

CLARITY STATION

ATS10232E

Multi-Input Light Measurement Module.

INSTRUCTION BOOK.

Please take your time to read this Instructions book in order to understand the safe and correct use of your new Bibby Scientific product.

It is recommended the Responsible Body for use of this equipment reads this Instruction book and ensures the user(s) are suitably trained in its operation.

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This product is manufactured in Great Britain by Electrothermal, part of the Bibby Scientific Group of companies.

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1. INTRODUCTION

1.1. The first step in the crystallization process is determining the solubility compound in a selection of solvents and / or solvent mixtures. Unfortunately, determining the solubility of a compound can be labour exhaustive and consume large quantities of material / chemical solution. The Clarity™ Solubility Station provides a quick and inexpensive way of determining the solubility of a compound by monitoring the turbidity of the mixture. The complete system for solubility consists of the following.

- Multi-Channel Infra-Red box (ATS10232E)
- Integrity 10 Reaction Station (PS20000)
- Micro-intrusive IR probe in stainless steel (ATS10230)
- Intrusive IR probe in PEEK (ATS10394/1)
- Non-intrusive IR probe for HPLC vials (ATS10360/1)
- Reflux/Inerting Block (ATS20100)
- Reflux/Inerting PTFE Caps SVL Thread (x10) (ATS20002)
- Multi-Channel temperature box (ATS10001)
- Temperature Probes (x10) (ATS10027/10)
- Reaction tubes (x10) (ATS10075)
- Integrity PC software (ATS11005)

2. SYMBOLS AND USING THIS INSTRUCTION BOOK.

- 2.1. Throughout this Instruction book the following symbols are shown to identify conditions which pose a hazard to the user, or to identify actions that should be observed. These symbols are also shown on the product, or its packaging. When a symbol is shown next to a paragraph or statement it is recommended the user takes particular note of that instruction in order to prevent damage to the equipment or to prevent injury to one's self or other people.

The Responsible Body and the Operator should read and be familiar with this Instruction book in order to preserve the protection afforded by the equipment.

To prevent injury or equipment damage it is the manufacturer's recommendation that all persons using this equipment are suitably trained before use.

- 2.2. Symbols Defined.



Caution, risk of danger. See note or adjacent symbol.



Protective conductor terminal to be earthed.
(Do not loosen or disconnect).



Caution / Risk of electric shock.



Recyclable Packaging Material.



Do not dispose of product in normal domestic waste.



Caution. Hot surface.



Refer to Instruction book.



Bio Chemical Hazard. Caution required. Will require decontamination.

3. SAFETY INFORMATION.

This product has been designed for safe operation when used as detailed in accordance with the Manufacturer's instructions.

NOTE: Failure to use this equipment in accordance with the manufactures operating instructions may compromise your basic safety protection afforded by the equipment and may invalidate your warranty / guarantee. The warranty / guarantee will not cover damaged caused by faulty installation or misuse of the equipment.

3.1. Prevention Fire and Electric Shock.



To prevent a risk of fire or electric shock, **DO NOT** open the Integrity10 or PSU or IR control unit without authorisation. Only qualified Service Personnel should attempt to repair this product.



Only use the Power Supply Unit supplied with the IR Control Box. (15v 4.2A output).



Never Operate this equipment with out connection to earth / ground. Ensure the mains supply voltage is correctly earthed / grounded in accordance with current area legislation.

3.2. General Safe Operating Practice.



Always follow good laboratory practice when using this equipment. Give due recognition to your company's safety and legislative health & safety procedures and all associated legislation applicable to your areas of operation. Check laboratory procedures for substances being heated and ensure all hazards (e.g. explosion, implosion or the release of toxic or flammable gases) that might arise have been suitably addressed before proceeding. When heating certain substances the liberation of hazardous gases may require the use of a fume cupboard or other means of extraction.



Ensure equipment is used on a clean, dry, non-combustible, solid work surface with at least 300mm suitable clearance all around from other equipment.



Ensure the Reaction Station PSU is positioned on a clean, dry, non-combustible surface with a sufficient space for the power cable to Integrity10 and mains input lead and plug set to enter / exit without undue bend stresses. Ensure a suitable clearance for air flow and heat dissipation.



Always keep the IR Control box well out of the way from chemical splashes.



Ensure the coolant fluid is connected and running through the Reaction Station prior to connecting mains power to the unit.



Always connect the Clarity system as detailed Section 5, 'Installation'. Observe the system connection.



