CRYO CALIBRATOR
MODEL ISIS

User Maintenance Manual/Handbook

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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 BSEN 61000-6-1:2001.

Symbol Identification	Publication	Description
	ISO3864	Caution (refer to handbook)
	IEC 417	Caution, Hot Surface
		Caution, Low Temperature Surface

⚠ ELECTRICAL SAFETY

This equipment must be correctly earthed.

This equipment is a Class 1 Appliance. A protective earth is used to ensure the conductive parts can not 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.

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.

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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.

⚠ CAUTIONARY NOTE

ISOTECH PRODUCTS ARE INTENDED FOR USE BY TECHNICALLY TRAINED AND COMPETENT PERSONNEL FAMILIAR WITH GOOD MEASUREMENT PRACTICES.

IT IS EXPECTED THAT PERSONNEL USING THIS EQUIPMENT WILL BE COMPETENT WITH THE MANAGEMENT OF APPARATUS WHICH MAY BE POWERED OR UNDER EXTREMES OF TEMPERATURE, AND ARE ABLE TO APPRECIATE THE HAZARDS WHICH MAY BE ASSOCIATED WITH, AND THE PRECAUTIONS TO BE TAKEN WITH SUCH EQUIPMENT.

⚠ HEALTH AND SAFETY INSTRUCTIONS

1. Read this entire handbook 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 is 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 without disconnecting it from the supply and leaving time for it to reach ambient temperatures.

8. Do not use the apparatus outside its recommended temperature range

⚠ CAUTION

1. Please use the insulated lid during the apparatus operation.
2. Always use a suitable insert for the application.
3. Take care when pressing the controller buttons. Do not use excessive force.
4. Only use the correct handles for lifting and moving.
5. Do not drop the equipment, this may sustain irreversible damage.
6. Take care when removing a sensor, especially if at low temperatures.
7. Please keep the distance between the apparatus and the back wall be more than 5cm.
8. Do not subject the equipment to intense electromagnet interference.
9. Do not obstruct the ventilation ducts.
10. If using alcohol, replace regularly to ensure performance.
11. Use alcohol sparingly.
12. This apparatus is designed for use in the following environment:

    - Indoor use only.
    - At less than 1000m altitude.
    - Ambient temperature range 0 ~ 35°C, relative humidity 30 ~ 85%RH.
    - No corrosive/flammable gases e.g. Do not use in an explosive atmosphere.
    - Power supply voltage is to be between the nominal voltage ±10%.

INTRODUCTION

The Isis Dry Block offers operation to temperatures as low as -100°C, and is currently the only block bath working to such a low temperature. Now it is possible to calibrate temperature sensors such as PRTs, Thermocouples and Thermistors at ultra low temperatures without the need for a liquid bath.

Portability and Safety

Unlike a liquid bath the Isis requires no costly, or hazardous fluids and offers greater portability. This will be of particular value to calibration engineers working on site with low temperature freezers as encountered in pharmaceutical, aeronautical and food environments.

The minimum operating temperature is less than stirred liquid laboratory calibration baths and users in laboratories will also benefit by avoiding the ongoing need for expensive fluids.

The maximum operating temperature is 40°C.

Cooling Technology

The Isis makes use of a Free Piston Stirling Cooler (FPSC) which provides a massive 80 Watts of cooling power to the calibration block. Specialist materials, patent applied for, are used for the heat transfer from the FPSC to the block.

Operating Life

Reliability is a prime attribute of this revolutionary new product. Testing at 20,000 hours (nominally equivalent to 10 years at 40 hours use each week) shows that -100°C is still possible, with an increase in cooling time <10%.

Benefits

Isotech can offer full support with options for UKAS / ILAC calibration, tutorial on getting the best calibration uncertainties and a full range of supporting reference thermometers, indicators and software.

The Isis has a large insert 35mm diameter by 160mm deep. This allows for calibration of multiple sensors. For thermal validation applications there is an insert with pockets for a reference probe (6.5mm) and 20 x 3.5mm pockets for thermocouples. This allows a single calibration cycle to validate up to 20 probes at a time.

