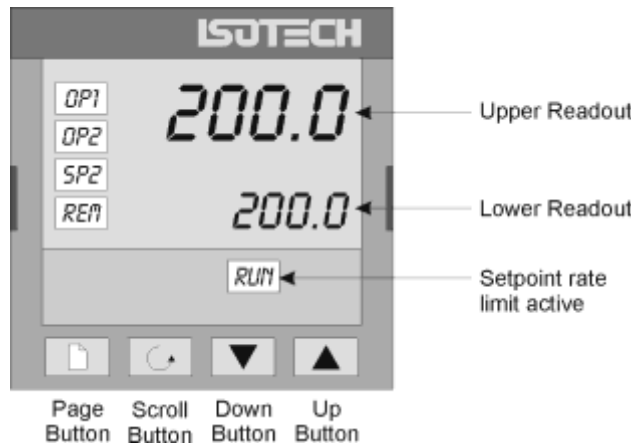
Thereafter, depressing either the up or down buttons will access the set-point value. Adjustment (up to the pre-set operating limit) can then be effected by means of the up and down buttons once again.

There is no facility incorporated for cooling, the control range being 50°C to 350°C means naturally cooling is sufficient.

Stability of temperature at the selected set-point should be established within about 30 minutes of switching on at ambient temperature.

OPERATING THE CONTROLLER

FRONT PANEL LAYOUT



The Temperature Controller

The controller has a dual display, the upper display indicates the nominal block temperature, and the lower display indicates the desired temperature or setpoint.

Altering the Setpoint

To change the setpoint of the controller simply use the UP and DOWN keys to raise and lower the setpoint to the required value. The lower display changes to indicate the new setpoint.

ADVANCED CONTROLLER FEATURES

Setpoint Ramp Rate

By default the plates are configured to heat (and cool) as quickly as possible. There may be some calibration applications where it is advantageous to limit the heating (or cooling rate).

The plate can have its heating rate limited with the Setpoint Ramp Rate feature. This feature is accessed from the Scroll key. Depress the key until the display shows,

SPrr

On the Upper Display, the lower display will show the current value from OFF (default) to 999.9. The desired rate is set here with the UP and DOWN keys, the units are °C/min.

When the SPrr is active the controller display will show "RUN", the lower setpoint display will now automatically update with the current value, known as the working setpoint. The setpoint can be seen by pressing either the UP and DOWN key.

The Setpoint ramp rate operates when the bath is heating and cooling.

Instrument Address

The controller has a configurable "address" which is used for PC communications. Each instrument has an address; this allows several instruments to be connected in parallel on the same communications bus. The default value is 1. This address would only need to be changed if more than one plate (dry block) is connected to the same PC port.

To check the Address value press the scroll key until the top display indicates,

Addr

The lower display will show the current value that can be modified with the UP and DOWN keys.

MONITORING THE CONTROLLER STATUS

A row of beacons indicate the controllers status as follows,

OP1	Heat Output
OP2	Cool Output (Only for models which operate below 0°C)
REM	This beacon indicates activity on the PC interface

UNITS

Momentary pressing the Scroll key will show the controller units °C or °F.

USING THE PC INTERFACE

This model includes an RS422 PC interface and a special converter cable that allows use with the standard RS232 port. When using the bath with an RS232 port it is essential that this converter cable is used. Replacement cables are available from Isotech, part number ISO-232-432. A further lead is available as an option, Part Number ISO-422-422 lead which permits up to 5 instruments to be daisy chained together.

The benefit of this approach is that a number of calibration baths may be connected together in a "daisy chain" configuration - and then linked to a single RS232, see diagram.



Note: The RS 422 standard specifies a maximum lead length of 1200M (4000ft). A true RS422 port will be required to realise such lead lengths. The Isotech conversion leads are suitable for maximum combined lead lengths of 10M that is adequate for most applications.

CONNECTIONS

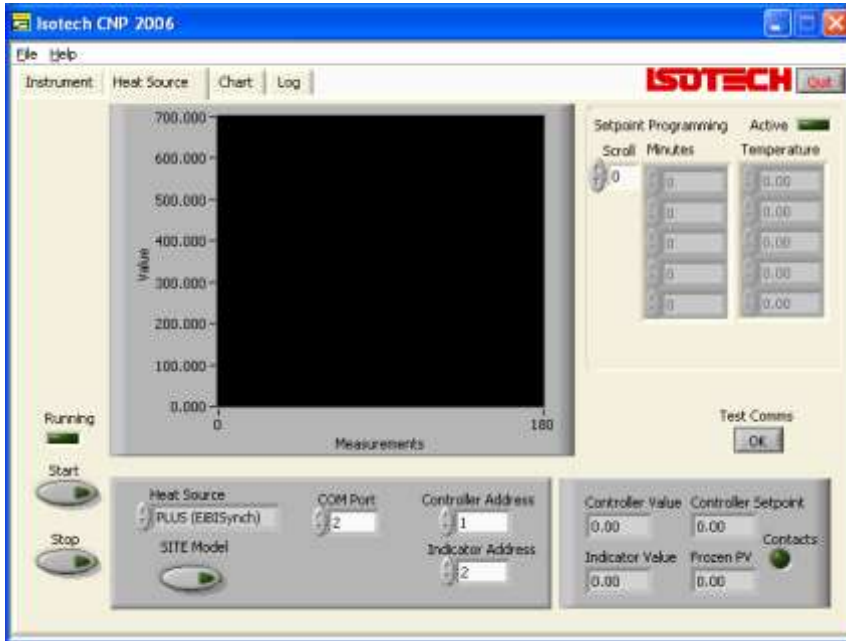
For RS232 use simply connect the Isotech cable, a 9 to 25 pin converter is included to suit PCs with a 25 pin serial converter.

RS422 Connections

Pin	Connection
4	Tx+ A
5	Tx- B
8	Rx+ A
9	Rx- B
1	Common

CAL NOTEPAD

Cal Notepad can be used to log and display values from the Dry Blocks and an optional temperature indicator such as the milliK or TTI-10. The software requires Windows 9X, XP, a minimum of 5Mb of free hard drive space and free serial ports for the instruments to be connected.



DEVELOPMENT

Cal NotePad was developed by Isothermal Technology using LabVIEW from National Instruments. The license details are shown on the download page and in the Cal Notepad manual.

HOW TO INSTALL CAL NOTEPAD

1. Download the ZIP from <http://www.isotech.co.uk/downloads> (7.6Mb)
2. Extract the files to a temporary folder
3. Run setup.exe



4. Follow the prompts which will install the application, a user manual with setup information and the necessary LabVIEW run time support files.
5. Should you ever need to uninstall the software then use the Add/Remove Programs option from the Control Panel.

PROTOCOL

The instruments use the "Modbus Protocol"

If required, e.g. for writing custom software the technical details are available from our Document Library at <http://www.isotech.co.uk>

MAINTENANCE

Each unit is fully tested before despatch from the facility and does not require the specification of a regular servicing/maintenance routine.

In the unlikely event of failure or of the incidence of a fault condition, the unit should be returned, carriage-paid, to Isotech (or its agent) for inspection and repair.