Do not position any item of your equipment so that it is difficult to connect / disconnect from the power cable assembly.



Do not position any item of your equipment so that it is difficult to connect / disconnect from the coolant fluid supply.



Do not position any item of your equipment so that it is difficult to connect / disconnect data and communication cables.



Do not position the Reaction Station PSU so that the on / off switch is inaccessible.



Do not immerse any part of this equipment in water / fluid.



Do not spill substances onto any part of the Reaction Station or Clarity system. If spillage does occur, disconnect unit from mains supply and follow instructions as detailed in Section 'Maintenance'.



Do not cover the reaction Station or PSU whilst in use.



It is recommended **never** to leave any heating apparatus unattended during operation.



Only use Original Equipment manufacture's spares and accessories. Ref Section 10.



Neither the Reaction Station or Clarity System are spark, flame or explosion proof and no part of the equipment has not been designed for use in hazardous areas in terms of BSEN 60079-14:1997. Keep flammable, low flash point substances away from the apparatus.



Do not operate or handle any part of this product with wet hands.



Do not touch the heating surface whilst in use.



Do not lean or stretch over equipment.



Keep all Mains Plugs and Lead set and cable away from the heating surface.



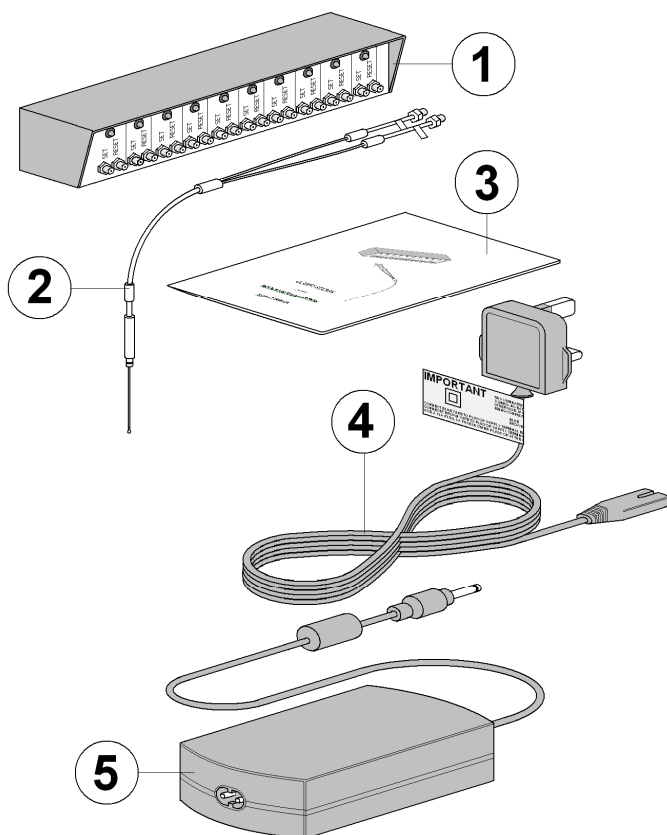
When heating certain substances, the liberation of hazardous gases may require the use of a fume cupboard or other extraction system.



Do not charge any vessel while in use unless using a dosage pump.

4. UNPACKING AND CONTENTS.

4.1. Please check the contents of your carton against the diagram.



Item	Description	Qty
1	IR control box (ATS10232E)	1
2	IR probe (ATS10230) (<i>Not Included</i>)	0
3	Instruction Book (M7998)	1
4	PSU mains leads (<i>illustration may be different to that shown depending on destination</i>).	A/R
5	Power Supply Unit	1


<p>For future reference please record your products Serial and Model Numbers.</p>	<p><i>Serial Number</i></p>	<p><i>Model Number</i></p>
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5. INSTALLATION.

5.1. Electrical Safety and Installation.


5.1.1. The Integrity Reaction Station and equipment is designed to be used safely under the following conditions:-

- Indoor use only.
- Altitude up to 2000 meters.
- Temperatures between 5°C and 40°C.
- Maximum relative humidity 80% for temperature up to 31°C decreasing linearly to 50% relative humidity at 40°C
- Mains supply voltage fluctuations up to $\pm 10\%$ of the nominal voltage.
- Transient overvoltage's typically present on the mains supply. (Overvoltage category II).
- Applicable rated pollution degree 2.

5.2.  This equipment must be earthed / ground to a fixed earth / grounded mains socket outlet. The mains supply is to be earthed / grounded in accordance with current and local legislation.