UNPACKING AND INITIAL INSPECTION

This equipment uses custom designed packaging to send you your unit, but as accidents can still happen in transit, you are advised, after unpacking the unit, to inspect it for any sign of shipping damage, and confirm that your delivery is in accordance with the packing note. If you find any damage or that part of the delivery is missing notify us or our agent, and the carrier immediately. If the unit is damaged you should keep the packing for possible insurance assessment.

While this apparatus has already been inspected at the factory, please check as follows;

1. Read this ensure manual thoroughly.

2. Familiarise yourself with the layout of the equipment.

3. Connect to a suitable electrical supply and switch on.

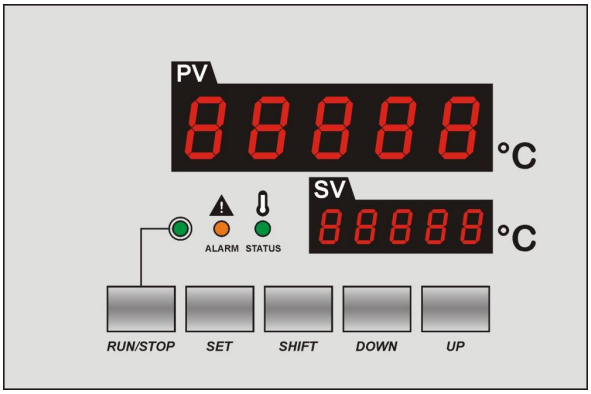
4. The cooling fan should be heard and the controller illuminated during power up.

5. Check the function of the equipment using the quick start guide on next page (page 11).

QUICK START GUIDE

This guide gives a general summary of the steps required to set the apparatus up and operate it.

This guide does not replace the manual and should be used only in conjunction with the correct manual supplied with the bath.



ISIS control front panel

1. Place the required insert into the temperature well and place the insulated lid in place.
2. Connect the ISIS to a suitable power supply and power up.
3. After power up the controller will be active.
4. To select the desired temperature, follow the procedure below:
   - Allow the controller to boot up
   - Press the SET button momentarily and remove finger
   - The lower green display will read the current block temperature, the upper red display will display the previous setpoint
   - Select the desired set point by pressing the SHIFT button, select the required digit and change the value with the up/down buttons
   - Once the desired set point is displayed then press the SET button again to enter the value
   - Exit this level of the controller by pressing the RUN/STOP button for 5 seconds.
5. The FPSC engine can now be heard running as the equipment approaches setpoint
6. When finished select a further setpoint or switch off

Notes:

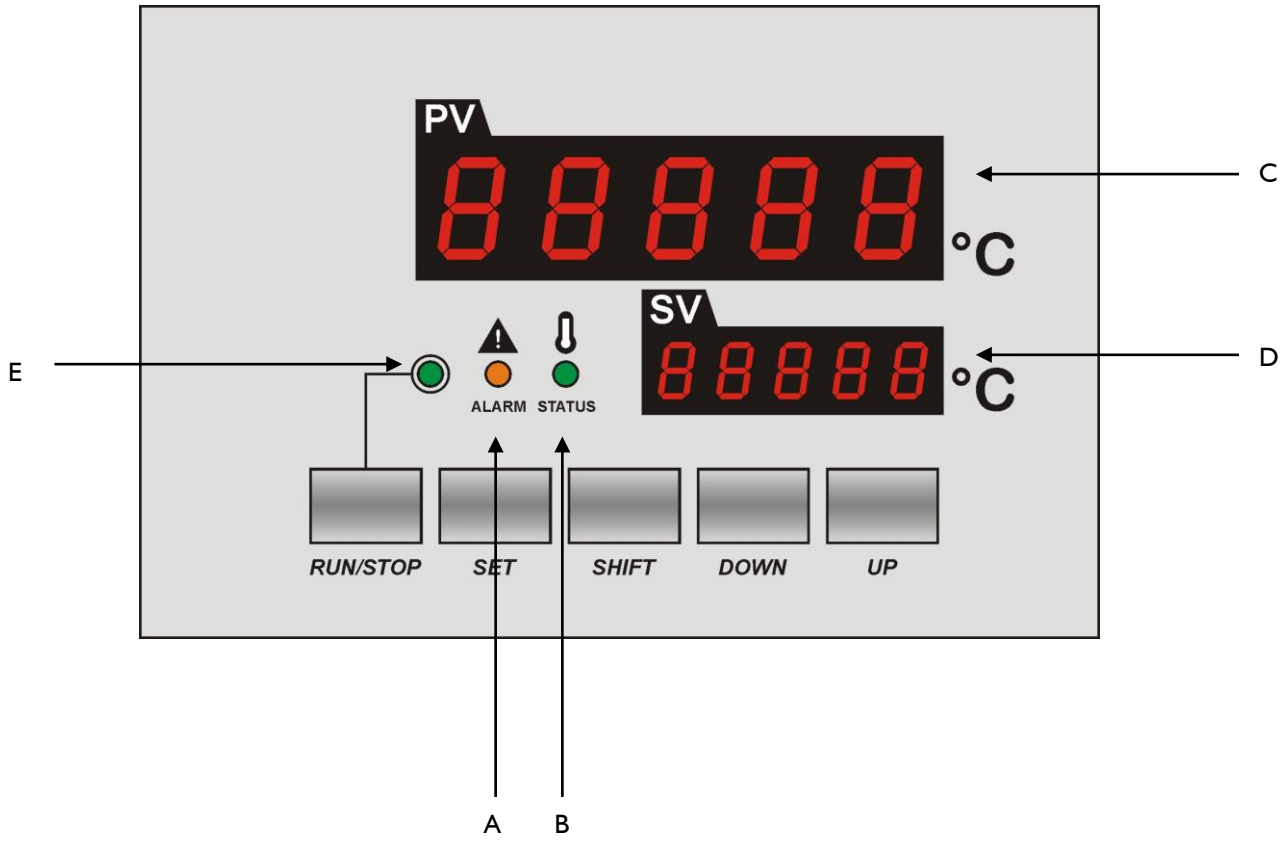
The RUN/STOP LED, indicated above, will illuminate when the unit is in heat/cooling mode. It will also blink when the unit is in Autotune mode*

