B-ACS Sample Heater

User Manual

Version 001

The information in this manual may be altered without notice.

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DECLARATION OF CONFORMITY

The under mentioned products

B-ACS HEATER POWER SUPPLY CPL H1491
B-ACS HEATER POWER SUPPLY 2 H14114
B-ACS SAMPLE HEATER 120C H1385

conforms to the main requirements set by the commission for the Harmonization of Regulations of the EU Member States with regards to electromagnetic compatibility regulations (EMI: 2004/108 ECC), safety regulations (Low Voltage Electrical Equipment: 73/23/ECC).

For the assessment the following norms were applied:

EMI: Emission: EN55022 / Class B, EN 61000-3-2, -3-3
Immunity: EN 61000-4-2, -4-3, -4-4, -4-5, -4-6, -4-8, -4-10

Safety: IEC 61010-1 2001

Manufacturer's Name: BRUKER BIOSPIN GMBH
Manufacturer's Address: Silberstreifen 4,
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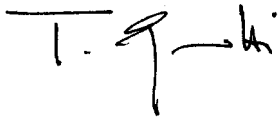
Germany

Declaration approved by:



Dr. Tonio Gianotti

Head of Development

Rheinstetten March 3, 2006

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Introduction 1.1

The B-ACS Sample Heater 120C is used in connection with the Bruker Automatic Sample Changer (B-ACS 60, B-ACS 120) for NMR spectrometer‘s.

Using the B-ACS Sample Heater it is possible to preheat NMR samples to a range of +30°C and +120°C depending upon the ambient temperature.

Figure 1.1. B-ACS with Sample Heater

Disclaimer 1.2

The B-ACS Sample Heater should only be used for the intended purpose as described in this manual. Use of the unit for any purpose other than that for which it is intended is taken only at the users own risk and invalidates any and all manufacturer warranties.

Service or maintenance work on the unit must be carried out by qualified personnel.

Only those persons schooled in the operation of the B-ACS Sample Heater should operate the unit.

Safety Issues 1.3

Before using the B-ACS Sample Heater be sure to read "Safety Considerations" on page 11.

Warnings and Notes 1.4

There are two types of information notices used in this manual. These notices highlight important information or warn the user of a potentially dangerous situation. The following notices will have the same level of importance throughout this manual.

Note: Indicates important information or helpful hints

WARNING: Indicates the possibility of severe personal injury, loss of life or equipment damage if the instructions are not followed.

Contact for Additional Technical Assistance *1.5*

For further technical assistance on the BPSU36-2 unit, please do not hesitate to contact your nearest BRUKER dealer or contact us directly at:

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am Silberstreifen
D-76287 Rheinstetten
Germany

Phone: + 49 721 5161 0
FAX: + 49 721 5171 01
E-mail: nmr-software-support@bruker-biospin.de
Internet: http://www.bruker-biospin.de

Safety Considerations 2

Introduction 2.1

Read these safety instructions carefully and make them accessible to anyone working around the B-ACS sample heater system. The B-ACS sample heater can be operated easily and safely provided the correct procedures are followed and certain precautions observed.

Disclaimer 2.2

Bruker is not responsible or liable for any injury or damage that occurs as a consequence of non-approved manipulations on the B-ACS sample heater system.

Important Safety Considerations 2.3

- The power supply voltage must correspond to the information listed in ***"Power Supply Requirements" on page 23***.
- Never touch any moving parts, always wait until the device has come to a complete stop.
- Please note that in **automation mode** the B-ACS may restart unexpectedly.
- In case of malfunction during operation, stop the device, disconnect the power supply and inform customer service.
- Always use original manufacturer accessories.
- Do not use the device if the power cord, or the device itself have visible damage.
- Inappropriate or improper repairs may result in personal injury to the user. ***Never disassemble the device or try to repair it***. Repairs and disassembly should only be carried out by experienced technicians.

Appropriate Usage of the B-ACS Sample Heater *2.4*

Operational safety can only be guaranteed if B-ACS heater is used properly.

The B-ACS Sample Heater System is used in connection with the Bruker Automatic Sample Changer (B-ACS 60, B-ACS 120) for NMR spectrometer‘s.

The B-ACS sample heater is used to preheat NMR samples in the range of +30°C and +120°C depending upon the ambient temperature.

Appropriate usage of the device includes reading this manual and observing all recommendations - especially all safety aspects.