5.3. Ensure only the correct rated mains input fuses are fitted. (Where applicable ensure the correct mains cord and moulded IEC plug and lead set fuse, if fitted). See Technical Specification Section 8 of this instruction book.


5.4. It is recommended this product be connected to a mains supply source which incorporates an RCD or GFCI device.

5.5.  Do not install this product or accessories on a surface which may become wet.

5.6. Mains Supply.

5.6.1. Check the voltage on each product data label on your Reaction Station and those of any accompanying electrical accessory. Ensure the rating conforms to your local supply.

5.6.2. The reaction station is supplied with a Mains cord and moulded plug wired as follows.

	Green / Yellow	or	Green	=	Earth / Ground
	Blue	or	White	=	Neutral
	Brown	or	Black	=	Live / line hot.

5.6.3. Solubility IR box is equipped with one universal power supply to be plugged into an electrical outlet using the lead supplied suitable for the country of use.

5.7. Coolant Supply.

5.7.1. It is recommended the minimum coolant flow rate be 2.5 litres/min at 5°C. The coolant system should be able to dissipate heat energy at 1000W. Running all cell positions at -30° without the recommended coolant supply may cause stress on the electrical components, resulting in reduced

performance and shorted times between service requirements. For best performance and maximum heat transfer the manufacturer strongly recommends using water as the preferred cooling fluid.

5.8. Customer – Supplied PC requirements to run Clarity Software.

The following minimum requirements for a computer using the Integrity 10 – PC – control software are:

5.8.1. Hardware.

Intel Pentium processor (Pentium III recommended).

- VGA Video display.
- CD_ROM disk drive.
- Mouse or similar pointing device.

5.8.2. RAM and Hard Disk Space.

- 32 MB of RAM (128 MB recommended).
- 20 MB free hard disk space.

5.8.3. Supported Operating Systems.

The PC-control software is compatible with the following PC operating system.

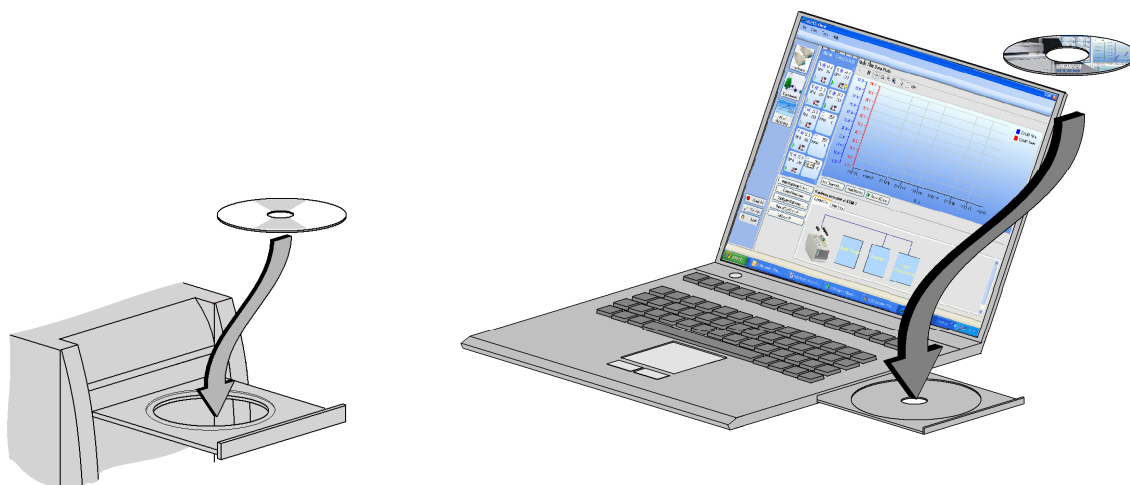
- MS Windows 95
- MS Windows 96 (2nd Edition).
- MS Windows NT 4.0 (service Pack 6a).
- MS Windows Me
- MS Windows 2000 (Service Pack 2).
- MS Windows XP (Service Pack 3)

5.8.4. Web Browser.

MS Internet Explorer 4.02, Service Pack 2
(Internet Explorer version 6.0 or above recommended).