The ALARM LED is illuminated when the unit temperature is in excess of 50°C or below -114°C for a period in excess of 3 minutes

The STATUS LED is illuminated when the bath temperature is stable to within +/- 0.3°C of the setpoint for a period in excess of 3 minutes

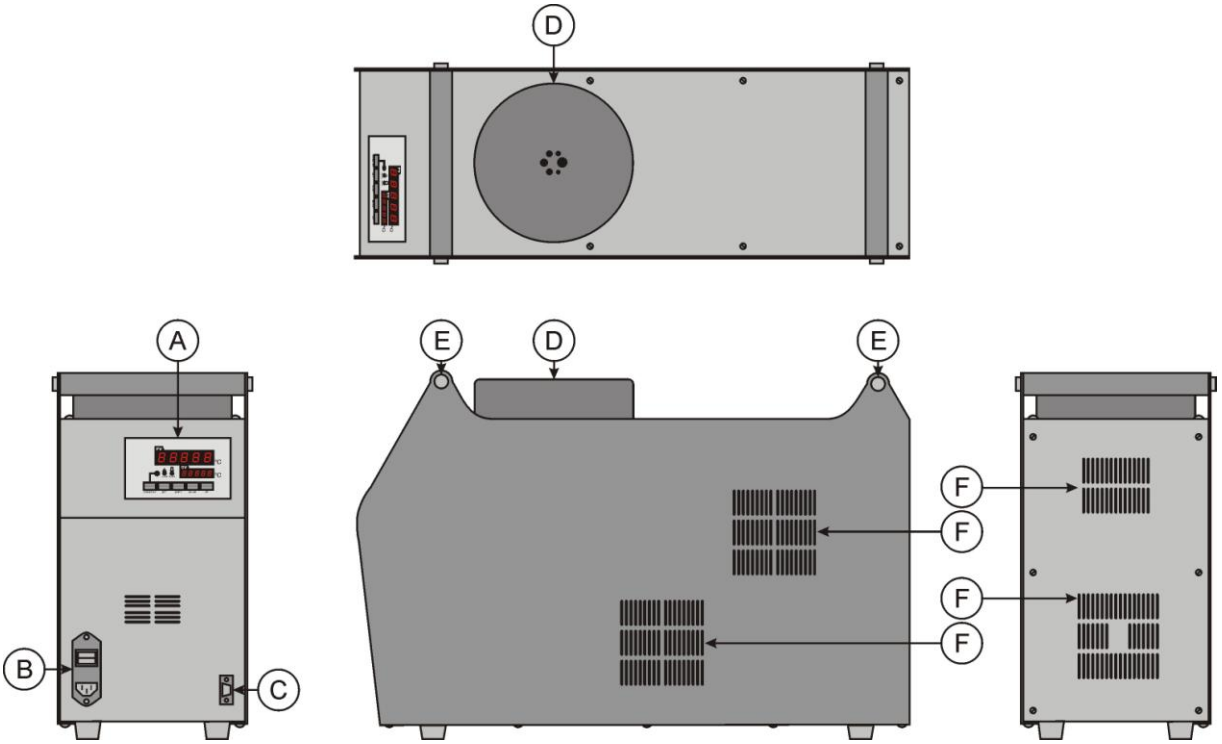
USING THE ISIS

Controller Panel



A. Alarm LED
B. Status LED
C. Block temperature display
D. Set point temperature display
E. Heating/Cooling enable

ISIS GENERAL ARRANGEMENT



A. Control panel
B. Mains electrical socket
C. PC communications socket
D. Insulated thermowell cover
E. Carry handles
F. Air ventilation

ISIS FUNCTION

Operation Mode

Item	Operation
PV Upper Red Display	Displays temperature in metal block bath
SV Lower Green Display	Displays set temperature
Status LED	Illuminated when the bath temperature is stable to within ±0.3°C for setpoint for 3 minutes
Alarm LED	Illuminated when bath temperature exceeds +50°C or -114°C for 3 minutes
Run LED	Illuminated when bath is running normally, blinks during auto tune mode
Run/Stop Switch	Holding down key for 5 seconds will enable/disable cooling/heating
Set Switch	(1) In precontrol mode, allow access to internal pyrameters by pressing for 5 seconds (2) Press to input data
Shift Switch	Multifunctional switch to allow: (1) Auto tuning. (2) Move the cursor during setpoint selection
Down Switch	Allows decreasing values to be entered
Up Switch	Allows increasing vlaues to be entered

OPERATIONAL PROCEDURE

Basic Operation

Step 1. Power up the equipment with a suitable electrical supply

Step 2. Initializing the apparatus
Upper bar of the Red Display and Alarm LED illuminate for 5 seconds

Step 3. The block temperature is displayed on the Red Display

Step 4. Set temperature is displayed on the smaller Green Display

Step 5. After setting the setpoint, press the Run/Stop switch for 5 seconds and the cooling/heating operation starts