If the B-ACS heater is used in any way other than for what it was intended, as outlined in this manual, this will constitute ’**unauthorized use**’. Bruker is not responsible or liable for any injury or damage that occurs as a consequence of improper or unauthorized usage of the B-ACS heater system.

Personnel Safety *2.4.1*

The transportation, mounting, start-up, instruction, maintenance, cleaning, service, repair and shutdown of the B-ACS heater system should only be carried out by **trained, qualified and authorized personnel**.

New users must be supervised by experienced personnel! It is highly recommended that a company training program be implemented for training new users on all aspects of product safety and operation.

Potential Hazards *2.4.2*

- When operating B-ACS using glass tubes, there is always a danger present when using samples with chemical or biological substances and solvents.
- Always use undamaged glass tubes. Damaged glass tubes need to be replaced immediately.
- The user’s organization is responsible for taking measures to avoid inherent risks in the handling of dangerous substances, preventing industrial disease, and providing medical first aid in emergencies.
- The user’s organization is responsible in providing facilities and making disposition according to the local regulations for the prevention of industrial accidents and generally accepted safety regulations according to the rules of occupational medicine.
- All substances needed for operating and cleaning the device - samples, solvents, cleaning agents, gases, etc. have to be handled with care and disposed of appropriately. All hints and warnings on storage containers must be read and adhered to!
- The use of glass tubes may result in cuts and stab wounds if a tube should be damaged. Therefore, appropriate care and diligence must be observed when using these devices.

Availability of Information *2.4.3*

The B-ACS Heater user manual must be kept with the device. All personnel operating the device must have access to the user manual at all times.

All other instructions concerning labor protection laws, operator regulations tools and supplies must also be available and be adhered to.

All warning and user information labels must be kept in a good and fully readable status. Unreadable or damaged labels should be replaced immediately.

The following markings on the B-ACS Heater must be observed:

- Warning symbols.
- Labeling for electric connections.

Before the First Start *2.4.4*

Familiarize yourself with:

- The operating and control elements.
- The device’s environment.

Activities Before Each Start *2.4.5*

Before every start the following activities are to be executed:

- Visible observe the device for any obvious damage; observed defects have to be eliminated immediately and/or reported immediately to the responsible party - B-ACS heater should only be used when in fully operational condition.
- Check and ensure that only authorized personnel remain in the work area during operation and that no one is at risk when the device is started.
- All objects and materials that are not required for the operation mode should be removed from the work area.

Normal Operation *2.4.6*

During operation of the device in Normal Mode the following special hazards may arise:

- Inappropriate use of the device in combination with dangerous or infectious samples and solvents may result in a life-threatening situation. Laboratory and general safety instructions (**operating company)** for the care, handling and use of substances and samples have to be observed without restriction at all times.
- Inappropriate reaction to hazardous incidents may result in personal injury and damage to property - be familiar with the company regulations on handling hazardous incidents.

Maintenance *2.4.7*

Before and during the service maintenance the following rules have to be considered:

- Switch off the electrical power supply and unplug the mains cable.
- Change faulty parts of the device immediately.
- Use only original manufacturer spare parts.

After the service maintenance and before a new start of the device the following rules have to be considered:

- Verify that all connections which were loosened have been retightened correctly.
- Check, that all protection devices have been replaced properly.
- Verify that tools, materials and other equipment used have been removed from the work area.
- Clean the work area and remove any leaking fluids and lubricants.

Cleaning *2.4.8*

Use only water or mild neutral cleaning agents for cleaning. Usage of a diluter or gasoline will damage the surface of the device.

When cleaning the device the following guidelines must be followed:

- Unplug the mains cable before cleaning.
- Clean the device with a dry or moist cloth.
- Dry the device completely before plugging in the mains cable.

Replacement Parts *2.4.9*

For safety reasons the device must not be modified without pre-authorization in writing from Bruker.

Use only Bruker original spare parts and accessories. These parts are especially designed for the device.

Parts and equipment, that are not supplied by Bruker, are not authorized for use, and no guarantee is given for the compatibility and safety of these products.

Bruker takes no responsibility for consequences arising from the use of unauthorized parts and equipment.

Installation, Relocation and Disposal of the Device *2.4.10*

The installation, replacement, and relocation of B-ACS heater should only be carried out by authorized Bruker personnel. Consult Bruker customer service for information on the disposition of B-ACS heater.

Customer Responsibilities *2.5*

B-ACS heater was constructed and built *state-of-the-art* based on a complete safety analysis and harmonized standards.