5.9. Integrity Software Installation.

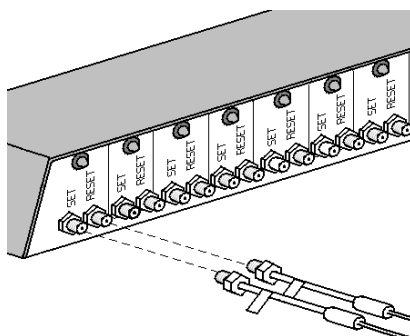
- 5.9.1. Load the Integrity PC operating software onto the control PC as detailed in the instructions supplied with the CD ROM.



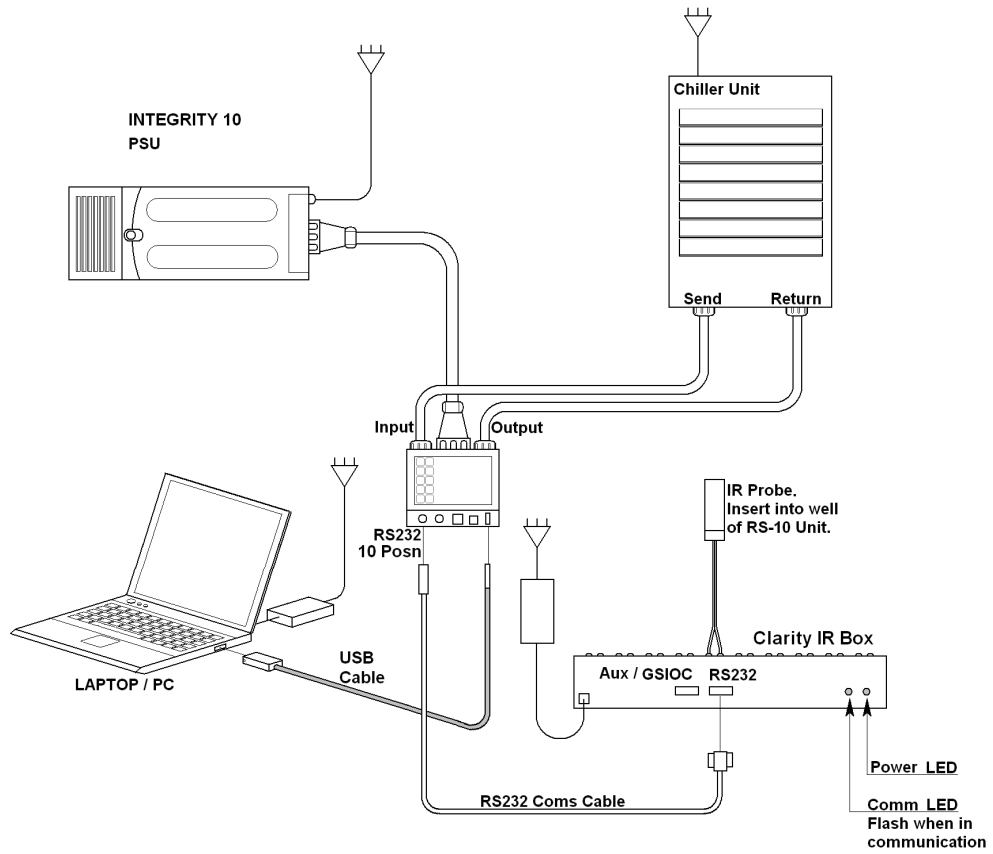
Note: The PC should be set up and located near the Clarity Station.

5.10. Installing Clarity IR box

- 5.10.1. Place the Multi-Channel IR Box onto a clean, flat, well-ventilated work area on the left side of the Clarity Reaction Station, ensuring there are no combustible materials in the vicinity.
- 5.10.2. Attach the RS232 cable to the RS232 port on the clarity IR box.
- 5.10.3. Attach other end of the RS232 cable to the RS232 port on the Integrity 10 reaction station as illustrated. Plug the TNX125 to the appropriate electrical outlet and then to Clarity IR Box.