Run LED goes "ON"

Controller Levels Of Operation

Precontrol Mode

After power-up, the controller will go through a self-test and finally display the set temperature and the actual temeprature. The heating/cooling is not yet enabled. This is the **Pre-control Mode**.

Input SV Mode

From the Pre-control mode, press the "Set" button momentarily. The upper display will show the set temperature and the lower display will show the current block temperature. This is the **Input SV Mode**.

This allows the set temperature to be changed.

Input Settings Mode

From the Pre-control mode, press and hold the "Set" button for 5 seconds. The upper display will read the current set temperature and the lower display will read "trEF". This is the **Settings Mode**.

Detailed Input Settings Mode

For access to this level refer to previous page (page 15).

Use the UP/DOWN buttons to scroll through the menu, listed below.

Parameter	Display	Upperlimit	Lowerlimit
SV	trEF	+50.0	-100.0
Proportional Band	Prop	50.0	0
Integral Gain	Iteg	5000	0
Derivative Gain	Deri	5000	0
Proportiona Gain	Regi	100	0
Temperature Offset	Offs	9.99	-9.99
Gain Offset	gain	5000	-5000

To access a value press the "UP/DOWN" buttons to locate the value. Once located press the "Set" button to allow access. Then the UP/Down button to adjust the value and when complete, press the "Set" button again to store the value.

To exit this level press and hold the "RUN/STOP" button for 5 seconds to revert back to Pre-control mode.

Auto Tune Mode

To initiate an "Auto Tune Run" press and hold the shift switch for 5 seconds. The temperature difference between setpoint and block temperature must be greater than 6°C to initate the Auto Tune mode.

It is recommended to use the factory installed PID values and only run the Auto Tune mode if these values are changed or the equipment has different "loading" than normal.