The proven level of safety can only be obtained when the operator takes reasonable precautions. It is the operator's due diligence to make all necessary safety precautions and continuously control them.

The operating company has to ensure, that:

- The B-ACS heater is used only in accordance with established regulations.
- The device is used only in proper operational condition and that the safety measures are checked at regular intervals.
- All warning notices and safety instructions attached to the device, stay readable.
- The operational manual stays in a readable state and is available at the usage site.
- Only qualified and authorized personnel operate, maintain and repair the device.
- All personnel are instructed regularly in all applicable industrial safety and environmental protection standards, as well as the information contained within this manual, especially all references to safety.
- All necessary safety equipment for operation, maintenance, and repair are available and are utilized.
- A safety evaluation be routinely conducted to further identify whether any local or special conditions exist that may effect the working conditions and/or safety of users.
- The results of the safety evaluation be summarized and posted in the work area to inform personnel of potential risks.

Potentially Hazardous Areas 2.6

Extreme Heater Temperatures 2.6.1

The sample heater and samples located on the magazine belt reach extremely high temperatures. The following warnings must be heeded:

Warning: During operation the heaters and samples can reach temperatures of up to 120°C. Coming in contact with these items may result in serious burns!

Warning: When heating up combustible liquids there is always a danger of deflagration, explosion or fire. Do not heat up liquids with a combustion point of less than 200°C. Keep all liquids away from open flames!

Warning: Consider the expansion characteristics of liquids when heating to prevent boil-over. Be very cautious when heating closed ampules/cuvettes, as the expanding liquid may cause the container to break or explode. Always wear eye protection and protective clothing (if appropriate)! Do not heat the liquid beyond it's boiling point!

Warning: Always use an appropriate venting system when heating health endangering and corrosive substances.

Moving Parts 2.6.2

During operation the B-ACS may move unexpectedly. Avoid putting hands or objects into the moving parts of the B-ACS, as this may result in personal injury or damage to the equipment.

Electrical parts 2.6.3

The B-ACS Heater Power Supply is driven by line voltage. If the power supply has to be opened for service or repair disconnect the mains cable before opening.

Remember that all service must be done by trained service personnel only.

Installation 3

Prerequisites 3.1

Before installing the sample heater, the B-ACS Sample Changer must be examined to see which version of the light barrier magazine is used.

The correct light barrier magazines are:

B-ACS 60: P/N H1402
B-ACS 120: P/N H1403

If the sample changer does not have the correct light barrier magazine the magazine belt will not turn when the sample heater is used. In this case contact Bruker for information about obtaining the correct light barrier magazine.

Figure 3.1. The New Light Barrier Magazine

Part Requirements 3.2

The following units are required for sample heating:

- B-ACS Heater Power Supply Complete (P/N H1491).
- B-ACS Sample Heaters 120C (P/N H1385). The maximum number of sample heaters that can be used is 30.

Table 3.1. Components of the B-ACS Heater Power Supply Complete

Part Number	Description
H14114	B-ACS Heater Power Supply 2 (see ***Figure 3.4.***)
H5806	B-ACS Heater Supply 2 (see ***Figure 3.4.***)
H5886	B-ACS Rotating Connector (see ***Figure 3.4.***)
H1496	Cable Rd. 6P10000
3000	Cable Rd. 3P3000 Network 1.0 QMM

In addition, a sliding ring (see section ***3.2.1***) used for the transmission of DC power supply, must be placed directly under the B-ACS cabinet (***Figure 3.2.***).

Mounting the Sliding Ring *3.2.1*

When mounting a new B-ACS, the sliding ring must be placed on the column before the cabinet is installed.

When the B-ACS system already exists, the column assembly must be partially dismantled so that the ring can be placed on the column. Refer to the **B-ACS 60/ 120 Installation & User Manual** (P/N Z31597) for details.

Figure 3.2. Sliding Ring Placement

Heater Installation *3.3*

Note: When using the B-ACS 120 sample changer, install the sample heaters on the inside chain positions. The outside positions can not be used for samples as this would result in the PWR24 cables being disturbed.

To install the sample heaters, the following procedures must be performed (refer to ***Figure 3.3.***):

1. Mount the B-ACS heater supply 2 (P/N H5806) by snapping it onto the magazine belt. The heater supply distributes the voltage to the sample heaters.The heater supply has a fixed pin inside that signifies that the position on the magazine belt is occupied.
2. Now you can mount up to 15 sample heaters (P/N H1385) on each side of the heater supply. If you are installing the maximum number of heaters (30), then be sure the heater supply is positioned in the middle.
3. Connect the heaters together in sequence using the PWR24 cables (P/N H1484) as illustrated in ***Figure 3.3.***.
4. Connect the sliding ring (P/N H5886) to the heater supply 2 (see ***Figure 3.4.***).