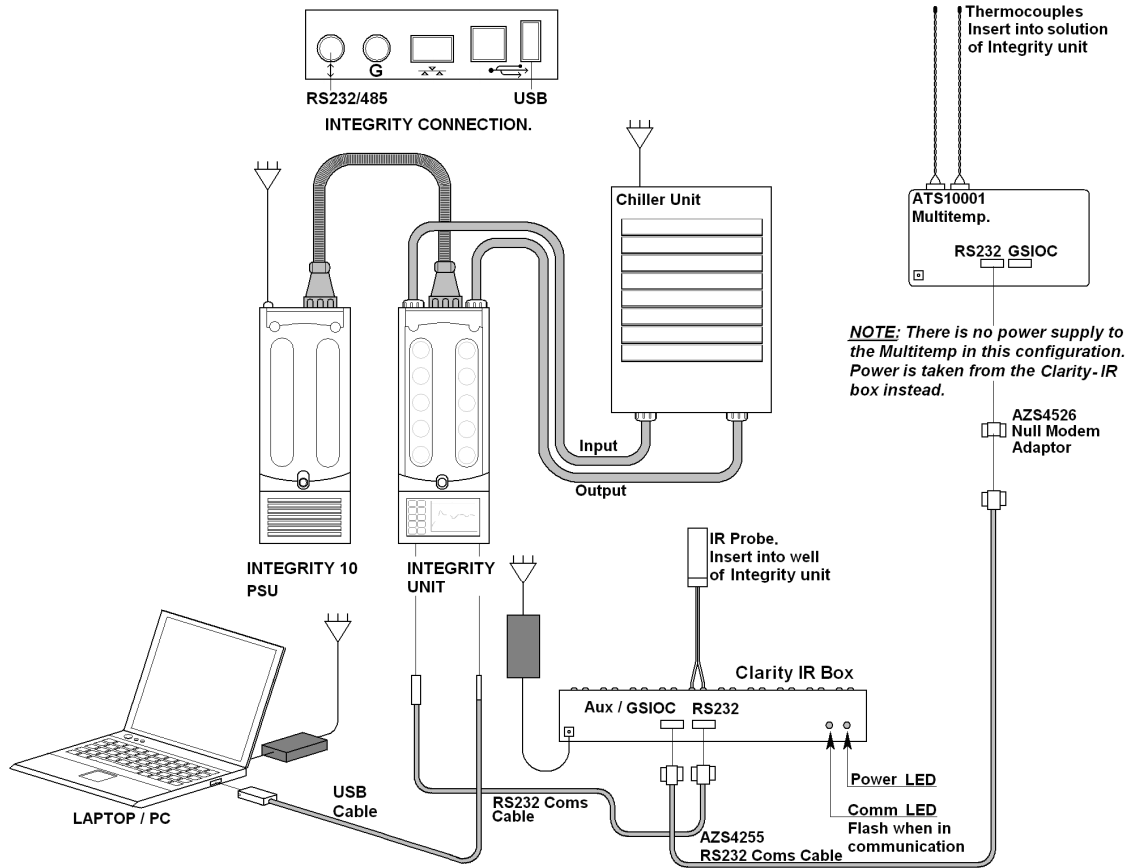


- 5.10.4. Install IR probes to Multi-IR Box. For turbidity probes (ATS10230) match launch with launch and return with the return. For Shoot-Trough probes (ATS10360/1), the connections are reversed.



5.11. Installing Multi-Temp Box (ATS10001) and Temperature Probes (ATS10027/10)

- 5.11.1. Attach RS232 cable to the RS232 port on the back-side of the Multi-Temp Box USING Null Modem Adaptor.
- 5.11.2. Attach the other side of the RS232 cable to the Aux/GSI/OC Port on the Clarity IR Box.
- 5.11.3. Attach Thermocouples (ATS10027/10) to the front side of the Multi-Temp Box (positions 1 – 10).



6. PRODUCT OPERATION.

6.1. Turbidity Probe calibration.

- 6.1.1. Open the calibration Screen from the Tools drop down menu.
- 6.1.2. Adjust the variable in the calibration window. Set the calibration dwell time to 1 minute.
- 6.1.3. Insert all the probes to be calibrated into a beaker of clear solvent. Make sure there is no air bubble in the window of each probe.
- 6.1.4. Begin calibrating by checking the Active box of the probe. Click the calibration button for the appropriate probe. In the Status bar you will see the temperature ramp to the set value, then pop-up window will appear to request 'Load Clear Sample'. Click OK in this window, and the upper value of transmittance will be calibrated.
- 6.1.5. Once the calibration is complete, the message 'Upper Calibration OK' will appear in the Status Window. A new pop-up window will appear to request 'Load Turbid Sample'. Without taking the probes out of the clear solvent, disconnect the Launch line from the Clarity IR control box, the click OK in this pop-up window. The lower value of transmittance will be calibrated. 'Complete' will appear in the Status bar at the end of calibration.
- 6.1.6. If the calibration failed in any of the upper or lower calibration parts, repeat steps 7.1.4 and 7.1.5 until the calibration is completed.
- 6.1.7. Complete steps 7.1.4 to 7.1.6 for all cells requiring calibration.