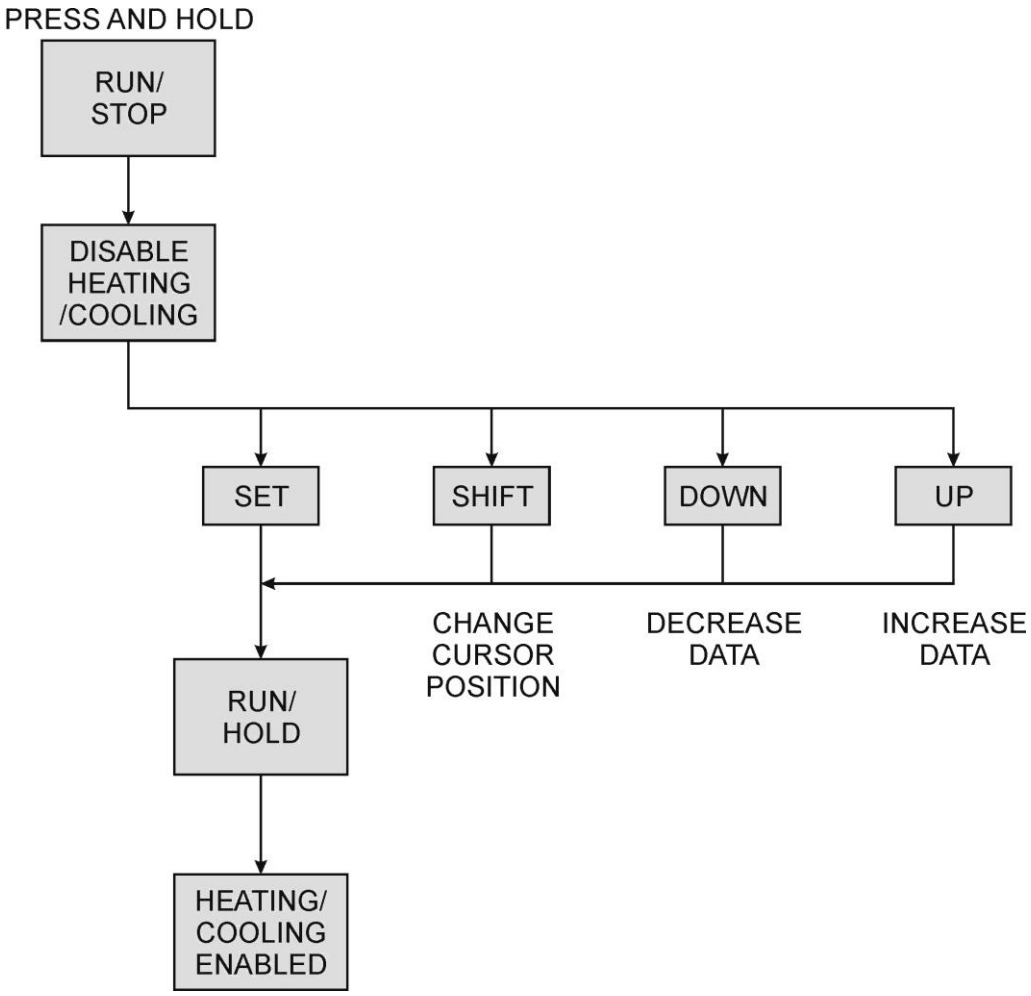
Alarm Mode

The Alarm LED will flash if the block temperature exceeds 50°C or drops below -114°C for a period of 3 minutes.

Status

The Status LED will flash when the block temperature is stable within ±0.3°C of the setpoint for 3 minutes.

SELECTING A SETPOINT



CAL NOTEPAD

Cal Notepad can be used to log and display values from the unit and an optional temperature indicat or.

Minimum System Requirements

CNP requires Windows 9X, XP, a minimum of 5Mb of free hard drive space and free serial ports fo r the instruments to be connected.

Development

CNP was developed by Isothermal Technology using LabVIEW from National Instruments.

License

Use of the Cal NotePad software program "CNP" is as granted in this license agreement. In using the CNP soft ware the user "licensee" is agreeing to the terms of the license. You must read and understand the terms of th is license before using CNP.
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3, CNP must not be reversed engineered, disassembled or de-compiled. Licensee may transfer the software to a third party provided that no copies or upgrades of CNP are retained.
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5, Limited Warranty. Isothermal Technology warrants that CNP will perform substantially as described in this ma nual for a period of 90 days from receipt. Any distribution media will under normal used be guaranteed for a p eriod of 90 days.