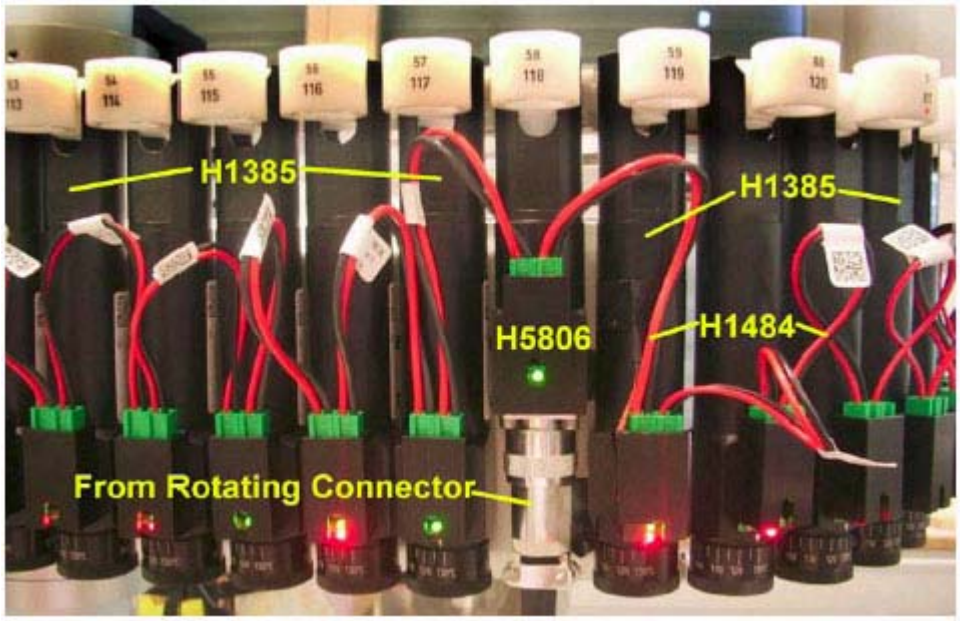

Figure 3.3. Sample Heater Arrangement

The Sample Heater Power Supply 3.4

The B-ACS Sample Heater Power Supply (P/N H14114) provides DC-power for the sample heaters.

- Connect the heater power supply to the sliding ring (P/N H5886) under the cabinet using the enclosed cable. When the connection cable is too short, use the extension cable P/N H1496.
- Connect the Power Supply to the to electricity mains outlet using the power cord (P/N 3000).

The Power Supply should not be located within the 0.5mT (5G) line. The ventilation openings at the front and rear of the power supply must remain free to allow adequate cooling.

Figure 3.4. Rear View of the B-ACS Heater Supply 2

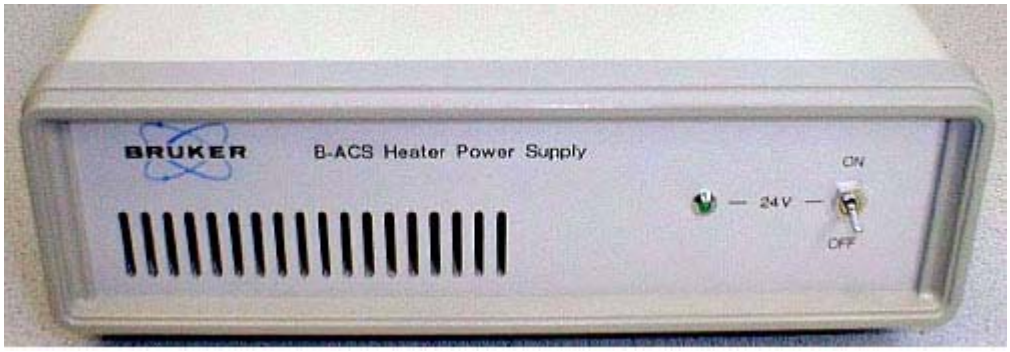

Figure 3.5. Front View of the B-ACS Heater Supply 2

Start - Up *3.5*

Switch on the power supply, the green LED in front of the power supply indicates that the unit is functioning correctly.

The **green LED** on all the attached heaters should be on (indicates that 24VDC power is available).