6.2. Shoot Through Probe Calibration.

- 6.2.1. Open Calibration screen from the Tools drop down menu.
- 6.2.2. Adjust the variable in the calibration window. Set the calibration dwell time to 1 minute.
- 6.2.3. Insert HPLC vials filled with clear solvent into each shoot-through probe well. Make sure there is a stir bar in each vial and marking on the HPLC vial will not block the light pathway of the probe.
- 6.2.4. Begin calibrating by checking the Active box of the probe. Click the calibrate button of the probe. In the Status bar, you will see the temperature ramp to set value, then a pop-up window will appear to request 'Load Clear Sample'. Click OK in this window and the upper value of transmittance will be calibrated.
- 6.2.5. Once the upper calibration is over, the message 'Upper calibration OK' will appear in the Status window. A new pop-up window will appear to request 'Load Turbidity sample'. Without changing anything in the HPLC vial, disconnect the Launch line from the Clarity IR control box, then click OK in this pop-up window. The lower value of transmittance will be calibrated. 'Complete' will appear in the Status bar at he end of calibration.
- 6.2.6. If the calibration failed in any of the upper or lower calibration parts, repeat steps 7.2.4 and 7.2.5 until the calibration is completed.
- 6.2.7. Complete steps 7.2.4 to 7.2.6 for all cells requiring calibration. Retrieve the stir bar from the HPLC vials before disposing of the vials.

6.3. Procedure or conducting System Test.

6.3.1. Keep the chiller and reaction station temperature between 5°C and 10°C.

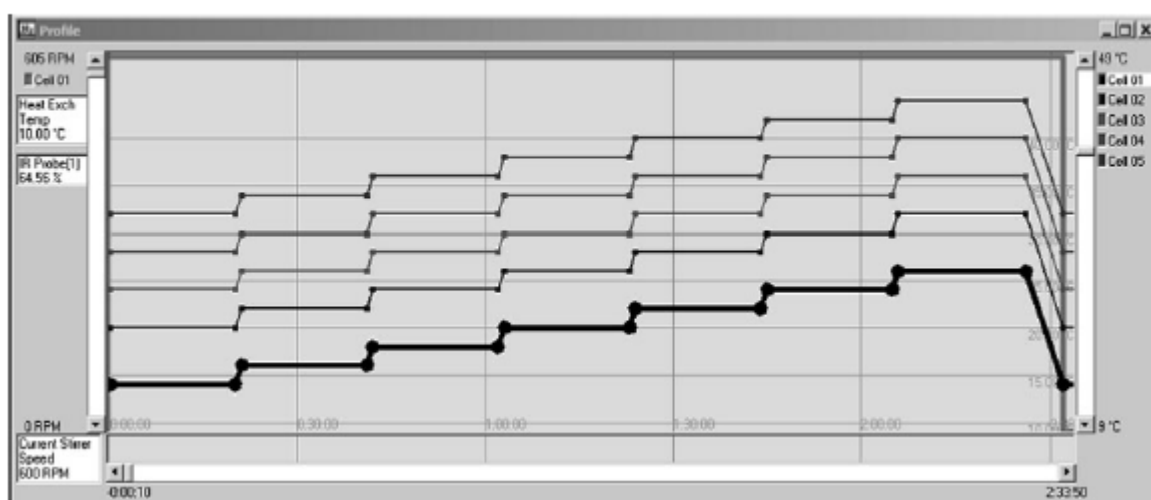
6.3.2. Below is an example of a system test that can be used for the Clarity Solubility Station.

Wt% 4-AAP	4-AAP (g) in 1mL IPA	4-AAP (g) in 5mL IPA	4-AAP (g) in 10mL IPA	Start Temp °C	End Temp °C	Dissolution Temp (°C)
10	0.087	0.435	0.87	14	26	21.5
11	0.097	0.485	0.97	20	32	26.3
12	0.107	0.535	1.07	24	36	31.5
13	0.117	0.585	1.17	28	40	35.3
14	0.128	0.640	1.28	32	44	37.0

6.3.3. Weigh certain amount of 4-AAP (use above table as a reference) in each glass vessel. Load the stir bar in to each vessel. Dispense the correct amount of IPA in each vessel. Insert the vessels in the reaction station and use manual control to setup the block temperature to 5°C. Make sure the stir function is working properly. Insert turbidity probes into each vessel.