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CNP is not designed for situations where the results can threaten or cause injury to humans.

Installing Cal NotePad

1. Insert Isotech Support CD into the CD drive.
2. Allow CD browser to open and install version of Cal NotePad required.
3. Follow the prompts which will install the application and necessary LabVIEW run time support files.
4 Should you ever need to uninstall the software then use the Add/Remove Programs option fro m the Control Panel.

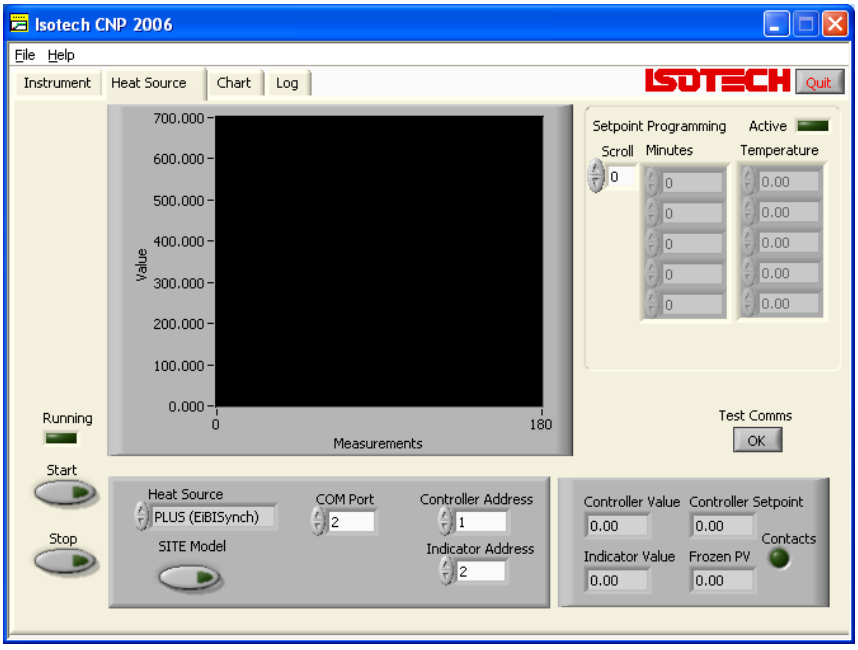
Starting Cal NotePad

From a Standard Installation:

Click the START button

Highlight PROGRAMS

Select Isotech - Select Calpad



Protocol

The instruments use the "Modbus Protocol"

If required, e.g. for writing custom software the technical details are available from our website at, w ww.isotech.co.uk/refer.html

SPECIFICATION

Voltage	**100 ~ 240 10% Vac**
Power	200VA
Supply Frequency	50/60Hz
Maximum Operating Temperature	40°C
Minimum Operating Temperature	-100°C
Calibration Volume	ø35mm×160mm deep
Sensor insert Hole Dimension	ø9.5 mm ×1pc + φ8 mm×1pc ø6.4 mm ×2pc + φ4.5 mm×2pc Hole depth is 157 mm.
Operation temperature	0 ~ 35°C
Operation Relative humidity	30 ~ 85%RH (non condensing)
Storage temperature	-10 ~ 50°C
Temperature Display resolution	0.01°C self ranging to 0.1°C
Dimensions	Height 420mm Width 215mm Depth 630mm
Weight	20Kg

COMMUNICATION

Communication Settings	
Communication	RS232C
Communication lines	3 lines
Control line	None
Length of PC communication cable	10m (2m Recommended)
Baud rate	9600bps
Method	Half duplex
Communication parameter	8bit NonParity StopBit=1
Communication character	ASCII code
Connecter	9pin Dsub male Connecter
Pin Assign	2pin = RXD 3pin = TXD 5pin = GND 7pin, 8pin Jumped

Regarding the detailed specification, please contact Isotech.

STANDARD PARTS LIST

- Body
- Power cable
- Metal insert block
- Extracting tool for insert block
- Lid for the calibration block
- User Maintenance manual/handbook