Adjusting the Nominal Temperature *3.5.1*

Use the temperature adjustment knob on each sample heater to adjust the nominal temperature (see ***Figure 3.6.***). The desired temperature is selected by aligning the required scale value with the white marker on the heater.

The **red LED** just above the adjustment knob displays the heater condition. During the heating cycle the red LED should be on. After reaching the selected temperature, the red LED should turn off.

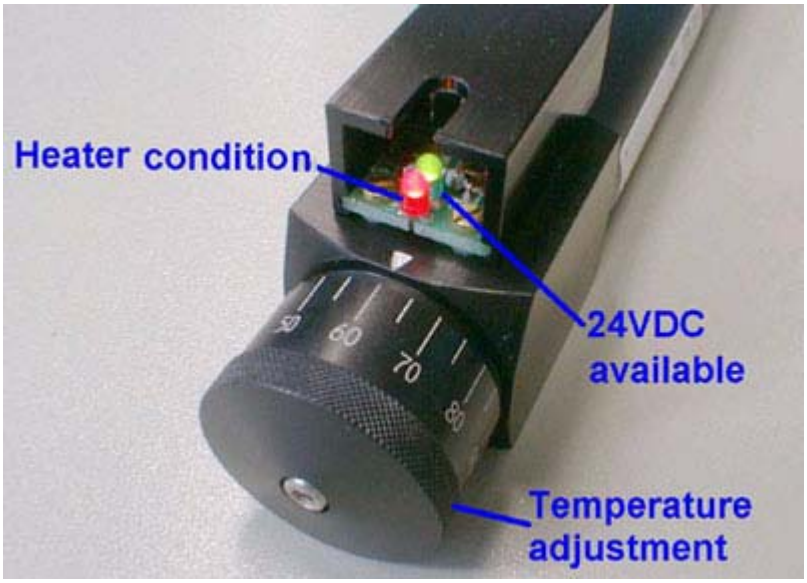

Figure 3.6. Location of the B-ACS Heater LED's

Heat-up Time *3.6*

The heat-up time for the sample is dependant on the temperature change required and the mass of the sample. The following diagrams are examples of typical heat-up times for oil in 5 and 10 mm sample tubes.