6.3.4. In the Integrity PC software, use the Set / Plateau Profile Template to setup the test method of each well according to its percentage weight. For example, if the weight percentage of 4-AAP is 10, the start temperature will be 10°C and the end temperature will be 26°C. The temperature difference of each step will be 2°C and the dwell time of each temperature step is 20 minutes. Set the ramp rate to 1°C/min and stirrer speed to 1000rpm. See figure below of a profile window for this system test.

Profile window of Clarity system test



6.4. Once the method is setup, save it and run it. The whole method will take approximately 2.5 hours to complete. The result can be analyzed and plotted in Excel. This system test can be used at anytime to verify if the Clarity system is working correctly.

7. TECHNICAL SPECIFICATIONS.

7.1. Infer Red Box (ATS10232E)

Basic Specification

Number of Sensors	10
Number of Light sources	10
Optical wavelength	940nm
Indicators	Ten multicoloured LED indicators (one per channel).

Flashing Red – Channel Off

Green - Channel Clear ($\geq 75\%$ of scale).

Orange – Channel Turbid ($< 75\%$ of scale).

Performance

Measured Range	-999.8 to 999.9
Resolution	0.1%

Power Supply

Input Voltage	10 to 15V d.c or 7 to 11V ~ a.c.
Connector	2.1mm power in connector
Power consumption	<10W

Interfaces

RS232 – C via DB9F connector

Aux RS232- C / RS485 /GSIOC¹ via DB9M connector.

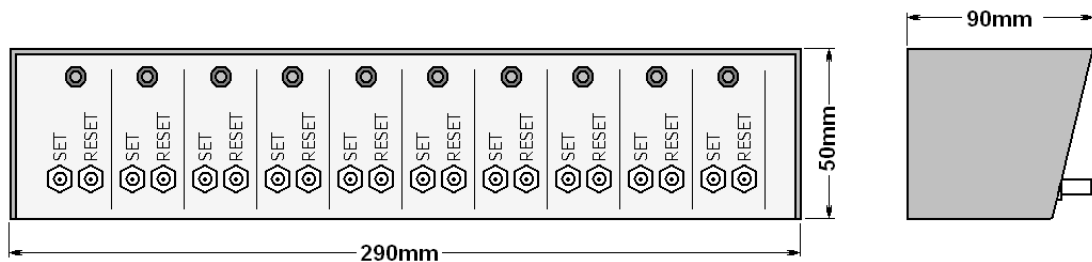
Ten FSMA connectors for optical illumination.

Ten FSMA connectors for optical sensors return path.

Environment

Ambient Temperature	10°C to 30°C
Ambient Humidity	20% to 90% R.H. non-condensing.

¹ GSIOC is a trademark of Gilson Inc.



7.1.1. The Ingress protection rating for the Multi-Temp temperature measuring module has been classified as IPX0.

Weight

150g (approximately).

8. MAINTENANCE.

8.1. General Information and System Care.



Unplug the unit from the mains voltage supply and allow it to cool before undertaking any maintenance tasks.



Maintenance should only be carried out under the direction of the Responsible Body, by a competent electrician. Failure to do so may result in damage to the product and in extreme cases be a danger to the end user.

With proper care in operation this equipment has been designed to give many years of reliable service. Contamination or general misuse will reduce the effective life of this product and may cause a hazard.

Maintenance for the unit should include:

- Periodic electrical safety testing (an annual test is recommended as the minimum requirement).
- Regular inspection for damage with particular attention to the mains lead and plug set.
- Routine cleaning of the equipment should be undertaken using a clean cloth.

DO NOT USE SOLVENTS FOR CLEANING ANY PART OF THIS EQUIPMENT.

8.2. Spillage and Decontamination.

8.3. There are no serviceable parts within the Integrity-10 Unit, Multi-temp Box or IR box and probes.

8.4. Spillage and Decontamination.



If the equipment has been exposed to spillage or contamination, the Responsible Body is responsible for carrying out appropriate decontamination. If hazardous material has been spilt on or inside the equipment, decontamination should only be undertaken under the control of the Responsible Body with due recognition of possible hazards. Before using any cleaning or decontamination method, the Responsible Body should check with the manufacturer the proposed method will not damage the equipment.

Prior to further use, the Responsible Body shall check the electrical safety of the unit. Only if all safety requirements are met can the unit be used again. The above procedure is intended as a guide. Should spillage occur with a toxic or hazardous fluid then special precautions may be necessary.