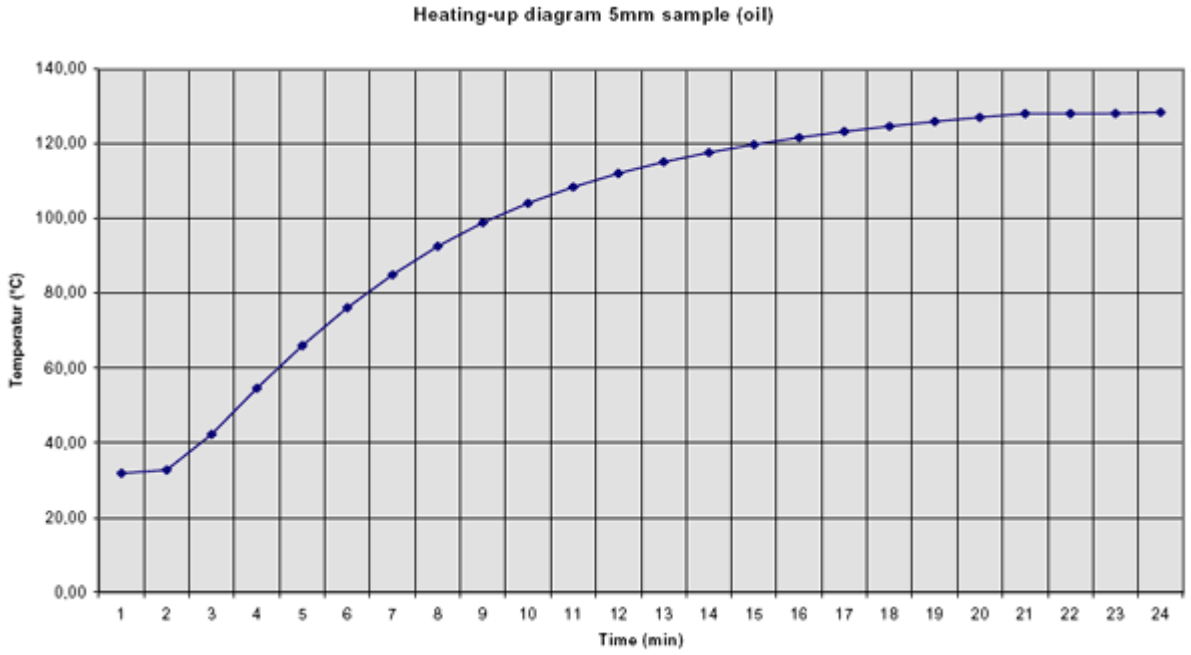

Figure 3.7. Graph Showing Heat-up Time for 5 mm Samples

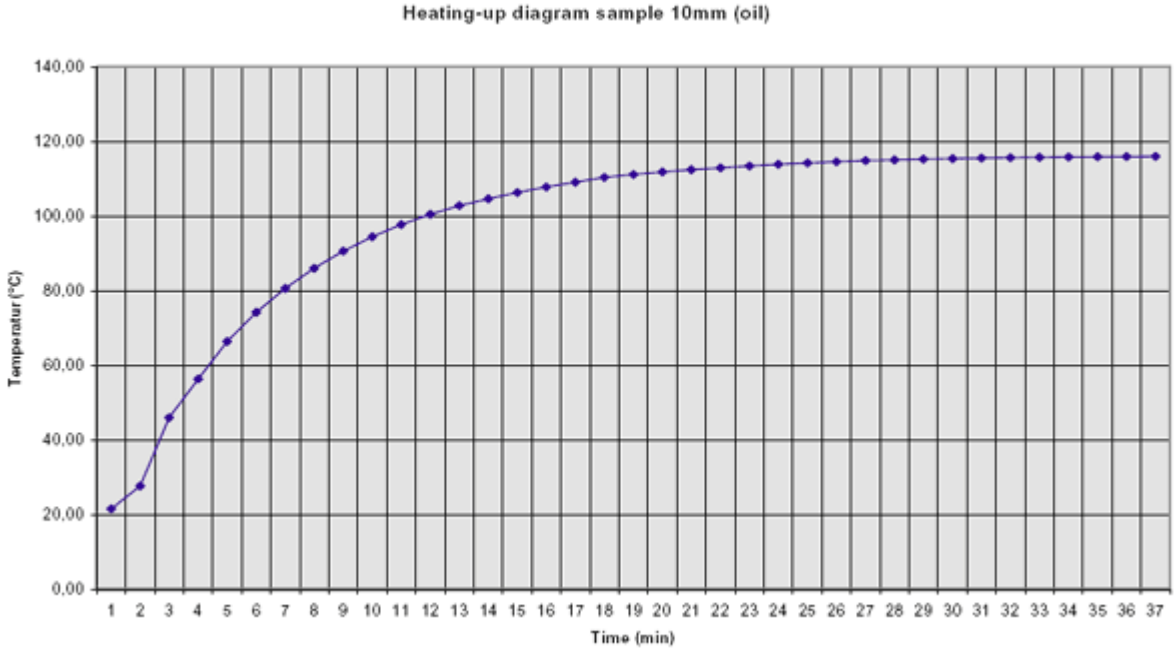

Figure 3.8. Graph Showing Heat-up Time for 10 mm Samples

Technical Data 4

Power Supply Requirements 4.1

Input Voltage Range:	90-264 VAC
Input Frequency Range:	47 - 440 Hz
Power Consumption:	max. 400 VA
Standby Consumption:	approx. 3 VA
Inrush Current:	<15A at 25°C and 264 VAC (cold start)
Output Voltage:	26 VDC (with remote sense and over-voltage protection)
Output Current:	max. 16 A (with over-current protection)
Degree of pollution:	2
Over voltage category:	2

Fuse Protection 4.2

Fast-acting (not user accessible)

Noise Level 4.3

Emitted noise level:	< 60 dB (A)

B-ACS Sample Heaters 120C (H1385) Requirements 4.4

Input Voltage:	24 - 26 VDC
Input Current:	approx. 250 mA
Temperature Range:	+30°C - +120°C (86°F - 248°F)
Temperture Tolerance:	+/- 5%
Max. Sample Diameter:	10 mm

Environmental Requirements *4.5*

B-ACS heater should only be used:

- in a standard laboratory environment;
- up to a height of 2,000 meters;
- at a temperature of 15 to 35°C;
- where the highest relative humidity of 80% for temperatures to 31°C, linear decreasing to 67% relative humidity to 35°C.

B-ACS Heater should only be stored in an area:

- similar to a laboratory environment;
- with a temperature range of 5 to 40°C;
- where the highest relative humidity of 80% for temperatures to 31°C, linear decreasing to 50% relative humidity to 40°C.

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