Decontamination Certificate.

Note: In the event of any part of this unit becoming damaged, the damaged item(s) should be returned to the manufacturer for repair accompanied by a decontamination certificate. Copies of the Certificate are available from Distributor/Manufacturer. Appendix A of this Instructions book may be copied and enlarged.

At the end of life this product must be accompanied with a Decontamination Certificate. See page 19.

9. ENVIRONMENTAL PROTECTION.

- 9.1. Maximum consideration has been given to environmental issues within the design and manufacturing process without compromising end product performance and value.



- 9.2. Packaging materials have been selected such that they may be sorted for recycling.



- 9.3. At the end of your product and accessories life, it must not be discarded as domestic waste. Ref: EU Directive 2002/96/EC on Waste Electrical and Electronic Equipment Directive (WEEE). Please contact your distributor / supplier for further information. For end users outside of the EU consult applicable regulations.

- 9.4. This product should only be dismantled for recycling by an authorised recycling company.



This product and accessories must be accompanied by a completed Decontamination Certificate prior to any disposal. Copies of the Certificate are available from your distributor of Bibby Scientific products, or you may copy and enlarge from 'Appendix A' of this instruction book.

Bibby Scientific's Electrothermal branded product range is registered with the Environment Agency under the name of as Electrothermal Engineering Limited as being a producer of WEEE (Waste Electronic and Electrical Equipment) through b2b Compliance, an authorised waste collection compliance scheme.

10. CUSTOMER SUPPORT.

For help and support in using this product, please contact Customer Services at the following address.

Bibby Scientific Limited.

Beacon Road,
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Staffordshire ST15 0SA,
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- General enquiries :
info@bibby-scientific.com
- Order enquiries :
sales@bibby-scientific.com
- Technical support :
electrothermalhelp@bibby-scientific.com
- www.electrothermal.com

For the America's and Canada, contact:

Techne Incorporated, 3 Terri Lane,
Suite 10 Burlington, NJ 08016 USA.

Toll free:800-225-9243Tel: 609-589-2560

Fax: 609-589-2571

Email: labproducts@techneusa.com

Http www.techneusa.com

APPENDIX 'A'. DECONTAMINATION CERTIFICATE.

<p>Bibby Scientific Limited. Beacon Road, Stone, Staffordshire ST15 0SA. Great Britain Tel: +44(0)1785 812121. Fax: +44(0)1785 810405 E-mail: electrothermalhelp@bibby-scientific.com</p>		
<p><u>DECONTAMINATION CLEARANCE CERTIFICATE</u></p>		
<p>For the Inspection, Repair or Return of Medical, Laboratory or Industrial Equipment.</p>		
<p>Prior to a Service Engineer working on equipment that has been in an environment where substances hazardous to health may have been used, you are requested to provide the following information:</p>		
<p>CUSTOMER DETAILS</p>		
<p>Company:- Department:- Contact Name:- Tel No:- Fax No:-</p>	<p>Address:- Post Code:-</p>	
<p><u>Product Description</u></p>		
<p>Model No:-</p>	<p>Serial No:-</p>	
<p>Has the equipment been exposed to any of the following, Please answer all questions by deleting YES/NO as applicable and by providing details in section 2 below.</p>		
<p>A. Blood, body fluids, Pathological specimens</p>	<p>YES/NO</p>	<p>Provide details if YES</p>
<p>B. Biodegradable material that could become a hazard</p>	<p>YES/NO</p>	<p>Provide details if YES</p>
<p>C. Other biohazard</p>	<p>YES/NO</p>	<p>Provide details if YES</p>
<p>D. Chemical or substances hazardous to health</p>	<p>YES/NO</p>	<p>Provide details if YES</p>
<p>E. Radioactive substances State name(s) and quantities of isotopes and checks made for residual activity</p>	<p>YES/NO</p>	<p>Provide details if YES</p>
<p>F. Other hazards</p>	<p>YES/NO</p>	<p>Provide details if YES</p>
<p>2. Please provide details of any hazard present as indicated above. Include details of names and quantities of agents as appropriate:-</p>		
<p>3. Your method of decontamination (please describe):-</p>		
<p>4. Are there likely to be any areas of residual contamination (please specify)</p>		
<p>I declare that the above information is true and complete to the best of my knowledge and belief.</p>		
<p>Authorised signature:- Title/Position:- For and behalf of:-</p>	<p>Name (please print):- Date:-</p>	